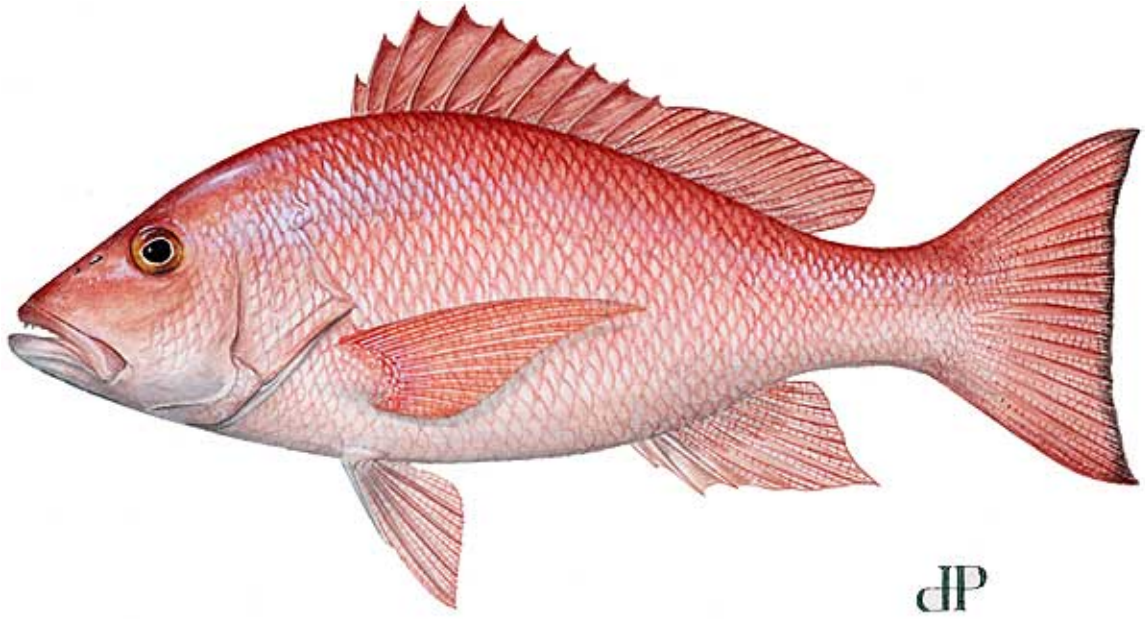
Draft Environmental Assessment

# Interim Measures to Address Overfishing of Red Snapper in the South Atlantic Region



Prepared By: NOAA Fisheries Service
Southeast Regional Office
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## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| ACL | Annual Catch Limits |
| ACT | Annual Catch Targets |
| AM | Accountability Measures |
| B | A measure of stock biomass in either weight or other appropriate unit |
| $B_{MSY}$ | The stock biomass expected to exist under equilibrium conditions when fishing at $F_{MSY}$ |
| $B_{OY}$ | The stock biomass expected to exist under equilibrium conditions when fishing at $F_{OY}$ |
| $B_{CURR}$ | The current stock biomass |
| CEA | Cumulative Effects Analysis |
| CS | Consumer Surplus |
| DEIS | Draft Environmental Impact Statement |
| EA | Environmental Assessment |
| EEZ | Exclusive Economic Zone |
| EFH | Essential Fish Habitat |
| EFH-HAPC | Essential Fish Habitat - Habitat Area of Particular Concern |
| EIS | Environmental Impact Statement |
| ESA | Endangered Species Act of 1973 |
| F | A measure of the instantaneous rate of fishing mortality |
| $F_{40\%SPR}$ | Fishing mortality that will produce a static SPR = 40%. |
| $F_{CURR}$ | 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 |
| FONSI | Finding of No Significant Impact |
| FTE | Full time Equivalent |
| M | Natural mortality rate |
| MARFIN | Marine Fisheries Initiative |
| MARMAP | Marine Resources Monitoring Assessment and Prediction Program |
| MFMT | Maximum Fishing Mortality Threshold |
| MMPA | Marine Mammal Protection Act of 1972 |
| MRFSS | Marine Recreational Fisheries Statistics Survey |
| MSFCMA | Magnuson-Stevens Fishery Conservation and Management Act |
| MSST | Minimum Stock Size Threshold |
| MSY | Maximum Sustainable Yield |
| NEPA | National Environmental Policy Act of 1969 |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NOR | Net operating Revenue |
| OFL | Overfishing Limit |

| | |
|---|---|
| OY | Optimum Yield |
| PS | Producer Surplus |
| R | Recruitment |
| RIR | Regulatory Impact Review |
| SAFE Report | Stock Assessment and Fishery Evaluation Report |
| SAMFC | South Atlantic Fishery Management Council |
| SDDP | Supplementary Discard Data Program |
| SEDAR | Southeast Data, Assessment, and Review |
| SEFSC | Southeast Fisheries Science Center |
| SERO | Southeast Regional Office |
| SSC | Scientific and Statistical Committee |
| TL | Total length |
| $T_{MIN}$ | The length of time in which a stock could rebuild to $B_{MSY}$ in the absence of fishing mortality |
| USCG | U.S. Coast Guard |

**INTERIM RULE TO THE FISHERY MANAGEMENT PLAN FOR THE SNAPPER-GROUPER FISHERY OF THE SOUTH ATLANTIC REGION**

**INCLUDING A DRAFT ENVIRONMENTAL ASSESSMENT AND DRAFT REGULATORY IMPACT REVIEW**

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| | |
|---|---|
| **Proposed actions:** | **Seasonal closure to immediately address overfishing of red snapper.** |
| **Lead agency:** | EA - NOAA Fisheries Service |
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## ABSTRACT

This draft environmental assessment analyzes management measures to immediately reduce overfishing of red snapper in the South Atlantic region. These measures are needed because the South Atlantic Fishery Management Council (Council) was notified by National Marine Fisheries Service (NMFS) on July 8, 2008, that red snapper are overfished and experiencing overfishing. According the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Stevens Act), council's have one year from the date of notification to develop and implement management measures to end overfishing. The Council is developing permanent management measures in Amendment 17 to end overfishing of red snapper but Amendment 17 will not be ready for implementation by summer 2009.

The measures analyzed in this document include: No action; a four month seasonal closure of the red snapper fishery; and a seasonal closure for the length of the interim rule (180 days with the possible extension for 186 days).

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## Summary

### Purpose and Need

The SAFMC was notified on July 8, 2008, that red snapper in the South Atlantic region are undergoing overfishing and are overfished according to the current definition of the minimum stock size threshold. The Magnuson Stevens Act requires the Council to prepare a plan amendment or proposed regulations to end overfishing within one year of notification that a stock is overfished. The Council has directed staff to develop a fishery management plan amendment that would establish management measures to end overfishing and rebuild the red snapper stock. However, the amendment (Amendment 17) is currently under development and is not expected to be implemented by summer 2009.

Immediate, short-term, and focused federal action is needed to address overfishing of red snapper in the South Atlantic region while these long-term management measures are developed and implemented. The purpose of the federal action analyzed in this environmental assessment is to immediately reduce total commercial and recreational fishing mortality on red snapper in the South Atlantic region to address overfishing of the species with minimal adverse social and economic consequences, and maximal administration and enforcement efficiency while permanent management measures are being developed to red snapper overfishing in Amendment 17.

Description of Alternatives

**Alternative 1: No action**

Implement no changes to current regulations for the harvest of red snapper.

**Alternative 2: No harvest of red snapper in the EEZ of Florida, Georgia, North Carolina and South Carolina.**

Establish interim regulations that would establish a seasonal closure of the red snapper fishery for 180 days that applies to both the commercial and recreational sectors; during which no fishing for and/or possession of red snapper would be allowed.

**Alternative 3: Four month seasonal closure**

Establish interim regulations that would immediately implement (upon publication of notice in the *Federal Register*) a four month closure of the red snapper fishery that applies to both commercial and recreational sectors; during which no harvest or possession of red snapper would be allowed.

For a person on board a vessel for which a federal commercial or charter/headboat permit for the South Atlantic snapper-grouper fishery has been issued, provisions proposed in

Alternatives 2 and 3 would apply regardless of whether the fish are harvested in state or federal waters.

Affected Environment

The affected environment of the proposed action includes the EEZ off of the coasts of North Carolina, South Carolina, Florida, and Georgia. The biological environment is described in Section 3.0. A description of the human environment is provided in Section 3.4.

Environmental Consequences

A complete analysis of the environmental impacts of these alternatives is included in Section 4.0.

*Biological Impacts*

**Alternative 1**, the status quo, would not provide relief to the red snapper population and the stock would continue to experience overfishing. If the interim rule was implemented on June 1, 2009, **Alternative 2** would prohibit recreational and commercial harvest of red snapper during June through November, which includes the period of peak spawning and when 46% of the landings have occurred in recent years (Tables 4-11 and 4-12). The biological effect of **Alternative 2** would be greater than **Alternative 3**, which would close fishing for or retention of red snapper during June through September when 30% of landing have historically occurred.

*Economic Impacts*

Under **Alternative 1**, the status quo, both the red snapper commercial and recreational fisheries could continue to operate as it currently does, with no short term reductions in the number of harvested fish, trips taken, or changes in economic value. Because the resource is overfished, however, these conditions would not be expected to persist, nor could they legally be allowed to continue. Under **Alternative 2 and 3,** fishermen would likely suffer reductions in revenue. The impacts are likely to be more severe under **Alternative 2** compared to **Alternative 3** due to the length of the closed season.

*Social Impacts*

**Alternative 1**, the no action alternative, would have the least impact in the short term. However, it would delay the recovery of red snapper in the long term, which may have deleterious impacts as management was extended over a longer period of time. Under **Alternatives 2 and 3**, fishermen harvesting red snapper would likely suffer reductions in catch and some reduction in revenue. This could have negative but possibly limited social effects for fishermen because these actions occur during a time of increasing

regulation and economic distress. The impacts would be more severe under **Alternative 2** rather than the seasonal closure under **Alternative 3**.

*Administrative Impacts*

**Alternative 1** would place no new administrative burden on the agency as current management measures would remain in place and no new management measures or enforcement burden would be created. **Alternative 2** would have a slightly higher enforcement burden as the closure would extend through the duration of the interim rule period (180 days with a possible extension for another 186 days) while **Alternative 3** would only be implemented for 4 months from the time of publication in the *Federal Register*.

# 1 Introduction

## 1.1 Background

Management of the federal snapper-grouper fishery located off the South Atlantic in the 3-200 nautical mile (nm) U.S. Exclusive Economic Zone (EEZ) is conducted under the Fishery Management Plan for the Snapper-Grouper Fishery (SAFMC 1983) (Figure 1-1). The fishery management plan (FMP) and its amendments are developed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), other applicable federal laws, and executive orders (E.O.s) and affect the management of 73 species (Table 1-1). This document addresses the management of red snapper through the promulgation of an interim rule while permanent management measures can be developed to end overfishing of red snapper in the South Atlantic.

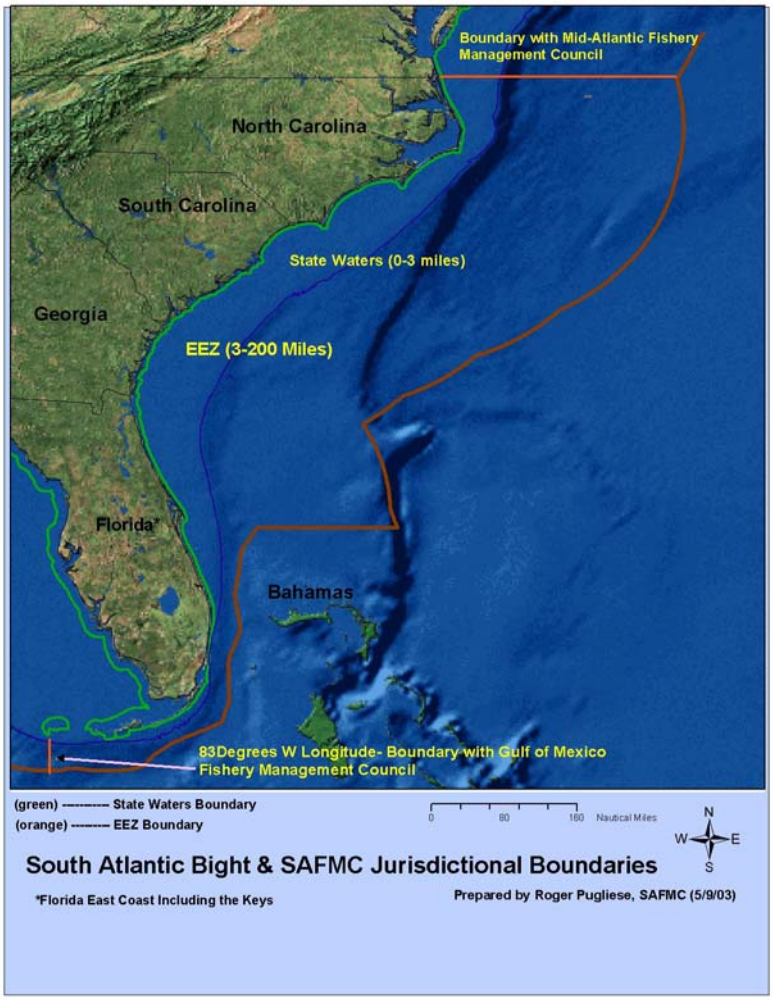



Figure 1-1. Jurisdictional boundaries of the South Atlantic Fishery Management Council.

Table 1-1. Species in the Snapper-Grouper Fishery Management Unit (FMU).

Almaco jack, *Seriola rivoliana*
Atlantic spadefish, *Chaetodipterus faber*
Banded rudderfish, *Seriola zonata*
Bank sea bass, *Centropristis ocyurus*
Bar jack, *Caranx ruber*
Black grouper, *Mycteroperca bonaci*
Black margate, *Anisotremus surinamensis*
Black sea bass, *Centropristis striata*
Black snapper, *Apsilus dentatus*
Blackfin snapper, *Lutjanus buccanella*
Blue runner, *Caranx crysos*
Blueline tilefish, *Caulolatilus microps*
Bluestriped grunt, *Haemulon sciurus*
Coney, *Cephalopholis fulva*
Cottonwick, *Haemulon melanurum*
Crevalle jack, *Caranx hippos*
Cubera snapper, *Lutjanus cyanopterus*
Dog snapper, *Lutjanus jocu*
French grunt, *Haemulon flavolineatum*
Gag, *Mycteroperca microlepis*
Golden tilefish, *Lopholatilus chamaeleonticeps*
Goliath grouper, *Epinephelus itajara*
Grass porgy, *Calamus arctifrons*
Gray (mangrove) snapper, *Lutjanus griseus*
Gray triggerfish, *Balistes capriscus*
Graysby, *Cephalopholis cruentata*
Greater amberjack, *Seriola dumerili*
Hogfish, *Lachnolaimus maximus*
Jolthead porgy, *Calamus bajonado*
Knobbed porgy, *Calamus nodosus*
Lane snapper, *Lutjanus synagris*
Lesser amberjack, *Seriola fasciata*
Longspine porgy, *Stenotomus caprinus*
Mahogany snapper, *Lutjanus mahogoni*
Margate, *Haemulon album*
Misty grouper, *Epinephelus mystacinus*
Mutton snapper, *Lutjanus analis*
Nassau grouper, *Epinephelus striatus*
Ocean triggerfish, *Canthidermis sufflamen*
Porkfish, *Anisotremus virginicus*
Puddingwife, *Halichoeres radiatus*
Queen snapper, *Etelis oculatus*
Queen triggerfish, *Balistes vetula*
Red grouper, *Epinephelus morio*
Red hind, *Epinephelus guttatus*
Red porgy, *Pagrus pagrus*
Red snapper, *Lutjanus campechanus*
Rock hind, *Epinephelus adscensionis*
Rock Sea Bass, *Centropristis philadelphica*
Sailors choice, *Haemulon parra*
Sand tilefish, *Malacanthus plumieri*
Saucereye porgy, *Calamus calamus*
Scamp, *Mycteroperca phenax*
Schoolmaster, *Lutjanus apodus*
Scup, *Stenotomus chrysops*
Sheepshead, *Archosargus probatocephalus*
Silk snapper, *Lutjanus vivanus*
Smallmouth grunt, *Haemulon chrysargyreum*
Snowy grouper, *Epinephelus niveatus*
Spanish grunt, *Haemulon macrostomum*
Speckled hind, *Epinephelus drummondhayi*
Tiger grouper, *Mycteroperca tigris*
Tomtate, *Haemulon aurolineatum*
Yellow jack, *Caranx bartholomaei*
Yellowedge grouper, *Epinephelus flavolimbatus*
Yellowfin grouper, *Mycteroperca venenosa*
Yellowmouth grouper, *Mycteroperca interstitialis*
Yellowtail snapper, *Ocyurus chrysurus*
Vermilion snapper, *Rhomboplites aurorubens*
Warsaw grouper, *Epinephelus nigritus*
White grunt, *Haemulon plumieri*
Whitebone porgy, *Calamus leucosteus*
Wreckfish, *Polyprion americanus*

## 1.2 Fishery Conservation and Management Authority

The Magnuson–Stevens Fishery Conservation and Management Act (MSA, *et seq*.) serves as the principal Federal statute authorizing the management of fisheries and resources within the United States Exclusive Economic Zone (EEZ). The MSA invests the authority of fishery resource management in the Secretary of Commerce (Secretary), who is advised by eight regional fishery management councils. Each council has authority over fisheries in its specific region and provides management recommendations to National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) for fisheries in their particular region. The Secretary delegates fishery management authority to NMFS.

For each fishery that requires conservation and management, or that requires data collection, councils are chiefly responsible for the preparation of fishery management plans (FMP) and amendments as needed (MSA Sec. 302(h)). Councils transmit these FMPs to NMFS for review and approval, partial approval, or disapproval. If approved, NMFS implements the FMP or amendment through regulations (MSA Sec. 304), and NOAA and the US Coast Guard (USCG) enforce the regulations.

The Magnuson Stevens Act has provisions to allow for the promulgation of interim rules for the purpose of ending overfishing of species considered to be in an overfished condition. Interim rules are subject to the same National Environmental Policy Act requirements and must be consistent with other applicable laws. Interim rules can be made effective for 180 days and extended for 186 days, after a public comment period.

## 1.3 National Environmental Policy Act Requirements

All fishery management actions that NMFS implements are subject to the requirements of the National Environmental Policy Act (NEPA; 42 U.S.C. 4331, *et seq.*). NEPA provides a mandate and framework to consider all reasonably foreseeable environmental effects of proposed actions and to involve and inform the public in the decision-making process. NEPA compliance for fishery management actions is further guided by regulations issued by the Council on Environmental Quality, and those issued by NOAA Administrative Order 216-6, "Implementing the National Environmental Policy Act."

In compliance with NEPA, this document serves as an environmental assessment of a proposed interim federal action proposed by the South Atlantic Fishery Management Council (Council). The Council's jurisdiction encompasses EEZ waters around the States of Florida, Georgia, North Carolina and South Carolina. For this environmental assessment, the proposed interim federal action would be regulated under the Snapper-Grouper Fishery Management Plan (FMP), which is outlined in Section 1.1.

## 1.4 Purpose and Need

The SAFMC was notified on July 8, 2008, that red snapper in the South Atlantic region are undergoing overfishing and are overfished according the current definition of the minimum stock size threshold. The Magnuson Stevens Act requires the Council to prepare a plan amendment or

proposed regulations to end overfishing within one year of notification that a stock is overfished. The Council has directed Council staff to develop a fishery management plan amendment that would establish management measures to end overfishing and rebuild the red snapper stock. However, the amendment (Amendment 17) is currently under development and is not expected to be implemented by summer 2009.

Immediate, short-term, and focused federal action is needed to address overfishing of red snapper in the South Atlantic region while these long-term management measures are developed and implemented. The purpose of the federal action analyzed in this environmental assessment is to immediately, for the 2009 calendar year, reduce total commercial and recreational fishing mortality on red snapper in the South Atlantic region to address overfishing of the species with minimal adverse social and economic consequences, and maximal administration and enforcement efficiency. The red snapper interim rule would immediately address overfishing of red snapper while permanent management measures could be implemented that address the issue of overfishing in the long term.

## 1.5 Proposed Interim Federal Action

The proposed interim federal action is a seasonal prohibition in the harvest or retention of red snapper by commercial and recreational fishermen. For a person on board a vessel for which a federal commercial or charter vessel/headboat permit for the South Atlantic snapper-grouper fishery has been issued, the provisions of the closure would apply regardless of whether the fish are harvested in state of federal waters. This action, which would be effective upon notice in the *Federal Register*, is expected to coincide with the peak spawning season of red snapper and would address overfishing of red snapper while permanent management measures can be developed.

## 1.6 Related NEPA Documents in Development

*Amendment 16*

Amendment 16 to the Snapper-Grouper FMP is being developed and if approved, is expected to be implemented by summer 2009. Amendment 16 proposes measures to end overfishing of gag and vermilion snapper and reduce overfishing of black grouper and red grouper, protect shallow-water grouper species during their spawning season, establish status determination criteria for gag and vermilion snapper, and reduce bycatch of snapper-grouper species in the South Atlantic.

<u>Measures to End Overfishing</u>
Amendment 16 proposes to implement management measures which would be applied to the commercial and recreational sectors of the snapper-grouper fishery. These measures include: A four month spawning season closure of the recreational and commercial harvest of shallow-water grouper species including gag, black grouper, red grouper, scamp, rock hind, red hind, coney, graysby, yellowfin grouper, yellowmouth grouper, and tiger grouper; directed commercial quotas for gag and vermilion snapper; a reduction in the recreational bag limits for shallow-water

grouper species and vermilion snapper; and a seasonal closure for the recreational vermilion snapper fishery.

Set Fishing Parameters for Gag and Vermilion Snapper
Amendment 16 would implement new status determination criteria for gag and vermilion snapper, including maximum sustainable yield, optimum yield, and minimum stock size threshold, which reflect current scientific information as provided by stock assessments and approved by the Council's Scientific and Statistical Committee (SSC).

Reduce Bycatch of Snapper-Grouper Species
Amendment 16 proposes requiring the use of venting tools and dehooking devices to reduce bycatch mortality of incidentally caught snapper-grouper species.

A final Environmental Impact Statement (EIS) is integrated into Amendment 16. The NOA for the FEIS was published on December 24, 2008, with a comment period ending on February 23, 2009. The FEIS can be found at safmc.net. The proposed rule for Amendment 16 was published in the *Federal Register* on February 6, 2009 (74 FR 6257).

*Amendment 17 to the Snapper-Grouper FMP*

Amendment 17 is in development and is expected to be implemented by late 2009 or early 2010. Amendment 17 would establish annual catch limits (ACLs), annual catch targets (ACTs) and accountability measures (AMs) for species experiencing overfishing and rebuild the red snapper stock; modify management measures as needed to limit harvest to the ACL or ACT; specify status determination criteria for red snapper; and specify a rebuilding plan for red snapper.

Amendment 17 will contain an integrated EIS.

*Amendment 18 to the Snapper-Grouper FMP*

Amendment 18 is under development and was the subject of public scoping meetings in January and February 2009.
Amendment 18 may address the following changes to the management regime:
1) Limiting participation and effort in the golden tilefish fishery (possibly endorsements or limited access program);
2) Limiting participation and effort in the black sea bass pot fishery (possibly endorsements or limited access program);
3) Extending the range of the Snapper-Grouper fishery Management Plan north through the Mid-Atlantic and New England Council areas;
4) Separating the snowy grouper quota into regions/states;
5) Separating the gag recreational Annual Catch Limit (ACL) into region or state Annual Catch Targets (ACTs);
6) Changing the golden tilefish fishing year;
7) Improving data reporting;
8) Changing the wreckfish fishery Individual Transferable Quota (ITQ) program; and
9) Designating Essential Fish Habitat (EFH) in new areas in the Mid-Atlantic and New England as part of a possible extension of the Snapper-Grouper fishery Management Plan (FMP) north.

Amendment 18 will contain an integrated EIS.

*Comprehensive ACL Amendment*

The comprehensive ACL amendment is under development and was the subject of public scoping meetings in January and February 2009. The comprehensive ACL amendment will: Establish ACLs, ACTs and AMs for species not currently undergoing overfishing (includes snapper/grouper, mackerel, dolphin, wahoo, golden crab and other species); establish allocations between recreational, commercial, and for-hire sectors; limit total mortality (landings and discards); and address spiny lobster fishery issues.

The comprehensive ACL amendment will contain an integrated EIS.

## 1.7 History of Management

For a complete history of management of the snapper-grouper fishery, see Appendix 1. A brief history of management for the red snapper stock is described below and in Table 1-2.

In 1983, the Snapper-Grouper Fishery Management Plan established a 12" TL for red snapper to maximize the yield per recruit (SAFMC 1983). Because of concerns of red snapper overfishing, Amendment 4 (SAFMC 1991) increased the size limit of red snapper taken by recreational and commercial fishermen from 12" TL to 20" TL. As a result of this increased size limit SEDAR 15 (2008) indicates many more red snapper are being released by the recreational sector than are retained. Since release mortality rates are estimated to be 40% for the recreational sector and 90% for the commercial sector, the increased size limit many not have had the intended effect of enhancing stock status. SEDAR 15 (2008) indicates the large number if discards combined with high release mortality rates is one of the major factors contributing to overfishing of red snapper in the South Atlantic. 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 (For more information, see Section 4.1.3).

Table 1-2. History of management for red snapper.

| Description of Action | FMP/Amendment | Effective Date |
|---|---|---|
| 4" Trawl mesh size and 12" TL minimum size limit | Snapper-Grouper FMP | 8/31/1983 |
| Prohibit trawls | Snapper-Grouper Amend 1 | 1/12/1989 |
| Required permit to fish for, land or sell snapper grouper species | Snapper-Grouper Amend 3 | 1/31/1991 |
| Prohibited gear: fish traps except bsb traps north of Cape Canaveral, FL; entanglement nets; longline gear inside 50 fathoms; bottom onglines to harvest wreckfish; powerheads and bangsticks in designated SMZs off S. Carolina. Established 20" TL minimum size and a 10 snapper/person/day bag limit, excluding vermilion snapper, and allowing no more than 2 red snappers. | Snapper-Grouper Amend 4 | 1/1/1992 |

| | | |
|---|---|---|
| *Oculina* Experimental Closed Area. | Snapper-Grouper Amend 6 | 6/27/1994 |
| Limited entry program; transferable permits and 225 lb non-transferable permits. | Snapper-Grouper Amend 8 | 12/14/1998 |
| Vessels with longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish. | Snapper-Grouper Amend 9 | 2/24/1999 |
| Approved definitions for overfished and overfishing. MSST = [(1-M) or 0.5 whichever is greater]*$B_{MSY}$. MFMT = $F_{MSY}$ | Snapper-Grouper Amend 11 | 12/2/1999 |
| Extended for an indefinite period the regulation prohibiting fishing for and possessing snapper grouper species within the *Oculina* experimental Closed Area. | Snapper-Grouper Amend 13A | 4/26/2004 |

# 2 Alternatives Considered

Alternatives considered in detail, with the exception of the no action alternative, include management measures made under the snapper-grouper fishery management framework to address the purpose and need of the proposed interim federal action. That is, the following alternatives target an immediate reduction in red snapper harvest in the South Atlantic region for a portion of the 2009 calendar year.

Section 2.1 outlines alternatives considered by the Council in this interim rule and Section 2.2 provides a brief comparison of their environmental consequences (For a more in depth analysis of the alternatives, see Section 4.0).

## 2.1 Description of Alternatives

**Alternative 1: No action**
Implement no changes to current regulations for the harvest of red snapper.

**Alternative 2: No harvest of red snapper in the EEZ of Florida, Georgia, North Carolina and South Carolina.**
Establish interim regulations that would establish a seasonal closure of the red snapper fishery for 180 days that applies to both the commercial and recreational sectors; during which no fishing for and/or possession of red snapper would be allowed.

**Alternative 3: Four month seasonal closure**
Establish interim regulations that would immediately implement (upon publication of notice in the *Federal Register*) a four month closure of the red snapper fishery that applies to both commercial and recreational sectors; during which no harvest or possession of red snapper would be allowed.

For a person on board a vessel for which a federal commercial or charter/headboat permit for the South Atlantic snapper-grouper fishery has been issued, provisions proposed in Alternatives 2 and 3 would apply regardless of whether the fish are harvested in state or federal waters.

**History of the Action**

The Council received notification from NOAA Fisheries Service on July 8, 2008, that red snapper stock in the South Atlantic is experiencing overfishing and is in an overfished condition. The Magnuson Stevens Act requires a plan amendment or proposed regulations be prepared to end overfishing within on year of notification of an overfishing determination. As a result, the Council began to prepare Amendment 17 to the FMP to address overfishing limits (OFLs), annual catch limits, (ACLs), annual catch targets (ACTs), and accountability measures (AMs) of species experiencing overfishing, as well as a rebuilding plan and management measures to end overfishing of red snapper. It is anticipated the Council will approve Amendment 17 for review

by the Secretary in late 2009. The Council voted at the December 2008 meeting to not move forward with an interim rule on red snapper due to concern that the interim rule would sunset before permanent management measures could be implemented, resulting in a lack of continuity in management for the red snapper fishery.

The Council agreed to revisit the issue of a red snapper interim rule at the March 2009 Council meeting and may vote to request an interim rule from the NMFS. The EA is intended to implement interim measures to reduce fishing mortality of red snapper while permanent measures are developed by the Council in Amendment 17.

## 2.2 Comparison of Alternatives

Table 2-1. Summary of effects of alternatives under consideration.

| | **Alternatives** | | |
|---|---|---|---|
| | **Alternative 1. (No Action)**. | **Alternative 2: Closure of the red snapper fishery for the duration of the interim rule** | **Alternative 3: Four month spawning season closure of the red snapper fishery to coincide with spawning season.** |
| **Biological Impacts** | Negative on red snapper stocks which continue to experience overfishing. | Positive to the red snapper population as it provides longer possible timeframe of closure. May lead to higher rates of discards if fishing methods don't change. | Positive to the red snapper population as it ensures that harvest will be prohibited during spawning season which may lead to stronger recruitment in future years. May lead to higher rates of discards if fishing methods don't change. |
| **Economic Impacts** | In the short term, there will be no positive or negative impacts from this alternative. In the long run, the economic impacts will be negative. | Short-term: Negative due to 180 days (with possible extension of another 186 days) of lost fishing opportunities for red snapper. | Short term: Negative due to 4 months of lost fishing opportunities for red snapper. |
| **Social Impacts** | Short term: neither positive or negative; Long term: Highly negative. | Short term: minimal economic impacts may create social disruption due to current U.S. economic situation; Long term: Positive on fishing community and fishing sectors. | Short term: minimal economic impacts may create social disruption due to current U.S. economic situation; Long term: Positive on fishing community and fishing sectors. |
| **Administrative Impacts** | Short term: neither positive or negative; Long term: m ay lead to increased restriction in the future which will have negative administrative impacts. | Increased administrative and enforcement burden for longer period of time than Alternative 3. | Increased administrative and enforcement burden for longer period of time than Alternative 1. |

# 3 AFFECTED ENVIRONMENT

## 3.1 Introduction

This chapter describes the environmental resources that may be affected by the proposed interim federal action, under each of the alternatives identified in Chapter 2. For more information on the affected environment for the snapper-grouper fishery, see Amendment 15A to the Snapper-Grouper FMP for the South Atlantic Region (SAFMC, 2008).

## 3.1 *Habitat*

### 3.1.1 Inshore/Estuarine Habitat

Many deepwater snapper-grouper species utilize both pelagic and benthic habitats during several stages of their life histories; larval stages of these species live in the water column and feed on plankton. Most juveniles and adults are demersal and associate with hard structures on the continental shelf that have moderate to high relief (e.g., coral reef systems and artificial reef structures, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings). Juvenile stages of some snapper-grouper species also utilize inshore seagrass beds, mangrove estuaries, lagoons, oyster reefs, and embayment systems. In many species, various combinations of these habitats may be utilized during diurnal feeding migrations or seasonal shifts in cross-shelf distributions. More detail on these habitat types is found in Sections 3.2.1 and 3.2.2 of the Council's Habitat Plan (SAFMC 1998).

### 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 11° to 27° C ($52^{o}$ to $81^{o}$ F) due to the proximity of the Gulf Stream, with lower shelf habitat temperatures varying from 11° to 14° C ($52^{o}$ to $57^{o}$ 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 percent of the shelf is suitable habitat for these species. These live-bottom habitats may include low relief areas, supporting sparse to moderate growth of sessile invertebrates, moderate relief reefs from 0.5 to 2 meters (1.6 to 6.6 feet), or high relief ridges at or near the shelf break consisting of outcrops of rock that are heavily encrusted with sessile invertebrates such as sponges and sea fan species. Live-bottom habitat is scattered irregularly over most of the shelf north of Cape Canaveral, Florida, but is most abundant offshore from northeastern Florida. South of Cape Canaveral, the continental shelf narrows from 56 to 16 kilometers (35 to 10 miles) wide, thence reducing off the southeast coast of Florida and the Florida Keys. The lack of a large shelf area, presence of

extensive, rugged living fossil coral reefs, and dominance of a tropical Caribbean fauna are distinctive benthic characteristics of this area.

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

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

The distribution of coral and live hard bottom habitat as presented in the SEAMAP Bottom Mapping Project is a proxy for the distribution of the species within the snapper-grouper complex. The method used to determine hard bottom habitat relied on the identification of reef obligate species including members of the snapper-grouper complex. The Florida Fish and Wildlife Research Institute (FWRI), using the best available information on the distribution of hard bottom habitat in the south Atlantic region, prepared ArcView maps for the four-state project. These maps, which consolidate known distribution of coral, hard/live bottom, and artificial reefs as hard bottom, are included in Appendix E of the Habitat Plan (SAFMC 1998). These maps are also available on the Internet at the Council's following Internet Mapping System website: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm.

The South Carolina Department of Natural Resources, NOAA/Biogeographic Characterization Branch, and the South Atlantic Fishery Management Council cooperatively generated additional information on managed species' use of offshore fish habitat. Plots of the spatial distribution of offshore species were generated from the Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) data (Figures 35-41) in the Habitat Plan (SAFMC 1998). The plots should be considered as point confirmation of the presence of each species within the scope of the sampling program. These plots, in combination with the hard bottom habitat distributions presented in Appendix E of the Habitat Plan (SAFMC 1998), can be employed as proxies for offshore snapper-grouper complex distributions in the south Atlantic region. Maps of the distribution of snapper-grouper species by gear type based on MARMAP data can be generated through the Council's Internet Mapping System at the following web address: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm.

### 3.1.3 Essential Fish Habitat

Essential fish habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act as "those waters and substrates necessary to fish for spawning, breeding,

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

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

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

### 3.1.4 Habitat Areas of Particular Concern

Areas which meet the criteria for essential fish habitat-habitat areas of particular concern (EFH-HAPCs) for species in the snapper-grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; near shore hard bottom areas; The Point, The Ten Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump (South Carolina); mangrove habitat; seagrass habitat; oyster/shell habitat; all coastal inlets; all state-designated nursery habitats of particular importance to snapper-grouper (e.g., Primary and Secondary Nursery Areas designated in North Carolina); pelagic and benthic *Sargassum*; Hoyt Hills for wreckfish; the *Oculina* Bank Habitat Area of Particular Concern; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; and Council-designated Artificial Reef Special Management Zones (SMZs). Areas that meet the criteria for designating essential fish habitat-habitat areas of particular concern include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages).

In addition to protecting habitat from fishing related degradation though FMP regulations, the Council, in cooperation with NOAA Fisheries, actively comments on non-fishing projects or policies that may impact essential fish habitat. The Council adopted a habitat policy and procedure document that established a four-state Habitat Advisory Panel and adopted a comment and policy development process. With guidance from the Advisory Panel, the Council has developed and approved habitat policies on: energy exploration, development, transportation and

hydropower re-licensing; beach dredging and filling and large-scale coastal engineering; protection and enhancement of submerged aquatic vegetation; and alterations to riverine, estuarine and nearshore flows (Appendix C of Habitat Plan; SAFMC 1998).

## 3.2 *Biological/Ecological Environment*

### 3.2.1 Species Most Impacted By This FMP Amendment

Red Snapper *Lutjanus campechanus*

The red snapper is found from North Carolina to the Florida Keys, and throughout the Gulf of Mexico to the Yucatan (Robins and Ray 1986). It can be found at depths from 10 to 190 m (33-623 ft). Adults usually occur over rocky bottoms. Juveniles inhabit shallow waters and are common over sandy or muddy bottom habitat (Allen 1985).

The maximum size reported for this species is 100 cm (39.7 in) TL (Allen 1985, Robins and Ray 1986) and 22.8 kg (50 lbs) (Allen 1985). Maximum reported age in the Gulf of Mexico is reported as 53 years by Goodyear (1995) and 57 years by Allman et al. (2002). For samples collected from North Carolina to eastern Florida, maximum reported age is 45 years (White and Palmer 2004). McInerny (2007) reports a maximum age of 54 years red snapper in the South Atlantic. Natural mortality (M) is estimated to be 0.078 using the Hoenig (1983) method with a maximum age of 53 years (SEDAR 15 2008). Manooch et al. (1998) estimated M at 0.25 but the maximum age in their study was 25 years (Manooch and Potts 1997).

Red snapper are gonochorists. In the U.S. South Atlantic Bight and in the Gulf of Mexico, Grimes (1987) reported that size at first maturity is 23.7 cm (9.3 in) FL. For red snapper collected along the Southeastern United States, White and Palmer (2004) found that the smallest mature male was 20.0 cm (7.9 in) TL, and the largest immature male was 37.8 cm (15 in) TL. 50% of males are mature at 22.3 cm (8.8 in) TL, while 50% of females are mature at 37.8 cm (15 in) TL. Males are present in 86% of age 1, 91% of age 2, 100% of age 3, 98% of age 4, and 100% of older age fish. Mature females are present in 0% of age 1, 53% of age 2, 92% of age 3, 96% of age 4, and 100% of older age individuals. Grimes (1987) found that the spawning season of this species varies with location, but in most cases occurs nearly year round. White and Palmer (2004) reported that the spawning season for female red snapper off the southeastern United States extends from May to October, peaking in July through September. Red snapper eat fishes, shrimps, crabs, worms, cephalopods, and some planktonic items (Szedlemayr and Lee 2004).

### 3.2.2 Red snapper assessment and stock status

Red snapper is overfished and experiencing overfishing. A statistical catch-at-age model (SCA) and a surplus-projection model (ASPIC) were considered in this assessment. Data used assessment consist of records of commercial catch for the handline (hook-and-line) and dive fisheries, logbook data from the recreational headboat fishery, and MRFSS survey data of the rest of the recreational sector. The bulk of landings of red snapper come from the recreational fishery, which have exceeded the landings of the commercial fishery by 2-3 fold over the assessment period. Total landings were variable, with a downward trend through the 1990s.

The fishing mortality (F) is compared to what the fishing mortality would be if the fishery were operating at the proxy level for maximum fishing (F40%). The ratio of F/F40% suggests a generally increasing trend from the 1950s through the mid-1980s, and since 1985 has fluctuated about a mean near 14. This indicates that overfishing has been occurring since 1960 at about 9 times the sustainable level, with the 2006 estimate of F/F40% at 7.658.

Estimated abundance-at-age shows truncation of the oldest ages from the 1950s into the 1980s; the age structure continues to be in a truncated condition. Fish of age 10 and above are practically non-existent in the population. Estimated biomass-at-age follows a similar pattern of truncation as seen in the abundance data. Total biomass and spawning biomass show nearly identical trends with a sharp decline during the 1950s and 1960s, continued decline during the 1970s, and stable but low levels since 1980. Numbers of age-1 fish have declined during the same period, however notably strong year classes occurred in 1983 and 1984, and again in 1998 and 1999.

[Note: Additional detail is presented in Section 4.]

### 3.2.3 Science Underlying the Management of Snapper-Grouper Species Most Impacted By This FMP Amendment

The status of red snapper has recently been assessed under the Southeast Data Assessment and Review (SEDAR) process in 2008. Results of that assessment indicate red snapper has been undergoing overfishing since the 1970s. There is some controversy with the results of the SEDAR assessment as many fishermen anecdotally report higher than normal catches of red snapper. These catches are thought to be due to a high recruitment in the past couple of years but do not point to a healthy red snapper stock. SEDAR and the SEFSC continue to support the determination that red snapper is overfished and experiencing overfishing. This information is based on the best available science.

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

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

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

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

#### 3.2.4 Other Affected Council-Managed Species

Red snapper are often incidentally caught while fishing for other snapper-grouper species such as red grouper, black grouper, black sea bass, gag, and vermilion snapper.

A prohibition of harvest of red snapper may increase fishing effort on these co-occurring species. However, Amendment 16 (under development) proposes management measures to restrict harvest of red grouper, black grouper and vermilion snapper. A detailed description of the life history of these species is provided in the Snapper-Grouper SAFE report (NMFS 2005).

## 3.3 *Protected Species in the Action Area*

*Endangered Species Act*

Species protected under the ESA occurring in the South Atlantic include five species of sea turtle (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); six species of marine mammals (sperm, sei, fin, blue, humpback, and North Atlantic right whale); the smalltooth sawfish; and two *Acropora* coral species (elkhorn [*Acropora palmata*] and staghorn [*A. cervicornis*]). Designated critical habitat for the northern right whale and *Acropora spp.* also occurs within the South Atlantic region. A more detailed description of the protected species found in the action area of the snapper-grouper fishery is contained in previous amendments (Amendment 13C (SAFMC 2006), Amendment 15A (SAFMC 2008a), Amendment 15B (SAFMC 2008b), and Amendment 16 (SAFMC, under development)) and is incorporated herein by reference.

The impacts of the South Atlantic snapper-grouper fishery on ESA-listed species were evaluated in a biological opinion on the continued authorization of snapper-grouper fishing under the South Atlantic Snapper-Grouper Fishery Management Plan and Amendment 13C (NMFS 2006). The opinion stated the fishery was not likely to adversely affect Northern right whale critical habitat, seabirds, or marine mammals . However, the opinion did state that the snapper-grouper fishery would adversely affect sea turtles and smalltooth sawfish.

NOAA Fisheries Service has also recently conducted an informal Section 7 consultation evaluating the impacts of the South Atlantic snapper-grouper fishery on ESA-listed *Acropora* species. The consultation concluded that the continued operation of the snapper-grouper fishery was not likely to adversely affect newly listed *Acropora* species.

*Acropora Critical Habitat*

On November 26, 2008, a final rule designating *Acropora* critical habitat was published in the *Federal Register* (73 FR 72210). In a consultation memorandum dated December 2, 2008, NOAA Fisheries Service concluded the continued authorization of the snapper-grouper fishery is not likely to adversely affect *Acropora* critical habitat pursuant to Section 7 of the ESA. The gear types used in the snapper-grouper fishery do not affect consolidated hard substrate or dead coral skeletons in any manner that would appreciably alter the biological or physical characteristics which make them suitable for larval settlement or coral regeneration.

*Marine Mammal Protection Act*

There are 31 different species of marine mammals that may occur in the EEZ of the South Atlantic region. All 31 species are protected under the MMPA and six are also listed as endangered under the ESA (i.e., sperm, sei, fin, blue, humpback, and North Atlantic right whales). There are no known interactions between the South Atlantic snapper-grouper fishery and marine mammals.

## 3.4 Human Environment

### 3.4.1 Description of the Fishery

A more detailed description of the snapper-grouper fishery is contained in previous amendments (Amendment 13C (SAFMC 2006), Amendment 15A (SAFMC 2008a), Amendment 15B (SAFMC 2008b), and Amendment 16 (SAFMC, under development)) and is incorporated herein by reference. The following sections summarize key information relevant to this amendment.

#### 3.4.1.1 Commercial Fishery

##### 3.4.1.1.1 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. The majority of the bandit fleet fishes 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. Most fluctuations in fishing effort in this fishery are a result of the weather. Trips can be limited during hurricane season and also during the winter months from December through March. Some fishermen stop bandit fishing to target king mackerel when they are running.

The use of bottom longlines is allowed north of St. Lucie Inlet, Florida, in depths greater than 50 fathoms. Bottom longline gear is used to target snowy grouper and golden tilefish. 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. The fishery is operated year long with little or no seasonal fluctuation barring hurricane disruption.

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. 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.

### 3.4.1.1.2 Landings, Ex-vessel Value, Price, and Effort

Landings of all species in the snapper-grouper management unit averaged 6.4 million pounds from 2003 through 2007, with an average annual dockside value of $13.0 million in current year dollars and $13.8 million in 2007 dollars (Table 3-3).[1] Since 1993, landings of snapper-grouper have exhibited a downward trend with year-to-year variation (Figure 3-1).

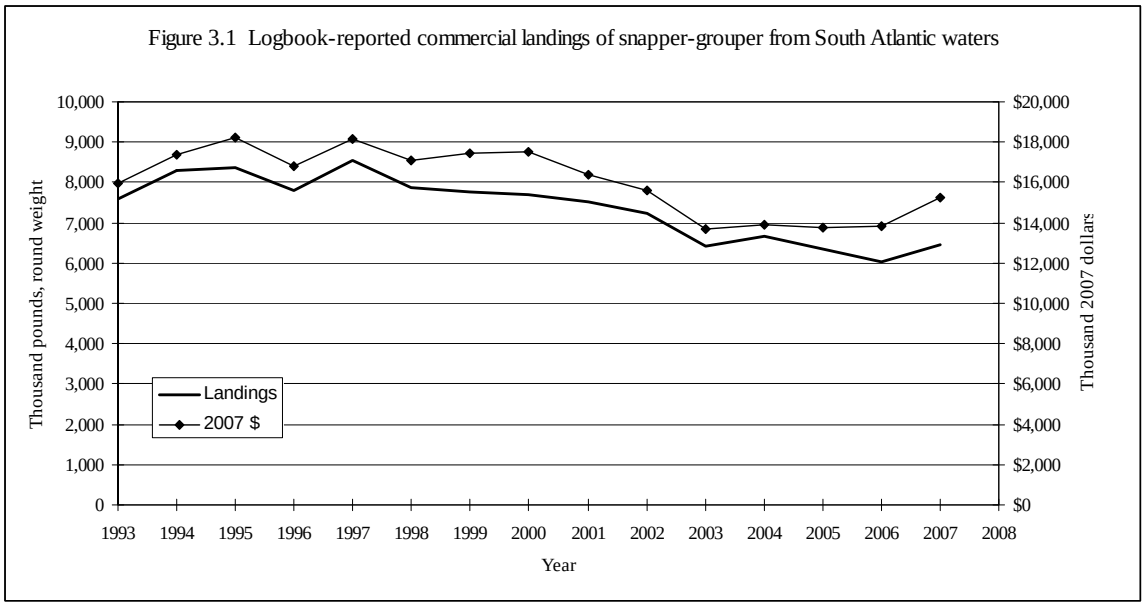



Figure 3.1 Logbook reported commercial landings of snapper-grouper from South Atlantic waters.

The shallow-water groupers and mid-shelf snappers are the largest species groups by volume and value within the snapper-grouper fishery. Vermilion snapper in the mid-shelf snapper group is

[1] Fishermen are required to report their landings by species by trip to NOAA Fisheries Service Southeast Fisheries Science Center logbook program. However, they do not report prices or revenues on their logbook sheets. Therefore, trip revenues were approximated as reported landings from individual logbook reports multiplied by average monthly prices for each species as calculated from the NOAA Fisheries Service Accumulated Landings System (ALS). To obtain values in 2007 dollars, the BLS Consumer Price Index for urban dwellers was used to adjust for the effects overall price inflation in the U.S. economy at the consumer level.

the largest volume species in the fishery, and accounts for 15% of total landings and 18% of dockside revenues on trips with at least one pound of snapper-grouper species. Gag is the largest volume shallow-water grouper, and accounts for 9% of total landings and 9% of dockside revenues on trips that landed at least one pound of snapper-grouper species. Fishermen also landed an average of 1.9 million pounds of

Table 3-3. Annual landings and dockside (ex-vessel) revenues for trips with at least one pound of species in the snapper-grouper fishery management unit in the South Atlantic, 2003-2007.

| Item | 2003 | 2004 | 2005 | 2006 | 2007 | Average |
|---|---|---|---|---|---|---|
| | Trips with at least one pound of snapper-grouper | | | | | |
| Landings of snapper-grouper, thousand pounds, whole wt | 6,471 | 6,693 | 6,365 | 6,112 | 6,528 | 6,434 |
| Dockside revenue from snapper-grouper, thousand current $ | $12,214 | $12,155 | $12,316 | $13,069 | $15,435 | $13,038 |
| Dockside revenue from snapper-grouper, thousand 2007 $ | $13,762 | $13,340 | $13,078 | $13,431 | $15,426 | $13,807 |
| Price/lb (whole wt) for snapper-grouper | $1.89 | $1.82 | $1.93 | $2.14 | $2.36 | $2.03 |
| BLS Producer price index for #2 diesel fuel, index=100 for 2007 | 43 | 54 | 80 | 92 | 100 | 67 |
| Landings of other species, same trips, thousand pounds | 2,092 | 1,651 | 1,751 | 2,116 | 2,122 | 1,946 |
| Dockside revenue from other species, same trips, thousand 2007 $ | $2,149 | $2,001 | $2,225 | $2,394 | $2,738 | $2,301 |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008, and Accumulated Landings System data base as of September 17, 2008. The BLS Consumer Price Index for all Urban Consumers was used to adjust dockside revenues and average annual prices for inflation.

non-snapper-grouper species worth $2.3 million in 2007 dollars on trips that landed at least one pound of species in the snapper-grouper management unit. These trips included trips that targeted species in the snapper-grouper management unit and trips that landed snapper-grouper species while targeting non-snapper-grouper species.

Landings and dockside revenues varied between 2003 and 2007 for species in the snapper-grouper management unit (Table 3-3). While lower in 2007 than in 2003, the numbers for trips, days away from port and vessels varied during 2003-2006 (Table 3-4). Part of the variation in snapper-grouper landings overall appears to be attributable to landings of vermilion snapper, which experienced a significant decline in 2003 due to unusually cold water temperatures in the summer and fall of 2003. Landings of vermilion snapper recovered in 2004 and 2005, declined in 2006, and recovered in 2007.

Table 3-4. Fishing effort and distribution of landings for trips with at least one pound of species in the snapper-grouper fishery management unit in the South Atlantic, 2003-2007.

| Item | 2003 | 2004 | 2005 | 2006 | 2007 | Average |
|---|---|---|---|---|---|---|
| | Trips with at least one pound of snapper-grouper | | | | | |
| Number of trips | 16,545 | 15,045 | 13,756 | 13,224 | 14,753 | 14,665 |
| Days away from port | 27,556 | 24,820 | 22,794 | 23,160 | 24,216 | 26,296 |
| Number of vessels landing snapper-grouper | 931 | 905 | 857 | 868 | 889 | 890 |
| Number of vessels landing 101-1,000 lbs of snapper-grouper | 245 | 225 | 242 | 258 | 261 | 246 |
| Number of vessels landing 1001-5000 lbs of snapper-grouper | 270 | 263 | 239 | 228 | 225 | 245 |
| Number of vessels landing 5,001-10,000 lbs of snapper-grouper | 104 | 96 | 86 | 64 | 86 | 87 |
| Number of vessels landing 10,001-50,000 lbs of snapper-grouper | 152 | 133 | 123 | 127 | 134 | 134 |
| Number of vessels landing more than 50,000 lbs of snapper-grouper | 20 | 32 | 29 | 27 | 28 | 27 |
| Number of permitted vessels | 1059 | 1001 | 909 | 874* | 877 | 944 |
| Number of vessels with transferable permits | 828 | 782 | 721 | 697* | 718 | 749 |
| Number of vessels with non-transferable permits | 231 | 219 | 188 | 177 | 159 | 195 |
| Number of dealer permits | 271 | 269 | 268 | 251 | | 265 |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008 and NOAA Fisheries Service, Southeast Regional Office permits database.
*The number of vessels with transferable permits seems low (697) in 2006, possibly because of database problems, which would affect both the estimate of the number of transferable permits and total permits for 2006.

The number of boats with snapper-grouper permits has exhibited a downward trend since 1999 (1,251 permits). There were 1,059 permits in 2003 and 877 in 2007 (Table 3-4). Two types of permits were created with the limited access program for the snapper-grouper fishery that was implemented in 1998. The number of transferable permits that allow an unlimited harvest per trip was 828 in 2003 and 718 in 2007 compared with 938 in 1999. The number of vessels with non-transferable permits with a 225-pound trip limit declined year-by-year from 313 in 1999 to 213 in 2003 and 159 in 2007. The number of transferable permits declined, in part, because new entrants into the fishery must buy two permits and retire one as the condition for entry into the fishery. Furthermore, it is likely hat the number of vessels in the snapper-grouper fishery declined for economic reasons. For example, fuel prices doubled between 2003 and 2005 and continued to increase through mid-2008. By contrast, average annual prices for species in the

snapper-grouper management unit were relatively flat (Table 3-3, average annual prices represented by the ratio of annual commercial revenues to landings in current year dollars). The number of fish dealers with permits to operate in the snapper-grouper fishery reached a maximum in 2003 (271) and has declined since then (Table 3-4).

From 2003 through 2007, an average of 890 boats averaged 14,665 trips per year on which at least one pound of snapper-grouper species was landed (Table 3-4). On average, 493 boats landed at least 1000 pounds of snapper-grouper species annually; 248 boats landed at least 5,000 pounds; 161 boats landed at least 10,000 pounds; and 27 boats landed at least 50,000 pounds of snapper-grouper species.

### 3.4.1.1.3 The South Atlantic Snapper-Grouper Fishery by State

The following discussion provides annual averages from 2003 to 2007. To maintain the confidentiality of individual reporting units, summaries are provided for regions defined as North Carolina, South Carolina, Georgia and northeast Florida combined, and central and south Florida combined. The northeast Florida region consists of trips landed in Nassau, Duval, and St. Johns Counties, and the central and south Florida region consists of trips landed from Flagler through Miami-Dade Counties and trips from Atlantic waters off the Florida Keys and landed in Monroe County.

The average annual quantities of snapper-grouper species harvested from 2003-2007 included 1.82 million pounds worth $3.74 million (in 2007 dollars) per year in North Carolina, 1.60 million pounds worth $3.80 million in South Carolina, 0.73 million pounds worth $1.65 million in Georgia and northeast Florida, and 0.79 million pounds worth $1.61 million in central and south Florida, and 1.50 million pounds worth $3.0 million in the Florida Keys (Table 3-5). Snapper-grouper landings by state were not proportional to total days fished in each state. Boats in central and south Florida, and the Florida Keys made 73% of the trips that landed species in the snapper-grouper management unit and accounted for 35% of the total snapper-grouper harvest. Conversely, boats in other states accounted for relatively larger portions of the total snapper-grouper harvest. Boats in North Carolina made 18% of the trips and landed 28% of the snapper-grouper harvest. Boats in South Carolina made 6% of the trips and landed 25% of the harvest. Boats in Georgia and northeast Florida made 32% of the trips and landed 12% of the snapper-grouper harvest. Boats in South Carolina and Georgia and northeast Florida took fewer but longer trips than their counterparts in North Carolina or central and south Florida and the Florida Keys.

Table 3-5. Average annual landings and dockside revenues for trips with at least one pound of species in the snapper-grouper fishery, averages for 2003-2007 by state.

| Item | North Carolina | South Carolina | Georgia and Northeast Florida | Central and South Florida | Florida Keys | South Atlantic |
|---|---|---|---|---|---|---|
| | Trips with at least one pound of snapper-grouper | | | | | |
| Snapper-grouper landings, thousand pounds, whole wt | 1,816 | 1,591 | 734 | 790 | 1,504 | 6,434 |
| Percentage of South Atlantic snapper-grouper landings, by state | 28% | 25% | 11% | 12% | 23% | 100% |
| Dockside revenue, snapper-grouper, thousand 2007 $ | $3,738 | $3,795 | $1,651 | $1,615 | $3,008 | $13,807 |
| Landings of other species, same trips, thousand lbs | 286 | 125 | 54 | 1,293 | 188 | 1,946 |
| Dockside revenue, other species, same trips, thousand 2007 $ | $389 | $182 | $123 | $1,406 | $202 | $2,301 |
| Number of boats* | 175 | 64 | 46 | 342 | 294 | 921 |
| Number of trips | 2,607 | 916 | 486 | 4,691 | 5,964 | 14,665 |
| Percent of trips | 18% | 6% | 3% | 32% | 41% | 100% |
| Number of days | 4,727 | 4,702 | 1,946 | 5,473 | 7,661 | 24,509 |
| Trips per boat | 14.9 | 14.2 | 10.6 | 13.7 | 20.3 | 15.9 |
| Days per trip | 1.8 | 5.1 | 4.0 | 1.2 | 1.3 | 1.7 |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008, and Accumulated Landings System data base as of September 17, 2008. The BLS Consumer Price Index for all Urban Consumers was used to adjust dockside revenues and average annual prices for inflation. *Some boats land in more than one area.

Gag and other shallow-water groupers and vermilion snapper and other mid-shelf snappers tend to be landed in North Carolina, South Carolina, and Georgia and northeast Florida, while jacks and shallow-water snappers tend to be landed in central and south Florida (Tables 3-6 and 3-7). The species groups that accounted for more than 10% of total landings and revenues in North Carolina include shallow-water groupers with nearly 24% of total pounds landed and nearly 34% of total revenues on trips with at least one pound of snapper-grouper species; black sea bass with 19% of total landings and 17% of total revenues; and mid-shelf snappers with 18% of total landings and 23% of total revenues. In South Carolina, the shallow-water groupers accounted for 32% of total pounds and 46% of total revenues, and the mid-shelf snappers accounted for 21% of total pounds and 23% of total revenues. In Georgia and northeast Florida, mid-shelf snappers accounted for 44% of total pounds and 51% of total revenues; shallow-water groupers accounted for 19% of total pounds and 27% of total revenues; and jacks accounted for 17% of total pounds and 7% of total revenues. In central and south Florida, coastal pelagics accounted for 49% of total pounds and 38% of total revenues, and jacks accounted for 12% of total pounds and 7% of total revenues, while tilefish accounted for 11% of total pounds and 17% of total revenue on trips with at least one pound of snapper-grouper species. Fishermen in central and south Florida tend to catch larger quantities of non-snapper-grouper species such as mackerels.

Table 3-6. Average annual landings (in thousands of pounds, whole weights) on trips that

landed at least one pound of snapper-grouper species: averages for 2003-2007, by state and species group.

| Item | North Carolina | | South Carolina | | Georgia and Northeast Florida | | Central and South Florida | | Florida Keys | | South Atlantic | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 lbs | col % | 1000 lbs | col % | 1000 lbs | col % | 1000 lbs | col % | 1000 lbs | col % | 1000 lbs | col % |
| Shallow-water groupers | 504 | 24% | 555 | 32% | 152 | 19% | 107 | 5% | 100 | 6% | 1,418 | 17% |
| Deep water groupers | 84 | 4% | 78 | 5% | 5 | 1% | 28 | 1% | 59 | 3% | 254 | 3% |
| Tilefish | 78 | 4% | 112 | 6% | 1 | 0% | 227 | 11% | 12 | 1% | 430 | 5% |
| Shallow-water snappers | 10 | 0% | 20 | 1% | 21 | 3% | 128 | 6% | 887 | 52% | 1,065 | 13% |
| Mid-shelf snappers | 375 | 18% | 366 | 21% | 347 | 44% | 33 | 2% | 15 | 1% | 1,136 | 14% |
| Triggerfish / Spadefish | 131 | 6% | 77 | 4% | 56 | 7% | 5 | 0% | 2 | 0% | 271 | 3% |
| Jacks | 111 | 5% | 159 | 9% | 132 | 17% | 240 | 12% | 406 | 24% | 1,047 | 12% |
| Grunts / porgies | 127 | 6% | 92 | 5% | 14 | 2% | 16 | 1% | 24 | 1% | 274 | 3% |
| Sea basses | 395 | 19% | 133 | 8% | 6 | 1% | 6 | 0% | 0 | 0% | 540 | 6% |
| Snapper-grouper | 1,816 | 86% | 1,591 | 93% | 734 | 93% | 790 | 38% | 1,504 | 89% | 6,434 | 77% |
| Coastal pelagics | 216 | 10% | 52 | 3% | 34 | 4% | 1,016 | 49% | 81 | 5% | 1,399 | 17% |
| Sharks | 9 | 0% | 19 | 1% | 6 | 1% | 195 | 9% | 77 | 5% | 306 | 4% |
| Tunas | 22 | 1% | 2 | 0% | 1 | 0% | 1 | 0% | 0 | 0% | 25 | 0% |
| Other | 39 | 2% | 54 | 3% | 13 | 2% | 81 | 4% | 30 | 2% | 217 | 3% |
| All species | 2,102 | 100% | 1,717 | 100% | 787 | 100% | 2,083 | 100% | 1,692 | 100% | 8,380 | 100% |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008.

Table 3-7. Average annual dockside revenues in thousands of 2007 dollars for trips that landed at least one pound of snapper-grouper species: averages for 2003-2007 by state and species group.

| Item | North Carolina | | South Carolina | | Georgia and Northeast Florida | | Central and Southeast Florida | | Florida Keys | | South Atlantic | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $1,000, 2007$ | col % | $1,000, 2007$ | col % | $1,000, 2007$ | col % | $1,000, 2007$ | col % | $1,000, 2007$ | col % | $1,000, 2007$ | col % |
| Shallow-water groupers | $1,404 | 34% | $1,847 | 46% | $475 | 27% | $338 | 11% | $272 | 8% | $4,336 | 27 % |
| Deep water groupers | $216 | 5% | $219 | 5% | $13 | 1% | $77 | 3% | $156 | 5% | $680 | 4% |
| Tilefish | $100 | 2% | $203 | 5% | $2 | 0% | $518 | 17% | $15 | 0% | $838 | 5% |
| Shallow-water snappers | $23 | 1% | $52 | 1% | $51 | 3% | $330 | 11% | $2,112 | 66% | $2,567 | 16 % |
| Mid-shelf snappers | $969 | 23% | $933 | 23% | $909 | 51% | $100 | 3% | $37 | 1% | $2,947 | 18 % |
| Triggerfish / Spadefish | $109 | 3% | $62 | 2% | $48 | 3% | $4 | 0% | $2 | 0% | $225 | 1% |
| Jacks | $106 | 3% | $161 | 4% | $126 | 7% | $223 | 7% | $396 | 12% | $1,011 | 6% |
| Grunts / porgies | $122 | 3% | $90 | 2% | $18 | 1% | $16 | 1% | $20 | 1% | $266 | 2% |
| Sea basses | $689 | 17% | $229 | 6% | $10 | 1% | $10 | 0% | $0 | 0% | $937 | 6% |
| Snapper-grouper | $3,738 | 91% | $3,795 | 95% | $1,651 | 93% | $1,615 | 53% | $3,008 | 94% | $13,807 | 86 % |
| Coastal pelagics | $299 | 7% | $100 | 3% | $66 | 4% | $1,139 | 38% | $104 | 3% | $1,708 | 11 % |
| Sharks | $4 | 0% | $11 | 0% | $2 | 0% | $78 | 3% | $23 | 1% | $118 | 1% |
| Tunas | $44 | 1% | $4 | 0% | $1 | 0% | $2 | 0% | $0 | 0% | $50 | 0% |
| Other species | $42 | 1% | $67 | 2% | $55 | 3% | $187 | 6% | $75 | 2% | $425 | 3% |
| All species | $4,127 | 100 % | $3,977 | 100 % | $1,775 | 100 % | $3,020 | 100 % | $3,210 | 100 % | $16,108 | 100 % |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008, and Accumulated Landings System data base as of September 17, 2008. The BLS Consumer Price Index for all Urban Consumers was used to adjust dockside revenues and average annual prices for inflation.

### 3.4.1.1.4 The South Atlantic Snapper-Grouper Fishery by Gear

The following discussion provides annual averages from 2003 to 2007. To maintain the confidentiality of individual reporting units, summaries are provided for vertical lines, longlines, black sea bass pots, and all other gears combined. The all-other-gear category includes trolling lines, nets, and other gears.

Most of the snapper-grouper harvest, including vermilion snapper and gag, is taken by some type of vertical hook-and-line gear. The exceptions include black sea bass, which is harvested primarily with black sea bass pots and golden tilefish and yellowedge grouper, which are harvested primarily

with bottom longlines. Some species, such as snowy grouper, are harvested by both vertical lines and longlines. Longlines also are used in the shark fishery and may catch species in the snapper-grouper management unit as secondary species.

The average quantities of snapper-grouper species harvested from 2003-2007 included 5.18 million pounds worth $11.31 million (in 2007 dollars) per year with vertical lines, 0.41 million pounds worth $0.90 million with longlines, 0.12 million pounds worth $0.17 million with black sea bass pots, and 0.51 million pounds worth $0.86 million with other gears (Table 3-8). Trips with vertical lines accounted for 78% of all trips that landed species in the snapper-grouper management unit and 82% of the total snapper-grouper harvest. Trips with longlines tend to be longer than trips with other gears. Longline trips accounted for 2% of the trips and 6% of the snapper-grouper harvest. Trips with black sea bass pots represented 5% of the trips and accounted for 2% of the harvest, while trips with other gears represented 11% of the trips and 8% of the harvest.

Table 3-8. Annual landings and dockside revenues for trips with at least one pound of species in the snapper-grouper fishery by primary gear, 2003-2007

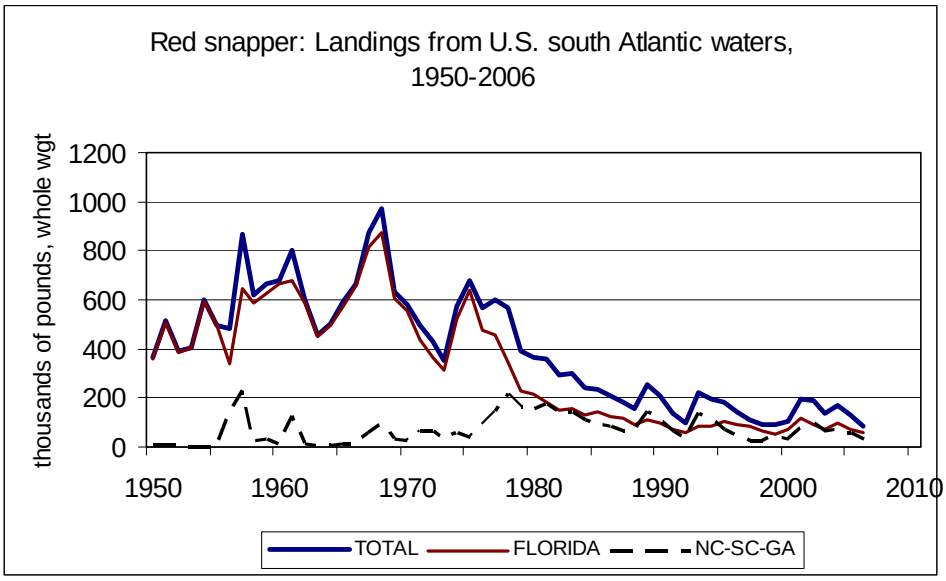
| Item | Diving | Hook & Line | Longline | Traps | Other gear | Total |
|---|---|---|---|---|---|---|
| | Trips with at least one pound of snapper-grouper | | | | | |
| Landings of snapper-grouper, thousand pounds, whole weight | 219 | 5,185 | 408 | 116 | 506 | 6,434 |
| Percentage of landings | 3% | 81% | 6% | 2% | 8% | 100% |
| Revenue, snapper-grouper, thousand 2007 $ | $571 | $11,314 | $895 | $168 | $861 | $13,807 |
| Percentage of 2007 $ | 4% | 82% | 6% | 1% | 6% | 100% |
| Landings of other species, same trips, thousand pounds | 49 | 674 | 265 | 941 | 17 | 1,946 |
| Percentage of landings, other | 3% | 35% | 14% | 48% | 1% | 100% |
| Revenue from other species, same trips, thousand 2007 $ | $191 | $958 | $153 | $980 | $19 | $2,301 |
| Percentage of total | 8% | 42% | 7% | 43% | 1% | 100% |
| Number of boats* | 65 | 723 | 27 | 50 | 245 | 1,110 |
| Number of trips | 648 | 11,405 | 246 | 690 | 1,676 | 14,665 |
| Percent of trips | 4% | 78% | 2% | 5% | 11% | 100% |
| Number of days | 920 | 19,910 | 924 | 944 | 1,811 | 24,509 |
| Trips per boat | 10.0 | 15.8 | 9.0 | 13.8 | 6.8 | 13.2 |
| Days per trip | 1.4 | 1.7 | 3.8 | 1.4 | 1.1 | 1.7 |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008, and Accumulated Landings System data base as of September 17, 2008. The BLS Consumer Price Index for all Urban Consumers was used to adjust dockside revenues and average annual prices for inflation. *Some boats employ more than one gear.

### 3.4.1.1.5 The Commercial Fishery for Red Snapper

A small commercial fishery for red snapper along the Atlantic coast has existed at least since 1902 when 155,000 pounds were landed, primarily in Georgia.[2] The fishery continued at relatively low levels until after World War 2. Landings jumped to approximately 250,000 pounds in 1945 and 363,000 pounds in 1950. Landings fluctuated along a generally increasing trend through 1968 when they peaked at 974,000 pounds, and then declined to less than 100,000 pounds in 2006 (Figure 3-2). Commercial landings of red snapper averaged 540,000 pounds per year from 1950-1959, 678,000 pounds per year from 1960-1969, 524,000 pounds per year from 1970-1979, 259,000 pounds per year from 1980-1989, and 147,000 pounds per year from 1990-2000.

Figure 3-2. Commercial landings of red snapper, 1950-2006




Source: SEDAR 15.

Fishermen along the east coast of Florida dominated the commercial fishery for red snapper until the mid-1970s, and accounted for more than 90% of landings from 1950-1975 (Figure 3-2). Geographic expansion of the fishery occurred during the late 1970s. Landings increased in Georgia, South Carolina and North Carolina and declined in Florida. Since 1980, landings in Florida have averaged approximately 55% of the total fishery.

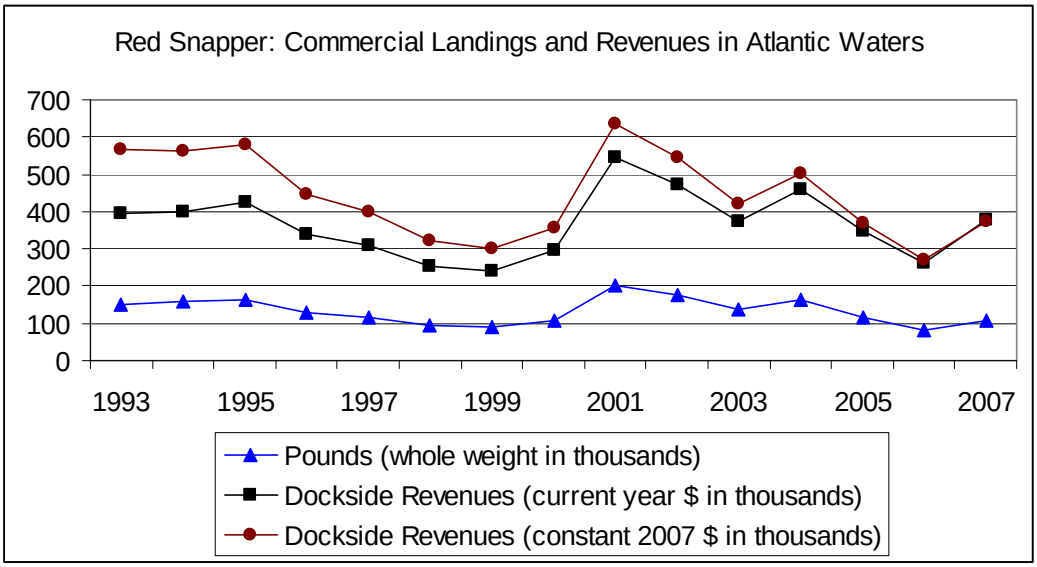
Logbook data provide additional details about the commercial fishery for red snapper.[3] Between 1993 and 2007, commercial landings of red snapper in federal waters ranged from a high of 202,000 pounds (whole weight) worth approximately $544,000 in current year dollars in 2001 to a low of 81,000 pounds worth $263,000 in 2006 (Figure 3-3). Preliminary data for 2007 indicate

[2] NOAA. 1990. Historical catch statistics: Atlantic and Gulf coast states, 1879-1989. Current Fishery Statistics 9010, NMFS Fishery Statistics Division, 107p.

[3] Fishermen with a permit to fish in Federal waters are required to submit a logbook report to the NMFS with information about landings, gear type, approximate location of trip and date of landing. Trip revenues were calculated as landings multiplied by average prices from the NMFS Accumulated Landings System. The logbook database does not include landings from trips in state waters by fishermen who do not have Federal permits.

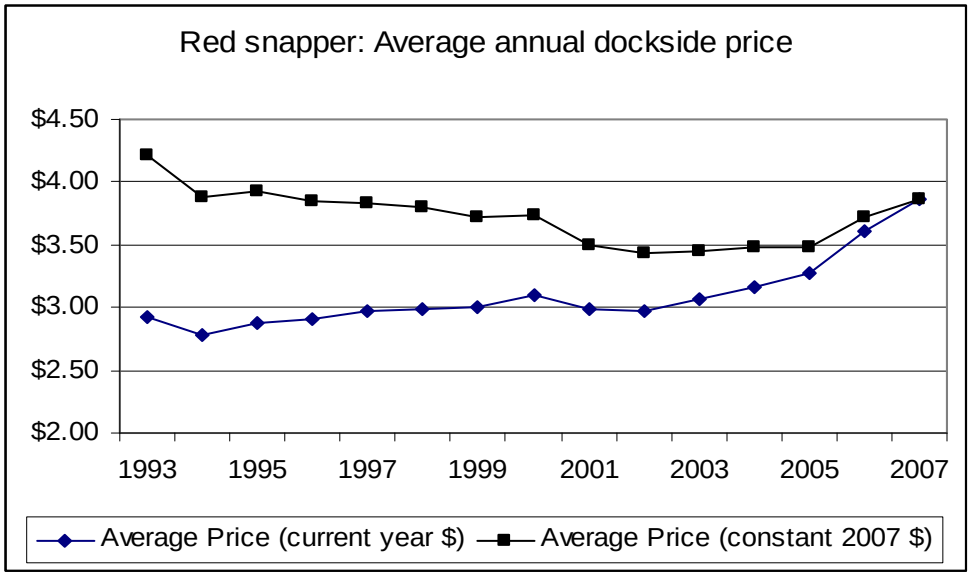
that commercial fishermen landed approximately 108,000 pounds of red snapper worth $377,000 in current year dollars. Dockside revenues and pounds landed fluctuate in the same direction, which suggests that ex-vessel demand is price elastic. The policy implication is that regulations that reduce industry landings in the short-term are expected to reduce dockside revenues in the short-term. Conversely, dockside revenues are expected to increase over time if regulation successfully increases biomass and landings.

Figure 3-3. Annual landings and dockside revenues for red snapper, 1993-2007.



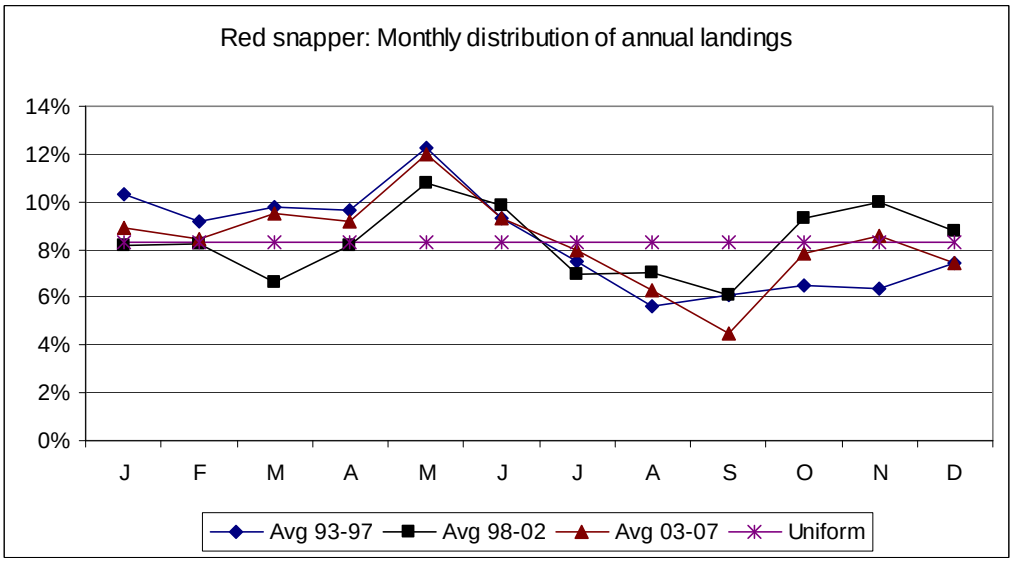

Average annual dockside prices for red snapper increased steadily in current year dollars (Figure 3-4). However, prices in constant 2007 dollars (after adjusting for the effects of inflation as measured by the consumer price index for all urban consumers) declined through 2002 before increasing in 2006 and 2007.

Figure 3-4. Average annual dockside prices for red snapper, in current dollars and 2007 dollars.




Although the seasonal distribution of landings varied from 1993-2007, landings tend to be highest in May and lowest in September (Figure 3-5). During the 5-year period from 2003-2007, landings were above average from March through June, below average in August and September, and about average between October and February when compared to a uniform distribution of landings throughout the year.

Figure 3-5. Seasonal distribution of red snapper landings, 1993-2007.




On average between 2003 and 2007, 220 vessels reported 1,385 trips that landed at least one pound of red snapper (Table 3-9). These trips totaled an annual average of 121,000 pounds of red snapper worth $364,000 in current year dollars, and produced an average of 8.26 million pounds of other species worth $14.85 million. Clearly, red snapper was not the primary revenue species on most of these trips. An average of 102 vessels landed less than 100 pounds of red

snapper per year, 84 vessels landed between 101 and 1000 pounds of red snapper per year, and 34 vessels landed more than 1000 pounds of red snapper per year.

Table 3-9. Annual landings, dockside revenues and fishing effort, trips and boats with landings of at least one pound of red snapper, 2003-2007.

| Item | 2003 | 2004 | 2005 | 2006 | 2007 | Average |
|---|---|---|---|---|---|---|
| | Trips and boats with at least one pound of red snapper | | | | | |
| Number of trips with at least one pound of red snapper | 1,639 | 1,476 | 1,341 | 1,153 | 1,315 | 1,385 |
| Landings of red snapper, thousand pounds, whole weight | 136 | 161 | 117 | 81 | 108 | 121 |
| Dockside revenue from red snapper, thousand current $ | $374 | $459 | $346 | $263 | $377 | $364 |
| Dockside revenue from red snapper, thousand 2007 $ | $422 | $505 | $368 | $271 | $376 | $388 |
| Dockside price, current $ / pound | $2.76 | $2.85 | $2.95 | $3.25 | $3.49 | $3.02 |
| Landings of all species, same trips, thousand pounds | 2,252 | 2,292 | 2,199 | 1,679 | 2,059 | 2,096 |
| Dockside revenue, all species, same trips, thousand 2007 $ | $5,190 | $5,105 | $4,969 | $3,990 | $5,131 | $4,877 |
| Dockside revenue, all species, all trips, same boats, thousand 2007 $ | $9,448 | $8,886 | $8,992 | $9,286 | $12,286 | $9,780 |
| Number of boats that landed red snapper | 236 | 217 | 216 | 206 | 225 | 220 |
| Number of boats landing 1-100 lbs per year of red snapper | 106 | 87 | 97 | 106 | 114 | 102 |
| Number of boats landing 101-1000 lbs per year of red snapper | 91 | 86 | 86 | 74 | 81 | 84 |
| Number of boats landing more than 1,000 lbs per year of red snapper | 39 | 44 | 33 | 26 | 30 | 34 |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008, and Accumulated Landings System data base as of September 17, 2008. The BLS Consumer Price Index for all Urban Consumers was used to adjust dockside revenues and average annual prices for inflation.

Red snapper is part of the mid-shelf snapper-grouper complex that includes scamp, gag, vermilion snapper, red porgy, gray triggerfish and red grouper, among other species. Red snapper was the primary source of trip revenue on an average of 163 trips per year (Table 3-10) and a lesser source of revenue on 1,222 trips per year (Table 3-11). Therefore, red snapper was the primary source of trip revenue on less than 12% of the total number of trips on which they were landed. These trips accounted for approximately 30% of the total commercial harvest of red snapper, with an annual average of 38,000 pounds of red snapper worth $117,000 in current dollars and 49,000 pounds of other species worth $96,000 (Table 3-10). Trips with red snapper as a lesser source of revenue accounted for an annual average of 82,000 pounds of red snapper worth $247,000 in current dollars and 8.2 million pounds of other species worth $14.7 million (Table 3-11). Red snapper were most commonly caught on trips with vermilion snapper, gag or

scamp as the primary revenue species on the trip. Red snapper were landed primarily from South Carolina through central Florida, with approximately 45% of the catch occurring in Georgia and northeast Florida (Table 3-12). Trips with vertical lines as the primary gear accounted for nearly 90% of red snapper landings (Table 3-12).

Table 3-10. Annual landings and dockside revenues on trips with red snapper as the top source of trip revenue, 2003-2007.

| Item | 2003 | 2004 | 2005 | 2006 | 2007 | Average |
|---|---|---|---|---|---|---|
| | Trips with red snapper as the top source of trip revenue | | | | | |
| Trips | 172 | 198 | 157 | 140 | 149 | 163 |
| Boats | 80 | 76 | 66 | 58 | 61 | 68 |
| Landings of red snapper on trips with red snapper as the top source of revenue, thousand pounds | 43 | 58 | 29 | 27 | 35 | 38 |
| Dockside revenue for red snapper on trips with red as the top source of revenue, thousand 2007 $ | $134 | $183 | $91 | $93 | $125 | $125 |
| Landings of other species, same trips | 63 | 75 | 38 | 29 | 41 | 49 |
| Dockside revenue for other species, same trips, thousand 2007 $ | $133 | $153 | $78 | $66 | $86 | $103 |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008, and Accumulated Landings System data base as of September 17, 2008. The BLS Consumer Price Index for all Urban Consumers was used to adjust dockside revenues and average annual prices for inflation.

Table 3-11. Annual landings and dockside revenues on trips with red snapper as a lesser source of trip revenue, 2003-2007.

| Item | 2003 | 2004 | 2005 | 2006 | 2007 | Average |
|---|---|---|---|---|---|---|
| | Trips with red snapper as a lesser source of trip revenue | | | | | |
| Trips | 1,467 | 1,278 | 1,184 | 1,013 | 1,166 | 1,222 |
| Boats | 224 | 204 | 199 | 191 | 213 | 206 |
| Landings of red snapper on trips with red snapper as a lesser source of revenue, thousand pounds | 93 | 103 | 89 | 54 | 73 | 82 |
| Dockside revenues for red snapper on trips with red snapper as a lesser source of revenue, thousand 2007 $ | $288 | $321 | $277 | $178 | $251 | $263 |
| Landings of other species, same trips | 2,053 | 2,057 | 2,044 | 1,569 | 1,910 | 1,927 |
| Dockside revenue for other species, same trips, thousand 2007 $ | $4,635 | $4,447 | $4,524 | $3,653 | $4,669 | $4,386 |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008, and Accumulated Landings System data base as of September 17, 2008. The BLS Consumer Price Index for all Urban Consumers was used to adjust dockside revenues and average annual prices for inflation.

Table 3-12. Annual landings of red snapper for trips with at least one pound of red snapper, by region and primary gear, 2003-2007.

| | 2003 | 2004 | 2005 | 2006 | 2007 | Average |
|---|---|---|---|---|---|---|
| | Trips with at least one pound of red snapper | | | | | |
| Red snapper caught off North Carolina, thousand pounds | 15 | 10 | 7 | 6 | 5 | 9 |
| Red snapper caught off South Carolina, thousand pounds | 37 | 43 | 38 | 20 | 25 | 33 |
| Red snapper caught off Georgia and northeast Florida, thousand pounds | 65 | 90 | 46 | 34 | 52 | 58 |
| Red snapper caught off central and southeast Florida, thousand pounds | 16 | 16 | 23 | 17 | 25 | 19 |
| Red snapper caught off Florida Keys, thousand pounds | 3 | 1 | 2 | 4 | 1 | 2 |
| Red snapper caught with vertical lines, thousand pounds | 122 | 147 | 103 | 72 | 90 | 107 |
| Red snapper caught with dive gear, thousand pounds | 11 | 13 | 11 | 7 | 16 | 12 |
| Red snapper caught with other gear, thousand pounds | 3 | 1 | 2 | 2 | 1 | 2 |

Source: NOAA Fisheries Service, Southeast Fisheries Science Center logbook database as of September 22, 2008.

### 3.4.1.1.6 Average Annual Total Dockside (Ex-vessel) Revenues

As seen in Table 3-4, the number of vessels permitted to operate in the snapper-grouper fishery from 2003-2007 ranged from 1,059 vessels to 877 vessels (recall that, although the number of vessels in 2006 was lower than the 2007 total, this is likely due to unidentified data problems because under the limited access program for this fishery the number of permitted vessels cannot increase from year to year), or an average of 955 vessels per year (it is noted that this average may be low due to the 2006 data issues). However, over the 2004-2006 fishing years, an average of only 717 vessels per year that were permitted to operate in the fishery actually recorded snapper-grouper sales (SAFMC 2008a). The average annual dockside (ex-vessel) value of snapper-grouper sold by these vessels was approximately $12.96 million (nominal dollars), while the value of all other species sold by these vessels was approximately $14.33 million (nominal dollars), or total average annual revenues of approximately $27.29 million. The average annual dockside revenue per vessel from the sales of all marine species for this period was approximately $38,000.

The transference of the revenues from the bag limit sales prohibition of Amendment 15B (SAFMC 2008a) to the federal commercial snapper-grouper sector is expected to result in an estimated increase of approximately $3,400 per vessel if compatible regulations are adopted by all states, and from approximately $2,300 to $2,700 if no states adopt compatible regulations. As a result, the average annual dockside revenue per vessel from the sales of all marine species is estimated increase to approximately $40,000 to $41,000 if Amendment 15B is implemented. Conversely, the management measures in Amendment 16 (SAFMC 2008b) are projected to

reduce the net revenues to the snapper-grouper fleet as a result of the proposed gag and vermilion snapper management measures by approximately $2,700 per vessel. However, because this estimate is a reduction in net revenues (net of certain operating costs) rather than gross ex-vessel revenues, it cannot be directly deducted from the estimated average revenues per vessel already listed. It can, however, be concluded that the expected average reduction in dockside revenues per vessel as a result of Amendment 16 is expected to be greater than $2,700 and the resultant average annual dockside revenue per vessel in the snapper-grouper fishery is expected to be less than $38,000.

It should be noted that Tables 3-4 and 3-5 contain information on the numbers of vessels that harvested snapper-grouper over the period 2003-2007 (an average of 944 vessels per year), as well as total average annual dockside revenues from snapper-grouper ($13.8 million) and all other species harvested on these trips ($2.3 million). Combining these figures results in an average annual dockside revenue of approximately $17,000 per vessel, a value that is considerably lower than the $38,000 discussed above. The lower value, however, was derived from an analysis of federal logbook data, whereas the higher value was derived from an analysis of state trip ticket data (each of the South Atlantic states manage their own trip ticket programs). Federal logbooks are not required for all fisheries that a vessel may participate in, whereas state trip tickets require the reporting of all marine harvests and sales landed in that state. Thus, the trip ticket data is the more appropriate source of information on total revenues from the sale of marine species. However, a comparable analysis of state trip ticket data for 2003-2007 is not available and the 2004-2006 results are currently the best available information.

#### 3.4.1.1.7 Economic Impacts of the Commercial Fishery

Estimates of the output (sales) and job (full time equivalent (FTE)) impacts of the commercial snapper-grouper or red snapper fishery are not available. USDOC (2009) contains estimates of the economic impacts of the 2006 South Atlantic commercial fishing industry, but these estimates are for all commercial fisheries combined and are not delineated by species or species group. Also, the results for Florida reflect the economic impact of commercial fishing for the entire state and not just eastern Florida. Overall, the South Atlantic commercial fishing industry (including all of Florida) in 2006 generated approximately $6.486 billion in total sales impacts and approximately 131,000 total employment impacts. Additionally, the South Atlantic commercial fishing industry generated approximately $3.542 billion in total income impacts in 2006. While estimates of the impacts of the snapper-grouper fishery are not available, it is noted that revenues from all snapper-grouper species comprised approximately four percent of the total revenues from all commercial landings in 2006, with shrimp, blue crab, and flounder, in order, the top revenue species.

#### 3.4.1.1.8 Imports

Imports have been a major source of seafood supply in the U.S., and the domestic snapper-grouper market is not an exception. For the period 2003-2006, imports of fresh and frozen snappers and groupers have stayed relatively high, averaging approximately 44.7 million pounds (Table 3-13), compared to the average South Atlantic snapper-grouper landings for the same period of 6.77 million pounds (Table 3-3). Clearly, imports dominate the snapper-grouper market. At an annual average of $79.2 million for the years 2001-2006, imports dwarf the

average annual $12.99 million dockside value of South Atlantic snapper-grouper landings. Dominance of imports in the snapper-grouper market may be expected to limit the movement of domestic ex-vessel prices that may result from changes in domestic landings of snappers and groupers as a result of management change.

Table 3-13. U.S. imports of snappers and groupers, 2001-2006.

| YEAR | Pounds of imports by product form Millions of pounds* | | | Value of imports by product form Millions of dollars | | |
|---|---|---|---|---|---|---|
| | FRESH | FROZEN | TOTAL | FRESH | FROZEN | TOTAL |
| 2001 | 31.1 | 8.4 | 39.4 | $51.7 | $10.6 | $62.3 |
| 2002 | 33.4 | 9.2 | 42.6 | $57.1 | $12.3 | $69.5 |
| 2003 | 34.3 | 10.2 | 44.5 | $58.9 | $14.4 | $73.3 |
| 2004 | 33.3 | 9.8 | 43.1 | $61.7 | $13.9 | $75.6 |
| 2005 | 35.9 | 13.8 | 49.7 | $72.0 | $21.0 | $93.0 |
| 2006 | 35.2 | 13.4 | 48.6 | $78.8 | $22.9 | $101.7 |
| Average | 33.9 | 10.8 | 44.7 | $63.4 | $15.9 | $79.2 |

Source: NOAA Fisheries, Foreign Trade Database.
*Weights are not converted to equivalent whole weights.

### 3.4.1.2 Recreational Fishery

The recreational fishery is comprised of the private and for-hire sectors. 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. The type of service, from a vessel- or passenger-size perspective, affects the flexibility to search different fishing locations during the course of a trip and target different species since larger concentrations of fish are required to satisfy larger groups of anglers.

#### 3.4.1.2.1 Harvest

Recreational snapper-grouper harvest in the South Atlantic was variable during the period 2003-2007, averaging slightly below 11million pounds (Table 3-14). On average, the private/shore mode of fishing accounted for the largest harvests at around 7.23 million pounds (MP). Over the same period, the charterboat sector harvested an average of 1.97 MP per year and the headboat sector harvested 1.69 MP. Harvests by state also fluctuated during the same period (Table 3-15). On average, Florida accounted for most of the snapper-grouper harvest in the South Atlantic at approximately 6.83 MP per year, followed by North Carolina (2.07 MP), South Carolina (1.41 MP), and Georgia (0.64 MP).

Table 3-14. Harvest of snapper-grouper species by mode in the South Atlantic, 2003-2007.

| Year | Charterboat[1] | Headboat[2] | Shore and Private/Rental Boat[1] | Total |
|---|---|---|---|---|
| 2003 | 2,301,303 | 1,375,688 | 7,265,886 | 10,942,877 |
| 2004 | 1,517,384 | 1,889,010 | 6,688,596 | 10,094,990 |
| 2005 | 2,313,468 | 1,649,210 | 6,123,049 | 10,085,727 |
| 2006 | 1,998,902 | 1,648,405 | 7,282,328 | 10,929,635 |
| 2007 | 1,697,350 | 1,893,031 | 8,777,570 | 12,367,950 |
| Average | 1,965,681 | 1,691,068 | 7,227,485 | 10,884,235 |

Source: The Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab and MRFSS database, NOAA Fisheries, NMFS, SERO.

[1] Pounds of A and B1 fish estimated from the MRFSS Survey.

[2] The total annual estimate of headboat catch derived from data collected through the NMFS headboat survey.

Table 3-15. Harvest of snapper-grouper species by state in the South Atlantic, 2003-2007.

| Year | Florida | Georgia | South Carolina | North Carolina |
|---|---|---|---|---|
| 2003 | 7,848,011 | 770,993 | 1,042,157 | 1,281,714 |
| 2004 | 5,970,816 | 763,609 | 1,625,212 | 1,735,353 |
| 2005 | 6,696,212 | 622,302 | 852,105 | 1,915,107 |
| 2006 | 6,474,221 | 746,982 | 1,466,944 | 2,241,489 |
| 2007 | 7,173,255 | 320,927 | 2,079,880 | 3,199,767 |
| Average | 6,832,503 | 644,962 | 1,413,259 | 2,074,686 |

Source: The Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab and MRFSS database, NOAA Fisheries, NMFS, SERO.

Recreational red snapper harvest in the South Atlantic is presented in Tables 3-16 and 3-17. On average, over 2003-2007, the private/rental sector has accounted for approximately 52 percent of read snapper harvests (Table 3-16). Within the for-hire mode, charterboats are the dominant sector. Over 80 percent of harvests, on average, occur in Florida (Table 3-17).

Table 3-16. Harvest of red snapper (pounds) by mode in the South Atlantic, 2003-2007..

| Year | Charterboat[1] | Headboat[2] | Private/Rental Boat[1] | Total |
|---|---|---|---|---|
| 2003 | 131,493 | 41,353 | 147,194 | 320,040 |
| 2004 | 120,797 | 80,348 | 173,139 | 374,284 |
| 2005 | 116,733 | 58,695 | 139,543 | 314,971 |
| 2006 | 100,460 | 41,431 | 138,924 | 280,815 |
| 2007 | 57,158 | 37,459 | 243,753 | 338,370 |
| Average | 105,328 | 51,857 | 168,511 | 325,696 |

Source: Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab and MRFSS database, NOAA Fisheries, NMFS, SERO.

[1] Pounds of A and B1 fish estimated from the MRFSS Survey. No recorded shore harvest.

[2] The total annual estimate of headboat catch derived from data collected through the NMFS headboat survey.

Table 3-17. Harvest of red snapper (pounds) by state in the South Atlantic, 2003-2007.

| Year | Florida | Georgia | North Carolina | South Carolina |
|---|---|---|---|---|
| 2003 | 250,216 | 8,757 | 14,275 | 46,791 |
| 2004 | 297,442 | 39,355 | 16,489 | 6,499 |
| 2005 | 253,227 | 36,276 | 11,313 | 20,183 |
| 2006 | 237,150 | 29,876 | 8,539 | 6,079 |
| 2007 | 300,114 | 15,350 | 2,962 | 21,200 |
| Average | 267,630 | 25,923 | 10,716 | 20,150 |

Source: Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab and MRFSS database, NOAA Fisheries, NMFS, SERO.

Combining the information in Tables 3-14 and 3-16 to examine the relative importance of red snapper recreational harvest to total snapper-grouper recreational harvest, the average annual red snapper harvest in terms of pounds landed over the period 2003-2007 accounted for approximately five percent, 3 percent, and 2 percent of the average annual total snapper-grouper harvest for the charterboat, headboat, and private angler sectors, respectively.

Bag composition analysis of the MRFSS data over this same period, demonstrates that, for all intercepted trips that caught red snapper, the most commonly caught species in terms of numbers of fish were black sea bass, vermilion snapper, red snapper, tomtate, and gray triggerfish (Table 3-18). These five species accounted for, on average, 72 percent of the total bag of all species. Other than sharpnose shark (approximately three percent; data not shown), no other species averaged more than two percent. It should be noted that these results reflect raw intercept fish counts and do not reflect any weighting as occurs in the generation of final harvest estimates. These species largely remain the top species when the data is examined by mode (sharpnose shark replaces gray triggerfish for the charterboat mode), however, the relative importance changes. For the private boat mode, the top three species are red snapper, black sea bass, and tomtate. For the charterboat sector, vermilion snapper is the most common species, followed by black sea bass, and red snapper.

Table 3-18. Bag composition for red snapper catch trips, 2003-2007.

| | All Modes | |
|---|---|---|
| Species | Number of Fish in Intercept* | Percent Total |
| Black Sea Bass | 6,094 | 23.30% |
| Vermilion Snapper | 5,966 | 22.81% |
| Red Snapper | 3,787 | 14.48% |
| Tomtate | 1,962 | 7.50% |
| Gray Triggerfish | 929 | 3.55% |
| | Charterboat | |
| Vermilion Snapper | 5,309 | 28.62% |
| Black Sea Bass | 4,570 | 24.64% |
| Red Snapper | 2,207 | 11.90% |
| Tomtate | 762 | 4.11% |
| Gray Triggerfish | 741 | 3.99% |
| | Private | |
| Red Snapper | 1,538 | 22.63% |

| | All Modes | |
|---|---|---|
| Species | Number of Fish in Intercept* | Percent Total |
| Black Sea Bass | 1,307 | 19.23% |
| Tomtate | 1,179 | 17.35% |
| Vermilion Snapper | 352 | 5.18% |
| Sharpnose Shark | 265 | 3.90% |

Source: MRFSS database, NOAA Fisheries, NMFS, SERO.
*The number of fish equal the recorded numbers of fish (measured or reported caught) in the raw intercept data and not extrapolated total catch of these species for the entire fishery.

An alternative bag composition analysis over the same 2003-2007 period (data not shown) examining all fish harvested on red snapper target trips (it should be noted that the results in the previous paragraph cover all red snapper catch trips) across all modes interestingly shows red snapper to comprise a lower proportion of total catch than on red snapper catch trips, ranging from a low of 2 percent in 2006 to a high of 10 percent in 2005. The most common alternative single or group species for red snapper target trips were vermilion snapper, ranging from a low of 16 percent in 2005 to a high of 41 percent in 2003, and bottom/reef fish, a group comprised of combined non-grouper or snapper reef fish species, of which black sea bass and grunts are likely the dominant species, ranging from a low of 25 percent in 2003 to a high of 53 percent in 2007. It would normally be expected that target anglers would be more successful than general fishermen in catching a particular species, but the available data in this case does not support this assumption. Evaluation by mode revealed similar results for red snapper, which comprised 1 percent (private mode, 2003) to 10 percent (both modes, multiple years) of the total bag, and reinforced the relatively greater importance of bottom/reef fish to private anglers (26 percent (2003) to 71 percent (2004) of the total bag) and vermilion snapper to charter anglers (23 percent (2005) to 53 percent (2004) of the total bag).

Similar evaluation of headboat data is not available. However, in addition to the information provided above which showed that total average annual red snapper harvests in terms of pounds landed from 2003-2007 accounted for approximately three percent of total snapper-grouper harvests, red snapper accounted for only approximately two percent of total harvests of all species (Table 3-19). In terms of pounds harvested, over this period, red snapper was the fifteenth most important species for the headboat sector.

Table 3-19. Average annual headboat harvests (1,000 pounds), 2003-2007.

| Species | Harvest LBS | Percent Total |
|---|---|---|
| Vermilion Snapper | 395.4 | 17.05% |
| King Mackerel | 194 | 8.37% |
| Black Sea Bass | 177.6 | 7.66% |
| White Grunt | 174.2 | 7.51% |
| Gray Triggerfish | 112.2 | 4.84% |
| Yellowtail Snapper | 102.4 | 4.42% |
| Greater Amberjack | 81 | 3.49% |
| Sharpnose Shark | 77.2 | 3.33% |
| Scamp | 73.2 | 3.16% |
| Gray Snapper | 72.6 | 3.13% |
| Gag | 69.6 | 3.00% |
| Little Tunny | 65.2 | 2.81% |

| Species | Harvest LBS | Percent Total |
|---|---|---|
| Red Porgy | 62.2 | 2.68% |
| Banded Rudderfish | 55.8 | 2.41% |
| Red Snapper | 51.9 | 2.24% |
| Red Grouper | 50.6 | 2.18% |
| All Species | 2,319 | 100.00% |

Source: Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab, NOAA Fisheries, NMFS, SERO.

### 3.4.1.2.2 Effort

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

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

Estimates of recreational effort for the entire snapper-grouper fishery in the South Atlantic for the shore, charterboat, and private boat modes were derived using the method described in Holiman (1996) and are provided in Table 3-20 for trips by mode and Table 3-21 for trips by state. The total column refers to the total number of trips taken by anglers in the South Atlantic snapper-grouper fishery and not to the sum of catch and target trips.

In the South Atlantic, total angler trips were highest for the shore mode, followed by the private mode, and then by the charter mode (Table 3-20). However, the average number of snapper-grouper catch trips was highest for the private mode and lowest for the charter mode. The same was true for snapper-grouper target trips. For the charter mode, both catch and target trips peaked in 2005 and decreased thereafter. Shore mode catch trips dropped from 2003 to 2004 but steadily increased thereafter; shore mode target trips fell from 2003 to 2005 and increased thereafter. Catch trips for the private mode fell in 2004 but increased thereafter, with relatively high levels in the last two years; target trips declined through 2005 and picked up in the last two years. Florida registered the highest total angler trips, followed in order by North Carolina, South Carolina, and Georgia (Table 3-21). The same pattern holds for catch trips but not for target trips. South Carolina registered slightly higher target trips than North Carolina.

Table 3-20. Recreational effort for the snapper-grouper fishery in the South Atlantic, in thousand trips, by mode, 2003-2007.

| | Charter Mode Trips | | | Shore Mode Trips | | | Private Mode Trips | | |
|---|---|---|---|---|---|---|---|---|---|
| | Catch | Target | Total | Catch | Target | Total | Catch | Target | Total |
| 2003 | 118 | 23 | 412 | 1,103 | 263 | 10,872 | 2,105 | 648 | 9,963 |
| 2004 | 129 | 28 | 418 | 987 | 209 | 11,186 | 1,985 | 477 | 9,488 |
| 2005 | 373 | 69 | 971 | 1,095 | 195 | 11,240 | 2,096 | 473 | 9,886 |
| 2006 | 285 | 68 | 834 | 1,276 | 272 | 12,511 | 2,603 | 530 | 10,749 |
| 2007 | 129 | 40 | 501 | 1,400 | 321 | 11,938 | 2,851 | 668 | 13,137 |
| Avg. | 207 | 45.6 | 627 | 1,172 | 252 | 11,549 | 2,328 | 559 | 10,644 |

Source: MRFSS database, NOAA Fisheries, NMFS, SERO.

Table 3-21. Recreational effort for the snapper-grouper fishery in the South Atlantic, in thousand trips, by state, 2003-2007.

| | Florida | | | Georgia | | | South Carolina | | | North Carolina | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Catch | Target | Total | Catch | Target | Total | Catch | Target | Total | Catch | Target | Total |
| 2003 | 2,860 | 723 | 11,444 | 92 | 46 | 971 | 143 | 86 | 2,098 | 231 | 80 | 6,733 |
| 2004 | 2,530 | 532 | 10,800 | 90 | 26 | 960 | 191 | 84 | 2,224 | 289 | 71 | 7,107 |
| 2005 | 2,835 | 579 | 12,200 | 96 | 28 | 859 | 178 | 60 | 2,188 | 454 | 70 | 6,849 |
| 2006 | 3,325 | 633 | 13,349 | 71 | 28 | 799 | 248 | 133 | 2,670 | 520 | 76 | 7,276 |
| 2007 | 3,807 | 784 | 15,169 | 104 | 20 | 926 | 137 | 109 | 2,529 | 332 | 116 | 6,951 |
| Avg. | 3,071 | 650 | 12,592 | 90 | 29 | 903 | 179 | 94 | 2,341 | 365 | 82 | 6,983 |

Source: MRFSS database, NOAA Fisheries, NMFS, SERO.

Red snapper catch and target effort is provided in Tables 3-22 and 3-23. Red snapper is not a significant target or catch species across the South Atlantic, with red snapper target effort accounting for less than one quarter of one percent, on average, of total recreational trips from 2003-2007, and red snapper catch effort accounting for less than one half of one percent of total recreational trips. The majority of both target and catch trips occurs in the private mode (Table 3-22), and a large majority of both types of trips occurs in Florida (Table 3-23).

Table 3-22. Recreational effort for the red snapper fishery in the South Atlantic, in thousand trips, by mode, 2003-2007.

| | Charter Mode Trips | | | Shore Mode Trips | | | Private Mode Trips | | |
|---|---|---|---|---|---|---|---|---|---|
| | Catch | Target | Total | Catch | Target | Total | Catch | Target | Total |
| 2003 | 17 | 3 | 412 | 1 | 6 | 10,872 | 47 | 34 | 9,963 |
| 2004 | 15 | 3 | 418 | 4 | 5 | 11,186 | 58 | 46 | 9,488 |
| 2005 | 16 | 2 | 971 | 1 | 2 | 11,240 | 57 | 28 | 9,886 |
| 2006 | 14 | 3 | 834 | 0 | 3 | 12,511 | 50 | 24 | 10,749 |
| 2007 | 12 | 3 | 501 | 2 | 5 | 11,938 | 103 | 49 | 13,137 |
| Avg. | 15 | 3 | 627 | 2 | 4 | 11,549 | 63 | 36 | 10,644 |

Source: MRFSS database, NOAA Fisheries, NMFS, SERO.

Table 3-23. Recreational effort for the red snapper fishery in the South Atlantic, in thousand trips, by state, 2003-2007.

| | Florida | | | Georgia | | | South Carolina | | | North Carolina | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Catch | Target | Total | Catch | Target | Total | Catch | Target | Total | Catch | Target | Total |
| 2003 | 59 | 43 | 11,444 | 1 | 0 | 971 | 3 | 0 | 2,098 | 1 | 0 | 6,733 |
| 2004 | 69 | 52 | 10,800 | 6 | 1 | 960 | 1 | 0 | 2,224 | 1 | 0 | 7,107 |
| 2005 | 67 | 31 | 12,200 | 5 | 1 | 859 | 1 | 0 | 2,188 | 1 | 0 | 6,849 |
| 2006 | 56 | 25 | 13,349 | 6 | 4 | 799 | 1 | 2 | 2,670 | 1 | 0 | 7,276 |
| 2007 | 106 | 45 | 15,169 | 7 | 1 | 926 | 4 | 12 | 2,529 | 0 | 0 | 6,951 |
| Avg. | 71 | 39 | 12,592 | 5 | 1 | 903 | 2 | 3 | 2,341 | 1 | 0 | 6,983 |

Source: MRFSS database, NOAA Fisheries, NMFS, SERO.

Similar analysis of recreational effort is not possible for the headboat sector because 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. Despite the inability to associate headboat effort with specific species, the stationary bottom nature of headboat fishing, as opposed to trolling, suggests that all headboat trips and, hence, angler days, are snapper-grouper trips by intent, though not necessarily success.

Headboat angler days are presented in Table 3-24. Due to confidentiality considerations, headboat effort data for Georgia were combined with Florida data. For the period 2003-2007, total headboat angler days fluctuated around the mean of 240,980 days. On average, Florida accounted for the largest number of angler days (164,492), or about 68 percent of all headboat angler days. Although all headboat angler days are presumed to target snapper-grouper species, similar to the effort results for the private and charter modes, headboat red snapper effort likely predominantly occurs in Florida waters.

Table 3-24. Estimate of headboat angler days for the U.S. South Atlantic.

| | Florida | South Carolina | North Carolina | Total |
|---|---|---|---|---|
| 2003 | 145,011 | 36,556 | 22,998 | 206,568 |
| 2004 | 173,701 | 50,461 | 27,255 | 253,421 |
| 2005 | 171,078 | 34,036 | 31,573 | 238,692 |
| 2006 | 175,522 | 56,074 | 25,736 | 259,338 |
| 2007 | 157,150 | 60,729 | 29,002 | 246,881 |
| Average | 164,492 | 47,571 | 27,312 | 240,980 |

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

### 3.4.1.2.3 Permits

For-hire vessels in the South Atlantic are required to have a snapper-grouper for-hire permit to fish for or possess snapper-grouper species in the EEZ. The number of permitted vessels for the period 2003-2007 is provided in Table 3-25. This sector operates as an open access fishery and not all permitted vessels are necessarily active in the fishery. Some vessel owners may purchase open access permits as insurance for uncertainties in the fisheries in which they actually operate.

The number of for-hire permits issued in the South Atlantic snapper-grouper fishery increased over the period 2003-2007, from 1,477 permits in 2003 to 1,754 permits in 2007. While the total number of permits increased over this period, the number of vessels with both for-hire and commercial permits remained flat through 2006, but decreased by almost 20 percent in 2007 relative to the previous years. The majority of snapper-grouper for-hire permitted vessels were home-ported in Florida, followed by North Carolina and South Carolina.

A for-hire permit does not distinguish whether the vessel operates as a charterboat or headboat. However, 82 vessels were included in the SEFSC Headboat Survey vessel list in 2007, with 48 homeported in Florida and Georgia, and 20 and 14 vessels homeported in North Carolina and South Carolina, respectively.

Table 3-25. South Atlantic snapper-grouper for-hire permit holders by home port state, 2003-2007.

| | Number of vessels issued for-hire vessel permits | | | | | | Number of vessels with both a for-hire permit and a commercial snapper-grouper permit | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Home Port State** | **2003** | **2004** | **2005** | **2006** | **2007** | **Avg.** | **2003** | **2004** | **2005** | **2006** | **2007** | **Avg.** |
| Florida | 957 | 1,084 | 1,119 | 1,108 | 1,140 | **1,082** | 148 | 151 | 148 | 151 | 122 | **144** |
| North Carolina | 206 | 232 | 254 | 284 | 315 | **258** | 45 | 42 | 43 | 46 | 40 | **43** |
| South Carolina | 122 | 108 | 121 | 119 | 129 | **120** | 34 | 33 | 33 | 34 | 24 | **32** |
| Georgia | 36 | 27 | 33 | 33 | 30 | **32** | 4 | 2 | 2 | 2 | 3 | **3** |
| Virginia | 5 | 13 | 10 | 10 | 8 | **9** | | 4 | 3 | 2 | | **3** |
| Other States | 69 | 48 | 51 | 62 | 69 | **60** | 8 | 3 | 5 | 3 | 2 | **4** |
| Gulf States | 82 | 82 | 79 | 65 | 63 | **74** | | | | | | |
| | | | | | | | | | | | | |
| **Total** | **1,477** | **1,594** | **1,667** | **1,681** | **1,754** | **1,635** | **239** | **235** | **234** | **238** | **191** | **227** |

Source: Southeast Permits Database, NOAA Fisheries, SERO.

### 3.4.1.2.4 Economic Value

Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above the cost of fishing. The monetary value of this satisfaction is referred to as consumer surplus (CS). The value or benefit derived from the recreational experience is dependent on several quality determinants, which include, among others, 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.

An estimate of the value lost on each trip when the harvest of red snapper harvest is prohibited is provided in the economic analysis prepared for the early closure of the red snapper season in the Gulf of Mexico (NOAA 2008). Specifically, starting from a 2 fish bag limit, the loss in CS on each trip when an angler cannot keep any red snapper is $53.53 in 2008 dollars. This loss in value applies to anglers fishing on trips for grouper, red snapper, dolphin, or king mackerel in the marine waters of the Gulf of Mexico or South Atlantic and captures the condition that the quality of trips for other species is also adversely affected by the prohibition of red snapper harvest.

In addition to anglers receiving 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, proxie values in the form of net operating revenue are also provided in NOAA (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.

#### 3.4.1.2.5 Economic Impacts of the Recreational Fishery

The value estimates provided in the previous section should not be confused with angler expenditures or economic activity. 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. However, angler expenditures benefit a number of sectors that provide goods and services for salt-water sport fishing. Gentner *et al.* (2001) provides estimates of saltwater recreational fishing trip expenditures (Table 3-26). These estimates do not include expenditures in Monroe County, Florida, or expenditures in the headboat sector.

Expenditure data is used to generate estimates of the economic impact of the recreational fishery. Similar to the situation with the commercial fishery, estimates of the output (sales) and job (full time equivalent (FTE)) impacts of the recreational snapper-grouper or red snapper fishery are not available. USDOC (2009) contains estimates of the economic impacts of the 2006 South Atlantic recreational fishery, but these estimates are for the entire recreational fishery for all marine species combined and are not delineated by species or species group. Overall, the South Atlantic recreational fishery in 2006 generated approximately $9.624 billion in total sales impacts and approximately 87,000 total employment impacts. Additionally, the recreational sector generated approximately $4.954 billion in value added impacts. While estimates of the impacts of the snapper-grouper or red snapper recreational fishery are not available, it is noted that snapper-grouper target effort accounted for, on average and not including the headboat sector, only four percent of the total recreational trips from 2003-2007, while red snapper target effort accounted for less than one half of one percent of total recreational trips (Tables 3-20 and 3-22).

Table 3-26. Summary of expenditures on saltwater trips.

| | North Carolina | | South Carolina | | Georgia | | Florida | |
|---|---|---|---|---|---|---|---|---|
| **Item** | **Resident** | **Non Resident** | **Resident** | **Non Resident** | **Resident** | **Non Resident** | **Resident** | **Non Resident** |
| Shore mode trip expenses | $63.61 | $75.53 | $54.12 | $104.27 | $31.78 | $115.13 | $36.90 | $141.30 |
| Private/rental boat trip expenses | $71.28 | $92.15 | $35.91 | $67.07 | $161.34 | $77.51 | $66.59 | $94.15 |
| Charter mode trip expenses | $201.66 | $110.71 | $139.72 | $220.97 | $152.45 | $155.90 | $96.11 | $196.16 |
| Charter fee-average-per day | $133.76 | $70.59 | $114.26 | $109.97 | $73.68 | $80.99 | $71.37 | $100.79 |

Source: 1999 MRFSS add-on survey (Gentner *et al.* 2001).

### 3.4.1.2.5 Financial Operations of the Charter and Headboat Sectors

Holland *et al.* (1999) estimated that the charterboat fee in the South Atlantic ranged from $292 to $2,000. The actual cost depended on state, trip length, and the variety of services offered by the charter operation. Depending on the state, the average fee for a half-day trip ranged from $296 to $360, for a full day trip the range was $575 to $710, and for an overnight trip the range was $1,000 to $2,000. Most (>90 percent) Florida charter operators offered half-day and full-day trips and about 15 percent of the fleet offered overnight trips. In comparison, only about 3 percent of operations in the other South Atlantic states offered overnight trips.

For headboats, the average fee in Florida was $29 for a half-day trip and $45 for a full day trip. For North and South Carolina, the average base fee was $34 per person for a half-day trip and $61 per person for a full day trip. Most of these headboat trips operated in federal waters in the South Atlantic (Holland *et al.* 1999).

Capital investment in charter vessels averaged $109,301 in Florida, $79,868 for North Carolina, $38,150 for South Carolina and $51,554 for Georgia (Holland *et al.* 1999). Charterboat owners incur expenses for inputs such as fuel, ice, and tackle in order to offer the services required by their passengers. Most expenses incurred in 1997 by charter vessel owners were on crew wages and salaries and fuel. The average annual charterboat business expenditures incurred was $68,816 for Florida vessels, $46,888 for North Carolina vessels, $23,235 for South Carolina vessels, and $41,688 for vessels in Georgia in 1997. The average capital investment for headboats in the South Atlantic was approximately $220,000 in 1997. Total annual business expenditures averaged $135,737 for headboats in Florida and $105,045 for headboats in other states in the South Atlantic.

The 1999 study on the for-hire sector in the Southeastern U.S. presented two sets of average gross revenue estimates for the charter and headboat sectors in the South Atlantic (Holland *et al*., 1999). The first set of estimates were those reported by survey respondents and were as follows: $51,000 for charterboats on the Atlantic coast of Florida; $60,135 for charterboats in North Carolina; $26,304 for charterboats in South Carolina; $56,551 for charterboats in Georgia; $140,714 for headboats in Florida; and $123,000 for headboats in the other South Atlantic states (Holland *et al*., 1999). The authors generated a second set of estimates using the reported average trip fee, average number of trips per year, and average number of passengers per trip (for the headboat sector) for each vessel category for Florida vessels. Using this method, the resultant average gross revenue figures were $69,268 for charterboats and $299,551 for headboats. Since the calculated estimates were considerably higher than the reported estimates (22 percent higher for charterboats and 113 percent higher for headboats), the authors surmised that this was due to sensitivity associated with reporting gross receipts, and subsequent under reporting. Alternatively, the respondents could have overestimated individual components of the calculated estimates. Although the authors only applied this methodology to Florida vessels, assuming the same degree of under reporting in the other states results in the following estimates in average gross revenues: $73,365 for charterboats in North Carolina, $32,091 for charterboats in South Carolina; $68,992 for charterboats in Georgia; and $261,990 for headboats in the other South Atlantic states.

It should be noted that the study's authors were concerned that while the reported gross revenue figures may be underestimates of true vessel income, the calculated values could overestimate

gross income per vessel from for-hire activity (Holland *et al.*, 1999). Some of these vessels are also used in commercial fishing activities and that income is not reflected in these estimates. Although more current statistics are not available, the reader should recognize that current financial statistics, including both fees and costs, are likely higher today than reported in the 1999 study.

### 3.4.2 Social and Cultural Environment

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 commercial 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 eight year period beginning in 2001 through 2007 (Figure 3-6). There was a 34% decrease in the number of unlimited permits and a 54% decrease in the number of limited permits during that time period. This downward trend in permits is reflected in other measures of effort that also show a decline, i.e. number of trips, landings, etc. (See SAFMC Amendment 16, under development). 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 for domestic product 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 fishing communities.

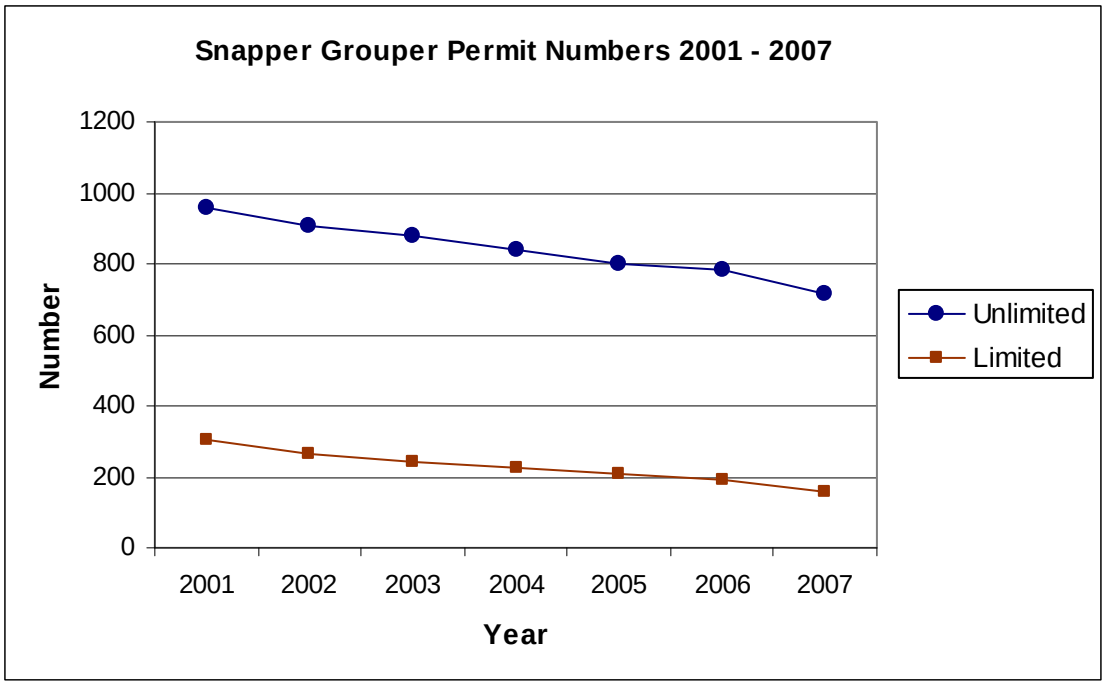



Figure 3-6. Number of Snapper-grouper Commercial Permits 2001-2007. (NMFS SERO Permits Database)

The recreational fishery has experienced permit requirements in the for-hire sector as vessels in the South Atlantic are required to have a snapper-grouper for-hire permit to fish for or possess snapper-grouper species in the EEZ. The number of permitted vessels for the period 2003-2007 is provided in Table 3-25.

The number of for-hire permits issued in the South Atlantic snapper-grouper fishery increased over the period 2003-2007, from 1,477 permits in 2003 to 1,754 permits in 2007. As discussed earlier most of the increases were for strictly for-hire business, since permits issued for vessels operating as for-hire and commercial entities were flat from 2005 to 2006 and fell in 2007. Most of these for-hire permitted vessels were home-ported in Florida; with a number also home-ported in North Carolina and South Carolina.

The factors that affect the loss of working waterfronts in fishing communities are coastal development, rising property taxes, decreasing access to waterfront due to increasing privatization of public resources, rising cost of dockage and fuel, lack of maintenance of waterways and ocean passages, competition with imported fish, and other less tangible (often political) factors. These along with increasingly strict regulations have combined to place a great deal of stress on many communities and their associated fishing sectors including commercial, charter/headboat and private recreational.

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 with the North Carolina commercial snapper-grouper fishery south of

Cape Hatteras, but did not include ethnographic research on communities dependent upon fishing.

In order to discuss the fishing communities that are associated with the red snapper fishery, some measures to ensure confidentiality will need to be implemented as the number of vessels and dealers that are placed within a community can often be less than 3 or there may be one dealer who handles a significant amount of landings of red snapper. Therefore, this description will begin at the county level then follow with a description of the communities within in each county.

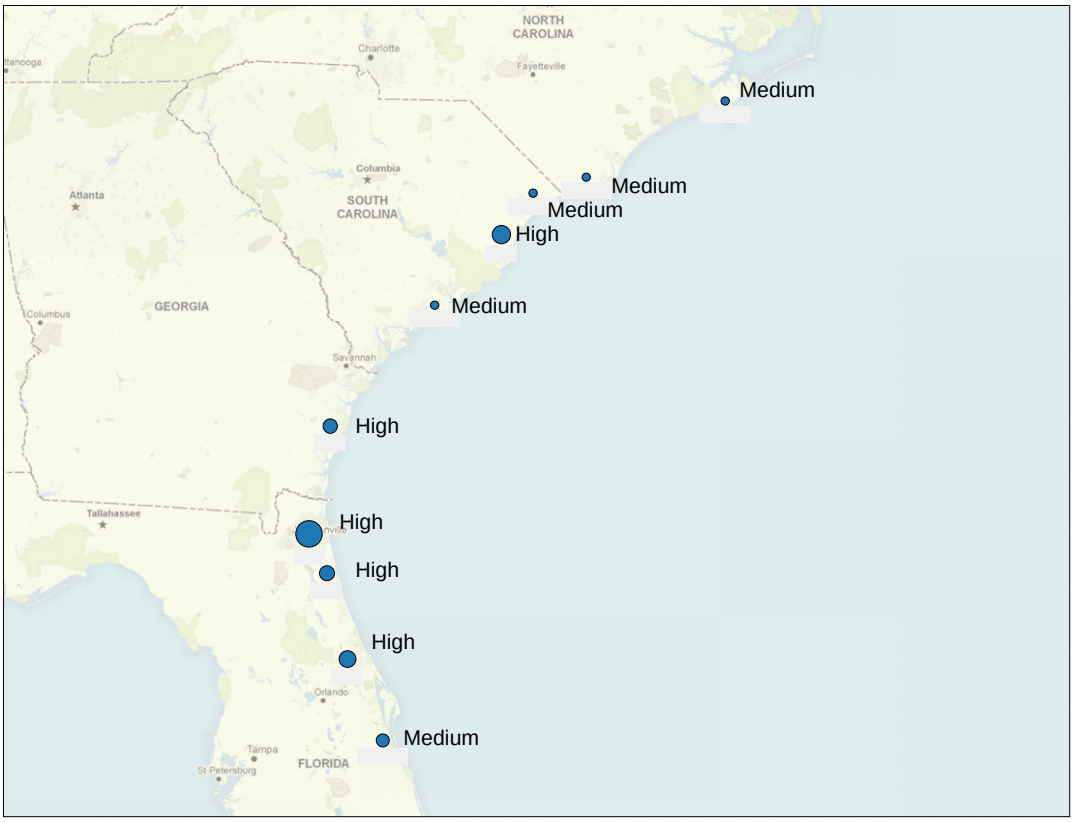



Figure 3-7. Counties with Red Snapper Landings Ranked High or Medium on Average from 2003-2007. (Source: NOAA Fisheries Service, Southeast Fisheries Science Center ACLS )

Based upon a range of landings, counties were categorized according to their average landings into three groups: Low, Medium and High. The range of landings cannot be provided as it may violate confidentiality for some counties with very few dealers. Therefore the discussion of communities affected by the interim rule will be narrowed to those communities within the counties classified with medium or high red snapper landings as these would be those most likely to see the largest impact (Figure 3-7).

The most recent study of fishing communities in the South Atlantic has been the community profiles assembled in Jepson et. al (2005). Updates for some communities appear in amendments to Council fishery management plans that have drawn on more recent research that focuses on a particular state or community. These original profiles and updates will be referenced in this discussion with some additional data added where available.

### 3.4.2.1 North Carolina

#### Commercial Fishing

There has been a steady decline in the number of federal commercial snapper-grouper permits in North Carolina since 1999, with 194 unlimited commercial permits in 1999 to only 139 in 2004 and approximately 123 by 2008. Limited commercial permits similarly declined from 36 to 16 in 2004 and have fallen to approximately 10 limited permits in 2008 (NMFS SERO Permit Database).

State license sale and use statistics for all types of licenses also indicate an overall decrease since 1994. While the overall number of state licenses to sell any species of fish or shellfish increased from 6,781 in 1994 to 9,712 in 2001/2002, the number of license holders actually reporting sales decreased from 6,710 in 1994/1995 to 5,509 in 2001/2002 (SAFMC 2006).

North Carolina fishermen demographics are detailed in Cheuvront and Neal (2004). Ninety eight percent of surveyed fishermen were white and 58 percent had completed some college or had graduated from college. Of those who chose to answer the question, 27 percent of respondents reported a household income of less than $30,000 per year, and 21 percent made at least $75,000 per year. On average, respondents had been fishing for 18 years, and had lived in their communities for 27 years.

Cheuvront and Neal (2004) also provided an overview of how North Carolina commercial snapper-grouper fishermen carry out their fishery. Approximately 65 percent of surveyed fishermen indicated year-round fishing. Gag is the fish most frequently targeted by these fishermen, with 61 percent of fishermen targeting gag at some point in the year, despite the prohibition of commercial sales and limit to the recreational bag limit in March and April. Vermilion snapper (36.3 percent) and black sea bass (46 percent) are the next most frequently targeted species. Red snapper was not a major targeted species with only 4.8% of fishermen targeting that species.

#### Recreational Fishing

Recreational fishing is popular along the North Carolina coast with data showing that North Carolina, until recently, has seen an increase in total recreational fishing participation that has equaled Florida's east coast (See SAFMC 2006). A brief discussion of public boat ramps and local recreational fishing clubs, as well as sources of information used by these anglers, can be found in SAFMC (2006). As of 2007 there were 315 snapper-grouper charter permits issued to North Carolina residents which is an increase from 284 in 2006 (See Table 3-25). Although there has been an increase in participation and permits, red snapper remains a very small percentage of recreational harvest (see Table 3-17) and rarely is it targeted effort for North Carolina recreational fishermen (see Table 3-23).

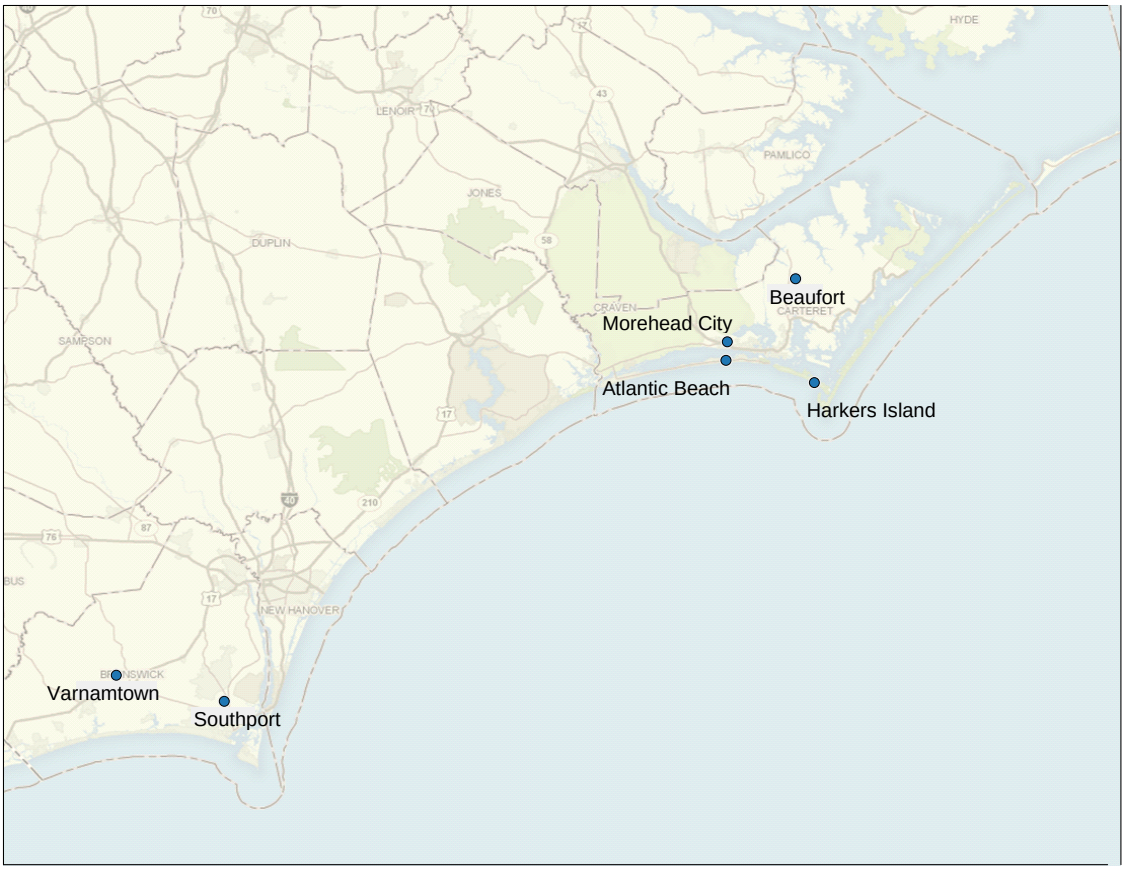


Figure 3-8. North Carolina communities in Counties with Medium to High Red Snapper Landings on Average 2003-2007. (Source: NOAA Fisheries Service, Southeast Fisheries Science Center ACLS )

#### 3.4.2.1.1 Carteret County

**Overview**

Carteret County had a total population of 59,383 in 2000 that is estimated to have grown to almost 63,000 by 2007. The majority of residents were identified as White (90%) and was estimated to have remained there with a very small percentage (2.2%) of the population identified as Hispanic. North Carolina as a state had an estimated 71% White population and Hispanics made up 6.7% of its total population. The median age for residents of Carteret County was estimated to have been 43.9 which is slightly higher than in 2000 when it was 42.3. The median age for the State of North Carolina was 35.3 in 2000 and was estimated to have increased to 36.6 by 2007 so Carteret County has a slightly more aged population. There was an estimated 6.9 % of the population in the civilian force that was unemployed in Carteret County, which was equal to the State's unemployment rate. The percentage of families below the poverty level was estimated at 8.4% which was below the 11% for the state as a whole during 2007. Carteret County had a slightly higher owner occupied housing rate than the state with slightly over 75% of owner occupied housing to the State's 68% estimated for 2007, both of which are slightly lower than in 2000 (U.S. Census Bureau).

Population density for Carteret County was 111 persons per square mile in 2000 which was double the 59 persons per square mile in 1970. It is still lower compared to the state's overall density which was an estimated at 186 persons per square mile in 2007, up slightly from 165 in

2000 (Source: NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

#### 3.4.2.1.2 Communities

There are four communities that have been identified as potential fishing communities in Carteret County: Morehead City, Beaufort, Harker's Island and Atlantic Beach. Of the four communities, Atlantic Beach does not have a long history of commercial fishing and is more recreational in its orientation as are many beachfront communities with histories of tourism. Beaufort was once the site of a menhaden processing plant and homeport for a menhaden fleet. Morehead City and Harker's Island both have residents who have worked in commercial fishing for much of their lives and fishing for snapper-grouper continues to be a primary fishery for the residents of all the communities (McCay et al 2000). There were 33 snapper-grouper dealers in the county in 2003, down to 28 in 2007 and of those only 10 had red snapper landings. Many former commercial dominated fishing communities are seeing a transition toward a more recreational tourism dependent economy. Morehead City, Beaufort and Harker's Island are no exception in that they have seen increases in the number of charter boats along their waterfronts, although most recently there may have been a decline in the number of charter operators. At this same time there has been a decline in the number of commercial vessels and associated fishing infrastructure. This transition is noticeable in the census demographics for Carteret County as it has a slightly older population than the state overall and has a much smaller minority population. The county has a lower poverty rate and a higher owner occupation housing rate than the state. These are all signs of potential gentrification that may be occurring along the coast which may accompany the transition to a more non-water dependent economy that tends to displace both recreational and commercial working waterfronts and their associated businesses (North Carolina Sea Grant 2007). According to a report by Garrity-Blake & Nash (no date) there were between 6-7 fish houses that have closed recently in Carteret County.

#### 3.4.2.1.3 Brunswick County

**Overview**

Brunswick County had a total population of 73,143 in 2000 that is estimated to have grown to almost 93,887 by 2007. The majority of residents were identified as White (82%) in 2000 and that statistic was slightly higher in 2007 (86%) In 2000 there was a small percentage (1.7%) of the population identified as Hispanic which had grown to 3.6% by 2007. North Carolina as a state had an estimated 71% White population and Hispanics made up 6.7% of its total population. The median age for residents of Brunswick County was estimated to have been 42.2, just slightly higher than 41.0 in 2000. The median age for the State of North Carolina was 35.3 in 2000 and was estimated to have increased to 36.6 by 2007 so Brunswick County has a slightly more aged population. There was an estimated 7.0 % of the population in the civilian force that was unemployed in Brunswick County, which was equal to the State's unemployment rate. The percentage of families below the poverty level was estimated at 8.4% which was below the 11% for the state as a whole during 2007. Brunswick County had a slightly higher owner occupied housing rate than the state with slightly over 75% of owner occupied housing to the State's 68% estimated for 2007, both of which are slightly lower than their respective occupancy rates in 2000 (U.S. Census Bureau).

Population density for the county was low with 28 persons per square mile in 1970. It had more than doubled to 84 persons per square mile by the year 2000. It is still relatively low compared to the state's overall density which was an estimated at 186 persons per square mile in 2007, up slightly from 165 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

The communities of Southport and Varnamtown were profiled in Jepson et al. (2005) as potential fishing communities. Both are considered rural in character and the county as a whole has a low population density, however population growth is having its impact (Blount 2006). Southport and Varnamtown residents have historically had an association with commercial fishing but many are now taking part-time jobs and there may be fewer residents who fish full-time as described in Jepson et al. (2005) and Blount (2006). There are some charter operations within these communities; Southport has a number of snapper-grouper unlimited and charter/headboat permits. In 2007 the county had 20 snapper-grouper dealers and only 5 of those had red snapper landings (SEFSC ACLS). There were approximately nine fish houses in the county at one time, that number has declined with the recent closing of two fish houses, one in Varnamtown and the other in Shallotte (Garrity-Blake & Nash, nd). With its rural character and low population Brunswick County does not seem to be experiencing the rate of gentrification as Carteret County, however, the demographic character of the county makes it a likely candidate as population pressure along the coast increase and according to Blount (2006) the process may well be underway.

### 3.4.2.2 South Carolina

**Commercial Fishing**

While pockets of commercial fishing activities remain in the state, many are being displaced by the development forces and associated changes in demographics described elsewhere. The number of unlimited commercial permits increased from 74 in 1999 to 87 in 2004 and then down to 61 in 2008. The number of limited commercial permits decreased by 75 percent from 12 to 4 in 2004 they dropped to 3 in 2008 (SAFMC 2006 & NMFS Permit Database).

**Recreational Fishing**

Many areas that used to be dedicated to commercial fishing endeavors are now geared towards the private recreational angler and for-hire sector. The number of federal charter/headboat permits held by South Carolina residents increased from 41 in 1999 to 111 in 2004 and to 129 in 2007. The majority of saltwater anglers fish for coastal pelagic species such as king mackerel, Spanish mackerel, tunas, dolphins, and billfish. A lesser number focus primarily on bottom fish such as snapper and groupers and often these species are the specialty of the headboats that run out of Little River, Murrells Inlet, and Charleston. There are 35 coastal marinas in the state and 34 sportfishing tournaments (SAFMC 2006).

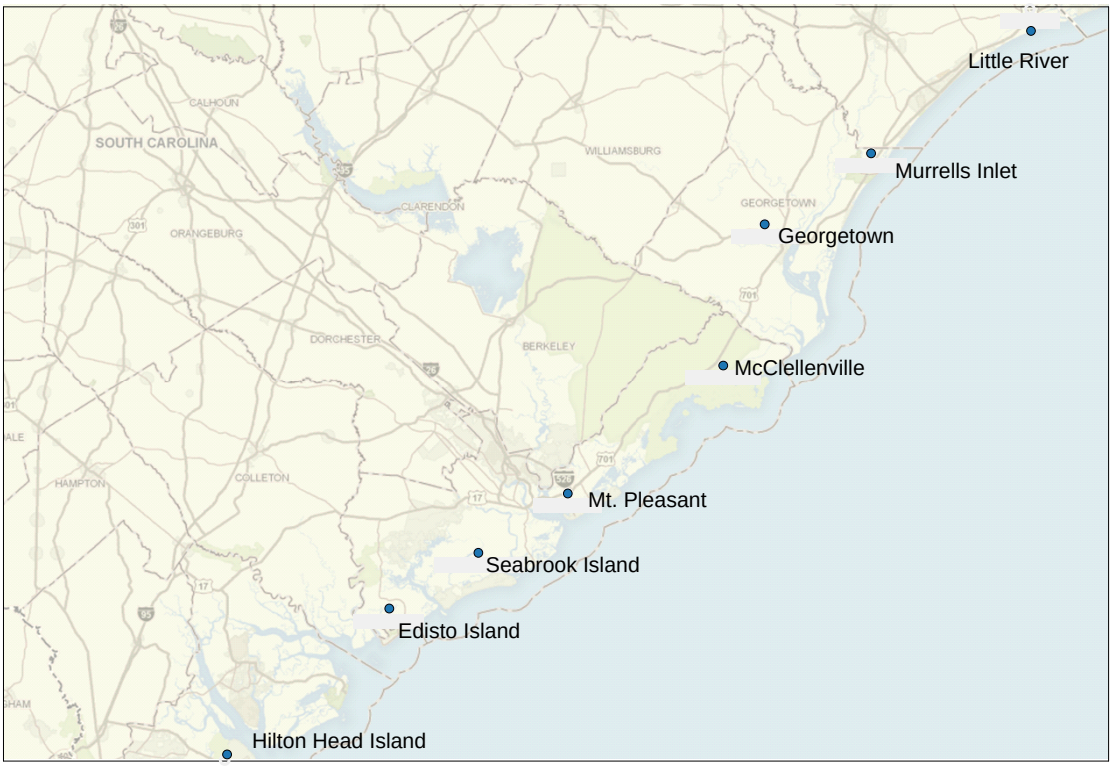


Figure 3-9. South Carolina Communities in Counties with Medium to High Red Snapper Landings on Average. (Source: NOAA Fisheries Service, Southeast Fisheries Science Center ACLS )

#### 3.4.2.2.1 Charleston County

**Overview**

Charleston County had a total population of 309,969 in 2000 that is estimated to have grown to almost 340,326 by 2007. The majority of residents were identified as White (65%) and was estimated to be to have remained there with a very small percentage (3.4%) of the population identified as Hispanic. South Carolina as a state had an estimated 68% White population and Hispanics made up 3.6% of its total population. The median age for residents of Charleston County was estimated to have been 36.2 which is slightly higher than in 2000 when it was 34.5. The median age for the State of South Carolina was 35.4 in 2000 and was estimated to have increased to 37.0 by 2007 so Charleston County's median age is comparable to the state as a whole. There was an estimated 5.6 % of the population in the civilian force that was estimated to be unemployed in Charleston County, which was well below to the State's unemployment rate of 7.4%. The percentage of families below the poverty level was estimated at 11.1% which was just below the 11.8% for the state as a whole during 2007. Charleston County had a slightly lower owner occupied housing rate than the state with slightly over 62% of owner occupied housing to the State's 70% estimated for 2007 (U.S. Census Bureau). Population density for the county has remained high with 259 persons per square mile in 1970 to just over 324 persons per square mile in 2000. The State of South Carolina has an estimated overall population density of 146 persons per square mile in 2007, up slightly from 133 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

There were five communities that have been identified as potential fishing communities in Charleston County (Jepson et al. 2005): Edisto Beach, Seabrook Island, Mt. Pleasant, Isle of Palms and McClellanville. The three communities on barrier islands, Edisto Beach, Seabrook and Isle of Palms all have very little commercial activity and few charter headboat permits associated with any community. Recreational tourism and non-water dependent activity may be a large part of the economy for these beach communities, although recreational fishing is also part of the mix. McClellanville and Mt. Pleasant have long histories associated with the commercial fishing industry, especially with the shrimp fishery. Charleston County had 6 snapper-grouper dealers permitted in 2007 and all six reported landings of red snapper (SEFSC ACLS). This county is one of the more urban counties in South Carolina with a rather high population density compared to the state. Loss of waterfront property to coastal development has affected the community of Mt. Pleasant, especially the Shem Creek area, with several former fish houses closing, being replaced by condominium and other types of non-fishery related development.

#### 3.4.2.2.2 Georgetown County

**Overview**

Georgetown County had a total population of 55,797 in 2000 that is estimated to have grown to almost 60,013 by 2007. The majority of residents were identified a White (60%) and was estimated to have increased to 64% by 2007. The largest minority population was African American which decreased from 38.8% in 2000 to 34% by 2007. The county had a very small percentage (1.9%) of the population identified as Hispanic in 2000 which was too small to estimate in 2007. South Carolina as a state had an estimated 68% White population and Hispanics made up 3.6% of its total population. The median age for residents of Georgetown County was estimated to have been 40.3 which is slightly higher than in 2000 when it was 39.1. The median age for the State of South Carolina was 35.4 in 2000 and was estimated to have increased to 37.0 by 2007, so Georgetown County's median age is slightly older than the state as a whole. There was an estimated 5.7 % of the population in the civilian force that was unemployed in Georgetown County, which was below the State's unemployment rate of 7.4%, but higher than the 3.6% found in the County in 2000. The percentage of families below the poverty level was estimated at 13.6% which was higher than the 11.8% for the state during 2007. Georgetown County had a slightly lower owner occupied housing rate with 68% of owner occupied housing compared to the State's 70% estimated for 2007 (U.S. Census Bureau).

Population density for the county has remained low with 40 persons per square mile in 1970 to just over 66 persons per square mile in 2000. The State of South Carolina has an estimated overall population density of 146 persons per square mile in 2007, up slightly from 133 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

There were two communities identified as potential fishing communities in Georgetown County: Georgetown and Murrell's Inlet (Jepson et al. 2005). Georgetown has always had an association with the commercial fishery, but primarily the shrimp fishery, although the number of shrimp

vessels homeporting in Georgetown may be fewer than in the past. Murrell's Inlet has historically been associated with the snapper-grouper fishery with more fish houses and a number of vertical line vessels that homeport there. There were seven snapper-grouper dealers in the county in 2007. Overall landings of red snapper in the county were 15,075 pounds on average over the period from 2003-2007. Murrell's Inlet is likely experiencing impacts from the tourism growth machine just south in Myrtle Beach as the counties population density has grown rapidly over the past two decades.

#### 3.4.2.2.3 Horry County

**Overview**

Horry County had a total population of 196,629 in 2000 that is estimated to have grown to almost 239,419 by 2007. The majority of residents were identified as White (81%) and was estimated to be to have remained there with a very small percentage (3.4%) of the population identified as Hispanic. South Carolina as a state had an estimated 68% White population and Hispanics made up 3.6% of its total population. The median age for residents of Horry County was estimated to have been 39 which is slightly higher than in 2000 when it was 38. The median age for the State of South Carolina was 35.4 in 2000 and was estimated to have increased to 37.0 by 2007 so Horry County's median age is slightly higher than the state as a whole. There was an estimated 5.5 % of the population in the civilian force that was estimated to be unemployed in Horry County, which was below to the State's unemployment rate of 7.4% but higher than the 2.9% in 2000 for the county. The percentage of families below the poverty level was estimated at 11.8% which was the same as the state as a whole during 2007. Those levels are higher than in 2000 when Horry County had 8.4% of families below the poverty level while the state overall was at 10.4%. Horry County had a slightly lower owner occupied housing rate than the state with slightly over 66% of owner occupied housing to the State's 70% estimated for 2007 (U.S. Census Bureau).

Population density for the county has more than doubled from 61 persons per square mile in 1970 to just over 172 persons per square mile in 2000. The State of South Carolina has an estimated overall population density of 146 persons per square mile in 2007, up slightly from 133 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

There is one community that has been identified as potential fishing communities in Horry County and that is Little River. Overall landings of red snapper in the county were 3,050 pounds on average over the period from 2003-2007. The overall landings of snapper-grouper species for the county were on average 588,000 pounds overall. The number of snapper-grouper unlimited harvest commercial permits held by community residents remained about the same between 1999 and 2004, from 15 permits to 16 permits, and one resident still held a limited harvest commercial license. As observed elsewhere, the number of charter/headboat permits held by community residents increased from 9 in 1999 to 16 in 2004. Three headboats operated out of Little River and this part of the for-hire industry has a long and storied past in the community. Recreational fishing, primarily through headboat effort, came about as a way for commercial fishermen to continue fishing in the summer months. A detailed account of how recreational fishing developed in Little River can be found in Burrell (2000). Most of the private recreational fishing

effort in this area occurs out of marinas in North Myrtle Beach, Myrtle Beach, and Murrells Inlet (SAFMC 2006).

### 3.4.2.3 Georgia

#### Commercial Fishing

Unlike the pattern observed in many other areas, the number of unlimited commercial permits and limited commercial permits held by Georgia residents did not decrease from 1999 to 2007, with 8 permits and 1 permit, respectively. In 2002, 947 vessels were registered with the state as commercial fishing vessels, 612 full-time state commercial fishing licenses were held by Georgia residents, and 147 residents held part-time state commercial fishing licenses (SAFMC 2006).

#### Recreational Fishing

As observed in other areas, the number of charter/headboat permits held by Georgia residents increased markedly from five permits in 1999 to 28 in 2008. Recreational vessels are located at Tybee Island close to Savannah, on the barrier islands off Brunswick, and between Savannah and Brunswick.

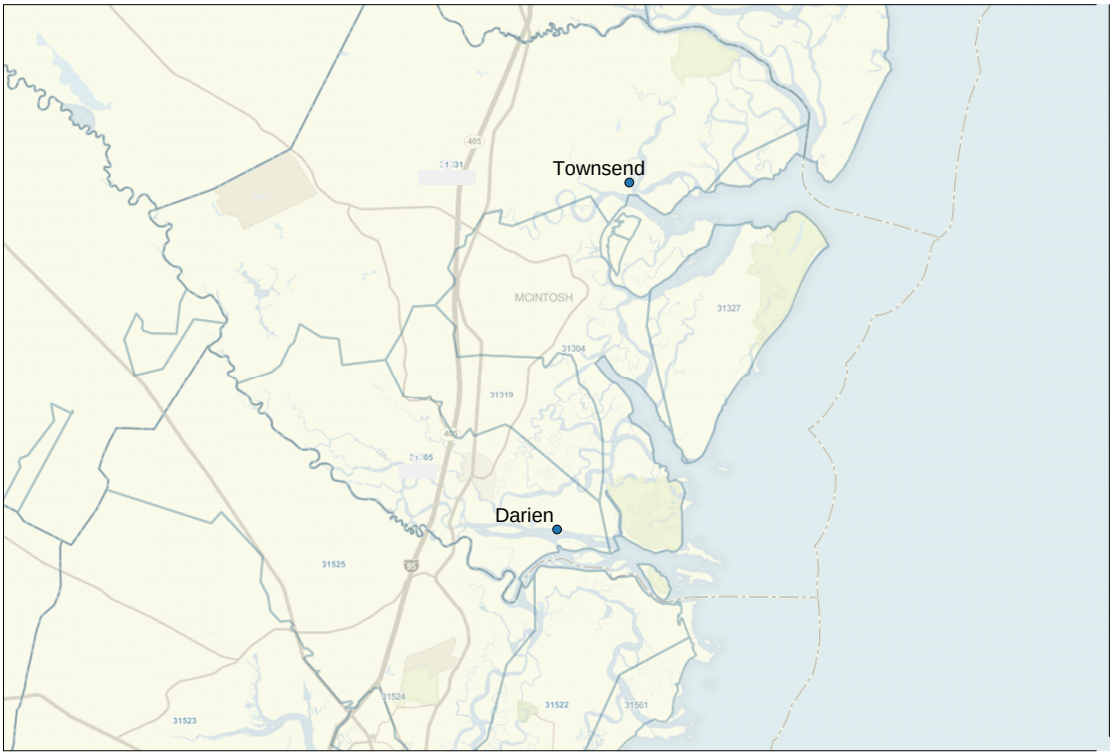



Figure 3-10. Communities in Georgia Counties with Medium to High Red Snapper Landings on Average 2003-2007. (Source: NOAA Fisheries Service, Southeast Fisheries Science Center ACLS )

#### *3.4.2.3.1 McIntosh County*

**Overview**

McIntosh County had a total population of 10,847 in 2000. The majority of residents were identified as White (61%) with the largest minority population being African Americans at 37% in 2000. The county had a very small percentage (0.9%) of the population identified as Hispanic in 2000. Georgia as a state had an estimated 66% White population and Hispanics made up 5.3% of its total population. The median age for residents of McIntosh County was estimated to have been 37 which is slightly higher than the median age for the State of South Carolina which was 33.4 in 2000. There was an estimated 3.3% of the population in the civilian force that was estimated to be unemployed in McIntosh County, which was just slightly below to the State's unemployment rate of 3.6% in 2000. The percentage of families below the poverty level was 15.7% which was higher than the 9.9% for the state as a whole in 2000. McIntosh County had a higher owner occupied housing rate than the state with an 83.6% of owner occupied housing to the State's 67.5% in 2000 (U.S. Census Bureau)[4].

Population density for the county has remained low with 17 persons per square mile in 1970 to just over 25 persons per square mile in 2000. The State of South Carolina has an estimated overall population density of 165 persons per square mile in 2007, up slightly from 141 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

While there are two communities in McIntosh County that have been profiled as potential fishing communities, Darien and Townsend (Jepson et al. 2005; SAFMC 2006), only one community (Townsend) lands a substantial amount of the snapper-grouper species. Other parts of the state involved in the commercial harvest of seafood are focused on penaeid shrimp, blue crabs, and other finfish such as flounder, shad, croaker, and mullet. Townsend is a small, rural community. In 2005, the fish house in this community was relocating inland. It is not known if this relocation was successful and whether that fish house will be handling domestically harvested fish in the future. For nearly a decade, only one fish house has consistently handled snapper-grouper species (SAFMC 2006).

Offshore recreational anglers do not often target or harvest snapper-grouper species in Georgia and targeted red snapper trips are rare. However, Blount (2006) points out, recreational fishing is important to the county residents as a form of relaxation and inexpensive entertainment. He goes on to describe changes that are beginning to occur in the county that signal the potential beginnings of gentrification that have appeared on the waterfronts as upscale waterfront homes for retirees are beginning to appear along with other new developments in areas where fish houses once were (Blount 2006).

### 3.4.2.4 Florida

**Overview**

[4] Estimates for 2005-2007 were not available for McIntosh County. Only geographic areas with population of 65,000 or more.

Florida stands apart from other states in the South Atlantic region in fishing behaviors, history, and demographics. Florida has one of the fastest growing populations in the United States, estimated to increase each day by 750 to 1,000 new immigrants. Twenty-five percent of all vacation homes in the United States are located in Florida's coastal counties (Coastal Ocean Resource Economics 2005).

Along with being heavily populated on land, coastal waters off Florida are also heavily used by recreational users of all kinds.

The natural geography of Florida also sets it apart from other South Atlantic states, particularly in the area from central Florida through the Keys. The weather is amenable to fishing almost year round, though hurricanes in 2004 were particularly devastating and took a toll on all fisheries in the state, both east and west coast. The continental shelf is much narrower in Florida than elsewhere in the region, allowing fishermen to access deep waters quickly and return the same day. Finally, the species of snapper-grouper available to fishermen in southern Florida are different than further north, with yellowtail snapper, gag and black grouper, and other alternative species such as stone crab, spiny lobster, dolphin, kingfish, and billfish allow a greater variety of both commercial and recreational fishing opportunities.

**Commercial Sector**

Considering the high population growth rates and emphasis on a tourism economy in Florida, the commercial fishing sector in Florida is still robust in some areas. Although total landings and dollar values of all species landed on the Florida East coast have decreased from 1998 to 2003 (from nearly 30 million pounds worth approximately $44 million to approximately 23 million pounds worth $33 million dollars; SAFMC 2006), there is still a considerable commercial fishing presence in east Florida.

**Recreational Sector**

While the commercial fishing industry, though still strong, may be in decline, the recreational sector appears to be stable or growing. The number of snapper-grouper for-hire permits has grown from 957 in 2003 to 1140 in 2007.

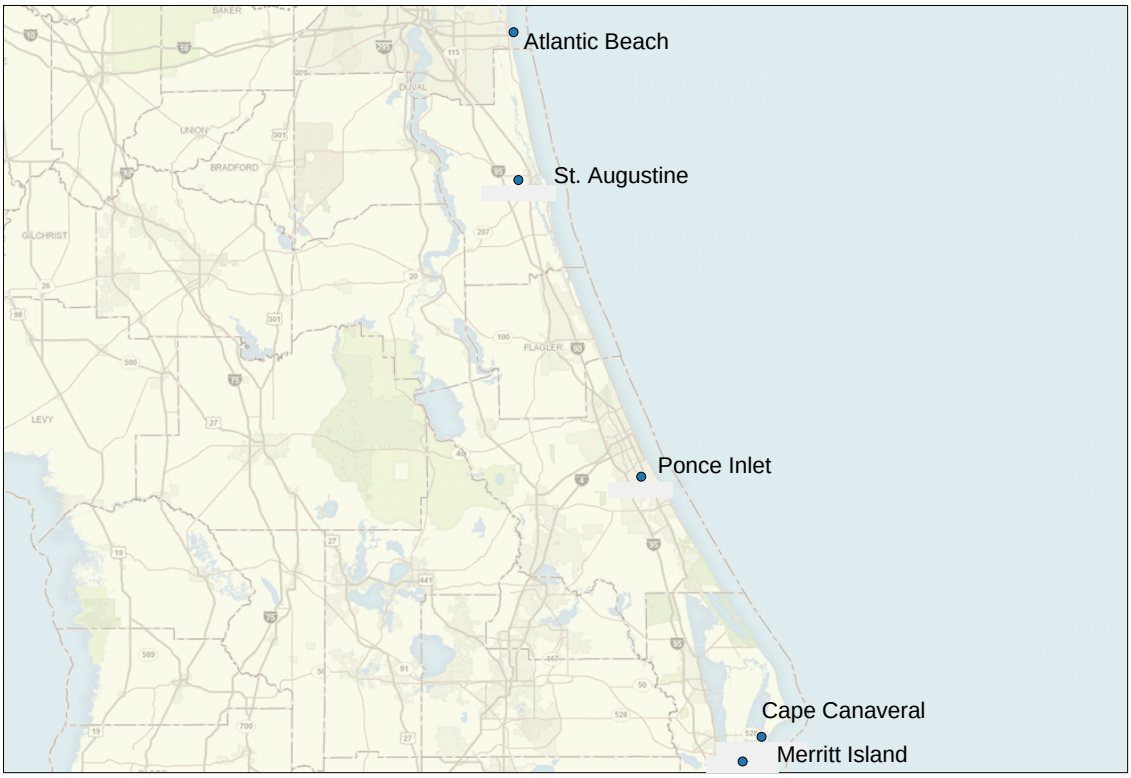



Figure 3-11. Communities in Florida Counties with Medium to High Red Snapper Landings on Average from 2003-2007. (Source: NOAA Fisheries Service, Southeast Fisheries Science Center ACLS )

#### 3.4.2.4.1 Duval County

**Overview**

Duval County had a total population of 778,879 in 2000 that is estimated to have grown to 841,077 by 2007. The majority of residents was identified White (67.3%) and was estimated to have decreased to 64.8% by 2007. The largest minority population was African American which increased from 28.8% in 2000 to 30% by 2007. The county had a small percentage (4.1%) of the population identified as Hispanic in 2000 which increased to 5.8% in 2007. Florida as a state had an estimated 77.8% White population and Hispanics made up 20% of its total population. The median age for residents of Duval County was estimated to have been 35.9 which is slightly higher than in 2000 when it was 34.1. The median age for the State of Florida was 38.7 in 2000 and was estimated to have increased to 39.1 by 2007 so Duval County's median age is slightly younger than the state as a whole. There was an estimated 6.3 % of the population in the civilian force that was estimated to be unemployed in Duval County, which was slightly higher than the State's unemployment rate of 6%. It is also higher than the 5% found in the County in 2000 which was lower than the state's unemployment rate 5.6% at the time. The percentage of families below the poverty level was estimated at 9.3% which was almost equal to the 9% for the state as a whole during 2007. Duval County had a slightly lower owner occupied housing rate than the state with slightly over 64.4% of owner occupied housing to the State's 70.3% estimated for 2007 (U.S. Census Bureau).

Population density for the county has remained high with 672 persons per square mile in 1970 to just over 989 persons per square mile in 2000. The State of Florida has an estimated overall

population density of 338 persons per square mile in 2007; up slightly from 296 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

Atlantic Beach was the only community in Duval County profiled in Jepson et al. (2005) and there has been relatively little description of the fishing infrastructure since then. Duval County had the highest overall average red snapper landings during the 2003-2007 time period with 10 snapper-grouper dealers in 2007. There are snapper-grouper unlimited and limited permitted vessels located in the community. Many of the snapper-grouper fishermen in this area utilize dive gear rather than vertical line gear (GSAFFI 2008). The County is highly urbanized along the coast and it is unknown whether there is a concentration of fishing infrastructure that caters to the snapper-grouper fishery. This area was also where a large portion of recreational targeted trips were estimated to have originated. The community of Atlantic Beach also has several federal charter snapper-grouper permits located in the community.

#### 3.4.2.4.2 St. Johns County

St. Johns County had a total population of 123,135 in 2000 that is estimated to have grown to 168,125 by 2007. The majority of residents was identified White (91%) and was estimated to have decreased to 64.8% by 2007. The largest minority population was African American which increased from 28.8% in 2000 to 30% by 2007. The county had a small percentage (4.1%) of the population identified as Hispanic in 2000 which increased to 5.8% in 2007. Florida as a state had an estimated 77.8% White population and Hispanics made up 20% of its total population. The median age for residents of St. Johns County was estimated to have been 41 which is slightly higher than in 2000 when it was 40.6. The median age for the State of Florida was 38.7 in 2000 and was estimated to have increased to 39.8 by 2007 so St. Johns County's median age is slightly older than the state as a whole. There was an estimated 4.1 % of the population in the civilian force that was estimated to be unemployed in St. Johns County, which was lower than the State's unemployment rate of 6.0%. The 2007 unemployment is only slightly higher than the 3.3% found in the County in 2000 which was still lower than the state's unemployment rate which was 5.6%. The percentage of families below the poverty level was estimated at 5.1% which was well below the 9% for the state as a whole during 2007. St. Johns County had a slightly lower owner occupied housing rate than the state with slightly over 64.4% of owner occupied housing to the State's 70.3% estimated for 2007 (U.S. Census Bureau).

Population density for the county has climbed from 50 persons per square mile in 1970 to just over 200 persons per square mile in 2000. The State of Florida has an estimated overall population density of 338 persons per square mile in 2007; up slightly from 296 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

St. John's County had one community, St. Augustine, profiled as a potential fishing community in Jepson et al. 2005. The community has a long history associated with the shrimp fishery as described in that profile. The community has a number of vessels with snapper-grouper unlimited and limited permits and charter fishing is also important as there are over 15 federally

permitted charter boats located in the community. There were 2 dealers with snapper-grouper federal permits in the county in 2007. St. John's County was one of the top 5 counties in terms of red snapper landings averaged over the 2003-2005 time period.

#### 3.4.2.4.3 Volusia County

Volusia County had a total population of 443,343 in 2000 that is estimated to have grown to 494,198 by 2007. The majority of residents was White (87%) and was estimated to have decreased to 85.7% by 2007. The largest minority population was African American which increased from 9.7% in 2000 to 11% by 2007. The county had a small percentage (4.1%) of the population identified as Hispanic in 2000 which increased to 5.8% in 2007. Florida as a state had an estimated 77.8% White population and Hispanics made up 9.7% of its total population. The median age for residents of Volusia County was estimated to have been 42.5 which is virtually the same as it was in 2000 when it was 42.4. The median age for the State of Florida was 38.7 in 2000 and was estimated to have increased to 39.8 by 2007 so Volusia County's median age is slightly older than the state as a whole. There was 5.6 % of the population in the civilian force that was estimated to be unemployed in Volusia County, which was slightly lower than the State's unemployment rate of 6.0%. The 2007 unemployment is only slightly lower than the 6.3% found in the County in 2000 which was just slightly higher than the state's unemployment rate which was 5.6% at the time. The percentage of families below the poverty level was estimated at 7.9% which was below the 9% for the state as a whole during 2007. Volusia County had a slightly higher owner occupied housing rate than the state with slightly over 75% of owner occupied housing to the State's 70.3% estimated for 2007 (U.S. Census Bureau).

Population density for the county has grown significantly with 154 persons per square mile in 1970 to just over 404 persons per square mile in 2000. The State of Florida has an estimated overall population density of 338 persons per square mile in 2007; up slightly from 296 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

Ponce Inlet was profiled in Jepson et al. (2005) as a potential fishing community in Volusia County which highlighted the importance of recreational fishing to the community. The community has several snapper-grouper for-hire permits located within. There were 14 unlimited snapper-grouper permits in Volusia County during 2007 a small portion of which were located in Ponce Inlet.

#### 3.4.2.4.4 Brevard County

Brevard County had a total population of 476,230 in 2000 that is estimated to have grown to 531,642 by 2007. The majority of residents was White (88%) in 2000 and was estimated to have decreased to 86% by 2007. The largest minority population was African American which increased from 9% in 2000 to 10% by 2007. The county had a small percentage (4.6%) of the population identified as Hispanic in 2000 which increased to 6.5% in 2007. Florida as a state had an estimated 77.8% White population and Hispanics made up 9.7% of its total population. The median age for residents of Brevard County was estimated to have been 43.2 which is slightly higher than it was in 2000 when it was 41.4. The median age for the State of Florida was 38.7 in 2000 and was estimated to have increased to 39.8 by 2007 so Brevard County's median

age is slightly older than the state as a whole. There was an estimated 5.4 % of the population in the civilian force that was estimated to be unemployed in Brevard County, which was lower than the State's unemployment rate of 5.6%. The 2007 unemployment is only slightly higher than the 4.9% found in the County in 2000 which was lower than the state's unemployment rate which was 5.6% at the time. The percentage of families below the poverty level was estimated at 7.9% which was below the 9% for the state as a whole during 2007. Brevard County had a slightly higher owner occupied housing rate than the state with slightly over 75% of owner occupied housing to the State's 70.3% estimated for 2007 (U.S. Census Bureau).

Population density for the county has remained relatively high with 219 persons per square mile in 1970 to just over 454 persons per square mile in 2000. The State of Florida has an estimated overall population density of 338 persons per square mile in 2007; up slightly from 296 in 2000 (NOAA Spatial Patterns of Socioeconomic Data 1970 to 2000 and the U.S. Census Bureau).

**Communities**

Cape Canaveral draws fishermen from Cocoa/Cocoa Beach, Merritt Island, Melbourne, and Titusville. These fishermen target many snapper-grouper species, as well as coastal migratory pelagics such as mackerel, highly migratory species such as sharks and swordfish, and shellfish such as oysters, quahogs, and shrimp. The number of unlimited commercial permits in the County increased from nine in 1999 to 16 in 2004 and grew slightly to 19 in 2008. The number of limited commercial permits fluctuated over this period, but ultimately averaged around 4-5 permits between1999-2008.

According to a recent amendment, Brevard County supported numerous bait and tackle stores, with five in Cape Canaveral, and 70 marinas with over 3,000 wet slips, indicating the importance of recreational fishing to the area. Fourteen fishing tournaments consistently occur in the area (SAFMC 2006). As in other coastal areas of Florida, there are a number of charter boats, private marinas, and other associated businesses catering to the recreational fishing sector. The number of federally permitted charter/headboat vessels in Cape Canaveral increased from zero to seven from 1999 to 2004. Current estimates from permit files show at least 11 for-hire vessels with snapper-grouper permits homeported in Cape Canaveral (SERO Permit Files).

# 4 ENVIRONMENTAL CONSEQUENCES

## 4.1 Alternatives Considered

Alternatives considered in detail, with the exception of the no action alternative, include management measures made under the snapper-grouper fishery management framework to address the purpose and need of the proposed interim federal action. That is, the following alternatives target an immediate reduction in red snapper harvest in the South Atlantic region for a portion of the 2009 calendar year.

**Alternative 1: No action**
Implement no changes to current regulations for the harvest of red snapper.

**Alternative 2: No harvest of red snapper in the EEZ of Florida, Georgia, North Carolina and South Carolina.**
Establish interim regulations that would establish a seasonal closure of the red snapper fishery for 180 days that applies to both the commercial and recreational sectors; during which no fishing for and/or possession of red snapper would be allowed.

**Alternative 3: Four month seasonal closure**
Establish interim regulations that would immediately implement (upon publication of notice in the *Federal Register*) a four month closure of the red snapper fishery that applies to both commercial and recreational sectors; during which no harvest or possession of red snapper would be allowed.

For a person on board a vessel for which a federal commercial or charter/headboat permit for the South Atlantic snapper-grouper fishery has been issued, provisions proposed in Alternatives 2 and 3 would apply regardless of whether the fish are harvested in state or federal waters.

### 4.1.1 Biological Effects

To determine the environmental effects of **Alternative 1,** no action management alternative, on red snapper, one must first examine current trends in harvest levels, stock biomass levels, and life history characteristics, then predict the direction of future trends under status quo management. The bulk of landings of red snapper come from the recreational fishery, which have exceeded the landings of the commercial fishery by 2-3 times in recent years. Total landings were variable, with a downward trend through the 1990s. The recent SEDAR assessment determined the red snapper stock in the South Atlantic is undergoing overfishing and is overfished (SEDAR 15 2008). The ratio of $F/F_{40\%SPR}$ suggests a generally increasing trend in fishing mortality from the 1950s through the mid-1980s, with the 2006 estimate of $F/F_{40\%SPR}$ 8.19 times greater than the fishing mortality that will produce the maximum sustainable yield (Figure 4-1).

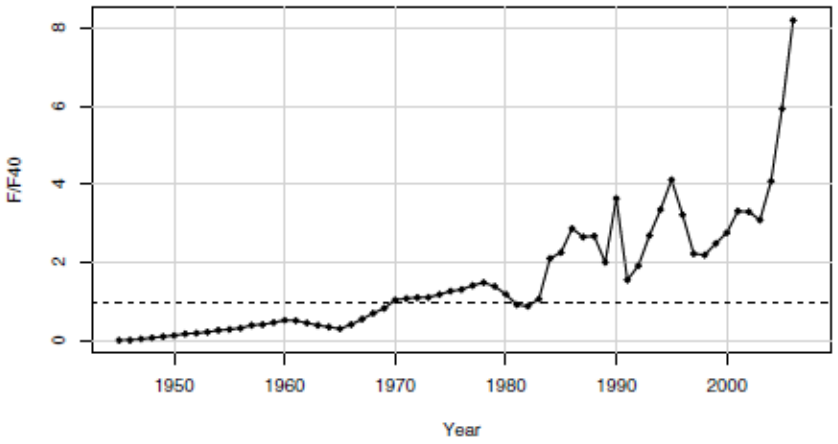



Figure 4-1. Estimated time series of full fishing mortality rate (F) relative to the $F_{MSY}$ proxy ($F_{40\%}$ ) for red snapper.
Source: Red Snapper: Estimation of biomass benchmarks and projections, November 2008. Addenda and Updates, Figure 6.10.

Recruitment, as measured by the number of fish, has declined from the early years (1950s-early 1970s) to a low in the mid-1990s (Figure 4-2). There have been several moderately good year classes in 1998, 1999, and 2000 and then another decline through 2003 with a slight increase through 2007. These moderately good year classes (1998-2000) have grown and entered the fishery over the last couple of years and are likely responsible for the higher catches being reported by recreational and commercial fishermen. However, if these fish are caught and killed, then the age/size composition and biomass will not continue to improve over time.

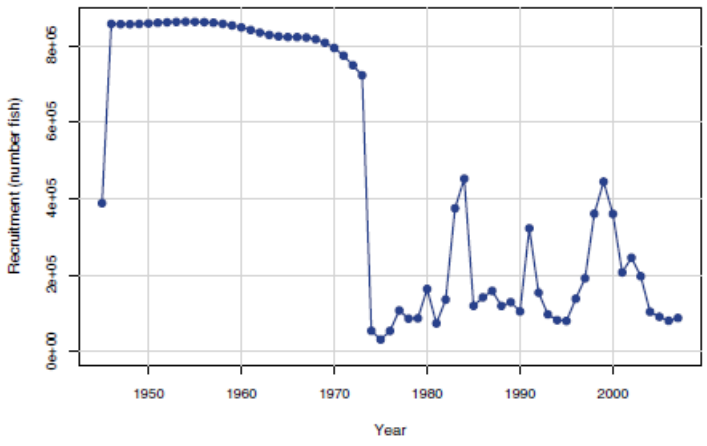



Figure 4-2. Estimated recruitment of age-1 red snapper.
Source: Red Snapper: Estimation of biomass benchmarks and projections, November 2008, Figure 6.2.

McInerny (2007) reports a maximum age of 54 years red snapper in the South Atlantic. Natural mortality is estimated to be 0.078 using the Hoenig (1983) method with a maximum age of 53

years (SEDAR 15 2008). Because red snapper are very long-lived and have low natural mortality rates, they are very vulnerable to overfishing. The average age of the population is currently fairly stable between 5 and 8 with an increase in recent years. Moderately good recruitment in 1998-2000 appears to be responsible for the recent increase in the mean age and increases in catches. As shown in Figure 4-3, most red snapper are age 10 or younger. This is based on ages from over 7,000 fish. Since red snapper live for at least 54 years, heavy fishing pressure is likely responsible for the truncation in the age structure. SEDAR 15 (2008) indicates most of the older fish were removed in the 1950s and 1960s and the population has not recovered.

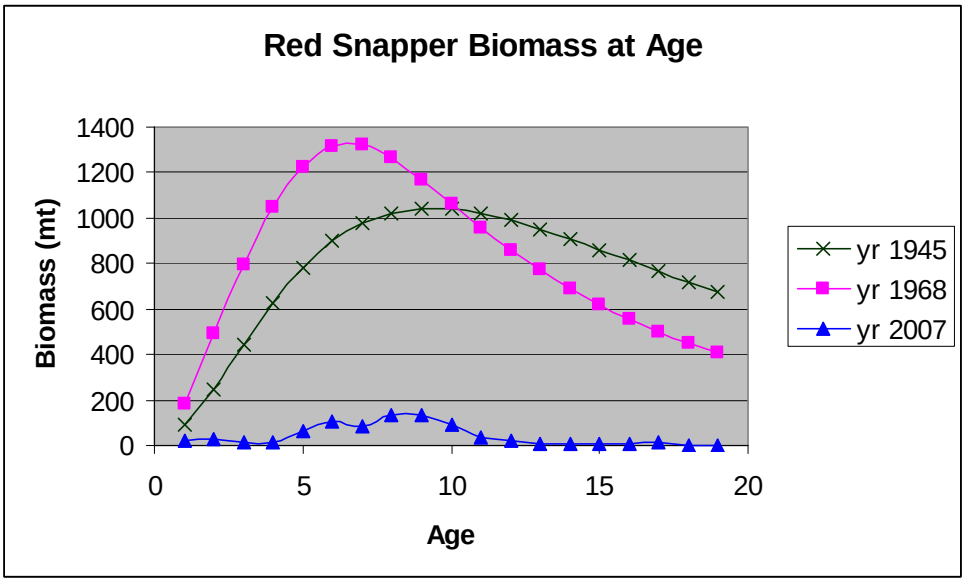



Figure 4-3. Age structure of the red snapper population.
Source: Table 5.2 Red Snapper: Estimation of biomass benchmarks and projections, November 2008.

Examination of Table 5.9 from the November 2008 estimation of biomass benchmarks and projections indicates the mean age of the South Atlantic red snapper population has been less than 10 years since the 1980s. A plot of mean age data since 1966 from Table 5.9 in the November 2008 update on red snapper biomass benchmarks and projections shows a decline mean age to 6 years in 2000 (Figure 4-4). Mean age increased to almost 8 years of age in 1997 and 2005 following good recruitment in 1988 and 1998-2001. In addition, the biomass of red snapper has changed dramatically over time (Figure 4-5).

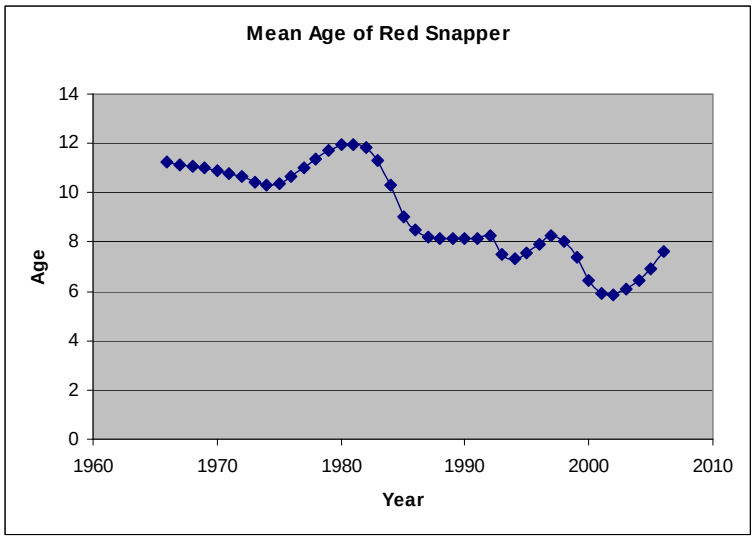



Figure 4-4. Mean age of red snapper.
Source: Plot of data from Table 5.9, Red Snapper: Estimation of biomass benchmarks and projections, November 2008.

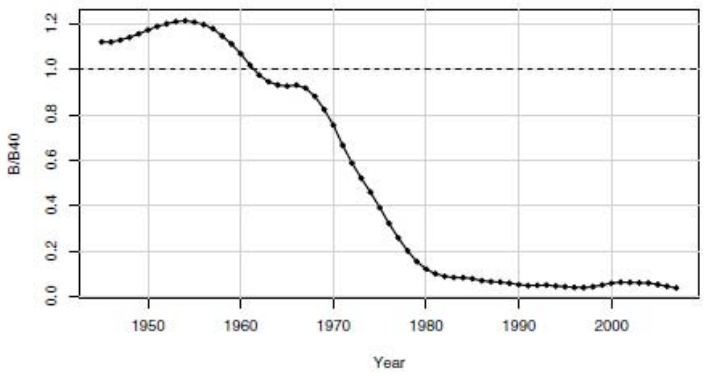



Figure 4-5. Estimated time series of red snapper biomass relative to $B_{MSY}$ proxy.
Source: Red Snapper: Estimation of biomass benchmarks and projections, November 2008, Figure 6.2.

**Alternative 1 (no action)** would retain the current regulations used to manage catches of red snapper. Regulations include a commercial limited access system, a 20" total length (TL) commercial and recreational minimum size limit, and a 2 fish recreational bag limit. Minimum size limits are generally used to maximize the yield of each fish recruited to the fishery and to protect a portion of a stock from fishing mortality. The concept behind maximizing yield is to identify the size that best balances the benefits of harvesting fish at larger, more commercially valuable sizes against losses due to natural mortality. Protecting immature and newly mature fish from fishing mortality provides increased opportunities for reproduction and recruitment before becoming vulnerable to fishing gear. If the size limit chosen is larger than the size at first reproduction for the species in question, then a sufficient pool of spawners could be retained even if fishing pressure is heavy.

These types of measures are generally expected to benefit the environment in the short term and long term by limiting the extent to which a stock is targeted. However, the extent to which such benefits are realized depends on the appropriateness of a measure when applied to a specific stock, as well as if and to what extent fishing effort changes or shifts in response to the select management measure.

Discard mortality also can limit the amount by which fishing effort and mortality is reduced by limited access systems, trip limits, and minimum size limits, if fishermen catch and discard red snapper when targeting co-occurring species. The snapper-grouper ecosystem includes many species, which occupy the same habitat at the same time. For example, red snapper co-occur with vermilion snapper, tomtate, scup, red porgy, white grunt, black sea bass, red grouper, scamp, gag, and others. Therefore, red snapper are likely to be caught and suffer some mortality when regulated since they will be incidentally caught when fishermen target other co-occurring species.

In 1983, the Snapper-grouper Fishery Management Plan established a 12" TL for red snapper to maximize the yield per recruit (SAFMC 1983). Because of concerns of red snapper overfishing, Amendment 4 (SAFMC 1991) increased the size limit of red snapper taken by recreational fishermen from 12" TL to 20" TL. As a result of this increased size limit SEDAR 15 (2008) indicates many more red snapper are being released by the recreational sector than are retained (Tables 4-1 and 4-2). Since release mortality rates are estimated to be 40% for the recreational sector and 90% for the commercial sector, the increased size limit many not have had the intended effect of enhancing stock status. SEDAR 15 (2008) indicates the large number if discards combined with high release mortality rates is one of the major factors contributing to overfishing of red snapper in the South Atlantic. However, management measures proposed in Amendment 16 (under development) such as the use of dehooking and venting tools may reduce the release mortality of red snapper that are incidentally caught while fishing for other snapper-grouper species.

Table 4-1. MRFFS landings (number A+B1) of red snapper by state, 2001-2006.

| State | 2001-2006 | Avg ww | Avg GW | Percent |
|---|---|---|---|---|
| FL | 206,489 | 34,415 | 31,004 | 86.05% |
| Georgia | 10,591 | 1,765 | 1,590 | 4.41% |
| SC | 9,526 | 1,588 | 1,430 | 3.97% |
| NC | 13,363 | 2,227 | 2,006 | 5.57% |
| Total | 239,969 | | | |

Table 4-2. MRFSS number of red snapper released alive (B2) among states, 2001-2006.

| MRFSS | 2001-2006 | Avg | percent |
|---|---|---|---|
| FL | 623,153 | 124,631 | 89.62% |
| GA | 5,878 | 1,176 | 0.85% |
| SC | 24,128 | 4,826 | 3.47% |
| NC | 42,161 | 8,432 | 6.06% |
| Total | 695,320 | | |

In December 2008, the Council's SSC recommended that a discard only projection from the November 2008 update of the SEDAR 15 (2008) stock assessment be used to set harvest levels for red snapper. This projection fixes fishing mortality at 75%$F_{40\%}$ and provides an estimate of current fishing mortality equal to 0.918 and fishing mortality at 75%$F_{40\%}$ equal to 0.078 (Table 4-3). NOTE: New projections will be provided by the Science Center. Using the Baranov equation, it is estimated that an 88% reduction in total removals would be needed to achieve the yield at 75%$F_{40\%}$.

Table 4-3. Table 5.31 from Red Snapper: Estimation of biomass benchmarks and projections, November 2008, Alternative 4: Projection results under scenario R9—Discard-only projection with fishing rate fixed at F = 75%F40%, and with release mortality rates of 0.9 in the commercial sector and 0.4 in the headboat and general recreational sectors. F = fishing rate (per year), Fmort = fishing rate leading to discard mortality (a portion of F), Pr(recover) = proportion of cases reaching SSBF40% , SSB = mid-year spawning stock biomass (mt), R = recruits (1000 fish), L = landings (1000 lb), D = discard mortalities (1000 fish), D.wgt = discard mortalities in weight (1000 lb). For reference, the target for rebuilding is SSBF40% = 6847.

| Year | F(per yr) | Fmort(per yr) | Pr(recover) | SSB(mt) | R(1000) | L(1000 lb) | D(1000) | D.wgt(1000 lb) |
|---|---|---|---|---|---|---|---|---|
| 2007 | 0.918 | 0.918 | 0 | 204 | 286 | 450 | 98 | 152 |
| 2008 | 0.918 | 0.918 | 0 | 206 | 308 | 455 | 101 | 153 |
| 2009 | 0.078 | 0.056 | 0 | 211 | 308 | 0 | 16 | 44 |
| 2010 | 0.078 | 0.056 | 0 | 456 | 308 | 0 | 21 | 69 |
| 2011 | 0.078 | 0.056 | 0 | 690 | 308 | 0 | 25 | 98 |
| 2012 | 0.078 | 0.056 | 0 | 961 | 308 | 0 | 29 | 132 |
| 2013 | 0.078 | 0.056 | 0 | 1255 | 308 | 0 | 32 | 167 |
| 2014 | 0.078 | 0.056 | 0 | 1559 | 308 | 0 | 35 | 205 |
| 2015 | 0.078 | 0.056 | 0 | 1865 | 308 | 0 | 37 | 242 |
| 2016 | 0.078 | 0.056 | 0 | 2165 | 308 | 0 | 40 | 278 |

However, if there was no reduction in effort and all current landings were discarded, only an 18.6% in total removals (landings and dead discards) would be expected per year (Table 4-4). Total removals are determined by applying 40% and 90% release mortality rates to the recreational and commercial sectors, respectively.

Table 4-4. Current landings and dead discards (numbers of individuals) for 2004-2006 from SEDAR 15 (2008) and November 2008 update.

| Item | Comm | MRFSS | HB | Total |
|---|---|---|---|---|
| Current landings | 11,525 | 33,207 | 8,565 | 53,296 |
| Current dead discards | 14,393 | 58,200 | 14,947 | 87,540 |
| Current landings and dead discards (total removals) | 25,918 | 91,407 | 23,512 | 140,836 |
| Total removals if no harvest of red snapper | 24,766 | 71,483 | 18,373 | 114,621 |
| Reduction in harvest | 4.45% | 21.80% | 21.86% | 18.61% |

Although a large number of red snapper are caught when fishing for co-occurring species, there is likely some degree of targeting, particularly in the area of greatest abundance for red snapper off northern Florida and southern Georgia. If one assumes that during a closure red snapper would only be caught when targeting major co-occurring species, some trips would not be taken during a seasonal closure for co-occurring species, and fishermen have some ability to avoid red snapper by avoiding locations then the reduction in total removals provided by closing red snapper year-round in the South Atlantic could be considerably greater. Permanent measures, which are being developed in Amendment 17 to end red snapper overfishing and rebuild the stock, will consider the effects management measures intended for other species would have on reducing fishing mortality of red snapper.

Since the alternatives to status quo management evaluated for red snapper are intended to reduce fishing mortality, they are expected to benefit the biological environment by assisting in restoring stock status and population demographics to more natural conditions. The indirect effects of these alternatives on the ecological environment are less certain. Improving the status of the red snapper stock would likely promote more natural ecological functions. However, competitor, predator, and prey relationships in marine ecosystems are complex and poorly understood.

The snapper-grouper ecosystem includes many species which occupy the same habitat at the same time. For example, red snapper co-occur with vermilion snapper, gag, scamp, greater amberjack, gray triggerfish, black sea bass, red grouper, and others (Tables 4-5 to 4-7). Therefore, snapper-grouper species are likely to be caught when regulated since they will be incidentally caught when fishermen target other co-occurring species. Continued overexploitation of any snapper-grouper species may disrupt the natural community structure of the reef ecosystems that support these species. Predator-exploited species could be expected to decrease in abundance in response to a decline of an exploited species. Alternatively, predators would target other species as prey items. Conversely, the abundance of those prey and competitor species of the overexploited species that are not targeted in fisheries (e.g., scup and tomtate) could increase in response to a decline in the abundance of a targeted species such as red snapper.

Table 4-5. Species taken on commercial trips when at least 1 pound of red snapper was caught. Based on ALS data from 2004-2006. Note: Data will be updated through 2007.

| Species | % by trip | % by wt | cum wt % |
|---|---|---|---|
| SNAPPER,VERMILION | 64.91% | 29.48% | 29.48% |
| GROUPER,GAG | 60.43% | 13.21% | 42.69% |
| SCAMP | 63.59% | 8.62% | 51.31% |
| AMBERJACK,GREATER | 38.01% | 6.56% | 57.87% |
| TRIGGERFISH,GRAY | 53.92% | 5.80% | 63.67% |
| SNAPPER,RED | 100.00% | 5.09% | 68.75% |
| GROUPER,RED | 56.06% | 4.86% | 73.61% |
| JACK,ALMACO | 32.83% | 3.40% | 77.02% |
| GROUPER,BLACK | 11.35% | 2.53% | 79.55% |
| GROUPER,SNOWY | 16.84% | 1.70% | 81.25% |
| KING MACKEREL | 29.24% | 1.50% | 82.75% |
| SEA BASSE,ATLANTIC,BLACK,UNC | 39.42% | 1.49% | 84.24% |

Table 4-6. Species taken on headboat trips when at least 1 red snapper was caught. Based on data from 2004-2006. Note: Data will be updated through 2007.

| Species | % trip | % number | Cum % number |
|---|---|---|---|
| Vermilion Snapper | 70.71% | 43.69% | 43.69% |
| Black Sea Bass | 82.41% | 19.80% | 63.48% |
| Tomtate | 23.56% | 4.83% | 68.31% |
| Gray triggerfish | 67.98% | 3.98% | 72.29% |
| Banded rudderfish | 15.66% | 3.16% | 75.45% |
| Red Snapper | 100.00% | 2.98% | 78.43% |
| Red porgy | 21.33% | 2.71% | 81.14% |
| White grunt | 11.66% | 2.57% | 83.71% |
| Greater amberjack | 50.12% | 2.21% | 85.92% |
| Gray snapper | 40.21% | 1.74% | 87.65% |
| Scamp | 30.20% | 1.69% | 89.34% |
| Bank sea bass | 13.31% | 0.90% | 90.25% |
| Scup | 2.07% | 0.71% | 90.95% |
| Whitebone porgy | 23.68% | 0.70% | 91.65% |
| Lane snapper | 30.14% | 0.69% | 92.34% |
| Gag | 54.03% | 0.65% | 92.99% |

Table 4-7. Species taken on MRFSS trips when at least 1 red snapper was caught. Based on data from 2004-2006. Note: Data will be updated through 2007.

| Species | % trip | % number | Cum % number |
|---|---|---|---|
| Vermilion snapper | 27.20% | 33.99% | 33.99% |
| black sea bass | 45.61% | 26.11% | 60.11% |
| red snapper | 100.00% | 5.21% | 65.32% |
| gray triggerfish | 20.96% | 4.80% | 70.12% |
| Tomtate | 20.96% | 2.89% | 73.00% |
| White grunt | 6.52% | 2.12% | 75.12% |
| Atlantic sharpnose shark | 19.97% | 1.71% | 76.83% |
| Gag | 17.42% | 1.70% | 78.53% |
| Round scad | 2.27% | 1.65% | 80.18% |
| king mackerel | 7.93% | 1.38% | 81.55% |
| red porgy | 9.07% | 1.37% | 82.92% |
| Scamp | 9.77% | 1.22% | 84.15% |
| greater amberjack | 8.92% | 1.19% | 85.34% |

It is anticipated the measures in the interim rule would become effective during summer 2009, which is when landings are highest in the commercial and headboat fisheries (Tables 4-8 and 4-9). Recreational landings (MRFSS) are highest during Wave 3 (May-June; Table 4-10). Furthermore, the interim rule would likely take effect during the spawning season for female red snapper off the southeastern United States, which extends from May to October with peak spawning during July through September (White and Palmer 2004).

Table 4-8. Percentage of red snapper (commercial) landed by month in FL, GA, SC, and NC during 2001-2006 (lbs gutted weight) by state and month.

| Month | Total | FL &GA | SC | NC |
|---|---|---|---|---|
| 1 | 8.47% | 8.69% | 8.38% | 7.00% |
| 2 | 8.63% | 9.62% | 6.76% | 5.49% |
| 3 | 9.29% | 9.94% | 7.56% | 8.50% |
| 4 | 9.91% | 10.05% | 9.15% | 10.73% |
| 5 | 10.75% | 10.59% | 9.90% | 14.21% |
| 6 | 11.14% | 11.52% | 9.65% | 11.94% |
| 7 | 8.25% | 7.72% | 9.11% | 10.40% |
| 8 | 6.14% | 5.83% | 6.47% | 7.89% |
| 9 | 4.56% | 4.68% | 4.00% | 5.03% |
| 10 | 7.46% | 6.95% | 9.40% | 6.58% |
| 11 | 8.86% | 7.53% | 13.68% | 7.12% |
| 12 | 6.53% | 6.89% | 5.94% | 5.11% |

Table 4-9. Average gag headboat landings 2001-2006 (percentage) by state and month.

| Month | Total | South FL | GA - NFL | SC | NC |
|---|---|---|---|---|---|
| 1 | 2.87% | 4.04% | 4.18% | 0.36% | 0.58% |
| 2 | 4.86% | 36.88% | 5.58% | 0.30% | 1.12% |
| 3 | 7.72% | 27.07% | 9.08% | 4.09% | 2.26% |
| 4 | 10.50% | 1.66% | 11.81% | 11.13% | 4.60% |
| 5 | 14.50% | 5.04% | 14.06% | 20.33% | 7.62% |
| 6 | 10.65% | 1.86% | 10.36% | 13.51% | 8.95% |
| 7 | 10.29% | 2.82% | 10.43% | 12.25% | 7.65% |
| 8 | 10.37% | 2.29% | 7.12% | 15.94% | 18.93% |
| 9 | 5.40% | 0.90% | 4.44% | 4.54% | 13.62% |
| 10 | 9.43% | 3.57% | 10.41% | 6.09% | 12.63% |
| 11 | 7.96% | 8.75% | 8.02% | 10.06% | 3.17% |
| 12 | 5.45% | 5.13% | 4.51% | 1.40% | 18.88% |

Table 4-10. Average red snapper MRFSS landings 2001-2006 (A+B1 Number, percent) by state and month.

| Wave | Total | FL | GA | SC | NC |
|---|---|---|---|---|---|
| 1 | 16.47% | 19.13% | 0.00% | 0.00% | 0.00% |
| 2 | 19.33% | 20.62% | 5.73% | 29.70% | 2.85% |
| 3 | 20.36% | 17.96% | 41.95% | 22.12% | 39.07% |
| 4 | 11.53% | 11.33% | 8.05% | 15.13% | 14.81% |
| 5 | 12.79% | 10.10% | 32.47% | 11.73% | 39.50% |
| 6 | 19.52% | 20.85% | 11.80% | 21.32% | 3.77% |

If the interim rule were to go into effect on June 1, 2009, **Alternative 2** would prohibit recreational and commercial harvest of red snapper during June through November, which includes the period of peak spawning and when 46% of the landings have occurred in recent years (Tables 4-11 and 4-12). The biological effect of **Alternative 2** would be greater than **Alternative 3**, which would close fishing for or retention of red snapper during June through September when 30% of landing have historically occurred. Similar to **Alternative 2**,

**Alternative 3** would prohibit fishing for and retention of red snapper during the period of peak spawning if measures were put into place during June 2009.

As mentioned previously, due to high release mortality rates, only an 18.6% reduction would be expected in total removals during a complete closure for red snapper if there was no reduction in effort for other snapper-grouper species and all fish previously retained were now discarded. (Table 4-12). However, the actual reduction in release mortality would be expected to be greater due to requirements in Amendment 16 to use venting and dehooking tools. Furthermore, it is expected fishermen can avoid red snapper to some degree by adjusting fishing behavior or avoiding hot spots where red snapper may be particularly abundant. Therefore, both **Alternatives 2 and 3** would have positive biological effects including protecting individuals in spawning condition, enhancing reproductive success, and increasing the magnitude of recruitment.

Table 4-11. Average commercial, headboat, and MRFSS landings (lbs gutted weight) during 2001-2006.

| Month | comm | HB | MRFSS | Total | % |
|---|---|---|---|---|---|
| 1 | 10,832 | 1,401 | 36,724 | 48,957 | 7.38% |
| 2 | 11,036 | 2,373 | 36,724 | 50,133 | 7.55% |
| 3 | 11,869 | 3,770 | 49,507 | 65,147 | 9.82% |
| 4 | 12,668 | 5,127 | 49,507 | 67,302 | 10.14% |
| 5 | 13,736 | 7,078 | 50,623 | 71,437 | 10.76% |
| 6 | 14,243 | 5,203 | 50,623 | 70,068 | 10.56% |
| 7 | 10,550 | 5,025 | 29,613 | 45,187 | 6.81% |
| 8 | 7,852 | 5,066 | 29,613 | 42,531 | 6.41% |
| 9 | 5,825 | 2,637 | 31,013 | 39,475 | 5.95% |
| 10 | 9,533 | 4,604 | 31,013 | 45,150 | 6.80% |
| 11 | 11,319 | 3,888 | 46,040 | 61,247 | 9.23% |
| 12 | 8,343 | 2,660 | 46,040 | 57,043 | 8.60% |
| Total | 127,806 | 48,832 | 487,038 | 663,677 | |
| % | 19.26% | 7.36% | 73.38% | | |

Table 4-12. Average landings, discards, and total removals (in number) for 2004-2006. Annual landings divided into month using proportions from ALS, Headboat, and MRFSS landings. Total removals determined by applying SEDAR 15 (2008) accepted release mortality rates to discarded fish.

| Month | Landings | Discards | Current Total Removals | Total removals with no RS harvest |
|---|---|---|---|---|
| 1 | 3,206 | 11,122 | 8,400 | 7,014 |
| 2 | 3,381 | 12,133 | 8,930 | 7,403 |
| 3 | 5,313 | 20,407 | 14,273 | 11,659 |
| 4 | 5,493 | 21,055 | 14,748 | 12,052 |
| 5 | 5,709 | 21,163 | 15,200 | 12,513 |
| 6 | 4,929 | 19,119 | 13,274 | 10,820 |
| 7 | 3,765 | 14,056 | 10,041 | 8,253 |
| 8 | 3,475 | 13,451 | 9,353 | 7,626 |
| 9 | 3,734 | 15,462 | 10,231 | 8,216 |

| Month | Landings | Discards | Current Total Removals | Total removals with no RS harvest |
|---|---|---|---|---|
| 10 | 4,924 | 19,453 | 13,323 | 10,814 |
| 11 | 4,848 | 18,899 | 13,074 | 10,645 |
| 12 | 4,519 | 18,352 | 12,317 | 9,935 |
| Total | 53,296 | 204,670 | 143,164 | 116,948 |

**Alternative 1** will perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. **Alternatives 2-3** and are unlikely to have adverse affects on ESA-listed species. Previous ESA consultations determined the snapper-grouper fishery was not likely to adversely affect these species. These alternatives are unlikely to alter fishing behavior in a way that would cause new adverse affects to protected species. The impacts from **Alternatives 2-3** on sea turtles and smalltooth sawfish are unclear. If they perpetuate the existing amount of fishing effort, but cause effort redistribution, any potential effort shift is unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. If these alternatives result in an overall reduction of fishing effort in the snapper-grouper fishery, the risk of interaction between sea turtles and smalltooth sawfish will likely decrease.

### 4.1.2 Economic Effects

In the following assessment, the expected changes in the economic value of the respective sectors were assessed independently and used two different dollar bases, 2007 dollars for the commercial sector and 2008 dollars for the recreational sector. The assessment of the commercial sector used 2007 dollars to be consistent with the last year of data used in the modeling exercise, which included fishery data from 2003-2007. The assessment of the recreational sector used 2008 dollars to be consistent with the source material from which key parameter estimates were taken (NOAA 2008). Standardization of the resultant estimates into a common base year has not been attempted. The absence of standardization will not adversely affect the use of these results, however, because the effects for each sector will be presented and discussed separately, the results will not be combined, and the different base years does not affect the ranking of the alternatives in terms of the magnitude of economic effect.

#### Commercial Sector

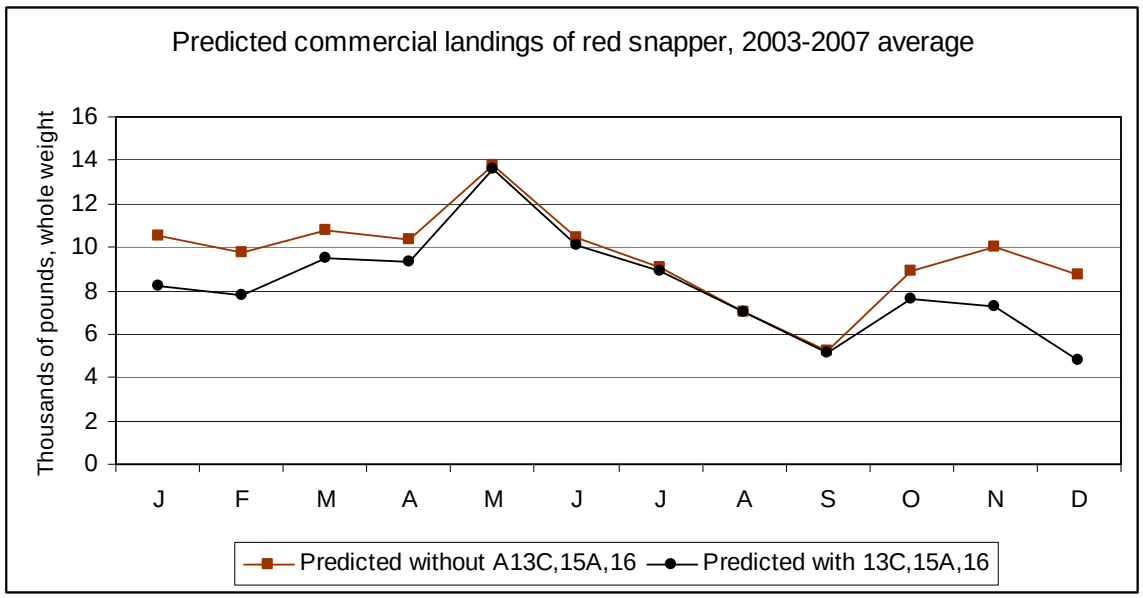
A description of the historical data on the commercial snapper-grouper and red snapper fisheries is contained in Section 3.4.1.1. However, historical data do not reflect the effects of regulations that were recently implemented or expected to be implemented soon by NMFS. Amendment 13C to the Snapper-Grouper Fishery Management Plan was implemented in October 2006 and Amendment 15A was implemented in March 2008. Both amendments primarily regulated the harvest of deep water groupers, tilefish and black sea bass. Amendment 16, if implemented, will impose limits on the harvest of vermilion snapper, gag, and other shallow-water groupers. Although Amendments 13C, 15A, and 16 do not specifically restrict the harvest of red snapper, landings of red snapper are expected to decline because they are caught most commonly on trips where vermilion snapper, gag, or scamp are the primary revenue species on the trip.

To establish the appropriate baseline for the current action, a simulation model was used to predict the effects of Amendments 13C, 15A, and 16 on commercial fishing activity. As seen in

Figure 4-6, these amendments are predicted to reduce average annual landings of red snapper to less than 100,000 pounds, whole weight, with most of the reductions to occur between October and April. The fishery for gag is already closed in March and April. Amendment 16 would prohibit the harvest of all shallow-water groupers from January through April, which would also be expected to reduce landings of red snapper. In addition, the annual quotas for gag and vermilion snapper are predicted to be filled in the fall, which would close the fisheries for these species and all other shallow-water groupers and indirectly reduce red snapper landings.

The simulation model used logbook trip reports from 2003-2007 to predict the short-term economic effects of alternative prohibitions on the harvest of red snapper. The general method of analysis was to hypothetically impose the proposed regulations on individual fishing trips, as reported to the logbook database, and calculate the effects on trip catches, revenues, and costs. A five-year average of simulated results was used to estimate the expected effects of the proposed regulations to average out any anomalies that data from any one year may have had on fishing success.

Figure 4-6. Predicted seasonal distribution of red snapper landings, without and with the simulated effects of Snapper-Grouper Amendments 13C, 15A and 16.




The simulated fishing incomes net of trip costs for the proposed alternatives were compared to the status quo no-action alternative (baseline) to estimate the expected economic effects on commercial fishermen. For the purposes of this analysis, the no-action alternative is defined by the predicted landings of red snapper given the rules specified in Amendments 13C, 15A, and 16.

Net operating revenues for trip *j* in year *t* were calculated as trip revenues from all species minus predicted trip costs, which include fuel, oil, bait, ice, and other supplies, and exclude fixed costs and labor costs. Fixed costs were not deducted because data are not available with which to determine the fraction of each boat's fixed costs that should be allocated to red snapper relative to other fishing activities. Therefore, the net operating revenues (NOR) represent the return to the fixed factors of production, labor (including crew), and the boat owner. The NOR were

adjusted to constant 2007 dollars with the consumer price index for all items and all urban consumers.

Red snapper is part of the mid-shelf snapper-grouper complex that includes scamp, gag, vermilion snapper, red porgy, gray triggerfish, and red grouper, among other species. In the simulation model, if the proposed alternative caused trip revenues to fall below the sum of trip costs and the opportunity cost for labor after accounting for the likely effects of the proposed restrictions on trip-level harvests, then the trip was recorded as not taken, and losses were measured as a reduction in net operating revenues, which included the loss in revenues from all species minus the savings of trip costs not incurred. This situation is most likely to occur when red snapper is the primary source of trip revenue. According to logbook trip reports from 2003-2007, red snapper was the primary source of trip revenue on an average of 163 trips per year, and a lesser source of revenue on 1,222 trips per year. Most of the trips on which red snapper was not the primary source of trip revenue are expected to remain profitable even when the harvest of red snapper is prohibited. In this case, losses to fishermen can be approximated as the ex-vessel value of red snapper not harvested due to the prohibitions.

Ten management scenarios were simulated. One scenario simulated the fishery without an interim rule for red snapper, eight scenarios simulated the effects of prohibitions on the harvest of red snapper, with 4 and 6 month closures beginning in either June, July, August, or September, and one scenario simulated the fishery prior to regulations implemented by Amendments 13C, 15A and 16 to serve as a baseline from which to measure the cumulative effects of recent regulations for the snapper-grouper fishery. The estimates of the expected change in NOR and fishing trips relative to the status quo are provided in Table 4-13.

Table 4-13. Average estimated change in vessel net operating revenue (NOR) and number of fishing trips associated with the prohibition of red snapper harvest, 2003-2007.

| | 4-Month Prohibition | | |
|---|---|---|---|
| Period | NOR | % | Trips Lost |
| June-September | $91,000 | 1.07% | 35 |
| July-October | $85,000 | 1.00% | 29 |
| August-November | $79,000 | 0.94% | 34 |
| September-December | $74,000 | 0.88% | 39 |
| | | | |
| | 6-Month Prohibition | | |
| | NOR | % | Trips Lost |
| June-November | $135,000 | 1.60% | 55 |
| July-December | $120,000 | 1.42% | 55 |
| August-January | $116,000 | 1.38% | 59 |
| September-February | $120,000 | 1.41% | 68 |

Under **Alternative 1**, the status quo, the red snapper commercial fishery could continue to operate as it currently does, with no short term reductions in the number of harvested fish, trips taken, or changes in economic value. Because the resource is overfished, however, these conditions would not be expected to persist, nor could they legally be allowed to continue. Biological conditions in the resource would be expected to worsen, requiring more stringent harvest restrictions than those considered here. The absence of action at this time would be

expected to adversely affect more permanent regulations. These actions have not yet been developed and the specific resultant economic effects are currently unknown.

**Alternative 2** would prohibit all harvest (retention) and sale of all red snapper from the South Atlantic EEZ as well as red snapper harvested by federally permitted vessels that fish in state waters. This prohibition could stay in effect for 180 days and could be extended for an additional 186 days, thereby remaining in effect for one full year. The target date for implementation is assumed to be June 1. It is expected that the prohibition would remain in effect until replaced by permanent action implemented through plan amendment. A June-November prohibition on the harvest of red snapper would be expected to result in a total reduction in NOR of approximately $135,000, or a reduction in NOR of approximately two percent, and reduce the number of historic average fishing trips during this period by 55 trips. Assuming the implementation of the prohibition is delayed no longer than September, the range of projected reductions in NOR relative to the status quo is approximately $116,000 (August-January) to $135,000 (June-November), and 55 (June-November and July-December) to 68 trips (September-February).

If **Alternative 2** is extended to a full year, the expected reduction of NOR is approximately $289,000 and approximately 142 trips would be expected to be lost. These estimates are higher than might be expected associated with the alternative six-month scenarios because extension of the prohibition to an annual closure would affect more winter and spring months (January through May) when red snapper harvests are historically higher.

**Alternative 3** would prohibit all harvest (retention) and sale of all red snapper from the South Atlantic EEZ as well as red snapper harvested by federally permitted vessels that fish in state waters for four months. The target date for implementation is assumed to be June 1. It is expected that the prohibition would remain in effect until replaced by permanent action implemented through plan amendment. A June-September prohibition on the harvest of red snapper would be expected to result in a total reduction in NOR of approximately $91,000, or a reduction in NOR of approximately one percent, and reduce the number of historic average fishing trips during this period by 35 trips. Assuming the implementation of the prohibition is delayed no longer than September, the range of projected reductions in NOR relative to the status quo is approximately $74,000 (September-August) to $91,000 (June-September), and 29 (July-October) to 39 trips (September-December). **Alternative 3** could not be extended. Continuation of the harvest prohibition would require the development of a new management action, with associated development and implementation costs. The expected economic effects on the fishery, however, would be expected to be as provided in Table 4-15.

**Recreational Sector**

The methodology employed in this assessment follows the methodology employed in NOAA (2008). NOAA (2008) analyzed the expected economic effects of a closure of the red snapper fishery in the Gulf of Mexico in 2008. The methodology for that assessment is thoroughly documented in that report and is incorporated herein by reference.

This assessment evaluated the expected change in economic value relative to the status quo to fishermen and for-hire vessels in response to the proposed alternatives. The change in economic value was measured in terms of the consumer surplus (CS) per angler fishing trip and net

operating revenues (NOR) to for-hire businesses. Estimates of the CS lost on each fishing trip when the harvest of red snapper harvest is prohibited and the NOR lost if a for-hire trip is canceled are provided in NOAA (2008). Specifically, starting from a 2-fish bag limit, the loss in CS on each trip when an angler cannot keep any red snapper is estimated to be $53.53 in 2008 dollars. The estimated NOR per individual angler charterboat and headboat trip is $162 and $78 (2008 dollars each), respectively.

Computation of the total expected change in economic value associated with this action involved multiplication of the change in the appropriate economic value, as described in the previous paragraph, times the appropriate number of red snapper individual angler target trips. The number of red snapper target trips was calculated using the methods described in Holiman (1996). This methodology applies only to the MRFSS data, which includes recreational fishing data for the shore, charterboat, and private/rental boat fishing modes.

The headboat data does not contain information collected at the angler level, nor does it collect target intent information. Therefore, an alternative approach to estimating target effort was required for the headboat sector. Based on examination of landings, this assessment assumed that all headboat trips (angler days) in Georgia and northeast Florida (GA-NEFL; NEFL consisted of Mayport south through the Cape Canaveral area) targeted red snapper. This assumption is expected to result in an overestimation of the amount of true red snapper target effort from these areas as some trips may not fish were red snapper are available, and many anglers would be expected to not be concerned with targeting any specific species. Although the majority of headboat red snapper harvest comes from Florida, some red snapper are also routinely harvested by South Carolina and North Carolina headboat fishermen. Use of the GA-NEFL effort estimates does not capture this effort. Overall, though, the GA-NEFL estimates of red snapper target effort are expected to fully compensate for the exclusion of trips from other areas and still overestimate true red snapper target effort by an unknown amount. The estimates of red snapper target trips for all sectors are provided in Table 4-14.

The expected change in the CS as a result of the proposed alternatives was computed by multiplying the number of red snapper target trips times the expected change in CS per trip ($53.53). Because the number of red snapper target trips used is likely an overestimate of the true number of trips, as discussed in the previous paragraph, the resultant estimate of the change in CS is also likely an overestimate of the true change in CS. The estimate of the expected change in CS may also differ from the true value because the value of the expected change in CS per trip used ($53.53) may be incorrect for headboat trips. As described in NOAA (2008), the expected change in CS per trip was derived from data collected from private and charterboat anglers. Headboat anglers may value red snapper differently, on average, than private and charterboat anglers. The direction of difference is unknown, though the higher cost of fishing to charterboat anglers suggests the expected change in CS to headboat anglers would be less than that to charterboat anglers. Nevertheless, overall, the effect of using too large an estimate of target effort is expected dominate the effects of using an incorrect measure of value per trip, such that the net effect is an overestimation of the expected change in CS as a result of the proposed alternatives.

Table 4-14. Average red snapper target effort in the South Atlantic, by month, 2003-2007.

| | Jun | Jul | Aug | Sep | Oct | Nov | Avg Annual | 6-mon sum | 4-mon sum |
|---|---|---|---|---|---|---|---|---|---|
| Private | 3,771 | 4,915 | 4,915 | 2,530 | 2,530 | 2,467 | | 21,129 | 16,131 |
| Charterboat | 299 | 421 | 421 | 118 | 118 | 223 | | 1,600 | 1,259 |
| Headboat | 7,528 | 8,609 | 5,295 | 1,995 | 2,468 | 2,133 | | 28,028 | 23,427 |
| All | 11,598 | 13,945 | 10,631 | 4,644 | 5,117 | 4,823 | | 50,757 | 40,818 |
| | | | | | | | | | |
| | | | | | | | | | |
| | Dec | Jan | Feb | Mar | Apr | May | Avg Annual | 6-mon sum | |
| Private | 2,467 | 1,247 | 1,247 | 5,435 | 5,435 | 3,771 | 3,394 | 19,601 | |
| Charterboat | 223 | 93 | 93 | 165 | 165 | 299 | 220 | 1,038 | |
| Headboat | 2,069 | 1,775 | 2,337 | 4,919 | 5,818 | 5,811 | 4,230 | 22,730 | |
| All | 4,760 | 3,115 | 3,677 | 10,519 | 11,418 | 9,881 | 7,844 | 43,369 | |

The expected change in NOR was computed by multiplying the average NOR per trip times the appropriate number of red snapper target trips. The analysis assumed all red snapper target trips would be cancelled. This assumption is expected to result in overestimation of the actual number of trips lost to the fishery. In reality, most red snapper anglers would be expected to continue to fish, but shift their effort to other species. Target effort for grouper, dolphin, and king mackerel was projected to increase from 13 percent (grouper) to 31 percent (dolphin) in response to the red snapper closure in the Gulf of Mexico (NOAA 2008).

The relatively minor apparent importance of red snapper as a target species in the South Atlantic, as demonstrated by the low incidence of either target or catch effort (see Section 3.4.1.2.2) and ranking within bags or total harvest (see Section 3.4.1.2.1), suggests there is little reason to expect widespread reduction in fishing trips from historic levels, in lieu of continued fishing for other species, in the event of the imposition of a zero bag limit for red snapper. However, it is noted that the likelihood of switching target species would be influenced by resource and management conditions for those other species. Given recent implemented or proposed management measures whereby harvest opportunities for other recreational species are becoming increasingly restricted (see SAFMC 2008b), the opportunity of switching is diminished and the likelihood of trip cancellation increased. As a result, it is possible and reasonable to expect that some trip reductions might occur in response to red snapper harvest prohibitions. Overall, while the assumption that all red snapper target trips would be canceled in response to a red snapper harvest prohibition is expected to be an exaggeration of actual likely effects, the use of this measure of effort is expected to adequately account for the true total of any trip reductions and serve as an acceptable upper bound.

In summary, this assessment estimated the change in CS associated with red snapper target trips (CS per trip times total number of target trips), and the change in NOR to for-hire vessels resulting from the reduction of red snapper target trips (NOR per trip times the number of red snapper target trips). When taken alone, the expected change in CS assumes no trip cancellation occurs in response to the harvest prohibition and is assumed to constitute a lower bound to the expected change in economic value relative to the status quo. When the change in NOR is added to the change in CS, the resultant sum is assumed to constitute an upper bound to the expected change in economic value relative to the status quo. The respective estimates of the expected changes in CS and NOR are provided in Table 4-15. These estimates encompass all trips regardless of considerations of whether they would be expected to occur in state waters or the

EEZ. As such, these estimates assume compatible regulations by all states. Estimates of target effort by area fished are not available. Approximately 19 percent, on average, of all private/rental boat trips occurred in the EEZ for 2003-2007, whereas approximately 59 percent of all charterboat trips occurred in the EEZ. Across the two sectors combined, approximately 21 percent of all trips occurred in the EEZ. However, approximately 95 percent of the average annual catch of red snapper by the private and charterboat sectors from 2003-2007 were caught in the EEZ, so the vast majority of target trips also likely occurred in these waters. Similar information is not available for the headboat sector. Nevertheless, it is noted that the effects described will be reduced by some unknown amount if states do not adopt compatible regulations.

Table 4-15. Average estimated change in economic value (2008 $), consumer surplus (CS) and vessel net operating revenue (NOR), associated with the loss of red snapper (fish) or red snapper fishing trips, by month, 2003-2007.

| | Jun | Jul | Aug | Sep | Oct | Nov | Avg Annual | 6-mon sum | 4-mon sum |
|---|---|---|---|---|---|---|---|---|---|
| CS – Trips | $620,820 | $746,476 | $569,067 | $248,604 | $273,892 | $258,159 | | $2,717,017 | $2,184,966 |
| NOR – CB | $48,406 | $68,186 | $68,186 | $19,181 | $19,181 | $36,077 | | $259,216 | $203,958 |
| NOR – HB | $587,184 | $671,502 | $412,994 | $155,641 | $192,488 | $166,343 | | $2,186,153 | $1,827,322 |
| Sum | $1,256,409 | $1,486,164 | $1,050,247 | $423,426 | $485,561 | $460,579 | | $5,162,386 | $4,216,246 |
| | | | | | | | | | |
| | | | | | | | | | |
| | Dec | Jan | Feb | Mar | Apr | May | Avg Annual | 6-mon sum | |
| CS – Trips | $254,776 | $166,757 | $196,841 | $563,066 | $611,200 | $528,919 | $419,881 | $2,321,559 | |
| NOR – CB | $36,077 | $15,066 | $15,066 | $26,795 | $26,795 | $48,406 | $35,618 | $168,205 | |
| NOR – HB | $161,413 | $138,466 | $182,302 | $383,666 | $453,804 | $453,274 | $329,923 | $1,772,924 | |
| Sum | $452,267 | $320,288 | $394,208 | $973,527 | $1,091,799 | $1,030,598 | $785,423 | $4,262,688 | |

Under **Alternative 1**, the status quo, the red snapper recreational fishery could continue to operate as it currently does, with no short term reductions in the number of harvested fish, trips taken, or changes in economic value. Because the resource is overfished, however, these conditions would not be expected to persist, nor could they legally be allowed to continue. Biological conditions in the resource would be expected to worsen, requiring more stringent harvest restrictions than those considered here. The absence of action at this time would be expected to adversely affect more permanent regulations. These actions have not yet been developed and the specific resultant economic effects are currently unknown.

**Alternative 2** would prohibit all harvest (retention) of red snapper in the South Atlantic EEZ as well as red snapper harvested by federally permitted for-hire vessels that fish in state waters. This prohibition could stay in effect for 180 days and could be extended for an additional 186 days, thereby remaining in effect for one full year. The target date for implementation is assumed to be June 1. It is expected that the prohibition would remain in effect until replaced by permanent action implemented through plan amendment. Assuming no trip cancellations and the adoption of compatible state regulations, a June-November prohibition on the harvest of red snapper would be expected to result in a total reduction in CS of approximately $2.7 million (2008 dollars) relative to the status quo (Table 4-15). The expected effects of alternative six-month periods generated by implementation delay can be tabulated by addition of the appropriate monthly totals. However, it should be noted that because the June value is one of the largest,

delayed implementation would be expected to reduce the six-month total effect. Extension of the prohibition to a full year would be expected to result in a reduction in CS of approximately $5.0 million. These values are assumed to constitute the lower bound of the expected change in economic value to the recreational fishery as a result of **Alternative 2**.

Under the assumption that the prohibitions of **Alternative 2** result in the cancellation of all red snapper target trips during the respective months, in addition to the reduction in CS, a June-November prohibition on the harvest of red snapper would be expected to result in a reduction in NOR of approximately $259,000 to charterboat vessels, and a reduction in NOR of approximately $2.2 million to headboats, or a total reduction in economic value of approximately $5.2 million, assuming the adoption of compatible state regulations. Extension of the prohibition to a full year would be expected to result in a reduction in economic value of approximately $9.4 million (CS and NOR). There is little expectation that all red snapper target trips would be cancelled under **Alternative 2**. As discussed above and in Section 3.4.1.2.1, on average, red snapper is only the third most important species in terms of the numbers of fish caught on private and charter trips and the fifteenth most important species in terms of the number of pounds of fish harvested on headboat trips. Thus, most of the historic trips that previously targeted red snapper would be expected to continue to be taken but would target other species. Absent specific data, however, to suggest the proportion of red snapper target trips that would be expected to be cancelled, this analysis simply assumes the cancellation of all red snapper target trips constitutes an upper bound of the expected change in economic value to the recreational fishery as a result of **Alternative 2**. Overall, **Alternative 2** is expected to result in a reduction in short term economic value of $2.7-$5.2 million if the action is implemented for six months and $5.0-$9.4 million if extended to a full year. As discussed above, these effects may be reduced by an unknown amount if the states do not adopt compatible regulations.

The distribution of effects, in terms of state and mode, would be expected to follow the distribution of target effort. Red snapper target effort primarily occurs in Florida. The headboat sector appears to be the largest target mode, but this may be due only because of the assessment assumptions and, as discussed above, overall, the estimates of headboat effort are believed to exceed actual totals. Nevertheless, the reductions in economic value discussed above would be expected to primarily accrue to Florida anglers in the private/rental and headboat sectors.

**Alternative 3** would prohibit all harvest (retention) of red snapper in the South Atlantic EEZ as well as red snapper harvested by federally permitted for-hire vessels that fish in state waters for four months from the time of implementation of the action. Similar to **Alternative 2**, the target date for implementation is assumed to be June 1. It is expected that the prohibition would remain in effect until replaced by permanent action implemented through plan amendment. A June-September prohibition on the harvest of red snapper would be expected to result in a total reduction in CS of approximately $2.2 million (2008 dollars) relative to the status quo (Table 4-15). The expected effects of alternative four-month periods generated by implementation delay can be tabulated by addition of the appropriate monthly totals. However, as with the six-month closure, it should be noted that because the June value is one of the largest, delayed implementation would be expected to reduce the four-month total effect. **Alternative 3** could not be extended. Continuation of the harvest prohibition would require the development of a new management action, with associated development and implementation costs. The expected economic effects on the fishery, however, would be expected to be as provided in Table 4-15. As per the discussion for **Alternative 2**, these values are assumed to constitute the lower bound

of the expected reduction in economic value to the recreational fishery as a result of **Alternative 3**.

Under the assumption that the prohibitions of **Alternative 3** result in the cancellation of all red snapper target trips during the respective months, in addition to the reduction in CS, a June-September prohibition on the harvest of red snapper would be expected to result in a reduction in NOR of approximately $204,000 to charterboat vessels, and a reduction in NOR of approximately $1.8 million to headboats, or a total reduction in economic value of approximately $4.2 million. As with **Alternative 2**, there is little expectation that all red snapper target trips during the respective months would be cancelled under **Alternative 3**. Nevertheless, some trip cancellation would be expected among both target and generalist trips and this analysis simply assumes the cancellation of all red snapper target trips during the respective months constitutes an upper bound of the expected change in economic value to the recreational fishery as a result of **Alternative 3**. Overall, **Alternative 3** is expected to result in a reduction in short term economic value of $2.2-$4.2 million. As with **Alternative 2**, these effects could be reduced by an unknown amount if the states do not adopt compatible regulations.

### 4.1.3 Social Effects

Under **Alternatives 2 and 3**, fishermen harvesting red snapper would likely suffer reductions in catch and some reduction in revenue. This could have negative but possibly limited social effects for fishermen because these actions occur during a time of increasing regulation and economic distress. The impacts would be more severe under **Alternative 2** rather than the seasonal closure under **Alternative 3**. Due to the rather limited harvest for red snapper, the impacts should be minimal or at least will be localized to those areas where the landings and losses would be greater. Central to Northern Florida and Southern Georgia would likely see greater impacts than other regions as these are where most of the landings and harvest take place. Although, red snapper landings do not constitute a substantial amount of overall commercial landings of snapper-grouper for these areas, there may still be some social and economic disruption. The same is true for recreational fishermen who will need to adjust the closure. Because Florida has the most targeted recreational trips and harvest of red snapper, it is assumed that those areas with the most commercial harvest are also the same areas where the most recreational harvest takes place. There would likely be a redirecting of effort to other species to compensate for lost revenue or for lost opportunities for charter and recreational fishermen, when possible. This may place increased pressure on other fisheries that may also require increased management. However, because landings and targeting behavior are limited, these may be relatively small impacts. It is unlikely these disruptions would cause any type of job loss or temporary shut down of operations, however, the nation is in the midst of a drastic economic downturn and it is not clear how resilient some of the fishing communities or counties may be at this time. Fishing businesses, fish houses, marinas and other fishing related businesses may be experiencing numerous other social and economic impacts that stem from the larger economic recession that are immeasurable at this time. As discussed under community descriptions, some areas are experiencing the effects of gentrification where property values and taxes may be increasing making it difficult for some working waterfronts to remain. The extent of these regulations under **Alternatives 2 and 3** could exacerbate those impacts if occurring. However, because red snapper revenues and target harvesting are relatively small when compared to other snapper-grouper species, it is unlikely that there will be substantial social disruption as a result.

**Alternative 1**, the no action alternative, would have the least impact in the short term. However, it would delay the recovery of red snapper in the long term which may have deleterious impacts as management was extended over a longer period of time.

### 4.1.4 Administrative Effects

**Alternative 1** would place no new administrative burden on the agency as current management measures would remain in place and no new management measures or enforcement burden would be created. However, if measures to reduce overfishing are not immediately implemented, there is a high likelihood that future management measures would need to be more restrictive to end overfishing of red snapper. If that does occur, the administrative and enforcement burden may grow.

**Alternative 2 and Alternative 3** would have similar administrative burdens as both would require coordination between NOAA Fisheries, NOAA Office of Law Enforcement, and the US Coast Guard, as well as state and local enforcement offices. These alternatives would also require the development of outreach materials such as fishery bulletins, web page content, and other education to ensure compliance with the interim regulations.

**Alternative 2** would have a slightly higher enforcement burden as the closure would extend through the duration of the interim rule period (180 days with a possible extension for another 186 days) while **Alternative 3** would only be implemented for 4 months from the time of publication in the *Federal Register*.

A seasonal closure restricting the harvest of only one snapper-grouper species would require enforcement officers to either board a vessel at sea or witness fishermen landing prohibited species dockside. Enforcement of these management measures would put a heavy burden on an already burdened enforcement staff.

## 4.2 Bycatch Practicability Analysis

The South Atlantic Council is required by MSFCMA §303(a)(11) to establish a standardized bycatch reporting methodology for federal fisheries and to identify and implement conservation and management measures that, to the extent practicable and in the following order, (A) minimize bycatch and (B) minimize the mortality of bycatch that cannot be avoided. The MSFCMA defines bycatch as "fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch-and-release fishery management program" (MSFCMA §3(2)). Economic discards are fish that are discarded because they are undesirable to the harvester. This category of discards generally includes certain species, sizes, and/or sexes with low or no market value. Regulatory discards are fish that are required by regulation to be discarded, but also include fish that may be retained but not sold.

NMFS outlines at 50 CFR §600.350(d)(3)(i) ten factors that should be considered in determining whether a management measure minimizes bycatch or bycatch mortality to the extent practicable. These are:

1. Population effects for the bycatch species;
2. Ecological effects due to changes in the bycatch of that species (effects on other species in the ecosystem);
3. Changes in the bycatch of other species of fish and the resulting population and ecosystem effects;
4. Effects on marine mammals and birds;
5. Changes in fishing, processing, disposal, and marketing costs;
6. Changes in fishing practices and behavior of fishermen;
7. Changes in research, administration, enforcement costs and management effectiveness;
8. Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources;
9. Changes in the distribution of benefits and costs; and
10. Social effects.

Agency guidance provided at 50 CFR §600.350(d)(3)(ii) suggests the Councils adhere to the precautionary approach found in the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (Article 6.5) when faced with uncertainty concerning these ten practicability factors. According to Article 6.5 of the FAO Code of Conduct for Responsible Fisheries, using the absence of adequate scientific information as a reason for postponing or failing to take measures to conserve target species, associated or dependent species, and non-target species and their environment, would not be consistent with a precautionary approach.

### 4.2.1 Population Effects for the Bycatch Species

#### 4.2.1.1 Background

SEDAR 15 (2008) reported that the bulk of landings of red snapper come from the recreational fishery, which have exceeded the landings of the commercial fishery by 2-3 fold over the assessment period (1984-2006). Total landings were variable, with a downward trend through the 1990s. The base natural mortality (M) in the fishery was 0.078. This was assumed to be a constant over time, but varying with age because younger fish are much more vulnerable (for example, to predation) than larger, older fish. Red snapper do not change sex over their lifetimes, and studies supported a constant 50:50 sex ratio for the population. The mean generation time of 20 years was estimated from data (SEDAR 15 2008). A 20 inch TL limit for red snapper was instituted in 1992 (Amendment 4, SAFMC 1991), which is believed to have caused an increase in discarding. The dive fishery was assumed to generate no discards because of the selectivity of the method. Mortality rates used for discarded fish were 0.4 for the recreational fisheries and 0.9 for the commercial handline fishery. The higher release mortality in the commercial fishery is due to the depth at which the fish are caught, the effect of pressure changes as they are brought to the surface, and the length of time fish may be on deck before being returned to the water.

Management measures, which are currently in place to manage this species, include size limits (20 inch TL), gear restrictions for both commercial and recreational fisheries, a snapper-grouper commercial limited access fishing permit, and a bag limit of 2 red snapper included in the 10 snapper per person retention limit for the recreational fishery.

Management measures proposed in the interim rule would consider alternatives, with the exception of the no action alternative, targeting an immediate reduction in red snapper harvest in the South Atlantic region for the 2009 calendar year. These alternatives are described in detail in Sections 2.0 and 4.0.

### 4.2.1.2 Commercial Fishery

Detailed information on the commercial fishery can found in Section 3.XX.

During 2001 to 2006, approximately 20% of snapper-grouper permitted vessels from the Gulf of Mexico and South Atlantic were randomly selected to fill out supplementary logbooks. A small number of trips that reported discards but did not report numbers or species were not included in analyses. The average number of trips per year during 2001 to 2006 was 15,500 (Table 4-xx). Fishermen spent an average of 1.70 days at sea per trip.

Table 4-16. Snapper-grouper fishery effort for the South Atlantic.

| YEAR | Trips | Days | Days per Trip |
|---|---|---|---|
| 2001 | 17,283 | 29,940 | 1.73 |
| 2002 | 17,231 | 29,683 | 1.72 |
| 2003 | 16,586 | 27,680 | 1.67 |
| 2004 | 15,060 | 24,911 | 1.65 |
| 2005 | 13,773 | 22,880 | 1.66 |
| 2006 | 13,067 | 22,926 | 1.75 |
| Mean | 15,500 | 26,337 | 1.70 |

Source: NMFS SEFSC Logbook Program.

Since the discard logbook database represents a sample, data were expanded to estimate the number of discard fish in the whole fishery. The method for expansion was to (1) estimate the probability of discarding a species; (2) estimate the number of fish discarded per trip; and (3) estimate the number discarded in the whole fishery (total discarded = total trips * % trips discarding * discard number). For example in 2001, the total discards 22,627 = 17,283 total trips * 0.0571 trips discarding * 22.9 discards/trip. During 2001-2006, an average of 11,218 red snapper were discarded per year (Table 4-17). Applying a release mortality rate of 90%, the average dead discards during 2001-2006 would be 10,096.

Table 4-17. Annual number of trips reporting discards, percentage of trips that discarded red snapper, number of red snapper discarded per trip, and expanded number of discarded red snapper per year in the South Atlantic. Average number of trips during 2001-2006 was 15,500.
Source: NMFS SEFSC Logbook Program.

| YEAR | # trips reporting discards | Total trips | % trips discarding | # discards/trip | Expanded # of discards/yr | Dead Discards |
|---|---|---|---|---|---|---|
| 2001 | 67 | 17,283 | 5.71 | 22.9 | 22,627 | 20,364 |
| 2002 | 88 | 17,231 | 3.25 | 18.1 | 10,169 | 9,152 |
| 2003 | 48 | 16,586 | 1.33 | 20.5 | 4,540 | 4,086 |
| 2004 | 42 | 15,060 | 1.45 | 98.8 | 21,546 | 19,392 |
| 2005 | 57 | 13,773 | 2.26 | 16.2 | 5,028 | 4,525 |

| YEAR | # trips reporting discards | Total trips | % trips discarding | # discards/trip | Expanded # of discards/yr | Dead Discards |
|---|---|---|---|---|---|---|
| 2006 | 53 | 13,067 | 2.55 | 10.2 | 3,397 | 3,057 |
| Mean | 59.17 | 15,500 | 2.76 | 31.13 | 11,218 | 10,096 |

Table 4-18. The 50 most commonly discarded species during 2001-2006 for the South Atlantic. Values represent total for 2001-2006 from NMFS discard logbook.

| Species (Table 4-xx) | Number trips reported discarding the species | Number discarded |
|---|---|---|
| SEA BASS,ATLANTIC,BLACK,UNC | 595 | 100,992 |
| PORGY,RED,UNC | 1,091 | 81,062 |
| SNAPPER,VERMILION | 904 | 64,885 |
| MENHADEN | 162 | 22,445 |
| SHARK,DOGFISH,SPINY | 137 | 22,193 |
| SNAPPER,YELLOWTAIL | 1,934 | 18,758 |
| SNAPPER,RED | 442 | 12,088 |
| SCAMP | 871 | 10,373 |
| SEA BASS,ROCK | 120 | 9,510 |
| GROUPER,GAG | 694 | 4,657 |
| GRUNTS | 190 | 4,646 |
| GRUNT,WHITE | 80 | 4,575 |
| FINFISHES,UNC,BAIT,ANIMAL FOOD | 43 | 4,351 |
| SHARK,ATLANTIC SHARPNOSE | 184 | 4,232 |
| KING MACKEREL and CERO | 582 | 4,193 |
| SNAPPER,MANGROVE | 221 | 4,112 |
| GROUPERS | 85 | 3,991 |
| GROUPER,RED | 724 | 3,806 |
| SHARK,UNC | 457 | 3,780 |
| SHARK,DOGFISH,UNC | 50 | 3,543 |
| GROUPER,BLACK | 505 | 3,142 |
| GRUNT,TOMTATE | 29 | 2,727 |
| AMBERJACK,GREATER | 379 | 2,599 |
| HIND,SPECKLED | 211 | 2,479 |
| BLUEFISH | 67 | 2,474 |
| SHARK,DOGFISH,SMOOTH | 37 | 2,441 |
| SHARK,BLACKTIP | 186 | 2,409 |
| KING MACKEREL | 414 | 2,393 |
| BLUE RUNNER | 279 | 2,126 |
| SNAPPER,MANGROVE (Duplicate of 3760) | 200 | 2,035 |
| BALLYHOO | 44 | 2,009 |
| TRIGGERFISH,GRAY | 129 | 1,774 |
| TRIGGERFISHES | 154 | 1,628 |
| SHARK,SANDBAR | 100 | 1,550 |
| TUNA,LITTLE (TUNNY) | 280 | 1,538 |
| DOLPHINFISH | 240 | 1,465 |
| BONITO,ATLANTIC | 300 | 1,358 |

| Species (Table 4-xx) | Number trips reported discarding the species | Number discarded |
|---|---|---|
| SNAPPERS,UNC | 40 | 1,073 |
| SCUPS OR PORGIES,UNC | 101 | 1,054 |
| SHARK,TIGER | 78 | 1,034 |
| SKATES | 42 | 1,020 |
| FINFISHES,UNC FOR FOOD | 126 | 995 |
| AMBERJACK | 218 | 975 |
| BARRACUDA | 197 | 932 |
| SNAPPER,MUTTON | 228 | 879 |
| SPANISH MACKEREL | 91 | 815 |
| AMBERJACK,LESSER | 19 | 759 |
| PINFISH,SPOTTAIL | 41 | 595 |
| REMORA | 233 | 582 |
| CHUBS | 29 | 526 |

### 4.2.1.3 Recreational Fishery

For the recreational fishery, estimates of the number of recreational discards are available from MRFSS and the NMFS headboat survey. The MRFSS system classifies recreational catch into three categories:

- Type A - Fishes that were caught, landed whole, and available for identification and enumeration by the interviewers.

- Type B - Fishes that were caught but were either not kept or not available for identification.

    - Type B1 - Fishes that were caught and filleted, released dead, given away, or disposed of in some way other than Types A or B2.

    - Type B2 - Fishes that were caught and released alive.

A 20 inch TL size limit was implemented for red snapper in 1992 through Amendment 4 (SAFMC 1991). Due to the size limit, a large number of red snapper were released by recreational and headboat fishermen. Approximately 80% of the red snapper captured by recreational fishermen and 46% of red snapper caught on headboats were released in recent years. It is estimated that 32% of the fish caught by recreational fishermen and 18% of the fish captured by headboat fishermen will be released and die (Table 4-19). Dead discards were determined by applying a 40% release mortality rate to the number of fish released by recreational and headboat fishermen (SEDAR 15 2008).

Table 4-19. Estimated number total catch (A+B1+B2), harvests (A+B1), and released (B2) fish in numbers for the South Atlantic during 2001-2006.
Source: MRFSS Web Site.

| Species | Total | A+B1 | B2 | % B2 | Dead Discards | % Dead |
|---|---|---|---|---|---|---|
| Red snapper 2001-2006 | 1,045,248 | 213,892 | 831,356 | 80% | 332,542 | 32% |
| Red snapper mean | 174,208 | 35,649 | 138,559 | 80% | 55,424 | 32% |

Table 4-20. Total red snapper retained and released on sampled headboat trips during 2004-2007.

| **Species** | **Total** | **retained** | **released** | **% released** | **dead discards** | **% dead** |
|---|---|---|---|---|---|---|
| Red snapper 2004-2007 | 229,373 | 123,313 | 106,060 | 46% | 42,424 | 18% |
| Red snapper mean | 57,343 | 30,828 | 26,515 | 46% | 10,606 | 18% |

Source: NMFS Headboat survey.

Dead discards for red snapper have also been estimated by SEDAR 15 (2008) and are similar to estimates provided above (Table 4-20).

Table 4.21. Estimated time series of dead discards (1000 fish) for commercial handline (D.c.hal), headboat (D.hb), and general recreational (D.rec). Discards were assumed to be zero prior to implementation of regulations in 1984.

| Year | D.c.hal | D.hb | D.rec | Total |
|---|---|---|---|---|
| 1984 | 6.76 | 3.29 | 43.28 | 53.33 |
| 1985 | 3.34 | 2.77 | 28.97 | 35.08 |
| 1986 | 6.35 | 2.42 | 25.93 | 34.7 |
| 1987 | 13.62 | 8.1 | 20.22 | 41.94 |
| 1988 | 6.78 | 6.57 | 22.79 | 36.14 |
| 1989 | 2.51 | 1.43 | 9.06 | 13 |
| 1990 | 26.86 | 10.38 | 7.42 | 44.67 |
| 1991 | 3.69 | 2.15 | 7.15 | 12.99 |
| 1992 | 16.45 | 1.3 | 19.85 | 37.61 |
| 1993 | 16.06 | 9.8 | 21.69 | 47.56 |
| 1994 | 21.99 | 7.4 | 24.43 | 53.82 |
| 1995 | 21.71 | 11.28 | 17.88 | 50.87 |
| 1996 | 28.98 | 4.34 | 11.18 | 44.5 |
| 1997 | 30.32 | 1.37 | 8.13 | 39.82 |
| 1998 | 22.96 | 8.24 | 29.2 | 60.39 |
| 1999 | 20.65 | 7.31 | 62.02 | 89.98 |
| 2000 | 19.62 | 9.88 | 86.08 | 115.58 |
| 2001 | 21.3 | 18.91 | 79.67 | 119.88 |
| 2002 | 19.91 | 16.13 | 66.19 | 102.23 |
| 2003 | 17.03 | 10.23 | 63.63 | 90.89 |
| 2004 | 14.22 | 17.51 | 62.61 | 94.35 |
| 2005 | 13.74 | 15.85 | 59.88 | 89.47 |
| 2006 | 15.22 | 11.48 | 52.11 | 78.81 |

Source: SEDAR 15 Update, November 2008

### 4.2.1.4 Finfish Bycatch Mortality

SEDAR 15 (2008) estimates acute release mortality rates of red snapper to be 90% and 40% for the commercial and recreational fisheries, respectively, in the South Atlantic. A study by Burns et al. (2004) conducted on headboats off Florida in the Atlantic and Gulf of Mexico found a release mortality of 64 % for red snapper. The majority of acute mortalities in this study (capture depth of 9–42 m) were attributed to hooking (49%), whereas barotrauma accounted for 13.5%. An earlier study by Burns et al. (2002), also conducted in the Atlantic and Gulf of Mexico, had similar results, as J-hook mortality accounted for 56% of the acute mortalities of red snapper on headboats. Using tagging data and cage studies, Burns et al (2002) determined the depth at which 50% of the released red snapper would die is 43.7 m (143 feet). SEDAR 15 (2008) indicated red snapper were most often caught at depths of 141 to 190 feet by the recreational sector and 141 to 234 feet by the commercial sector.

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

***Red Snapper***

Red snapper ranked seventh out of the 10 most commonly discarded species in the commercial fishery in recent years (Table 4-18). A 20 inch TL size limit was implemented for red snapper for both the commercial and recreational sectors in 1992 through Amendment 4 (SAFMC 1991). Due to the size limit, a large number of red snapper were released by recreational and headboat fishermen. Approximately 80% of the red snapper captured by recreational fishermen and 46% of red snapper caught on headboats were released in recent years. It is estimated that 32% of the fish caught by recreational fishermen and 18% of the fish captured by headboat fishermen will be released and die (Tables 4-xx). Currently, there is also a bag limit of 2 red snapper included in the 10 snapper per person recreational bag limit. Dead discards were determined by a 40% release mortality rate to the number of fish released by recreational and headboat fishermen (SEDAR 15 2008).

Higher release mortality has been attributed to the commercial fishery in the South Atlantic than the recreational fishery due to different handling times and depths fished (SEDAR 15 2008). Commercial fishermen have been observed to hold fish on deck until fishing at a site has ceased. After fishing activity has slackened, fishermen measure and release undersized fish, contributing to higher post release mortality.

In this interim rule, two seasonal closures of the commercial and recreational fisheries are being considered to reduce the harvest of red snapper in the South Atlantic. **Alternative 2** would prohibit the harvest of red snapper in the EEZ of Florida, Georgia, South Carolina and North Carolina for the length of the 180 day interim rule. **Alternative 3** would establish regulations that would immediately implement (upon publication of notice in the *Federal Register*) a four month closure of the red snapper fishery. These alternatives would reduce the fishing pressure on the red snapper stocks in a timely manner, and enable them to start recovering in terms of biomass and increases in age/size.

Amendment 16 (under development), includes a management measure that requires the use of venting tools and dehooking devices, which could reduce discard and bycatch mortality in the

snapper-grouper fishery, including red snapper. Venting, when properly executed, is believed to increase survival of released fish. The use of venting tools may also reduce predation on reef fish species by allowing rapid return to depth making them less vulnerable to predators. Discarded fish stranded at the surface become easy prey for marine mammals, sea birds, and large predators such as amberjack, barracuda, and sharks (Burns *et al.* 2002). Dehooking devices can allow fishermen to remove hooks with greater ease and more quickly from snapper-grouper species without removing the fish from the water. If a fish does need to be removed from the water, dehookers could still reduce handling time in removing hooks, thus increasing survival.

A closed season for red snapper could be expected to reduce bycatch if there were some reduction in effort and targeting of the species. It is likely red snapper would still be caught when fishermen target co-occurring species. If there was no reduction in effort and fishermen were unable to avoid red snapper, an increase in bycatch would be expected. However, fishermen may be able to avoid locations where red snapper occur and adjust fishing methods to avoid catching red snapper. Red snapper bycatch mortality could also be reduced through alternatives that would require the use of venting tools and dehooking devices. Therefore, bycatch could decrease during a seasonal closure for red snapper. Even if bycatch does increase, an increased number of red snapper would be expected to survive since fish would not be retained by fishermen and a 60% survival rate is estimated for red snapper caught by recreational fishermen.

### 4.2.2 Ecological Effects due to Changes in the Bycatch

The ecological effects of bycatch mortality are the same as fishing mortality from directed fishing efforts. If not properly managed and accounted for, either form of mortality could potentially reduce stock biomass to an unsustainable level. Management alternatives proposed in the interim rule (closures) could reduce bycatch and would likely decrease overall mortality.

Overall fishing effort could decrease in the commercial and recreational sectors in response to more restrictive management measures, thereby reducing the potential for bycatch. Reduced fishing pressure would be expected to result in an increase in the mean size/age of red snapper. In addition, red snapper biomass would be expected to increase. Thus ecological changes could occur in the community structure of reef ecosystems through actions that would end overfishing.

Additional actions in Amendment 16 (under development), such as the use of venting tools and dehooking devices in the snapper-grouper fishery (including red snapper) could reduce bycatch mortality. Amendment 16 also proposes seasonal closures for shallow-water groupers and vermilion snapper, which co-occur with red snapper. Therefore, implementation of Amendment 16 is likely to reduce bycatch of red snapper. Amendment 17, which is under development to establish ACLs and catch limits for species undergoing overfishing may also include actions that could reduce bycatch of red snapper by reducing take of co-occurring species. The Comprehensive ACL Amendment (under development) for species in FMPs not experiencing overfishing could propose additional measures to reduce bycatch in the snapper-grouper fishery with the possible establishment of species units. Species grouping would be based on biological, geographic, economic, taxonomic, technical, social, and ecological factors. Each group would be represented by an indicator species that has been recently assessed or is scheduled for a SEDAR assessment in the future. Amendment 14, approved in January 2009, will establish

Marine Protected Areas in areas known to be ecologically important to red snapper and could also reduce bycatch of red snapper. Fishery-independent data indicate red snapper occur in MPAs located off South Carolina and northern Florida.

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

Management measures proposed in the interim rule are intended to address overfishing of red snapper. Proposed actions such as seasonal closures could increase the number of discards if fishermen are not able to avoid red snapper and there is no decrease in effort targeting the species. However, fishermen may be able to avoid locations where red snapper occur and adjust fishing methods to avoid catching red snapper. Red snapper bycatch mortality could also be reduced through alternatives that would require the use of venting tools and dehooking devices in Amendment 16, which should be implemented by the time the interim rule is implemented. Therefore, bycatch could decrease during a seasonal closure for red snapper. Even if bycatch does increase, an increased number of red snapper would be expected to survive since fish would not be retained by fishermen and a 60% survival rate is estimated for red snapper caught by recreational fishermen.

The management measures proposed in the interim rule could result in an effort shift to other species and fisheries causing a change in the magnitude of harvest and number of discards in those fisheries. Reduced fishing pressure on red snapper would be expected to result in an increase in the biomass and the mean size and age.

### 4.2.4 Effects on Marine Mammals and Birds

Under Section 118 of the Marine Mammal Protection Act (MMPA), NMFS must publish, at least annually, a List of Fisheries (LOF) that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. The snapper-grouper fishery which uses hook and line gear is listed as a Category III fishery in the LOF. A category III fishery is a fishery that is not expected to cause incidental mortality and serious injury to marine mammals. Gear types used in these fisheries are determined to have occasional incidental mortality and serious injury of marine mammals (72 FR 66048; November 27, 2007). For the snapper-grouper fishery, the best available data on protected species interactions are from the Southeast Fisheries Science Center (SEFSC) Supplementary Discard Data Program (SDDP) initiated in July of 2001 and sub-samples 20% of the vessels with an active permit. To date, no interactions with marine mammals have been reported from this program (8/1/2001-7/31/2004) (Poffenberger 2004; McCarthy SEFSC database).

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

The endangered Bermuda petrel and threatened roseate tern occur within the action area. Bermuda petrels are occasionally seen in the waters of the Gulf Stream off the coasts of North and South Carolina during the summer. Sightings are considered rare and only occur in low numbers (Alsop 2001). Roseate terns occur widely along the Atlantic coast during the summer but in the southeast region they are found mainly off the Florida Keys (unpublished USFWS data). Interaction with fisheries has not been reported as a concern for either of these species.

Fishing effort reductions have the potential to reduce the amount of interactions between the fishery and marine mammals and birds. Although, the Bermuda petrel and roseate tern occur within the action area, these species are not commonly found and neither has been described as associating with vessels or having had interactions with the snapper-grouper fishery. Thus, it is believed that the snapper-grouper fishery is not likely to negatively affect the Bermuda petrel and the roseate tern.

### 4.2.5 Changes in Fishing, Processing, Disposal, and Marketing Costs

Management alternatives in the interim rule, which are intended to reduce overfishing of red snapper, would be expected to affect the cost of fishing operations. It is likely that Northeast Florida and Southern Georgia would be impacted most from a spawning season closure for red snapper since fewer trips would be taken from North Carolina, South Carolina, and Georgia when the temperatures are cold and weather is poor. Furthermore, red snapper is found most commonly off of Northeast Florida and Southern Georgia and this is likely where most spawning occurs.

### 4.2.6 Changes in Fishing Practices and Behavior of Fishermen

Management measures proposed in the interim rule could result in a modification of fishing practices by commercial and recreational fishermen; thereby, affecting the magnitude of discards. There is a potential for increased discards with closures since fishermen might target species which co-occur with red snapper. However, fishermen may be able to modify their behavior by avoiding locations where high concentrations of the restricted species occurs or changing fishing methodology such as hook size and type.

Amendment 16 (under development) would also require the use of dehooking tools and venting tools. Use of these devices will require a modification in fishing practices and behavior and have the potential to reduce bycatch mortality if properly used. Gear changes such as the use of venting tools and dehooking devices is expected to result in a reduction in bycatch mortality. Furthermore, seasonal closures could reduce red snapper bycatch if there is some targeting of red snapper and fishermen can avoid locations where red snapper occur or fishing methods that select the species. However, it is difficult to quantify any of the measures in terms of reducing discards until the magnitude of bycatch has been monitored over several years.

### 4.2.7 Changes in Research, Administration and Enforcement Costs and Management Effectiveness

Research and monitoring is needed to understand the effectiveness of proposed management measure in reducing bycatch. A detailed monitoring program for red snapper will be implemented as part of the rebuilding program for the species in Amendment 17. Additional work is needed to determine the effectiveness of measures being developed in Amendment 16, Amendment 17, and by future actions being proposed by the Council to reduce bycatch. Some observer information has recently been provided by MARFIN and Cooperative Research Programs but more is needed. Approximately 20% of commercial fishermen are asked to fill out discard information in logbooks; however, a greater percentage of fishermen could be selected with emphasis on individuals that dominate landings. Furthermore, the use of electronic logbooks could be enhanced to enable fishery managers to obtain information on species composition, size distribution, geographic range, disposition, and depth of fishes that are released. Amendment 18, which is being developed, identifies additional measures to enhance data collection programs in the South Atlantic. Additional administrative and enforcement efforts will be needed to implement and enforce these regulations.

### 4.2.8 Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

Preferred management measures, including those that are likely to increase discards as well as those that are likely to decrease discards could result in social and/or economic impacts as discussed in Section 4.

### 4.2.9 Changes in the Distribution of Benefits and Costs

Attempts were made to ensure reductions provided by preferred management measures are equal in the commercial and recreational sectors. The closures considered in the interim rule would apply to both sectors. The extent to which these management measures will increase or decrease the magnitudes of discards is unknown. It is possible that the number of discards may increase. However, this depends on a) if fishermen shift effort to other species, seasons, or fisheries, and b) if effort decreases in response to closures as well as changes in community structure and age/size structures that could result from ending overfishing.

### 4.2.10 Social Effects

The Social Effects of all the alternatives, including those most likely to reduce bycatch are described in Section 4.

### 4.2.11 Conclusion

This section evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality in the South Atlantic snapper-grouper fishery using the ten factors provided at 50 CFR 600.350(d)(3)(i). In summary, the alternatives considered affecting both commercial and recreational fisheries for red snapper could help to minimize bycatch of red snapper by

causing fishermen to avoid red snapper hotspots or change fishing behavior to avoid catching these species. It is possible that these alternatives could increase the number of discards. However, this depends on if fishermen shift effort to other species, seasons, or fisheries and if effort decreases in response to more restrictive management measures as well as changes in community structure and age/size structures that could result from ending overfishing. Furthermore, overall fishing effort could decrease in the commercial and recreational sectors in response to more restrictive management measures being implemented in Amendment 16, thereby reducing the potential for bycatch.

Red snapper could continue to be caught when species with fewer regulations are targeted. However, fishermen may be able to avoid areas where a restricted species occurs thereby reducing the potential for bycatch. Reduced fishing pressure on red snapper in the interim rule would be expected to result in an increase in the mean size/age, as well as the population biomass of the species. Overlapping seasonal closures with red porgy, greater amberjack, mutton snapper that are currently in place as well as seasonal closures for vermilion snapper, gag, and shallow-water groupers proposed in Amendment 16 could be expected to reduce bycatch and fishing mortality of many species that co-occur with red snapper. The relative abundance, size structure, and age structure of other species in reef communities could be expected to change in response to reduced fishing pressure on red snapper in the interim rule as well as potential shifts in effort. Thus, ecological changes could occur in the community structure of reef ecosystems through actions that would reduce overfishing. These ecological changes could affect the nature and magnitude of bycatch over time.

Additional measures to reduce bycatch in the snapper-grouper fishery are being developed. Amendment 17 to the Snapper-Grouper FMP and the Comprehensive ACL Amendment could propose additional measures to reduce bycatch in the snapper-grouper fishery. For example, species grouping based on biological, geographic, economic, taxonomic, technical, social, and ecological factors could be proposed in the Comprehensive ACL Amendment. Each group could be represented by an indicator species, which has been recently assessed or is scheduled for a SEDAR assessment in the future.

### 4.3 Cumulative Effects

The magnitude and significance of environmental consequences of the proposed interim Federal action are analyzed in the context of the cumulative effects of other past, present, and reasonably foreseeable future actions. Verifying the cumulative environmental consequences of the proposed interim federal action requires delineating the relationship between multiple actions and the resources, ecosystems, and human communities of concern. The cumulative effects of the alternatives are analyzed by combining (a) the direct effects of the alternatives and (b) the indirect effects of the alternatives with (c) the effects of exogenous factors, as modified by (b). The cumulative effects on the physical, social and economic environments, habitat, protected species and the resources are described below.

### 4.3.1 Physical Environment

The immediate impact area of this interim rule is the federal 200-nautical mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West. Since the boundaries are solely political in nature and do not prohibit immigration and emigration of fish, and fish larvae, the geographic scope of the cumulative effects analysis must be expanded.

In light of the available information, the extent of the boundaries would depend upon the degree of fish immigration/emigration and larval transport, whichever has the greatest geographical range. The cumulative effect analysis cannot establish geographical boundaries in terms of coordinates, but recognizes that the proper geographical boundary to consider effects on the biophysical environment is larger than the entire South Atlantic EEZ. The ranges of affected species are described in Section 3.2. The most measurable and substantial effects would be limited to the South Atlantic region.

Past management of the snapper-grouper fishery, this interim rule, and potential future management of the snapper grouper fishery is not likely to have negative impacts on the physical environment. The fishery is believed to have minimal impact on bottom habitat and would not result in long term modification of the physical environment. Recent actions taken with regard to the snapper-grouper fishery will likely result in a reduction in fishing effort which could decrease chances for damage to physical habitat.

### 4.3.2 Habitat and EFH

Reductions in overall fishing effort, as a result of past and current fishery management actions are thought to have had a positive impact on habitat and EFH. This interim rule would result in a decrease in fishing effort for the 2009 fishing year and future management measures proposed in Amendment 16, Amendment 17 and the Comprehensive Ecosystem-Based Amendment are also expected to reduce effort in the snapper-grouper fishery. The Comprehensive Ecosystem-Based Amendment (under development) will establish deepwater Coral Habitat Areas of Particular Concern, which is intended to protect coral habitat from destruction due to bottom tending gear and fishing.

### 4.3.3 Fishery Resources

Past and future fishery management actions taken through the FMP process are thought to have had a positive effect on the managed resources. It is anticipated that future management actions could result in additional indirect positive effects on the managed species through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services. This interim action will implement a seasonal closure intended to coincide a summer spawning season, which will have positive impacts on the red snapper stocks. Future actions proposed in Amendment 17 (under development) would implement management measures to end overfishing and rebuild the red snapper stock consistent with the guidance of the Magnuson-Stevens Act.

### 4.3.4 Protected Resources

A description of the protected resources in the action area and the effects determinations can be found in Section 3.3. An ESA consultation conducted in 2006 determined that the snapper-grouper fishery is not likely to adversely affect protected species (NMFS 2006). Past and future fishery management actions taken through the FMP process are thought to have had a positive effect on the protected species as they tend to reduce fishing effort in the area which would reduce any chance for interaction with fishing gear.

### 4.3.5 Social and Economic Environment

The snapper-grouper fishery is a highly regulated fishery and continues to be the subject of new management measures from the NMFS. Section 1.7 describes amendments to the snapper-grouper FMP under development, which could impact the social and economic environments of the snapper-grouper fishery and communities. However, the interim rule described in this environmental assessment would have the most negative effects on communities which target red snapper exclusively. The negative effects associated with this interim rule as well as previous and subsequent management measures are necessary to address overfishing of snapper-grouper species. Without these measures long term management of the fishery may become more restrictive to fishermen and burdensome on the agency.

### 4.3.6 Summary of Cumulative Impacts

The proposed interim federal action is not expected to compound the cumulative effects on the physical, social and economic environments, habitat, protected species or the fishery resource. Therefore, there are no foreseeable significant additive or interactive effects as a result of the proposed interim Federal action.

In terms of context and intensity, the proposed interim federal action is not anticipated to have any significant effects on the subject marine ecosystem, marine species or human community involved for the following reasons.

1) The limited nature of the proposed interim federal Action. The proposed action is temporary and would impose a seasonal closure for four months or 180 days (with the possibility of extension for another 186 days), depending on what the Council recommends as the preferred alternative.
2) The interim closure is intended to correspond with the spawning season of red snapper, which will allow the resource protection from harvest during a particularly important life history stage.
3) Other fishery activities will be available to participants of the snapper-grouper fishery in federal waters during the seasonal closure. While retention of red snapper would be prohibited; harvest and retention of other snapper grouper species would be allowed.
4) The proposed period of the closure is a period of high fishing activity for the snapper-grouper fishery but this fishery tends not to target red snapper. Red snapper is primarily caught incidentally to other snapper-grouper species and fishermen can adjust fishing methods and locations to avoid red snapper.
5) Impacts of the seasonal closure in federal waters would be applied evenly to the recreational and commercial fishery sectors in the South Atlantic region. A sustainable and accessible red

snapper resource would provide positive impacts to all snapper-grouper fishery participants in the South Atlantic.

In reference to past federal actions, the proposed action is interim in nature. Following the seasonal closure, the proposed interim federal action would maintain management measures currently under the snapper-grouper FMP, including commercial limited access system, minimum size limits and bag limits. No permanent change to the snapper-grouper FMP will be made by this interim action. However, the Council will develop permanent management measures to end overfishing of red snapper in Amendment 17.

The proposed interim federal action requires no long-term restrictions or operational adjustments to the fishery and, as such, is not anticipated to have any significant impacts that combine with previous impacts. Considering that the proposed interim federal action is temporary, potential economic impacts of the closure are insignificant because of their lack of intensity within the framework of the fishing sector as a whole.

When combined with the past and potential future management efforts, the overall direct and indirect effects of the proposed interim federal action do not produce significant cumulative impacts in the biological, administration and enforcement, economic, social, and cultural environments of the snapper-grouper fishery.

## 4.4 Unavoidable Adverse Effects

The alternatives explored in this environmental assessment would apply to the commercial and recreational red snapper fishery participants in the South Atlantic region. Under **Alternatives 2 and 3**, the fishery would be subject to a closure to address overfishing of red snapper. During the closures, fishing for other snapper-grouper species would be permitted which would eliminate some of the adverse economic and social impacts associated with a seasonal closure. The management measures proposed would be temporary (180 days with a possible extension for 186 days) while permanent management measures to end overfishing of red snapper can be developed in Amendment 17.

## 4.5 Effects of the Fishery on the Environment

The biological impacts of the proposed actions are described in Section 4.0, including impacts on habitat. No actions proposed in this interim rule are anticipated to have any adverse impact on EFH or EFH-HAPCs for red snapper.

## 4.6 Damage to Ocean and Coastal Habitats

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

## 4.7 Relationship of Short-Term Uses and Long-Term Productivity

The relationship between short-term uses and long-term productivity will be affected by this interim rule. The proposed management measures would restrict the harvest of red snapper in the short-term for both the commercial and recreational sectors of the fishery. However, reductions in harvest are expected to benefit the long-term productivity of these species.

## 4.8 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments are defined as commitments that cannot be reversed, except perhaps in the extreme long-term, whereas irretrievable commitments are lost for a period of time. There are no irreversible commitments for this interim rule. While the proposed management measures would result in irretrievable losses in consumer surplus and angler expenditures, failing to take action would compromise the long-term sustainability of the stocks and would not meet the requirements of the Magnuson Stevens Act.

Since the Snapper-grouper FMP and its implementing regulations are always subject to future changes, proceeding with the implementation of an interim rule does not represent an irreversible or irretrievable commitment of resources. NOAA Fisheries Service always has discretion to amend its regulations and may do so at any time, subject to the Administrative Procedures Act.

## 4.9 Monitoring and Mitigation Needs

The proposed actions would adversely affect immediate, short-term net revenues of some commercial and for-hire fishermen in the South Atlantic. The proposed management measures would also adversely affect short-term consumer surplus of some recreational anglers in the South Atlantic and may result in cancelled trips and reduced expenditures to the fishery and associated industries. However, it is anticipated reductions in fishing pressure, which will reduce the likelihood that these stocks will be declared overfished, will assist in restoring the size and age structure to more natural conditions and allow stock biomass to increase to more sustainable and productive levels.

As a result, the amount of fish that can be harvested should increase as the stocks rebuild. The short-term, adverse effects of ending overfishing can be mitigated to some degree by the type of regulations the Council selects to manage reduced catch levels in Amendment 17.

## 4.10 Unavailable or Incomplete Information

The Council on Environmental Quality, in its implementing regulations for the National Environmental Policy Act, addressed incomplete of unavailable information at 40 CFR 1502.22 (a) and (b). That direction 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…”.

Stock assessments have been conducted on red snapper using the best available data. Status determinations for these species were derived from the 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 NMFS staff reviewed and considered any concerns about the adequacy of the data. The Council's SSC and the SEFSC determined the red snapper stock assessment is based on the best available data.

The Council's Snapper-Grouper Committee and SSC acknowledged, while stock assessment findings are uncertain, 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. 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.

# 5 Regulatory Impact Review

## 5.1 Introduction

NOAA Fisheries Service conducts a Regulatory Impact Review (RIR) as required by Executive Order 12866, as amended. The RIR: (1) Provides a comprehensive review of the incidence and level of impacts associated with a proposed or final regulatory action; (2) provides a review of the problems and the policy objectives prompting the regulatory proposals and an evaluation of alternatives that could be used to solve the problem; and (3) ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way.

The RIR provides the information needed to determine if the proposed regulations constitute a significant regulatory action under Executive Order 12866 and serves as the basis for determining if the action will have a significant economic impact on a substantial number of small entities as per the requirements of the Regulatory Flexibility Act. This RIR analyzes the expected economic effects of the proposed interim prohibition of the harvest (retention) and sale of red snapper in the South Atlantic commercial and recreational fisheries.

## 5.2 Problems and Objectives

The purpose and need of this action are discussed in Section 1.4 and are incorporated herein by reference. In summary, red snapper in the South Atlantic region are undergoing overfishing and are overfished according the current definition of the minimum stock size threshold. The Magnuson Stevens Act requires the Council to prepare a plan amendment or proposed regulations to end overfishing within one year of notification that a stock is overfished.

Immediate, short-term, and focused federal action is needed to address overfishing of red snapper in the South Atlantic region while long-term management measures are developed and implemented. The objective of this action is to immediately reduce total commercial and recreational fishing mortality on red snapper in the South Atlantic region to address overfishing while permanent management measures are being developed in Amendment 17.

## 5.3 Description of the Fisheries

A description of the South Atlantic red snapper fisheries is contained in Section 3.4.1 and is incorporated herein by reference.

## 5.4 Methodology and Framework for Analysis

The methodology and framework for this analysis is described in Section 4.1.2 and is incorporated herein by reference.

## 5.5 Impacts of the Proposed Action

This section will be completed upon selection of a preferred alternative.

## 5.6 Public and Private Costs of Regulations

The preparation, implementation, enforcement, and monitoring of this or any federal action involves the expenditure of public and private resources which can be expressed as costs associated with the regulations. Costs associated with this action include:

Council costs of document preparation, meetings, public hearings, and information dissemination ..... 0

NMFS administrative costs of document preparation, meetings, and review .....$ 50,000

Law enforcement costs .....0

TOTAL .....$ 50,000

Because this is an interim rule, the document preparation, review, and administrative costs are limited to NMFS staff. Although the implementation of a new regulation may result in re-allocation of law enforcement time and priorities, no additional costs have been identified as necessary to enforce the proposed action.

## 5.7 Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a “significant regulatory action” if it is likely to result in: (1) An annual effect of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this executive order. Based on the information provided above, this regulatory action has been determined to not be significant for purposes of E.O. 12866.

## 6 List of Preparers

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| Rick DeVictor | Environmental Impact Scientist | SAFMC | N/A | SAFMC |
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## 7 List of Agencies, Organizations, and Persons To Whom Copies of the Statement Are Sent

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

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