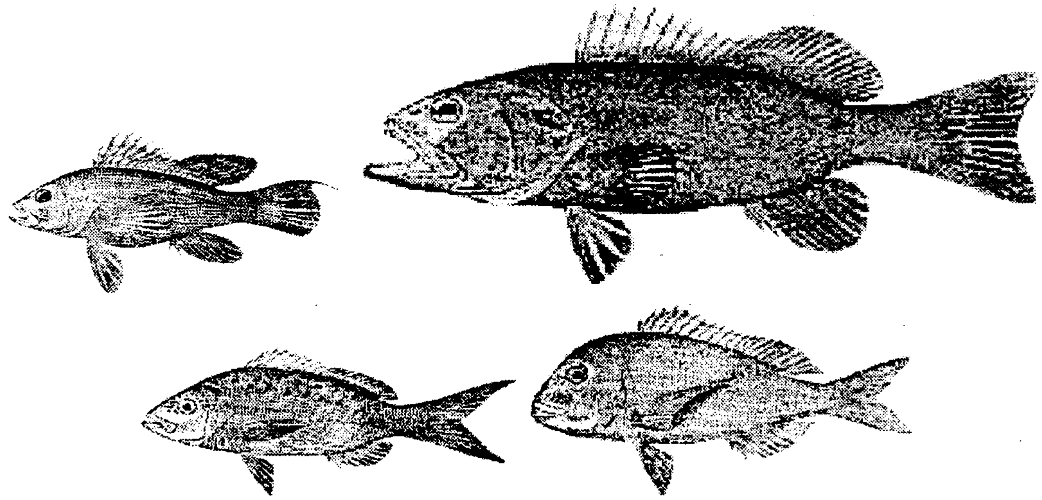
FINAL
AMENDMENT 9
TO THE
FISHERY MANAGEMENT PLAN
FOR THE
SNAPPER GROUPER FISHERY
OF THE
SOUTH ATLANTIC REGION

INCLUDING A FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT, INITIAL REGULATORY FLEXIBILITY ANALYSIS REGULATORY IMPACT REVIEW, AND SOCIAL IMPACT ASSESSMENT/ FISHERY IMPACT STATEMENT



JANUARY 1998

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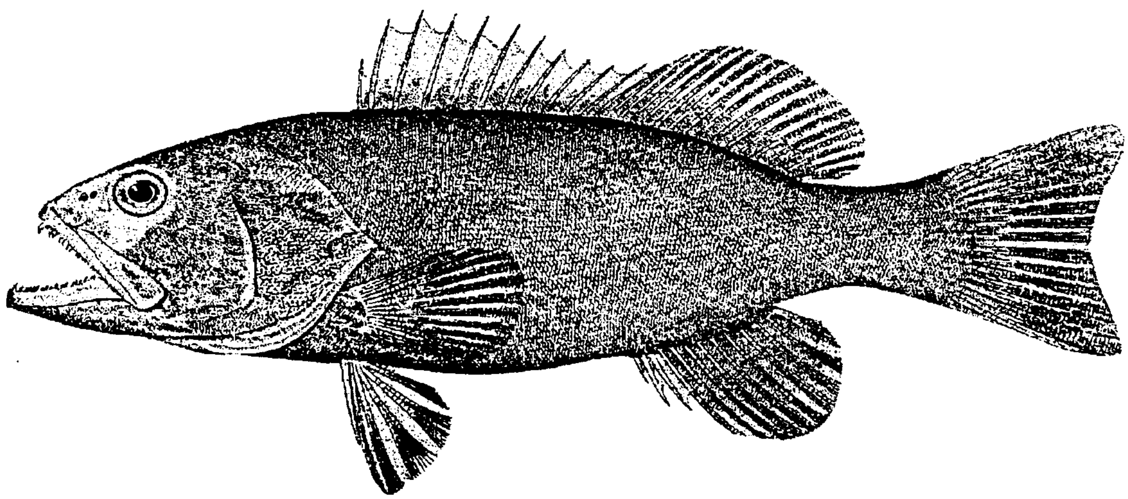

prepared by the
South Atlantic Fishery Management Council

JANUARY 1998

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AMENDMENT 9 COVER SHEET

This integrated document contains all elements of the Plan Amendment, Final Supplemental Environmental Impact Statement (FSEIS), Initial Regulatory Flexibility Analysis (IRFA), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA)/Fishery Impact Statement (FIS). Separate Tables of Contents are provided to assist readers and the NMFS/NOAA/DOC reviewers in referencing corresponding sections of the Amendment. Introductory information and/or background for the FSEIS, IRFA, RIR, and SIA/FIS are included within the separate table of contents for each of these sections.

Responsible Agencies

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Name of Action:

(X) Administrative

( ) Legislative

SUMMARY

The Council is proposing to: Increase the **red porgy** minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, establish a recreational bag limit of 5 red porgy per person per day, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase **the black sea bass** minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day; **Require escape vents and escape panels** with degradable fasteners in black sea bass pots; Establish measures for **greater amberjack** that will: reduce the recreational bag limit from 3 to 1 greater amberjack per person per day, prohibit harvest and possession in excess of the bag limit during April throughout the EEZ, establish a 1,000 pound daily commercial trip limit, establish a quota at 63% of 1995 landings (quota=1,169,931 pounds), begin the fishing year on May 1, prohibit sale of fish harvested under the bag limit when the season is closed, and prohibit coring; Increase the recreational **vermilion snapper** minimum size limit from 10" to 11" TL and retain the current 10-fish bag limit; Increase the **gag grouper** minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase the **black grouper** minimum size limit from 20" to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Specify that within the **5-fish aggregate grouper bag limit** (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 fish may be gag grouper or black grouper (individually or in combination); Establish an **aggregate recreational bag limit** of 20 fish per person per day inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners); and Specify that **vessels with longline**

gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

Public hearings originally scheduled to be held between October 15 and October 24, 1996 from Manteo, NC along the coast to Marathon, Florida were postponed. Public hearings were re-scheduled and held: on January 6, 1997 at the Ramada Inn in Pooler, Georgia; on January 7, 1997 at the Comfort Inn Oceanfront in Jacksonville Beach, Florida; on January 8, 1997 at the Holiday Inn in Cocoa Beach, FL; on January 9, 1997 at the Sheraton Hotel in West Palm Beach, Florida; on January 10, 1997 at the Banana Bay Resort in Marathon, Florida (rescheduled as shown below); on January 13, 1997 at the Town and Country Inn in Charleston, South Carolina; on January 14, 1997 at the Holiday Inn in Kill Devil Hills, North Carolina; on January 15, 1997 at the Sheraton Atlantic Beach Resort in Atlantic Beach, North Carolina; on January 16, 1997 at the Holiday Inn in Wilmington, North Carolina; and on January 17, 1997 at the Myrtle Beach Martinique Resort in Myrtle Beach, South Carolina. The Marathon, Florida public hearing was held on January 24, 1997.

At the February 1997 meeting the Council separated the measures taken to public hearings into Amendments 8 and 9. The above items were included in Amendment 9 and approved for additional public hearings. The Council made additional changes in the document at the April 1997 meeting and approved Amendment 9 for additional public hearings. Public hearings were held: on June 17, 1997 at the Pier House Resort in Key West, Florida; on June 24, 1997 at the Comfort Inn in Brunswick, Georgia; on June 25, 1997 at the Ramada Inn Daytona Speedway in Daytona Beach, Florida; on June 26, 1997 at the Holiday Inn on the Oceanfront in Pompano Beach, Florida; on June 30, 1997 at the Sheraton Atlantic Beach in Atlantic Beach, North Carolina; on July 1, 1997 at the Holiday Inn Wilmington in Wilmington, North Carolina; and on July 2, 1997 at the Town & Country Inn in Charleston, South Carolina.

The Council reviewed public comments and informal review comments during the August 18-22, 1997 meeting in Charleston, South Carolina. The Council modified a number of actions and approved Amendment 9 for formal review by the Secretary of Commerce.

FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

This integrated document contains all elements of the Plan Amendment, Final Supplemental Environmental Impact Statement (FSEIS), Initial Regulatory Flexibility Analysis (IRFA), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA)/Fishery Impact Statement (FIS). The table of contents for the FSEIS is provided separately to aid reviewers in referencing corresponding sections of the Amendment.

( ) Draft (X) Final

SUMMARY

The following problems exist in the snapper grouper fishery. Problems 1, 4 and 12 are addressed by the Draft Supplemental Environmental Impact Statement and are shown in bold:

1. **Excessive fishing mortality.**
2. Lack of biological, statistical, social, and economic information.
3. Intense competition exists among users.
4. **Habitat degradation.**
5. Inconsistent State and Federal regulations.
6. Excess capacity.
7. Inefficiency.
8. Low conservation and compliance incentives.
9. Potential conflicts among participants.
10. High regulatory costs.
11. Low marketing incentives.
12. **Localized depletion.**

The following objectives are included in the snapper grouper management plan as amended through Amendment 8. The Draft Supplemental Environmental Impact Statement addresses Objectives 1, 5, 10, 13 and 14 and are shown in bold:

1. **Prevent overfishing.**
2. Collect necessary data.
3. Promote orderly utilization of the resource.
4. Provide for a flexible management system.
5. **Minimize habitat damage.**
6. Promote public compliance and enforcement.
7. Mechanism to vest participants.
8. Promote stability and facilitate long–run planning.
9. Create market–driven harvest pace and increase product continuity.
10. **Minimize gear and area conflicts among fishermen.**
11. Decrease incentives for overcapitalization.
12. Prevent continual dissipation of returns from fishing through open access.
13. **Evaluate and minimize localized depletion.**
14. **Minimize bycatch.**

To address the problems and objectives stated above, the Council is proposing to:

Increase the **red porgy** minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, establish a recreational bag limit of 5 red porgy per person per day, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase **the black sea bass** minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day; **Require escape vents and escape panels** with degradable fasteners in black sea bass pots; Establish measures for **greater amberjack** that will: reduce the recreational bag limit from 3 to 1 greater amberjack per person per day, prohibit harvest and possession in excess of the bag limit during April throughout the EEZ, establish a 1,000 pound daily commercial trip limit, establish a quota at 63% of 1995 landings (quota=1,169,931 pounds), begin the fishing year on May 1, prohibit sale of fish harvested under the bag limit when the season is closed, and prohibit coring; Increase the recreational **vermilion snapper** minimum size limit from 10" to 11" TL and retain the current 10-fish bag limit; Increase the **gag grouper** minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase the **black grouper** minimum size limit from 20" to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Specify that within the **5-fish aggregate grouper bag limit** (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 fish may be gag grouper or black grouper (individually or in combination); Establish an **aggregate recreational bag limit** of 20 fish per person per day inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners); and Specify that **vessels with longline gear** aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

DSEIS to NMFS on: **December 6, 1996** **DSEIS to EPA on:** **December 30, 1996**
Comments on DSEIS requested by: **February 24, 1997**

FSEIS to NMFS on: **February 3, 1998** **FSEIS to EPA on:** ______________
Comments on FSEIS requested by: ______________

REGULATORY IMPACT REVIEW

This integrated document contains all elements of the Plan Amendment, Final Supplemental Environmental Impact Statement (FSEIS), Initial Regulatory Flexibility Analysis (IRFA), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA)/Fishery Impact Statement (FIS). A table of contents for the RIR is provided separately to aid the reviewer in referencing corresponding sections of the Amendment.

INTRODUCTION

The Regulatory Impact Review (RIR) is part of the process of developing and reviewing fishery management plans, amendments and seasonal adjustments, and is prepared by the Regional Fishery Management Councils with assistance from the National Marine Fisheries Service (NMFS), as necessary. The regulatory impact review provides a comprehensive review of the level and incidence of economic impact associated with the proposed regulatory actions. The purpose of the analysis is to ensure that the regulatory agency or council systematically considers all available alternatives so that public welfare can be enhanced in the most efficient and cost effective way.

The National Marine Fisheries Service requires a RIR for all regulatory actions that are of public interest. The RIR does three things: 1) it provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action, 2) it provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem, and 3) it ensures the regulatory agency systematically and comprehensively considers all available alternatives so public welfare can be enhanced in the most efficient and cost effective way.

The RIR also serves as the basis for determining whether any proposed regulations are a "significant regulatory action" under certain criteria provided in Executive Order 12866 and whether the proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Act of 1980 (RFA) as amended by Public Law 104-121. The purpose of the Regulatory Flexibility Act is to relieve small businesses, small organizations, and small governmental entities from burdensome regulations and record–keeping requirements, to the extent possible.

This RIR analyzes the probable impacts on the fishery and habitat of the proposed plan amendment to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (FMP).

PROBLEMS AND OBJECTIVES

The Fishery Management Plan for the Snapper Grouper Fishery (SAFMC, 1983) contains a detailed description of the snapper grouper fishery. The problems and issues in the fishery are outlined in the various amendments.

The problems specified in the Snapper Grouper Fishery Management Plan are listed in the Final Supplemental Environmental Impact Statement and explained in the Purpose and Need Section.

METHODOLOGY AND FRAMEWORK FOR ANALYSIS

The basic approach adopted in this RIR is an assessment of management measures from the standpoint of determining the resulting changes in costs and benefits to society. The net effects should be stated in terms of producer and consumer surpluses for the harvesting, processing/dealer sectors and for consumers. Ideally, the expected present values of net yield streams over time associated with the different alternatives should be compared in evaluating the impacts. However, lack of data precludes this type of analysis. The approach taken in analyzing alternative management approaches is to describe and/or quantify the changes in short-term net benefits. A qualitative discussion of the long-term impacts is also included.

An economic survey was conducted in 1994 to collect data on snapper grouper permitees in the South Atlantic region by the South Carolina Department of Natural Resources under a MARFIN grant. Snapper grouper permit holders with home ports in North Carolina, South Carolina, Georgia and east coast of Florida were surveyed through in-person interviews. Data were collected on vessel characteristics, fixed and variable costs, revenues and incremental costs associated with switching to and from the fishery. A project report has already been submitted. The NMFS is doing a detailed analysis of the data. Results of the data analyses are incorporated into the RIR and IRFA analyses in this document. Also, Section 3 contains an executive summary of the economic survey of commercial snapper grouper vessels along the U.S. south Atlantic Coast (Waters et al., 1997). This report is currently under peer review.

Because of the nature of the snapper grouper fishery in the Florida Keys, a separate economic survey was conducted in 1994 for Monroe County in conjunction with the MARFIN grant and NMFS. The data from this survey has not been analyzed and is not available at this time for inclusion in the discussions under the RIR and IRFA sections.

Summary of Expected Changes in Net Benefits (Summary of Regulatory Impact Review)

The Council's preferred options are presented in the following table in bold.

Table 1. Summary of Expected Changes in Net Benefits.

Proposed Actions and Other Possible Options	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Proposed Action 1: Increase the red porgy minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen; establish a recreational bag limit of 5 red porgy per person per day; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	Increased revenue in the long-term due to stock rebuilding. Increased recreational satisfaction in the long-term due to stock rebuilding.	Reduced revenue in the short-term. Estimated $268,000 reduction in gross revenue in the first year. Reduced recreational satisfaction in the short-term. Estimated 50% reduction in numbers of fish for recreational sector in the first year.	Increased net benefits in the long-term. Increased recreational satisfaction in the long-term.
Other Possible Options:			
Option 1: No Action. Maintain the existing 12" TL recreational and commercial size limits.	Maintain current revenue in the short-term.	Reduced revenue in the long-term.	Reduced net benefits in the long-term.
Option 2: Increase the red porgy minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 2.	Increased revenue in the long-term due to stock rebuilding. Increased recreational satisfaction in the long-term due to stock rebuilding.	Reduced revenue in the short-term. Estimated $98,800 reduction in gross revenue in the first year. Reduced recreational satisfaction in the short-term. Estimated 56% reduction in numbers of fish for recreational sector in the first year.	Increased net benefits in the long-term. Increased recreational satisfaction in the long-term.
Option 3: Increase the red porgy minimum size limit from 12" TL to 13" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 5.	Increased revenue in the long-term due to stock rebuilding. Increased recreational satisfaction in the long-term due to stock rebuilding.	Reduced revenue in the short-term. Estimated $47,400 reduction in gross revenue in the first year. Reduced recreational satisfaction in the short-term. Estimated 33% reduction in numbers of fish for recreational sector in the first year.	Increased net benefits in the long-term. Increased recreational satisfaction in the long-term.
Option 4: Increase the red porgy minimum size limit from 12" TL to 13" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 2.	Increased revenue in the long-term due to stock rebuilding. Increased recreational satisfaction in the long-term due to stock rebuilding.	Reduced revenue in the short-term. Estimated $47,400 reduction in gross revenue in the first year. Reduced recreational satisfaction in the short-term. Estimated 45% reduction in numbers of fish for recreational sector in the first year.	Increased net benefits in the long-term. Increased recreational satisfaction in the long-term.

Proposed Actions and Other Possible Options	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Proposed Action 2: Increase the black sea bass minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day.	Increased revenue and recreational satisfaction in the long-term due to stock rebuilding.	Reduced revenue and recreational satisfaction in the short-term. Estimated $242,000 reduction in gross revenue to commercial fishermen in the first year. Estimated 40% reduction in numbers of fish for the recreational sector in the first year.	Increased net benefits and recreational satisfaction in the long-term.
Other Possible Options:			
Option 1: No Action. Maintain the existing 8" TL minimum size limit for both recreational and commercial fishermen, and no bag limit.	None.	Reduced revenue and recreational satisfaction in the long-term.	Reduced revenue and recreational satisfaction in the long-term.
Proposed Action 3: Require escape vents and escape panels with degradable fasteners in black sea bass pots	Increased revenue in the long-term.	One time increase in capital investment estimated at $25,000.	Increased net benefits in the long-term.
Other Possible Options:			
Option 1: No Action. Maintain the existing mesh and escape panel regulations.	None.	Stock reduction resulting from ghost fishing. Reduced revenue in the long-term.	Reduced net benefits in the long-term.
Option 2: Require escape vents and escape panels with degradable fasteners in black sea bass pots with different sizes.	Increased revenue in the long-term.	One time increase in capital investment estimated at $25,000.	Increased net benefits in the long-term.
Option 3: Require escape vents and escape panels with degradable fasteners in black sea bass pots with sizes to track MAFMC.	Increased revenue in the long-term.	One time increase in capital investment estimated at $25,000.	Increased net benefits in the long-term.
Option 4: Require escape vents and escape panels with degradable fasteners in black sea bass pots (Preferred option in public hearing draft of Amendment 9).	Increased revenue in the long-term.	One time increase in capital investment estimated at $25,000.	Increased net benefits in the long-term.

Proposed Actions and Other Possible Options	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Proposed Action 4: Establish measures for greater amberjack that will: reduce the recreational bag limit from 3 to 1 greater amberjack per person per day; prohibit harvest and possession in excess of the bag limit during April throughout the EEZ; establish a 1,000 pound daily commercial trip limit; establish a quota at 63% of 1995 landings (quota=1,169,931 pounds); begin the fishing year on May 1; prohibit sale of fish harvested under the bag limit when the season is closed; and prohibit coring.	Possible increase in revenue and recreational satisfaction in the long-term due to stock rebuilding.	Reduction in revenue in the short-term. Estimated reduction in gross revenue of between $397,000 and $352,000 to commercial fishermen in the first year. Estimated 11% reduction in recreational catches in the first year. Estimated 29% to 21% reduction in numbers of fish for the entire fishery.	Possible increase in net benefits and recreational satisfaction in the long-term.
Other Possible Options:			
Option 1: No Action. Maintain the existing minimum size limits,, 3-fish bag limit. and limits during April.	Maintain revenue in the short-term.	Unknown.	Unknown.
Option 2: Prohibit any retention during April.	Possible increase in revenue and recreational satisfaction in the long-term.	Reduction in revenue in the short-term. Estimated $82,000 reduction in gross revenue to commercial fishermen in the first year. Reduced level of recreational satisfaction during the month of April.	Possible increase in net benefits and recreational satisfaction in the long-term.
Option 3: Prohibit all harvest above the bag limit and all sale during April and May in the EEZ off Florida.	Possible increase in revenue in the long-term.	Reduction of about 30% ($323,000) in revenue to commercial fishermen in the first year. Could cause hardship to some fishermen in Florida.	Possible increase in net benefits in the long-term.
Option 4: Reduce the amberjack bag limit to 1 and change the recreational size limit to 20" FL for all *Seriola* species.	Possible increase in revenue and recreational satisfaction in the long-term.	Reduction in revenue and recreational satisfaction in the short-term. Estimated 17% reduction in recreational catch in the first year.	Possible increase in net benefits in the long-term.

Proposed Actions and Other Possible Options	**POSITIVE IMPACTS**	**NEGATIVE IMPACTS**	**NET IMPACTS**
Option 5: Establish measures for greater amberjack that will: extend the April closure throughout the EEZ and prohibit sale during April; reduce the recreational bag limit to 1 fish per person per day; implement a commercial quota to reduce landings by 21% based on average landings 1986-95 and implement a trip limit of 500 to 1,000 pounds; change the start of the fishing year from January 1 to July 1; and prohibit coring.	Possible increase in revenue and recreational satisfaction in the long-term.	Reduction in revenue in the short-term. Estimated $328,000 reduction in gross revenue in the first year. Estimated 2% and 12% reduction in headboat and MRFSS catches respectively, in the first year. Total catch would likely be reduced by 21% by weight in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.
Option 6: Increase the greater amberjack size limit from 28" FL to 36" FL for the recreational fishery.	Possible increase in recreational satisfaction in the long-term.	Reduced recreational satisfaction in the short-term. Recreational catch would be reduced by 38% in numbers of fish in the first year.	Possible increase in recreational satisfaction in the long-term.
Option 7: Establish measures for greater amberjack that will: prohibit all harvest in excess of the bag limit throughout the EEZ during March, April and May; prohibit sale during March, April and May; reduce the recreational bag limit from 3 to 1 fish per person per day: and prohibit coring.	Possible increase in revenue and recreational satisfaction in the long-term due to stock rebuilding.	Reduction in revenue in the short-term. Estimated $550,000 reduction in gross revenue to commercial fishermen in the first year. Estimated 2% and 12% reduction in headboat and MRFSS catches respectively, in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.

Proposed Actions and Other Possible Options	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Proposed Action 5: Increase the recreational vermilion snapper minimum size limit from 10" to 11" TL and retain the current 10-fish bag limit.	Possible increase in recreational satisfaction in the long-term.	Reduced recreational satisfaction in the short-term. Recreational catch would be reduced by 34% in numbers of fish in the first year. Total catch would be reduced by 13% in numbers of fish in the first year.	Possible increase in recreational satisfaction in the long-term.
Other Possible Options:			
Option 1: No Action. Maintain the existing 10-fish bag limit and 10" TL recreational and 12" TL commercial size limits.	None.	Possible decrease in revenue and recreational satisfaction in the long-term.	Decrease in net benefits and recreational satisfaction in the long-term.
Option 2: Increase the minimum size limit to 14" TL for both recreational and commercial fisheries and no bag limit or quota.	Possible increase in revenue and recreational satisfaction in the long-term.	Commercial landings would be reduced by 44% in numbers of fish in the first year. Head boat and MRFSS catches would be reduced by 87% and 91% respectively, in the first year. Total catch would be reduced by 62% in numbers of fish in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.
Option 3: Implement an annual vermilion snapper quota of 600,000 pounds, a recreational bag limit of 5 fish, and a recreational minimum size limit of 12" TL.	Possible increase in revenue and recreational satisfaction in the long-term.	Reduction in gross revenue of $837,000 to commercial fishermen in the first year. Reduced recreational satisfaction in the short-term. Headboat and MRFSS catches would be reduced by 60% and 84% respectively, in numbers of fish in the first year. Total catch would be reduced by 48% in numbers of fish in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.
Option 4: Increase the recreational vermilion snapper minimum size limit from 10" to 12" TL.	Possible increase in recreational satisfaction in the long-term.	Reduced recreational satisfaction in the short-term. Recreational catch would be reduced by 61% in numbers of fish in the first year. Total catch would be reduced by 28% in numbers of fish in the first year.	Possible increase in recreational satisfaction in the long-term.

Proposed Actions and Other Possible Options	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Proposed Action 6: Increase the gag minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	Possible increase in revenue and recreational satisfaction in the long-term.	Decrease in commercial landings by 37%, estimated at $1,186,000 of gross revenue in the first year. Fishermen may have to switch to other species during closure. Also, fishermen may increase effort before and/or after closure, dissipating any positive effects of the closure. Recreational catches would be reduced by 13% in numbers of fish in the first year. Estimated 27% reduction (numbers of fish) in total catch in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.
Option 1: No Action. Maintain the existing 20" TL size limit and 5-grouper aggregate bag limit.	Maintain revenue and recreational satisfaction in the short-term.	Could cause stock depletion and decrease benefits from the fishery in the long-term.	Possible decrease in net benefits and recreational satisfaction in the long-term.
Option 2: Prohibit harvest of gag in excess of the 5-grouper aggregate bag limit (excluding Nassau grouper, jewfish, speckled hind, and warsaw grouper) January through March, and prohibit sale January through March.	Possible increase in revenue in the long-term. Possible increase in recreational satisfaction in the short-term.	Estimated $830,000 reduction in gross revenue in the first year. Estimated 18% reduction in total catch in the first year.	Possible increase in net benefits in the long-term.
Option 3: Prohibit sale and establish a possession limit of 1 gag per person per day January through March.	Possible increase in revenue and recreational satisfaction in the long-term.	Estimated 15% reduction in numbers of fish ($830,000) reduction in gross revenue in the first year. Estimated 3% reduction (numbers of fish) in recreational catch in the first year. Total catch could be reduced by 10% in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.
Option 4: Establish a 100 - 1,000 pound trip limit January - March.	Possible increase in revenue in the long-term.	Could decrease gross revenue between $55,000 and $430,000 in the short-term depending on poundage established.	Possible increase in net benefits in the long-term.
Option 5: Establish a seasonal closure to achieve a 30% - 40% reduction in total landings.	Possible increase in revenue in the long-term.	Reduction in gross revenue between $638,000 and $850,000 in the first year.	Possible increase in net benefits in the long-term.

Proposed Actions and Other Possible Options	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Option 6: Establish a quota to achieve a 31% reduction based on average landings from 1986-95.	Possible increase in revenue in the long-term.	Reduction in gross revenue up to $961,000 in the first year.	Possible increase in net benefits in the long-term.
Option 7: Increase the gag minimum size limit from 20" TL to 24" TL for recreational and commercial fishermen, and prohibit all harvest January through March.	Possible increase in revenue and recreational satisfaction in the long-term.	Decrease in commercial landings by 48%, estimated at $1,554,000 of gross revenue in the first year. Fishermen may have to switch to other species during closure. Also. fishermen may increase effort before and/or after closure, dissipating any positive effects of the closure. Headboat, charter boat and private boat catches would be reduced by 27%, 9% and 10% respectively, in numbers of fish in the first year. Estimated 35% reduction in total catch in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.
Proposed Action 7: Increase the black grouper minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	Possible increase in revenue and recreational satisfaction in the long-term.	Reduction in commercial landings of 35% or decrease in gross revenue of $90,000 in the first year. Decrease in headboat catch by 71% in the first year. Estimated 39% reduction (in numbers of fish) in commercial and headboat catch in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.
Other Possible Option:			
Option 1: No Action. Maintain the existing 20" TL size limit and the 5-grouper aggregate bag limit.	Maintain revenue and recreational satisfaction in the short-term.	Could result in stock reduction and decrease revenue in the long-term.	Possible decrease in net benefits and recreational satisfaction in the long-term.
Option 2: Increase the black grouper minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen.	Possible increase in revenue and recreational satisfaction in the long-term.	Decrease in gross revenue of $39,000 in the first year. Decrease in headboat catch by 71% in the first. Estimated 21% reduction (in numbers of fish) in commercial and headboat catch in the first year.	Possible increase in net benefits and recreational satisfaction in the long-term.

Proposed Actions and Other Possible Options	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Proposed Action 8: Specify that within the 5-fish aggregate grouper bag limit (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 fish may be gag or black grouper (individually or in combination).	Possible increase in recreational satisfaction in the long-term.	Minimal reduction (1%) in headboat catch in the first year. No impact on charterboat and private / rental boats. Also, 13% reduction in gag catches for the charterboat sector.	Possible increase in recreational satisfaction in the long-term.
Other Possible Option:			
Option 1: No Action. Maintain the existing 5-grouper aggregate bag limit.	Maintain current level of recreational satisfaction in the short-term.	Reduction in recreational satisfaction in the long-term.	Possible decrease in recreational satisfaction in the long-term.
Option 2: Specify that within the 5-fish aggregate grouper bag limit (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 may be gag and no more than 2 may be black grouper.	Possible increase in recreational satisfaction in the long-term.	Minimal reduction (1%) in headboat catch in the first year. No impact on charterboat and private / rental boats.	Possible increase in recreational satisfaction in the long-term.
Proposed Action 9: Establish an aggregate recreational bag limit of 20 fish inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners).	Could enhance and sustain recreational fishing experience in the long-term.	Total reduction of less than 1% in recreational catch in the first year.	Slight improvement in stock status and enhanced or sustained recreational experience in the long-term.
Other Possible Options:			
Option 1: No Action. There is currently no aggregate bag limit for species not under a bag limit.	Maintain current level of recreational satisfaction in the short-term.	Reduction in recreational satisfaction in the long-term.	Possible decrease in recreational satisfaction in the long-term.

Proposed Actions and Other Possible Options	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Proposed Action 10: Specify that vessels with longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.	Should aid enforcement.	Would prevent multiple gear trips, particularly fishermen who carry longline gear and bandit reels on the same trips. Estimated $157,000 reduction in gross revenue in the first year.	Increased enforcement capabilities and reduced enforcement costs.
Other Possible Options:			
Option 1: No Action. Maintain the existing allowance of longline gear in waters deeper than 50 fathoms, only north of St. Lucie Inlet, and only for species other than wreckfish.	Would allow fishermen to make multiple gear trips.	Could cause habitat degradation.	Could lead to stock decline due to habitat degradation in the long-term.

SOCIAL IMPACT ASSESSMENT/FISHERY IMPACT STATEMENT

This integrated document contains all elements of the Plan Amendment, Final Supplemental Environmental Impact Statement (FSEIS), Initial Regulatory Flexibility Analysis (IRFA), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA)/Fishery Impact Statement (FIS). A table of contents for the SIA/FIS is provided separately to aid reviewers in referencing corresponding sections of the Amendment.

INTRODUCTION

Mandates to conduct Social Impact Assessments (SIA) come from both the National Environmental Policy Act (NEPA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). NEPA requires Federal agencies to consider the interactions of natural and human environments by using a "systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences...in planning and decision-making" [NEPA section 102 (2) (a)]. Under the Council on Environmental Quality's (CEQ, 1986) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* a clarification of the terms "human environment" expanded the interpretation to include the relationship of people with their natural and physical environment (40 CFR 1508.14). Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects which may be direct, indirect or cumulative (Interorganizational Committee on Guidelines and Principles for Social Impact Assessment, 1994).

Under the MSFCMA, fishery management plans (FMPs) must "...achieve and maintain, on a continuing basis, the optimum yield from each fishery" [MSFCMA section 2 (b) (4)]. When considering "a system for limiting access to the fishery in order to achieve optimum yield" the Secretary of Commerce and Regional Fishery Management Councils are to consider both the social and economic impacts of the system [MSFCMA section 303 (b) (6)]. Recent amendments to the MSFCMA require that FMPs address the impacts of any management measures on the participants in the affected fishery and those participants in other fisheries that may be affected directly or indirectly through the inclusion of a fishery impact statement [MSFCMA section 303 (a) (9)]. Most recently, with the addition of National Standard 8, FMPs must now consider the impacts upon fishing communities to assure their sustained participation and minimize adverse economic impacts upon those communities [MSFCMA section 301 (a) (8)]. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. With an increasing need for management action, the consequences of such changes need to be examined in order to mitigate the negative impacts experienced by the populations concerned.

PROBLEMS AND METHODS

Social impacts are generally the consequences to human populations that follow from some type of public or private action. Those consequences may include alterations to "the ways in which people live, work or play, relate to one another, organize to meet their needs and generally cope as members of a society...." (Interorganizational Committee on Guidelines and Principles for Social Impact Assessment, 1994:1). In addition, cultural impacts which may involve changes in values and beliefs which affect people's way of identifying themselves within their occupation, communities and society in general are included under this interpretation. Social impact analyses help determine the consequences of policy action in advance by comparing the status quo with the projected impacts. Therefore, it is extremely important that as much information as possible concerning a fishery and its participants be gathered for an assessment. Although public hearings and scoping meetings do provide input from those concerned with a particular action, they do not constitute a full overview of the fishery.

Without access to relevant information for conducting social impact analyses it is important to identify any foreseeable adverse effects on the human environment. With quantitative data often lacking, qualitative data can be used to provide a rough estimate of some impacts. In addition, when there is a body of empirical findings available from the social science literature, it needs to be summarized and referenced in the analysis.

In attempting to assess the social impacts of the proposed amendment it must be noted that data used for this analysis did not represent a comprehensive overview of the fishery therefore the analyses do not include all social impacts. What information was available pertains primarily to the commercial harvesting sector of the snapper grouper fishery. Thus social impacts on non-commercial harvesters, the processing sector, the consumer, fishing communities and society as a whole are not fully addressed due to data limitations. The fishery impact statement consists of the description of the commercial fishery and the social impacts under each action item and options. There is presently no information or sufficient guidelines to define or determine impacts upon fishing communities.

SOCIAL IMPACT SUMMARY

Table 2. Social impact (SIA/FIS) summary.

ACTION	SOCIAL IMPACTS
Action 1. Increase the red porgy minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen; establish a recreational bag limit of 5 red porgy per person per day; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	Increasing the size limit received mixed support during previous public hearings, although an incremental approach might be viewed more favorably. The impacts will likely be to shift effort to other species. Recreational fishermen may be satisfied with a 5 fish bag limit, but, this will depend upon past fishing practices and whether or not they have become accustomed to keeping large numbers of red porgies. Recent public hearings suggest little support for a 5 fish bag limit.
Action 2. Increase the black sea bass minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day.	There may be species substitution for any lost harvest of black sea bass, however, effort may also increase. The social impacts of this combined size limit increase and bag limit would depend upon the availability of other species, or, for commercial fishermen the ability to replace lost income. However, with the small increase in size limit, there may be no need to switch to other species as fishermen may increase their effort to fish black sea bass to offset any losses. The bag limit will likely constrain some recreational fishermen.
Action 3. Require escape vents and escape panels with degradable fasteners in black sea bass pots.	Requiring escape vents on pots would have few social impacts since most of the impacts would have come primarily with the size limits, if implemented. Requiring degradable fasteners would have few if any social impacts other than an added expense to the fishing operation.
Action 4. Establish measures for greater amberjack that will: reduce the recreational bag limit from 3 to 1 greater amberjack per person per day; prohibit harvest in excess of the bag limit during April throughout the EEZ; establish a 1,000 pound daily commercial trip limit; establish a quota at 63% of 1995 landings (quota=1,169,931); begin the fishing year on May 1; prohibit sale of fish harvested under the bag limit when season is closed; and prohibit coring.	The social impacts from this measure will vary and affect both the commercial and recreational sector. The prohibition of sale and closure during April may increase effort on either side of the closure. Reducing the recreational bag limit to one fish may induce fishermen to switch to other species. The combined effect of moving the fishing year, trip limits and including the quota will likely be a closure of the fishery sometime in February or March. An even earlier closure could occur if fishermen increase their efforts early in the fishing year in anticipation of the closure. The 1,000 pound trip limit should constrain the effort increase to some extent, particularly if fishermen cannot increase the number of trips over time.
Action 5. Increase the recreational vermilion snapper minimum size limit from 10" TL to 11" TL, and retain the current 10-fish bag limit.	Increased discards could result as fishermen continue to fish vermilion but discard smaller fish which comprised much of the catch previously. If they are unable to catch sufficient numbers under the new size limit, then they will likely redirect effort to other species. It was noted during previous public hearings that many headboats that fish the "party grounds" rarely catch vermilion that are over 10" as this may be an artifact of fishing closer inshore where smaller fish reside. If these boats are forced to fish farther offshore this may reduce the number of trips they are able to make daily and increase their operating costs.

Table 2 (cont.). Summary of social impacts.

ACTION	SOCIAL IMPACTS
Action 6. Increase the gag minimum size limit from 20" TL to 24" TL for both commercial and recreational fishermen; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	With the reduction in catch that comes with this option there will undoubtedly be impacts as fishermen try to replace lost income or recreational satisfaction. Commercial and recreational harvesters in the northern area of the South Atlantic will be impacted the most through this measure. Species substitution and other means of replacing lost income or recreation will accompany the desired reduction in catch. Although March was a month that was chosen by several fishermen when asked which months they would choose not to fish, April was chosen by very few. The month of April may be important to the annual fishing round for many fishermen making it difficult to replace lost income without increased effort or other sources of income.
Action 7. Increase the black grouper minimum size limit from 20" TL to 24" TL for both commercial and recreational fishermen; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	Because black grouper and gag are often misidentified by fishermen, a same size limit as gag would help avoid further confusion and provide protection for both species. As with gag, this action will likely induce species substitution and other impacts discussed above.
Action 8. Specify that within the 5-fish aggregate grouper bag limit (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 may be gag or black grouper (individually or in combination).	Because black grouper and gag are often misidentified as the same species, a similar bag limit requirement will help avoid confusion and will provide protection for both species. This action would reduce the bag limit for either species to 2.
Action 9. Establish an aggregate recreational bag limit of 20 fish inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners).	Although fishermen must abide by bag limits already, this action may cause increased highgrading of less desirable species as fishermen reach the limit. Previous public hearings had mixed support for an aggregate bag limit. In many cases comments suggested that 20-25 fish were too many, however, that was when the bag limit included species that already had bag limits. Support for this bag limit may not be as forthcoming because this bag limit would cap only those species without a bag limit. In anticipation of species substitution in light of other actions within this amendment, this bag limit would provide limited protection for those species which may see increased effort.
Action 10. Specify that vessels with longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.	This action would further clarify the Council's intent regarding the use of longline gear and assist law enforcement in making cases where snapper grouper species have been landed within the 50 fathom line with longlines. However, many fishermen in the northern area presently make multi-gear trips and fish vertical lines inside the 50 fathom line. Those individuals would be required to return to port to change gear adding to the costs of their fishing operation.

Table 2 (cont.). Summary of social impacts.

Cumulative Impacts	With the revisions to the reauthorized Magnuson-Stevens Act the council has had to take a more conservative approach to managing overfished species. The combined impact on commercial, charter and headboat fishermen of the proposed measures in this amendment could be substantial. There is the possibility that some individuals whose business has been operating on the margin may be forced to leave if alternative fisheries or other means of substituting for lost income are not readily available. The ability to enter other fisheries will depend upon an individual's present capability to diversify their fishing practices and the open access nature of other fisheries. There are an increasing number of fisheries coming under limited access regimes. Other alternatives for replacing lost income will depend upon the ability of fishermen or other household members to take on any, or, additional responsibilities for the household income. That capability is certainly tied to the availability of work and the possession of individual skills needed for jobs that are available. Many fishing communities are located in rural areas where job opportunities are limited, although, fishermen often have skills that are compatible with many of the short term and/or part time work opportunities available in rural areas. The key is whether those opportunities will exist at the same time fishermen will be in need of them. Because of the more conservative approach adopted under the Magnuson-Stevens Act, the council is required to take what are considered extreme actions by some fishermen, when much of the stock assessment data is outdated and has not taken into account past council management actions. Fishermen have complained that such excessive measures are not justified until a better idea of the true stock status is known.

SOCIAL IMPACT ASSESSMENT DATA NEEDS

The recent socio-demographic survey and economic survey were snapshots of the commercial fishery. To provide better assessments socio-economic data need to be collected on a continuing basis for both the commercial and recreational sectors, including the for-hire sector. Collecting social and economic information in logbooks would be one manner of providing this information on a continuing basis for the commercial sector. Social and economic add-ons to the MRFSS data collection system can provide this type of data for recreational fishermen. In addition, information on fishing communities in the South Atlantic is virtually non-existent. Fishing communities need to be identified and their dependence upon fishing and fishery resources needs to be established. The following list of data needs is provided as a guideline:

1. Demographic information may include but not necessarily limited to: population; age; gender; ethnic/race; education; language; marital status; children, (age & gender); residence; household size; household income, (fishing/non-fishing); occupational skills; association with vessels & firms (role & status).

2. Social Structure information may include but not necessarily limited to: historical participation; description of work patterns; kinship unit, size and structure; organization & affiliation; patterns of communication and cooperation; competition and conflict; spousal and household processes; and communication and integration.

3. Emic culture information may include but not necessarily limited to: occupational motivation and satisfaction; attitudes and perceptions concerning management; constituent views of their personal future of fishing; psycho-social well-being; and cultural traditions related to fishing (identity and meaning).

4. Fishing community information might include but not necessarily limited to: identifying communities, dependence upon fishery resources (this includes recreational use), identifying businesses related to that dependence, determine the number of employees within these businesses and their status.

This list of data needs is not exhaustive or all inclusive. The upcoming issues within the snapper grouper will undoubtedly focus upon allocation and the need for reliable and valid information concerning the social environment will become necessary for managing this fishery.

1.0 PURPOSE AND NEED

1.1 Issues/Problems

The Fishery Management Plan for the Snapper Grouper Fishery (SAFMC, 1983) contains a detailed description of the snapper grouper fishery. The problems and issues in the fishery are outlined in the various amendments and are shown below.

The current definition of overfishing refers to 30% Spawning Stock Biomass Per Recruit (SSBR). SPR is defined as the number of eggs that could be produced by an average recruit in a fished stock divided by the number of eggs that could be produced by an average recruit in an unfished stock. SPR can also be expressed as the spawning stock biomass per recruit (SSBR) of a fished stock divided by the SSBR of the stock before it was fished. SSBR is defined as the spawning stock biomass divided by the number of recruits to the stock or how much spawning biomass an average recruit would be expected to produce. The current wording of problems and some of the stock assessment results refer to SSBR, SSR and SPR. It is the Council's intent that overfishing be defined in terms of SPR. Future assessments will be conducted to yield estimates of SPR.

Problems identified in the Snapper Grouper Fishery Management Plan as modified by Amendment 8 (SAFMC, 1997) are:

1. Excessive fishing mortality is jeopardizing the biological integrity of the snapper grouper resource of the South Atlantic.

2. Adequate management has been hindered by lack of current and accurate biological, statistical, social, and economic information.

Progress has been made in determining the status of additional species. However, data to calculate stock status remains limited and in many cases the status of particular stocks are disputed between fishermen and scientists.

The permitting system defines the universe of participants, and social and economic survey results are available for portions of the commercial fishery. Information for the recreational fishery remains very limited.

3. Intense competition exists among recreational, part-time, and full-time commercial users of the snapper grouper resources; and between commercial users employing different gears (hook and line, traps, entanglement nets, longlines, and powerheads/bang sticks).

4. Habitat degradation caused by some types of fishing gear and poor water quality have adversely affected fish stocks and associated habitat.

5. The existence of inconsistent State and Federal regulations makes it difficult to coordinate, implement and enforce management measures and may lead to overfishing. Inconsistent management measures create public confusion and hinders voluntary compliance.

6. Excess Capacity: The size and capacity of the fleet have increased significantly in recent years. Despite bag and trip limits, and other regulatory measures, some of the stocks are still overfished or near the overfished stage. Any gains from current regulatory measures under open access are likely to attract new entrants to the fishery and provide incentive for those already in the fishery to increase harvest capacity even when gains in production are marginal or when economies of scale are not necessarily realized.

7. Inefficiency: Past and present measures to control harvest (TAC, gear restrictions, trip limits, size limit and bag limits), and future measures that would likely be implemented under continued open access, would increase fishing costs and decrease potential consumer and producer benefits from the fishery. This inefficiency could be minimized if access to the fishery is controlled.

8. Low Conservation and Compliance Incentives: Under open access there is little incentive on the part of fishermen to promote conservation and to voluntarily comply with regulations. This is because the benefits from doing so may accrue to other fishermen or to new entrants. A controlled access management system would provide a mechanism for those who participate in conservation measures to share in the resulting benefits.

9. Potential Conflicts among Participants: As the number of vessels continues to increase over time, competitive fishing conditions may eventually lead to gear and area conflicts as a large number of vessels compete for the available resources on the same fishing grounds. (At the other extreme, stocks may decline to the point where marginal fishermen may not find it economically viable to fish. This situation could lead to a decline in fishing effort.)

10. High Regulatory Costs: The progression of regulatory measures already implemented in the snapper grouper fishery has resulted in increasing management and enforcement costs. However, the full benefit from these measures has not been realized due to the open access nature of the fishery. More management measures under open access would further increase these costs to the point where management costs could outweigh the benefits.

11. Low Marketing Incentives: Short–run oversupply and lack of product continuity continues to create price fluctuation and uncertainty in the marketplace for these species. The likelihood of additional harvest restrictions under open access increases uncertainty and instability which discourages long–term planning and investment by dealers.

12. Localized Depletion: Localized depletion where a species' abundance in an area is reduced by high fishing effort can cause conflict among fishermen.

1.2 Management Objectives for Amendment 9

The objectives are spelled out in the Fishery Management Plan and its amendments. It should be noted that various actions implemented under the FMP and its amendments established the management structure for stabilizing yield at maximum sustainable yield (MSY), for recovery of overfished stocks, and for maintaining population levels sufficient to ensure adequate recruitment. The existing management program does not provide a means for reducing excess capacity nor provide incentives for fishermen to comply with regulations. The controlled access management system proposed in Amendment 8 would correct some of these inadequacies. However, a controlled access system by itself does not resolve all management problems, it provides a means for addressing problems other management measures cannot solve. Thus, controlled access should be considered a supplement to other management measures. Also, no matter which controlled access approach is used, there are always winners and losers due to overcapacity already existing in the fishery. The management goal is to select a system that will provide the most benefit to society and at the same time ensure optimum use of the resource in the long–run while minimizing impacts on fishermen.

Objectives of the Snapper Grouper Fishery Management Plan as modified by Amendment 8 (SAFMC, 1997) are:

1. Prevent overfishing in all species by maintaining the spawning potential ratio (SPR) at or above target levels.

2. Collect necessary data to develop, monitor, and assess biological, economic, and social impacts of management measures designed to prevent overfishing, obtain desired SPR levels, and address the other stated problems.

3. Promote orderly utilization of the resource.

4. Provide for a flexible management system that minimizes regulatory delays while retaining substantial Council and public involvement in management decisions, and rapidly adapts to changes in resource abundance, new scientific information, and changes in fishing patterns among user groups.

5. Minimize habitat damage due to direct and indirect effects of recreational and commercial fishing activities as well as other non-fishery impacts.

6. Promote public comprehension of, voluntary compliance with, and enforcement of the management measures.

7. Mechanism to Vest Participants: A controlled access system provides a means whereby participants have a stake in conserving the resource. This ensures that participants consider the long–run benefits of conserving the resource because they know it is in their best interest. Unlike open access, controlled access would ensure that those who conserve the resource share in the long–run benefits. This gives fishermen incentive to protect the resource and expose those who are violating regulations. As a result, voluntary compliance would increase and enforcement costs would likely decrease.

8. Promote Stability and Facilitate Long–run Planning: Participants in the fishery will have access to the resource based on certain criteria to be determined by the Council after reviewing public comments. This would give participants the flexibility to employ the most profitable way to fish and also fish when it is most profitable in terms of market conditions. Such a system will promote stability in the fishery by providing a regular supply of fish throughout the fishing year, and maintain stable prices. Both fishermen and fish dealers will have the incentive to engage in long–run planning and investment activities.

9. Create Market–Driven Harvest Pace and Increase Product Continuity: A system that ensures participants can harvest their allocations (whether in terms of individual quotas, effort units, trip limits, etc.) anytime during the fishing year would ensure that fishermen conduct their fishing activities to supply the market according to its structure and demand situation. There would be no incentive on the part of fishermen to flood the market with fish. This could result in product continuity, improved product quality, and better prices.

10. Minimize Gear and Area Conflicts among Fishermen: Presently, allowable gear provision (implemented under Snapper Grouper Amendment 6) controls the types of gear in the fishery. Controlled access and effort unit controls would limit the number of allowable gear in the fishery.

11. Decrease Incentives For Overcapitalization: If some form of vested interest is provided to fishermen, their objective would be to maximize profits subject to certain conditions. In order to maximize profits they would explore the least cost method for harvesting in the fishery. This means they would employ fishing effort only to the point where the difference between the anticipated total revenue and total cost is greatest. This practice would reduce incentives for overcapitalization.

12. Prevent Continual Dissipation of Returns from Fishing through Open Access: It is a well known fact that under open access any measure(s) that generate "pure profits" will provide an opportunity for those already in the fishery to dissipate those profits and also attract new entrants into the fishery. This can only be prevented if measures are taken to prevent those already in the fishery from increasing their effort without any restriction and also to create a barrier against unlimited entry into the fishery. A controlled access system will reduce the incentive for present participants to violate the regulations, and also prevent unlimited entry into the fishery.

13. Evaluate and minimize localized depletion. High fishing mortality rates have resulted in localized depletion of some species in certain areas. Certain species are overfished throughout their range; however, there are particular areas where the overfishing rate is more severe than in the rest of the range. There may also be some cases where the stock as a whole is not overfished, but the numbers in a localized area have been significantly reduced.

14. Minimize bycatch.

Reflects greater responsibility under recent Magnuson-Stevens Act amendment which added the following national standard: "(9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch."

1.3 History of Management

1.3.1 Snapper Grouper Fishery Management Plan and Amendments.

The **Fishery Management Plan** (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (SAFMC, 1983) was prepared by the South Atlantic Fishery Management Council and implemented by the Secretary of Commerce on August 31, 1983 [48 Federal Register 39463]. The FMP was prepared to prevent growth overfishing in thirteen species in the snapper grouper complex and to establish a procedure for preventing overfishing in other species. The FMP established a 12" total length minimum size for red snapper, yellowtail snapper, red grouper and Nassau grouper; an 8" total minimum size for black sea bass; and a 4" trawl mesh size to achieve a 12" minimum size for vermilion snapper. Additional harvest and gear limitations were also included in the original plan.

Amendment 1 (SAFMC, 1988) was implemented by the Secretary effective January 12, 1989 [54 Federal Register 1720] to address the problems of habitat damage and growth overfishing in the trawl fishery. The amendment prohibited use of trawl gear to harvest fish in the directed snapper grouper fishery south of Cape Hatteras, North Carolina (35° 15' N Latitude) and north of Cape Canaveral, Florida (Vehicle Assembly Building, 28° 35.1' N Latitude). A vessel with trawl gear and more than 200 pounds of fish in the snapper grouper fishery (as listed in Section 646.2 of the regulations) on board was defined as a directed fishery. The amendment also established a rebuttable presumption that a vessel with fish in the snapper grouper fishery (as listed in Section 646.2 of the regulations) on board harvested its catch of such fish in the Exclusive Economic Zone (EEZ).

Amendment 2 (SAFMC, 1990b) prohibited the harvest or possession of jewfish in or from the EEZ in the South Atlantic due to its overfished status and defined overfishing for jewfish and other snapper grouper species according to the National Marine Fisheries Service (NMFS) 602 guidelines requirement that definitions of overfishing be included for each fishery management plan. The harvest or possession of jewfish was prohibited by emergency rule. The amendment was approved on October 10, 1990 and final regulations were effective October 30, 1990 [55 Federal Register 46213].

Amendment 3 (SAFMC, 1990a) established a management program for the recently developed wreckfish fishery. The Council was concerned that the rapid increase in effort and catch threatened the wreckfish resource with overfishing and that the concentration of additional vessels in the relatively small area where the resource is located could also create problems with vessel safety because of overcrowding. Actions included: (1) adding wreckfish to the management unit; (2) defining optimum yield; (3) defining overfishing for wreckfish; (4) requiring an annual permit to fish for, land or sell wreckfish; (5) collecting data necessary for effective management; (6) establishing a control date of March 28, 1990 after which there would be no guarantee of inclusion in a limited entry program should one be developed (this was later limited to the area bounded by 33° and 30° N. latitude based on public hearing testimony); (7) establishing a fishing year beginning April 16; (8) establishing a process whereby annual total allowable catch (annual quotas) would be specified, with the initial quota set at 2 million pounds; (9) establishing a 10,000 pound trip limit; and (10) establishing a spawning season closure from January 15 through April 15. Actions (7), (9) and (10) were based on public testimony. An emergency rule effective August 3, 1990 [55 Federal Register 32257] added wreckfish to the management unit, established a fishing year for wreckfish commencing April 16, 1990, established a commercial quota of 2 million pounds and established a catch limit of 10,000 pounds per trip. The Secretary of Commerce closed the fishery for wreckfish in the EEZ effective August 8, 1990 when the 2 million pound TAC was reached [55 Federal Register 32635]. The Council requested an extension of the emergency rule which was approved [55 Federal Register 40181]. Amendment 3 was approved on November 9, 1990 and final regulations were effective January 31, 1991 [56 Federal Register 2443].

Amendment 4 (SAFMC, 1991b) was prepared to reduce fishing mortality on overfished species, to establish compatible regulations, where possible, between state and federal agencies, to identify the universe of fishermen, and to gather the data necessary for management. Amendment 4 prohibits: (1) use of fish traps in South Atlantic federal waters with the exception of black sea bass traps when used north of Cape Canaveral, Florida; (2) use of entanglement nets, which includes gill and trammel nets; (3) use of longline gear inside 50 fathoms (300 feet) in the snapper grouper fishery in South Atlantic federal waters; (4) use of bottom longlines for wreckfish; and (5) use of powerheads and bangsticks in all designated special management zones (SMZs) off the South Carolina coast. In addition, fishermen who fish for other species with gear prohibited in the snapper grouper fishery may not have bycatch of snapper and grouper species in excess of the allowed bag limit. No bycatch would be allowed for those species that have no bag limit or that are prohibited.

The amendment established the following minimum sizes: 8" total length for lane snapper and black sea bass; 10" total length for vermilion snapper (recreational fishery only); 12" total length for red porgy, vermilion snapper (commercial fishery only), gray, yellowtail, mutton, schoolmaster, queen, blackfin, cubera, dog, mahogany and silk snappers; 20" total length for red snapper, gag, and red, black, scamp, yellowfin, and yellowmouth groupers; 28" fork length for greater amberjack (recreational fishery only); 36" fork length or 28" core length for greater amberjack (commercial fishery only); and no retention of Nassau grouper. Amendment 4 also requires that all snappers and groupers possessed in South Atlantic federal waters must have head and fins intact through landing.

Bag limits established under Amendment 4 for the recreational fishery are: a bag limit of 10 vermilion snapper per person per day; a bag limit of three greater amberjack per person per day; a snapper aggregate bag limit of 10 fish per person per day, excluding vermilion snapper and allowing no more than two red snappers; and a grouper aggregate bag limit of five per person per day, excluding Nassau grouper and jewfish for which no retention is allowed. Charter and head boats are allowed to have up to a two–day possession limit as long as there are two licensed operators on board and passengers have receipts for trips in excess of 12 hours. Excursion boats would be allowed to have up to a three–day possession limit on multi–day trips. Fish harvested under the bag limit may be sold in conformance with state laws if they meet the commercial minimum sizes. The commercial harvest and/or landing of greater amberjack in excess of the three–fish bag limit is prohibited in April south of Cape Canaveral, Florida. The commercial harvest and/or landing of mutton snapper in excess of the snapper aggregate bag limit is prohibited during May and June.

To exceed bag limits in the snapper grouper fishery, an owner or operator of a vessel that fishes in South Atlantic federal waters is required to obtain an annual vessel permit. For individuals to qualify for a permit they must have at least 50 percent of their earned income, or $20,000 in gross sales, derived from commercial, charter, or headboat fishing. For a corporation to be eligible for a permit, the corporation or shareholder or officer of the corporation or the vessel operator would be required to have at least $20,000 in gross sales derived from commercial fishing. For partnerships, the general partner or operator of the vessel is required to meet the same qualifications as a corporation. A permit, gear, and vessel and trap identifications are required to fish with black sea bass traps. Amendment 4 also addresses enforcement concerns that surfaced with wreckfish trip limit. Amendment 4 was approved on August 26, 1991 by the Secretary of Commerce and all regulations were effective on January 1, 1992 except the bottom longline prohibition for wreckfish was implemented on October 25, 1991 [56 Federal Register 56016].

Bottom longline gear was being used to a limited extent in the wreckfish fishery and fishermen indicated that gear loss, habitat damage and lost gear continuing to fish were problems. The Council subsequently requested and was granted **emergency regulations** [56 Federal Register 18742] that prohibited the use of bottom longline gear in the wreckfish fishery effective April 19, 1991 and were granted an **extension** on July 19,1991 [56 Federal Register 33210].

A **control date** of July 30, 1991 for possible future limited entry was established for the entire snapper grouper fishery excluding wreckfish [56 Federal Register 36052].

Amendment 5 (SAFMC, 1991a) established Individual Transferable Quota (ITQ) management program for the wreckfish fishery. The Council submitted the amendment to the Secretary of Commerce on September 12, 1991. Amendment 5 was implemented with an effective date of April 6, 1992, except that the sections dealing with permits and fees, falsifying information, and percentage shares was effective March 5, 1992 [57 Federal Register 7886]. The amendment included the following: (1) a limited entry program for the wreckfish sector of the snapper grouper fishery consisting of transferable percentage shares of the annual total allowable catch (TAC) of wreckfish and individual transferable quotas (ITQs) based on a person's share of each TAC; (2) required dealer permits to receive wreckfish; (3) removed the 10,000 pound (4,536 kilogram) trip limit for wreckfish; (4) required that wreckfish be off loaded from fishing vessels only between 8:00 a.m. and 5:00 p.m.; (5) reduced the occasions when 24–hour advance notice must be made to NMFS Law Enforcement for off–loading of wreckfish; and (6) specified the procedure for initial distribution of percentage shares of the wreckfish TAC. At its February 1996 meeting, the Council approved staying with the 2 million pound TAC for fishing year 1996/97.

Implementation of Amendment 4 resulted in a prohibition on black sea bass pot fishermen making multi–gear trips and retaining other species which resulted in large, unintended economic losses. The Council subsequently requested **emergency regulations** on July 8, 1992 to modify the definition of black sea bass pot, allow multi–gear trips, and allow retention of incidentally caught fish. These regulations became effective on August 31, 1992 [57 Federal Register 39365] and were extended on November 30, 1992 [57 Federal Register 56522]. On December 11, 1992 the Council submitted a **regulatory amendment** implementing the above changes on a permanent basis. An interim final rule and request for comments was published on March 2, 1993 with an effective date of March 1, 1993 [58 Federal Register 11979]. The final rule was published on July 6, 1993 [58 Federal Register 36155] with an effective date of July 6, 1993.

The Council submitted a **regulatory amendment** requesting implementation of eight special management zones off South Carolina on August 12, 1992. The proposed rule was published in the federal register on March 15, 1993 [58 Federal Register 13732]. The final rule was published on July 2, 1993 [58 Federal Register 35895] with the effective date of July 31, 1993.

Amendment 6 (SAFMC, 1993b) was submitted to the Secretary of Commerce in December 1993. The amendment was developed to rebuild the snowy grouper, golden tilefish, speckled hind, warsaw grouper, misty grouper, and yellowedge grouper resources and proposed to phase–in quotas over a three year period beginning January 1994. Commercial trip limits, recreational bag limits, and an experimental closed area were also proposed to manage and rebuild these economically and ecologically important resources. Data will be collected to evaluate shifts in fishing effort (effort shifts) among fisheries and for future evaluation of an "Individual Transferable Quota" (ITQ) type of management approach. Amendment 6 was approved on May 5, 1994 with the exception of the 100 percent logbook coverage and the anchoring prohibition within the Oculina Bank. Commercial trip limits for snowy grouper and golden tilefish became effective June 6, 1994, and the remainder of the regulations became effective June 27, 1994 [59 Federal Register 27242].

Amendment 7 (SAFMC, 1994a) was submitted to the Secretary of Commerce on June 16, 1994. It establishes a 12" fork length size limit for hogfish; increases the mutton snapper size limit from 12" to 16" total length; requires dealer, charter and headboat federal permits; allows sale under specified conditions; specifies allowable gear and makes allowance for experimental gear; makes allowance for multi–gear trips in North Carolina; adds localized overfishing to the list of problems and objectives; adjusts the bag limit and crew specification for charter and headboats; modifies the management unit for scup to apply south of Cape Hatteras, North Carolina; modifies the framework procedure to increase the timeliness of action by the Council. The final rule was published on December 23, 1994 [59 Federal Register 66270] and the regulations became effective January 23, 1995 except for application and possession of dealer, charter and headboat federal permits which became effective December 23, 1994 and March 1, 1995 respectively.

At the request of the State of Florida, the Council submitted **Regulatory Amendment 6** (SAFMC, 1994b) on October 21, 1994 to the Secretary of Commerce for bag limits on hogfish and cubera snapper, and a size limit on gray triggerfish. It proposes to establish a daily recreational bag limit of five hogfish per person; limit the harvest and possession to two per day; of cubera snapper to 30" total length or larger and establish a minimum size limit for gray triggerfish of 12" total length. These measures would apply only in the EEZ off the Atlantic coast of Florida. The proposed rule was published on February 15, 1995 [60 Federal Register 8622]. The final rule was published on April 20, 1995 [60 Federal Register 19683 with effective date of May 22, 1995].

In a letter dated February 6, 1997, the Council requested establishment of **a control date for the black sea bass pot fishery** effective upon publication in the federal register. The advanced notice of proposed rulemaking was published in the federal register on April 23, 1997 [62 Federal Register 19732], thus April 23, 1997 is the control date for the black sea bass pot fishery.

Amendment 8 (SAFMC, 1997) proposes to: limit initial eligibility for participation in the snapper grouper fishery to owners of boats/vessels that: (1) can demonstrate any landings of species in the snapper grouper management unit in 1993, 1994, 1995 or 1996 (as of August 20, 1996) and (2) held a valid snapper grouper permit between February 11, 1996 and February 11, 1997. Vessels landing at least 1,000 pounds of species in the snapper grouper management unit in any of these years receives a transferable permit. All other vessels receive a non-transferable permit and are limited to a 225 pound trip limit. Amendment 8 also modifies the problems, objectives, Optimum Yield and overfishing definition in the snapper grouper management plan. In addition, the habitat responsibility was expanded and measures to modify allowable gear and allow possession of fillets from the Bahamas were included. Amendment 8 was submitted to the Secretary of Commerce on July 10, 1997. The notice of availability of Amendment 8 was published in the federal register on October 30, 1997 [62 Federal Register 58703] thereby beginning the formal review process. The Secretary of Commerce must inform the Council of approval or disapproval of Amendment 8 on or before January 28, 1998 (90 days after publication of the notice of availability). The proposed rule was published in the federal register on January 12, 1998 [63 Federal Register 1813]; written comments on the proposed rule must be received by NMFS on or before February 26, 1998.

1.3.2 Development of Amendment 9

The Council received requests from the public to consider additional regulations for (1) greater amberjack in Monroe County, Florida, (2) yellowtail snapper, and (3) multi-day bag limits. Additional options were taken to scoping concerning (4) prohibiting possession of fish traps in the South Atlantic EEZ to enhance enforcement; (5) specifying the time when commercial permits are available; and (6) limiting access based on the number of permitted fishermen that have complied with all reporting requirements. Actions addressing red porgy and black sea bass were taken to public hearing during development of Amendments 6 and 7 but the Council did not propose taking action in either of those amendments. Additional public comment was received during public hearings on Amendment 8.

During three scoping meetings (June 21, 1994, Marathon, Florida; August 24, 1994, Charleston, South Carolina; and October 25, 1994, Wrightsville Beach, North Carolina), a number of suggestions for additional action surfaced and are included in this amendment. Scoping meeting minutes, letters and comments from the Snapper Grouper Advisory Panel were distributed to all council members on January 13, 1995. This material, the most recent assessment results, and public hearings on Amendments 8 and 9 formed the basis for the final Amendment 9 actions.

1.4 Issues/Problems Requiring Plan Amendment

Fishermen and others have asked why additional measures are being proposed so soon after Amendment 4 which was implemented January 1, 1992. The information in Table 3 presents the species addressed in Amendment 9, the years of data included in the most recent assessment, and the present status of these species.

The gag assessment included one year of data under the size/bag limits implemented under Amendment 4. The current size/bag limits will not rebuild gag to the Council's overfished level of 30% transitional SPR (short-term goal).

The red porgy assessment includes one year of the 12" TL size limit implemented in Amendment 4. Present fishing mortality is very high and the 12" TL size limit will not achieve 30% transitional SPR.

The 1993 NMFS vermilion snapper assessment includes no years with the size/bag limits implemented in Amendment 4 but a 4" trawl mesh size to achieve a 12" TL size limit was implemented in Amendment 1 (January 12, 1989). The MARMAP assessment includes two years of data under the Amendment 4 bag/size limits. The 1997 NMFS vermilion snapper assessment included five years of data under the Amendment 4 bag/size limits and shows and increase in SPR from the management measures implemented under Amendment 4. The current size/bag limits will not achieve 30% transitional SPR.

There are problems with the assessment on greater amberjack due to the very limited data base. A new assessment (Atlantic and Gulf combined) was completed in November 1996. The 1996 NMFS assessment, which included three years under the size limit, indicated a SPR of 84%, well above the target of 40% static SPR. The assessment results have since been discounted by NMFS.

Black sea bass have been managed with a 8" TL size limit since late 1983; the NMFS 1996 assessment included 12 years of data with the size limit. The current size limit results in a transitional SPR of 26%. However, the 8" TL size limit will not achieve 30% static SPR.

Amendment 4 implemented a 20" TL size limit and established a 5-fish aggregate bag limit for all groupers, including black grouper. The 1992 NMFS stock assessment included data through 1990 and probably does not reflect current stock status. The south Florida study (Appendix H) probably does not reflect stock status throughout the range. True stock status is unknown but probably lies somewhere between 5% and 43% SPR (Table 3A).

Table 3A. Summary of stock status for species included in Amendment 9.

Present state of fishing mortality (F), spawning potential ratio (SPR) and F needed to reach a SPR target.
(Source: NMFS Beaufortt & SC MARMAP.)

SPECIES	ASSESSMENT YEAR	DATA YEAR	PRESENT F	PRESENT SPR	F TO REACH 20% SPR	F TO REACH 30% SPR	F TO REACH 40% SPR	% REDUCTION IN FISHING MORTALITY RATES TO REACH VARIOUS SPR LEVELS 20% SPR	30% SPR	40% SPR
GAG										
M = 0.1	1996	1993	0.36	13%	0.25	0.17	0.12	31%	53%	67%
M = 0.15	1996	1993		20%	n/a			F same	F lower	F lower
M = 0.2	1996	1993	0.19	32%	n/a	n/a	n/a	F could go up	F same	F lower
RED PORGY	1994	1992	1.28	13%	0.73	0.45	0.32	43%	65%	75%
VERMILION SNAPPER										
NMFS	1993	1991	0.95	16%	0.76	0.52	0.32	20%	45%	66%
MARMAP	1995	1993	0.93	25%	n/a	0.65	0.37	F could go up	30%	60%
NMFS	1997*	1996	0.51	21%	n/a	0.35	0.25	F could go up	31%	51%
(M=0.30* -0.35**)	1997**	1996	0.46	27%	n/a	0.41	0.28	F could go up	11%	39%
GREATER AMBERJACK	1996	1995	0.19	84%	n/a	n/a	n/a	F could go up	F could go up	F could go up
BLACK SEA BASS	1996	1995	0.90	26%	1.60	0.7	0.4	F could go up	22%	56%
BLACK GROUPER										
NMFS (M=0.28)	1992	1990	0.20	43%	n/a	n/a	n/a	F could go up	F could go up	F could go up
Appendix H (M=0.15)	1997	1995		5%						

SPECIES	YEAR DETERMINED OVERFISHED		YEARS TO REBUILD
GAG	1996		15
RED PORGY	1991		10
VERMILION SNAPPER	1993		10
GREATER AMBERJACK	Not Overfished		10
BLACK SEA BASS	Not Overfished		10

Snapper Grouper Amendment 4 established rebuilding timeframes of 10 years (shorter lived species) and 15 years (longer lived species).
Overfished currently = SPR < 30% but in Amendment 8 proposed to be changed to SPR < 20%. The overfished determination is based on SPR < 20%.

Table 3B. SPR values for snapper grouper species with overfishing status at 30% transitional SPR (**bold=overfished**).

SPECIES IN SNAPPER GROUPER FMP	COUNCIL'S OVERFISHED SPR %	ASSESSMENT YEAR	DATA THRU (YEAR)	LATEST ESTIMATED SPR %	PROJECTED SPR% WITH REGULATIONS
I. MINIMUM SIZE = 8" (203 MM) TOTAL LENGTH					
Lane snapper	30%	1992	1990	58%	63%
Black sea bass	30%	1996	1995	**26%**	>30%
(Am. 8 Proposed Cap on #Permits)					
(Am. 9 Proposed 10" TL Rec & Com; Rec Bag=20)					
II. MINIMUM SIZE = 12" (305 MM) TOTAL LENGTH					
Yellowtail snapper	30%	1993	1991	**24%**	30%
Gray snapper	30%	1993	1991	41%	45%
Mutton snapper (Rec & Com 16" TL)	30%	1993	1991	43%	45%
Vermilion snapper (10" Rec & Bag=10; 12" Com)	30%	1997	1996	**21%-27%**	**<30%**
(Am. 8 Proposed Cap on #Permits)					
(Am.9 Proposed 11" TL Rec)					
Red porgy	30%	1994	1992	**13%**	**>30%**
(Am. 8 Proposed Cap on #Permits)					
(Am.9 Proposed 14" TL Rec & Com; Rec Bag=5; Com closure March & April)					
Gray triggerfish (Rec & Com 12"TL in EEZ off Florida)	30%	1992	1990	**27%**	>30%
Hogfish (Rec & Com 12" FL)	30%				
(Rec Bag = 5 in EEZ off Florida)					
Schoolmaster snapper	30%				
Queen snapper	30%				
Blackfin snapper	30%				
Cubera snapper (Rec & Com = 2/boat for fish >30"TL)	30%				
(Rec fish <30"TL included in 10 fish snapper bag limit)					
Dog snapper	30%				
Mahogany snapper	30%				
Silk snapper	30%				
III. MINIMUM SIZE = 20" (508 MM) TOTAL LENGTH					
Red snapper (Bag = 2 within 10 snapper bag limit)	30%	1997	1995	**24%-32%**	35%
Gag	30%	1996	1993	**13%**	**<30%**
(Am. 8 Proposed Cap on #Permits)				32%	>30%
(Am. 9 Proposed 24" TL Rec & Com; Rec Bag=2 gag or black in 5 grouper bag; and					
(Com closure March & April)					
Scamp (Fork Length)	30%	1992	1990	**20%**	30%
Red grouper	30%	1992	1990	61%	68%
Black grouper	30%	1992	1990	43%	47%
(Am. 8 Proposed Cap on #Permits)		1997	1995	**5%**	?
(Am. 9 Proposed 24" TL Rec & Com; Rec Bag=2 gag or black in 5 grouper bag; and					
Com closure March & April)					
Yellowfin grouper	30%				
Yellowmouth grouper	30%				
IV. MINIMUM SIZE = 28" (711 MM) FORK LENGTH					
Greater amberjack (28" FL rec. & 28" cored/36" FL com.)	30%	1996	1995	84%	?
(Am. 8 Proposed Cap on #Permits)					
(& Am. 9 Proposed Rec Bag=1; Com closure March & April, quota & 1,000 lb trip limit)					
V. OTHER SPECIES					
Speckled hind (Rec & Com =1 fish/vessel/trip)	30%	1992	1990	**12%**	**<30%**
Warsaw grouper (Rec & Com =1 fish/vessel/trip)	30%	1992	1990	**6%**	**<30%**
Misty grouper	30%				
Yellowedge grouper	30%				
Snowy grouper (Com quota & trip limit)	30%	1992	1990	**15%**	30%
(Rec bag = 5 grouper and tilefish)					
Golden tilefish (Com quota & trip limit)	30%	1992	1990	**21%**	30%
(Rec bag = 5 grouper and tilefish)					
Nassau grouper (Rec & Com - No retention)	30%			**NO SPR**	?
Jewfish (Rec & Com - No retention)	40%			**NO SPR**	?
Tomtate	30%				
Blue runners	30%				
VI. INDIVIDUAL TRANSFERABLE QUOTA (ITQ)					
Wreckfish	30%	1997	1996	**8%-22%**	**<30%**

Table 3B Continued. SPR values for snapper grouper species with overfishing status at 30% transitional SPR (**bold=overfished**).

SPECIES IN SNAPPER GROUPER FMP	COUNCIL'S OVERFISHED SPR %	ASSESSMENT YEAR	DATA THRU (YEAR)	LATEST ESTIMATED SPR %	PROJECTED SPR% WITH REGULATIONS
VII. AGGREGATE RECREATIONAL BAG LIMIT OF 20 FISH					
(Applies to all species currently not under a bag limit except tomtate and blue runners)					
White Grunt	30%	1992	1990	**19%**	**<30%**
Black snapper	30%				
Bank sea bass	30%				
Rock sea bass	30%				
Rock hind	30%				
Graysby	30%				
Coney	30%				
Red hind	30%				
Tiger grouper	30%				
Sheepshead	30%				
Grass porgy	30%				
Jolthead porgy	30%				
Saucereye porgy	30%				
Whitebone porgy	30%				
Knobbed porgy	30%				
Longspine porgy	30%				
Scup	30%				
Queen triggerfish	30%				
Ocean triggerfish	30%				
Yellow jack	30%				
Crevalle jack	30%				
Bar jack	30%				
Almaco jack	30%				
Lesser amberjack	30%				
Banded rudderfish	30%				
Spadefish	30%				
Black margate	30%				
Porkfish	30%				
Margate	30%				
Smallmouth grunt	30%				
French grunt	30%				
Spanish grunt	30%				
Cottonwick	30%				
Sailors choice	30%				
Blue striped grunt	30%				
Blueline tilefish	30%				
Sand tilefish	30%				
Puddingwife	30%				
SUMMARY:					
NUMBER OF SPECIES = 73					
NUMBER OVERFISHED = 17					
NUMBER NOT OVERFISHED = 5					
NUMBER UNKNOWN =51					

Reduce Fishing Mortality (F) to Achieve 40% Static SPR

The Council evaluated two approaches to achieve the long-term goal (OY) of 40% SPR:

Approach 1. Fully implement measures to reach 40% static SPR. Management measures which could be used would include size limits, bag limits, quotas, and trip limits. Size limits to achieve 40% static SPR are shown below:

Species	**Current Regulations**	**Necessary Regulations to reach 40% Static SPR**	**% Reduction in F to reach 40% Static SPR**
Gag	20" TL /bag	30-31" TL	67%
Red porgy	12" TL	16" TL	75%
Vermilion	10" TL rec./bag 12" TL com.		
NMFS		14-15" TL	66%
MARMAP		14-15" TL	72%
Black sea bass	8" TL	11" TL	56%

Approach 2. Step-in measures to reach 40% static SPR. Initially, the objective is to rebuild where necessary above 30% transitional SPR (overfished level) and then to the long-term goal of 40% static SPR (OY). Management measures which could be used include size limits, bag limits, quotas, and trip limits. Examples are shown on the next page.

Future assessments would indicate progress towards the short-term goal of 30% transitional SPR and the long-term goal of 40% static SPR. Additional regulations would be implemented, if it becomes necessary, through the framework procedure.

The Council used Approach 2 to meet the new requirements of the Magnuson-Stevens Act. These new provisions, as interpreted by NMFS, require that any species below MSY (SPR proxy of 30%-40%) must be rebuilt above 30%-40% SPR within 10 years. In most cases the Council's action should rebuild all overfished species above the 30% level Table 3B. The NMFS SEFSC is in the process of generating yield streams which they will use to project the rate of rebuilding for each species. The Council will monitor each species and new assessment, and if additional measures are necessary to rebuild above the 30% level, the framework provision will be used.

Species	Current Regulations	Necessary Size Regulations to reach 40% static SPR	% Reduction in F to reach		Proposed Regulations
			40% SPR	30% SPR	(% Reduction)
Gag	20" TL Bag = 5	30-31" TL	67%	53%	24" TL (Rec & Com) no harvest March & April (17% Rec, 37% Com, 28% combined based on numbers)
Red porgy	12" TL	16" TL	75%	65%	14" TL (Rec & Com) Bag = 5 No harvest March & April (50% Rec, 60% Com, 56% combined based on numbers)
Vermilion	10" TL Rec Bag = 10				11" TL(Rec & Com) (30% Rec, 9% combined based on numbers)
NMFS	12" TL Com	16" TL	66%	9-31%	
MARMAP		16" TL	72%	30%	
Black sea bass	8"	11-12" TL	56%	22%	10" TL (Rec & Com) Bag = 20 (40% Rec, 26% Com, 34% combined based on numbers)

1.5 Measures to Restore and Maintain Long-term Health of the Snapper Grouper Resource

Closed areas are included as a discussion item which may be evaluated in developing a long-term approach to restoring and maintaining the health of the snapper grouper resource. Closed areas are not being proposed in Amendment 9. Results from the experimental closed area off Florida will be used to evaluate this concept as a possible future mechanism.

The percentage reductions in fishing mortality necessary to achieve a 40% static SPR are shown above. For gag, red porgy, and vermilion snapper the percentage reductions to achieve 40% static SPR all meet or exceed 66%; for black sea bass the reduction is 56%. Recognizing the severe impact such reductions would have on fishermen, the long-term solution may require use of area closures to achieve some of the necessary reduction in fishing mortality. While recognizing the high level of controversy associated with area closures, the Council felt it was important to advise the public that area closures may be necessary in the long-term. Should the Council ultimately decide to pursue closed areas, a separate amendment would be developed and taken out to public hearings.

1.6 Proposed Measures

The Council is proposing to: Increase the **red porgy** minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, establish a recreational bag limit of 5 red porgy per person per day, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase **the black sea bass** minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day; **Require escape vents and escape panels** with degradable fasteners in black sea bass pots; Establish measures for **greater amberjack** that will: reduce the recreational bag limit from 3 to 1 greater amberjack per person per day, prohibit harvest and possession in excess of the bag limit during April throughout the EEZ, establish a 1,000 pound daily commercial trip limit, establish a quota at 63% of 1995 landings (quota=1,169,931 pounds), begin the fishing year on May 1, prohibit sale of fish harvested under the bag limit when the season is closed, and prohibit coring; Increase the recreational **vermilion snapper** minimum size limit from 10" to 11" TL and retain the current 10-fish bag limit; Increase the **gag** minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase the **black grouper** minimum size limit from 20" to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Specify that within the **5-fish aggregate grouper bag limit** (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 fish may be gag or black grouper (individually or in combination); Establish an **aggregate recreational bag limit** of 20 fish per person per day inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners); and Specify that **vessels with longline gear** aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

National Environmental Policy Act (NEPA) regulations indicate that Section 2.0 should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public. The Council's documents must also conform to Magnuson-Stevens Act and "Other Applicable Law" requirements. National Environmental Policy Act regulations are one of the "other applicable laws" referenced. The Council decided to blend Magnuson-Stevens Act and "other applicable law" (including NEPA) requirements in one consolidated, non-duplicative, and non-repetitive document. The bulk of the evaluation of alternatives and discussion about the effects on the environment is in Section 4.0 Environmental Consequences. Section 2.0 Alternatives presents a summary of Section 4.0. The Council concluded this meets NEPA regulatory requirements.

Management measures (proposed actions) address the management objectives and issues discussed in Section 1. Each management measure has a number of alternatives that have been considered by the Council.

The Council is proposing to: Increase the **red porgy** minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, establish a recreational bag limit of 5 red porgy per person per day, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase **the black sea bass** minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day; **Require escape vents and escape panels** with degradable fasteners in black sea bass pots; Establish measures for **greater amberjack** that will: reduce the recreational bag limit from 3 to 1 greater amberjack per person per day, prohibit harvest and possession in excess of the bag limit during April throughout the EEZ, establish a 1,000 pound daily commercial trip limit, establish a quota at 63% of 1995 landings (quota=1,169,931 pounds), begin the fishing year on May 1, prohibit sale of fish harvested under the bag limit when the season is closed, and prohibit coring; Increase the recreational **vermilion snapper** minimum size limit from 10" to 11" TL and retain the current 10-fish bag limit; Increase the **gag** minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase the **black grouper** minimum size limit from 20" to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Specify that within the **5-fish aggregate grouper bag limit** (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 fish may be gag or black grouper (individually or in combination); Establish an **aggregate recreational bag limit** of 20 fish per person per day inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners); and Specify that **vessels with longline gear** aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

The following problems have been identified in the snapper grouper fishery. The summary title is used in the impact table (Table 4) to identify which problems are addressed by which proposed management measure.

Biological

• Excessive fishing mortality.	Overfishing
• Localized depletion.	Overfishing
• Habitat degradation.	Habitat
• Lack of biological, statistical, social, and economic information.	Data

Socio-Economic

• Intense competition exists among users.	Competition
• Excess capacity.	Capacity
• Inefficiency.	Efficiency
• Potential conflicts among participants.	Conflicts
• High regulatory costs.	Costs
• Low marketing incentives.	Marketing
• Inconsistent State and Federal regulations.	Regulations
• Low conservation and compliance incentives.	Enforcement

The following table (Table 4) summarizes how the alternatives address the problems and issues identified by the Council. Management alternatives are in the rows and issues and problems are in the columns.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4. Summary of Environmental Consequences.

Red Porgy Measures:

Alternatives	Issues/Problems: Biological: Overfishing	Issues/Problems: SocioEconomic: Competition, Efficiency, Conflicts
Proposed Action 1: Increase the red porgy minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, establish a recreational bag limit of 5 red porgy per person per day; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	Would reduce fishing mortality and begin rebuilding stock. A 14" size limit would reduce the total catch by 39% in numbers and 25% in weight; the recreational and commercial reductions are approximately the same. A bag limit of 5 in combination with a 14" size limit would reduce the private/rental catch by 33%, headboat catch by 61% and charterboat catch by 36% based on numbers of fish. Combined measures would reduce the recreational catch by 50%, commercial catch by 65%, and total catch by 59% based on numbers of fish.	Reduced revenue in the short- term; commercial reduction is estimated at $268,000 in the first year. Increased revenue in the long- term due to stock rebuilding. May induce shifts in effort within snapper grouper or to other fisheries.
Option 1: No Action. Maintain the existing 12" TL recreational and commercial size limits.	Present 12" TL size limit only achieves 12% SPR. Taking no action would allow overfishing to continue.	Reduced revenue in the long-term. Maintained revenue in the short-term. Reduced net benefits and satisfaction as stock declines.
Option 2: Increase the red porgy minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 2.	Would reduce fishing mortality and begin rebuilding stock. A 14" TL size limit in combination with a 2 fish bag limit would reduce charterboat catch by 49% and headboat catch by 63% based on numbers in the first year. Commercial catch would be reduced by 40% in numbers and total catch by 44% in numbers of fish.	Reduced revenue in the short- term. Increased revenue in the long- term due to stock rebuilding. May induce shifts in effort within snapper grouper or to other fisheries.
Option 3: Increase the red porgy minimum size limit from 12" TL to 13" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 5.	Would reduce fishing mortality and begin rebuilding stock. A 13" size limit would reduce the commercial catch by 22% in numbers and 12% in weight; the recreational and commercial reductions are approximately the same. A bag limit of 5 in combination with a 13" size limit would reduce the charterboat catch by 29% and headboat catch by 36% based on numbers. Total catch reduced by 27% based on numbers.	Reduced revenue in the short- term. Increased revenue in the long- term due to stock rebuilding. May induce shifts in effort within snapper grouper or to other fisheries.
Option 4: Increase the red porgy minimum size limit from 12" TL to 13" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 2.	Would reduce fishing mortality and begin rebuilding stock. A 13" size limit would reduce the commercial catch by 22% in numbers and 12% in weight; the recreational and commercial reductions are approximately the same. A bag limit of 2 in combination with a 13" size limit would reduce the headboat and charterboat catch by 45% based on numbers of fish. Total catch reduced by 30% based on numbers.	Reduced revenue in the short- term. Increased revenue in the long- term due to stock rebuilding. May induce shifts in effort within snapper grouper or to other fisheries.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4 (cont.). Summary of environmental consequences.

Black Sea Bass Measures:

Alternatives	Issues/Problems Biological: Overfishing	 SocioEconomic: Competition, Efficiency, Conflicts
Proposed Action 2: Increase the black sea bass minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day.	The size limit would reduce catch in number by 40% in the recreational fishery and by 26% in the commercial fishery in the first year. Weight would be reduced by 16% in the recreational fishery and 12% in the commercial fishery. The 10" size limit and 20-fish bag limit would, based on numbers, reduce the headboat catch by 51%, the charterboat catch by 13%, and the private boat catch by 53%. Would reduce fishing mortality and increase SPR closer to 40%.	Reduced revenue and recreational satisfaction in the short-term. Increased revenue and recreational satisfaction in the long-term due to stock rebuilding. May induce increased effort or shifts in effort among commercial fishermen.
Option 1: No Action. Maintain the existing 8" TL minimum size limit for both recreational and commercial fisherman, and no bag limit.	No additional reduction in fishing mortality or increase in spawning potential of the stock.	Could reduce revenue and recreational satisfaction in the long-term. As stock declines may force effort shifts.

Alternatives	Issues/Problems Biological: Overfishing	 SocioEconomic: Competition, Efficiency, Conflicts
Proposed Action 3: Require escape vents and escape panels with degradable fasteners in black sea bass pots.	There will be a reduction in fishing mortality depending on the size of the escape vent chosen. Escape panels will prevent stock depletion from lost pots ghost fishing.	One time increase in capital investment. Increased net benefits in the long- term.
Option 1: No Action. Maintain the existing mesh and escape panel regulations.	No reduction in fishing mortality or prevention of stock depletion from lost pots ghost fishing.	Reduction in revenue in the long- term. Possible increase in fishing mortality from ghost fishing.
Options 2-4: Require escape vents (alternative sizes) and escape panels with degradable fasteners in black sea bass pots.	There will be a reduction in fishing mortality depending on the size of the escape vent chosen. Escape panels will prevent stock depletion from lost pots ghost fishing.	One time increase in capital investment Increased net benefits in the long- term.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4 (cont.). Summary of environmental consequences.

Greater Amberjack Measures:

Alternatives	Issues/Problems: Biological: Overfishing, Data	Issues/Problems: SocioEconomic: Competition, Capacity, Conflict
Proposed Action 4: Establish measures for greater amberjack that will: reduce the recreational bag limit from 3 to 1 greater amberjack per person per day; prohibit harvest and possession in excess of the bag limit during April throughout the EEZ; establish a 1,000 pound daily commercial trip limit; establish a quota at 63% of 1995 landings (quota=1,169,931 pounds); begin the fishing year on May 1; prohibit sale of fish harvested under the bag limit when the season is closed; and prohibit coring.	Provides additional biological protection by reducing commercial harvest by 27%-41% based on numbers of fish and by preventing targeting and sale of amberjack after a closure. A bag limit of 1 would reduce recreational catch by 11%. Researchers could attain otoliths necessary for aging studies easier. Total catch reduced by 21%-29% based on numbers of fish.	Reduction in revenue in the short-term. Could cause hardship to some fishermen. Possible increase in revenue in the long-term. Reduces conflict over sale of fish by recreational fishermen. Likely reduction in landings and recreational satisfaction.
Option 1: No Action. Maintain the existing minimum size limits, 3-fish bag limit, and limits during April.	Will not prevent targeting and sale of amberjack during spawning period.	Possible decrease in revenue in the long-term.
Option 2: Prohibit any retention during April.	Would prevent any harvest of greater amberjack that occurs during spawning period therefore providing additional biological protection by preserving the reproductive potential of the stock.	Reduction in revenue in the short-term. Possible increase in revenue in the long-term. Possible effort shifts among recreational fishermen.
Option 3: Prohibit all harvest above bag limit and all sale during April and May in the EEZ off Florida.	Provides additional biological protection by extending bag limit through May and reducing fishing mortality.	Reduction of about 30% in revenue for Florida fishermen in the short-term. Could cause hardship to some fishermen in Florida. Possible increase in revenue in the long-term.
Option 4: Reduce the greater amberjack bag limit to 1 and change the recreational size limit to 20" FL for all *Seriola* species.	Reduce recreational catch of all *Seriola spp.* between 10% and 17%.	Reduction in revenue and recreational satisfaction in the short-term. Possible increase in revenue and recreational satisfaction in the long-term.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4 (cont.). Summary of environmental consequences.

Greater Amberjack Measures:

	Issues/Problems	
Alternatives	**Biological: Overfishing, Data**	**SocioEconomic: Competition, Capacity, Conflict**
Option 5: Establish measures for greater amberjack that will: extend the April closure throughout the EEZ and prohibit sale during April; reduce the recreational bag limit to 1 fish per person per day; implement a commercial quota to reduce landings by 21% based on average landings 1986-1995 and implement a trip limit of 500 to 1,000 pounds; change the start of the fishing year from January 1 to July 1; and prohibit coring.	Provides additional biological protection by preventing targeting and sale of amberjack during spawning period. A bag limit of 1 would reduce recreational catch between 2% and 12%. Reduces the commercial catch by 21%. Provides some additional biological protection depending on level of reduction in catch. Researchers could attain otoliths necessary for aging studies easier.	Reduction in revenue in the short-term. Possible increase in revenue in the long-term. Reduces conflict over sale of fish by recreational fishermen. Likely reduction in landings and recreational satisfaction. Reduction of about 21% in revenue in the short-term. Could cause hardship to some fishermen.
Option 6: Increase the greater amberjack size limit from 28" to 36" FL for the recreational fishery.	Provides additional biological protection by allowing almost all greater amberjack to spawn prior to being harvested.	Reduced recreational satisfaction in the short-term. Possible increase in recreational satisfaction in the long-term.
Option 7: Establish measures for greater amberjack that will: prohibit all harvest in excess of the bag limit throughout the EEZ during March, April and May; prohibit sale during March, April and May; reduce the recreational bag limit from 3 to 1 greater amberjack per person per day; and prohibit coring.	Provides additional biological protection by preventing targeting and sale of amberjack during spawning period. A bag limit of 1 would reduce recreational catch between 2% and 12%. Provides some additional biological protection depending on level of reduction in catch. Researchers could attain otoliths necessary for aging studies easier.	Reduction in revenue in the short-term. Possible increase in revenue in the long-term. Reduces conflict over sale of fish by recreational fishermen. Likely reduction in landings and recreational satisfaction. Reduction of about 48% in revenue in the short-term. Could cause hardship to some fishermen.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4 (cont.). Summary of environmental consequences.

Vermilion Snapper Measures:

Alternatives	Issues/Problems: Biological: Overfishing	Issues/Problems: SocioEconomic: Competition, Capacity, Efficiency, Conflicts
Proposed Action 5: Increase the recreational vermilion snapper minimum size limit from 10" to 11" TL, and retain the 10-fish bag limit.	Will reduce fishing mortality and increase SPR. Would reduce headboat catch by 29%, and private /rental boat catch by 70% in the first year. The overall recreational reduction would be 34%, and the total reduction would be 13%. SPR and yield per recruit would be expected to increase.	Reduction in recreational satisfaction in the short-term. Possible increase in recreational satisfaction in the long-term.
Option 1: No Action. Maintain the existing 10-fish bag limit and 10" TL recreational and commercial size limits.	Will not reduce fishing mortality and increase SPR.	Possible decrease in revenue in the long-term. Possible effort shifts as fishery continues to decline.
Option 2: Increase the minimum size limit to 14" TL for both recreational and commercial fishermen and no bag limit or quota.	Will reduce fishing mortality and increase SPR.	Possible decrease in revenue and recreational satisfaction in the short-term. Likely effort shifts to replace lost income or reduced recreational satisfaction.
Option 3: Implement an annual vermilion snapper commercial quota of 600,000 pounds, a recreational bag limit of 5 fish, and a recreational minimum size limit of 12" TL.	Will reduce fishing mortality and increase SPR to 30%. Would reduce commercial catch by 40% in the first year.	Reduction in revenue of about 40% to commercial fishermen in the short-term. Possible increase in revenue and recreational satisfaction in the long-term. Likely effort shifts among commercial fishermen within snapper grouper or to other fisheries to replace lost income.
Option 4: Increase the recreational vermilion snapper minimum size limit from 10" to 12" TL.	Will reduce fishing mortality and increase SPR. Would reduce commercial catch by 10% (with increased compliance), headboat catch by 58%, and private /rental boat catch by 84% in the first year. SPR and yield per recruit would be expected to increase.	Reduction in recreational satisfaction in the short-term. Possible increase in recreational satisfaction in the long-term.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4 (cont.). Summary of environmental consequences.

Gag Measures:

	Issues/Problems	
Alternatives	**Biological: Overfishing**	**SocioEconomic: Competition, Capacity, Efficiency, Conflicts**
Proposed Action 6: Increase the gag minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	Increase in size limit increases SPR and reduces commercial and recreational catch by 42% in North Carolina, 35% in South Carolina, 6% in Georgia, and by 7% in Florida in the first year. Overall recreational reduction of 13%. Provides initial step to reduce fishing mortality and increase SPR to target level. Commercial landings would decrease by 37% in the first year. Total catch reduced by 27% based on numbers of fish.	Decreased revenue to fishermen. Fishermen may have to switch to other species during closure. Likely increase in revenue in the long-term. Also, fishermen could expand effort during the open season, dissipating any benefits from the closure.
Option 1: No Action. Maintain the existing 20" TL size limit and 5 grouper aggregate bag.	Does not reduce fishing mortality or increase SPR.	Maintain revenue in the short-term. Possible effort shifts as fishery continues to decline.
Options 2-3: • Prohibit harvest in excess of the five grouper aggregate bag limit January through March and prohibit sale January - March. • Prohibit sale and establish a possession limit of 1 gag per person per day January through March.	Reduction in fishing mortality not sufficient to rebuild the stock above 40% static SPR.	Decreased revenue to fishermen. Fishermen may have to switch to other species during closure. Impacts large scale commercial fishermen. Could cause hardship to commercial fishermen and also create equity problem. Likely increase in revenue in the long-term.
Options 4-6: Establish: • a 100 - 1,000 pound trip limit January through March. • seasonal closure to achieve 30% - 40% reduction. • quota to achieve 31% reduction based on average landings 1986 - 95.	Reduction in fishing mortality not sufficient to rebuild the stock above 40% static SPR.	Could decrease revenue from $55,000 - $430,000 in the short-term depending on the poundage. Phased-in approach would lessen impact on fishermen. North and South Carolina fishermen would have their total landings reduced by 42% and 35% respectively in the first year. Reduction in revenue between $640,000- $850,000 in the first year depending on option chosen. Likely increase in revenue in the long-term. Likely effort shifts among commercial fishermen within snapper grouper or to other fisheries to replace lost income.
Option 7: Increase the gag minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen, and prohibit all harvest January through March.	Increase in size limit increases SPR and reduces commercial and recreational catch by 42% in North Carolina, 35% in South Carolina, 6% in Georgia, and by 7% in Florida in the first year. Provides initial step to reduce fishing mortality and increase SPR to target level.	Decreased revenue to fishermen. Fishermen may have to switch to other species during closure. Likely increase in revenue in the long-term. Also, fishermen could expand effort during the open season, dissipating any benefits from the closure.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4 (cont.). Summary of environmental consequences.

Miscellaneous Snapper Grouper Measures:

	Issues/Problems	
Alternatives	**Biological: Overfishing, Data**	**SocioEconomic: Regulations, Enforcement**
Proposed Action 7: Increase the black grouper minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.	Provides initial step to reduce fishing mortality and increase SPR to target level. Commercial catch reduced by 35% and headboat catch by 71% based on numbers of fish. The commercial and headboat catch would be reduced by 39% based on numbers of fish.	Decrease in revenue and recreational satisfaction in the short-term. Possible increase in revenue in the long-term. Less confusion over species identification.
Option 1: No Action. Maintain the existing 20" TL size limit and 5 grouper aggregate bag.	Does not reduce fishing mortality or increase SPR.	Could result in stock reduction and reduced revenue in the long-term.
Option 2: Increase the black grouper minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen.	Provides initial step to reduce fishing mortality and increase SPR to target level.	Decrease in revenue and recreational satisfaction in the short-term. Possible increase in revenue in the long-term. Less confusion over species identification.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4 (cont.). Summary of environmental consequences.

Miscellaneous Snapper Grouper Measures:

	Issues/Problems	
Alternatives	**Biological:**	**SocioEconomic: Conflicts, Enforcement**
Proposed Action 8: Specify that within the 5-fish aggregate grouper bag limit (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 may be gag grouper or black grouper (individually or in combination).	Would reduce fishing mortality and increase SPR closer to 30% for both gag and black grouper.	Reduction in recreational satisfaction in the short-term. Possible increase in recreational satisfaction in the long-term. Less confusion over species identification.
Option 1: No Action. Maintain the existing 5-fish grouper aggregate bag limit.	No additional reduction in fishing mortality or increase in spawning potential of the stock.	Possible decrease in recreational satisfaction in the long-term.
Option 2: Specify that within the 5-fish aggregate grouper bag limit (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 may be gag and no more than 2 may be black grouper.	Would reduce fishing mortality and increase SPR closer to 40% for both gag and black grouper.	Reduction in recreational satisfaction in the short-term. Possible increase in recreational satisfaction in the long-term. Less confusion over species identification.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES
(Effects of Alternatives on the Issues/Problems)

Table 4 (cont.). Summary of environmental consequences.

Miscellaneous Snapper Grouper Measures:

	Issues/Problems	
Alternatives	**Biological: Overfishing**	**SocioEconomic / Enforcement: Competition, Capacity, Efficiency, Conflicts**
Proposed Action 9: Establish an aggregate recreational bag limit of 20 fish inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit for tomtate and blue runners).	Some biological benefit from limiting total catch of species in the management unit that do not have a bag limit. Catch would be reduced by 1% for headboats, 0% for charterboats, and 7% for the private/rental fishery.	Could enhance and sustain satisfactory recreational fishing experience in the long-term. May force fishermen to become more selective in their fishing practices.
Option 1: No Action. There is currently no aggregate bag limit for species currently not under a bag limit.	Would not reduce fishing mortality.	Possible diminished recreational fishing experience in the long-term.

	Issues/Problems	
Alternatives	**Biological:**	**SocioEconomic: Conflicts, Enforcement**
Proposed Action 10: Specify that vessels with longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.	Prevents targeting overfished snapper grouper species not in the deepwater complex and aids in preventing use of longlines on essential habitat.	Would prevent those using longline gear from using bandit reels to catch mid-shelf species during the same trips. Will clarify Councils intent regarding this type of allowable gear. May interfere with some fishermen using gear not well defined under current regulations.
Option 1: No Action. Maintain the existing allowance of bottom longline gear in waters deeper than 50 fathoms, only north of St. Lucie Inlet, and only for species other than wreckfish.	Would not aid in the protection of other species or bottom habitat.	Would continue loophole in enforcement. Confusion may continue to exist over allowable gear.

3.0 AFFECTED ENVIRONMENT

The affected environment including a description of the snapper grouper fisheries in the South Atlantic Region are presented in detail in the original FMP (SAFMC, 1983). A description of Council concerns and recommendations on protecting snapper grouper habitat are also included in Amendment 1 (SAFMC, 1988) and updated in subsequent amendments.

3.1 Optimum Yield

The South Atlantic Council's target level of stock status or Optimum Yield (OY) as modified by Amendment 8 (SAFMC, 1997) is 40% static SPR (see discussion under overfishing).

3.2 Definition of Overfishing

A. A snapper grouper species (including jewfish) is considered to be overfished when the transitional spawning potential ratio (SPR) is below 30%. Snapper Grouper Amendment 8 proposed changing the overfished level to 20% and adding a threshold level of 10%, however, both measures were rejected.

B. The South Atlantic Council's target level or Optimum Yield (OY) is 40% static SPR.

C. When a stock is overfished (transitional SPR less than 30%), a rebuilding program that makes consistent progress toward restoring stock condition must be implemented and continued until the stock is restored beyond the overfished condition. The rebuilding program must be designed to achieve recovery within an acceptable time frame as specified by the council. The council will continue to rebuild the stock until the stock is restored to the management target (OY).

D. When a stock is not overfished (transitional SPR equal to or greater than 30%), the act of overfishing is defined as a static SPR that exceeds 30% (i.e., $F_{30\%}$). If fishing mortality rates that exceed the level associated with the static SPR overfished level are maintained, the stock may become overfished. Therefore, if overfishing is occurring, a program to reduce fishing mortality rates toward management target levels (OY) will be implemented, even if the stock is not in an overfished condition.

E. For species, when there is insufficient information to determine whether the stock is overfished (transitional SPR), overfishing is defined as a fishing mortality rate in excess of the fishing mortality rate corresponding to a default static SPR of 30%. If overfishing is occurring, a program to reduce fishing mortality rates to at least the level corresponding to management target levels will be implemented.

F. The timeframe for recovery of overfished stocks remains unchanged: (a) not to exceed 10 years for snappers (excluding red snapper), greater amberjack, black sea bass, and red porgy; and (b) not to exceed 15 years for red snapper and the groupers. For species which were not documented as overfished in Amendment 3, Year 1 is the year in which the species is documented as being overfished. For example, gag were documented as being overfished in the 1996 assessment; therefore, Year 1 = 1996.

G. Definitions and Terminology (directly from Mace et al., 1996).

The acronym, SPR, has been used to represent both Spawning Potential Ratio and Spawning (biomass) Per Recruit. As implied by its name, the spawning potential ratio is a relative measure. It expresses the spawning production of a fished population relative to the spawning production of an unfished population with otherwise similar characteristics. By *contrast, spawning per recruit is an absolute measure (usually expressed in units of weight or numbers of eggs), intended to be analogous to yield per recruit (YPR). Spawning per recruit is converted to a relative measure by dividing by the maximum spawning per recruit, which is converted to a relative measure by dividing by the maximum spawning per recruit, which occurs under conditions of no fishing, and expressing the result as a percentage. Relative spawning per recruit is commonly abbreviated as %SPR. Thus, spawning potential ratio is usually measured on a scale of 0 to 1 while % spawning per recruit is expressed as a percentage. Use of proportions or percentages in FMP overfishing definitions, in the scientific literature, and even in this report may not be consistent, but it is usually clear which one is being used because %SPR levels less than 1% are rarely considered.*

A much more fundamental point of departure between the two SPR measures is that % spawning per recruit is a static measure while spawning potential ratio is a transitional measure. Although the conceptual foundation for the two measures is similar, there are differences in methods of calculation and in the interpretation of results. For spawning per recruit (static measure), the reference points are calculated from a standard (Beverton-Holt "spawning per recruit analysis" which is analogous to the familiar yield per recruit analysis, and uses exactly the same inputs (e.g. constant weights at age, a constant natural mortality vector, and a constant fishing mortality vector), with the addition of a constant maturity ogive. For the spawning potential ratio (transitional measure), the reference points are calculated from empirical estimates of population numbers and fishing mortalities by age and year derived from age-structured stock assessments. With the exception of some of the work conducted by Goodyear (1980, 1993; see original report of the NMFS Overfishing Definition Review Panel), virtually all of the theoretical development and empirical analyses of SPR reference points relate to the static approach, for which each level of SPR (or %SPR) corresponds directly to a unique level of fishing mortality (for a given selectivity ogive).

In this supplemental report, the acronym "SPR" is always preceded by the terms "static,", "static %" or "transitional," to differentiate between the alternative interpretations.

The Review Panel considered two primary measures of transitional SPR; the spawning production in year t relative to that which would have been produced in year t if there had been no fishing on the cohorts that exist in year t; and the spawning production per recruit in year t (called SPR1 and SPR2, respectively, by Powers MS). These measures have been variously referred to as "non-equilibrium," "dynamic," and "transitional." The Review Panel preferred the latter terminology and has used it consistently from here on. SPR1 is referred to as the weighted transitional SPR (where the weighting is by year class strength); while SPR2 is referred to as the unweighted transitional SPR, or simply transitional SPR. Similarly, "static %SPR" has frequently been referred to as "equilibrium %SPR," but since equilibrium conditions are not essential for the measure to be valid, the Review Panel preferred the term "static." The word "static" refers to the underlying assumption that growth rates, maturity schedules, natural mortality, fishing mortality, and selectivity patterns are constant; however, recruitment itself need not be constant.

In terms of the use of transitional SPR measures in control laws, the Review Panel believes that the unweighted transitional SPR can be considered an index of stock condition in terms of whether or not the stock is overfished (i.e. whether or not the age structure is distorted due to historical fishing patterns), but not necessarily in terms of whether or not the stock is depleted (with respect to total or spawning biomass). Thus, controls laws that specify lower thresholds beyond which fishing should cease probably need to consider *explicit indices of biomass as well as or instead of the unweighted transitional SPR. Ideally, a control law (or series of control laws) would have axes corresponding to the act of overfishing (indexed by the static %SPR), the overfished condition (indexed by the unweighted transitional SPR), and the extent of stock depletion (indexed by absolute or relative estimates of biomass). This level of complexity is required because spawning or total biomass may be depleted due to adverse environmental effects, yet the stock may not be considered overfished based on estimates of transitional SPR. Similarly, a stock can be overfished, even though spawning or total biomass is high relative to optimum or historical levels. In effect, the term "overfished" can be thought of an index of the degree of distortion in the age structure due to historical fishing practices, whereas "depleted" simply implies low biomass. An overfished stock will often also have low biomass, but need not.*

The best way to think of the overfishing and optimum yield definitions is to relate them to the amount of spawners in the water. Research for a number of species has shown that as the percentage of spawners is reduced from the number or amount in pounds that would be in the water if there were no fishing, the risk of stock collapse increases. If the amount of spawning fish is reduced below 20% (which the scientists refer to as 20% SPR), the chance of stock collapse becomes a very real possibility. If it is reduced below 10%, you can be pretty sure you are going to see severe declines in numbers of fish and probably see the stock collapse. If we had sufficient information to accurately determine where this level was for each species we could avoid any biological problems. The problem is our information is incomplete and we do not know what the specific percentage is for each species to prevent risk of stock collapse. As a result, the Council is proposing to aim for having 40% of the spawners in the water that would be there if there was no fishing (scientists call this 40% SPR). In this way, when the stock declines for environmental or other "non-fishing" reasons, the spawners should not go below the 30% level. Some years the quantity of spawners will be above 40% and some years below 40%. The Council wants to ensure it will remain above 30% thereby avoiding potential stock problems.

In the event the quantity of spawners should go below 30%, the Magnuson-Stevens Act requires the Council specify how long they will take to rebuild the stock. The timeframe for recovery of snappers (excluding red snapper), greater amberjack, black sea bass, and red porgy is not to exceed 10 years. For red snapper and the groupers, the timeframe is not to exceed 15 years. These timeframes were established in Amendment 4 and are based on the life history characteristics (growth rate, mortality rate, longevity, etc.). Longer lived, slower growing species are more susceptible to overfishing and will rebuild more slowly, hence the 15 year recovery period. Shorter-lived, faster growing species will recover more quickly and was the basis for choosing 10 years. Year 1 for species considered overfished at that time (Amendment 4) was the 1991 fishing year. The recovery time period may be modified by the framework (regulatory amendment) procedure.

If the quantity of spawners is above 30% but below the Council's long-term target (optimum yield) of 40%, the Council will determine the timeframe to get the stock above 40%. This allows the Council greater flexibility to balance social and economic costs of rebuilding a stock.

3.3 Description of Fishing Activities

3.3.1 Commercial Fishery

The following is taken directly from the executive summary of the economic survey of commercial snapper grouper vessels along the U.S. south Atlantic coast (J.R. Waters et al, 1997). This summary and tabulated results from the survey were presented to the Snapper Grouper Committee at the November 1997 council meeting at Beaufort, North Carolina. The detailed report of this survey is in review and there could be some changes to figures when the final report is released.

This survey provides the first, comprehensive source of economic information about the population of boats in the commercial snapper-grouper fishery along the Atlantic seaboard. One hundred forty seven commercial reef fish boats from Dare County, North Carolina, through Dade County, Florida, were examined in a stratified random sampling design, with strata defined by area, primary gear and length of boat. The sample was selected from a universe of 709 boats with snapper-grouper permits that reported on their permit applications that their most important gear was vertical lines with bandit reels or rods and reels, bottom longlines, or fish traps, even though many of them also used other gears. Interviewers asked respondents for: background information about themselves and their boats; their capital investments in vessel, gear and electronics; and detailed information about fishing effort, catches, revenues, and routine harvesting costs per trip for their two most important kinds of fishing trips for reef fish. If there was only one kind of trip for reef fish, then information was collected about it and the most important kind of trip for other species.

Method of Analysis

Characteristics of respondents and their boats were summarized for boats that primarily used vertical lines, bottom longlines or fish traps in the northern area (i.e., from North Carolina through St. Augustine, FL) and for boats that primarily used vertical lines or bottom longlines in the southern area (i.e., south of St. Augustine, FL). Averages for each characteristic (such as the average age of respondent or average investment in boat and equipment) were calculated for each group of boats and for all boats combined. Group and population totals (such as the total investment for all boats) were derived by expanding the survey responses to the entire sampled population of 709 snapper-grouper boats. Weighting factors accounted for differences among strata in the probabilities of individual boats being included in the sample.

Characteristics of Respondents

Respondents were characterized with regard to their dependence on the commercial snapper-grouper fishery as a source of household income. On average, respondents were in their early to mid forties, with an average of 17 years experience in commercial fishing. Respondents on boats with fish traps were the oldest, on average, and those on boats with vertical lines in the southern area were the youngest. On average, respondents who used bottom longlines or fish traps were more experienced fishermen than were respondents who used vertical lines. Household incomes ranged from less than $10,000 to more than $150,000, with more than 50% of respondents citing household incomes of less than $40,000. Respondents who primarily used bottom longlines or fish traps earned, on average, more than one-half of their household incomes from commercial fishing, whereas respondents who used vertical lines did not. Respondents in the northern area who used bottom longlines comprised the only group to average more than 50% of their household incomes from commercial fishing for reef fishes. Overall, respondents in the northern area relied more heavily on commercial fishing for reef *fishes as a source of household income than did respondents in the southern area. However, respondents in the northern area derived a smaller fraction of their household incomes from other kinds of commercial fishing because they were more likely to charter whereas respondents in the southern area relied more heavily on commercial fishing for non-reef species such as king mackerel. In approximately two-thirds of the households someone other than the respondent also was employed to supplement household income.*

Characteristics of Boats

Boats were described in terms of their physical characteristics. Boats were relatively small. The average length was 32.7 feet, with nearly all sampled boats being less than 50 feet in length. Boats with bottom longlines tended to be the longest, had the most powerful engines, the greatest fuel capacities, and the largest holding boxes for fish and ice. Boats with vertical lines, especially in the southern area, tended to be the shortest, had the least powerful engines, the smallest fuel capacities, and the smallest holding boxes for fish and ice.

Also, boats were described in terms of their financial characteristics. On average, boats and gear in the northern area embodied greater investments than did boats in the southern area. Boats with bottom longlines in the northern area required the greatest investments, and boats with vertical lines in the southern area required the smallest investments. The total investment in boats and equipment for the sampled population of snapper-grouper boats was estimated to be $54.0 million.

Resale value was interpreted as the value of capital currently invested in the snapper-grouper fishery. Average resale value in the northern area was $93,000 for boats with bottom longlines, $55,289 for boats with fish traps and $53,205 for boats with vertical lines. Average resale value in the southern area was $64,860 for boats with bottom longlines and $37,215 for boats with vertical lines. The estimated total resale value of commercial snapper-grouper boats was $35.4 million.

Financial Performance on Different Kinds of Fishing Trips

Some boats fished in one kind of activity year-round whereas others rotated among several kinds of fishing trips according to seasonal availability of fish, seasonal variation in prices, fishery regulations and so forth. An important objective of the survey was to estimate average net operating revenues per boat per trip and per boat per year that were earned on the most important kinds of fishing trips taken by snapper-grouper fishermen. A secondary objective was to estimate the total number of boats that participated in each kind of fishing and total catches, revenues, trip costs and net operating revenues for those boats, although the possibilities for errors in estimation exist because each interview was limited to questions about a maximum of two kinds of fishing even if the boat participated in more than two kinds of fishing per year. Net operating revenues were defined as trip revenues minus routine trip costs, which included fuel, bait, ice, lost gear, food, packing charges if any, and other miscellaneous supplies. Net operating revenues represent the combined payments to boat owner, captain and crew and should not be interpreted as profit because they exclude fixed costs and other variable costs that were not routinely encountered per trip. Average net operating revenue per person per day fished was used to compare the overall economic performance of boats on different kinds of fishing trips after correcting for variations in the duration of trips and the number of persons aboard, and is not an accounting of actual payments or shares to boat owner, captain or crew.

Boats with black sea bass pots constituted an important component of the snapper-grouper fishery in the northern area. An estimated 90 boats landed nearly 2.7 million pounds of *all species worth $4.1 million on trips with pots for black sea bass, with average revenues of $44,965 per boat per year. After adjusting for variation among fishing activities in duration of trips and number of persons aboard, pot-fishing for black sea bass was, on average, the most profitable activity examined in this survey. Boats with black sea bass pots averaged $349 per person per day fished for black sea bass and $30,494 per year after deducting routine trip costs. Peak fishing activity for black sea bass occurred between November and March, with some boats having additional sources of income during the remainder of the year. Commonly mentioned alternatives to black sea bass were fishing with vertical lines for gag throughout the year but primarily between April and October, chartering between May and October, and fishing for king mackerel between October and April.*

Trips for king mackerel represented the next most profitable fishing activity examined here for the northern area. Net operating revenues on king mackerel trips averaged $292 per person per day fished, but only $16,046 per year because average catches per trip were relatively low compared to other fishing activities in the northern area, and because average days fished for king mackerel per boat per year were relatively low. An estimated 107 boats targeted king mackerel, primarily between October and April, with peak fishing activity occurring in March. The main alternative activities to king mackerel were gag, especially between April and November, fishing charters between April and October, and black sea bass, primarily between November and January.

Deep water groupers and tilefish constituted an important component of the snapper-grouper fishery in both northern and southern areas, although small sample size necessitated that analyses be completed with observations for both areas combined rather than for each area separately. An estimated 66 boats used bottom longlines to land a total catch of 3.3 million pounds worth $5.3 million in the northern and southern areas combined. Golden tilefish and snowy grouper were the primary target species caught with bottom longlines, with yellowedge grouper, greater amberjack, sharks and blackbelly rosefish being among the non-target species. Boats with bottom longlines fished year-round for deep water species, and averaged more days fished per year (105 days), landed greater quantities of fish per year (50,552 pounds), received more revenue per year ($79,860), and earned higher net returns per year after deducting routine trip costs ($45,598) than did boats when fishing in other sectors of the snapper-grouper fishery. However, these trips were the longest among the fishing activities examined here. Hence, net operating revenues per person per day fished, at $235, averaged less than trips for black sea bass or king mackerel in the northern area.

The temperate, mid-shelf complex clearly was the mainstay of the snapper-grouper fishery in the northern area. An estimated 339 boats took trips in the northern area for mid-shelf groupers and snappers (but not necessarily at the same time or continuously throughout the year), with an estimated total catch of nearly 7.0 million pounds worth nearly $14.4 million. Revenues averaged $42,425 per boat per year on trips for mid-shelf species. Gag and vermilion snapper were the species most often targeted, with porgies and triggerfish being the most frequently caught non-target species. Other species landed on mid-shelf trips included grunts, black sea bass, greater amberjack, scamp, red snapper and king mackerel. Gag were landed throughout the year, with the fewest number of boats being active during January, February and March. Vermilion snapper were also caught throughout the year with the least fishing activity occurring during May and June. The most frequently cited alternatives to fishing for mid-shelf species were fishing charters between April and October, king mackerel fishing between October and April, and fishing for black sea bass between November and March.

Trips for mid-shelf species were among the least profitable in the northern area, perhaps because of the high level of participation in the mid-shelf fishery. Average quantities landed and revenues per trip ranked second to trips with bottom longlines for deep water groupers and tilefish, but trips for mid-shelf species were relatively long with a relatively large number of persons aboard. Hence, boats averaged only $167 per person per day fished after deducting routine trip costs. Nevertheless, net operating revenues averaged $28,556 per boat per year because mid-shelf species were available throughout the year, with allowances for bad weather during the winter months.

Snowy grouper were caught by boats with vertical lines in a segment of the snapper-grouper fishery that also landed mid-shelf species such as vermilion snapper. An estimated 41 boats landed 0.4 million pounds of deep water groupers, tilefish and mid-shelf species worth $0.6 million. Trips by boats with vertical lines for deep water species averaged $160 per person per day fished, which was slightly lower than the average net return of trips for mid-shelf species. The main fishing alternative was king mackerel, especially in October, November and December.

In general, the fishing activities examined for the southern area were not as profitable as the activities in the northern area. Catches per trip tended to be lower in the southern area than in the northern area. Also, the average number of days fished per boat per year in each activity was relatively low. Hence, net revenues per person per day fished and per boat per year after deducting routine trip costs were relatively low.

Trips for mid-shelf groupers and snappers represented the most profitable fishing activity examined for the southern area. When fishing for mid-shelf species, boats averaged $229 per person per day fished and $13,747 per year after deducting routine trip costs. An estimated 97 boats landed 0.8 million pounds worth approximately $1.7 million. Boats averaged 42 days fished per year for mid-shelf species. Gag was caught year-round, especially between January and March. A smaller number of boats caught red snapper, especially between January and July. Supplemental species included mutton snapper, red grouper, greater amberjack and cobia, among others. The main fishing alternatives included king mackerel throughout the year, mutton snapper between April and August, greater amberjack in March and May, gray snapper from March through June and yellowtail snapper from March through September.

Trips for king mackerel represented the next most profitable fishing activity examined here for the southern area. Net operating revenues on king mackerel trips averaged $195 per person per day fished and $13,306 per year. An estimated 51 boats targeted king mackerel, with fishing activity occurring throughout the year but with peak activity between December and May. Boats averaged 36 days fished per year for king mackerel. Their main alternatives were gag between January and March, and mutton snapper, yellowtail snapper, golden tilefish and snowy grouper year-round.

Trips for greater amberjack averaged $185 per person per day fished and $11,770 per boat per year. Greater amberjack were targeted throughout the year, with peak fishing activity occurring in March and May, and minimal activity occurring in April, July and August. An estimated 66 boats landed 1.1 million pounds worth $1.0 million. Alternative species included gag between January and March, mutton snapper between April and June, yellowtail snapper between May and September, and king mackerel between December and April.

The fishery for tropical snappers attracted the greatest number of boats in the southern area. There were an estimated 170 boats that landed nearly 1.0 million pounds worth nearly $2.0 million. Target species included yellowtail snapper, mutton snapper, and gray snapper. More than 20 species were listed as supplemental catches, with black grouper, red grouper, *mutton snapper, gray triggerfish, and greater amberjack being frequently mentioned. The chief alternative fishing activities included king mackerel throughout the year, spiny lobster between August and March, gag between January and March, greater amberjack in March, May and June, and charter fishing between May and December.*

As was the case in the northern area, the fishing activity with the greatest level of participation was one of the least profitable. Boats that fished for tropical snappers averaged only 236 pounds and revenues of $440 per trip. Net returns after deducting routine trip costs averaged only $128 per person per day fished and $8,747 per boat per year.

Overall Financial Performance

Interviewers also asked respondents about their boat's gross revenues and net income before taxes for all fishing activities combined. The estimated total revenues for the sampled population of snapper-grouper boats were $31.8 million, with aggregate net incomes of $9.5 million. In general, boats with bottom longlines achieved the highest gross revenues and earned the highest net incomes, while boats with vertical lines achieved the lowest revenues and net incomes. Average net incomes, in declining order, were $83,224 for boats that primarily used bottom longlines in the northern area, $23,075 for boats that primarily used black sea bass pots in the northern area, $15,563 for boats that primarily used bottom longlines in the southern area, $11,649 for boats that primarily used vertical lines in the southern area, and $8,307 for boats that primarily used vertical lines in the northern area. Overall, boats in the northern area averaged $14,143 net income based on average revenues of $48,702, while boats in the southern area averaged $12,388 net income based on average revenues of $39,745.

General Characteristics of Snapper Grouper Fishermen

An economic and a socio-demographic survey were recently completed with two different samples of snapper grouper fishermen in the South Atlantic. Interviews conducted for the economic survey took place during the summer of 1994, while those for the socio-demographic survey (which excludes the Florida Keys) were conducted during 1996. The following summary has been constructed using either or both the economic survey contract report (Rhodes, Waltz, and Wiggers, 1996) and the contract report for the socio-demographic survey (Rhodes, Backman, and Hawkins, 1997).

A target population of snapper grouper fishermen was identified from the NMFS permits file and then a stratified random sample was selected for interviewing in both surveys. A total of 162 interviews were completed for the economic survey, while 232 interviews with active/inactive snapper grouper fishermen were completed for the socio-demographic survey. Further discussion of the sampling frame and response rate is found in Rhodes, Waltz, and Wiggers 1996 and Rhodes, Backman, and Hawkins 1997.

Certain characteristics of each sample based on questions included in both surveys are summarized in Table 5. It is not known whether the differences between these samples are statistically significant. The average age for each sample is similar with respondents in the economic survey being slightly older on average. This difference in average age may account for the longer tenure as commercial fishermen for those included in the economic sample, also. Years as a snapper grouper fisherman was the same for respondents in both the socio-demographic and economic survey. Respondents were not asked their marital status or number of dependents on the economic survey, however 73% of active snapper grouper fishermen in the socio-demographic survey were married and 45% had children. For the most part, the samples were similar with regard to education, gear types and percent of income from snapper grouper fishing. The dissimilarity regarding outside employment may be related to the larger number of respondents in the economic survey from the Georgia/Carolina region, since a larger percentage from that area reported having employment other than commercial fishing. The majority (54%) of those who responded that they did have some type of employment outside of commercial fishing on the economic survey indicated that employment was either charter fishing or other fishing/boating industry related activity. In response to a slightly different question on the socio-demographic survey respondents were asked whether they had employment other than fishing: some may have interpreted the question to include charter fishing as 22% indicated some type of income from charter fishing. Therefore, the lower percentage may be an indication that some included charter fishing as a part of their general fishing occupation. In both surveys, approximately half indicated that 25% or less of their income comes from snapper grouper. Slightly over 20% in both surveys said that 50% or more of their income comes from snapper grouper fishing.

Table 5. General Characteristics of Survey Participants for 1995/6. Source: Rhodes, Waltz, and Wiggers (1996) and Rhodes, Backman, and Hawkins (1997).

Variable	Socio-Demographic Survey	Economics Survey
Age (in years)	43	45
Years as a Commercial Fisherman (in years)	15	19
Years as a Snapper Grouper Fisherman (in years)	13	14
Education (Percent)		
Some high school	18%	20%
High school graduate or more	82%	79%
Region (Percent)		
Florida	53%	35%
Georgia/Carolinas	47%	65%
Gear Type (Percent)		
Bandit Reel	42%	35%
Rod & Reel	29%	35%
Traps	1%	15%
Longline	6%	14%
Spear	4%	-
Other	18%	-
Have Other Employment (Percent)	32%	52%
Percent of Income from S/G Fishing (Percent)		
25% or less	48%	50%
50% or more	25%	21%

Because the socio-demographic survey did not include as many questions about vessel characteristics as did the economic survey, Table 6 includes information from the economic survey only. When examining vessel characteristics by region, vessels in the GA/C area were larger, more powerful, had a larger fuel capacity and had a larger fish hold capacity. This is most likely related to the distance to fishing grounds and subsequent environmental conditions fishermen must endure farther north. Fishermen from St. Augustine north travel greater distances to fish and often withstand heavier seas than fishermen to the south. Therefore, they need larger vessels that can travel the longer distance to fishing grounds and withstand the harsher environmental conditions. The associated trip and fixed costs are also naturally higher with a larger vessel.

Table 6. Vessel and economic characteristics by region.* Source: Rhodes, Waltz, and Wiggers (1996).

Variable	All Areas	GA/C	S/CFL
Average Vessel Length (ft.)	34	38	31
Average Vessel Horsepower (hp)	343	352	325
Average Vessel Fuel Capacity (gal)	469	553	313
Average Vessel Fish Hold Capacity (lb.)	3,585	4,143	2,557
Average Vessel Trip Costs ($)	527	973	357
Average Vessel Fixed Costs ($)	17,007	19,566	12,228

* GA/C - St. Augustine, FL and north; S/CFL - South of St. Augustine to Dade/Monroe County Line.

Characteristics by Gear Type

Fishermen exhibit differences based upon a number of characteristics. Gear type is certainly one which will differentiate snapper grouper fishermen on both demographic and other fishery related variables. Table 7 furnishes averages for a number of characteristics subdivided by gear type based upon questions included in the economic survey. Trap fishermen in this sample have a higher average age and average tenure as commercial fishermen than those using other types of gear. In addition, they tend to have been in their current position longer. Rod & reel fishermen and trap fishermen are more likely to be owner operators. Also rod & reel fishermen are more likely to have a high school education or more, and most likely to have outside employment.

Table 7. Demographic and vessel characteristics by gear type for snapper grouper fishermen. Source: Rhodes, Waltz, and Wiggers (1996).

Variable	Bandit Gear	Rod & Reel	Traps	Bottom Longline
Personal Characteristics				
Age (yrs.)	46	43	48	43
Years as a fisherman	18	15	27	20
Years in current position	13	13	18	14
High school education or more	74%	86%	76%	83%
Owner/Operator	67%	88%	88%	52%
Have outside employment	46%	68%	40%	39%
Vessel Characteristics				
Vessel Length (ft.)	36	33	38	41
Fuel Capacity (gal.)	393	321	422	1074
Horsepower (hp)	271	387	357	395
Fish Box Capacity (lb.)	4372	1740	2744	7122

When examining vessel characteristics bottom longline vessels are larger on average with greater fuel and fish box capacity. Those characteristics are likely an indication of the need for a vessel to withstand the harsher environmental conditions endured when fishing deep shelf species farther offshore, in addition to the prohibition of bottom longlines within nearshore waters south of St. Lucie Inlet. Fish trap vessels also have a higher average length and are more powerful than rod & reel or bandit vessels. Black sea bass pots are the only type of fish traps allowed in the South Atlantic. The fishery is north of Florida where fishermen must travel farther to reach deep waters, therefore needing larger vessels as discussed previously.

Table 8 shows active snapper grouper fishermen in the socio-demographic survey to have demographic characteristics similar to those in the economic survey when the sample is stratified by gear type. The one characteristic that is not similar is the percent having outside employment. Fishermen in the socio-demographic sample, on average, are less likely to have outside employment. However, as mentioned earlier, that difference may be an artifact of the different manner in which the question was worded on each survey. Fishermen included in the socio-demographic survey may have included charter fishing as part of their general commercial fishing occupation and did not make a distinction. Whereas, on the economic survey fishermen were more likely to make a distinction between their commercial snapper grouper fishing and their charter fishing.

Table 8. Demographic characteristics by gear type for active snapper grouper fishermen in social survey. Source: Rhodes, Backman, and Hawkins (1997).

Variable	Bandit Gear	Rod & Reel	Traps	Bottom Longline
Personal Characteristics				
Age in years	45	43	50	44
Years as a fisherman	17	12	24	20
Years in current position	15	12	18	17
Have outside employment (%)	21%	37%	15%	17%

In Table 9 revenue and trip costs by gear type are provided from the economic survey and again bottom longline vessels have the highest trip costs. They also have the highest average gross and net revenue per trip. These average revenues and costs again reflect the larger vessel used in the fishery and the associated cost and returns needed for fishing offshore.

Table 9. Revenue and trip costs by gear type for snapper grouper fishermen. Source: Rhodes, Waltz, and Wiggers (1996).

Reported Averages	Bandit Gear	Rod & Reel	Traps	Bottom Longline
Gross Revenue Per Trip	$1,880	$846	$1,306	$3,583
Trip Costs	$557	$557	$362	$1,303
Net Revenue Per Trip	$1,323	$1,323	$944	$2,280
Captain's Share of Net	$357	$357	$438	$490
Boat's Share of Net	$390	$390	$320	$816
Crew Share of Net	$360	$360	$235	$753

High Volume and Low Volume Active Snapper Grouper Fishermen

The sample of active snapper grouper fishermen in the socio-demographic survey was also stratified by the category high volume/low volume. A fisherman was classified high volume if more than 14,250 pounds of snapper grouper were landed and classified low volume if less than 14,250 pounds were landed. Fishermen were also grouped according to region fished by combining Georgia and the Carolinas. This corresponds to a similar classification used in the economic survey as outlined in notes to Table 6. As shown in Table 10 low volume fishermen are generally older. Fishermen from Florida were more likely to have a longer tenure as commercial fishermen and have been snapper grouper fishing longer with low volume fishermen from Florida having the highest average tenure for both.

Table 10. Demographic characteristics of active snapper grouper fishermen by high volume/low volume and region. Source: Rhodes, Backman, and Hawkins (1997).

Variable (Mean)	High Volume GA, SC & NC	High Volume FL	Low Volume GA, SC & NC	Low Volume FL
Age (yrs.)	44	44	50	48
Years as a commercial fisherman (yrs.)	16	17	13	18
Years as a snapper grouper fisherman (yrs.)	13	16	10	14

Low volume fishermen have smaller vessels in general, while fishermen from Georgia and the Carolinas fish farther offshore on average no matter what their volume classification (Table 11). High volume fishermen from Georgia and the Carolinas reported higher average landings than high volume fishermen from Florida, while low volume fishermen from Florida reported a higher average landings than low volume fishermen from Georgia and the Carolinas.

Table 11. Average characteristics of fishing operations for active snapper grouper fishermen by high volume/low volume and region. Source: Rhodes, Backman, and Hawkins (1997).

Variable (Mean)	High Volume GA, SC & NC	High Volume FL	Low Volume GA, SC & NC	Low Volume FL
Boat length (ft.)	34	32	31	29
Miles fished off shore (mi.)	42	26	32	23
Pounds of snapper grouper landed in 1994 (lb.)	31,608	20,584	610	720

When comparing perceptions of future fishing high volume fishermen are more likely to respond that they intend to continue fishing than low volume fishermen (See Table 12). Low volume fishermen from Georgia and the Carolinas are the least likely to perceive that they will stay with snapper grouper or commercial fishing in general.

Table 12. Average perceptions of fishing future for active snapper grouper fishermen by high volume/low volume and region. Source: Rhodes, Backman, and Hawkins (1997).

Variable*	High Volume GA, SC & NC	High Volume FL	Low Volume GA, SC & NC	Low Volume FL
Intend to stay with snapper grouper fishing for next 2/3 years	1.9	2.0	3.1	3.0
Intend to leave snapper grouper fishing in next 2/3 years	3.8	3.7	2.7	3.1
Intend to leave commercial fishing in next 2/3 years	4.0	3.9	2.8	3.6

* Scale: 1 = strongly agree; 5 = strongly disagree

General Characteristics of Active and Inactive Snapper Grouper Fishermen

As part of the sampling frame for the socio-demographic survey, fishermen who had not fished for snapper grouper species in 1995 or had quit commercial fishing altogether, but still had a snapper grouper permit were also included. A total of 27 inactive fishermen completed surveys included in the results. The following tables compare snapper grouper fishermen from the socio-demographic survey stratified by whether they were active or inactive snapper grouper fishermen.

In general the two groups are very much alike with regard to general demographic characteristics (See Table 13). Inactive fishermen have a higher average age and are less likely to be an owner captain, but have an average tenure as a fisherman and education level comparable to those who are active. There was a larger percentage of inactive fishermen from the Georgia/Carolinas, as there was active fishermen from Florida. When stratified by gear type the two samples were similar with percentages in each category very much the same, except for traps. One likely reason for the higher percentage of trap fishermen in the inactive category is the prohibition on trap fishing implemented in the early 1990s by the South Atlantic Council.

Active and Inactive Snapper Grouper Fishermen's Perceptions of Fishing

While active and inactive fishermen may be similar regarding their demographic characteristics, they have some rather marked differences in other areas. Fishermen were asked to score their perceptions regarding quality of life as commercial fishermen on a scale of one (1) to ten (10), with ten being the best life possible. When comparing their perceptions in Table 14, a greater percentage of inactive fishermen see their present quality of life as being worse as a commercial fisherman than do active fishermen. This perception is likely related to their reasons for not actively participating in snapper grouper fishing. More active fishermen, on the other hand, see their life as a commercial fisherman as being better five years ago. Future perceptions of being a commercial fisherman five years from now seem poor for inactive fishermen as they have a larger percentage (68%) who score their future perception of fishing with five (5) or below. Again, their perception of their current status and future for commercial fishing seem to indicate their inactive status and perception of the future are linked.

Table 13. A comparison of general characteristics for active and inactive snapper grouper fishermen. Source: Rhodes, Backman, and Hawkins (1997).

Variable	Active S/G Fishermen	Inactive S/G Fishermen
Age (in years)	43	49
Years as a Commercial Fisherman (in years)	15	15
Years as a Snapper Grouper Fisherman (in years)	13	10
Education (Percent)		
Some high school	18%	15%
High school graduate or more	82%	85%
Position on Boat		
Owner and Captain	82%	69%
Region (Percent)		
Florida	53%	33%
Georgia/Carolinas	47%	67%
Gear Type (Percent)		
Bandit Reel	42%	33%
Rod & Reel	29%	26%
Traps	1%	22%
Longline	6%	8%
Spear	4%	-
Other	12%	11%

Table 14. Perceptions of quality of life by inactive and active snapper grouper fishermen. Source: Rhodes, Backman, and Hawkins (1997).

Quality of Life Scale Item Score	Inactive (Percent)	Active (Percent)
Life as a commercial fisherman		
1-3	33	14
4-5	29	42
6-7	9	18
8-10	29	26
Five years ago		
1-3	12	11
4-5	36	22
6-7	16	25
8-10	36	42
Five years from now		
1-3	46	28
4-5	23	26
6-7	4	16
8-10	27	30

Inactive status in the snapper grouper fishery may indicate a possibility of leaving commercial fishing altogether. A larger percentage of inactive fishermen (46%) than active fishermen (11%) indicate they may leave commercial fishing altogether as shown in Table 15.

Another indication of intent to leave fishing is reflected by the larger percentage of inactive fishermen (33%) to active fishermen (19%) who indicate they agree or strongly agree that people important to them want them to stop fishing. In addition, a much larger percentage of inactive fishermen (58%) than active fishermen (42%) see the future of fishing as being risky or hopeless. Although, a large percentage of active fishermen seem to have a rather dim view of the future of commercial fishing also.

Table 15. Perceptions of commercial fishing future by inactive and active snapper grouper fishermen. Source: Rhodes, Backman. and Hawkins (1997).

Variable	Inactive (Percent)	Active (Percent)
Likelihood to leave commercial fishing altogether		
Very likely	33	6
Likely	13	5
Not sure	13	18
Not likely	12	35
Unlikely	29	36
People Important to me want me to stop fishing		
Strongly agree	11	6
Agree	22	13
Neither agree/disagree	7	33
Disagree	22	29
Strongly agree	37	19
Future for commercial fishing		
Good	15	18
Unstable	27	33
Risky	42	34
Hopeless	16	8

Preferred Management Option

Fishermen were asked to choose their preferred management option on the socio-demographic survey from the options presented in Table 16. Of those who had a preference, the largest percentage of respondents chose license limitation. The next highest percentage choice was co-management, with ITQs and limited closure both being chosen about 8% of the time. However, 30% of respondents did not have a preferred choice or decided that some other management option was their preferred. Further analysis may provide more insight into which snapper grouper fishermen prefer license limitation. At this time, we can only say there seems to be some support for license limitation among this sample of fishermen.

Table 16. Preferred Management option of active/inactive commercial snapper grouper fishermen. Source: Rhodes, Backman, and Hawkins (1997).

	Active		Inactive	
Variable	Percent	n	Percent	n
License Limitation	39%	77	12%	3
Co-Management	17%	40	44%	11
Individual Transferable Quota	7%	14	0%	0
Limited Closure	11%	21	12%	3
Not Sure of Best	13%	25	24%	6
Other	12%	24	8%	2

Fishermen from the Keys were also given an opportunity to select their preferred type of management as indicated in Table 17. Respondents in the economic survey were given the opportunity to choose more than one management option, therefore the sum may be greater than the number of samples (n) provided in the table. Keys fishermen differed markedly from those snapper grouper fishermen in the socio-demographic survey in their preferred management option. Limiting the number of boats was near the bottom while use of seasonal closures was the preferred management alternative.

Table 17. Management preference for Keys fishermen. Source: Waters (1996).

Type of Management	Upper Keys n = 21	Middle Keys n = 24	Lower Keys n = 57	Total n = 102
Limit number of boats	3	2	7	10
Limit number of fishing days	2	0	3	5
Limit boat size	2	3	1	6
Limit size/amount of gear	5	4	9	18
Limit catch per trip	1	5	7	13
Use of seasonal closures	7	7	27	41
Favor other limitations	8	8	18	34

Profile of Commercial Snapper/Grouper Fishing Regions

The following description was provided by Kim Iverson of SC Department of Natural Resources. This profile of the snapper grouper fishery is not complete, but gives an indication of the number vessels and their homeport locations. It does not constitute a profile of fishing communities, but is the only information available to describe fishing communities involved in snapper grouper fishing in the South Atlantic, at this time. Again, this research did not include the Florida Keys, therefore, excludes an important aspect of the South Atlantic snapper grouper fisheries.

The following information was compiled during in-person interviews with commercial snapper grouper fishermen during the MARFIN project "Socio-demographic Assessment of Commercial Reef Fishermen in the South Atlantic Region" (Rhodes, et al. 1997) and from Robert Wiggers, currently a port sampler with the SC Department of Natural Resources. Robert Wiggers was the primary field investigator for another MARFIN funded project involving an economic assessment of the commercial snapper grouper fishermen (Rhodes, Waltz and Wiggers 1996). He was responsible for collecting economic data from St. Augustine, Florida north to the Outer Banks of North Carolina. Information from the Socio-Demographic Assessment was collected from Broward County, Florida to Harkers Island, North Carolina. While it is impossible to discuss every fishing port in the South Atlantic in this summary, it does provide a general overview of the fishery by regions.

The commercial reef fishery along the South Atlantic is a diverse and complex business. Many factors influence fishing patterns of snapper grouper fishermen. These include:

- Offshore Environment - proximity to fishing area, bottom composition and currents
- Available Species
- Seasonal Weather patterns

These factors in turn determine vessel size, gear type, days at sea and crew requirements and associated costs.

The Carolinas and Georgia

Outer Banks:

The commercial fishing industry on the Outer Banks of North Carolina is divided among five ports; Manns Harbor, Manteo, Wanchese, Hatteras and Ocracoke. Because of the rough water and strong currents that prevail in the offshore waters, bottom fishing is at best, a hit or miss venture. Most of the snapper grouper permit holders work out of Hatteras and only a small portion of their annual commercial fishing activity is devoted to targeting snapper grouper species. Black sea bass, snowy grouper, and blueline tilefish are the most frequently targeted species by commercial snapper grouper fishermen. Surface longlining for tuna and swordfish is apparently the most productive and profitable style of commercial fishing in the area, and the small towns of Manteo and Wanchese serve as refuge for a large number of both local and non-local long lining boats.

Morehead City to Murrells Inlet:

The Morehead City/Beaufort area is located approximately 50 miles south of Ocracoke. This area is known for its sportfishing activity including several major tournaments each year. There is a small population of full time commercial reef fishermen in Morehead, however the majority of fishermen holding commercial permits are primarily part timers. Many of these fishermen divide their time between charter fishing during the peak tourist season (April through September) and commercial fishing in the winter months. Full time fishermen in this area reported fishing approximately 50 miles straight offshore and fishing from Hatteras to as far south as the South Carolina/Georgia line. Trip lengths vary with the size of the vessel, but the average trip length is 7 days and the larger boats carried up to 3 crew members.

South of New River Inlet is the small community of Sneads Ferry, unique in that the majority of the commercial reef fishermen fish with sea bass pots. According to the 1993 Federal Permit List for the South Atlantic region, there were 58 permit holders who indicated that sea bass pots were their primary gear type. Of those, 13 permit holders worked out of Sneads Ferry. Subsequently, 72% of fishermen using sea bass pots as their primary gear work out of home ports in North Carolina.

Further south in the Carolinas commercial fishing ports include Southport, NC and Murrells Inlet, SC. One of the largest concentration of snapper grouper vessels is located in Murrells Inlet, SC. Most of the reef fishermen in this area are full time commercial fishermen and consider bandit reels to be the most effective way of catching snapper grouper. There is a wide variety of snapper grouper species off of Murrells Inlet, with gag, scamp, and vermilion snapper being highly targeted. The average trip length is 5 days with some of the larger boats (>40 ft.) fishing up to 10 days. A few smaller bandit boats may stay out for 2-3- days. The Gulf Stream is approximately 62 miles offshore from Murrells Inlet. Most bandit boats fish between the 20-50 fathom line, concentrating on the 25 fathom curve. Winter weather dictates that fishermen fish shallow, in waters 60-90' deep. Several fishermen switch to sea bass trapping during the winter months.

Vessels in Murrells Inlet will fish an area from Frying Pan Shoals off southern NC, south to Savannah. The average boat has two crew members. It is interesting to note that fishermen stated a crew of 3 plus the captain was ideal for this area, but decreasing catches and increased costs have made it necessary to cut back on crew members.

The coast of Georgia contains a small concentration of full-time reef fishermen that fish primarily with bandit reels. Their fishing patterns are similar to those found in SC with vessels fishing from northern Florida north to the SC/NC line.

North Florida to Cape Canaveral

Concentrations of reef fishermen can be found in the communities of Mayport, Port Orange and New Smyrna, north of Cape Canaveral. Bandit reels are the primary gear used for reef fishing in these areas, although a few bottom longline vessels are present. In northern Florida, bandit fishermen report trips lasting 5-6 days and fish 30-50 miles offshore. They average between 2 to 3 crew members depending on vessel size and gear. Vessels from the Mayport area reported fishing from the Georgia line south to the Daytona area. The larger longline vessels are required by regulations to fish past the 50 fathom line. As a result, trip lengths of up to 10 days are reported, with fishing taking place as far as 100 miles from shore. These bottom longline vessels fish for deep water species such as tilefish in water 600 - 900' deep.

South of Cape Canaveral

South of Cape Canaveral, one begins to see large changes in fishing trips as the reef is found closer to shore and accessibility is increased. Commercial fishing communities include Sebastian, Ft. Pierce, Jupiter, and West Palm and Boyton Beaches. Small numbers of full-time commercial fishermen are found scattered throughout south Florida. In addition to reef fishing, many are involved in other fisheries including king mackerel. Beginning at Ft. Pierce, snapper grouper fishermen report fishing an average of 20 miles offshore while moving down to West Palm they fish 1 to 2 miles offshore. Day trips are common with a few fishermen staying out overnight. In general, vessel size decreases and most captains fish alone or with an occasional crew member.

3.3.2 Recreational Fishery

Recreational total catches and catch rates for traditional snapper grouper species, such as red snapper, vermilion snapper, and several of the groupers have declined substantially during the 1980s and 1990s. The average size of vermilion snappers, black sea bass, and groupers is quite small in recreational catches. The small average size of recreational fish is partly due to the habit of some species to stratify in size by depth. Another important reason is that total inshore fishing pressure is so high that fish are not allowed to grow to optimum size before capture. As soon as fish reach legal size they are caught. This is an example of growth overfishing.

Recreational fishing pressure by private boats will likely continue to increase as the coastal population continues to grow in the South Atlantic. The virtual absence of larger fish in the near shore waters of the management unit, as well as the shifting of target species by both recreational and commercial sectors, are other indicators that many, especially the highly prized, traditional species (red snapper, gag, scamp, etc.), are under intense fishing pressure and require management.

Recreational catches, average size, and catch-per-unit-effort are included under stock status.

3.4 Status of the Stocks

A summary of the stock status for species specifically addressed in Amendment 9 is shown in Tables 3A and 3B (pages 10 and 11). More detailed information is contained below and under the Action item addressing each species. Appendix H contains a pre-publication draft of a paper that is "In Review" with the Fishery Bulletin. This paper presents a multispecies assessment of coral reef fish stocks in the Florida Keys.
Amendment 8 (SAFMC, 1997) proposed to change the overfishing definition level to 20% transitional SPR and to add a threshold level of 10%; however, both were rejected by NMS, resulting in the overfishing level remaining at 30% transitional SPR (see the discussion under Section 3.2 Definition of Overfishing, page 27, for an explanation of SPR and overfishing). Recent revisions to the Magnuson-Stevens Act have resulted in the determination that the overfished level should be based on MSY, and if SPR is used as a proxy, then the overfished level should be 30%-40% SPR. The Council considered both the proposed level and the recent revisions to Magnuson-Stevens to determine whether a species is overfished. The following species are below 20% transitional SPR: (1) red porgy at 13%, (2) gag at 13%, (3) black grouper at 5%, (4) speckled hind at 12%, (5) warsaw grouper at 6%, (6) snowy grouper at 15%, (7) wreckfish at 8-22%, and (8) white grunt at 19%. The following species are below 30% transitional SPR: (1) black sea bass at 26%, (2) yellowtail snapper at 24%, (3) vermilion snapper at 21-27%, (4) gray triggerfish at 27%, (5) red snapper at 24-32%, (6) scamp at 20%, and (7) golden tilefish at 21%. Based on the 30% transitional SPR overfished level, 15 species in the snapper grouper management unit are currently overfished.

Thirteen species are thought to be overfished even though the SPRs are unknown. This group consists of yellowedge grouper, misty grouper, Nassau grouper, black grouper, yellowmouth grouper, yellowfin grouper, schoolmaster snapper, queen snapper, blackfin snapper, cubera snapper, dog snapper, mahogany snapper, and silk snapper. The jewfish resource is thought to be severely overfished throughout the Gulf of Mexico and South Atlantic even though SSR is unknown. Finally, additional species may be overfished or likely to experience overfishing in the near future.

More specific information on south Florida is contained in Appendix H. Seventeen of the species listed in Table 5 of Appendix H are overfished. The authors conclude:

Using a new approach, we provide a multi-species reef fish retrospective assessment for the Florida Keys. Fishing effort and mortality, although highly variable, are generally very intense. Current levels of exploitation appear to have "overfished" some stocks and altered community structure and dynamics. Continuing increased fishing effort, particularly by recreational anglers, and possible habitat degradation by larger human populations, suggest further potential for overfishing and ecosystem changes. Without some form of effective intervention, reef fish stocks are likely to continue to decline. To achieve long-term goals of protecting biodiversity and maintaining sustainable fisheries, we proscribe a combination of traditional management measures coupled with permanent area closures. Fishery-independent data used here provide a baseline for assessing future changes. Efforts are underway to monitor changes and assess the effectiveness of marine reserves and management of the Florida Keys National Marine Sanctuary.

The NMFS Beaufort Laboratory's Reef Fish Team was requested to provide graphical and tabular data pertaining to trends in catches of species addressed in Amendment 9. Weight of landings (kilograms), mean fish size, catch per unit effort (CPUE) from headboat data, Yield per Recruit, and Spawning Stock Ratio data are presented below for each species compiled for the entire southeastern United States fishing area, North Carolina through the Florida Keys. Yield per Recruit and Spawning Stock Ratio are not included for yellowedge grouper because no assessment has been completed for the species. Three data bases, each with a landings and fish size (bioprofiles) component, were utilized: Headboat, Commercial and Marine Recreational Fisheries Statistical Survey (MRFSS). [Note: This information is from Potts, J.C., C. S. Manooch, III and M. L. Burton, Trends in catch data for fifteen species of reef fish landed along the southeastern United States, NMFS Beaufort Lab, April 1997.]

Descriptions of the data limitations and outputs are:

1. **Headboat:** Landings were available for the entire region for 1981-1995; restricted to NC and SC for 1972-1975; NC through North Florida for 1976-1977; and partial coverage of South Florida for 1978-1980. Mean weights were obtained from bioprofiles data for 1972-1995. CPUE was calculated in terms of number of fish caught as well as pounds of fish caught and kilograms of fish caught, all per angler day. CPUE trends were plotted in terms of one data point per year, combining all areas used for a given species. This gives an area-wide look at CPUE trends over time. For a given species, CPUE calculations were done only for those areas in which the species was a common and frequent occurrence. This was done to avoid negatively biasing the CPUE calculation (i.e., inclusion of areas of infrequent or rare occurrence would involve including both low landings data and high effort data, resulting in low CPUE values perhaps not reflecting reality).

2. **Commercial:** Landings were available from 1986-1995. 1986 was the first year that all fish were identified to species. Before 1992 greater amberjack were included in an unclassified category, which contained four species; most were probably greater amberjacks. Mean weights were generated from intercept (TIP) length, which were then applied to Weight-Length relationships for each species, 1983-1995.

3. **MRFSS:** Landings data were available for 1981-1995. However, 1981-1985 data provide crude estimates because charter boats were combined with party boats (headboats) for those years. To adjust, we used the intercept data to obtain the proportion of charter boat and headboat samples for each species. We then applied the proportion to the landings data and discarded the party boat segment because it was already included in the headboat data. Mean weights for each species were obtained from the intercept data. For the samples with no weight recorded, the length-weight relationship for each species was used to convert the lengths to weights.

Results are presented in the following order:

1. Red porgy: Action 1.
2. Black sea bass: Actions 2 & 3.
3. Greater amberjack: Action 4.
4. Vermilion snapper: Action 5.
5. Gag: Actions 6 & 8.
6. Black grouper: Actions 7 & 8.
7. Snowy grouper: Action 10.
8. Yellowedge grouper: Action 10.
9. Tilefish: Action 10.

For simplicity, all information for a particular species is included here under the heading of a Figure. We recognize this mixes tables and figures (some of which have numbers from the original stock assessments), however, it does group all material together and reduces the requirement to number each table and figure separately. We hope this makes reviewing the material easier.

Figure 1. Trends in catches, CPUE and stock status for red porgy (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).

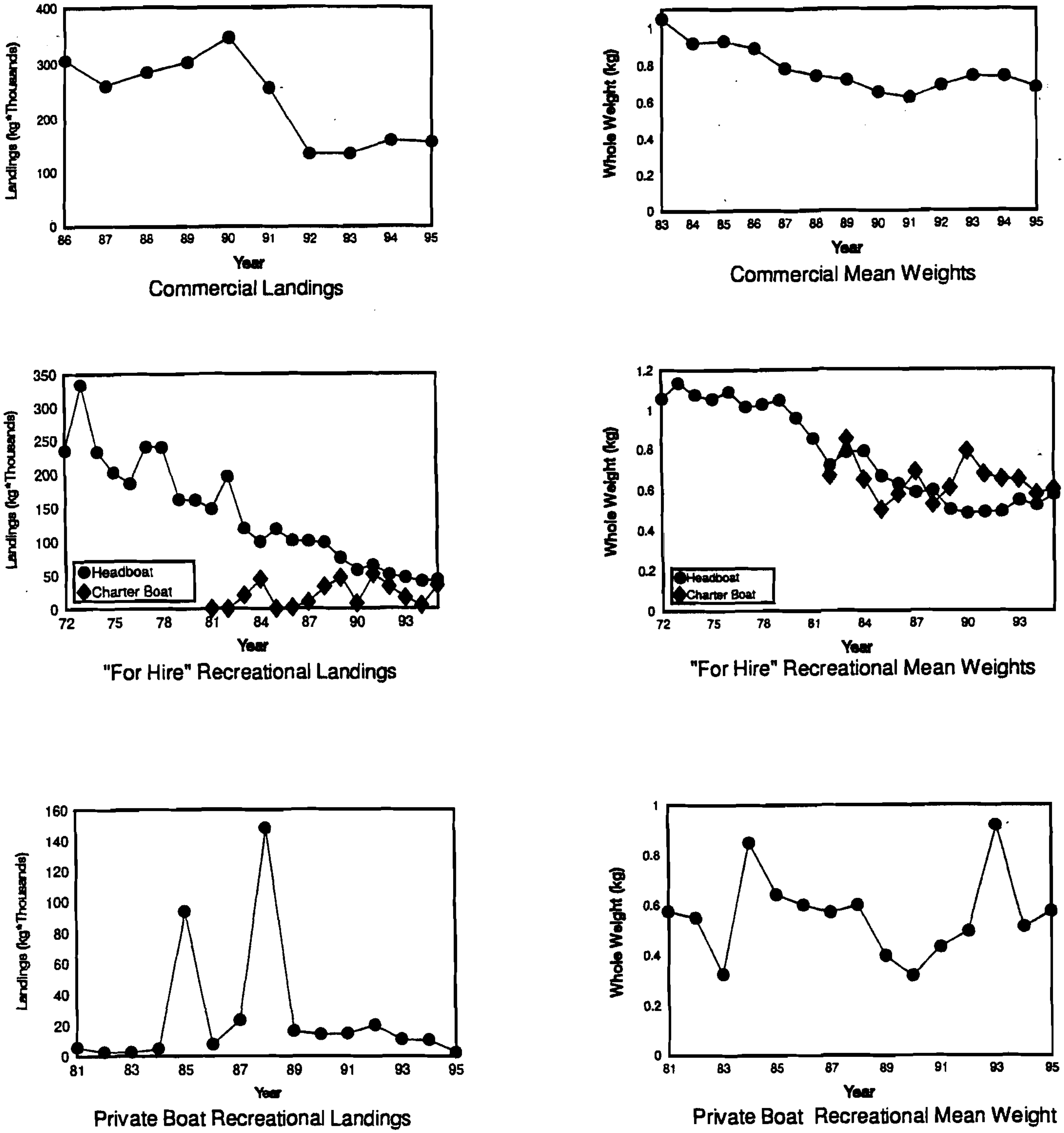


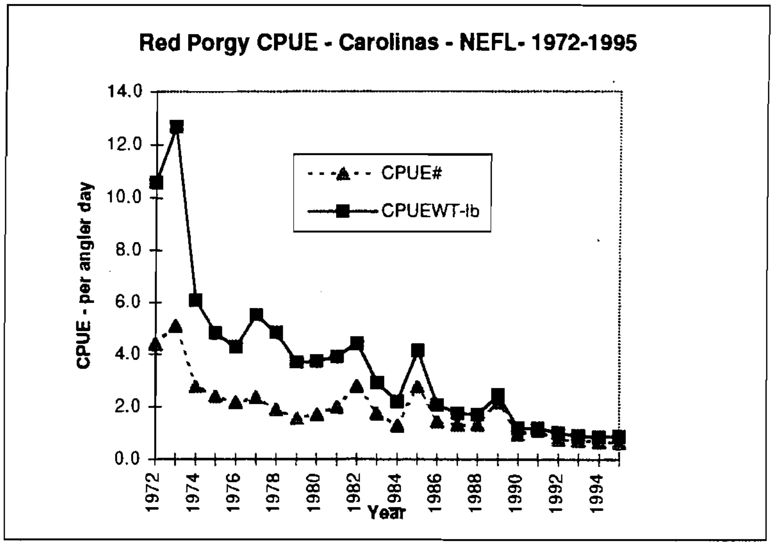
Figure 1 (continued).

Red Porgy Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings[1]	Mean Wt[2]	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972				235351	1.06	2115						
73				334125	1.13	2508						
74				233116	1.07	1798						
75				202542	1.05	1148						
76				186310	1.09	1240						
77				240348	1.01	1100						
78				239757	1.02	843						
79				162176	1.05	458						
1980				161668	0.95	727						
81				147625	0.85	575	0			5789	0.58	8
82				195923	0.72	1246	0	0.67	3	2503	0.55	4
83		1.05	337	118592	0.78	1206	19158	0.85	19	2487	0.33	4
84		0.92	3347	98446	0.78	1284	43250	0.65	24	4835	0.85	2
85		0.93	3447	118106	0.66	967	35	0.50	1	93437	0.64	31
86	307283	0.89	3770	100737	1.39	1228	1284	0.58	8	7538	0.60	12
87	260159	0.78	3306	100006	0.58	1203	9574	0.69	23	23407	0.57	35
88	284672	0.74	1721	97764	0.59	811	32207	0.53	27	148055	0.60	27
89	302010	0.72	2035	74865	0.50	1511	45587	0.61	51	16277	0.40	29
1990	347227	0.65	2463	56819	0.48	1312	7078	0.79	47	14016	0.32	10
91	256559	0.62	2457	63874	0.48	649	50482	0.68	17	14741	0.43	28
92	134958	0.69	1384	49830	0.49	828	32513	0.65	77	20206	0.50	23
93	133897	0.74	1979	45824	0.54	1011	15797	0.65	43	10564	0.92	5
94	158678	0.74	1745	39721	0.52	780	4115	0.58	50	10503	0.51	8
95	155473	0.68	2260	42198	0.57	851	33755	0.60	54	2427	0.58	6

1. Landings in kg. 2. Mean weights in kg

Figure 1 (continued).



Trends in catch per unit effort - Red Porgy - Headboats - North Carolina-Northeast Florida

YEAR	NUMBER	WEIGHT (kg)	WEIGHT (lb)	ANGDAYS	CPUE#	CPUEWT-kg	CPUEWT-lb
1972	215958	235351	517772	48989	4.4	4.8	10.6
1973	295027	334125	735075	57917	5.1	5.8	12.7
1974	233602	233386	513449	84431	2.8	2.8	6.1
1975	222939	202542	445592	92450	2.4	2.2	4.8
1976	197303	178642	393012	91643	2.2	1.9	4.3
1977	218914	231689	509716	92570	2.4	2.5	5.5
1978	176406	205637	452401	93494	1.9	2.2	4.8
1979	128764	140456	309003	83425	1.5	1.7	3.7
1980	148686	149563	329039	87958	1.7	1.7	3.7
1981	156888	139195	306229	78402	2.0	1.8	3.9
1982	264954	189520	416944	94478	2.8	2.0	4.4
1983	152656	116660	256652	87631	1.7	1.3	2.9
1984	124389	95112	209246	96178	1.3	1.0	2.2
1985	167148	113779	250314	60208	2.8	1.9	4.2
1986	140765	91599	201518	97832	1.4	0.9	2.1
1987	150971	90629	199384	114067	1.3	0.8	1.7
1988	157939	91904	202189	118889	1.3	0.8	1.7
1989	137412	70947	156083	63539	2.2	1.1	2.5
1990	97497	53890	118558	100391	1.0	0.5	1.2
1991	122738	58423	128531	108918	1.1	0.5	1.2
1992	81083	47589	104696	102967	0.8	0.5	1.0
1993	78518	44079	96974	107242	0.7	0.4	0.9
1994	67739	38319	84302	99924	0.7	0.4	0.8
1995	66760	40041	88090	102033	0.7	0.4	0.9

Figure 1 (continued).

Figure 39. Ricker Yield per Recruit for Red Porgy (1992 Carolinas data, Murphy VPA, M=0.28)

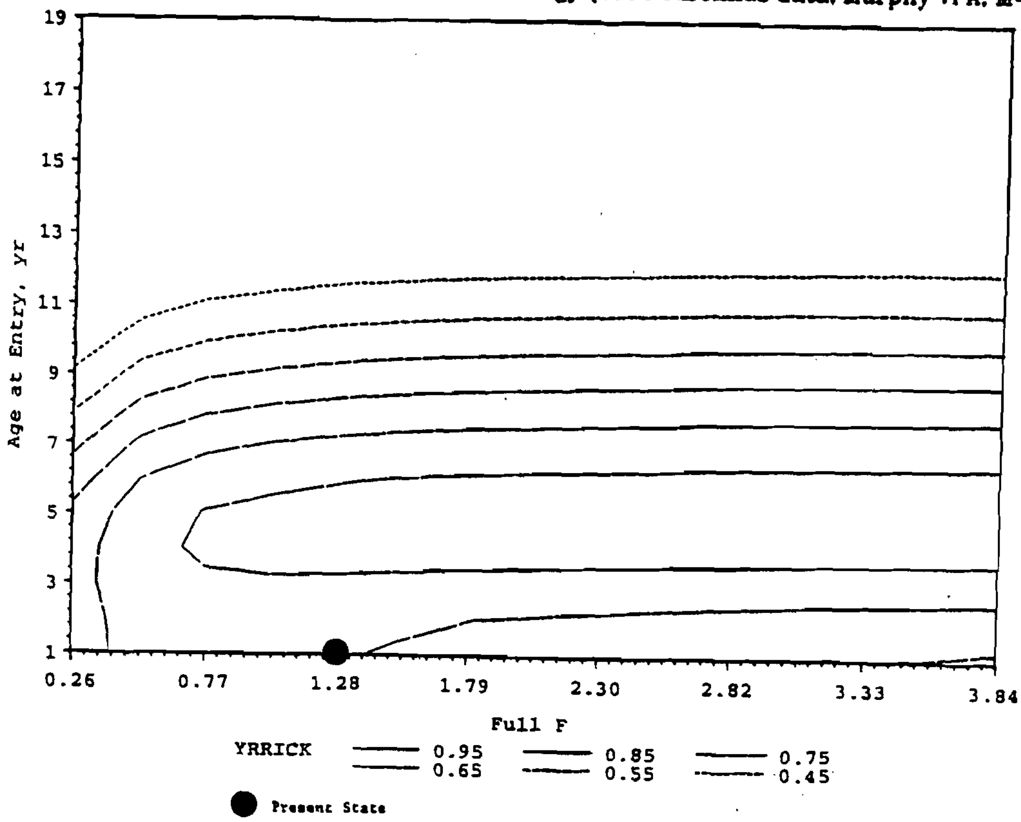


Figure 37. Spawning Stock Ratio for Red Porgy (1992 Carolinas data, Murphy VPA, M=0.28)

(SSR = 0.13)

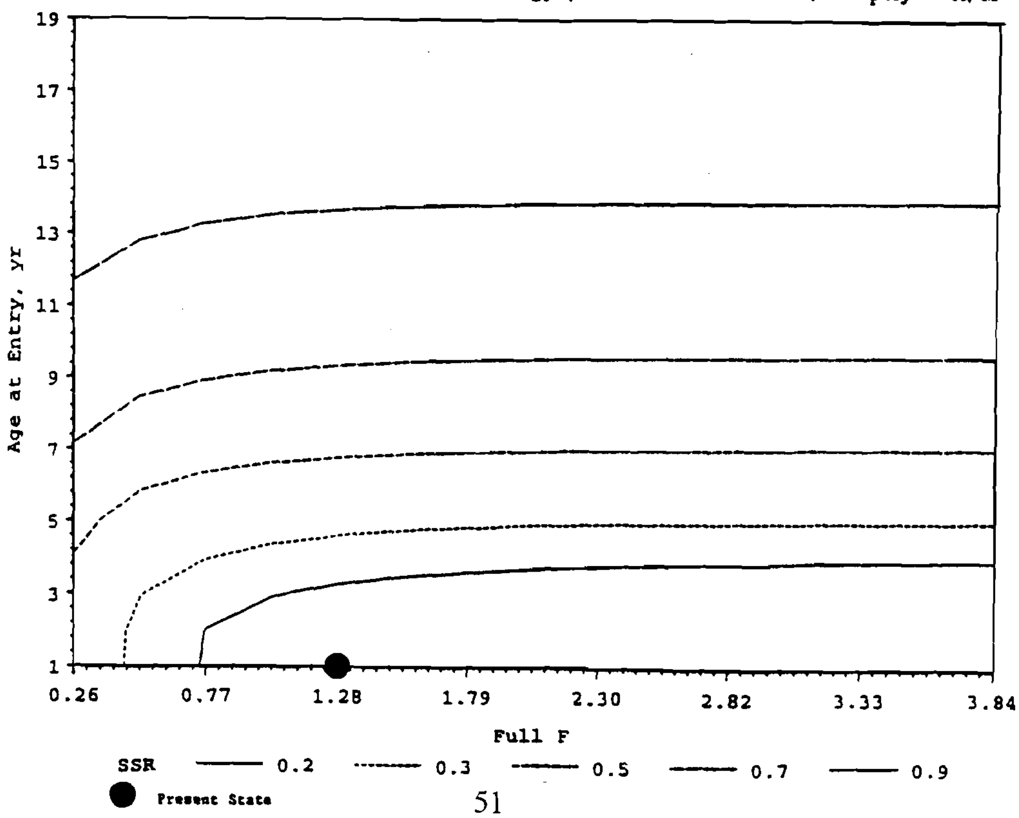


Figure 2. Trends in catches, CPUE and stock status for black sea bass (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).

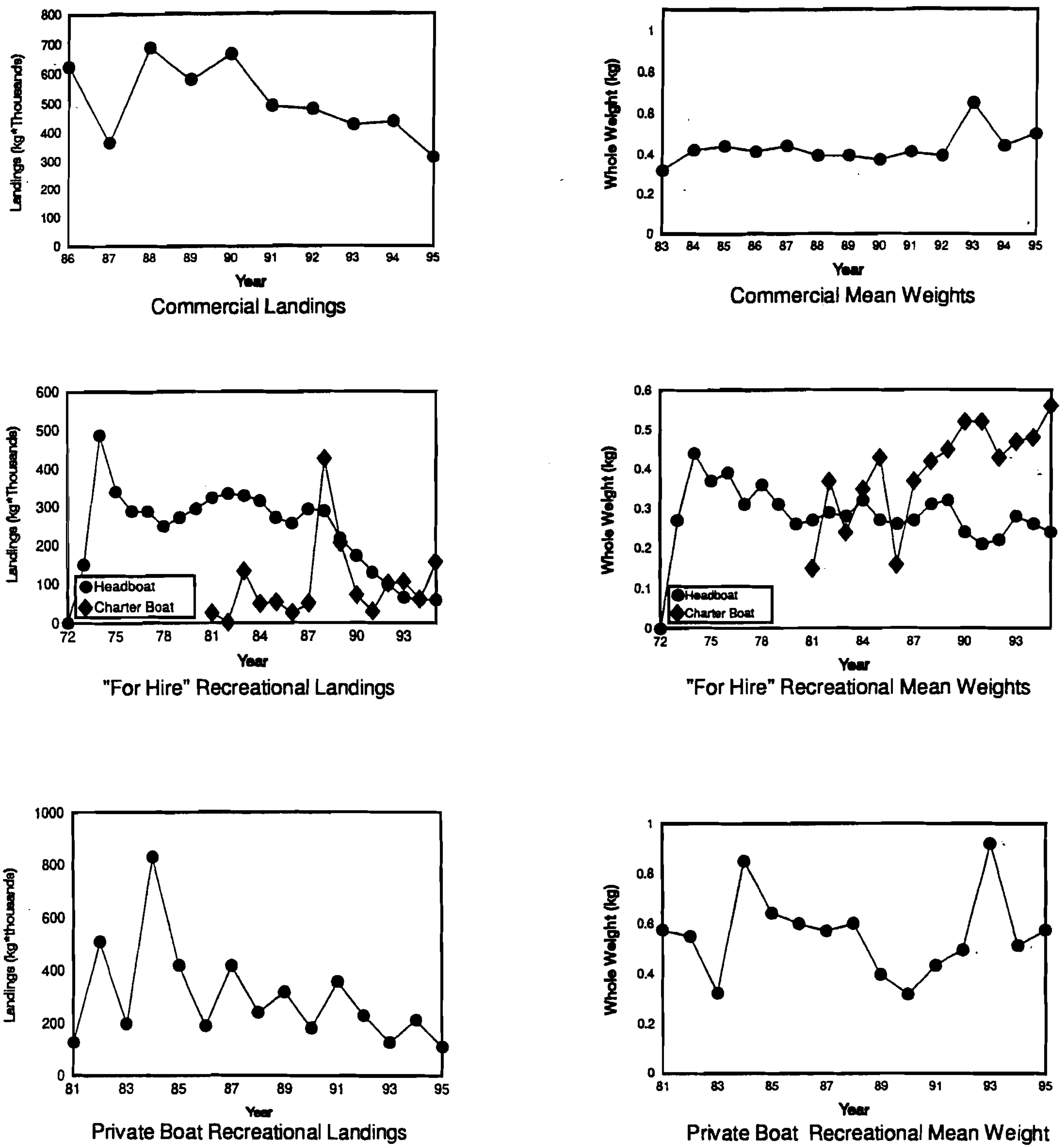
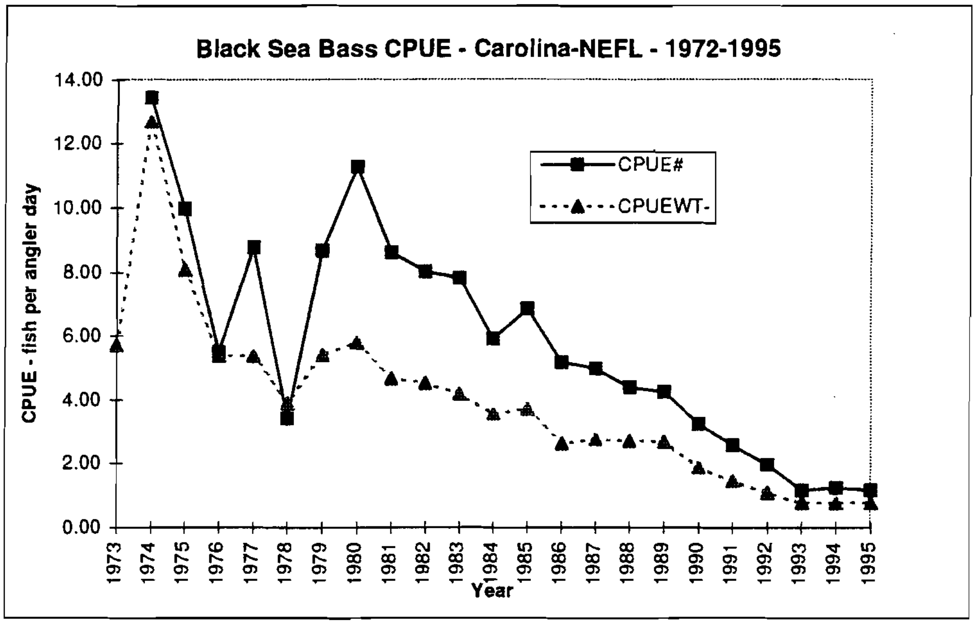


Figure 2 (continued).

Black Sea Bass Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972				0								
73				150904	0.27	1						
74				486815	0.44	592						
75				338986	0.37	519						
76				287705	0.39	479						
77				287646	0.31	1622						
78				249028	0.36	1168						
79				271717	0.31	822						
1980				293863	0.26	1197						
81				322621	0.27	1510	25424	0.15	49	128601	0.19	171
82				333613	0.29	1849	733	0.37	3	507045	0.29	433
83		0.32	333	328363	0.28	2895	132560	0.24	33	197614	0.21	165
84		0.42	2352	314446	0.32	3073	48675	0.35	93	828732	0.34	222
85		0.44	1792	270223	0.27	2984	53085	0.43	47	417996	0.28	453
86	623906	0.41	2398	255335	0.26	3368	25455	0.16	152	189919	0.28	275
87	363779	0.44	2068	293254	0.27	3254	49840	0.37	134	418843	0.24	519
88	684746	0.39	2545	288132	0.31	2159	425111	0.42	196	242583	0.28	344
89	576724	0.39	1090	216831	0.32	3840	205022	0.45	90	318751	0.27	444
1990	662497	0.37	2227	172171	0.24	6209	71489	0.52	172	181540	0.25	301
91	487755	0.41	3011	129836	0.22	5381	29316	0.52	56	357748	0.35	334
92	476537	0.39	2958	97920	0.22	5195	101038	0.43	296	228647	0.34	412
93	425012	0.65	2326	64875	0.28	3959	106048	0.47	138	125861	0.31	255
94	435346	0.44	2697	60074	0.26	4225	60776	0.48	199	212779	0.32	198
95	310589	0.5	1038	57889	0.24	3331	156969	0.56	177	109424	0.28	211

Figure 2 (continued).



Trends in catch per unit effort- Black Sea Bass-Headboats - North Carolina - Northeast Florida

YEAR	NUMBER	WEIGHT (kg)	WEIGHT (lb)	ANGDAYS	CPUE#	CPUEWT-kg	CPUEWT-lb
1973		150904	331989	57917		2.61	5.73
1974	1134759	486815	1070993	84431	13.44	5.77	12.68
1975	920699	338986	745769	92450	9.96	3.67	8.07
1976	504873	224613	494149	91643	5.51	2.45	5.39
1977	812636	227092	499602	92570	8.78	2.45	5.40
1978	319890	165695	364529	93494	3.42	1.77	3.90
1979	724300	204905	450791	83425	8.68	2.46	5.40
1980	990313	232148	510726	87958	11.26	2.64	5.81
1981	1296394	320711	705564	150471	8.62	2.13	4.69
1982	1293100	333363	733399	161439	8.01	2.06	4.54
1983	1337613	327841	721250	171130	7.82	1.92	4.21
1984	1131823	309730	681406	191412	5.91	1.62	3.56
1985	1060084	261738	575824	154654	6.85	1.69	3.72
1986	1091325	251584	553485	211515	5.16	1.19	2.62
1987	1135960	286176	629587	228211	4.98	1.25	2.76
1988	1003274	281970	620334	228045	4.40	1.24	2.72
1989	709802	203852	448474	166459	4.26	1.22	2.69
1990	647757	169428	372742	198625	3.26	0.85	1.88
1991	500582	128660	283052	194029	2.58	0.66	1.46
1992	382067	96935	213257	193777	1.97	0.50	1.10
1993	210416	64004	140809	181736	1.16	0.35	0.77
1994	205233	59483	130863	165669	1.24	0.36	0.79
1995	186120	56843	125055	161137	1.16	0.35	0.78

Figure 3. Trends in catches, CPUE and stock status for greater amberjack (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).

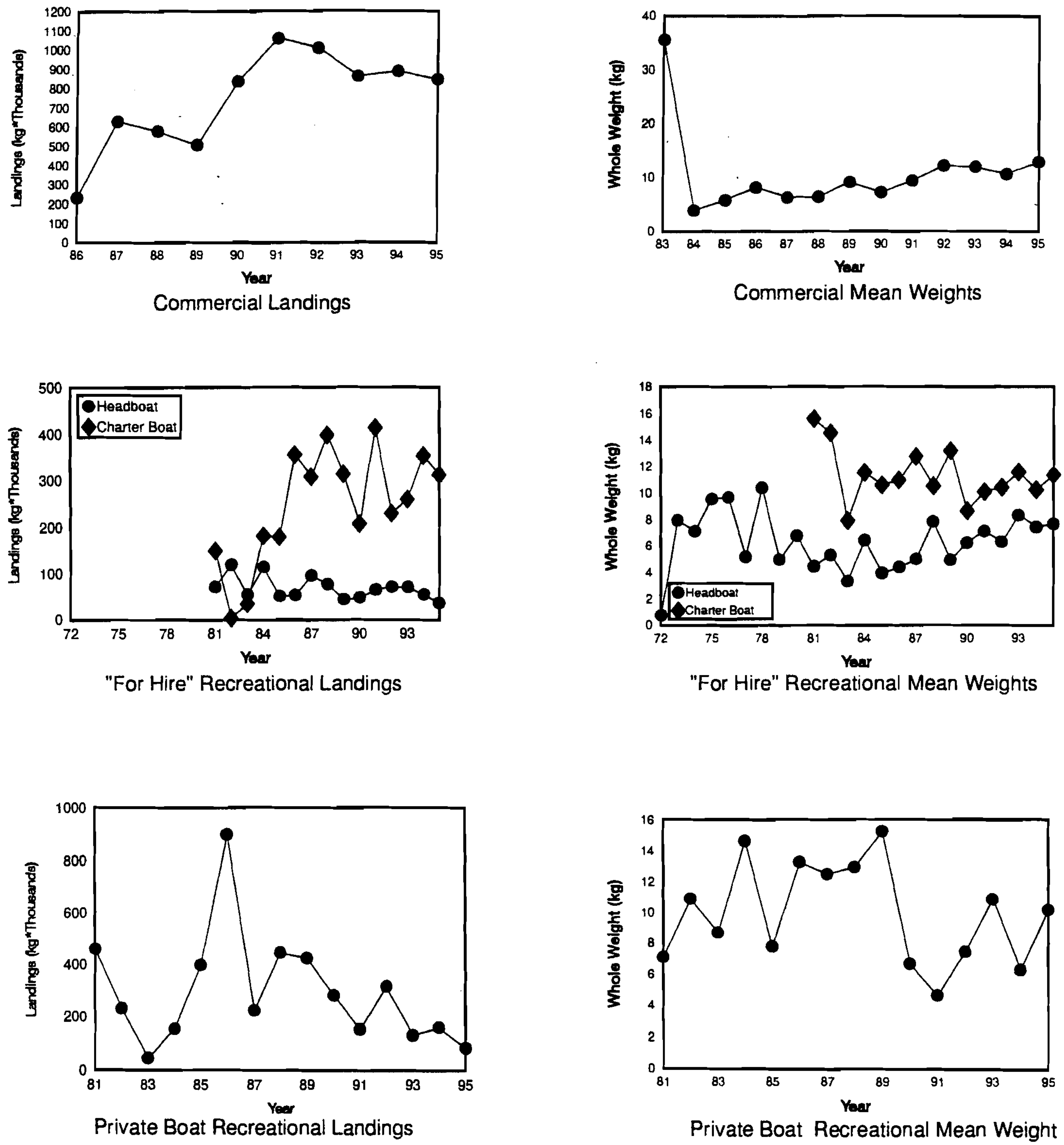
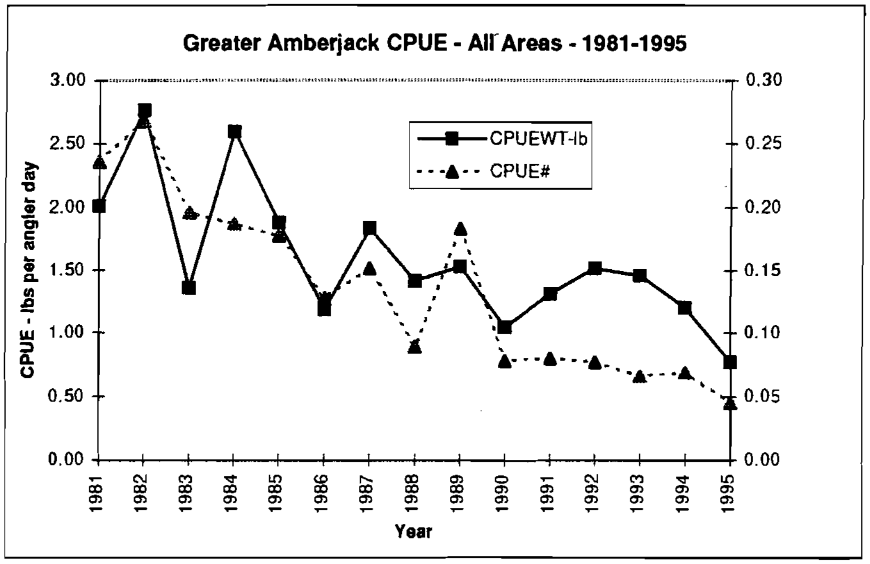


Figure 3 (continued).

Greater Amberjack Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972					0.77	1						
73					7.96	16						
74					7.13	22						
75					9.58	19						
76					9.67	50						
77					5.21	39						
78					10.42	92						
79					4.97	115						
1980					6.81	52						
81				71631	4.46	108	148667	15.63	6	459631	7.1	2
82				118594	5.32	48	3914	14.55	2	231962	10.91	13
83		35.49	1	54213	3.34	161	35327	7.91	7	43979	8.7	1
84		3.9	1	113345	6.45	151	181257	11.55	34	154952	14.66	7
85		5.81	24	51398	3.95	165	179373	10.62	16	396966	7.77	12
86	232878	8.26	22	53728	4.38	168	355806	10.97	34	899836	13.31	19
87	629073	6.35	50	94986	5.01	186	307662	12.78	48	224838	12.49	14
88	577291	6.47	61	76431	7.85	86	397668	10.54	30	445690	12.97	21
89	506944	9.21	29	44158	4.93	191	314312	13.2	62	423073	15.27	18
1990	835765	7.28	53	47798	6.26	119	206767	8.64	27	282419	6.66	13
91	1060147	9.51	137	65088	7.13	74	413312	10.12	35	153309	4.63	17
92	1007593	12.31	244	71255	6.32	130	229485	10.43	38	315746	7.44	14
93	863930	12.07	812	71200	8.33	121	260519	11.6	59	130720	10.89	26
94	888360	10.69	412	54693	7.43	124	353272	10.24	93	159359	6.29	8
95	844016	12.91	319	35784	7.65	113	311588	11.36	48	83893	10.18	13

Figure 3 (continued).

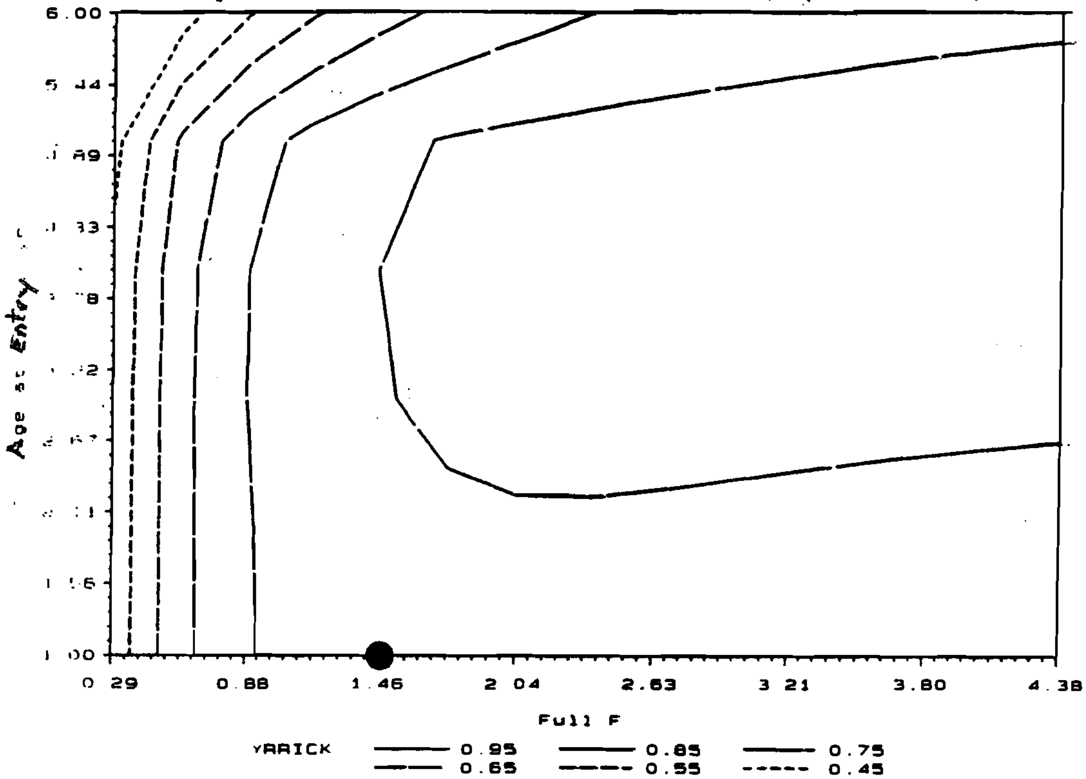


Trends in Catch per unit effort -Greater Amberjack - Headboats - Carolinas-Dry Tortugas - 1981-1995

YEAR	NUMBER	WEIGHT (kg)	WEIGHT (lb)	ANGDAYS	CPUE#	CPUEWT-kg	CPUEWT-lb
1981	18528	71632	157589	78402	0.24	0.91	2.01
1982	25300	118594	260907	94478	0.27	1.26	2.76
1983	17151	54213	119269	87631	0.20	0.62	1.36
1984	17951	113345	249360	96178	0.19	1.18	2.59
1985	10697	51399	113077	60208	0.18	0.85	1.88
1986	12839	54198	119235	100326	0.13	0.54	1.19
1987	17260	94987	208971	114067	0.15	0.83	1.83
1988	10564	76432	168150	118889	0.09	0.64	1.41
1989	11636	44159	97149	63539	0.18	0.69	1.53
1990	7822	47799	105157	100391	0.08	0.48	1.05
1991	8709	65089	143195	108918	0.08	0.60	1.31
1992	7975	71255	156762	102967	0.08	0.69	1.52
1993	7066	71201	156642	107242	0.07	0.66	1.46
1994	6911	54693	120325	99924	0.07	0.55	1.20
1995	4615	35785	78727	102033	0.05	0.35	0.77

Figure 3 (continued). Present State Figure 1

Ricker Yield per Recruit for GREATER AMBERJACK (ALL AREAS): RM=0.00



Present State Figure 2

Spawning Stock Ratio for GREATER AMBERJACK (ALL AREAS):RM=0.00

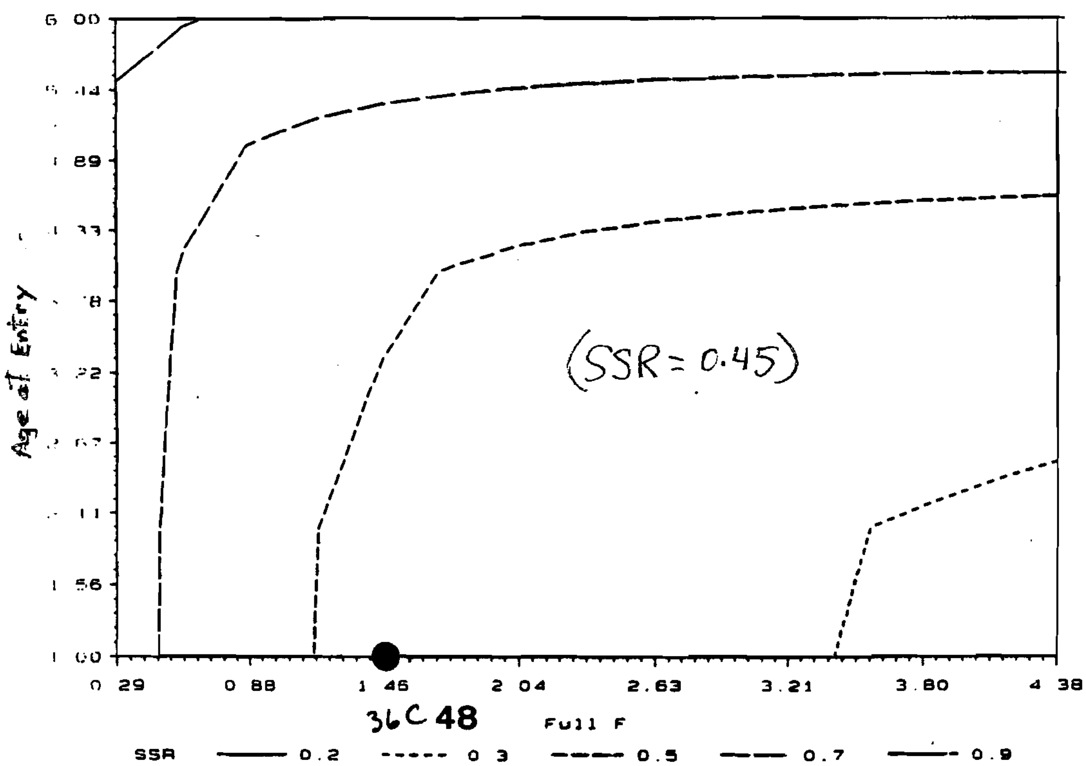


Figure 4. Trends in catches, CPUE and stock status for vermilion snapper (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).

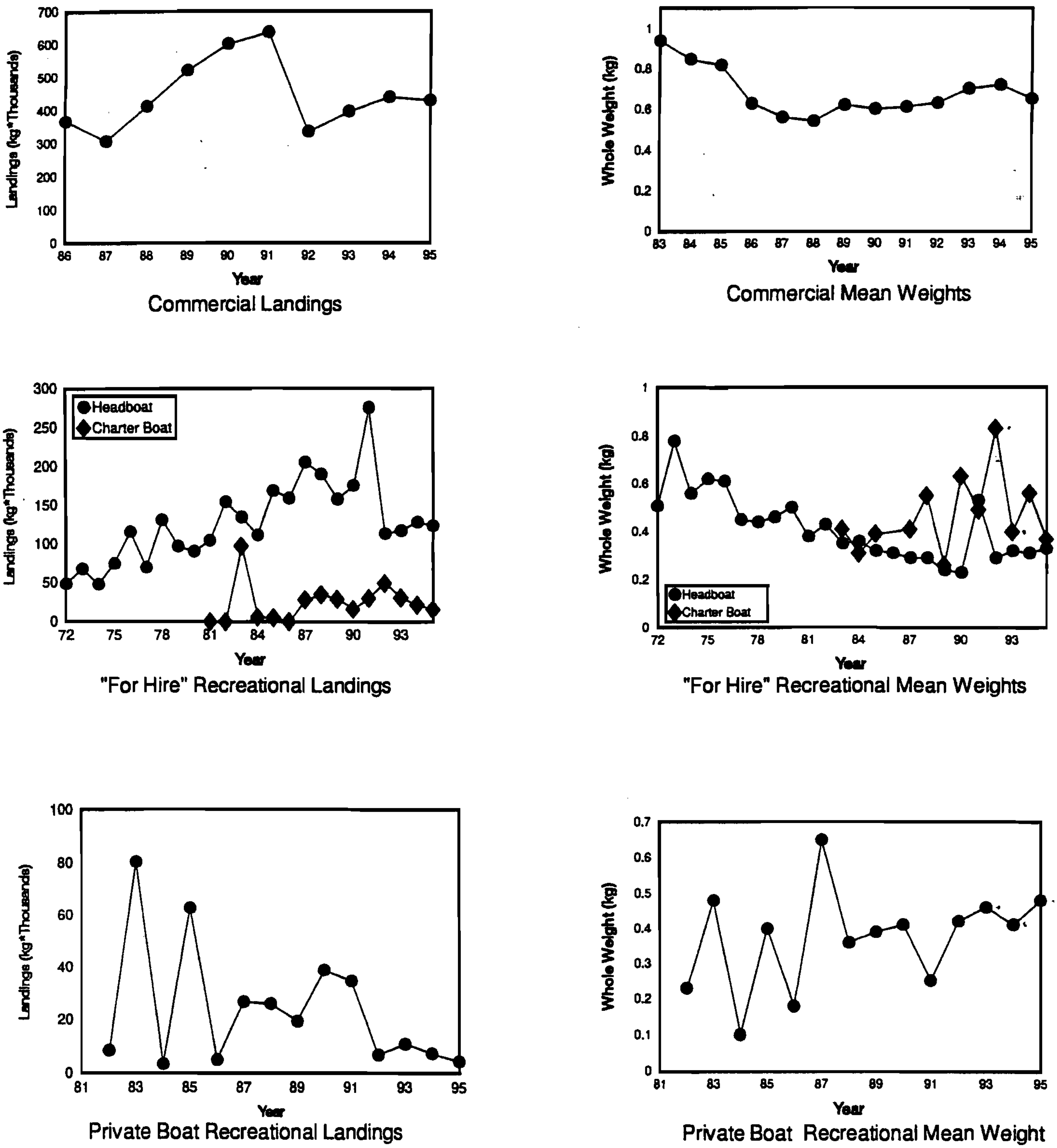
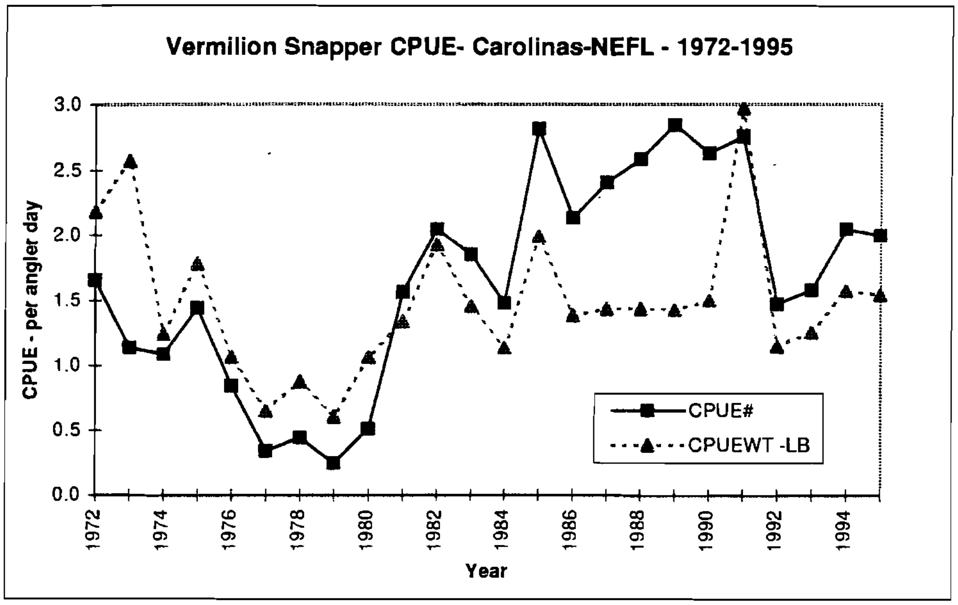


Figure 4 (continued).

Vermilion Snapper Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972				48576	0.51	569						
73				67762	0.78	278						
74				47679	0.56	672						
75				74872	0.62	702						
76				115354	0.61	667						
77				69538	0.45	514						
78				131201	0.44	917						
79				97192	0.46	699						
1980				90025	0.49	677						
81				104320	0.38	676	0			0		
82				154150	0.43	1397	0			8639	0.23	6
83		0.94	391	133985	0.35	2280	96935	0.41	24	80523	0.48	13
84		0.85	4921	111114	0.36	2316	5483	0.31	29	3466	0.1	1
85		0.82	5996	168814	0.32	2994	4759	0.39	15	62931	0.4	6
86	367342	0.63	8621	158448	0.31	3564	0			5109	0.18	20
87	305520	0.56	8022	204999	0.29	3383	27891	0.41	15	26823	0.65	23
88	411435	0.54	6266	189892	0.29	2495	35048	0.55	83	26059	0.36	38
89	519911	0.62	5625	157189	0.24	4776	28586	0.26	33	19478	0.39	19
1990	600253	0.59	6007	175439	0.23	5333	15828	0.63	38	38870	0.41	17
91	636444	0.61	10525	275691	0.53	4041	30213	0.49	24	34679	0.25	23
92	334510	0.63	6039	113216	0.29	2835	49421	0.83	117	6943	0.42	10
93	394686	0.7	8230	116665	0.32	3330	30585	0.39	60	11050	0.46	15
94	437910	0.72	7545	127754	0.31	5738	21354	0.56	75	7489	0.41	4
95	428182	0.65	9866	123314	0.33	4811	15506	0.37	75	4455	0.48	6

Figure 4 (continued).



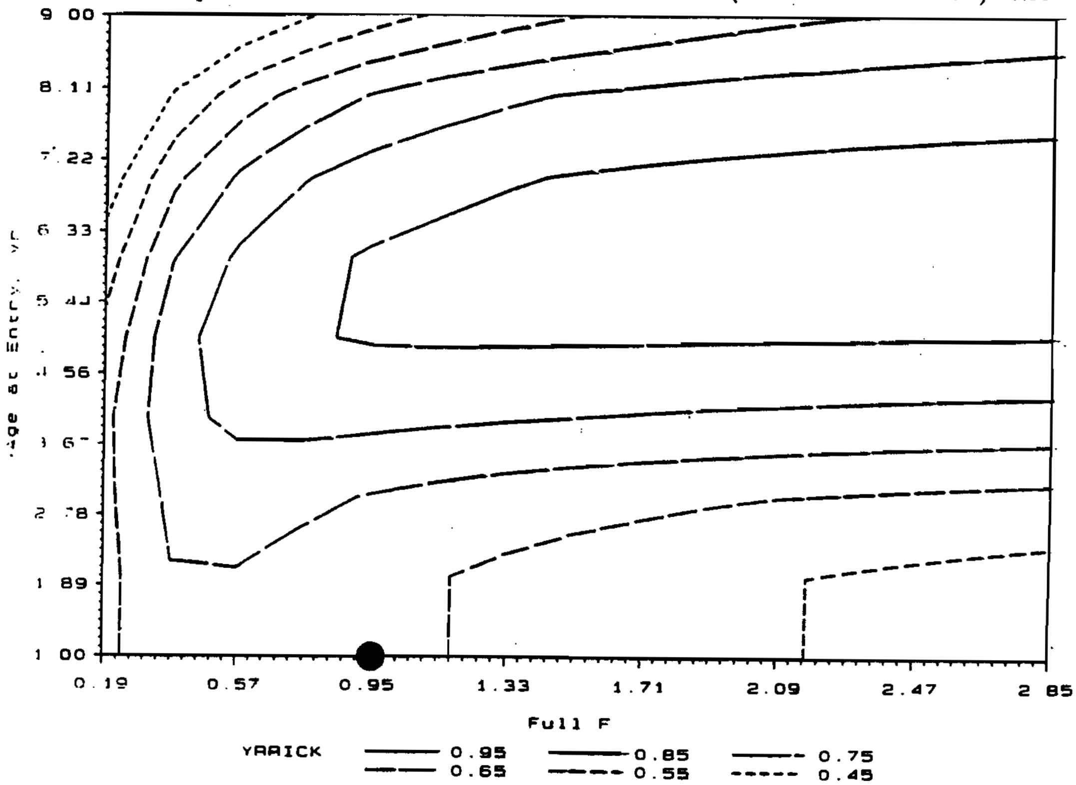
Trends in catch per unit effort - Vermilion snapper - Headboats - North Carolina-Northeast Florida

YEAR	NUMBER	WEIGHT (kg)	WEIGHT (lb)	ANGDAYS	CPUE#	CPUEWT-KG	CPUEWT -LB
1972	80844	48576	106867	48989	1.7	1.0	2.2
1973	65849	67762	149076	57917	1.1	1.2	2.6
1974	91197	47679	104894	84431	1.1	0.6	1.2
1975	133238	74872	164718	92450	1.4	0.8	1.8
1976	77269	44245	97339	91643	0.8	0.5	1.1
1977	31289	27346	60161	92570	0.3	0.3	0.6
1978	41459	37129	81684	93494	0.4	0.4	0.9
1979	20473	22854	50279	83425	0.2	0.3	0.6
1980	44801	42248	92946	87958	0.5	0.5	1.1
1981	234496	91593	201505	150471	1.6	0.6	1.3
1982	329378	140943	310075	161439	2.0	0.9	1.9
1983	316027	112806	248173	171130	1.8	0.7	1.5
1984	282015	98244	216137	191412	1.5	0.5	1.1
1985	435103	139850	307670	154654	2.8	0.9	2.0
1986	451155	133428	293542	211515	2.1	0.6	1.4
1987	548769	149115	328053	228211	2.4	0.7	1.4
1988	589264	148632	326990	228045	2.6	0.7	1.4
1989	472958	108005	237611	166459	2.8	0.6	1.4
1990	521782	135588	298294	198625	2.6	0.7	1.5
1991	533946	262091	576600	194029	2.8	1.4	3.0
1992	285190	100740	221628	193777	1.5	0.5	1.1
1993	287250	103747	228243	181736	1.6	0.6	1.3
1994	339052	118465	260623	165669	2.0	0.7	1.6
1995	321462	112998	248596	161137	2.0	0.7	1.5

Figure 4 (continued).

Present State   Figure 7

Ricker Yield per Recruit for VERMILION SNAPPER (SOUTH ATLANTIC): RM=0.00



Present State   Figure 8

Spawning Stock Ratio for VERMILION SNAPPER (SOUTH ATLANTIC):RM=0.00

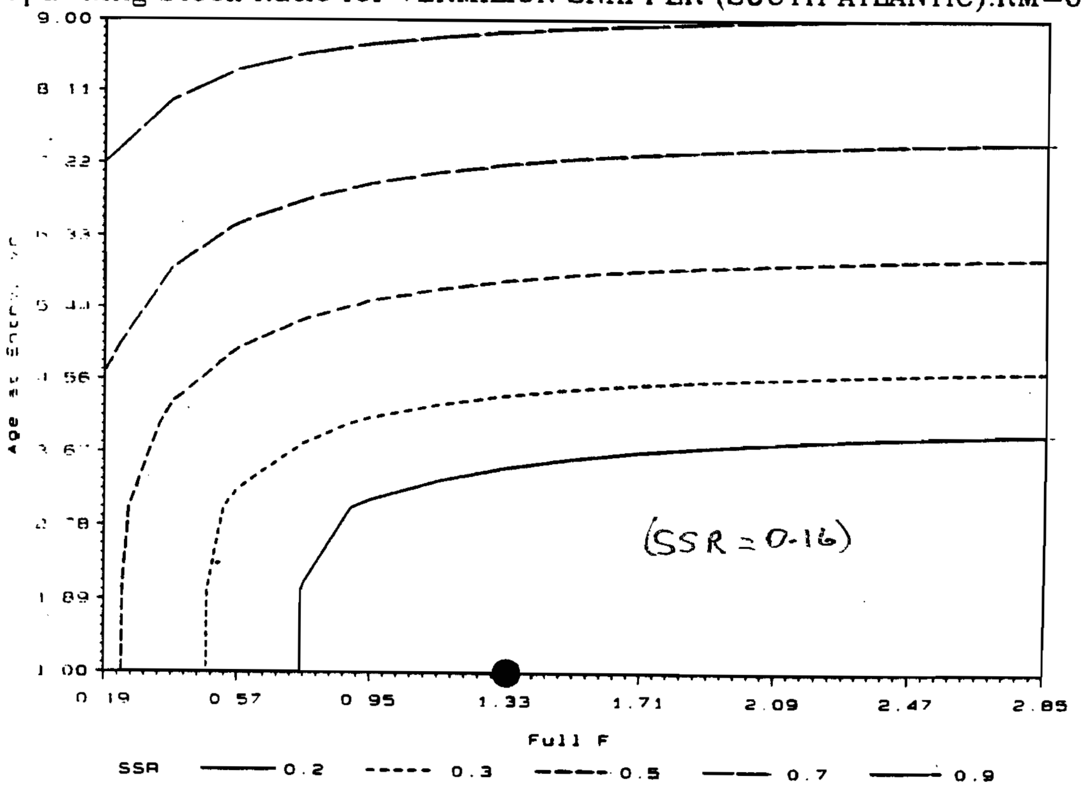
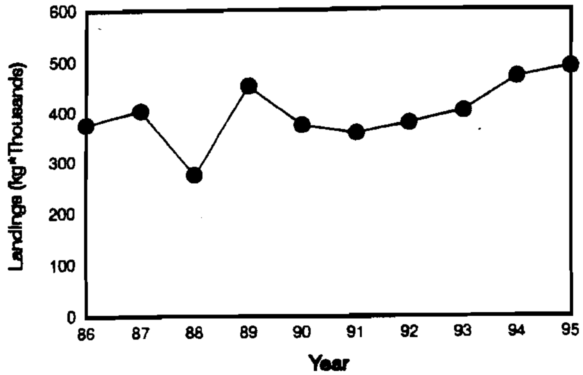
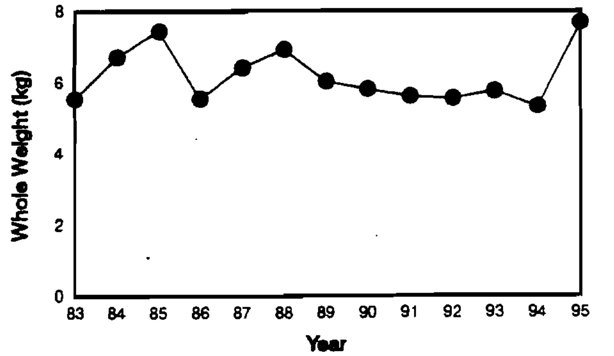


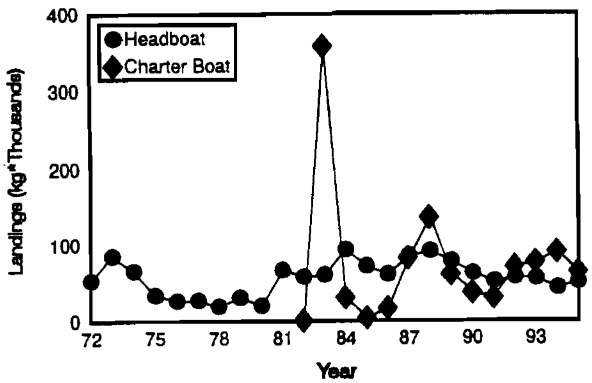
Figure 5. Trends in catches, CPUE and stock status for gag grouper (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).



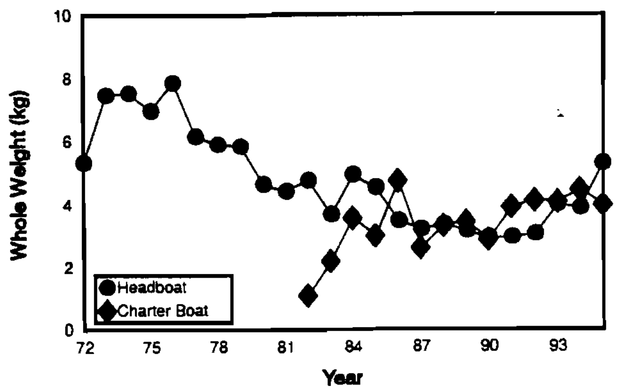
Commercial Landings



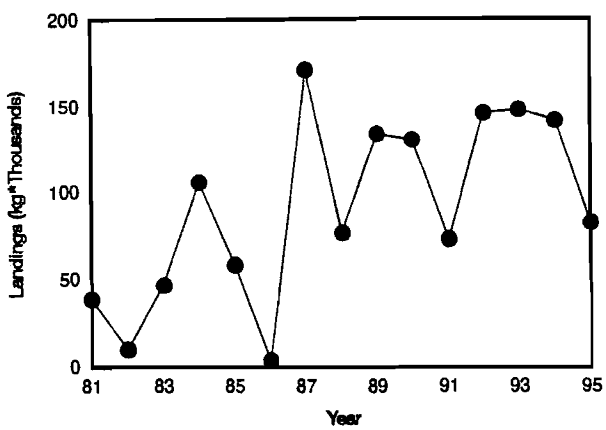
Commercial Mean Weights



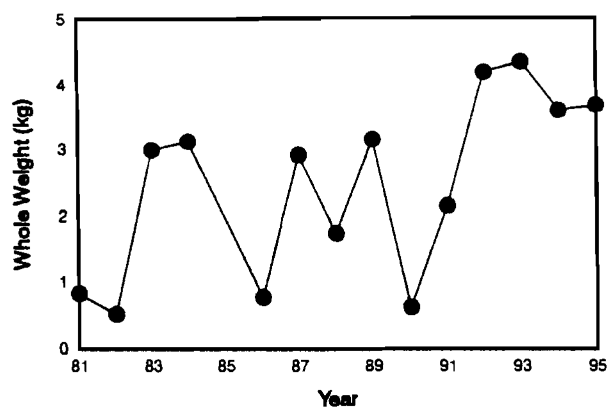
"For Hire" Recreational Landings



"For Hire" Recreational Mean Weights



Private Boat Recreational Landings

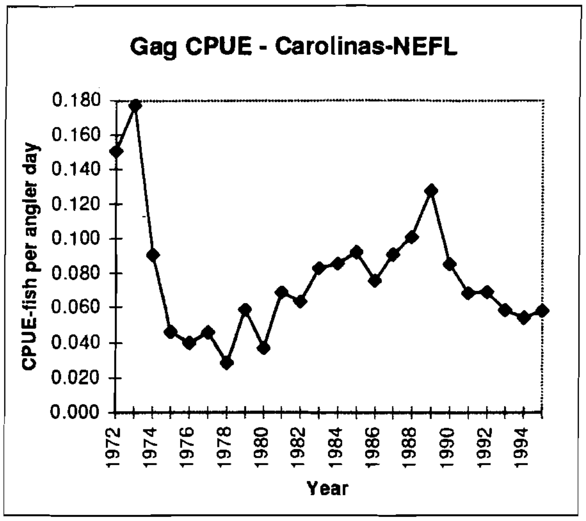


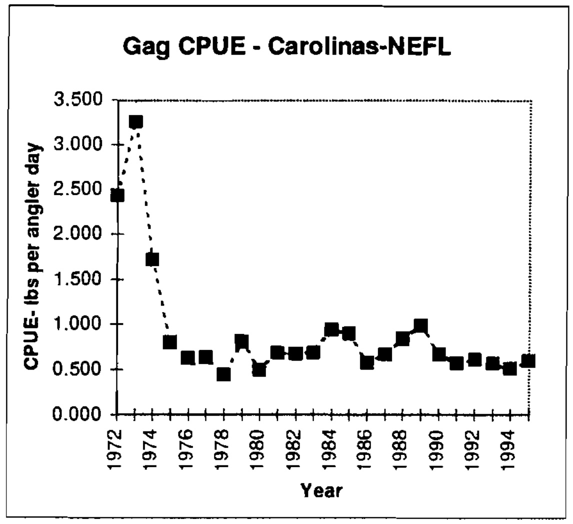
Private Boat Recreational Mean Weight

Gag Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972				54136	5.35	76						
73				85817	7.47	124						
74				65830	7.54	88						
75				33471	6.96	135						
76				26124	7.85	149						
77				26813	6.15	183						
78				18906	5.89	173						
79				30562	5.83	147						
1980				19543	4.63	175						
81				67130	4.42	225	0			38724	0.83	9
82				58007	4.76	296	1063	1.1	1	10149	0.52	5
83		5.55	116	59971	3.68	481	358219	2.2	2	46920	3	7
84		6.72	3443	93522	4.93	713	30118	3.58	17	105841	3.12	12
85		7.45	3738	71585	4.53	512	3739	3	5	58482	0.89	21
86	375587	5.54	2412	60839	3.35	382	16611	4.75	2	3835	0.77	15
87	403530	6.42	3463	84937	3.22	372	82972	2.63	24	170898	2.91	32
88	275452	6.91	1932	91269	3.38	288	135881	3.33	33	76638	1.73	17
89	452029	6.04	1794	78711	3.15	472	61410	3.46	30	133790	3.15	20
1990	374401	5.82	1329	62911	2.95	366	36969	2.88	65	130351	0.63	15
91	359031	5.62	1780	51674	2.94	184	30385	3.92	21	72870	2.15	30
92	380015	5.56	2354	56466	3.06	276	71019	4.13	75	146148	4.18	28
93	403785	5.77	2430	55053	3.98	282	76530	4.07	44	147849	4.33	33
94	469973	5.33	1741	43048	3.89	363	90232	4.47	65	141489	3.59	26
95	489416	7.68	379	50439	5.29	2571	63730	3.98	52	82070	3.67	22

Figure 5 (continued).





Trends in catch per unit effort - Gag - headboats- North Carolina-Northeast Florida

YEAR	NUMBER	WEIGHT (kg)	WEIGHT (lb)	ANGDAYS	CPUE#	CPUEWT-kg	CPUEWT-lb
1972	7366	54136	119099	48989	0.150	1.105	2.431
1973	10249	85817	188797	57917	0.177	1.482	3.260
1974	7671	65830	144826	84431	0.091	0.780	1.715
1975	4276	33471	73636	92450	0.046	0.362	0.796
1976	3634	26124	57473	91643	0.040	0.285	0.627
1977	4218	26813	58989	92570	0.046	0.290	0.637
1978	2653	18906	41593	93494	0.028	0.202	0.445
1979	4895	30562	67236	83425	0.059	0.366	0.806
1980	3253	19543	42995	87958	0.037	0.222	0.489
1981	10362	46910	103202	150471	0.069	0.312	0.686
1982	10246	49759	109470	161439	0.063	0.308	0.678
1983	14186	53842	118452	171130	0.083	0.315	0.692
1984	16346	81777	179909	191412	0.085	0.427	0.940
1985	14276	63017	138637	154654	0.092	0.407	0.896
1986	16029	55733	122613	211515	0.076	0.263	0.580
1987	20669	69403	152687	228211	0.091	0.304	0.669
1988	22952	87299	192058	228045	0.101	0.383	0.842
1989	21223	74240	163328	166459	0.127	0.446	0.981
1990	16911	60546	133201	198625	0.085	0.305	0.671
1991	13212	50390	110858	194029	0.068	0.260	0.571
1992	13384	53893	118565	193777	0.069	0.278	0.612
1993	10619	47402	104284	181736	0.058	0.261	0.574
1994	8892	38740	85228	165669	0.054	0.234	0.514
1995	9361	43788	96334	161137	0.058	0.272	0.598

Figure 5 (continued). Figure 30. Yield per recruit model for gag.

Ricker Yield per Recruit for GAG (S. ATLANTIC): 1993 (M=0.10).

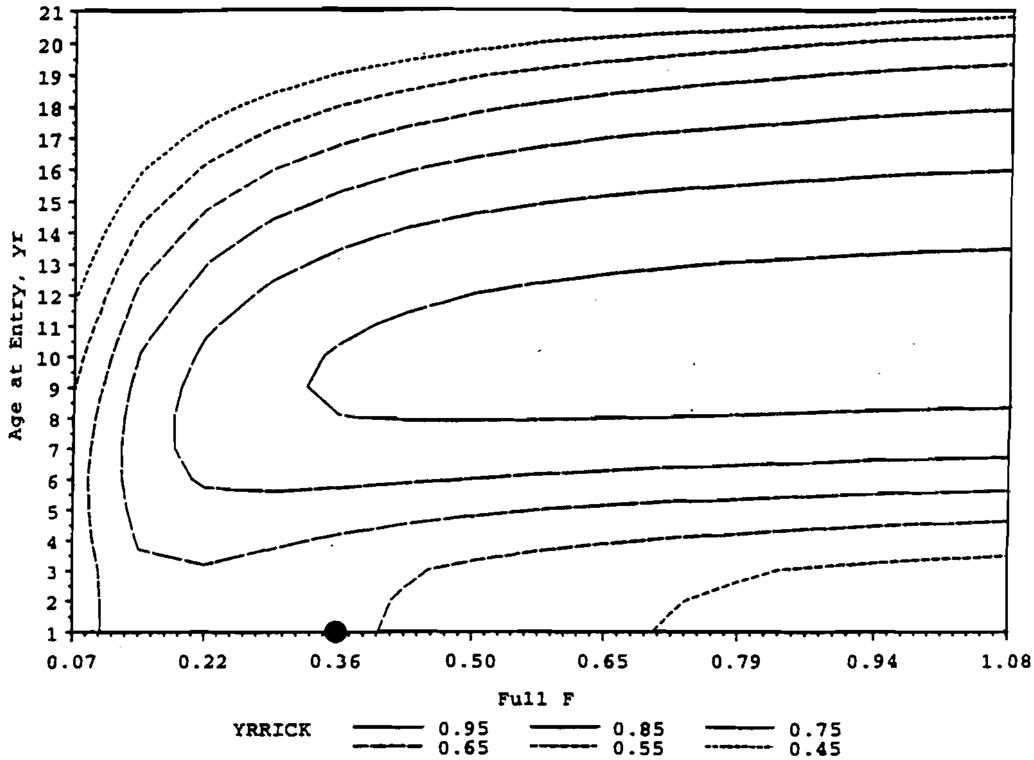


Figure 36. Spawning stock ratio for gag.

Spawning Stock Ratio for GAG (S. ATLANTIC): 1993 (M=0.10)

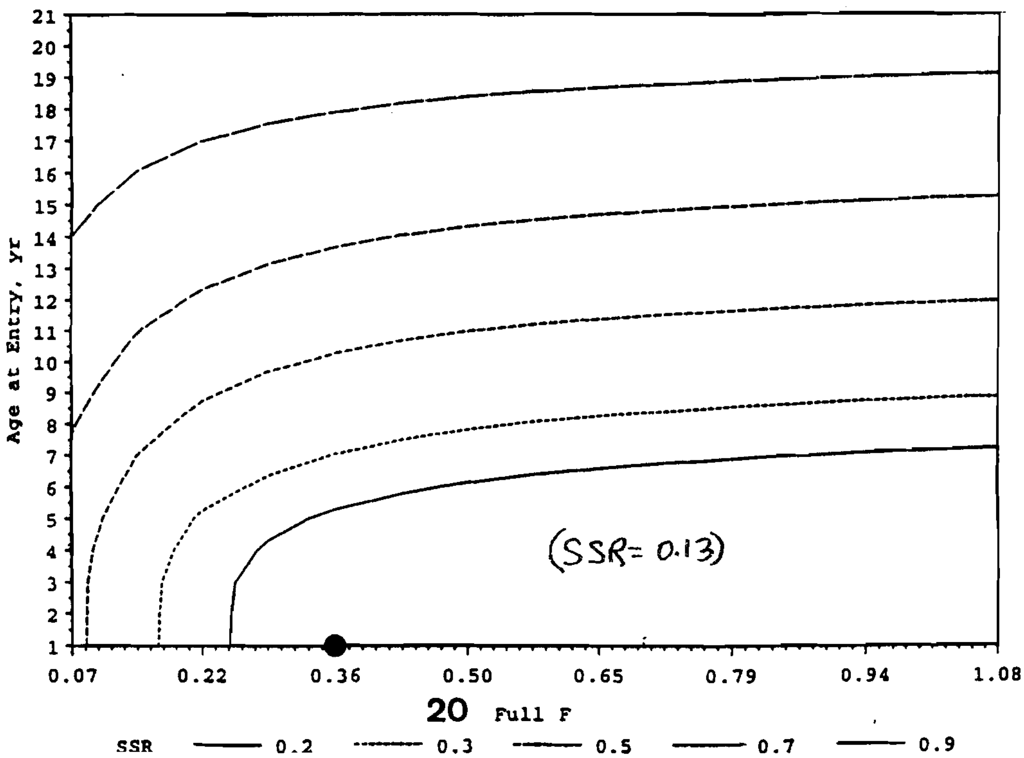


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Figure 6. Trends in catches, CPUE and stock status for black grouper (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).

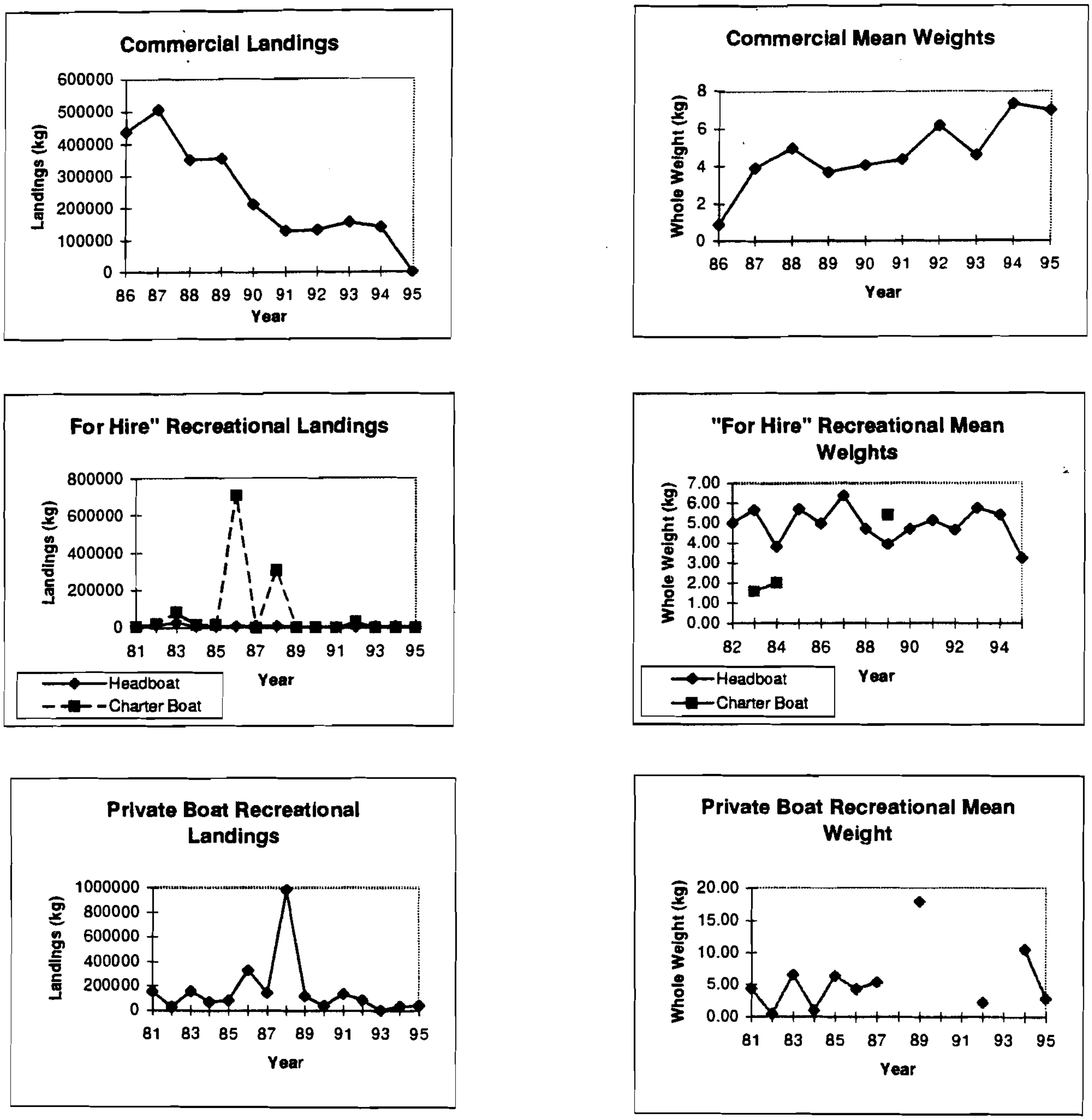
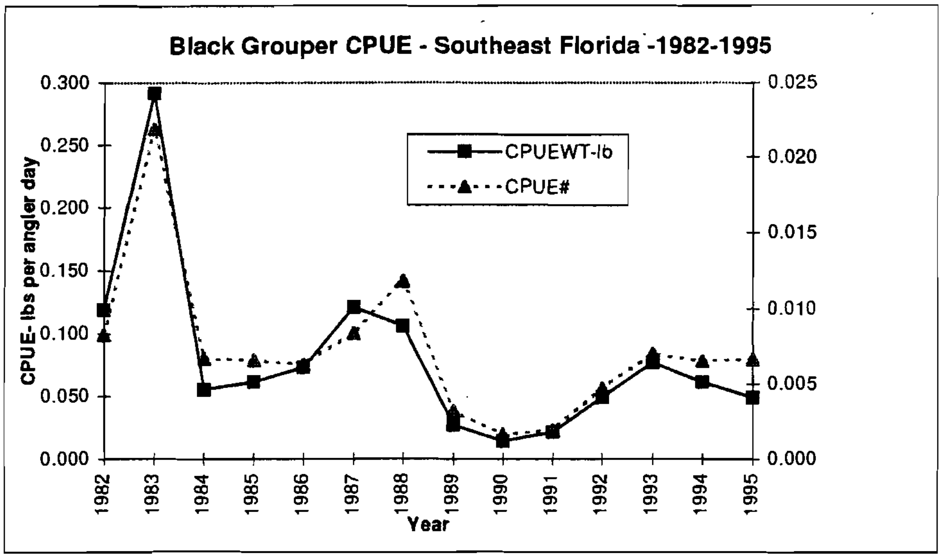


Figure 6 (continued).

Black Grouper Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972					11.07	4						
73						2						
74						6						
75												
76												
77					21.34							
78					5.55							
79					8.65	24						
1980					6.43	43						
81				6981	4.09	67	3920			150254	4.35	10
82				12295	5.01	42	18842			27056	0.42	3
83				25736	5.65	34	79944	1.59	8	156028	6.55	4
84		17.01	1	5120	3.80	48	15427	2.02	6	65755	1.05	3
85		21.17	4	5202	5.71	59	15318			79607	6.38	3
86	436756	0.89	3	6774	4.98	54	711021			326505	4.26	8
87	505425	3.87	135	12018	6.37	28	803			141577	5.38	6
88	350125	4.96	274	9353	4.69	17	305090			980737		
89	354232	3.68	191	2659	3.91	20	940	5.40	2	115285	18.00	1
1990	210440	4.06	312	1547	4.70	18	0			36833		
91	127947	4.36	77	2025	5.13	10	0			133037		
92	131724	6.16	89	3959	4.64	11	31203			84910	2.23	1
93	154386	4.57	127	5760	5.77	17	0			0		
94	140692	7.32	43	4966	5.41	20	0			30072	10.49	1
95	833	6.97	8	3362	3.25	14	0			42026	2.84	8

Figure 6 (continued).

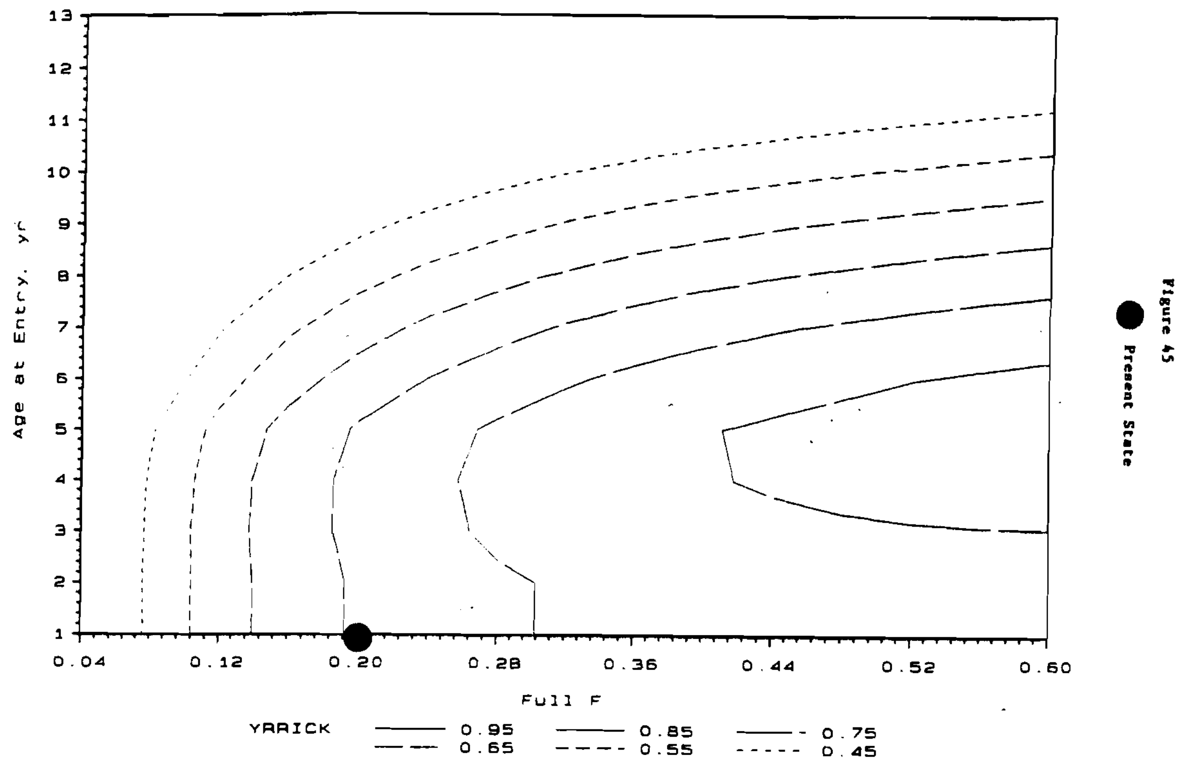


Trends in Catch-per-Unit Effort - Black Grouper - Southeast Florida

Year	NUMBER	WEIGHT (kg)	WEIGHT (lb)	ANGDAYS	CPUE#	CPUEWT-kg	CPUEWT-lb
1982	1871	12229	26905	226172	0.008	0.054	0.119
1983	4256	25731	56607	194364	0.022	0.132	0.291
1984	1297	4869	10712	193760	0.007	0.025	0.055
1985	1227	5202	11445	186398	0.007	0.028	0.061
1986	1291	6764	14881	203960	0.006	0.033	0.073
1987	1831	12018	26441	218897	0.008	0.055	0.121
1988	2276	9260	20372	192618	0.012	0.048	0.106
1989	684	2642	5812	213944	0.003	0.012	0.027
1990	373	1466	3224	224661	0.002	0.007	0.014
1991	373	1912	4207	194911	0.002	0.010	0.022
1992	814	3886	8550	173714	0.005	0.022	0.049
1993	1144	5725	12595	162478	0.007	0.035	0.078
1994	1157	4930	10846	177035	0.007	0.028	0.061
1995	1005	3358	7388	150957	0.007	0.022	0.049

Figure 6 (continued).

Ricker Yield per Recruit for BLACK GROUPER (ALL AREAS)



Spawning Stock Ratio for BLACK GROUPER (ALL AREAS)

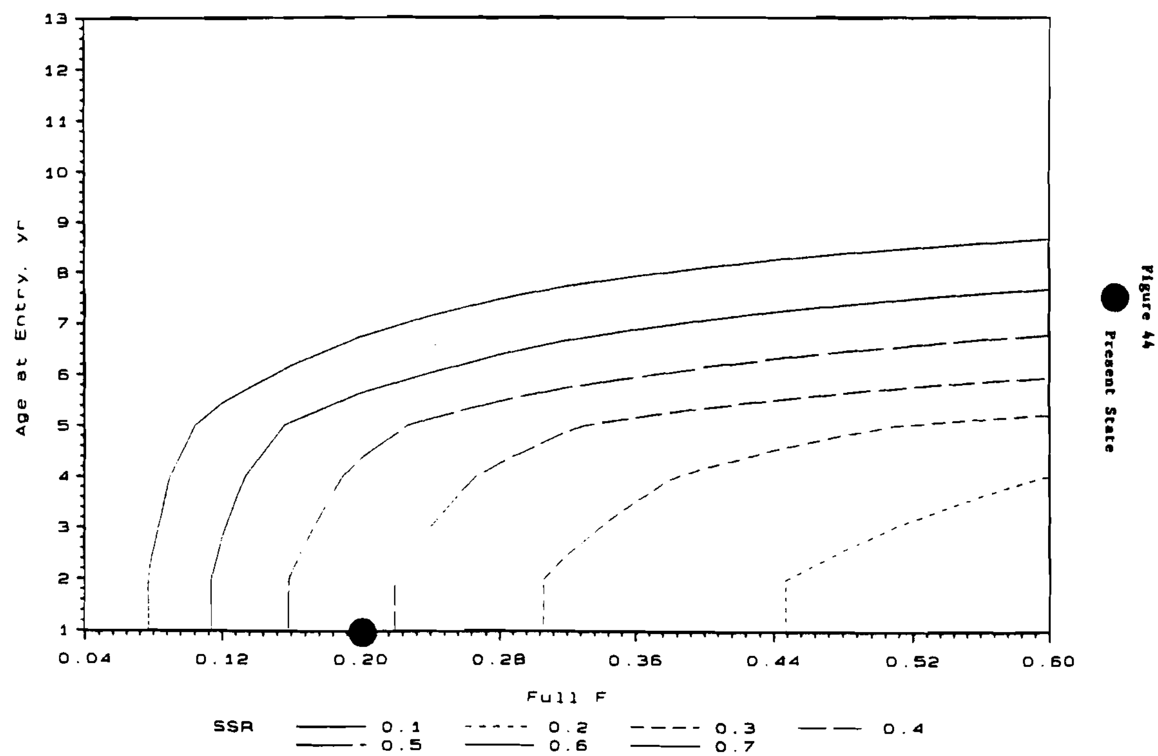
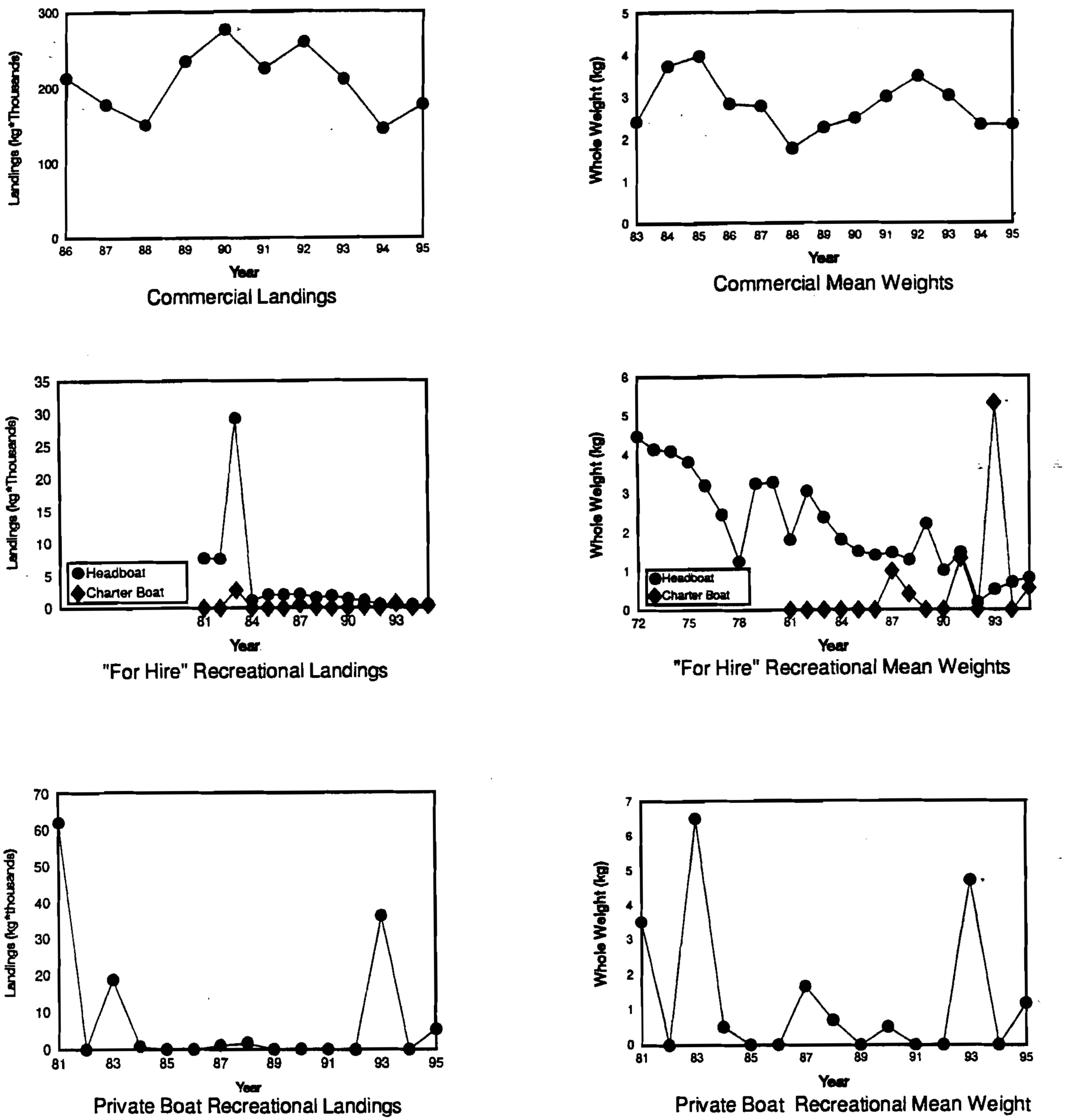


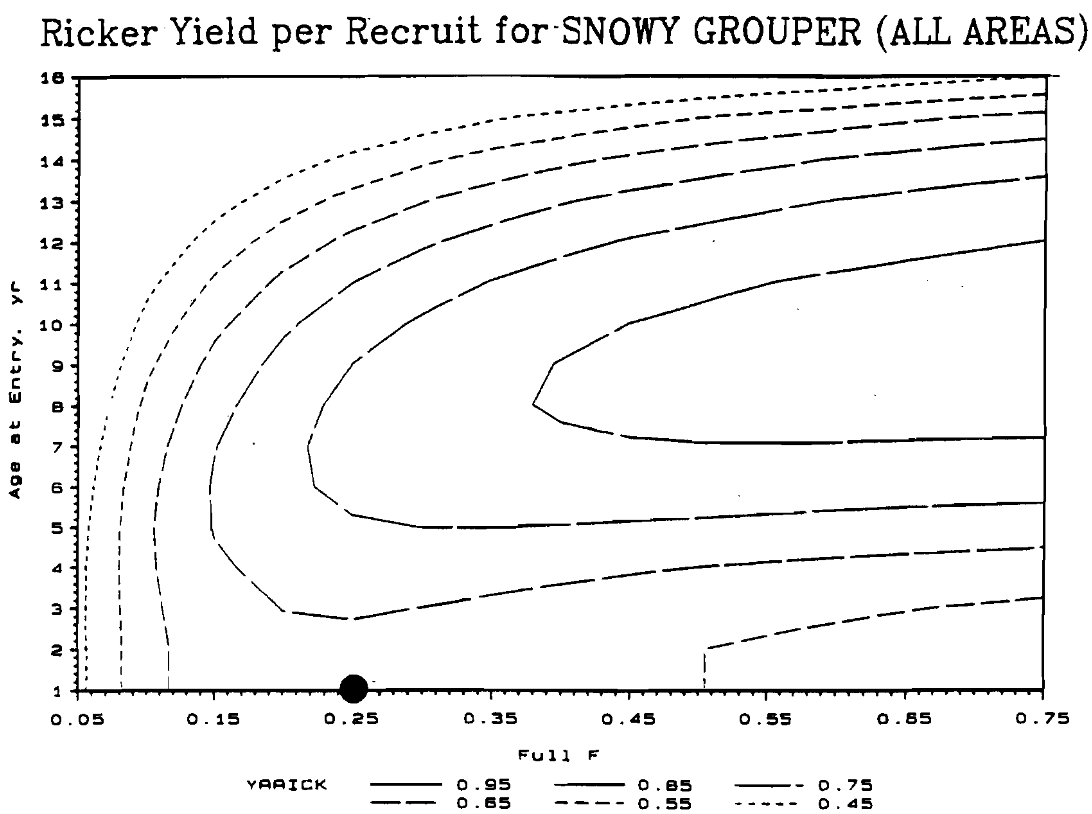
Figure 7. Trends in catches, CPUE and stock status for snowy grouper (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).



Snowy Grouper Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972					4.47	38						
73					4.14	27						
74					4.09	116						
75					3.81	104						
76					3.2	115						
77					2.46	62						
78					1.24	25						
79					3.24	25						
1980					3.28	29						
81				7647	1.79	32	0			62117	3.52	5
82				7520	3.05	11	0			0		
83		2.42	95	29147	2.37	33	2690			18711	6.5	1
84		3.73	1735	1100	1.79	6	0			824	0.5	1
85		3.97	3058	1962	1.49	38	0			0		
86	213755	2.84	2863	1919	1.39	46	0			0		
87	177876	2.78	1807	2002	1.47	20	497	1	1	1048	1.65	2
88	151069	1.77	1209	1487	1.27	23	45	0.4	2	1623	0.7	1
89	234473	2.26	1605	1827	2.21	51	0			0		
1990	276645	2.48	2394	1291	0.99	6	0			130	0.5	1
91	224907	2.99	2715	991	1.46	3	129	1.33	3	0		
92	259678	3.47	4628	397	0.18	2	0			0		
93	210905	3.01	7110	493	0.5	7	652	5.3	2	36142	4.7	1
94	144504	2.32	2689	331	0.69	16	0			0		
95	177039	1.59	5558	330	0.81	11	289	0.55	1	5378	1.17	5

Figure 7 (continued).



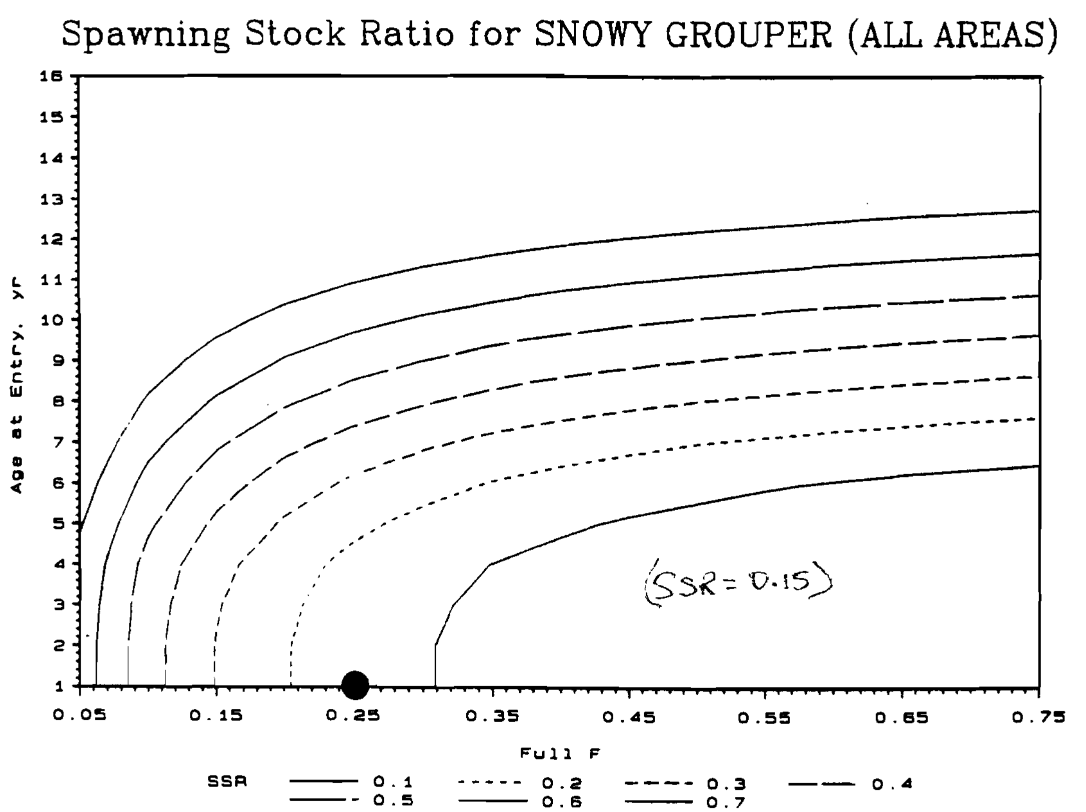
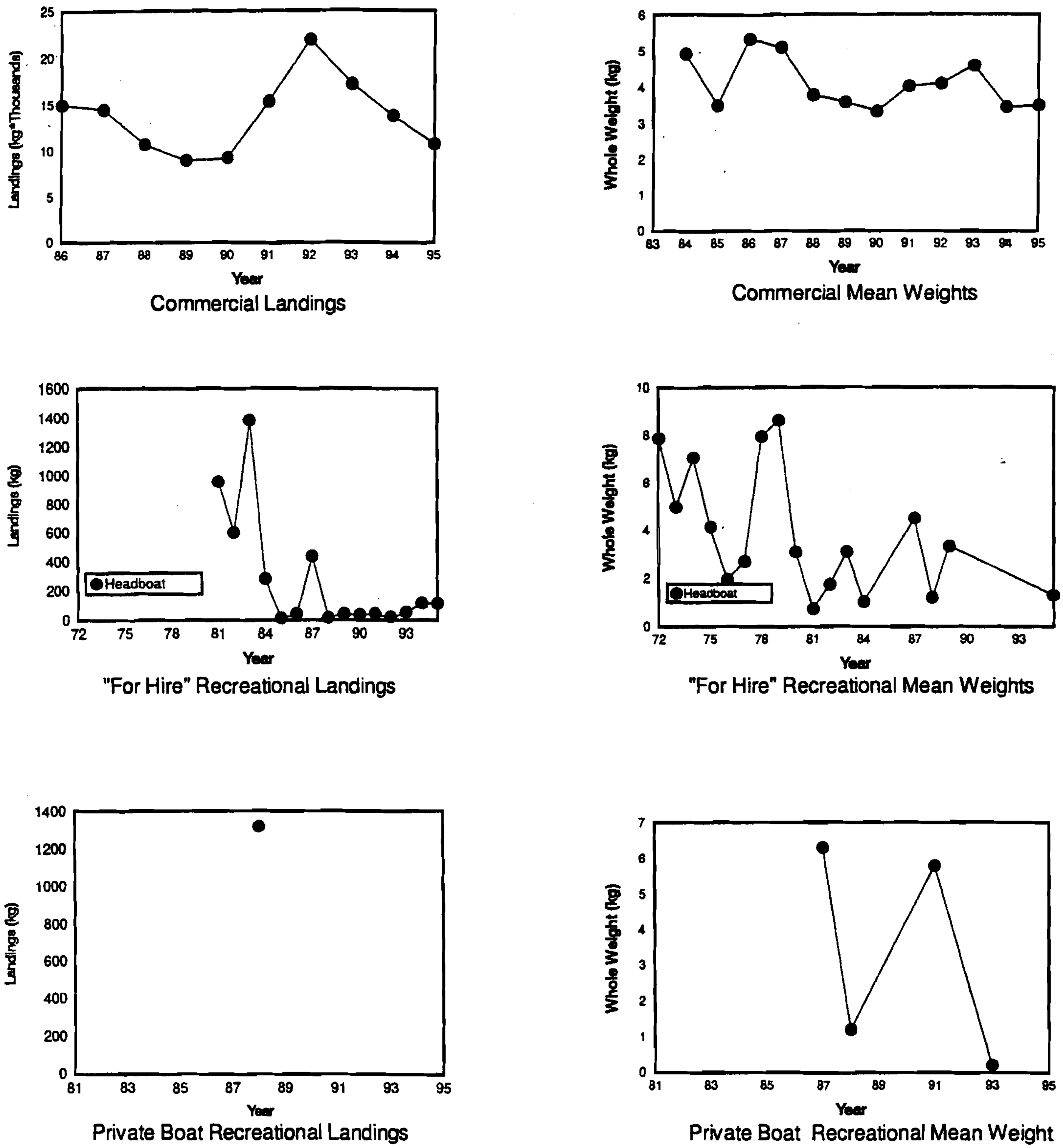


Figure 8. Trends in catches, CPUE and stock status for yellowedge grouper (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).



Yellowedge Grouper Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972					7.89	7						
73					4.99	2						
74					7.08	5						
75					4.14	17						
76					1.95	18						
77					2.71	3						
78					7.95	3						
79					8.63	5						
1980					3.08	2						
81				957	0.75	3	0			0		
82				599	1.75	1	0			0		
83				1381	3.11	5	0			0		
84		4.92	47	282	1.02	5	0			0		
85		3.51	102	12			0			0		
86	14982	5.34	387	43			0			0		
87	14461	5.1	102	436	4.5	1	0	6.3	1	0		
88	10707	3.79	97	16	1.2	1	0			1321	1.2	1
89	9028	3.86	43	43	3.34	2	0			0		
1990	9287	3.34	107	37			0			0		
91	15379	4.03	192	42			0	5.8	1	0		
92	21920	4.09	787	19			0			0		
93	17190	4.59	756	52			0			0	0.2	1
94	13806	3.45	135	118			0			0		
95	10775	3.49	94	113	1.29	1	0			0		

Figure 8 (continued).

Figure 9. Trends in catches, CPUE and stock status for tilefish (Source: J. C. Potts, C. S. Manooch, III and M. L. Burton, NMFS Beaufort Lab; April 1997).

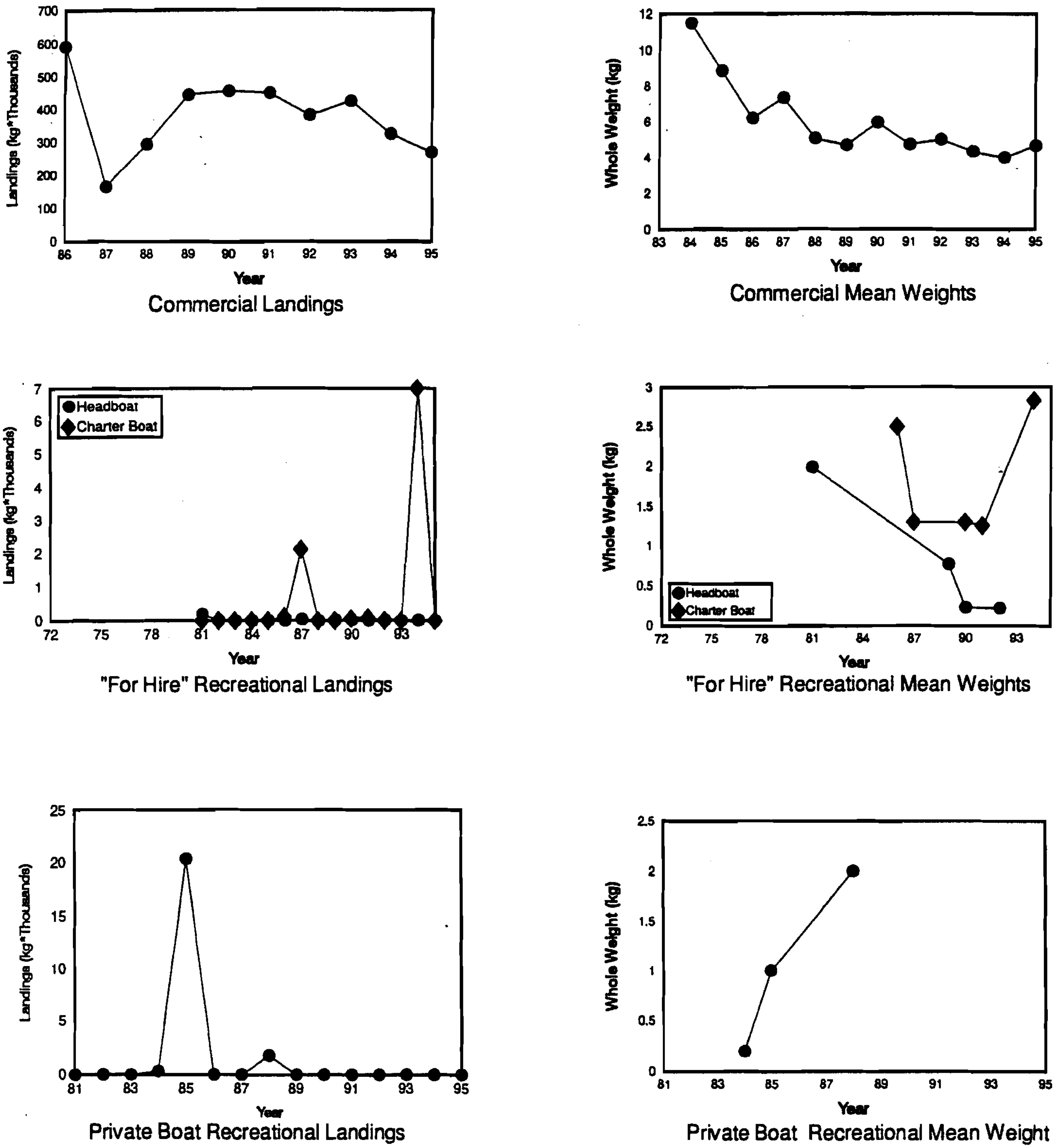
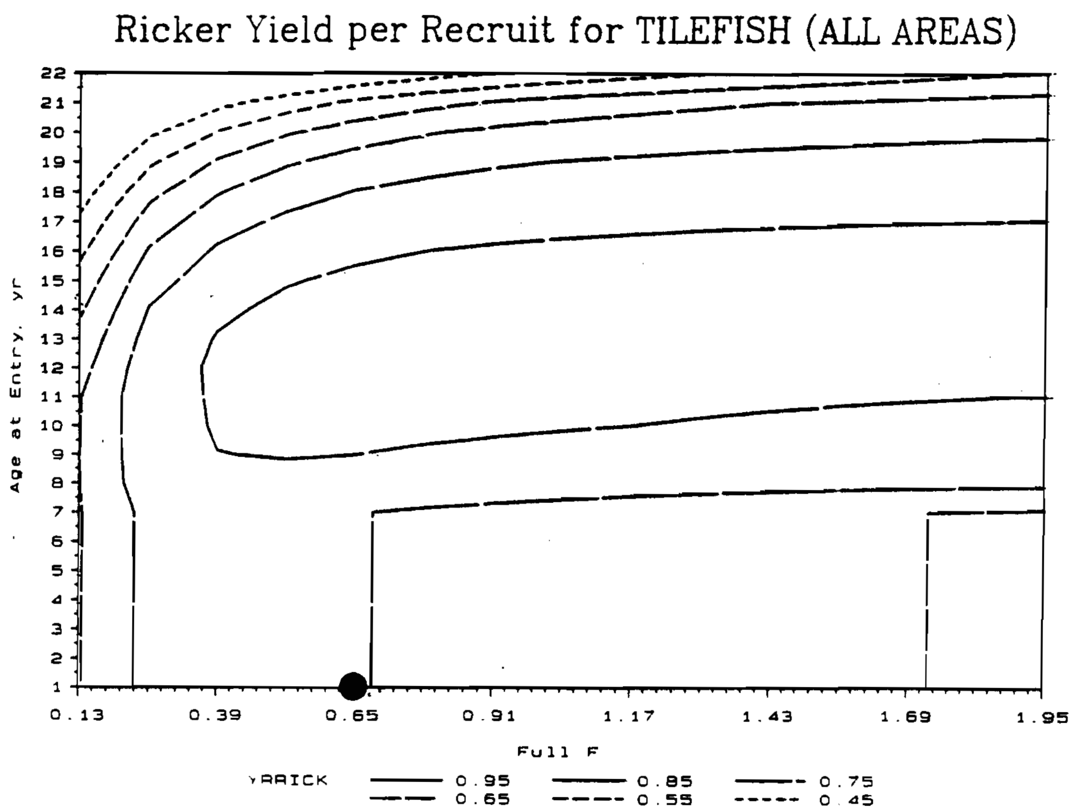


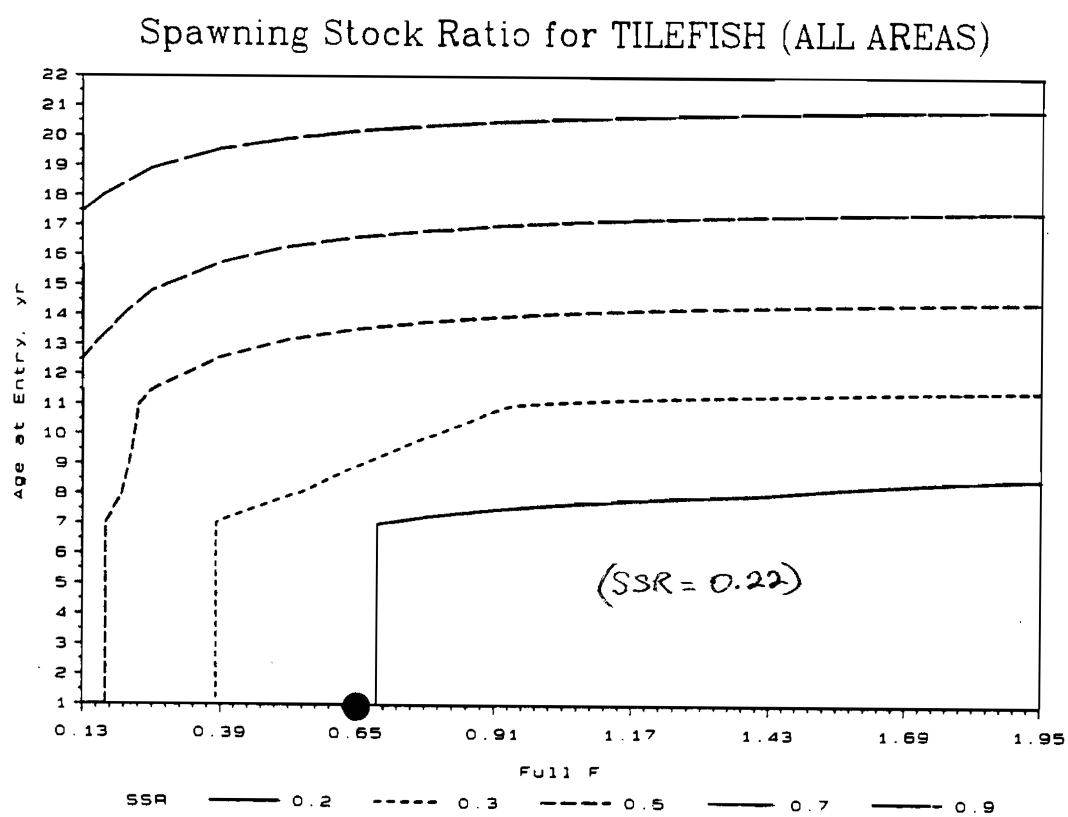
Figure 9 (continued).

Tilefish Data

	Commercial			Headboat			Charter Boat			Private Boat		
Year	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
1972												
73												
74												
75												
76												
77												
78												
79												
1980												
81				187	1.99	1	0			0		
82				8			0			0		
83							0			0		
84		11.49	291				0			330	0.2	1
85		8.86	109				0			20384	1	1
86	593073	6.19	4053				114	2.5	1	0		
87	166697	7.35	542	36			2142	1.3	2	0		
88	296643	5.07	1060				0			1799	2	1
89	446986	4.67	834	6	0.77	17	0			0		
1990	458372	5.95	755	3	0.23	14	62	1.3	1	0		
91	451465	4.72	6344				81	1.25	2	0		
92	359937	4.98	11667	12	0.22	1	0			0		
93	427224	4.29	29265				0			0		
94	326257	3.97	9536	5			6998	2.83	3	0		
95	269377	4.64	9604				0			0		

Figure 9 (continued).





3.5 Status of Snapper Grouper Habitat

The Council has adopted a general habitat policy and developed policy statements to address concerns and present recommendations on ocean dumping, dredging and dredge disposal, plastic pollution, oil and gas exploration, development and transportation, and submerged aquatic vegetation. The text of the policy statements are included in Section 8.3.

Section 8.2, Description of the Habitat Comprising the Management Unit, is a compilation of Habitat information contained in the original FMP (SAFMC, 1983), Amendment 1 (SAFMC, 1988), and Amendment 6 (SAFMC, 1993b). The sections have been combined and updated to reflect modification to the Council habitat policy and policy statements, more accurately reflect information on and the status of essential snapper grouper habitat. The policies presented were developed to provide guidance for resource managers in the protection and restoration of the environmental quality and habitat quantity in the South Atlantic region.

Essential snapper grouper habitat as defined in the reauthorized Magnuson-Stevens Fishery Conservation and Management Act is that which includes "water and substrate necessary to fish for spawning, breeding or growth to viability." The Council's definition of habitat mirrors the intent by stating that essential habitat is "the physical, chemical and biological parameters that are necessary for continued productivity of the species that is being managed." The objectives of the Council's policy will be accomplished through a short-term goal and recommendation of no net loss or significant environmental degradation of existing habitat. The Council's long-term objective is to promote net-gain of fisheries habitat through restoration and rehabilitation of the productive capacity of habitats that have been degraded, and the creation and development of productive habitats where increased fishery production is probable.

Essential snapper grouper habitat includes, but is not limited to, coral and coral reefs, live/hard bottom habitat, inshore tidal marsh, submerged aquatic vegetation, mangroves, and sargassum habitat. Therefore essential habitat for species in the snapper grouper management unit extends from inshore to offshore including pelagic sargassum habitat.

The available information on distribution of these habitat types in the South Atlantic region is presented in various fishery management plans including the associated environmental impact statement or environmental assessment: the distribution of coral, coral reefs and live/hardbottom habitat (GMFMC and SAFMC, 1982; SAFMC and GMFMC, 1994; and SAFMC, 1995); the distribution of submerged aquatic vegetation (SAFMC, 1995); and distribution of wetland habitat (SAFMC, 1993a).

3.6 The Effects of The Proposed Measures on Snapper Grouper Habitat

The proposed actions, and their alternatives, are not expected to have any adverse effect on the ocean and coastal habitats. In fact, the measures will protect essential ocean and coastal habitats by reducing the negative impact of the fishery on the environment.

Management measures adopted in the original management plan through Amendment 7 combined have significantly reduced the impact of the fishery on essential habitat. The Council has reduced the impact of the fishery and protected essential habitat by prohibiting use of poisons and explosives, prohibiting use of fish traps and entanglement nets in the EEZ, defining allowable gear, banning use of bottom trawls on live/hard bottom habitat north of Cape Canaveral, Florida, restricting use of bottom longlines to depths greater than 50 fathoms north of St. Lucie Inlet, Florida and prohibiting bottom longline use south of St. Lucie, Inlet, and only for species other than wreckfish, and prohibiting the use of black sea bass pots south of Cape Canaveral, Florida. These gear restrictions have significantly reduced the impact of the fishery on coral and live/hard bottom habitat in the South Atlantic region.

Management measures proposed in Amendment 8 include specifying allowable net gear and limiting the number of commercial fishermen which will protect habitat by reducing the quantity of gear used in the fishery.

Additional measures proposed in Amendment 9 include further restricting bottom longlines to retention of only deepwater species which will protect habitat by making existing regulations more enforceable. In addition, the requirement that black sea bass pots have escape vents and escape panels with degradable fasteners will reduce catch of undersized fish and insure that the pot, if lost, will not continue to "ghost" fish.

Measures adopted in the coral plan and shrimp plan have also protected essential snapper grouper habitat including the designation of the Oculina Bank Habitat Area of Particular Concern and the rock shrimp closed area (see Section 8.2 of this document and the FMP document (SAFMC, 1983) for additional information).

3.7 Habitat Responsibilities as Defined in the Magnuson-Stevens Fishery Conservation and Management Act

The following wording is taken directly from the Magnuson-Stevens Fishery Conservation and Management Act, Public Law 104-208 and reflects the new Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of essential fishery habitat. A new section was added in Amendment 8 as follows:

Section 305 (b) Fish Habitat.—(1)(A) The Secretary shall, within 6 months of the date of enactment of the Sustainable Fisheries Act, establish by regulation guidelines to assist the Councils in the description and identification of essential fish habitat in fishery management plans (including adverse impacts on such habitat) and in the consideration of actions to ensure the conservation and enhancement of such habitat. The Secretary shall set forth a schedule for the amendment of fishery management plans to include the identification of essential fish habitat and for the review and updating of such identifications based on new scientific evidence or other relevant information.

(B) The Secretary, in consultation with participants in the fishery, shall provide each Council with recommendations and information regarding each fishery under that Council's authority to assist it in the identification of essential fish habitat, the adverse impacts on that habitat, and the actions that should be considered to ensure the conservation and enhancement of that habitat.

(C) The Secretary shall review programs administered by the Department of Commerce and ensure that any relevant programs further the conservation and enhancement of essential fish habitat.

(D) The Secretary shall coordinate with and provide information to other Federal agencies to further the conservation and enhancement of essential fish habitat.

(2) Each Federal agency shall consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under this Act.

(3) Each Council—

(A) may comment on and make recommendations to the Secretary and any Federal or State agency concerning any activity authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by any Federal or State agency that, in the view of the Council, may affect the habitat, including essential fish habitat, of a fishery resource under its authority; and

(B) shall comment on and make recommendations to the Secretary and any Federal or State agency concerning any such activity that, in the view of the Council, is likely to substantially affect the habitat, including essential fish habitat, of an anadromous fishery resource under its authority.

(4) (A) If the Secretary receives information from a Council or Federal or State agency or determines from other sources that an action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by any State or Federal agency would adversely affect any essential fish habitat identified under this Act, the Secretary shall recommend to such agency measures that can be taken by such agency to conserve such habitat.

(B) Within 30 days after receiving a recommendation under subparagraph (A), a Federal agency shall provide a detailed response in writing to any Council commenting under paragraph (3) and the Secretary regarding the matter. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on such habitat. In the case of a response that is inconsistent with the recommendations of the Secretary, the Federal agency shall explain its reasons for not following the recommendations.'

A proposed rule was published by NMFS on April 23, 1997 specifying regional fishery management council guidelines for the description and identification of essential fishery habitat (EFH) in fishery management plans, adverse impacts on EFH, and actions to conserve and enhance EFH. In order to address the new essential fish habitat mandates in the Magnuson-Stevens Act, the South Atlantic Council has begun development of: (1) a habitat plan which will serve as a source document describing EFH; (2) a comprehensive amendment which will amend each of the existing fishery management plans, identifying and describing EFH and addressing impacts of fishing gear and/or fishing practices on EFH; and (3) a monitoring program for each fishery management plan to determine new impacts from fishing gear and/or fishing practices in an effort to minimize, to the extent practicable, the adverse impacts on EFH.

An interim final rule was published in the federal register on December 19, 1997 [62 Federal Register 66531]. These guidelines become effective on January 20, 1998 and written comments must be received by NMFS no later than February 17, 1998.

The South Atlantic Council will approve a habitat plan and comprehensive habitat amendment for public hearing at their March 1998 meeting. The Council will review public hearing and informal review comments at the September 1998 meeting, and approve both documents for formal submission to the Secretary of Commerce.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1. Introduction

This section presents management measures and alternatives considered by the Council and the environmental consequences of management. The final supplemental environmental impact statement (FSEIS), regulatory impact review (RIR), and social impact assessment (SIA)/fishery impact statement/FIS are incorporated into the discussion under each of the proposed action items.

Each action is followed by four sub-headings: Biological Impacts, Economic Impacts, Social Impacts, and Conclusion. These are self explanatory with the first three presenting the impacts of each measure considered. The Council's rationale for taking or rejecting the actions/options are presented under the heading "Conclusion". The Council's preferred action is listed below the Action number and options considered by the Council are indicated under the heading "Other Possible Options".

Alternatives that were eliminated from detailed consideration and/or were removed from consideration are included in Appendix I. This information is included to provide a complete record of all alternatives considered by the Council during development of and public hearings on Amendment 9.

4.2. Management Options

4.2.1 ACTION 1. Increase the red porgy minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen; establish a recreational bag limit of 5 red porgy per person per day; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.

These measures would apply to red porgy in or from the South Atlantic EEZ and red porgy in the South Atlantic harvested on board a permitted vessel (commercial or charter/headboat) without regard to where the red porgy is harvested or possessed. The prohibition on purchase would apply to all permitted dealers without regard to where the red porgy is harvested or possessed (i.e., state or federal waters). However, fish could be purchased from areas outside the South Atlantic provided there was an appropriate paper trail documenting the area of origin.

In Amendment 7 the council's position was to defer action on a red porgy quota until a new assessment became available. An updated stock assessment was presented to the council in June 1994 (Huntsman, Vaughan, and Potts, 1994). The following points are taken directly from the assessment report (**Note: The assessment results refer to SSR. Future assessments will refer to SPR.**):

- Evidence from every source: catch size, observations by fishermen, and analyses of size distributions, indicate that the red porgy is drastically overfished. The history of the red porgy fishery appears to follow what is now regarded as a classic three-phase pattern exhibited by fisheries for many species: (1) an early period of increasing catches as effort increased on a near-virgin stock, (2) a peak of yield as the stock reached maximum productivity, and (3) a period of declining catches (late 1980's and early 1990's) occurring as effort (including increased effectiveness of existing fishermen and vessels) became sufficiently high to take catches that limited the reproductive capacity of the stock.
- Population biomass of red porgy increased from 1972, the first year of study, to a peak of 130% to 190% (depending on M and analysis) of the initial value and declined almost continuously until 1992, the final year of study.

- The change in numbers of red porgy over time is very much like the change in biomass except that any peak in numbers occurred earlier (1975-1979 depending on the estimate of M). Peak population numbers were 112% to 132% of values in 1972; and population numbers declined more or less continually from the peak to 1992.
- The number of recruits to age 1 has irregularly declined since 1972. Depending on the estimate of M (M=0.2 or 0.3), recruitment by 1991 had decreased to 12% from 29% of that in 1972, and in 1992 recruitment was only 7% to 14% of the 1972 value.
- Fishing mortality in the fishery exhibits three historical phases: (1) in the 1970's F (for full recruited ages, 5-9) was nearly constant at values of 0.2 to 0.3, (2) in the early and mid 1980's F was nearly constant, but gradually increasing, at values, depending on M, of 0.4 to 0.6, and (3) in the late 1980's and early 1990's, F increased rapidly to 1.2 to 1.4, values five to six times those in the 1970's.
- For adult biomass and egg production, Spawning Stock Ratio (SSR) was 0.50-0.60 in the early high period, about 0.30 in the mid-period, and about 0.15 recently. Based on female biomass, SSR values were 0.60 - 0.70 in the 1970's, about 0.40 in the early 1980's and declined through the late 1980's and early 1990's to a value in 1992 near 0.20. Using male biomass resulted in the lowest estimates of SSR. Even in the 1970's values only ranged from 0.30 - 0.50. In the stable mid period male-based SSR was about 0.12, and present values are 0.20 - 0.40.
- In 1992, F was 1.28 and SSR was 0.13. To achieve a SSR of 0.30 the Council's current minimum size of 12" is insufficient and a 14" size limit is necessary. Reducing F by 73% to 0.35 (an approximate catch of 54 tons or 120,960 pounds) would provide an SSR of 0.30.
- Based on observations at sea, the mortality of red porgy released from commercial handline vessels is 9% (n=23) and from headboats is 18% (n=115). Overall mortality was estimated to be 13% and an additional 7% was added for deaths occurring after the fish return to the bottom; the approximate overall mortality rate for released red porgy is 20%. Thus, a size limit of 15" is required to achieve a SSR of 0.30.

Similar results were reported by Harris and McGovern (In Review). Their abstract is shown below:

> *Aspects of the life history of red porgy collected from the South Atlantic Bight (SAB) were examined for four periods (1972-1974, 1979-1981, 1988-1990, and 1991-1994) and annual changes in the age and growth of red porgy were described for data collected during 1988-1994. The life history of red porgy during 1972-1974 were assumed to represent that of an unfished population, although it was subject to light fishing pressure. From 1972-1974 to 1979-1981, the backcalculated size at age became slightly larger for ages 2-8. However, by 1988-1990 and 1991-1994, the backcalculated size at age for the same age classes were significantly smaller than in 1979-1981. In addition, the size at maturity and size at transition occurred at progressively smaller sizes from 1972-1974 through 1991-1994. The mean size at age (observed and backcalculated) declined for most ages between 1988 and 1994. Von Bertalanffy growth curves fitted to the mean backcalculated size at age for each year showed similar decreasing trends. The changes in life history may be a response to sustained overexploitation during the last 20 years that has selectively removed individuals predisposed towards rapid growth and larger size.*

Of particular concern are the impacts fishing can have on reproduction as reported by Harris and McGovern (In Review)(Note: Tables not included here.):

Our examination of 4,293 gonads (n=1,397 1979-1981; n=727 1988-1990; n=2,169 1991-1994) suggested that sexual transition was occurring at smaller sizes in the later periods. There was a significant increase (P<0.001) in the number of males with time (Table 4). However, in 1988-1990 and in 1991-1994 the proportion of males relative to the total number of fish sexed was significantly greater at smaller sizes than during 1979-1981 (Table 4). At 301-350 mm TL, male red porgy made up 24% of the fish sexed during 1991-1994 compared to 7% at the same size interval during 1979-1981 (P<0.001; Table 4). In 1979-1981, male red porgy constituted 12% of the fish examined at 351-400 mm TL compared to 32% in 1988-1990 (P<0.01) and 49% in 1991-1994 (P<0.001; Table 4).

Size at maturity of female red porgy has also changed. Female red porgy became sexually mature at smaller sizes in 1991-1994 than during 1979-1981. During 1991-1994, female red porgy first became sexually mature at 176-200 mm TL (mean age = 0.9). In 1979-1981, the first mature female was at 201-225 mm TL (mean age = 0.9)(Table 5). There were significantly more mature females (54%; P<0.001) at 251-275 mm TL (mean age = 1.9) in 1991-1994 than during 1979-1981 (27%; mean age = 1.7).

Size at age information is presented in Table 18. Red porgy undergo a sex change from female to male as they age. Females predominate at smaller sizes (less than 400 mm) while males predominate at larger sizes (greater than 450 mm). Approximately 37% of the females are mature at age 2, 81% at age 3 and 100% at age 4.

Table 18. Red Porgy Size at Age Relationship (Data Source: Gene Huntsman, NMFS Beaufort Lab, pers. comm.; March 1993).

Age	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Red Porgy TL (inches)	7.2	9.3	11.2	13.0	14.5	15.9	17.2	18.4	19.5	20.4
Red Porgy TL (mm)	184	237	285	329	369	405	438	468	495	519

Biological Impacts

Based on 1995 data, approximately 67% of the catch was harvested by commercial fishermen (155,000 kg or 342,000 lb) and 33% by recreational fishermen (78,000 kg or 172,000 lb). Figure 1 (page 48) contains information for additional years.

The red porgy minimum size limit of 12" was implemented in January 1992 (Snapper Grouper Amendment 4). The red porgy minimum size limit became 12" TL in the State of Florida effective March 1, 1994. Data from 1991 are included as a comparison of pre-size limit catches. During 1996, 6% of the recreational (MRFSS) catch, 10% of the headboat catch, and 5% of the commercial catch was below the 12" minimum size limit (Table 19). Although compliance with the minimum size limit is improving, non-compliance is negatively impacting stock rebuilding.

Impacts of size limits are presented in two ways. First, the direct reduction in landings by sector is examined using data for each species as shown for red porgy in Table 20. Then the overall reduction is determined by weighting the reduction for each sector by the landings for each sector. This methodology is described under the Economic Impacts heading for red porgy (see below) and is the same for each species. The total percent reduction in numbers of fish is then compared with the percent reduction in fishing mortality required to reach 30% SPR. Analyses for all measures assume the reduction in numbers of fish is equivalent to an equal reduction in fishing mortality (F). This assumption is valid as long as the number of trips does not increase significantly. We have no way of gauging the future number of trips. In addition, reductions in terms of weight are presented and used to gauge economic value based on price per pound.

A 14" size limit would reduce the recreational catch by 37% based on numbers of fish (Table 20). Based on 1995 data on numbers of fish, a bag limit of 5 in combination with a 14" size limit would reduce the charterboat and headboat catches by 36% and 61% respectively (Table 21). There are no bag limit savings for bag limits of 1-5 fish with size limits of 12-14" for the private/rental sector; the 14" size limit in conjunction with a 5-fish bag limit would reduce the private/rental boat catch by 33% based on numbers of fish (NMFS Beaufort Lab analyses of impacts, 1996). It should be noted that increasing the size limit would result in about a two year loss in yield before the increased size limit would produce a weight gain.

The size limit will reduce the commercial catch by 40% based on numbers of fish (Table 20). Closure of the commercial fishery during March and April will reduce the commercial catch by 25% based on numbers of fish (Table 22).

To achieve a transitional SPR of 30% (overfished level), total fishing mortality must be reduced by 65%. To achieve the long-term goal of 40% static SPR, fishing mortality must be reduced by 75%. The proposed combination of recreational and commercial measures will reduce the commercial catch by 65%, the recreational catch by 50%, and the total catch by 59% based on numbers of fish.

Table 19. Percent of Red Porgy Catch Below Legal Size Limit. (Source: Mays and Manooch, 1997).

Year	Headboat	Recreational (MRFSS)	Commercial
1996	10%	6%	5%
1995	8%	30%	5%
1994	11%	37%	5%
1993	13%	6%	6%
1992	24%	66%	NO DATA
1991	32%	51%	24%

Table 20. Red Porgy Catch Reduction By Size Limits. (Source: 1995 NMFS Beaufort Lab).

Size Limit TL (in)	NUMBER			WEIGHT		
	Commercial Cumulative %	Recreational Cumulative %	Total Cumulative %	Commercial Cumulative %	Recreational Cumulative %	Total Cumulative %
12	4.91	5.91	5.06	2.24	2.86	2.33
13	21.87	20.79	21.70	12.07	12.03	12.06
14	**39.55**	**37.29**	**39.20**	**24.85**	**24.86**	**24.85**
15	60.18	89.99	64.69	43.15	75.14	47.70
16	73.72	96.08	77.10	57.74	82.20	61.22
17	85.17	98.42	87.16	72.42	85.43	74.27
18	90.19	99.55	91.59	80.10	87.28	81.12
19	94.26	99.61	95.05	87.38	98.99	89.03
20	98.82	99.73	98.94	96.90	99.26	97.23
21	99.57	100.01	99.62	98.72	99.98	98.89
22	99.86		99.87	99.53		99.59
23	99.94		99.94	99.78		99.80
24	99.97		99.96	99.78		99.89
25						
26	100.00		99.98	100.01		100.00

Table 21. Reduction in Landings from Size and Bag Limits. Red Porgy 14" Size Limit from 1995 MRFSS Data. (Source: R. L. Dixon et al, NMFS Beaufort Laboratory, April 1997).

BAG LIMIT	HEADBOAT		CHARTER BOAT	
	% REDUC. #	% REDUC. WT.	% REDUC. #	% REDUC. WT.
1	69.0	56.3	64.8	63.4
2	63.3	49.3	48.5	44.1
3	61.6	47.2	41.6	35.9
4	60.8	46.1	38.4	32.1
5	**60.5**	**45.7**	**35.9**	**29.2**

Table 22. Monthly Landings of Red Porgy in 1995 for the entire South Atlantic Region from the General Canvass Database. Source: Linda Hardy, NMFS Beaufort Laboratory, October 10, 1997.

MONTH	WEIGHT (LBS)	CUM. WEIGHT	# OF FISH
JANUARY	18,549	18,549	12,366
FEBRUARY	24,003	42,552	16,002
MARCH	55,614	98,166	37,076
APRIL	30,823	128,989	20,549
MAY	28,504	157,493	19,003
JUNE	38,387	195,880	25,591
JULY	51,874	247,754	34,583
AUGUST	33,729	281,483	22,486
SEPTEMBER	15,583	297,066	10,389
OCTOBER	12,435	309,501	8,290
NOVEMBER	16,595	326,096	11,063
DECEMBER	19,404	345,500	12,936
TOTAL	**345,500**		**230,333**
MARCH & APRIL CLOSURE	**Av. wt. = 1.50 pounds** (from Figure 1)		
Total savings (lbs):	**55,614 + 30,823 = 86,437**		
Total savings (# of fish):	**37,076 + 20,549 = 57,625**		
% reduction (# of fish):	**57,625/230,333 = 25%**		

Economic Impacts

Commercial fishermen would incur a 40% reduction (in numbers of fish) in landings due to the size increase alone in the first year (Table 20). Based on 1995 (Trends database), this could result in reduced landings of 137,102 pounds ($164,500 in gross revenue from red porgy sales) in the first year. The average exvessel price is $1.20 per pound (1995 Snapper Grouper Commercial Logbook Report). The March and April closure would result in a 25% decrease (in numbers of fish) in landings for commercial fishermen in the first year based on 1995 landings (General Canvass; Table 22). This is equivalent to a reduction of 86,437 pounds ($104,000) of fish in the first year. Thus, the total reduction to commercial fishermen as a result of the combined measures is likely to be 65% or 223,539 pounds of fish with an estimated ex-vessel value of $268,000.

It is not known to what extent fishermen would be able to compensate for a reduction in red porgy landings by increasing fishing effort on other species. However, it is possible that fishermen are getting to the point where no substitutes are available because virtually all of the species have a number of restrictive regulations in place or contemplated to be put in place. Assuming that some fishermen may be able to switch to alternative fisheries, this would be done at a cost to them because the alternative fisheries are second best by definition. Also, their switching would be at a cost to the fishermen currently targeting the alternative species.

The extent of the impact on the recreational fishery would depend on the number of recreational fishermen targeting red porgy. If fewer target red porgy, the impact would be less than if a large number target this species. Based on 1995 data, a 14" size limit in conjunction with a 5-fish bag limit would reduce the private/rental boat catch by 33% in numbers of fish in the first year (Bob Dixon's April 1997 Report). For the headboat category, catch would be reduced by 61% in numbers of fish in the first year (Table 21). Total catch for the charterboat sector would be reduced by 36% in numbers of fish in the first year (Table 21). The combined catch for the recreational sector would be reduced by 50% in numbers of fish in the first year. Using 1995 landings data for both sectors (Trends and General Canvass database), total catch for the red porgy fishery would be reduced by 59% in numbers of fish in the first year.

Social Impacts

Support for changing the size limit was mixed during the two sets of public hearings held to address this issue. Many people commenting suggested a smaller size limit than the 14" proposed originally during public hearings for Amendment 8. There was some support for a 5 fish bag limit expressed in several of the public hearings. Because the reductions will be substantial, the overall social impacts from increasing the size limit to 14" and imposing a 5 fish bag limit will depend upon the ability of fishermen to adjust to such an action.

If commercial fishermen can easily substitute another species, or replace lost income, they may see benefits to such an increase as the stock rebounds over time. Red porgy is an important species for commercial fishermen in the northern area. Species substitution may not be easy as their dependence upon this particular fishery may be seasonal and important to the household or business at that time. If substitution is not easy, fishermen may increase their effort on this species. Where that effort shift would occur, is unclear as most snapper grouper fishermen hold a variety of permits. There will be a moratorium imposed on issuing king mackerel permits once Amendment 8 to the FMP for Coastal Pelagic Resources is implemented that is retroactive to October, 1995. However, with over 1,300 king and Spanish mackerel permits for the south Atlantic in 1994, it is likely that most snapper grouper fishermen who would shift their effort to mackerel already hold the necessary permit and would be eligible under the moratorium. The coastal pelagic fisheries could see substantial effort increases with this action, in addition to others within this amendment.

The combined impact on commercial fishermen of this measure with other measures proposed in this amendment could be substantial. There is the possibility that some individuals whose business has been operating on the margin may be forced to leave if alternative fisheries or other means of substituting for lost income are not readily available. Their ability to enter other fisheries will depend upon their present capability to diversify their fishing practices. Other alternatives for replacing lost income will depend upon the ability of fishermen or other household members to take on any or additional responsibilities for the household income. That capability is certainly tied to the availability of work and the possession of individual skills needed for jobs that are available. Many fishing communities are located in rural areas where job opportunities are limited, although, fishermen often have skills that are compatible with many of the short term and/or part time work opportunities available in rural areas. The key is whether those opportunities will exist at the same time fishermen will be in need of them.

Recreational fishermen may be satisfied with a 5 fish bag limit, but, this will depend upon past fishing practices and whether or not they have become accustomed to keeping larger numbers of red porgies. Bag limits are an acceptable form of management to recreational fishermen as long as that limit does not go below a certain preference level. That preference level is species specific and may vary according to region. From previous public comments, it seems that recreational fishermen may be satisfied with a 5 fish bag limit on red porgy as there was some support for it shown during public hearings. There will likely be species substitution once fishermen have reached their bag limit, thereby increasing pressure on other species, or possibly high-grading for larger fish. Which species would act as a substitute for red porgy is not known, but will likely be other species in the snapper grouper complex that are also overfished.

This action will likely have the greatest impact in the headboat/charter boat sectors with 61% and 36% reductions in numbers of fish respectively. Although there was no clear consensus from the public hearings, many fishermen from the northern areas indicated that a 14" size limit for red porgies may be too strict; a five fish bag limit did receive support. Charter and headboats can always target other fish, however if porgies continue to be caught, release mortality may become a factor.

Conclusion

The Council's preferred option in the public hearing draft of Amendment 8 was a 14" TL size limit for both recreational and commercial fishermen and a bag limit of 2 red porgy. Based on comments that the impacts were too great, the Council modified their preferred option to a 13" TL size limit and a 2-fish bag limit in the public hearing draft of Amendment 9. Additional commercial restrictions were evaluated under Action 11 in the public hearing draft of Amendment 9.

Red porgy were documented as overfished in 1991, and the Council established a rebuilding timeframe of 10 years or by the year 2001. Using SPR as the measure of stock status precludes the production of yield streams which would allow the Council to project which year the red porgy stock would be rebuilt. Such yield streams are available from yield-per-recruit analyses. The Council has requested the NMFS Southeast Fisheries Science Center to explore techniques to provide projections of yield streams. Results of such projections were not available at the August 1997 Council meeting. Also, at the August 1997 meeting, the Council was informed by NMFS that the proposed 20% overfishing level included in Snapper Grouper Amendment 8 would be disapproved. Further, in finalizing Snapper Grouper Amendment 9, the Council should propose actions that would be expected to rebuild overfished species above the 30% SPR level within 10 years. Recent guidance from NMFS indicates year one begins upon implementation of measures proposed to restore a stock above the overfished level. In this case that would be sometime in 1998. The red porgy stock will have to be rebuilt by 2008.

Fishing mortality needs to be reduced by 75% to achieve the long-term goal or optimum yield (OY) of 40% static SPR and by 65% to reach the short-term goal (overfished level) of 30% transitional SPR. The combined 14" TL recreational and commercial size limit, 5-fish bag limit for the recreational fishery, and March/April commercial closure reduces the commercial catch by 65% and the recreational catch by 50%. The total catch would be reduced by 59% which is 6% less than the necessary reduction to achieve 30% SPR.

It is important to remember that the SPR estimate of 13% for red porgy the Council is working from is based on data only through 1992. Because the results of management measures to reduce fishing mortality on red porgy (that have been in place since 1991) have not been factored into a subsequent stock assessment, the Council believes the SPR estimate of 13% is low. The Council requested an updated assessment which would include more years of data under measures implemented in 1992 (Snapper Grouper Amendment 4) and has been told by NMFS the assessment would not be available until November 1998. Given that we do not actually know the current SPR but believe it to be greater than 13%, the Council concluded the proposed actions would achieve the target reduction and meet the mandates of the Magnuson-Stevens Act to rebuild the red porgy stock above the overfished level. Also, some additional reductions in fishing mortality may occur through implementation of Snapper Grouper Amendment 8 which established a limited entry program.

The Council will monitor red porgy stock status and evaluate the 1998 updated stock assessment with data through 1997. If additional measures are necessary to rebuild above 30% transitional SPR and ultimately to 40% static SPR, the framework will be used to implement additional measures.

Other Possible Options for Action 1:

Option 1. No Action. Maintain the existing 12" TL recreational and commercial size limits.

Biological Impacts

This option would continue the 12" TL size limit from Amendment 4 (implemented January 1992). The 1992 assessment indicated that the present minimum size of 12" TL will, after the fishery achieves equilibrium, produce a SSR of only 12%. The 1992 assessment indicated that a 15" TL size limit would be necessary to achieve a SSR of 30%.

There is general agreement that catches have declined and some advisory panel members mentioned cycles of abundance may be at play. Some members felt that the 12" size limit is working and that they could operate under some reasonable bag limit. The plan development team agreed with the large declines in abundance and noted that this species undergoes sex reversal and this may have contributed to the decline.

The 1994 assessment is available and indicates the SSR is 13%. Fishing mortality must be reduced by 43% to achieve a transitional SPR of 20%, by 65% to achieve a transitional SPR of 30%, and by 75% to obtain a static SPR of 40%.

Economic Impacts

Given the biological status of red porgy, taking no action would lead to further decline in stock size. This would result in reduced net benefits to society in the long-term.

Social Impacts

With the no action option, red porgy stocks may be jeopardized thereby creating additional social impacts as stocks decline and the fishery becomes impractical. During previous public hearings, the no action alternative showed greater support than the preferred alternative, especially in the northern areas of the South Atlantic region. Although comments were mixed regarding red porgy management, some individuals indicated some changes in management would be acceptable. Others felt past management actions were sufficient and had not been given enough time to reveal the impacts since recent assessments incorporated only one year's data since the increase in the size limit to 12" TL in Amendment 4.

Conclusion

The Council rejected this option because it would result in continued overfishing and prevent rebuilding above the 30% SPR level. This action would not meet the mandates of the Magnuson-Stevens Act.

Option 2. Increase the red porgy minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 2.

Biological Impacts

The red porgy minimum size limit of 12" was implemented in January 1992 (Snapper Grouper Amendment 4). Data from 1991 are included as a comparison of pre-size limit catches. During 1996, 6% of the recreational (MRFSS) catch, 10% of the headboat catch, and 5% of the commercial catch was below the 12" minimum size limit (Table 19). Non-compliance is negatively impacting stock rebuilding.

A 14" size limit would reduce the recreational catch by 37% based on numbers of fish (Table 20). Based on 1995 data on numbers of fish, a bag limit of 2 in combination with a 14" size limit would reduce the charterboat and headboat catches by 49% and 63% respectively (Table 21). There are no bag limit savings for bag limits of 1-5 fish with size limits of 12-14" for the private/rental sector; the 14" size limit in conjunction with a 2-fish bag limit would reduce the private/rental boat catch by 33% based on numbers of fish (NMFS Beaufort Lab analyses of impacts, 1996). It should be noted that increasing the size limit would result in about a two year loss in yield before the increased size limit would produce a weight gain.

The size limit will reduce the commercial catch by 40% based on numbers of fish (Table 20). To achieve a transitional SPR of 30% (overfished level), total fishing mortality must be reduced by 65%. To achieve the long-term goal of 40% static SPR, fishing mortality must be reduced by 75%. The combination of recreational and commercial measures will reduce the commercial catch by 40%, the recreational catch by 56%, and the total catch by 46% based on numbers of fish.

Economic Impacts

It is likely commercial fishermen would incur up to 40% reduction in terms of numbers of fish in landings in the first year (Table 20). Based on average annual landings for 1993 to 1995 (Trends database), there could be a reduction of 82,314 pounds ($98,800) in landings in the first year. It is not known to what extent fishermen would be able to compensate for reduction in red porgy landings by increasing fishing effort on other species. Assuming that some fishermen may be able to switch to alternative fisheries, this would be done at a cost to them because the alternative fisheries are second best by definition. Also, their switching would be at a cost to the fishermen currently targeting the alternative species.

The extent of the impact on the recreational fishery would depend on the number of recreational fishermen targeting red porgy. If fewer target red porgy, the impact would be less than if a large number target this species. Based on 1995 data, a 14" size limit in conjunction with a 2-fish bag limit would reduce catch by 33% for the private/rental boat sector. For the headboat category, total catch would be reduced by 63% in numbers of fish in the first year (Table 21). Total catch for the charterboat sector would be reduced by 49% in numbers of fish in the first year (Table 21). The combined catch for the recreational sector would be reduced by 56% in numbers of fish in the first year. Using 1995 landings data for both sectors (Trends and General Canvass database), total catch for the red porgy fishery would be reduced by 46% in numbers of fish in the first year.

Social Impacts

The social impacts from a 14" size limit increase and a 2 fish bag limit could be substantial for both commercial and recreational fishermen with a total catch reduction of 46% in numbers of fish. Previous public hearing comments showed little support for measures that would have such a large impact. Headboat operators were particularly concerned about customers ability to retain only two red porgies, but did indicate a bag limit could be beneficial.

Conclusion

The Council rejected the 14" TL size limit and 2-fish recreational bag limit due to the larger negative impacts on the recreational sector.

Option 3. Increase the red porgy minimum size limit from 12" TL to 13" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 5.

Table 23. Reduction in Landings from Size and Bag Limits. Red Porgy - 13" Size Limit from 1995 MRFSS Data. (Source: R. L. Dixon et al, NMFS Beaufort Laboratory, April 1997). [Note: There are no bag limit savings for bag limits of 1-5 fish with minimum size limits of 12-14" for the private/rental sector.]

BAG LIMIT	HEADBOAT		CHARTER BOAT	
	% REDUC. #	% REDUC. WT.	% REDUC. #	% REDUC. WT.
1	58.5	48.9	63.3	61.9
2	45.4	34.2	44.7	41.1
3	40.1	28.2	35.6	30.8
4	37.6	25.5	31.2	25.9
5	**36.2**	**23.9**	**28.8**	**23.2**

Biological Impacts

A 13" size limit would reduce the total catch by 22% in numbers and 12% in weight; the recreational and commercial reductions are approximately the same (Table 20). Based on 1995 data on numbers of fish, a bag limit of 5 in combination with a 13" size limit would reduce the charterboat catch by 29% and headboat catch by 36% (Table 23). There are no bag limit savings for bag limits of 1-5 fish with size limits of 12-14" for the private/rental sector. The 13" size limit would reduce the private/rental sector's catch by 17% in numbers of fish and 13% in weight of fish.

To achieve a transitional SPR of 30% (overfished level), total fishing mortality must be reduced by 65%. To achieve the long-term goal of 40% static SPR, fishing mortality must be reduced by 75%. The combination of recreational and commercial measures proposed under this option would reduce the commercial catch by 22%, the recreational catch by 33%, and the total catch by 27% based on numbers of fish. This is well short of the reductions needed to restore red porgy above the overfished level and would not meet the mandates of the Magnuson-Stevens Act.

Economic Impacts

Commercial fishermen would incur about a 22% reduction in numbers of fish in landings in the first year (Table 20). Based on average annual landings from 1993 to 1995 (Trends database), this could result in reduction in landings of 39,511 pounds ($47,413 in gross revenue from red porgy sales) in the first year. It is not known to what extent fishermen would be able to compensate for reduction in red porgy landings by increasing fishing effort on other species. Assuming that some fishermen may be able to switch to alternative fisheries, this would be done at a cost to them because the alternative fisheries are second best by definition. Also, their switching would be at a cost to the fishermen currently targeting the alternative species.

The extent of the impact on the recreational fishery would depend on the number of recreational fishermen targeting red porgy. If fewer target red porgy, the impact would be less than if a large number target this species. Based on 1995 data, a 13" size limit and 5-fish bag limit would reduce catch by 17% for the private/rental boat sector. For the headboat category, total catch would be reduced by 36% in numbers of fish in the first year (Table 23). Total catch for the charterboat sector would be reduced by 29% in numbers of fish in the first year (Table

23). The combined catch for the recreational sector would be reduced by 33% in numbers of fish in the first year. Using 1995 landings data for both sectors (Trends database), total catch for the red porgy fishery would be reduced by 27% in numbers of fish in the first year.

Social Impacts

The social impacts from this size and bag limit combination would reduce the impacts on the recreational sector by allowing retention of smaller, thus more, fish. A bag limit of 5 received some support during previous public hearings, although some felt an even larger bag limit was necessary.

Conclusion

The Council rejected this option in favor of the proposed action because the reductions in fishing mortality were not sufficient under this alternative. This option would not meet the requirements in the Magnuson-Stevens Act to rebuild the red porgy resource above the overfished level.

Option 4. Increase the red porgy minimum size limit from 12" TL to 13" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 2.

Biological Impacts

A 13" size limit would reduce the total catch by 22% in numbers and 12% in weight; the recreational and commercial reductions are approximately the same (Table 20). Based on 1995 data on numbers of fish, a bag limit of 2 in combination with a 13" size limit would reduce the charterboat and headboat catches by 45% (Table 23). There are no bag limit savings for bag limits of 1-5 fish with size limits of 12-14" for the private/rental sector. The 13" size limit would reduce the private/rental sector's catch by 17% in numbers of fish and 13% in weight of fish.

To achieve a transitional SPR of 30% (overfished level), total fishing mortality must be reduced by 65%. To achieve the long-term goal of 40% static SPR, fishing mortality must be reduced by 75%. The combination of recreational and commercial measures proposed under this option would reduce the commercial catch by 22%, the recreational catch by 45%, and the total catch by 30% based on numbers of fish. This is well short of the reductions needed to restore red porgy above the overfished level and would not meet the mandates of the Magnuson-Stevens Act.

Economic Impacts

Commercial fishermen would incur about a 22% reduction in numbers of fish in landings in the first year (Table 20). Based on average annual landings from 1993 to 1995 (Trends database), this could result in reduced landings of 39,511 pounds ($47,400 in gross revenue from red porgy sales) in the first year. The average exvessel price is $1.20 per pound (1995 Snapper Grouper Commercial Logbook Report).

The extent of the impact on the recreational fishery would depend on the number of recreational fishermen targeting red porgy. If fewer target red porgy, the impact would be less than if a large number target this species. Based on 1995 data, a 13" size limit in conjunction with a 2-fish bag limit would reduce catch by 17% for the private/rental boat sector. For the headboat and charterboat categories, total catch would be reduced by 45% each, in numbers of fish in the first year (Table 23). The combined catch for the recreational sector would be reduced by 45% in numbers of fish in the first year. Using 1995 landings data for both sectors (Trends database), total catch for the red porgy fishery would be reduced by 30% in numbers of fish in the first year.

Social Impacts

Support for changing the size limit was mixed during previous public hearings, although many suggested a smaller increase than the 14" proposed originally. An incremental approach may gain increased acceptance by the public as it lessens the immediate impact and may give fishermen time to plan for future management measures, if necessary. There was some support for a 5 fish bag limit expressed in several previous public hearings, but little support for a 2 fish bag limit. The overall social impacts from increasing the size limit and imposing a bag limit would depend upon the ability of fishermen to adjust to such an action.

If commercial fishermen can easily substitute another species, or replace lost income, in the short-term, they may see benefits to such a size increase in the long-term. If substitution is not easy, fishermen may increase their effort on red porgy. Red porgy is an important species for commercial fishermen in the northern area. Species substitution may not be easy as their dependence upon this particular fishery may be seasonal and important to the household or business at that time.

Recreational fishermen may be satisfied with a 2 fish bag limit, but this will depend upon past fishing practices and whether or not they have become accustomed to keeping large numbers of red porgies. Bag limits are an acceptable form of management to recreational fishermen as long as that limit does not go below a certain preference level. That preference level is species specific and may vary according to region. From previous public comments, it seems that recreational fishermen would not be satisfied with a 2 fish bag limit on red porgy and may see the impacts upon the recreational sector as being too severe. However, because the fishery is distressed, recreational fishermen may support a bag limit reduction to strengthen the stock. There will likely be species substitution once fishermen have reached their bag limit, thereby increasing pressure on other species. Which species would act as a substitute for red porgy is not known, but will likely be other species in the snapper grouper complex.

Conclusion

The Council rejected this option in favor of the proposed action because the reductions in fishing mortality were not sufficient under this alternative and would not meet the mandates of the Magnuson-Stevens Act.

4.2.2 ACTION 2. Increase the black sea bass minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day.

Black sea bass are overfished based on the overfished level of 30% SPR and for data through 1995 (Table 3a, page 10) as presented in the 1996 assessment (Vaughan et al., 1996). The 1996 assessment indicated a SPR of 26%. Public input during the scoping process indicated that there are serious declines in black sea bass, at least off northern South Carolina. Such declines are supported by the headboat CPUE which declined from just over 11 fish per angler day in 1980, to just over 1 fish per angler day in 1995 (Figure 2, page 50).

The Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission (ASMFC) have proposed (through a joint management plan—Amendment 9 to the Summer Flounder FMP: FMP and Final EIS for the Black Sea Bass Fishery, June 1996; see Appendix B) gear regulations and minimum size limits for the black sea bass fishery. During the first two years, a 9" TL minimum size limit for both the recreational and commercial fisheries, minimum mesh size, and escape vents for trawl nets and pots respectively, were implemented effective on December 16, 1996. Measures for Years 3 onwards are as follows (directly from Appendix B):

"1. Prior to year three and annually thereafter, the Council, working through a Monitoring Committee, would evaluate the success of the FMP relative to the overfishing reduction goal and propose adjustments to the management system. Beginning with year three, additional measures would include:

a. A commercial quota with Federal permit holders being prohibited from landing (selling) after the quota had been landed. Quota overruns would be deducted from the subsequent year. All states would need to prohibit black sea bass sales following federal sales prohibition.

b. A coastwide possession limit, season, and recreational harvest limit.

2. The minimum fish size, minimum mesh size and threshold, escape vent size, possession limit, and recreational season could be adjusted annually through framework action."

Current ASMFC regulations for state waters include a 10" TL recreational and commercial minimum size limit.

Biological Impacts

Based on 1995 data, approximately 49% of the catch was harvested by commercial fishermen (311,000 kg or 686,000 lb) and 51% by recreational fishermen (324,000 kg or 714,000 lb). Figure 2 (page 52) contains information for additional years.

Size at age information is presented in Table 24. Sexual transformation from females to males occurs in ages 1 through 8. Fish larger than 10" TL are predominantly males. Most females do not spawn until age 2 but usually are mature by age 3. Males mature at age 1 or more.

Table 24. Black Sea Bass Size at Age (Data Source: MARMAP- 1978-95).

Black Sea Bass		
Age	**Total Length (inches)**	**Total Length (mm)**
1	6.4	89
2	8.3	141
3	9.9	182
4	11.8	215
5	13.6	241
6	14.9	262
7	15.7	278
8	16.0	291
9	16.6	301

The black sea bass minimum size limit of 8" was implemented in August 1983 (Snapper Grouper FMP). During 1996, 4% of the recreational (MRFSS) catch, 2% of the headboat catch, and 1% of the commercial catch was below the 8" minimum size limit (Table 25).

Table 25. Percent of black sea bass catch below legal size limit.

BLACK SEA BASS: PERCENT LESS THAN LEGAL SIZE			
YEAR	**MRFSS**	**HEADBOAT**	**COMMERCIAL**
1996	4%	2%	1%
1995	10%	4%	0.1%
1994	19%	3%	0.4%
1993	13%	2%	0%
1992	6%	5%	0.5%
1991	14%	5%	0.5%

A 10" TL size limit would reduce the commercial catch by 26% and the recreational catch by 36% in numbers in the first year; total catch in numbers would be reduced by 30% in the first year (Table 26). Also, in terms of weight, the commercial catch would be reduced by 12% and the recreational catch by 16% in the first year (Table 26). The total catch in weight would be reduced by 14% in the first year (Table 26).

The 20-fish bag limit, under the existing 8" TL size limit, would reduce the headboat catch by 1% and would not reduce the charterboat or private/rental catch (Table 27).

The 10" TL size limit and 20-fish bag limit would reduce the headboat catch by 51% based on number of fish and the charterboat catch by 13% (numbers of fish); the private/rental catch would be reduced by 53% (Table 28).

The differential impact of size and bag limits up to 10-fish for the headboat fishery in North and South Carolina are shown in Table 29 and for the charterboat/private/rental fishery (lumped together as MRFSS data) in Table 30. Headboat reductions in South Carolina are double those in North Carolina, whereas, the charterboat/private reductions are approximately 10% greater in South Carolina than North Carolina.

To achieve a transitional SPR of 30% (overfished level), total fishing mortality must be reduced by 22%. To achieve the long-term goal of 40% static SPR, fishing mortality must be reduced by 56%. The combination of recreational and commercial measures proposed in this action will reduce the commercial catch by 26%, the recreational catch by 40%, and the total catch by 34% based on numbers of fish.

Table 26. Impacts of Different Black Sea Bass Size Limits - Fraction of Catch Excluded (Source: NMFS Beaufort Lab).

Size Limit TL (in)	**NUMBER**			**WEIGHT**		
	Commercial Cumulative %	Recreational Cumulative %	Total Cumulative %	Commercial Cumulative %	Recreational Cumulative %	Total Cumulative %
5		0.11	0.04		0.007	0.003
6		1.19	0.49		0.14	0.05
7		3.69	1.53		0.63	0.24
8	0.46	7.11	3.22	0.12	1.63	0.70
9	6.38	19.59	11.86	2.27	6.85	4.02
10	**25.50**	**36.13**	**29.91**	**11.76**	**16.30**	**13.49**
11	40.21	56.97	47.17	21.42	32.06	25.47
12	58.05	69.94	62.99	36.53	44.71	39.64
13	72.27	81.48	76.10	51.84	58.93	54.53
14	81.97	90.05	85.33	64.69	72.02	67.47
15	90.17	92.07	90.97	77.98	75.80	77.15
16	95.57	94.70	95.22	88.53	81.72	85.93
17	98.15	96.89	97.64	94.53	87.60	91.88
18	99.41	98.66	99.12	98.00	93.20	96.16
19	99.86	99.12	99.57	99.44	94.91	97.70
20	99.91	99.45	99.74	99.63	96.34	98.36
21	99.97	99.56	99.82	99.89	96.87	98.72
22		99.88	99.95		98.67	99.41
23				100.00		99.48
24	99.99		99.96			
25						
26						
27						
28						
29		99.99	100.00		100.00	99.99

Table 27. Percent Reduction in Headboat and MRFSS Black Sea Bass Catch Resulting from Size and Bag Limits - 1995 Commercial, Headboat and MRFSS Data (Source: Bob Dixon, NMFS Beaufort Lab).

BAG LIMIT	HEADBOAT	MRFSS
	8" SIZE LIMIT	8" SIZE LIMIT
1	53.3%	75.5%
2	34.6%	58.6%
3	25.8%	46.3%
4	20.2%	37.0%
5	16.1%	29.6%
6	13.2%	24.1%
7	10.9%	19.7%
8	9.0%	16.1%
9	7.5%	13.3%
10	6.3%	11.2%
11	5.3%	9.2%
12	4.4%	7.3%
13	3.7%	5.7%
14	3.0%	4.3%
15	2.5%	2.8%
16	2.1%	1.8%
17	1.7%	1.0%
18	1.5%	0.4%
19	1.2%	0.2%
20	**1.0%**	**0%**

Economic Impacts

A 10" TL minimum size limit would reduce commercial catch by 26% in terms of numbers of fish in the first year (Table 26). Using landings data for 1995 (Trends database), commercial landings would be reduced by 161,506 pounds ($242,300) in the first year. The average exvessel price per pound is $1.50 (1995 Snapper Grouper Commercial Logbook Report).

For the recreational sector, a size limit of 10" TL in conjunction with a bag limit over 10 fish would have virtually no effect on the headboat and private/rental boat sectors. Thus, for these two sectors the analysis incorporates a 10" TL size limit with a 1 - 10 fish bag limit. The charterboat sector analysis incorporates a 10" TL size limit with a 1 - 20 fish bag limit. Headboat catch would be reduced by 51% in numbers of fish in the first year (Table 28). Charterboat catch would be reduced by 13% in numbers of fish in the first year (Table 28). Private/rental boat catch would be reduced by 53% in numbers of fish in the first year (Table 28). Total catch for the entire recreational sector would be reduced by 40% in numbers of fish in the first year. Even though the minimum size limit would make some fish unavailable to the recreational sector, the actual reduction due to the combination of size and bag limits would depend on the number and frequency of trips made by recreational fishermen. Using 1995 landings (Trends database), total catch for the black sea bass fishery would be reduced by 34% in numbers of fish in the first year.

Table 28. Reduction in Landings from Size and Bag Limits. Black Sea Bass - 10" Size Limit from MRFSS Data. (Source: R. L. Dixon et al, NMFS Beaufort Laboratory, April 1997).

BAG LIMIT	HEADBOAT		CHARTER BOAT		PRIVATE BOAT	
	% REDUC. #	% REDUC. WT.	% REDUC. #	% REDUC. WT.	% REDUC. #	% REDUC. WT.
1	67.5	40.8	79.7	53.2	75.9	78.0
2	60.4	32.3	63.5	41.6	66.2	58.0
3	56.9	28.1	52.0	33.1	60.5	46.3
4	54.9	25.7	43.7	27.0	57.2	39.6
5	53.6	24.1	37.3	22.3	55.1	35.4
6	52.6	23.0	32.8	19.0	53.8	32.6
7	52.0	22.2	29.1	16.3	53.4	31.9
8	51.5	21.6	26.4	14.3	53.2	31.5
9	51.2	21.2	24.3	12.7	53.0	31.1
10	51.0	21.0	22.1	11.1	53.0	31.0
11	51.0	21.0	20.1	9.6	53.0	31.0
12	51.0	21.0	18.1	8.2	53.0	31.0
13	51.0	21.0	16.2	6.7	53.0	31.0
14	51.0	21.0	14.7	5.6	53.0	31.0
15	51.0	21.0	13.5	4.8	53.0	31.0
16	51.0	21.0	13.0	4.4	53.0	31.0
17	51.0	21.0	12.8	4.2	53.0	31.0
18	51.0	21.0	12.6	4.1	53.0	31.0
19	51.0	21.0	12.6	4.1	53.0	31.0
20	**51.0**	**21.0**	**12.6**	**4.1**	**53.0**	**31.0**

Social Impacts

Increasing the size limit for black sea bass may require commercial and recreational fishermen to substitute other species given the lost availability of black sea bass which would no longer be of legal size, or increase effort on this species targeting legal sized fish to compensate. There was support for increasing the size limit for black sea bass to 9" in previous public hearings held in January 1997. In addition, there was support for a bag limit, although, there seems to be a desire to retain black sea bass in large quantities as there was not much support for a bag limit of less than 20 black sea bass. The social impacts of this combined size limit increase and bag limit would depend upon the availability of other species for headboats, and/or, for commercial fishermen the ability to replace lost income.

Recently completed surveys with commercial snapper grouper fishermen indicated that trap fishermen were on average older and had been in their current position longer than other snapper grouper fishermen. It is not known whether those differences are statistically significant. Those characteristics, if significantly different, could suggest that these fishermen may have greater difficulty switching to other species or finding alternative sources of income, if needed.

For headboats, there is a rather large disparity in the impacts between headboats in North Carolina and those in South Carolina (Table 29). The impact of increasing the minimum size in South Carolina will be twice that in North Carolina with a 54% and 24% reduction respectively (Table 29). This may indicate regional differences in preference for smaller size black sea bass and/or differences in stock structure. In either case, there may also be significant regional differences in support of this action.

Table 29. Percent Reduction in Black Sea Bass **Headboat Catch** in North and South Carolina Resulting from Bag and Size Limits (Data Source: 1995 Headboat Data for North and South Carolina).

Bag Limit	NORTH CAROLINA			SOUTH CAROLINA		
	PERCENT REDUCTION WITH 8" TL SIZE LIMIT	PERCENT REDUCTION WITH 9" TL SIZE LIMIT	PERCENT REDUCTION WITH 10" TL SIZE LIMIT	PERCENT REDUCTION WITH 8" TL SIZE LIMIT	PERCENT REDUCTION WITH 9" TL SIZE LIMIT	PERCENT REDUCTION WITH 10"TL SIZE LIMIT
1	35%	39%	44%	54%	60%	68%
2	15%	22%	31%	33%	48%	62%
3	7%	16%	27%	24%	43%	59%
4	4%	13%	26	19%	40%	57%
5	3%	12%	25%	15%	38%	56%
6	2%	12%	25%	12%	36%	55%
7	2%	11%	24%	10%	35%	55%
8	1%	11%	24%	8%	34%	54%
9	0.5%	10%	24%	7%	34%	54%
10	0.3%	10%	24%	6%	33%	54%

Table 30. Percent Reduction in Black Sea Bass **Recreational Catch** in North and South Carolina Resulting from Bag and Size Limits (Data Source: 1995 MRFSS Data for North and South Carolina).

Bag Limit	**NORTH CAROLINA**			**SOUTH CAROLINA**		
	PERCENT REDUCTION WITH 8" SIZE LIMIT	**PERCENT REDUCTION WITH 9" SIZE LIMIT**	**PERCENT REDUCTION WITH 10" SIZE LIMIT**	**PERCENT REDUCTION WITH 8" SIZE LIMIT**	**PERCENT REDUCTION WITH 9" SIZE LIMIT**	**PERCENT REDUCTION WITH 10" SIZE LIMIT**
1	73%	75%	77%	81%	82%	83%
2	59%	60%	65%	67%	69%	72%
3	45%	51%	58%	54%	58%	65%
4	37%	45%	53%	44%	51%	61%
5	30%	40%	50%	35%	46%	57%
6	25%	35%	48%	30%	42%	54%
7	22%	34%	45%	26%	38%	53%
8	19%	31%	44%	22%	35%	52%
9	16%	29%	42%	18%	32%	51%
10	14%	27%	40%	15%	31%	50%

<u>Conclusion</u>

The Council's preferred option in the public hearing draft of Amendment 8 was for a 10" TL minimum size limit for both recreational and commercial fishermen and a 10-fish bag limit. The Council is proposing a 20-fish bag limit to provide some additional protection while addressing fishermen's concerns that the 10-fish bag limit was too restrictive. The public hearing draft of Amendment 9 included the 20-fish bag limit and an evaluation of additional commercial restrictions.

Black sea bass are overfished based on the 30% SPR overfishing level given the current SPR of 26%. The Council approved a 10" TL size limit for rebuilding to 30% SPR. Fishing mortality needs to be reduced by 22% to achieve a 30% SPR.

The 10" TL size limit reduces the commercial catch by 26% based on numbers of fish. In addition, the Council established a control date of April 23, 1997 for the black sea bass pot fishery. Commercial fishermen entering the black sea bass pot fishery after April 23, 1997 may not be included in a limited entry system for the black sea bass pot fishery should the Council develop such a system.

The 10" TL size limit and a 20-fish bag limit reduces the recreational catch by 40% based on numbers of fish. The 20-fish bag limit, although having minimal effect on current levels of harvest, would cap harvest as the stock builds towards the 40% SPR level (Optimum Yield) and black sea bass become more abundant. The proposed actions are sufficient to rebuild black sea bass above the overfished level and meet the mandates of the Magnuson-Stevens Act. The Council will monitor the stock status and if additional measures are necessary to rebuild to 40% SPR, the framework will be used to implement additional measures.

Other Possible Options for Action 2:

Option 1. No Action. Maintain the existing 8" TL minimum size limit for both recreational and commercial fishermen, and no bag limit.

Biological Impacts

Without any increase in the size limit and no bag limit, there would be no reduction in fishing mortality and black sea bass would continue to be overfished. Based on the level of catch by each group, the percentage of total catch below legal size was minimal. However, sexual transformation from female to male occurs between 7" TL and 10" TL, thus an 8" TL minimum size limits the number of females available to transform to males. This could affect the reproductive capacity of the stock leading to declining stock size and the consequent reduction in net benefits from the fishery in the long-term.

Economic Impacts

Table 25 shows the percentage of black sea bass caught below the legal size limit from 1991 to 1996 by recreational, headboat and commercial fishermen. During 1996, approximately 4% of the recreational catch and 2% of the headboat catch were below the 8" TL minimum size limit. Only 1% of the commercial catch was below the 8" TL size limit. Also, a 10" black sea bass would have a higher market price per pound than an 8" black sea bass, thus allowing the fish to grow to larger sizes would likely create increased net benefits in the long-term.

Social Impacts

No action would create some inconsistency with management proposed by other agencies while at the same time reduce the possibility for increased protection of this stock.

Conclusion

The Council rejected this option because it would not result in rebuilding above the overfished level (30% SPR) or in building towards the long-term goal (OY) of 40% static SPR. Also, the 8" TL size limit would be inconsistent with the size limit implemented by South Carolina and states north of North Carolina. No action would not meet the mandates of the Magnuson-Stevens Act.

4.2.3 ACTION 3. Require escape vents and escape panels with degradable fasteners in black sea bass pots.

Black sea bass pots and traps would be required to have a minimum unobstructed escape vent opening of 1 and 1/8" x 5 and 3/4" for rectangular vents, 1.75" x 1.75" for square vents (inside measure), or 2" diameter for circular vents. Also, require a minimum of 2 vents per black sea bass pot, and specify the escape vents must be located on opposite vertical panels of the pot. In effect, this excludes the top or bottom as locations for the escape vents.

A black sea bass pot or trap that is used or possessed in the South Atlantic EEZ north of 28° 35.1′ N. latitude is required to have on at least one side, excluding top or bottom, a panel or door with an opening equal to or larger than the interior end of the trap's throat (funnel). The hinges and fasteners of each panel or door must be made of the following degradable material:

(1) ungalvanized or uncoated iron wire no larger than 19 gauge or 0.041 inches diameter,

(2) galvanic timed release mechanisms no letter grade higher than "J".

It should be noted black sea bass pots and traps are currently required to have degradable panels/fasteners. The proposed action modifies the specification of material acceptable as fasteners.

Biological Impacts

Based on 1995 data, approximately 49% of the catch was harvested by commercial fishermen (311,000 kg or 686,000 lb) and 51% by recreational fishermen (324,000 kg or 714,000 lb). Figure 2 contains information for additional years on page 52.

There would be a reduction in fishing mortality and bycatch mortality would be reduced (see Appendix B. for material from the Mid-Atlantic Council). Escape panels will allow black sea bass to escape lost traps and reduce any mortality from lost traps continuing to fish. This will allow black sea bass that would be lost, to reproduce and/or be harvested thereby protecting the biological integrity of the resource.

Economic Impacts

Escape vents would allow the release of fish below the minimum size limit. This would enhance survival of undersized fish that enter the pots. Hauling pots from varying depths exposes fish to trauma such as predation, changes in pressure, etc. There would be added costs to include the escape vents on pots that are already in use. However, fishermen would realize some savings in the time required to cull their catches. In the long-term, net benefits from the fishery are expected to increase due to low release mortality.

Escape panels would allow the doors or panels of black sea bass pots to fall away from unattended pots within a reasonable time period. This would prevent "ghost fishing", that is continuing to catch and retain fish that could not be removed from the pots. Black sea bass pots are utilized mainly in North Carolina and South Carolina. The latest figures available indicate that in 1994, 142 fishermen with permits operated 4,980 pots in North Carolina. The average number of pots per permit holder was 35. A total of 61 fishermen held permits in South Carolina and operated 1,181 pots. The average number of pots per permit holder was 19 (NMFS Beaufort Lab.). Given an average cost of $30.00 per pot, including ropes and buoys (adjusted for depreciation), the total value of black sea bass pots in North Carolina and South Carolina is estimated at $185,000. The materials required for including escape vents and escape panels are readily available. Assuming an average cost of $4.00 (Jodie Gay, pers. comm.), the cost for fitting the 6,161 pots with escape vents and escape panels would be approximately $25,000. Black sea bass pot fishermen in North Carolina would incur an average cost of $140, while those in South Carolina would incur an average cost of $76 in the first year.

Social Impacts

Requiring escape vents on pots would have few social impacts. Requiring degradable fasteners would have few if any social impacts other than an added expense to the fishing operation. Fishermen may perceive an added benefit to this requirement as it would help resolve the problem of "ghost fishing" by abandoned or lost traps.

Conclusion

The Council concluded use of escape vents is necessary, particularly if the minimum size limit is increased. The existing 2" mesh used in pots culls at about an 8" TL fish. Based on an increase in minimum size to 10" TL, escape vents are necessary to prevent retention of undersized fish. This will allow culling while the pot is fishing.

The revised material for fasteners allow for a more timely release of fish which addresses bycatch mortality through "ghost fishing". The galvanic timed release mechanism has been used and suggested by fishermen. This material will reduce bycatch mortality while allowing fishermen the opportunity to use a device which may make their fishing operation more efficient.

The Council concluded escape panels are necessary to protect the biological integrity of the black sea bass resource by removing mortality from lost or ghost pots and minimizing bycatch mortality. The material specified are expected to degrade within one to two months based on experience with a larger gauge wire in the black sea bass pot fishery and input from fishermen. The Council is requesting research be conducted in this area and will modify the regulations as necessary in the future through the framework procedure.

Other Possible Options for Action 3:

Option 1. No Action. Maintain the existing mesh and escape panel regulations.

Biological Impacts

If the minimum size limit is increased and escape vents are not required, fish below the minimum size limit will be retained, brought to the surface and subjected to some level of handling-induced mortality. Black sea bass are hardy fish and it would be expected that mortality would be low.

"Ghost fishing" would result in negative biological impacts from unaccounted fishing mortality.

Economic Impacts

This option would result in release mortality particularly with the increase in minimum size. The long-term effect would be stock reduction and decrease in net benefits from the fishery.

There is no information on the loss of fish or the decline in black sea bass stock through "ghost fishing". However, pots are known to have been lost for various reasons. This option would allow loss from "ghost fishing" to continue.

Social Impacts

With no requirement for escape vents, fishermen may have problems with increased amounts of discards depending on the size limit. This would require fishermen to establish some type of sorting protocol when landing fish, which undoubtedly already takes place. The social impacts would be limited to any inconvenience to changes in fishing operation. No action regarding degradable fasteners would have little if any social impacts since fishermen are not required to use them at present. However, others may perceive management as being complacent with regard to an often controversial problem of "ghost fishing" by abandoned traps.

Conclusion

The Council rejected this option because it would unnecessarily impose some low level of fishery-induced mortality. The Council concluded escape panels as specified in the proposed action are necessary to protect the biological integrity of the black sea bass resource by removing mortality from lost or ghost traps (bycatch mortality). Therefore, the Council rejected this option.

Option 2. Require escape vents and escape panels with degradable fasteners in black sea bass pots with the following sizes:

Black sea bass pots would be required to have a minimum escape vent ranging in size from 1" - 1.75" x 5" - 6" or 1.75" - 2" x 2" for rectangular vents or 1.75" - 2.5" diameter for ring vents. Also, require a range of 1 to 4 vents on black sea bass pots.

A black sea bass pot that is used or possessed in the South Atlantic EEZ north of 28° 35.1′ N. latitude is required to have on at least one side, excluding top or bottom, a panel or door with an opening equal to or larger than the interior end of the trap's throat (funnel). The hinges and fasteners of each panel or door must be made of the following degradable material: ungalvanized or uncoated wire no larger than 19 gauge or 0.041 inches diameter.

Biological Impacts

There would be a reduction in fishing mortality depending on the size chosen (see Appendix B. for material from the Mid-Atlantic Council.)

Escape panels will allow black sea bass to escape lost traps and reduce any mortality from lost traps continuing to fish. This will allow black sea bass that would be lost to reproduce and/or be harvested thereby protecting the biological integrity of the resource.

Economic Impacts

See discussion under economic impacts for Action 3.

Social Impacts

The social impacts would be similar to those included under Action 3.

Conclusion

The Council concluded the sizes specified in the proposed action are more appropriate to achieve the proposed minimum size limit and rejected this more broad group of sizes.

Option 3. Require escape vents and escape panels with degradable fasteners in black sea bass pots with the following sizes to directly track proposed wording by the Mid-Atlantic Fishery Management Council.

Black sea bass pots and traps would be required to have a minimum escape vent of 1 1/8" x 5 3/4" or 2.0" in diameter or 1.75" square (inside measure). Vents would be required to be placed in a lower corner of the parlor portion of the pot or trap. Pots or traps constructed with wooden lathes would be required to have the spacing between one set of lathes in the parlor portion of the trap 1 1/8" or greater.

Black sea bass pots and traps would be required to have hinges and fasteners on one panel or door made of one of the following degradable materials: (a) untreated hemp, jute, or cotton string of 3/16" (4.8 mm) diameter or smaller; (b) magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners; or (c) ungalvanized or uncoated iron wire of 0.094" (2.4 mm) diameter or smaller.

Biological Impacts

There would be a reduction in fishing mortality depending on the size chosen (see Appendix B. for material from the Mid-Atlantic Council).

Escape panels will allow black sea bass to escape lost traps and reduce any mortality from lost traps continuing to fish. This will allow black sea bass that would be lost to reproduce and/or be harvested thereby protecting the biological integrity of the resource.

Economic Impacts

See discussion under economic impacts for Action 3.

Social Impacts

This option would enhance law enforcement in North Carolina where fishermen may work in either the Mid-Atlantic or the South Atlantic area of jurisdiction. Law enforcement officials would have only one criteria for escape vents and panels and not have to determine whether pots were in South Atlantic or Mid-Atlantic waters.

Conclusion

The Council concluded the sizes specified in the proposed action are more appropriate to achieve the proposed minimum size limit and rejected this more broad group of sizes.

Option 4. Require escape vents and escape panels with degradable fasteners in black sea bass pots (Preferred Option in public hearing draft of Amendment 9).

Black sea bass pots would be required to have a minimum unobstructed escape vent opening of 1" x 5" for rectangular vents, 1.75" x 1.75" for square vents, or 1.75" diameter for circular vents. Also, require a minimum of 2 vents per black sea bass pot, and specify the escape vents must be located on opposite sides of the pot.

A black sea bass pot that is used or possessed in the South Atlantic EEZ north of 28° 35.1′ N. latitude is required to have on at least one side, excluding top or bottom, a panel or door with an opening equal to or larger than the interior end of the trap's throat (funnel). The hinges and fasteners of each panel or door must be made of the following degradable material: ungalvanized or uncoated wire no larger than 19 gauge or 0.041 inches diameter.

Biological Impacts

There would be a reduction in fishing mortality depending on the size chosen (see Appendix B. for material from the Mid-Atlantic Council).

Escape panels will allow black sea bass to escape lost traps and reduce any mortality from lost traps continuing to fish. This will allow black sea bass that would be lost to reproduce and/or be harvested thereby protecting the biological integrity of the resource.

Economic Impacts

See discussion under economic impacts for Action 3.

Social Impacts

See discussion under social impacts for Action 3.

Conclusion

The Council concluded the sizes specified in the proposed action are more appropriate to achieve the proposed minimum size limit and rejected this more broad group of sizes.

4.2.4 ACTION 4. Establish measures for greater amberjack that will: (1) reduce the recreational bag limit from 3 to 1 greater amberjack per person per day; (2) prohibit harvest and possession in excess of the bag limit during April throughout the EEZ; (3) establish a 1,000 pound daily commercial trip limit; (4) establish a quota equal to 63% of 1995 landings (quota=1,169,931 pounds); (5) begin the fishing year May 1; (6) prohibit sale of fish harvested under the bag limit when the season is closed; and (7) prohibit coring.

These measures would apply to greater amberjack in or from the South Atlantic EEZ and greater amberjack in the South Atlantic harvested on board a permitted vessel (commercial or charter/headboat) without regard to where the greater amberjack is harvested or possessed. The prohibition on purchase would apply to all permitted dealers without regard to where the greater amberjack is harvested or possessed (i.e., state or federal waters). However, fish could be purchased from areas outside the South Atlantic provided there was an appropriate paper trail documenting the area of origin.

This option maintains the 28" FL recreational minimum size limit and the 36" FL minimum size limit in the commercial fishery, however the 28" cored length commercial size limit would be eliminated given coring will be prohibited. Currently, during April all fishermen south of Cape Canaveral are limited to the bag limit to give some protection during the spawning season (April and May). These measures were implemented January 1, 1992.

Biological Impacts

Based on 1995 data, approximately 66% of the catch was harvested by commercial fishermen (844,000 kg or 1,861,000 lb) and 34% by recreational fishermen (432,000 kg or 952,000 lb). Figure 3 presents information for additional years on page 55.

The Miami Lab completed a stock assessment for amberjack in October 1996 (Cummings and McClellan, 1996). This analysis examined the exploitation status through 1995. Major results are summarized below (directly from Cummings and McClellan, 1996):

- *Commercial landings increased between 1979 and 1991 from around 80,000 lbs to 2.3 million lbs. Commercial landings declined after 1991 and appear to have stabilized around 1.9 million lbs.*

- *Recreational catches (estimated) have shown more variability when compared on an annual basis than have commercial landings which showed steady upward increases until 1991. Recreational catches have ranged from about 15,000 fish to 100,000 fish since 1981 without strong trend. Anecdotal information from the recreational fishery has suggested large declines in amberjack catches in the Atlantic. The available data do support a consistent decline for the Atlantic group as a whole with large declines in estimated recreational catches having occurred in the charterboat fishery off South Carolina since 1990 and in the private angler mode in North Carolina since 1993. In Florida recreational catches have declined across all modes. Temporal trends in recreational catches should be viewed with caution as the MRFSS estimates contain large variance in several years (1980, 1981, 1984, 1985).*
- *The 1993 assessment summarized the available information regarding observed sample average weight and length. Since that assessment length sampling has declined but not as greatly as from the Gulf of Mexico fishery. The overall rate of length sampling of the Atlantic greater amberjack fishery is less than 1% by number.*
- *As for the Gulf of Mexico fishery, temporal trends in length and weight must be considered in context to the low levels of sampling documented at the time of the 1993 assessment and again here. The data available for this assessment indicate that average length of greater amberjack caught recreationally by private anglers, charterboat fishermen, and shore anglers fluctuated without strong trend since the 1993 assessment. Average weight has tended to be more variable and more suspect because of low sample sizes. Sample average weight has increased in the headboat fishery since about 1987 and also in the commercial fishery. These increases could be reflective of the introduction of the minimum size regulations that took effect during 1991.*
- *Standardized recreational CPUE of Atlantic greater amberjack suggest declines in abundance in the recreational charterboat and private angler fisheries since about 1992. Standardized CPUE from the commercial fishery from logbooks suggests a weak declining trend beginning about 1994.*
- *The weight based population model, SLM, used in the 1993 assessment provided estimates of total production and fishing mortality but did not incorporate information on size into the estimation procedure. The model results from that analysis indicated that 1) fishing mortality was fairly low over the time series of the analysis, 1986-1991, ranging from 0.13 to 0.22; 2) stock abundance was very variable over the time period with CV's ranging from 104% to 216%; 3) stock production was exceeded in 1986, 1988, and in 1991; 4) good recruitment (immigrants + recruits) occurred in 1987 and in 1990.*
- *The results from the preliminary VPA analyses are not directly comparable to those of the weight based population estimator, SLM, however, general trends can be compared from the two analyses. The VPA results from the M = 0.3 fit indicate the following regarding fishing mortality. Fishing mortality was in general very low over the time period of the analysis, 1987-1995. Fishing mortality on young fish, ages 1-3, increased between 1991 and 1994 but appears to have declined during 1995. Fishing mortality on adult fish, ages 4+, varied without strong trend over the time period, 1987-1995. This last observation is in general agreement with the results from the SLM model regarding trends in fishing mortality. Although specific values must be carefully considered, the VPA analysis appears to indicate that fishing mortality on older fish, ages 8+, was higher during the early period of the time series 1987-1990.*
- *Trends in estimated stock size from the M = 0.3 fit indicates the following regarding stock abundance. Recruitment declined between 1987 and 1993 and increased between 1992 and 1993 to about the 1989 level. Estimates of recruitment should be used*

cautiously as age 0 fish were not fully represented by any of the CPUE indices used in the calibration of the VPA. Estimated stock abundance of young fish, ages 1-3 declined by about one half after 1990 from the 1987 level and apparently increased between 1993 and 1994. Abundance estimates of ages 1-3 are very imprecise and should only be used for trends if at all as the CV on the estimate of age 4 fish is extremely high. Stock abundance of adult fish, ages 4+, showed increases of about 50% in number between 1987 and 1992 while subsequent years showed consistent decreases. The largest component in the decrease in adult stock of ages 4+, since 1993 is apparently in the age 4 component and the trend in stock size of age 4 fish was estimated very imprecisely thus trends in age 4 should be used very cautiously by managers. In general the increase in adult stock between 1987 and 1992 is in agreement with the results of the SLM model and suggests that most of the increase in stock production was from fish recruiting into the fishery and becoming available to the gear as opposed to recruitment of age 0 fish.

- *These preliminary VPA results provide corroboration regarding general trends between the VPA model and the weight based estimator. In addition, the VPA results seem to suggest that increases in stock production predicted for some years by the SLM estimators were not due to increases in recruitment. The data available for this analysis suggests a significant decline in recruitment of the Atlantic greater amberjack and in abundance of age 1-3 fish. As predicted by the weight based model, recruitment and adult stock were high between 1987 and 1990 but showed several years of declines. Using the results from the VPA in equilibrium analyses of yield per recruit and spawning potential ratios (SPR's) calculations suggests that current SPR levels are reasonably high however future declines in SPR are imminent. This predicted trend is highly dependent upon the confidence place in the VPA analysis.*

The authors indicate that the 1993 figures for current fishing mortality (F) and spawning potential ratio (SPR) are the best estimates they would recommend for management purposes. In 1993, F was estimated at 0.19 and SPR was 0.84 or 84%.

Size at age information is shown in Table 31. A 36 inch fork length greater amberjack is between 5 and 6 years old while a 28 inch fork length greater amberjack is between 3 and 4 years old.

The greater amberjack minimum size limits were implemented in January 1992 (Snapper Grouper Amendment 4). The August 1997 Compliance report evaluated catch below 28 inches fork length; the commercial limit is 36 inches fork length or 28 inches core length. The 1991 figures allow a comparison to what was landed pre-size limit. During 1996, 8% of the recreational (MRFSS) catch, 24% of the headboat catch, and 0% of the commercial catch was below the minimum size limits (Table 32). Non-compliance with size limits continues to be a problem in the recreational sector of the fishery.

A **bag limit** of 1 will reduce the headboat catch by 2% and the charterboat and private/rental sectors by 12% (Table 33).

Table 31. Greater Amberjack Size at Age. (Source: Manooch and Potts, 1997: Fisheries Science).

AGE	TOTAL LENGTH (inches)	TOTAL LENGTH (mm)
1	14.4	366
2	20.9	530
3	26.1	664
4	30.5	774
5	34.4	873
6	37.4	949
7	39.7	1009
8	42.1	1069
9	44.5	1130
10	47.5	1207
11	49.7	1262
12	51.6	1310
13	54.0	1371
14	56.3	1429
15	57.9	1471
16	63.6	1615
17	64.8	1646

Table 32. Percent of greater amberjack catch below legal size limit.

GREATER AMBERJACK: PERCENT LESS THAN LEGAL SIZE			
YEAR	**MRFSS**	**HEADBOAT**	**COMMERCIAL**
1996	8%	24%	0%
1995	6%	13%	10%
1994	21%	13%	44%
1993	9%	20%	5%
1992	9%	20%	28%
1991	17%	28%	41%

Table 33. Percent Reduction in Greater Amberjack Headboat and Recreational Catches Resulting from a Size Limit of 28" FL and Bag Limits of 1 to 3 (Data Source: 1995 Headboat Data and MRFSS).

Bag Limit	Headboat	MRFSS
1	1.5%	12.2%
2	0.3%	3.7%
3	0.2%	0%

Monthly commercial catches for 1993, 1994, and 1995 are shown in Table 34a. and for 1995, 1996, and 1997 in Table 34b.

Table 34a. Total Reported Greater Amberjack Landings for the South Atlantic Region (Source: Linda Hardy, NMFS Beaufort Lab, General Canvass Database; April 2, 1997).

MONTH	POUNDS '93	POUNDS '94	POUNDS '95
JANUARY	122,751	87,243	169,163
FEBRUARY	154,851	186,096	170,329
MARCH	396,756	345,581	293,377
APRIL	104,221	153,087	113,663
MAY	468,799	353,316	365,168
JUNE	112,913	166,911	119,652
JULY	81,672	117,398	138,608
AUGUST	80,441	97,589	103,854
SEPTEMBER	106,924	86,883	107,307
OCTOBER	80,251	152,553	93,097
NOVEMBER	70,968	97,021	87,946
DECEMBER	120,102	110,712	94,870
TOTAL	**1,900,649**	**1,954,390**	**1,857,034**

Table 34b. Commercial Landings of Greater Amberjack (in pounds) from the South Atlantic region. (Source: General Canvass Database. Data for NC, SC, GA and FL east coast provided by Linda Hardy; NMFS and data for South Atlantic portion of Monroe County provided by Joshua Bennett, NMFS; October, 1997).

1995	**MONTH**	**SA EXCLUDING MONROE COUNTY**	**MONROE CO.**	**TOTAL POUNDS**
	JANUARY	107,064	61,234	168,298
	FEBRUARY	70,197	98,901	169,098
	MARCH	123,592	172,751	296,343
	APRIL	90,525	28,845	119,370
	MAY	123,592	245,765	369,357
	JUNE	80,500	38,421	118,921
	JULY	122,127	15,922	138,049
	AUGUST	86,186	17,030	103,216
	SEPTEMBER	96,262	10,702	106,964
	OCTOBER	88,341	4,558	92,899
	NOVEMBER	76,024	12,278	88,302
	DECEMBER	67,961	25,853	93,814
	TOTAL	**1,132,371**	**732,260**	**1,864,631**

1996	MONTH	SA EXCLUDING MONROE COUNTY	MONROE CO.	TOTAL POUNDS
	JANUARY	77,375	54,738	132,113
	FEBRUARY	76,796	97,846	174,642
	MARCH	55,989	79,454	135,443
	APRIL	85,038	28,644	113,682
	MAY	121,289	143,478	264,767
	JUNE	88,900	23,740	112,640
	JULY	61,437	13,956	75,393
	AUGUST	134,572	10,839	145,411
	SEPTEMBER	79,786	18,286	98,072
	OCTOBER	95,877	15,147	111,024
	NOVEMBER	51,721	9,275	60,996
	DECEMBER	70,843	25,939	96,782
	TOTAL	**999,623**	**521,342**	**1,520,965**
1997	**MONTH**	**SA EXCLUDING MONROE COUNTY**	**MONROE CO.**	**TOTAL POUNDS**
	JANUARY	60,399	25,530	85,929
	FEBRUARY	46,266	46,853	93,119
	MARCH	119,449	134,505	253,954
	APRIL	51,231	30,601	81,832
	MAY	153,265	113,885	267,150
	JUNE	89,533	21,207	110,740
	TOTAL	**520,143**	**372,581**	**892,724**

Measures proposed for the commercial sector are interrelated with the overall impacts outlined in Tables 35a and 35b. The 1,000 pound **trip limit** will reduce landings by 25% based on trip data shown in Table 35b. Given that the trip information is from the logbook, we used the 1995 landings figure of 1,346,363 pounds for greater amberjack from logbook data. The number of trips with landings over 1,000 pounds was 330, and the pounds resulting from those trips was 662,063 (Table 36). Limiting these 330 trips to 1,000 pounds per trip results in a reduction in the commercial catch of 332,063 pounds (662,063-330,000) or 25%. The 25% reduction in commercial catch was then applied to the 1995 NMFS Canvass data which results in a projected reduction in commercial catch of 458,922 pounds or 16,124 fish. The 25% reduction in commercial catch was also applied to the May 1994 through April 1995 monthly data as shown in Table 35a.

Projected reductions in commercial landings are shown in Tables 35a and 35b. The **quota** of 1,169,931 pounds (63% of 1995 landings which were 1,857,034 pounds) would be caught during March for a projected reduction in catch from the commercial sector of 39% based on May 1994 - April 1995 data. As discussed in the economic section (see below), the quota is not projected to be met based on May 1995 - April 1996 data. Note that potential reductions in commercial catch from the **April closure** are included within the savings from the quota because the fishery will already have been closed (based on 1994/95 data).

Table 35a. Greater Amberjack Commercial Monthly Landings for May 1994 through April 1995 and Projected Reductions From Proposed Management Measures. (Source: Monthly data, Linda Hardy from General Canvass Database).

	Monthly Catches	Cumulative Catches	Monthly Catches With Trip Limit	Cumulative Catches With Trip Limit	
MAY'94	353,316	353,316	264,987	264,987	
JUNE	166,911	520,227	125,183	390,170	
JULY	117,398	637,625	88,049	478,219	
AUGUST	97,589	735,214	73,192	551,411	
SEPTEMBER	86,883	822,097	65,162	616,573	
OCTOBER	152,553	974,650	114,415	730,988	
NOVEMBER	97,021	1,071,671	72,766	803,753	
DECEMBER	110,712	1,182,383	83,034	886,787	
JANUARY'95	169,163	1,351,546	126,872	1,013,660	
FEBRUARY	170,329	1,521,875	127,747	1,141,406	
MARCH	293,377	1,815,252	220,033	1,361,439	
APRIL	113,663	1,928,915	85,247	1,446,686	**% Reduction**
	1,928,915		1,446,686		**(pounds)**
May 1994 through April 1995 catches =				1,928,915	
Projected landings with trip limit =				1,446,686	**25%**
Projected landings with trip limit & April closure =				1,361,439	**29%**
Quota = 63% of 1995 landings (1,857,034 pounds) =				1,169,931	**Closure During**
Poundage saved with quota=				191,508	**March**
Projected landings with trip limit, April closure & quota =				1,169,931	
Projected % Reduction from trip limit, April closure & quota closure =					**39%**
To calculate reductions based on numbers of fish, use 1995 catch of 1,860,718 pounds and					
1995 numbers of fish 65,377 for an average weight =				28.46	
Pounds of fish saved =		758,984			
Number of fish saved =		26,667			
Number recreational saved =		4,374			
Applying this savings to the 1995 catches allows one to calculate the total reductions:					
1995 Catch in numbers					**(numbers)**
Commercial =		65,377			**41%**
Recreational =		40,347			**11%**
Total =		105,724			**29%**

Table 35b. Greater Amberjack Commercial Monthly Landings for May 1995 through April 1996 and Projected Reductions from Proposed Management Measures. (Source: General Canvass Database, Linda Hardy and Joshua Bennett, NMFS, October 1997).

MONTH	MONTHLY LANDINGS	CUMULATIVE LANDINGS	MONTHLY LANDINGS WITH TRIP LIMIT	CUMULATIVE LANDINGS WITH TRIP LIMIT
MAY'95	369,357	369,357	277,018	227,018
JUNE	118,921	488,278	89,191	366,209
JULY	138,049	626,327	103,537	469,745
AUGUST	103,216	729,543	77,412	547,157
SEPTEMBER	106,964	836,507	80,223	627,380
OCTOBER	92,899	929,406	69,674	697,055
NOVEMBER	88,302	1,017,708	66,227	763,281
DECEMBER	93,814	1,111,522	70,361	833,642
JANUARY'96	132,113	1,243,635	99,085	932,726
FEBRUARY	174,642	1,418,277	130,982	1,063,708
MARCH	135,443	1,553,720	101,582	1,165,290
APRIL	113,682	1,667,402	85,262	1,250,552
TOTAL	**1,667,402**		**1,250,552**	
May 1995 through April 1996 landings =			1,667,402	**% Redn. (lbs)**
Projected landings with trip limit =			1,250,552	**25%**
Projected landings with trip limit & April closure =			1,165,290	**30%**
Quota = 63% of 1995 landings (1,857,034 pounds) =			1,169,931	
Projected landings with trip limit, April closure & quota =			1,165,290	
Projected % reduction from trip limit, April closure & quota closure =				**30%**
To calculate reductions based on numbers of fish, use 1995 catch of 1,864,631 pounds and				
1995 numbers of fish 65,518 for an average weight =			28.46 pounds	
Pounds of fish saved =			502,112 pounds	
Number of fish saved =			17,643	
Number of recreational saved =			4,374	
Applying this savings to the 1995 landings allows one to calculate the total reductions:				
1995 landings in numbers				**(numbers)**
	Commercial =	65,518		**27%**
	Recreational =	40,347		**11%**
	Total =	105,865		**21%**

Table 36. Greater Amberjack Commercial Landings by Trip Category in the South Atlantic Region for 1993 - 1996. (Source: Nelson Johnson, from Logbook Data, March 20, 1997). Note: Data for 1996 is for January 1, 1996 to August 20, 1996.

Yr	Size Range	Total # Pounds	Cumulative # Pounds	# Trips	Cumulative # Trips
1993	1-225	126,665	126,665	1,671	1,671
	226-500	110,674	237,339	330	2,001
	501-1000	199,653	436,992	273	2,274
	1001-1500	146,659	583,651	122	2,396
	1501-2000	126,273	709,924	74	2,470
	2001-2500	94,631	804,555	42	2,512
	2501-3000	77,295	881,850	28	2,540
	3001-3500	87,234	969,084	27	2.567
	3501-4000	55,624	1,024,708	15	2,582
	> 4000	157,339	1,182,047	29	2,611
1994	1-225	163,396	163,396	2,015	2,015
	226-500	177,012	340,408	522	2,537
	501-1000	263,113	603,521	373	2,910
	1001-1500	203,383	806,904	166	3,076
	1501-2000	140,128	947,032	81	3,157
	2001-2500	119,209	1,066,241	53	3,210
	2501-3000	98,165	1,164,406	36	3,246
	3001-3500	54,848	1,219,254	17	3,263
	3501-4000	98,797	1,318,051	26	3,289
	> 4000	145,071	1,463,122	28	3,317

Table 36 (continued).

Yr	Size Range	Total # Pounds	Cumulative # Pounds	# Trips	Cumulative # Trips
1995	1-225	165,629	165,629	1,985	1,985
	226-500	210,857	376,486	615	2,600
	501-1000	307,814	684,300	443	3,043
	1001-1500	195,391	879,691	160	3,203
	1501-2000	111,340	991,031	64	3,267
	2001-2500	72,566	1,063,597	33	3,300
	2501-3000	54,913	1,118,510	20	3,320
	3001-3500	44,564	1,163,074	14	3,334
	3501-4000	29,934	1,193,008	8	334
	> 4000	153,358	1,346,363	31	3,373
1996	1-225	88,144	88,144	1,096	1,096
	226-500	111,583	199,727	323	1,419
	501-1000	149,361	349,088	214	1,633
	1001-1500	104,658	453,746	86	1,719
	1501-2000	58,871	512,617	34	1,753
	2001-2500	35,432	548,049	16	1,769
	2501-3000	43,201	591,250	16	1,785
	3001-3500	34,826	626,076	11	1,796
	3501-4000	19,005	645,081	5	1,801
	> 4000	37,261	682,342	5	1,806

Projected reductions in catch by sector is shown at the bottom of Table 35a. Overall reductions in catches from the commercial sector would be 41%, reductions in catch from the recreational sector would be 11%, and the total reduction in catch from the entire fishery would be 29%. All of these percentages are based on numbers of fish.

Beginning the **fishing year** May 1 will provide additional biological protection by increasing the likelihood the fishery will be closed at the start of the spawning period in March. Prohibiting coring may provide some additional reductions in commercial catch in that the head and tail will count towards the trip limit. In addition, should port samplers become available at some time in the future, having fish landed whole increases the potential for collection of otoliths for aging studies.

Economic Impacts

A 1-fish recreational **bag limit** per person per day would reduce headboat catch by 2%, charter boat and private rental boat catches combined by 12% (numbers of fish) during the first year based on MRFSS data (Table 33). Total recreational catch would be reduced by 11% (numbers of fish). This assumes that the number of recreational fishermen would not increase. If the number increases, the reduction would be much less. It is also possible for the recreational catch to increase above previous years' levels if the number of recreational fishermen targeting greater amberjack increases.

This action proposes a split year (May to April) for the fishing year. Also, the quota was set based on the total landings of greater amberjack for the 1995 calendar year. Thus, data for two time periods (May 1994 to April 1995 and May 1995 to April 1996) are utilized in the analysis of the impacts for the commercial fishery. The 1,000 pound **trip limit** would likely reduce annual commercial landings between 482,229 pounds (25%) and 416,850 pounds (25%) based on landings reported through the General Canvass system for the two time periods (Tables 35a and 35b). Based on an average exvessel price of $0.70 per pound (1995 Snapper Grouper Commercial Logbook Report) the trip limit would reduce gross annual revenue between $338,000 (using 1994/95 data) and $292,000 (using 1995/96 data) during the first year.

Using the 1995/96 data, the **April closure** throughout the EEZ to commercial fishermen would reduce commercial landings by 85,262 pounds (5% in numbers of fish) in the first year. Using 1994/95 data, the reduction would be 85,247 pounds (5% in numbers of fish). This means that the trip limit and the April closure would reduce commercial landings between 567,476 pounds (31% in numbers of fish) using 1994/95 data and 502,112 pounds (27% in numbers of fish) using 1995/96 data. The trip limit and closure would restrict annual landings to between 1,361,439 pounds and 1,165,290 pounds respectively.

Using the 1994/95 data, the **quota** of 1,169,931 pounds (63% of the 1995 landings) would further reduce annual landings by 191,508 pounds in the first year. This means that the fishery would close during March. Total commercial landings would be reduced by 758,984 pounds (41% in numbers of fish) in the first year. When the 1995/96 data is applied, the trip limit and April closure would restrict landings for the entire season below the quota. Thus, the quota would not be taken and the fishery would remain open throughout the season. However, if harvest levels increase the quota would ensure the desired level of reduction in catch is achieved.

Based on 1994/95 and 1995/96 data from the General Canvass database, and 1995 landings data for setting the quota, this action would likely reduce total landings of greater amberjack by 29% and 21% respectively, (numbers of fish) in the first year.

Prohibiting **coring** would affect the ability of fishermen to land more fish per trip since coring enables fishermen to increase their pay load of catches. However, because of the 1,000 pound trip limit year round, it is not expected that this would be a factor anymore.

Social Impacts

There is some dispute over the status of greater amberjack given the recent stock assessment which indicated a SPR of 84%. Problems in sampling were identified as causing the unusually high SPR estimate. Nonetheless, commercial fishing representatives have called into question the need for such an extreme management measure given the poor data included in the stock assessment. Testimony during public hearings suggested that the amberjack stock has declined and is in need of management, the extent of that management is what is being debated, primarily by commercial fishermen.

Amberjack was once viewed as a trash fish, but has gained popularity as a good fighter among recreational fishermen, as well as commercial fishermen who have seen a growing market for amberjacks. Once identified as underutilized, amberjack were included in a promotional campaign to increase its popularity among recreational fishermen (Griffith et. al, 1989). Commercial fishermen have responded to a growing market for amberjack which may have replaced a previous market niche once filled by fish like red drum. Landings for both sectors have increased since the early 1980s to a point where amberjack has become a rather important species for both recreational and commercial fishermen, especially in the Florida Keys. Spawning aggregations during March, April, and May in the Keys have provided easy targets for both commercial and recreational fishermen as they have increased their efforts to harvest these fish.

This action stems, in part, from a proposal by commercial fishing industry representatives from the Florida Keys. The previous preferred action, which included a three month closure, would have resulted in a substantial reduction on the commercial harvest from the Keys. Fishermen from the Florida Keys suggested a one month closure with a trip limit to spread out the harvest over the year. The quota, which was not part of the proposal was added to ensure the desired reduction in mortality was reached.

The combined effect of moving the fishing year, trip limits and including the quota will likely be a closure of the fishery sometime in February or March. This is predicated upon the 1995 fishing year harvest patterns and does not take into account any changes in effort. It is likely that with the quota, fishing effort will increase during the early months of the fishing year as commercial fishermen try to maintain harvest levels comparable to years past in anticipation of an early closure of the fishery. The trip limit will prevent a derby fishery from developing, however, effort may still increase as fishermen increase the number of fishing trips. This may mean an even earlier closure of the fishery and the possibility that some regions may have decreased opportunity to harvest amberjack. It was noted by law enforcement during development of the amendment that enforcement of trip limits is not always practical and would most likely be enforced dockside. With the limited number of enforcement agents able to conduct dockside enforcement, it was noted that any new fishery regulatory burden would require a shift from other fishery enforcement efforts.

Conclusion

The Council's preferred option in the public hearing draft of the original Amendment 8 is included as Option 5 under Other Possible Options (see below). In Amendment 9 the Council was proposing less restrictive measures to provide some biological protection while addressing comments from fishermen (see Option 7 below).

The Council is concerned about the status of greater amberjack. The recent stock assessment indicated a fishing mortality rate of 0.19 and a SPR of 84%. These values are unlikely given the level of catches in recent years. In fact, NMFS has serious concerns about their own stock assessment and, in their opinion, they consider the stock status unknown. The Council recognizes the concern of fishermen that additional actions are being proposed when the SPR is so high. This level of uncertainty about the conclusions of the stock assessment reflects the poor level of data available for greater amberjack. The Council's Scientific and Statistical Committee approved the assessment as being the best available given the situation (i.e., the lack of data). This is not a negative reflection on the assessment itself, rather it acknowledges the need for more data before an assessment may be completed that would accurately portray the stock status.

Even though the assessment report indicated a SPR of 84%, there is concern about future recruitment and pending declines in the stock mentioned in the report. Given the level of uncertainty and the desire to prevent overfishing, the Council concluded the proposed actions are necessary and appropriate to ensure the long-term productivity of the greater amberjack resource.

The bag limit of 1-fish would be consistent with the Gulf Council's new regulations, thereby promoting consistent regulations. The prohibition of coring will enhance data collection, particularly for aging studies.

Other Possible Options for Action 4:

Option 1. No Action. Maintain the existing minimum size limits, 3-fish bag limit, and limits during April.

Biological Impacts

This option would continue the 28" FL minimum size limit and 3-fish bag limit in the recreational fishery and the 36" FL or 28" cored length minimum size limit in the commercial fishery. In addition, during April all fishermen south of Cape Canaveral are limited to the bag limit to give some protection during the spawning season (April and May). These measures were implemented January 1, 1992. As the stock status has been listed as unknown by NMFS, no action may be detrimental to the greater amberjack stock.

Economic Impacts

Unknown at this time. Available data from stock assessment studies indicate stock size estimates have been highly variable over the study period and that stock density is recruitment driven. Also, fishing mortality approximately doubled between 1986 and 1987; although it declined in 1988. Given these observations, stock size could diminish if succeeding years of high fishing effort coincide with low levels of recruitment. This could lead to diminished profitability in the long-term. Conversely, years of high fishing effort could coincide with high levels of recruitment which likely would not cause stock decline. This scenario would likely not impact profitability in the long-term. It is not possible to predict the economic impacts of a "no action" option at this time given the dearth of information on the fishery.

Social Impacts

There has been considerable concern for the increased directed fishing effort for greater amberjack in recent years. With the no action option that concern will continue to exist and may grow creating annoyance with further delays in management. However, one comment that was heard during previous public hearings was that this was a localized issue in south Florida and the fisheries elsewhere in the South Atlantic were not experiencing the same problems, and therefore did not need further management.

Conclusion

The Council rejected this option because it would not provide additional biological protection at a time when the status of the greater amberjack stock is unknown.

Option 2. Prohibit any retention during April.

Biological Impacts

This option would prevent harvest under the bag limit that takes place during a part of the spawning season and provide additional reproductive potential to the stock.

Economic Impacts

Based on General Canvass data for 1995 – 1996, the average landings of greater amberjack for April was 116,526 pounds (7% in numbers of the annual landings) with an estimated value of $82,000 (Table 34b). This is for the entire South Atlantic region. Thus, commercial fishermen would likely experience a reduction in gross revenue of this magnitude during the first year with this prohibition unless they can redirect effort to other fisheries during this time period. Recreational fishermen targeting greater amberjack during April would experience reduced satisfaction from their fishing experience unless they can experience the same level of satisfaction fishing other species. The extent of any reduced satisfaction in recreational experience cannot be determined at this time.

Social Impacts

Prohibiting retention during the month of April may remove incentive for recreational greater amberjack fishermen to fish that species. The likelihood of increased effort prior to or after April is a possibility.

Conclusion

The Council rejected this option because it would prevent any harvest during the month of April. The Council decided its preferred action is more appropriate based on the uncertainty with the assessment and conditions in the fishery.

Option 3. Prohibit all harvest above the bag limit and all sale during April and May in the EEZ off Florida.

Biological Impacts

This option would provide some protection for greater amberjack. Biological benefits are less than with the Council's preferred option.

Economic Impacts

Presently, the bag limit affects all fishermen during the month of April. This option would extend it to May. Using General Canvass data for 1993 – 1995, the average landings in Florida was 461,362 pounds for April and May. This represents 30% of the commercial landings for Florida for the same period. Based on these figures, commercial fishermen in Florida would likely experience a decrease in gross revenue of $323,000 in the first year.

Social Impacts

The impacts of prohibiting sale of amberjack during this time period would depend upon how reliant commercial fishermen are upon this species to contribute to the fishing operation and household income.

Conclusion

The Council rejected this option because it would differentially prevent any large scale commercial harvest in the EEZ off Florida during the months of April and May. The Council decided its preferred action is more appropriate based on the uncertainty with the assessment and conditions in the fishery, and is also more equitable to all fishermen.

Option 4. Reduce the amberjack bag limit to 1 and change the recreational size limit to 20" FL for all *Seriola* species.

Biological Impacts

The greater amberjack bag limit would reduce the headboat catch by 2% and the charterboat and private/rental sectors' catch by 12% (Table 33). If the size limit was 20" FL for all *Seriola* spp., recreational catch would not be reduced significantly at bag limits of 3 or larger (Table 37). If the bag limit for all *Seriola* species was 1, recreational catch would be reduced by 10% (headboat) and 17% (MRFSS) as shown in Table 37.

Economic Impacts

A bag limit of 1-fish and a minimum size limit of 20" FL would reduce headboat and MRFSS catches by 10% and 17% respectively, for all *Seriola* species (Table 37). Based on 1995 landings data from the Trends database, total recreational catch would be reduced by 17%. This assumes that there would be no further increase in the number of recreational fishermen participating the fishery. If this number increases, the percent reduction would be much less. The extent of any reduced satisfaction in recreational experience cannot be determined at this time.

Table 37. Percent Reduction in *Seriola* spp. Catch Resulting from Size Limit of 20" FL and Bag Limits of 1 – 3 (Data Source: Headboat Data and MRFSS 1995).

BAG LIMIT	PERCENT REDUCTION IN CATCH	
	HEADBOAT	MRFSS
1	10.2%	17.4%
2	1.4%	5.2%
3	0.1%	1.4%

Social Impacts

Bag limits and size limits together are common management tools for recreational fisheries. They may be acceptable as long as the limits do not go beyond a certain satisfaction level. Choosing a bag limit that is too low may cause fishermen to lose interest in the fishery or become dissatisfied with management. Reducing the recreational bag limit to one fish may induce fishermen to switch their fishing effort to other species. On the other hand, recreational fishermen may be satisfied with a one fish bag limit for greater amberjack and continue to fish this species which may increase release mortality. Implementing a 20" size limit for all *Seriola* spp. may provide for better conservation as fishermen have to contend with less species identification when measuring fish, thereby eliminating problems associated with misidentification.

Conclusion

The Council rejected this option because its preferred action is more appropriate based on the uncertainty with the assessment and conditions in the fishery.

Option 5. Establish measures for greater amberjack that will: extend the April closure throughout the EEZ and prohibit sale during April; reduce the recreational bag limit to 1 fish per person per day; implement a commercial quota to reduce landings by 21% based on average landings 1986-1995 and implement a trip limit of 500 to 1,000 pounds; change the start of the fishing year from January 1 to July 1; and prohibit coring.

Biological Impacts

This option is very similar to the preferred action except that the targeted reduction is 21% versus 37% and the fishing year is different. This option would propose a 21% reduction because this was the target reduction in Amendment 4. The reductions anticipated from Amendment 4 were never realized due in part to changes in fishing patterns. The trip limit and change of the fishing year would equitably spread harvest throughout the fishery.

Economic Impacts

The proposed action would further aid the recovery process initiated by the current minimum size limits (36" FL and 28" FL for commercial and recreational fishermen respectively) since it would remove any incentive for fishermen to target greater amberjack during this period. Prohibiting any retention of greater amberjack and sale during April would likely reduce annual commercial catch by 116,526 pounds (7% in numbers of the annual landings) based on average annual landings for the period 1995 to 1996 reported through the General Canvass system (Table 34b). This means that commercial fishermen in the South Atlantic region who have fished for greater amberjack during April would forgo approximately \$82,000 in gross revenue during the first year. A 1-fish recreational bag limit per person per day would reduce headboat and MRFSS catches by 2% and 12% respectively, during the first year (Table 33). This assumes that the number of recreational fishermen would not increase. If the number increases, the reduction would be much less. It is also possible for the recreational catch to increase above previous year's level if the number of recreational fishermen targeting greater amberjack increases significantly.

A 21% reduction in commercial landings would result in the quota being set at 1,296,821 pounds, based on average landings from 1986- 95 (Table 38). Without a trip limit and with the fishing year starting on July 1, the quota would likely be filled in April. This assumes that the landing trend in 1995 would continue. It is important to note that adverse economic consequences could result from quota management. The worse case scenario could result in derby fishing (large quantities landed in a relatively short time period), declining exvessel prices, and shortening of the fishing season. These consequences may or may not occur for greater amberjack.

The trip limit would slow down landings and possibly prevent closure of the fishery. However, the effectiveness of the trip limit cannot be determined at this time. Based on 1995 monthly landings data from the General Canvass database, and 1995 annual landings data for all sectors from the Trends database, this action would likely reduce total landings of greater amberjack by 27% in numbers of fish in the first year (Table 38).

Prohibiting coring would affect the ability of fishermen to land more fish per trip since coring enables fishermen to increase their pay load of catches. If this becomes a factor, if could reduce returns to fishermen. The magnitude of any reduction in revenue cannot be determined at this time.

Social Impacts

The social impacts from prohibiting sale of bag limit greater amberjack during these months would most likely affect few commercial fishermen since they would unlikely make a trip for just bag limit fish. However, that which is sold may provide an important source of income to those fishermen who are selling their catch. On the other hand, the conservation benefits perceived and actually gained from such an action may outweigh any inconvenience that might come from the prohibition of sale. Again, the actual impacts are difficult to assess without knowing who is selling amberjack during that time period and how important it is to their fishing operation or household income.

Table 38. Greater Amberjack Commercial Landings for 1986 - 1995 showing Month fishery is Expected to close based on Quota Level. (Source: 1986 - 1995 Yearly Data, J.C. Potts et al; April 1, 1997, "Trends in Catch Data for Fifteen Species of Reef Fish Landed Along the Southeastern United States". 1995 Monthly data, Linda Hardy from General Canvass Data Base).

YEAR	LANDINGS (LBS)	OPTIONS FOR QUOTA		MONTH EXPECTED TO CLOSE
		% '86-'95 AVG.	QUOTA	
1986	513,403	25%	410,386	OCTOBER
1987	1,386,854	50%	820,773	FEBRUARY
1988	1,272,696	60%	984,927	MARCH
1989	1,117,609	70%	114,908	MARCH
1990	1,842,528	79%	1,296,821	APRIL
1991	2,337,200	80%	1,313,236	APRIL
1992	2,221,340	90%	1,477,391	MAY
1993	1,904,620	95%	1,559,468	MAY
1994	1,958,478			
1995	1,860,718			
AVERAGE	1,641,545			
MONTH	LANDINGS (LBS)	CUMULATIVE LANDINGS	QUOTA = 1,296,821	
JULY	138,608	138,608		
AUGUST	103,854	242,462		
SEPTEMBER	107,307	349,769		
OCTOBER	93,097	442,866		
NOVEMBER	87,946	530,812		
DECEMBER	94,870	625,682		
JANUARY	169,163	794,845		
FEBRUARY	170,329	965,174		
MARCH	293,377	1,258,551		
APRIL	113,663	1,372,214	APRIL	
MAY	365,168	1,737,382		
JUNE	119,652	1,857,034		

Conclusion

The Council determined the provisions of the preferred action better address the uncertainties in the amberjack assessment and the fishery and therefore rejected this option.

Option 6. Increase the greater amberjack size limit from 28" to 36" FL for the recreational fishery.

Biological Impacts

This option would provide additional biological protection to the stock by allowing more fish to spawn before they are harvested. A 36" FL minimum size limit equates to 91.44 cm which would allow almost all greater amberjack to spawn prior to capture.

The following is directly from work by Ray King Burch (1979):

Few immature fish were landed during the spawning season. The smallest male with the macroscopic appearance of ripeness was 82.5 cm long and the gonad index was 5.31%. The smallest ripe female was 81.0 cm long. Therefore, based on von Bertalanffy growth rates, maturity may occur as early as during the fourth year (age 3) in both sexes. Almost all greater amberjack are mature by the end of the fifth year (age 4). It was difficult to find the gonads in fish smaller than 45.0 cm (age 1) and the sex of fish smaller than 50.0 cm (< age 2) could not be determined.

Burch's aging results were different than more recent work as shown below in Table 39. Both results are shown below. Aging from otoliths indicated a smaller size at age than indicated by reading scales. Based on Burch's results, the smallest ripe female was 81 cm long which would correspond to late Age 4. Similarly, Burch found almost all mature by Age 4 which corresponded to 92 cm. Based on more recent aging work, this would equate to Age 6.

Table 39. Greater Amberjack Aging Information. (Source: Burch, 1979.)

AGE	Fork Length(cm)	from Burch	Fork Length	from Table 31
(years)	FL (growth eq.)	FL (scales)	FL(otoliths,cm)	FL(otoliths, in)
1	41	42	37	14
2	61	63	53	21
3	77	80	66	26
4	91	92	77	31
5	103	102	87	34
6	113	110	95	37
7	121	117	101	40
8	128	127	107	42
9	135	134	113	45
10	139	140	121	48

Economic Impacts

The extent of the impact on the recreational fishery would depend on the number of recreational fishermen targeting greater amberjack. Based on 1995 data, a 36" FL size limit would reduce headboat catch by 75% in numbers of fish and MRFSS catch by 33% in numbers of fish in the first year. Total catch for the recreational sector would be reduced by 38% in numbers of fish in the first year.

Social Impacts

With this size change and the reduction in catch for headboats and other recreational fishermen it is likely that some effort shift will occur if amberjack are a primary target species. If amberjack are not a primary target species then landings will likely increase on those species that are the primary target species or that occur in the same area and time with amberjack.

Conclusion

The Council voted at the June 1997 meeting to include this option in order to get public input. The Council is concerned about the status of greater amberjack and wanted to evaluate all alternatives to provide biological protection. The Council determined the provisions of the preferred action better address the uncertainties in the amberjack assessment and the fishery, and therefore rejected this option.

Option 7. Establish measures for greater amberjack that will: prohibit all harvest in excess of the bag limit throughout the EEZ during March, April, and May; prohibit sale during March, April, and May; reduce the recreational bag limit from 3 to 1 greater amberjack per person per day; and prohibit coring.

Biological Impacts

This option would address the large number of complaints concerning recreational fishermen targeting and selling amberjack during April when all fishermen are currently limited to the bag limit. This option continues the 28" FL recreational minimum size limit and the 36" FL minimum size limit in the commercial fishery, however the 28" cored length commercial size limit would be eliminated given coring will be prohibited. Currently, during April all fishermen south of Cape Canaveral are limited to the bag limit to give some protection during the spawning season (April and May). These measures were implemented January 1, 1992.

A bag limit of 1 will reduce the headboat catch by 2% and the charterboat and private/rental sectors by 12% (Table 33). Prohibiting all harvest in excess of the bag limit and prohibiting sale should reduce commercial landings by 45% based on catches during March, April, and May 1995 (Table 34a). It should be noted the 113,663 pounds in April resulted under the 3-fish bag limit and probably included sales from charterboat, headboats, recreational boats, and possibly some commercial boats fishing under the 3-fish bag limit.

Economic Impacts

The proposed action would further aid the recovery process initiated by the current minimum size limits (36" FL and 28" FL for commercial and recreational fishermen respectively) since it would remove any incentive for fishermen to target greater amberjack during this period. Prohibiting any retention of greater amberjack in excess of the bag limit and prohibiting sale during March, April and May would likely reduce annual commercial catch by 785,070 pounds (42% in numbers of fish) based on landings for 1995 reported through the General Canvass system (Table 34b). Based on an average exvessel price of $0.70 per pound (1995 Snapper Grouper Commercial Logbook Report) commercial fishermen in the South Atlantic region who have fished for greater amberjack during March, April and May would forgo approximately $550,000 in gross revenue during the first year.

A 1-fish recreational bag limit per person per day would reduce headboat and MRFSS catches by 2% and 12% respectively, during the first year (Table 33). This assumes that the number of recreational fishermen would not increase. If the number increases, the reduction would be much less. It is also possible for the recreational catch to increase above previous years' levels if the number of recreational fishermen targeting greater amberjack increases significantly.

Based on 1995 monthly landings data from the General Canvass database, and 1995 annual landings data for all sectors from the Trends database, this action would likely reduce total landings of greater amberjack by 32% in numbers of fish in the first year.

Prohibiting coring would affect the ability of fishermen to land more fish per trip since coring enables fishermen to increase their pay load of catches. If this becomes a factor, it could reduce returns to fishermen. The magnitude of any reduction in revenue cannot be determined at this time.

Social Impacts

Prohibiting harvest in excess of the bag limit and all sale of greater amberjack during these months will likely force commercial fishermen to switch effort to other species. There could also be increased effort on both sides of the closure. This closure would add two months to the present Florida closure and would create consistency problems, unless the state also added the months of March and May. The added protection during spawning season may be looked upon favorably by fishermen. However, combined with other closures proposed in this amendment for other species, this action could have significant impact for fishermen in those fisheries which may also have closures proscribed. The prohibition of coring will enhance enforcement and data collection, however, some fishermen believe this practice enhances the quality of their product. Those that core their fish will look upon this restriction unfavorably and may need to make some change in their fishing practice to accommodate this restriction which will reduce the number of fish they are able to place in their hold. The social impacts of reducing the recreational bag limit to one fish may induce fishermen to switch their fishing effort to other species. On the other hand, recreational fishermen may be satisfied with a one fish bag limit for amberjack and continue to fish for this species on a more limited basis. Previous public hearings indicated that fishermen in the northern areas (i.e., north of Florida) considered the amberjack problem a localized issue in Florida. They expressed concern that management measures chosen to address a localized problem may restrain their efforts to target amberjack in the future.

Conclusion

The Council is concerned about the status of greater amberjack. The recent stock assessment indicated a fishing mortality rate of 0.19 and a SPR of 84%. These values are unlikely given the level of catches in recent years. In fact, NMFS has serious concerns about their own stock assessment and, in their opinion, they consider the stock status unknown. The Council recognizes the concern of fishermen that additional actions are being proposed when the SPR is so high. This level of uncertainty about the conclusions of the stock assessment reflects the poor level of data available for greater amberjack. The Council's Scientific and Statistical Committee approved the assessment as being the best available given the situation (i.e., the lack of data). This is not a negative reflection on the assessment itself, rather it acknowledges the need for more data before an assessment may be completed that would accurately portray the stock status.

Even though the assessment report indicated a SPR of 84%, there is concern about future recruitment and pending declines in the stock. Given the level of uncertainty and the desire to prevent overfishing, the Council concluded additional actions are necessary and appropriate to ensure the long-term productivity of the greater amberjack resource.

The Council rejected this option because the preferred option provides additional biological protection for the stock without the level of negative impacts on fishermen with this option.

4.2.5 ACTION 5. Increase the recreational vermilion snapper minimum size limit from 10" to 11" TL, and maintain the current 10 vermilion snapper bag limit.

The Council established a 10-fish recreational bag limit and size limits of 10" TL for the recreational fishery and 12" TL for the commercial fishery in Amendment 4; regulations became effective January 1992.

During the scoping process for Amendment 8 some fishermen indicated that vermilion snapper are in good shape and fishermen requested an increase in the existing 10-fish bag limit.

The 1993 NMFS Assessment (Huntsman et al., 1993) applied models to catch data from 1991 (see their paper for the referenced Tables):

"The catch in number of vermilion snapper in 1991 (Table 1) increased from 1990 by nine percent (1,695,698 to 1,854,352) but it was almost identical to the 1988 catch (1,830,160 fish). By weight the 1991 catch (789,726 kg) was three percent less than in 1990 (812,495 kg), and 37 percent greater than in 1988 (576,760 kg).

Values of SSR for vermilion snapper for 1988, 1990 and 1991 (0.23, 0.20, 0.16) have been low and closely agreeing. Values of F on fully recruited age classes have also agreed reasonably well (0.79, 0.91, 0.95) (Table 3). In combination, the 10 fish recreational bag limit and the size limits (10 inch recreational, 12 inch commercial) are projected, based on data from 1990 to produce an SSR of 0.24 if all released undersized fish survive. A new analysis, based on headboat catches in 1991, suggests that the 10 fish recreational bag limit causes only a very small (three percent) reduction in catch. A 14 (13.4) inch size limit is needed to produce an SSR of 0.30 with the current distribution of fishing mortality by age. Alternatively, a 45 percent reduction in F to 0.52 would provide an SSR of 0.30. A 16 inch size limit would produce a 43 percent increase in yield per recruit and an SSR of 0.50 if all released fish survive.

On the basis of computed equilibrium values of F and SSR it appears that the vermilion snapper population is depressed and that current management measures will not provide the desired SSR of 0.30. However, as noted in previous assessments, estimates will be inaccurate if there are trends in recruitment. A trending increase in recruitment will cause an overestimate of F and underestimate of SSR. There is no clear evidence that such a trend is occurring for vermilion snapper, but catches in number remain high, and the possibility of violation of the equilibrium assumption must be considered."

At the June 1995 meeting, the Council received a draft report entitled "Population characteristics of the vermilion snapper, *Rhomboplites aurorubens*, from the southeastern United States" prepared by Boxian Zhao and John C. McGovern of the South Carolina Department of Natural Resources (1995). Major conclusions were as follows:

- *Mean length of vermilion snapper taken by MARMAP in hook-and-line and trap collections showed a significant decline from 1979-1993.*
- *Mean length of vermilion snapper taken by the headboat and commercial hook-and-line gear declined tremendously between 1979-1991.*
- *An overall decline was significant for MARMAP trap CPUE between 1983-1993.*
- *The percentage of females gradually increased from 62% in 1979-1981 to 70% in 1991-1993.*

- *Both sexes of vermilion snapper collected more recently (1986-1993) became sexually mature at a smaller size and a younger age than individuals collected in 1979-1981.*
- *The fish size at age was getting smaller during 1979-1993.*
- *Validation of annulus formation in otoliths was achieved by marginal increment analysis and frequency distribution of focus-to-ring measurement.*
- *Five age-length-keys were created from MARMAP samples for running the VPA.*
- *The catch in numbers of private and charter boat showed little change during 1979-1993. The headboat catch increased until 1988 followed by a decrease through 1993. The commercial catches were fairly stable until 1987, increased from 1988 until 1991, and then declined to the level of the mid 1980's. The total catch in numbers showed a steady increase until 1991, and decreased.*
- *The modal age was getting older in the total catch during 1979-1993. However, the mean length declined with time.*
- *The annual stock numbers increased from 1979 through 1983, remained stable for three years, and then decreased until 1993.*
- *Numbers of recruits have diminished continuously since 1984.*
- *The present values of fishing mortality were larger than F_{max} and $F_{0.1}$ in 1990 and 1991, suggesting concern for growth overfishing.*
- *The Spawning Stock Ratio (SSR) for mature biomass sharply declined from 1988 and was below 30% in 1990 and 1991, which is the Council's definition for recruitment overfishing. The SSR for fecundity was below 30% during 1988-1991.*
- *The SSR was calculated for ten (10) management options. A minimum size limit above 12" TL or a reduction of more than 30% in fishing mortality would be necessary to achieve 30% SSR for mature biomass.*

Impacts on sexual maturity and sex ratios are described by Zhao and McGovern (In Press):

Percentages of mature male and female vermilion snapper Rhomboplites aurorubens based on total length (TL) and age were calculated for five three-year periods during 1979-1993. Males and females collected from 1982-1987 became sexually mature at a smaller size and a younger age than individuals collected during 1979-1981. The median TL at maturity for females decreased from 160 mm during 1979-81 to 151 mm in the 1985-87 period. The median TL at maturity for males was 145 mm during 1979-81. All males at 140 mm matured in 1985-87. The temporal shift to a smaller size at maturity was more pronounced in males than in females. The percentage of mature males at age 1 significantly increased from 63.6% in 1979-81 to 100% in 1985-87 and afterwards. More than twice as many females at age 1 were mature in 1985-87 (48.6%) as in 1979-81. The decline in size and age at maturity may have been caused by fishing pressure that gradually increased during 1980's.

The sex ratio of vermilion snapper was dependent on latitude and gear type, but generally length, and sampling years. Although the sex ratio was significantly different among latitudes, there were no trends among latitudes of 31°N, 32°N, and 33°N. The percentage of females was 72.1%, 68.0%, and 59.9% for vermilion snapper caught by trap, hook-and-line, and trawl respectively. Rationale for the difference in sex ratio among gear types are unclear; however, caution must be used when calculating the sex ratio for any fish species collected by various gear types.

At the August 1997 meeting, the Council received preliminary information from a draft NMFS stock assessment. Two estimates of natural mortality were used to bracket the expected value. For M=0.3, the SPR is 21% and if M=0.35, the SPR is 27% (Table 3A). The final report was presented at the November 1997 Council meeting.

Biological Impacts

Based on 1995 data, approximately 75% of the catch was harvested by commercial fishermen (428,000 kg or 944,000 lb) and 25% by recreational fishermen (143,000 kg or 315,000 lb). Figure 4 presents information for additional years on page 59.

Size at age information is presented in Table 40. All males larger than 140 mm and females larger than 160 mm are mature (Zhao and McGovern, 1997).

Table 40. Vermilion Snapper: Size at Age. (Source: Potts 1997 East Carolina University M.S. Thesis).

AGE	LENGTH (INCHES)	LENGTH (MM)
1	4.3	108
2	6.8	173
3	9.0	228
4	10.8	275
5	12.4	315
6	14.0	355
7	15.5	393
8	16.9	429
9	18.0	458
10	19.0	482
11	19.5	496
12	20.4	517
13	17.4 (n = 1)	441
14	23.9 (n = 1)	607

The vermilion snapper minimum size limits (10" recreational; 12" commercial) were implemented in January 1992 (Snapper Grouper Amendment 4). The August 1997 Compliance report evaluated catch below 10" TL; the commercial limit is 12" TL. The 1991 figures allow a comparison to what was landed pre-size limit. During 1996, 0% of the recreational (MRFSS) catch, 6% of the headboat catch, and 10% of the commercial catch was below the minimum size limits (Table 41).

Fishing mortality must be reduced by between 11% and 31% to rebuild above the overfished level of 30% transitional SPR, and by between 39% and 51% to achieve the long-term goal of 40% static SPR. The 11" TL minimum size limit would reduce the headboat catch by 29% and the charterboat and private/rental catch by 70% in terms of numbers of fish (Table 42). For the entire fishery, the reduction would be 9%, slightly below the level reduction required to rebuild above the overfished level of 30% SPR with M=0.35.

Table 41. Percent of vermilion snapper catch below legal size limit

VERMILION SNAPPER: PERCENT LESS THAN LEGAL SIZE			
YEAR	MRFSS	HEADBOAT	COMMERCIAL
1996	0%	6%	10%
1995	37%	14%	11%
1994	0%	9%	6%
1993	4%	3%	5%
1992	47%	14%	1%
1991	49%	57%	50%

Table 42. Percent Reduction in Commercial, Headboat, and MRFSS Vermilion Snapper Catch Resulting from Different Size Limits - 1995 Commercial, Headboat and MRFSS Data. (Source: Bob Dixon, NMFS Beaufort Lab)

SIZE LIMIT	COMMERCIAL	HEADBOAT	MRFSS	COMBINED
11	-	29.0%	70.0%	8.7%
12	4.6%	57.8%	83.8%	27.8%
13	27.2%	78.5%	89.2%	48.7%
14	44.0%	87.2%	90.5%	61.7%

Economic Impacts

The percentage reduction in catch for a 11" TL size limit (headboat and MRFSS) are shown in Table 42. Headboat catch would be reduced by 29% and MRFSS catch by 70% in terms of numbers of fish. The combined recreational catch would be reduced by 34% in numbers of fish in the first year. The total catch (commercial and recreational) of vermilion snapper would be reduced by 13% in numbers of fish in the first year. The impact on the recreational sector would likely be reflected in reduced satisfaction from recreational experience. The extent of this cannot be determined at this time.

Social Impacts

An increase in the recreational minimum size limit for vermilion will affect a substantial part of the recreational catch with reductions for headboat catches of 29% and for other recreational fishermen a reduction of 70%. One impact might be increased discards as fishermen continue to fish vermilion but discard smaller fish. If they are unable to catch sufficient numbers under the new size limit, then they will likely redirect effort to other species. During previous public hearings it was noted that many headboats that fish the "party grounds" rarely catch vermilion that are over 10". This may be an artifact of fishing closer inshore because larger fish reside offshore. If these boats are forced to fish farther offshore this may reduce the number of trips they are able to make daily and increase their cost of fuel.

It is difficult to determine the impacts of this action alone as it must be considered in conjunction with the additional restrictions that come with several other actions within this amendment. Recreational fishermen may switch their fishing effort to other snappers and groupers, but their choices will be limited both by size and bag limits through other actions in this amendment. Because most analysis is done on a species by species basis, the reactions of fishermen in a multi-species fishery are unknown. It is likely that there will be some effort shifting, but where and to what extent are still unanswered.

Conclusion

The Council's preferred option in the public hearing draft of Amendment 8 is included as Option 3 under Other Possible Options (see below) and included a 12" size limit and 5-fish bag limit. The preferred option in the public hearing draft of Amendment 9 is included as Option 4 (see below). The Council dropped the proposed 5-fish bag limit and decided to keep the bag limit at the current 10-fish based on public comments and the economic analyses that demonstrated large negative impacts on the recreational sector. Updated biological information supports a more modest reduction in fishing mortality.

The Council selected this option even though the reduction in fishing mortality is slightly below that necessary to rebuild the stock above the overfished level (30% SPR). The Council concluded this action meets the mandates of the Magnuson-Stevens Act because vermilion will be rebuilt above the overfished level within the 10-year rebuilding timeframe specified in Snapper Grouper Amendment 4. Vermilion snapper are slightly below the overfished level of 30% SPR (Table 3A) and were documented as overfished in 1993. The Council's rebuilding timeframe was 10 years or the year 2003. Using SPR as the measure of stock status precludes the production of yield streams which would allow the Council to project which year the vermilion snapper stock would be rebuilt. Such yield streams are available from yield-per-recruit analyses. The Council has requested the NMFS Southeast Fisheries Science Center to explore techniques to provide projections of yield streams. Results of such projections are currently not available.

The Council will monitor the stock status and if additional measures are necessary to rebuild to 30% SPR, and ultimately to 40% SPR, the framework will be used to implement additional measures.

Other Possible Options for Action 5:

Option 1. **No Action.** Maintain the existing 10-fish bag limit and 10" TL recreational and 12" TL commercial size limits.

Biological Impacts

The SSR (equivalent to SPR) with existing regulations was estimated to be 30% in 1990, 22% in 1991, 24% in 1992 and 16% in 1993 (Zhao and McGovern, 1995). Under the No Action option, the stock would not rebuild and would continue to be below the 30% transitional SPR or overfished level.

Zhao and McGovern (1995) indicate that when SSR for the mature biomass was above 40%, recruitment was high. Also, that SSR values below 40% appeared to have a negative effect on recruitment. They stated that it appears that a threshold at 40% exists for SSR based on biomass. Similarly, a threshold at 30% exists for SSR based on egg production. They concluded that their examination suggested that a 40% SSR for mature biomass, or a 30% SSR for egg production is likely to be the true indicator of overfishing.

Economic Impacts

The biological data indicate this species is in a state of overfishing. The no action option would lead to further overexploitation. In the long-term, net returns to fishermen would decline.

Depending on the rate of overexploitation, the stock could be depleted to the point where fishing is no longer profitable. The no action option could lead to recruitment failure with severe economic, social, and biological consequences. This could require closing the fishery. A closure would occur if the spawning potential ratio falls below the threshold level.

Social Impacts

With no action vermilion snapper stocks may continue to decline. The long-term social impacts of a declining stock will most likely precipitate switching to other fisheries or added pressure on an already stressed stock.

Conclusion

The Council rejected this option because SPR has declined steadily since 1990 and was 16% (below the overfished level) in 1993. More recent estimates range from 21% to 27% SPR, below the overfished level of 30% SPR. Taking no action would allow overfishing to continue. Taking no action could lead to recruitment failure with severe economic, social, and biological impacts. Should such recruitment failure occur, recovery may require closing the fishery. No action would not meet the mandates of the Magnuson-Stevens Act.

Option 2. Increase the minimum size limit to 14" TL for both recreational and commercial fisheries and no bag limit or quota.

Biological Impacts

A size limit of 14" TL would reduce commercial catch by 44%, headboat catch by 87%, and charterboat and private/rental catch by 91% in numbers of fish (Table 42). Total catch in numbers of fish would be reduced by 62%.

Economic Impacts

Total catch of vermilion snapper would be reduced by 62% in terms of numbers of fish in the first year (Table 42). Commercial catch would be reduced by 44% in numbers of fish; on the recreational side, headboat catch would be reduced by 87% and MRFSS catch by 91% in the first year (Table 42). The recreational fishery would virtually shut down for vermilion snapper, because very few fish of legal size would be available initially. It could reduce satisfaction gained from recreational fishing experience and significantly impact associated commercial and recreational revenues.

Social Impacts

If the total commercial and recreational catch for this species is reduced by 62% then fishermen will undoubtedly shift their fishing effort. Commercial fishermen will seek alternative species to replace lost income. If there are no suitable substitutes then other means of replacing lost income will be sought. The availability of other types of work will certainly determine the impacts of a decision to work outside of fishing. The recently completed socio-demographic survey completed with active snapper grouper fishermen showed 32% of those surveyed had jobs besides fishing. That statistic may be related to the almost same number of 30% who considered their fishing to be part time. The remaining 70% who consider fishing a full time occupation may find alternative work hard to come by. Other choices would be for another member of the household to take on more responsibility for the household income. Again, the survey indicated that 56% of those interviewed had spouses who worked outside the home. The availability of work and the ability to find jobs that meet skill level are all factors in the impacts that remain unknown. Fishing communities are often rural and job opportunities are scarce and many times seasonal. Whether work will be available during the time when fishermen would have been catching vermilion snapper is not known and may depend upon the region.

Recreational fishermen will undoubtedly also switch to other species, as they may be unable to catch sufficient numbers at this size to meet preferences. Headboats, especially those that fish the "party grounds" closer to shore, may not be able to catch vermilion at this larger size limit.

Conclusion

The Council rejected this option because the impacts would be too harsh and the reduction in fishing mortality that would be achieved is not necessary to meet the mandates of the Magnuson-Stevens Act.

Option 3. Implement an annual vermilion snapper commercial quota of 600,000 pounds, a recreational bag limit of 5 fish, and a recreational minimum size limit of 12" TL.

Biological Impacts

Fishing mortality must be reduced by between 11% and 31% to rebuild above the overfished level of 30% static SPR. The 12" TL minimum size limit would reduce the headboat catch by 58% and the charterboat and private/rental catch by 84% in terms of numbers of fish (Table 42). The 5-fish bag limit would reduce the recreational catch by 39% based on headboat and MRFSS data (Table 43). The commercial catch would be reduced by 40% based on the quota (Tables 44 and 45). A combined 12" TL size limit and 5-fish bag limit would reduce the headboat catch by 60% and the MRFSS catch by 84% (Table 46).

Table 43. Percent Reduction in Vermilion Snapper Catch Resulting from Bag Limits of 1 – 10: (Data Source: 1994 Headboat Data and MRFSS).(Source: Bob Dixon et al, NMFS Beaufort Laboratory).

Bag Limit	1	2	3	4	5	6	7	8	9	10
% Reduction in Catch	81%	68%	57%	47%	39%	31%	25%	18%	13%	9%

Economic Impacts

Commercial landings of vermilion snapper from 1986 to 1995 are shown in Table 45. These figures show an increasing trend although landings declined in some years. An annual commercial quota of 600,000 pounds would reduce annual catch by 40% based on average annual landings for 1986 – 1995. This would be equivalent to a reduction of 398,457 pounds in landings in the first year. Based on the average exvessel price for 1995, total gross revenue would be reduced by $836,760 in the first year (1995 Snapper Grouper Commercial Logbook Report). Implementation of this quota would result in a closure of the fishery in August assuming the present landing pattern continues. This means that commercial fishermen could lose 40% of their historical catch in the first year. It is important to note that adverse economic consequences could result from quota management. The worse case scenario could result in derby fishing (large quantities landed in a relatively short time period), declining exvessel prices, and shortening of the fishing season. These consequences may or may not occur for vermilion snapper.

Table 44 shows the reported commercial landings of vermilion snapper by state for 1995. North Carolina accounted for 41% of the landings, followed by Florida (28%), South Carolina (17%), and Georgia (15%) of the commercial landings of vermilion snapper in the South Atlantic region in 1995. The highest landing was reported in September and the lowest landing in February. The figures do not show any particular trend during the year although landings were high during the summer and fall months.

The percent reduction in recreational catch for a 12" TL size limit and a 5 fish bag limit (headboat and MRFSS) are shown in Table 46. The headboat catch would be reduced by 60% and the private recreational catch (MRFSS) by 84% in terms of numbers of fish. Total catch of vermilion snapper (commercial and recreational) would be reduced by 48% in numbers of fish in the first year.

Social Impacts

This action would reduce the commercial and recreational catch by 48% and will have substantial impacts if viable substitutes are not found for this fishery. Commercial fishermen would undoubtedly switch to other species to make up for lost income. Whether the shift in effort would be for species in the snapper grouper complex will likely depend upon which other management measures are presently in place. Snapper grouper fishermen tend to fish many species and several gear types, including traps, hook and line, and nets. The majority of snapper grouper fishermen hold permits for coastal pelagics and therefore may shift effort to that fishery if possible. The ability to make up the entire amount of lost income by switching to another fishery would depend upon the status of that fishery and the amount of capital already present. If the effort shift is substantial, gear and user group conflict could accompany movement into another fishery. Recreational fishermen may switch to other species, or experience high discard rates as they continue to fish for vermilion snapper, but throw undersized fish back.

Table 44. Commercial Vermilion Snapper Landings for 1995 by Month and by State (Data Source: Nelson Johnson NMFS December 1996).

MONTH	NORTH CAROLINA	SOUTH CAROLINA	GEORGIA	FLORIDA (EAST)	FLORIDA (WEST)*	TOTAL
JANUARY	37,930	13,157	2,779	23,119	515	77,500
FEBRUARY	14,165	6,982	3,757	10,558	13	35,475
MARCH	24,537	10,779	5,172	16,843	53	57,384
APRIL	32,324	24,324	19,637	37,384	1,348	115,017
MAY	30,256	16,034	11,079	24,508	945	82,822
JUNE	31,599	11,565	12,285	13,157	202	68,808
JULY	16,461	10,230	14,295	23,824	236	65,046
AUGUST	39,392	24,234	17,374	19,337	83	100,420
SEPTEMBER	55,177	14,103	18,291	35,622	1,039	124,232
OCTOBER	38,848	11,373	18,286	20,745	139	89,391
NOVEMBER	37,639	7,195	7,811	18,136	982	71,763
DECEMBER	34,334	10,993	12,692	20,691	523	79,233
TOTAL	392,662	160,969	143,458	263,924	6,078	967,091
% OF SA TOTAL	40.6%	16.6%	14.8%	27.3%	0.6%	

*Atlantic catches landed on the west coast of Florida (mostly Monroe County).

Table 45. Commercial Vermilion Snapper Landings for 1986 – 1995 showing Month Fishery is Expected to Close based on Quota Level (Data Source: NMFS 1986-1994).

Year	Vermilion Snapper Average 1986–95 Landings		
1986	811,623		
1987	674,833		
1988	910,476		
1989	1,149,000		
1990	1,329,520		
1991	1,026,016		
1992	791,189		
1993	929,180		
1994	1,395,643		
1995	967,091		
Average	**998,457**		
Month	**Monthly 1995 Catch**	**Cumulative Catch**	**Quota = 600,000**
JANUARY	77,500	77,500	
FEBRUARY	35,475	112,975	
MARCH	57,384	170,359	
APRIL	115,017	285,376	
MAY	82,822	368,198	
JUNE	68,808	437,006	
JULY	65,046	502,052	
AUGUST	100,420	602,472	August
SEPTEMBER	124,232	726,704	
OCTOBER	89,391	816,095	
NOVEMBER	71,763	887,858	
DECEMBER	79,233	967,091	
TOTAL	**967,091**		

Table 46. Percent Reduction in Vermilion Snapper Catch Resulting from Different Bag and Size Limits (Data Source: 1995 Headboat and MRFSS Data).

BAG LIMIT	10" SIZE LIMIT		12" SIZE LIMIT	
	HEADBOAT	MRFSS	HEADBOAT	MRFSS
	% REDUCTION	% REDUCTION	% REDUCTION	% REDUCTION
1	79%	51%	83%	84%
2	65%	22%	74%	84%
3	53%	0.11%	67%	84%
4	44%	0.05%	62%	84%
5	**35%**	**0.01%**	**60%**	**84%**
6	28%	0.003%	59%	84%
7	22%	0%	59%	84%
8	16%	0%	58%	84%
9	11%	0%	58%	84%
10	0.07%	0%	58%	84%

Conclusion

The Council rejected this option because of the multispecies nature of the fishery which makes a commercial quota inefficient, because the impacts to recreational fishermen would have been too great, and because the preferred action is a sufficient step to rebuilding the stock. This action was not required to meet the mandates of the Magnuson-Stevens Act.

Option 4. Increase the recreational vermilion snapper minimum size limit from 10" to 12" TL.

Biological Impacts

The headboat catch would be reduced (based on numbers of fish) by 58% and the charterboat and private/rental catch would be reduced (based on numbers of fish) by 84% based on MRFSS data (Table 42).

Economic Impacts

The percentage reduction in catch for a 12" TL size limit (headboat and MRFSS) are shown in Table 42. Headboat catch would be reduced by 58% and MRFSS catch by 84% in terms of numbers of fish. Recreational catch would be reduced by 61% in numbers of fish in the first year. The total catch (commercial and recreational) of vermilion snapper would be reduced by 28% in numbers of fish in the first year. The impact on the recreational sector would likely be reflected in reduced satisfaction from recreational experience. The extent of this cannot be determined at this time.

Social Impacts

An increase in the minimum size limit for vermilion will affect a substantial part of the recreational catch with reductions for headboat catches of 58% and 84% for other recreational fishermen. One impact might be increased discards as fishermen continue to fish vermilion but discard smaller fish which comprised much of the catch previously. If they are unable to catch sufficient numbers under the new size limit, then they will likely redirect effort to other species. During previous public hearings it was noted that many headboats that fish the "party grounds" rarely catch vermilion snapper over 10". This may be an artifact of fishing closer inshore. If these boats are forced to fish farther offshore this may reduce the number of trips they are able to make daily and increase their cost of fuel.

Conclusion

The Council established a 10-fish recreational bag limit and size limits of 10" TL for the recreational fishery and 12" TL for the commercial fishery in Amendment 4; regulations became effective January 1992. During the scoping process for Amendment 8 some fishermen indicated that vermilion snapper are in good shape and fishermen requested an increase in the existing 10-fish bag limit.

The Council rejected this option because the negative impacts on the recreational fishery were too great and because this large of a reduction in fishing mortality is not necessary to rebuild the stock above the overfished level (30% SPR) and meet the mandates of the Magnuson-Stevens Act.

4.2.6 ACTION 6. Increase the gag minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.

These measures would apply to gag in or from the South Atlantic EEZ and gag in the South Atlantic harvested on board a permitted vessel (commercial or charter/headboat) without regard to where the gag is harvested or possessed. The prohibition on purchase would apply to all permitted dealers without regard to where the gag is harvested or possessed (i.e., state or federal waters). However, fish could be purchased from areas outside the South Atlantic provided there was an appropriate paper trail documenting the area of origin.

Biological Impacts

Based on 1995 data, approximately 71% of the catch was harvested by commercial fishermen (489,000 kg or 1,078,000 lb) and 29% by recreational fishermen (196,000 kg or 432,000 lb). Figure 5 (page 63) contains information for additional years.

Gag are a protogynous hermaphrodite, meaning that they begin life as females but change to males later in life. They live over 20 years and due to the high rate of exploitation, the male spawning stock may have been reduced to a point that the population may be "sperm limited" rather than "egg limited" like most other fish populations (Dr. Chris Koenig, Florida State University; personal communication).

The NMFS held a workshop on grouper reproduction November 18-19, 1993 (Koenig, 1994). Major points from the meeting were:

1. The percentage of males has decreased which is cause for concern.
2. SSR may overstate stock status.
3. Fishing effort is concentrated on spawning aggregations in the Gulf of Mexico and Florida east coast.
4. Red grouper do not form aggregations and have not demonstrated a similar decline in the percentage of males in the population.
5. The following information should be collected within the *Oculina* experimental closed area:
   A. Number and type of aggregations.
   B. Sex ratios and size distributions.
   C. Spawning aggregation structure and function.
   D. Map the habitat distribution and determine the importance to spawning aggregations.
   E. Document community structure changes over time.
6. Research needs - first three shown in priority order:
   A. Evaluate sperm limitation.
   B. Determine recruitment.
   C. Establish fishery reserves.

Gag spawn in the winter with peak spawning in February off the Carolinas (Manooch and Haimovici, 1978 from Burton, 1991) and in the Gulf of Mexico gag spawned from January through March (McErlean, 1963 from Burton, 1991). Burton (1991) has observed gag in spawning condition in northeast Florida from December through February. Gag are densely aggregated and very aggressive during the spawning period making them especially vulnerable to fishing at this time. In general, the council is concerned about high catch rates from spawning aggregations. Since the commercial fishery is not currently constrained by a quota, a commercial closure during the spawning period will help prevent an excessive harvest and resultant increase in fishing mortality from occurring. Excessive harvest when fish are so vulnerable might result in increases in fishing mortality sufficient to require implementation of quotas or other measures to constrain the commercial fishery. Spawning area closures may preclude the need for further measures.

Bohnsack (1989) summarized information relevant to the management strategy of protecting grouper spawning aggregations (Amendment 4, Appendix 2). The information presented would be applicable to any species such as gag that forms spawning aggregations:

"Polovina and Ralston (1987, p. 394) noted that groupers may be especially vulnerable to overexploitation because of their tendency to aggregate at traditional spawning sites and their protogynous reproductive system. A concern exists that this concentrated fishing activity exacerbates overfishing problems. Spawning aggregations have shown signs of overfishing in the Virgin Islands (Olsen and LaPlace, 1978). Evidence exists that fishing mortality can reduce or annihilate known spawning aggregations...A suggested remedy is to protect these spawning aggregations from all fishing activities...Altering catchability is a recognized management technique. Clearly, protecting spawning aggregations would reduce catchability. Spawning aggregations increase catchability (portion of the stock removed by one unit of fishing effort) by increasing fish concentration in defined areas at predictable times. Some evidence shows that in addition to concentrating grouper, grouper may be less cautious and more vulnerable to fishing gear. Johannes (1981) reported that grouper tended to be more lethargic during mass spawning aggregations and could be more easily approached by spearfishermen...Another concern is based on the fact that larger fishes (males) tend to be more aggressive and less cautious in taking baits and entering traps (Thompson and Munro 1974; 1983; pg 651, Munro 1987)...Kapuscinski and Philipp (1988) noted that harvest regulations during spawning seasons help maintain the genetic diversity within stocks...In conclusion, management actions to limit or prohibit fishing of spawning aggregations appears justified and prudent. Grouper populations in the Virgin Islands and Puerto Rico show signs of overfishing. Spawning stocks are targeted and particularly vulnerable to exploitation by a variety of fishing gear types during mass spawning aggregations. Particular spawning aggregations have disappeared or show signs of overexploitation due to fishing activities. Evidence exists that reef fish stocks are recruitment limited and recruitment success becomes increasingly uncertain with reduced stock size."

The Council considered including December in the closure to protect gag when they begin to aggregate in "staging" areas. Dr. Koenig recommends specifying that additional research be conducted to determine when gag begin to change sex in preparation for spawning (Dr. Chris Koenig, Florida State University; personal communication). Such research can be conducted within the Oculina HAPC that is an experimental closed area. If such research indicates that the spawning season closure should be expanded, the council will take action either through a plan amendment or through the framework (regulatory amendment).

In Amendment 7 the Council's position was to defer action on gag until a new assessment became available. This assessment has been completed and the report was presented at the April 1996 meeting of the Joint Snapper Grouper Committee, Controlled Access Committee, and Snapper Grouper Advisory Panel.

The new assessment report indicated that by every reasonable standard the gag population appears overfished (Huntsman et al., 1996). It concluded that even at the previous estimate of M=0.2, the average SSR for 1992 and 1993 was 0.33, a value barely above the overfished level of 30% SPR. Using an estimate of M=0.1, which seems more reasonable for this long lived species, the SSR is low. With M=0.1, SSR (for total adult biomass) was only 0.21 in 1986, and it declined irregularly to 0.11 in 1991, then increased, perhaps in response to the size limit, to 0.13 in 1993. By present council standards (SSR < 0.30 = overfishing) the gag population is clearly overfished.

The report noted that the relationship of F and M is crucial. In the 1990's, F for the gag population is three to four times M. A common rule of thumb for successful management of fisheries is to maintain F near the value of M. Thus, it is clear that in the case of gag, F has risen to levels high enough to exact major changes in size and abundance.

Unlike the previous assessment, the 1996 assessment utilized two estimates of natural mortality (M) 0.1 and 0.2. The following is taken directly from Huntsman et al. (1996):

- *We used two estimates of natural mortality (M) 0.1 and 0.2. M = 0.2, as used in previous estimates of spawning stock biomass per recruit (SSR) (Huntsman et al. 1991, 1992), is derived from the contemporary apparent maximum age in the fishery (about 22 years) by the method of Hoenig (1983) and is almost certainly an overestimate. It is probable that gag in unfished stocks live at least 30 years in which case (via Hoenig) M = 0.14 or less. Further, the total mortality rate of gag, Z, of which M is only a part, off North Carolina and South Carolina in 1975 was estimated as only 0.17 despite the existence of an active headboat fleet catching about 35,000 kg that year, a growing local commercial fleet, and visiting vessels from Florida and the Gulf Coast seeking grouper and snapper. That M < 0.17 is suggested not only by fishery activity, but also by the nature of the sample allowing the estimates, fish only from headboat landings. Because headboat catches represent the activity of generally inexperienced fishermen using gear that is more likely to capture smaller fish, and because headboats are restricted to the most intensely fished areas, by their need to return to port daily, logic suggests that estimates of Z based on samples from headboats alone would overestimate Z. Larger (older) fish available to less selective gear or from areas more distant from ports would be underrepresented in catches. Given the widely accepted assumption that gag off the Carolinas in 1975 were not older fish that emigrated from other areas but were a lightly fished geographic subunit of the regional population, it appears reasonable to attribute M and Z using the Z = 0.17 reference. Thus from at least two lines of evidence we infer that M < 0.2 and is most likely nearer to 0.1. We provide analyses based on both estimates. Schirripa (1994) estimated M for gag in the Gulf of Mexico as between 0.20 and 0.15.*

In order to help the gag population recover, a substantial adjustment in the fishery is needed. The size limit should be increased by 75% or the catch cut in half merely to achieve the minimum status that would not be termed overfishing (SSR <0.30)under the current definition (Huntsman et al., 1996). Again, Amendment 8 proposes to change the overfishing level to 20% SPR.

The 1992 assessment results indicated that the gag SSR was 35% and with the minimum size limit of 20" TL, the SSR was expected to increase to 39%. This did not occur. The 1996 assessment results indicate that the gag SSR is 13% (M=0.1) below the current overfishing level.

The 1996 assessment concluded gag are overfished. Fishermen on the other hand do not agree with this conclusion. While they support the Council taking additional action such as the increase in minimum size, they feel the closure is unnecessary. Trends in catch, average size, and CPUE (Figure 5 on page 63) support the fishermen's conclusion. The Council's SSC reviewed the gag assessment and concluded the true value of natural mortality (M) is somewhere between 0.1 and 0.2 which would result in a SPR above the 13%.

Additional scientific concern is presented by McGovern et al. (unpublished manuscript). Their abstract is presented below:

The gag, Mycteroperca microlepis, is a large, slow-growing, protogynous grouper that probably makes annual migrations to specific locations to aggregate for spawning. During 1976-1982, male gag constituted 19.6% of the sexually mature individuals taken by fishery-dependent and fishery-independent sampling along the southeast coast of the United States. A similar percentage of males was found in the Gulf of Mexico during 1977 to 1980; however, males made up only 1.9% of the population in the Gulf of Mexico during 1992. An emergency rule, enacted by the Department of Commerce, National Marine Fisheries Service in January 1995 that required commercial vessels from North Carolina to southeast Florida to land gag with gonads intact allowed us to determine recent sex ratios. Histological examination of 2,613 gonads of sexually mature gag collected from 18 January-18 April 1995 revealed that 5.5% of the gag from the southeast Atlantic were male. Females reached maturity at a smaller mean size in 1994-1995 compared to 1976-1982. Very few transitional specimens were collected during the spawning season. Most transitional individuals (79%) were taken immediately after the spawning season of 1995 during April through June. Gag is spawning condition were landed during December through mid May by fishermen working offshore of North Carolina to southeast Florida. In addition, gag in spawning condition were taken during research cruises off South Carolina and Georgia at depths ranging form 49 to 91 m, documenting the occurrence of spawning north of Florida.

In addition, preliminary work in South Carolina (McGovern, personal communication) indicated recruitment may have declined over the previous year. These preliminary results, along with other work on gag, was presented to the Council at the August 18-22, 1997 meeting in Charleston, South Carolina prior to the Council taking final action on Amendment 9.

The average age for gag at length sizes of 22" TL, 24" TL and 26" TL are 3.0, 3.6 and 4.2 years respectively. The catch–at–age plot for the most recent year's data used in the stock assessment (1993) shows that gag are not fully recruited to the fishery until age 5 (Figure 10). Also, SPR would not reach above 0.14 even at a 26" TL size limit (Jennifer Potts, NMFS Beaufort Lab; personal communication).

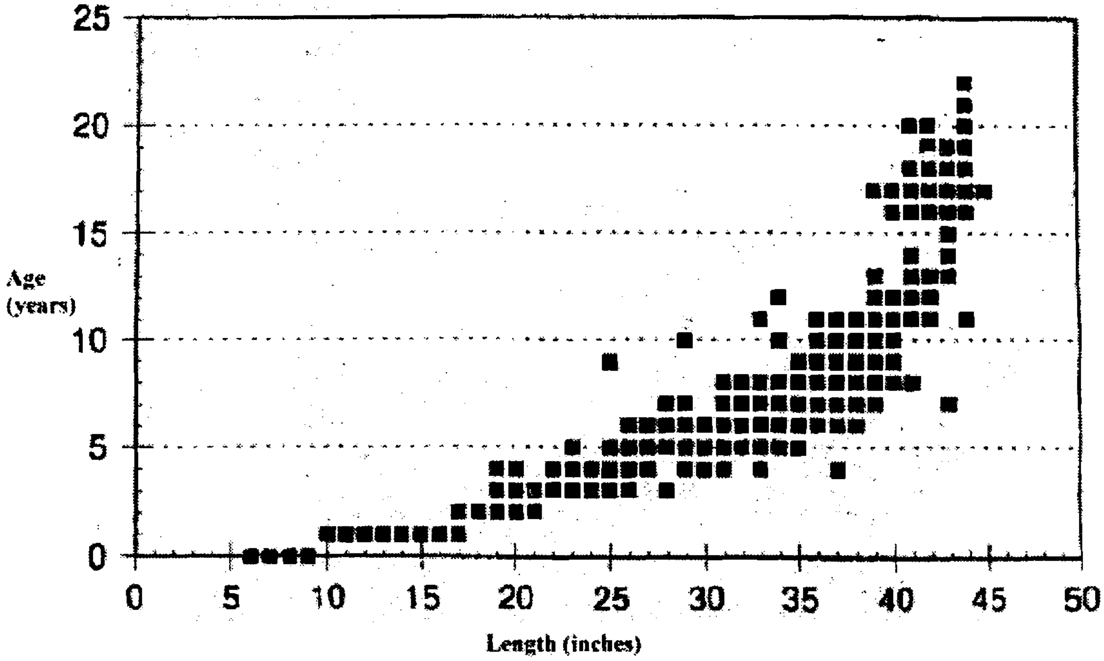


Figure 10. Gag catch at age - 1993 data (Source: NMFS Beaufort Lab).

The percent of gag sampled during 1992 and 1993 that were below the proposed minimum size limit of 24" TL is shown in Table 47 for the combined commercial and recreational fisheries by state.

Table 47. Percent of gag catch sampled that were below 24" TL (Data Source: Charles Manooch, NMFS Beaufort Laboratory). The commercial data for Florida are from 1992 samples. The rest of the data are from 1993 samples.

STATE	BOTH FISHERIES	COMMERCIAL	RECREATIONAL
NORTH CAROLINA	35%	3%	42%
SOUTH CAROLINA	26%	25%	32%
GEORGIA	5%	3%	20%
FLORIDA	6%	2%	25%

The gag minimum size limit (20" recreational and commercial) was implemented in January 1992 (Snapper Grouper Amendment 4). The 1991 figures allow a comparison to what was landed pre-size limit. During 1996, 7% of the recreational (MRFSS) catch, 2% of the headboat catch, and 0.3% of the commercial catch was below the minimum size limits (Table 48).

Table 48. Percent of gag catch below legal size limit

GAG: PERCENT LESS THAN LEGAL SIZE			
YEAR	MRFSS	HEADBOAT	COMMERCIAL
1996	7%	2%	0.3%
1995	9%	0.4%	0.3%
1994	24%	2%	2%
1993	7%	3%	1%
1992	13%	4%	3%
1991	39%	16%	7%

Tables 49, 50, and 51 present the percent reduction in catch resulting from different commercial and recreational size limits using 1993 data. In North Carolina, the reduction in recreational and commercial catches would be 42%, in South Carolina 35% reduction, in Georgia 6% reduction, and in Florida 7% reduction (Table 49).

Prohibiting the harvest of gag in excess of the bag limit during March and April would protect the spawning stock, particularly males which are more aggressive during this period and are more susceptible to being caught. Potential savings from March/April are shown in Tables 52, 53a and 53b. However, this action may cause fishermen to redirect fishing effort to other species in order to avoid disruption of their fishing activities, or, alternatively increase effort outside this closure period. Testimony at public hearings indicate the spawning season is different in some locations in the region. According to fishermen, spawning occurs in some areas around April/May, and in others around June/July. They also indicate this closure would impose more hardship on them since they already have a short fishing season. If the spawning season is variable as claimed by fishermen, the March and April closure would not protect the spawning stock in some areas.

Economic Impacts

Table 47 shows the percentage of catch sampled from 1993 landings that were below 24" TL. North Carolina had the highest (35%) for both commercial and recreational, and Georgia had the least (5%) for both sectors. For the entire South Atlantic region, 7% of the MRFSS catch and 2% of the headboat catch were below the legal size limit in 1996 (Table 48). Also, 0.3% of the 1996 commercial catch was below the minimum size (Table 48).

The 24" TL minimum size limit would reduce headboat catch by 27% in terms of numbers of fish, charterboat catch by 9% in terms of numbers of fish, and private/rental boat catch by 10% in terms of numbers of fish, based on 1995 data (Table 54). The combined recreational catch would be reduced by 13% in the first year. The 24" size limit would reduce commercial landings by 22% in numbers of fish in the first year (Table 50). Thus, the size limit alone would reduce total catch of gag (commercial and recreational) by 18% in numbers of fish in the first year.

Based on General Canvass data for 1995, commercial landings for March and April were 84,861 pounds and 73,146 pounds respectively (Table 52). Assuming that the landing trend continues, a March and April closure would reduce commercial landings by 158,007 pounds in the first year. This represents a 15% decrease in terms of numbers of fish in annual commercial landings. Based on an average exvessel price of $3.00 per pound (1995 Snapper Grouper Commercial Logbook Report), fishermen could experience a decrease of $474,000 in gross revenue in the first year.

The 24" TL minimum size limit with the March and April closure would reduce commercial landings by 37% in the first year. The combined measures would reduce total catch for the entire gag fishery (commercial and recreational) by 27% in the first year.

The prohibition on harvest during March and April would protect some of the spawning stock, particularly the males which are more susceptible at this time. This would increase recruitment and fishermen would benefit from increased stock density in the long-term. There is no quantitative information available to predict whether the long-term benefits would exceed the short-term costs that would have to be forgone by fishermen.

Although spawning closures may allow spawning fish to spawn more effectively because they are undisturbed by fishing activities, use of spawning closures to limit removals from the stock is not always successful. It is conceivable that fishing effort could increase before and/or after the spawning closure to keep overall harvest at the same level. Whether this occurs or not depends on the cost of fishing when the fish are not as aggregated as they are during the spawning or pre-spawning periods. If prices are high enough and additional fishing costs are such that fishing is still profitable, the total commercial catch could be nearly the same as without the closure. If this should occur, the biological goal may not be met while net producer benefits could be reduced because of reduced efficiency due to fishermen having to fish when fish are less concentrated. With this scenario, and from a solely economic perspective, it would probably have been preferable to allow fishing during spawning aggregations while controlling total harvest with TAC and trip limit restrictions.

On the other hand, if fishing costs are far greater because fishing cannot take place when fish are less aggregated, and catch is actually reduced because of the spawning closure, then the spawning closure may meet its biological objective. Even if this is the case, it would have been better solely from an economic perspective to limit catch to the same level by TAC and trip limit, rather than incurring far greater fishing costs by making fishing inefficient. This is not to say that competitive fishing under TAC management does not promote negative economic effects. These occur through derby fishing, lower exvessel prices, possible shortening of the fishing season, and inefficiencies from incentives to add unnecessary capital goods and to fish in bad weather or when fishing is not necessarily good. Both types of controls may serve biological goals but have potentially large effects on the economics of the fishery. One positive aspect of spawning season closure is that during the fishing season, fishermen would not be racing against the threat of an early closure. Also, spawning closures enable fishermen to better plan their fishing year, and probably are easier and less costly for the government to monitor and enforce.

Table 49. Percent reduction in catch resulting from different size limits **(recreational and commercial)** using 1993 data (Data Source: Charles Manooch, NMFS Beaufort Lab; August 1996).

SIZE LIMIT (IN)(TL)	PERCENT REDUCTION IN CATCH				
	SA	NC	SC	GA	FL
20	7%	16%	8%	2%	3%
21	10%	22%	14%	2%	4%
22	15%	29%	21%	3%	5%
23	19%	35%	26%	5%	6%
24	**24%**	**42%**	**35%**	**6%**	**7%**
25	30%	51%	45%	7%	8%
26	35%	58%	51%	10%	9%
27	41%	63%	60%	14%	11%
28	45%	73%	65%	18%	12%
29	52%	78%	73%	26%	19%
30	59%	83%	77%	37%	30%
31	72%	87%	84%	49%	54%
32	80%	88%	88%	57%	73%
33	88%	93%	92%	70%	87%
34	92%	95%	93%	78%	93%
35	94%	96%	95%	85%	96%
36	96%	97%	96%	87%	97%
37	97%	97%	97%	91%	98%
38	98%	98%	98%	94%	99%
39	99%	99%	99%	97%	
40	99%	99%	99%	99%	99%
41	100%	100%	100%		100%
42	100%		100%	100%	
43	100%		100%		
44	100%		100%		100%
45	100%				100%

Table 50. Percent reduction in catch resulting from different size limits **(commercial)** using 1993 data (Data Source: Charles Manooch, NMFS Beaufort Lab; August 1996).

SIZE LIMIT	**PERCENT REDUCTION IN CATCH**				
	SA	**NC**	**SC**	**GA**	**FL**
20	5%		8%		1%
21	8%		14%		
22	12%		20%	2%	1%
23	16%	3%	25%	3%	2%
24	**22%**		**35%**	**3%**	**2%**
25	28%	10%	44%	3%	3%
26	32%	13%	51%	5%	4%
27	38%		60%	9%	6%
28	42%	23%	65%	11%	6%
29	49%	27%	73%	19%	13%
30	56%	37%	76%	29%	25%
31	70%	53%	84%	42%	53%
32	79%	57%	88%	50%	74%
33	88%	70%	91%	65%	90%
34	91%	73%	93%	74%	94%
35	94%	77%	95%	82%	97%
36	95%	80%	96%	85%	98%
37	96%	83%	97%	89%	99%
38	98%	90%	98%	93%	99%
39	99%	93%	99%	96%	
40	99%	97%	100%	99%	100%
41	100%	100%	100%		
42	100%		100%	100%	
43	100%		100%		
44	100%		100%		100%
45					

Table 51. Percent reduction in catch resulting from different size limits (**recreational**) using 1993 data (Data Source: Charles Manooch, NMFS Beaufort Lab; August 1996).

SIZE LIMIT	PERCENT REDUCTION IN CATCH				
	SA	NC	SC	GA	FL
20	12%	20%	6%	6%	10%
21	19%	27%	15%	9%	15%
22	27%	35%	27%	14%	21%
23	32%	42%	32%	20%	25%
24	**38%**	**51%**	**40%**	**26%**	**26%**
25	44%	59%	48%	29%	27%
26	50%	67%	56%	37%	30%
27	55%	73%	62%	46%	31%
28	63%	84%	67%	57%	36%
29	68%	89%	73%	66%	40%
30	76%	93%	80%	86%	49%
31	80%	94%	85%	91%	57%
32	87%	94%	93%	94%	71%
33	91%	98%	95%	100%	78%
34	95%	99%	98%		88%
35	97%	100%	99%		92%
36	98%		100%		93%
37	99%				96%
38					
39					
40	99%				97%
41	99%				98%
42					
43					
44	100%				99%
45	100%				100%

Table 52. Monthly Landings of Gag in 1995 for the entire South Atlantic Region from the General Canvass Data base. Source: Linda Hardy, NMFS Beaufort Laboratory, April 2, 1997.

MONTH	WEIGHT (LBS)	CUM. WEIGHT	# OF FISH
JANUARY	155,842	155,842	9,205
FEBRUARY	75,745	231,587	4,474
MARCH	84,861	316,448	5,012
APRIL	73,146	389,594	4,320
MAY	104,131	493,725	6,151
JUNE	104,502	598,227	6,173
JULY	82,807	681,034	4,891
AUGUST	59,556	740,590	3,518
SEPTEMBER	76,371	816,961	4,511
OCTOBER	100,342	917,303	5,927
NOVEMBER	85,359	1,002,662	5,042
DECEMBER	74,054	1,076,716	4,374
TOTAL	**1,076,716**		**63,598**
MARCH & APRIL CLOSURE			**Av. wt. = 16.93 lbs**
Total savings (lbs):	**84,861+ 73,146 = 158,007**		
Total savings (# of fish):	**5,013 + 4,321 = 9,334**		
% reduction (# of fish):	**9,334/63,598 = 15%**		

Table 53a. Commercial gag landings for January - March 1993-1995 in whole pounds in the South Atlantic Region from Logbook Data (Data Source: Nelson Johnson, NMFS Beaufort Laboratory, May 1996).

MONTH	1993		1994		1995	
	# TRIPS	# POUNDS	# TRIPS	# POUNDS	# TRIPS	# POUNDS
JANUARY	186	38,496	281	54,764	370	110,607
FEBRUARY	182	38,345	282	53,581	251	59,837
MARCH	243	62,095	337	68,118	290	70,543
TOTAL	**611**	**138,936**	**900**	**176,463**	**911**	**240,987**
Average per month	**204**	**46,312**	**300**	**58,821**	**304**	**80,329**
AV. # OF TRIPS (1993 – 1995)			**807**			
AV. # OF POUNDS (1993 – 1995)			**185,462**			

Table 53b. Commercial Gag Landings for January - March 1993 to 1995 in whole pounds in the South Atlantic Region. (Source: Linda Hardy, NMFS Beaufort Lab, from General Canvass Database, April 1997).

MONTH	1993	1994	1995
JANUARY	101,975	70,915	155,842
FEBRUARY	86,104	75,788	75,745
MARCH	85,281	93,743	84,861
TOTAL (JAN-MAR) % OF ANNUAL	273,360 (31%)	240,466 (23%)	316,448 (29%)
TOTAL ANNUAL	888,322	1,033,941	1,076,716
AVERAGE PER MONTH	91,120	80,149	105,483
AVERAGE # OF LBS JAN - MAR (1993 - 1995)	276,758		

Social Impacts

Gag is an important commercial and recreational species in the South Atlantic, primarily in the northern region. This action would disproportionately affect fishermen in North and South Carolina, reducing commercial landings by over 35% and 26% respectively for the commercial fisheries in those states (Table 47). Recreational landings would also be reduced substantially. Again, as with previous actions fishermen will likely seek substitutions if possible. There may also be substantial effort increases on gag prior to and after the closure to compensate. Commercial fishermen will seek replacement of lost income through other fisheries or other means of compensation; this might entail other types of work or changes in household work patterns. The availability of work during the closure will become a factor if this becomes necessary.

Recreational fishermen may not substitute other species if the size limit is acceptable and the retention rate at that size limit is satisfying. However, it is likely that fishermen have been accustomed to catching and retaining gag at 20 inches. Therefore, some species substitution is likely with such a reduction in the recreational catch through this action.

In addition to this action, recreational fishermen will be limited by the aggregate bag limit change in Action 8. There will now be a 2 gag grouper bag limit rather than the five gag allowed previously. Much of the reduction comes from the size limit change, however, the charter boat sector will likely see an additional reduction of 13% in numbers of fish with the new bag limit (Table 54).

Commercial fishermen were asked to respond to the Council's request for information regarding which months they would choose if a three month closure was implemented to help reduce fishing mortality in the snapper grouper fishery. Thirty-one fishermen responded during the public hearing comment period and indicated which months they would choose to not fish . Although not a random sample of all snapper grouper fishermen their responses may give an indication of some of the social impacts. Of those months that this sample of fishermen chose not to fish, March was chosen by 39%. With almost 40% choosing March, fishermen may more readily accept this part of the closure. April, on the other hand, was chosen by only 7% and may indicate this month as an important month for harvesting snapper grouper species. How important gag is during April is not known entirely, except that March and April landings contributed between 7 and 10 percent to total gag landings in the South Atlantic over the three year period from 1993-95.

Again, this action must be viewed in the context of other actions within this amendment. These restrictions on gag may affect regions and fishermen disproportionately, depending upon their ability to adjust. As mentioned earlier, fishermen in North and South Carolina will be impacted more than others simply from the change in size limits for gag. Adding the closure may increase the impacts to where some fishermen may have no other choices for shifting their effort or replacing lost income. Of those fisheries which may see increased effort the mackerel fishery would be a likely candidate as almost 80% of snapper grouper commercial permit holders have commercial mackerel permits. With little to no information on fishing communities, it is impossible to assess the opportunities for those fishermen and/or their households who may need to find other ways to replace lost income.

Conclusion

Gag were documented as overfished in 1996 and the Council's rebuilding timeframe is 15 years or the year 2011. Using SPR as the measure of stock status precludes the production of yield streams which would allow the Council to project which year the gag stock would be rebuilt. Such yield streams are available from yield-per-recruit analyses. The Council has requested the NMFS Southeast Fisheries Science Center to explore techniques to provide projections of yield streams. Results of such projections are not currently available. In finalizing Snapper Grouper Amendment 9, the Council has proposed actions that would be expected to rebuild gag above the 30% SPR level within 10 years.

Based on M=0.1 as used in the NMFS assessment, fishing mortality needs to be reduced by 53% to rebuild above the overfished level of 30% transitional SPR. The combined 24" TL recreational and commercial size limit and March/April commercial closure reduces the commercial catch by 37% and the recreational catch by 17%. The total catch would be reduced by 27%.

The natural mortality for gag is unknown and there is some concern that M=0.1 is too low. The Council's Scientific and Statistical Committee reviewed the gag stock assessment during their April 14, 1997 meeting. No motion was approved, however, the discussion indicated a value of M between 0.1 and 0.15 would be more consistent with gag life history. If M=0.15, the proposed management measures would rebuild the stock to around the 30% level, and if M=0.2 no reduction is necessary as the stock would be at 30% SPR.

It is important to remember that the SPR estimate of 13% for gag is based on data only through 1993. The Council requested an updated assessment which would include more years of data under measures implemented in 1992 (Snapper Grouper Amendment 4); NMFS has responded that such an assessment would not be available until November 1998. The current SPR is unknown.

The Council concluded the proposed action was sufficiently close to the target reduction and meets the mandates of the Magnuson-Stevens Act to rebuild the gag stock above the overfished level. Some additional reductions may occur through implementation of Snapper Grouper Amendment 8 which established a limited entry program.

The Council will monitor gag stock status and if additional measures are necessary to rebuild above 30% transitional SPR and ultimately to 40% static SPR, the framework will be used to implement additional measures.

Other Possible Options for Action 6:

Option 1. No Action. Maintain the existing 20" TL size limit and 5-grouper aggregate bag limit.

Biological Impacts

It is possible that there has been a reduction in fishing mortality, but this has not been determined. During an informal meeting with gag fishermen at the February 1994 council meeting in St. Augustine, Florida, fishermen stated that the spawning period at the northern end of the management zone is different from that at the southern end. Also, January through March is the period during which fishing activities are limited due to severe weather conditions. According to the fishermen, there has not been any changes in the numbers of gags being caught. Thus, the stock is not in any danger of being overfished. A January-March closure would create significant hardship for them since gag would be out of their range by the time they are allowed to fish them. This would mean significant loss in revenue to them. Another issue that was mentioned is that larger gags (mainly males) stay in deeper waters most of the time and this could be the reason why the percentage of males in catches has declined to such an extent. If the gag stock is not currently being overfished, then the no action option would not cause the stock to decline and fishermen would not have to incur any loss in revenue. However, if overfishing is taking place, the no action option would cause further stock declines and fishermen could incur lost revenue in the long-term.

Tables 54 and 55 show the percent reduction in catch that should be expected with a combination of size and bag limits. With the current 20" size limit (Table 55), a bag limit above two would have no effect on the headboat catch; a 1-fish bag limit would reduce the headboat catch by 5% and a 2-fish bag limit would reduce the headboat catch by 1%. Also, with a 20" TL size limit, a bag limit above four would have no effect on the catch. A 1-4 fish bag limit would reduce charterboat catch by 29% to 4%. A bag limit above one would have no effect on the recreational catch.

With a 24" size limit (Table 54), a bag limit above two would have no additional effect on the headboat catch. A 1 to 2 fish bag limit would have a minimal effect on the headboat catch. Similarly, for the private/rental catch, a bag limit above two would have no effect. A 1-fish bag limit would reduce recreational catch by 16% and a 2-fish bag limit would reduce private/rental recreational catch by 10%. Bag limits of 5 and fewer would impact the charterboat catch (Table 54).

The commercial catch has remained relatively stable between 1990 and 1995 (Table 56).

Table 54. Reduction in Landings from Size and Bag Limits. Gag - 24" Size Limit. (Source: R. L. Dixon et al, NMFS Beaufort Laboratory, April 1997).

BAG LIMIT	HEADBOAT		CHARTER BOAT		PRIVATE BOAT	
	% REDUC. #	% REDUC. WT.	% REDUC. #	% REDUC. WT.	% REDUC. #	% REDUC. WT.
1	29.1	13.8	33.4	61.3	15.6	11.5
2	27.1	11.4	21.8	34.8	10.0	0
3	27.0	11.3	16.5	22.9	10.0	0
4	27.0	11.3	11.3	11.0	10.0	0
5	27.0	11.3	9.3	6.4	10.0	0

Table 55. Reduction in Landings from Size and Bag Limits. Gag - 20" Size Limit. (Source: R. L. Dixon et al, NMFS Beaufort Laboratory, April 1997).

BAG LIMIT	HEADBOAT		CHARTER BOAT		PRIVATE BOAT	
	% REDUC. #	% REDUC. WT.	% REDUC. #	% REDUC. WT.	% REDUC. #	% REDUC. WT.
1	4.9	4.7	28.7	57.6	0.1	12.4
2	1.3	1.3	14.8	29.7	0	0
3	<0.1	<0.1	9.6	19.2	0	0
4	0	0	4.3	8.7	0	0
5	0	0	0	0	0	0

Table 56. Gag commercial landings by state for 1990-95 (Data Source: 1990-92 NMFS General Canvas Data; 1993-95 Logbook File).

YEAR	**NC**	**SC**	**GA**	**FLEC**	**TOTAL**
1990	236,257	298,523	27,996	237,619	800,395
1991	140,454	276,421	39,728	233,819	690,422
1992	169,537	355,562	37,812	317,365	690,422
1993	110,200	252,039	42,562	191,648	596,449
1994	163,931	286,991	49,550	212,636	712,469
1995	148,414	345,855	70,373	243,228	807,870

Economic Impacts

Presently, there is a 20" TL size limit in place. This became effective in 1992 with implementation of Amendment 4. The 1996 Gag Assessment Report (Huntsman et al., 1996) indicates that over all fisheries, mean weight of gag has declined from 6.3 kg (13.9 pounds) in 1986 to 5.4 kg (11.9 pounds) in 1993. However, there was a slight increase in 1993 over 1991 and 1992 mean weights. This could have been the result of the minimum size limit. Also, mean weight of gag taken from headboats increased from 3.4 kg. (7.5 pounds) in 1986 – 1991 to 4.4 kg. (9.7 pounds) in 1993. Mean weight of gag taken from commercial vessels declined from 7.1 kg. (15.6 pounds) in 1986 – 1987 to 5.6 kg (12.3 pounds) in 1992 – 1993. The report further states that the minimum size limit apparently had little effect on the mean weight of commercially caught gag since most were larger than the size limit prior to its establishment.

Table 55 shows that the current 20" minimum size limit and 5-fish bag limit have no effect on the recreational fishery. There is no reduction in the headboat, charterboat or private/rental boat catch as a result of these measures. Depending on the status of the stock, the no action option could lead to recruitment failure with severe economic, social, and biological consequences. This could require closing the fishery. A closure would occur if the spawning potential ratio falls below the threshold level.

Social Impacts

Taking no action regarding gag would leave open the possibility of stock decline. Although some fishermen tend to disagree with the stock assessment, there is concern about gag in some areas, if not everywhere. No action would leave the Council with a risk prone management strategy given the scientific data presented in the last stock assessment.

Conclusion

Amendment 4 included a 20" TL gag minimum size limit, eliminated longlines within 50 fathoms, prohibited use of fish traps, and implemented a 5-fish aggregate grouper bag limit. The experimental closed area in Amendment 6 offers some additional protection. There was some concern that taking no additional action might result in overfishing. The present estimated spawning stock ratio (=SPR) indicate an average SSR for 1992 and 1993 of 0.33 for estimated M (0.2). However, this estimate only includes one year of data after the minimum size was implemented. If M is estimated at 0.15, the SSR for 1993 would be 0.20. Thus, no reasonable alternative estimate of M would suggest that the gag population is healthy (Huntsman et al., 1996).

The Council accepted the "no action" option earlier because they concluded that existing regulations provided sufficient protection for gag at that time. However, the 1996 Gag Assessment Report has shed new light on the status of gag population. The report indicates that the population is not in a healthy state and recommends measures that will assist in stock recovery.

Taking no action would allow this decline to continue and could lead to recruitment failure with severe economic, social, and biological impacts. Should such recruitment failure occur, recovery may require closing the fishery. Also, no action was not an option for the Council as reductions in fishing mortality are necessary to rebuild the gag stock above the overfished level and meet the mandates of the Magnuson-Stevens Act. Therefore, the Council rejected the no action option.

Option 2. Prohibit harvest of gag in excess of the 5-grouper aggregate bag limit (excluding Nassau grouper, jewfish, speckled hind, and warsaw grouper) January through March, and prohibit sale January through March.

Biological Impacts

Limiting catches to the bag limit during January through March has the potential to reduce fishing mortality by approximately 7-10% per month based on mean percent of 1982-1990 North and South Carolina commercial landings data and 7-18% per month based on 1986-1990 Florida commercial landings data assuming most gag landed during this time period were associated with spawning aggregations and that commercial fishing would not occur.

Economic Impacts

This option does not preclude commercial fishing during this period as long as harvest does not exceed the 5-grouper aggregate bag limit. However, the no sale provision means that commercial fishermen cannot sell gag caught under the bag limit. This would remove any incentive for commercial fishermen to catch gag during this period. Commercial fishermen would likely forgo their landings for those months which is approximately 276,758 pounds

($830,000) based on average landings for 1993 - 1995 as shown in Tables 53b. Total catch (commercial and recreational) would be reduced by 18% by weight.

With this option, nearly all of the conservation sacrifices are on the commercial sector. Allowing a bag limit of five is the status quo for the recreational fishing sector and as discussed under the no action option, it has no impact on the recreational sector. This could increase recreational catch because anglers would not be competing with commercial fishermen during the spawning period when fishing is usually good. On the other hand, anglers may not be able to fish effectively during those months because of poor weather conditions, or may not fish as hard if they can not sell the catch.

Social Impacts

Commercial fishermen would most likely need to find substitute fisheries during the bag limit harvest only and prohibition on sale. There is a likelihood of increased fishing pressure prior to and after the commercial closure. Recreational fishermen would be able to continue to fish and retain gag in the same quantities previously allowed. This would place all of the conservation effort on commercial fishermen who would not likely fish for bag limit fish they are unable to sell. This option could create an atmosphere of antagonism among commercial fishermen toward this type of management.

Conclusion

The Council rejected this option because the reduction in fishing mortality was not sufficient to meet the mandates of the Magnuson-Stevens Act and because the preferred option better addresses the problems and objectives identified.

Option 3. Prohibit sale and establish a possession limit of 1 gag per person per day January through March.

Biological Impacts

This is similar to Option 2 above, the only difference being a lower bag limit.

Economic Impacts

This option would essentially impose a harvest prohibition on commercial fishermen during this period. Based on the average landings for 1993 – 1995, commercial landings would be reduced by 276,758 pounds in the first year since there would be no sale of gag during January through March (Tables 53b). Commercial fishermen would have to forgo about $830,000 in gross revenue in the first year. This could impact other fisheries as fishermen increase their participation in alternative fisheries to compensate for this loss.

The 1–fish bag limit with the current 20" TL minimum size limit would affect the recreational sector. For those catching all gag under the current 5–grouper aggregate bag limit regulations, this option represents a 5% decrease in terms of numbers of fish and weight for the headboat sector, 29% decrease in terms of numbers of fish for the charterboat sector, and less than 1% reduction in terms of numbers of fish for the private/rental boat sector Table 55). This represents a 3% reduction in catch in numbers of fish for the recreational sector. Those catching one gag under the bag limit would experience no decrease in their catch. Thus, the impact on the recreational sector could range from no reduction to a 3% reduction in numbers of fish of the recreational catch.

Social Impacts

This option would reduce the recreational harvest of gag during the same months as the commercial closure. Whether recreational fishermen would support a 1 fish bag limit is not known, although there was little support for this option during previous public hearings with an average preference score of 1.8 out of 5. Although commercial fishermen would not shoulder all conservation efforts, they would still be prohibited from selling their catch.

Conclusion

The Council rejected this option because the reduction in fishing mortality was not sufficient to rebuild the gag stock above the overfished level of 30% transitional SPR and because the preferred option better addresses the problems and objectives identified.

Option 4. Establish a 100 – 1,000 pound trip limit January - March.

Biological Impacts

To the extent fishing mortality is reduced, the stock would rebuild towards the 30% transitional SPR level. Number of trips with various poundage levels are shown in Table 57.

Economic Impacts

Impacts would be proportional to the trip limit established. Lower trip limits would have greater impacts and higher trip limits lesser impacts. Fishermen may try to minimize the effect of this option by reducing their turnaround time so that they can make more trips. If fishermen are able to increase the number of trips, their operating cost would increase and they would be operating inefficiently. Enforcing the trip limit could also be problematic and costly because of the nature of the fishery.

Based on logbook data for commercial gag landings for 1993 – 1995, an average of 154 trips landed over 100 pounds per trip, resulting in a monthly average landing of 62,320 pounds in January (Table 57). With a 100 pound trip limit, those 154 trips would be constrained to 100 pounds per trip. Thus, their total landings would be reduced by 46,920 pounds in January (Table 57). Similarly, for February and March, total landings would be reduced by 33,790 pounds and 45,856 pounds respectively (Table 57). This means that the trip limit of 100 pounds January through March would result in foregone landings of 126,566 pounds ($379,698) in the first year to commercial fishermen if previous trends continue.

At the other extreme, an average of 13 trips landed over 1,000 pounds per trip, resulting in monthly average landings of 19,992 pounds in January (Table 57). With a 1,000 pound trip limit, those 13 trips would be constrained to 1,000 pounds per trip. Thus, their total landings would be reduced by 6,992 pounds in January (Table 57). Similarly, for February and March, total landings would be reduced by 4,263 pounds and 7,116 pounds respectively. This means that the trip limit of 1,000 pounds January through March would result in foregone catch of 18,371 pounds ($55,000) in the first year to commercial fishermen if previous trends continue.

Social Impacts

The constraints placed on the commercial fishery by trip limits would depend upon the trip limit chosen. Certainly the lower the trip limit the greater the impact or the constraint. Fishermen may be willing to consider trip limits if it will allow them continued harvest of gag and they can replace lost income through other means. However, trip limits are often viewed as hampering highliners, those who regularly land larger quantities of fish. This type of management is often considered economically inefficient for that type of fishing operation.

Table 57. Commercial gag landings in whole pounds by month, year and size range of trip for the South Atlantic region (Data Source: Nelson Johnson, NMFS Beaufort Lab; May, 1996).

	POUNDAGE CATEGORY	1993		1994		1995	
		# TRIPS	POUNDS	# TRIPS	POUNDS	# TRIPS	POUNDS
J	< 100	87	3,960	138	6,694	149	6,252
A	101 -200	31	4,485	62	9,164	75	11,372
N	201 - 300	25	5,948	31	7,540	52	12,763
U	301 - 400	20	7,209	18	6,135	25	8,688
A	401 - 500	9	4,129	6	2,623	8	3,644
R	501 - 600	4	2,097	6	3,303	9	4,940
Y	601 - 700	1	621	5	3,359	8	5,215
	701 - 800	2	1,487	2	1,483	9	6,943
	801 - 900	0	0	3	2,485	9	7,606
	901 - 1,000	0	0	2	1,883	2	1,866
	1,001 - 1,100	1	1,016	4	4,224	3	3,191
	1,101 - 1,200	0	0	1	1,101	2	2,375
	1,201 - 1,300	1	1,227	1	1,261	1	1,248
	1,301 - 1,400	1	1,392	0	0	2	2,698
	1,401 - 1,500	0	0	0	0	3	4,423
	1,501 - 1,600	1	1,584	0	0	1	1,513
	1,601 - 1,700	1	1,628	1	1,663	0	0
	1,701 - 1,800	1	1,715	0	0	3	5,275
	1,801 - 1,900	0	0	1	1,846	0	0
	1,901 - 2,000	0	0	0	0	4	7,757
	2,001 - 2,100	0	0	0	0	1	2,057
	2,201 - 2,300	0	0	0	0	1	2,300
	2,601 - 2,700	0	0	0	0	1	2,647
	2,801 - 2,900	0	0	0	0	1	2,886
	2,901 - 3,000	0	0	0	0	1	2,948
	TOTAL	185	38,496	281	54,764	370	110,607

Table 57. Continued- Commercial gag landings in whole pounds by month, year and size range of trip for the South Atlantic region (Data Source: Nelson Johnson, NMFS Beaufort Lab; May, 1996).

	POUNDAGE CATEGORY	1993		1994		1995	
		# TRIPS	POUNDS	# TRIPS	POUNDS	# TRIPS	POUNDS
F	< 100	90	3,883	141	6,113	135	5,601
E	101 -200	35	4,949	61	8,548	47	6,552
B	201 - 300	20	4,511	28	7,251	14	3,230
R	301 - 400	12	4,074	17	6,035	10	3,416
U	401 - 500	6	2,720	7	3,186	13	5,957
A	501 - 600	6	3,280	8	4,485	5	2,697
R	601 - 700	1	680	5	3,128	4	2,596
Y	701 - 800	3	2,325	3	2,194	3	2,299
	801 - 900	2	1,669	4	3,431	3	2,558
	901 - 1,000	0	0	2	1,844	3	2,766
	1,001 - 1,100	1	1,043	2	2,056	0	0
	1,101 - 1,200	0	0	1	1,180	2	2,272
	1,201 - 1,300	2	2,447	1	1,211	3	3,737
	1,301 - 1,400	0	0	1	1,366	1	1,349
	1,401 - 1,500	1	1,433	0	0	0	0
	1,501 - 1,600	0	0	1	1,558	2	3,118
	1,601 - 1,700	1	1,656	0	0	2	3,348
	1,701 - 1,800	1	1,794	0	0	1	1,779
	1,801 - 1,900	1	1,881	0	0	0	0
	1,901 - 2,000	0	0	0	0	1	1,962
	2,001 - 2,100	0	0	0	0	1	2,030
	2,501 - 2,600	0	0	0	0	1	2,570
	TOTAL	182	38,345	282	53,586	251	59,837

Table 57. Continued- Commercial gag landings in whole pounds by month, year and size range of trip for the South Atlantic region (Data Source: Nelson Johnson, NMFS Beaufort Lab, May, 1996).

	POUNDAGE CATEGORY	1993		1994		1995	
		# TRIPS	POUNDS	# TRIPS	POUNDS	# TRIPS	POUNDS
M	< 100	124	5,230	152	6,307	145	6,051
A	101 -200	41	5,720	78	11,275	64	9,329
R	201 - 300	25	6,056	38	9,146	21	5,474
C	301 - 400	9	3,156	21	7,240	21	7,268
H	401 - 500	10	4,385	15	6,582	7	3,149
	501 - 600	4	2,243	12	6,492	9	4,937
	601 - 700	2	1,210	4	2,694	7	4,573
	701 - 800	4	2,880	6	4,469	5	3,738
	801 - 900	5	4,224	3	2,460	4	3,415
	901 - 1,000	3	2,896	1	913	2	1,895
	1,001 - 1,100	6	6,409	0	0	1	1,003
	1,101 - 1,200	3	3,504	0	0	3	3,457
	1,201 - 1,300	1	1,247	2	2,508	2	1,408
	1,301 - 1,400	1	1,358	1	1,368	1	1,390
	1,401 - 1,500	0	0	1	1,497	0	0
	1,501 - 1,600	0	0	1	1,561	0	0
	1,601 - 1,700	0	0	1	1,666	0	0
	1,801 - 1,900	1	1,827	0	0	0	0
	1,901 - 2,000	1	1,992	1	1,940	0	0
	2,.101 - 2,200	1	2,161	0	0	1	2,146
	2,501 - 2,600	1	2,515	0	0	0	0
	2,701 - 2,800	0	0	0	0	1	2,731
	2,901 - 3,000	0	0	0	0	1	2,900
	3,001 - 3,100	1	3,081	0	0	0	0
	4,601 - 4,700	0	0	0	0	1	4,679
	TOTAL	243	62,095	337	68,118	296	70,543

Conclusion

The Council rejected this option because the reduction in fishing mortality was not sufficient to rebuild the gag stock above the 30% transitional SPR level and because the preferred option better addresses the problems and objectives identified.

Option 5. Establish a seasonal closure to achieve a 30% - 40% reduction in total landings.

Biological Impacts

Huntsman et al. (1996) indicate that under 1993 conditions and M = 0.1, F should be diminished to about 0.17, a 50% reduction which is greater than the level proposed in this option. This option would reduce catches by 30% to 40%.

Economic Impacts

Based on General Canvass data for gag commercial landings for 1993 – 1995, closure during the following months would achieve a 30% reduction in annual catch, other things being equal: January – April, April – June, or September – December. Similarly, closure during January – May, April – July, or August – December would achieve a 40% reduction in annual catch (Tables 58 and 59). Reducing the commercial catch by 30% – 40% would cause financial hardship on fishermen. Fishermen would lose between $638,000 – $850,000 of their annual gross revenue in the first year if there is no way to make up the loss. However, given that a limited entry system would already be in place, fishermen would stand to gain from increased catch per unit of effort through stock recovery in the long-term.

Table 58. Commercial gag landings in whole pounds and number of trips for the South Atlantic region (Data Source: Nelson Johnson, NMFS Beaufort Lab; August, 1996).

MONTH	1993		1994		1995	
	POUNDS	# TRIPS	POUNDS	# TRIPS	POUNDS	# TRIPS
JAN.	38,496	185	54,765	281	110,604	370
FEB.	38,343	182	53,585	282	59,835	251
MAR.	62,092	243	68,117	337	70,544	296
APR.	55,920	213	71,581	377	72,324	297
MAY	63,006	334	72,774	325	83,183	332
JUN.	63,743	327	60,344	331	83,897	384
JUL.	53,159	299	38,818	256	59,349	362
AUG.	45,423	260	55,300	305	43,116	243
SEP.	37,892	217	42,725	260	57,919	270
OCT.	40,484	233	64,444	292	60,795	244
NOV.	42,888	207	59,288	255	54,261	277
DEC.	55,000	262	70,725	270	52,038	235
TOTAL	**596,446**	**2,962**	**712,466**	**3,571**	**807,865**	**3,561**

Social Impacts

Some type of seasonal closure to reduce catch by 30-40% will most likely have impacts similar to any of the previous options that wish to attain a similar reduction. Although a combination of seasonal closures spread out over time may lessen the immediate financial impacts on commercial fishermen, they will still likely seek to replace lost income through some means of species substitution. When considering a seasonal closure, the possibility of effort shifting into other fisheries needs to be examined. Other concerns may be the availability of other work for fishermen who may find themselves unable to fish during the closures.

Table 59. Monthly Gag Commercial Landings (Data Source: Linda Hardy from General Canvass Database, April 2, 1997).

MONTH	1993		1994		1995	
	POUNDS	% OF TOT	POUNDS	% OF TOT	POUNDS	% OF TOT
JANUARY	101,975	11.5	70,915	6.9	155,842	14.5
FEBRUARY	86,104	9.7	75,788	7.3	75,745	7.0
MARCH	85,281	9.6	93,743	9.1	84,861	7.9
APRIL	72,846	8.2	106,335	10.3	73,146	6.8
MAY	94,035	10.6	104,077	10.1	104,131	9.7
JUNE	84,645	9.5	104,826	10.1	104,502	9.7
JULY	80,641	9.1	68,251	6.6	82,807	7.7
AUGUST	63,345	7.1	88,529	8.6	59,556	5.5
SEPTEMBER	49,448	5.6	75,916	7.3	76,371	7.1
OCTOBER	47,505	5.3	77,527	7.5	100,342	9.3
NOVEMBER	51,895	5.8	77,430	7.5	85,359	7.9
DECEMBER	70,602	7.9	90,604	8.8	74,054	6.9
TOTAL	**888,322**		**1,033,941**		**1,076,716**	

Conclusion

The Council could have pursued this mechanism for reducing fishing mortality, however, the Council chose the preferred option that better addresses the problems and objectives identified and is more equitable for all resource harvesters. Therefore, the Council rejected this option.

Option 6. Establish a quota to achieve a 31% reduction based on average landings from 1986-95.

Biological Impacts

To the extent actual landings are reduced, similar reductions in fishing mortality would be expected.

Economic Impacts

Using average annual landings for the period 1986 to 1995, a 31% reduction in landings would result in an annual quota of 713,031 pounds (Table 60). If the 1995 landing trend continues the fishery would close in August. Commercial fishermen would lose approximately $961,000 of their annual gross revenue in the first year if there is no way to make up for the loss. However, given that a limited entry system would already be in place, fishermen would stand to gain from increased catch per unit of effort through stock recovery in the long-term.

It is important to note that adverse economic consequences could result from quota management. The worse case scenario could result in derby fishing (large quantities landed in a relatively short time period), declining exvessel prices, and shortening of the fishing season. These consequences may or may not occur for gag.

Table 60. Commercial Gag Landings for 1993-1995 Showing Month Fishery is Expected to Close. (Source: Huntsman et al., and Linda Hardy from General Canvass Database, NMFS Beaufort Lab., April 2, 1997).

YEAR	ANNUAL LANDINGS	QUOTA		MONTH EXPECTED TO CLOSE
		% OF 86-95 AVERAGE	QUOTA	
1986	1,216,600	69%	713,031	
1987	1,256,200			
1988	849,200			
1989	1,247,400			
1990	939,400			
1991	849,200			
1992	976,800			
1993	888,322			
1994	1,033,941			
1995	1,076,716			AUGUST
TOTAL	10,333,779			
AVERAGE	1,033,378			
MONTH	**LANDINGS**	**CUM. LBS.**	**% OF TOT**	**CUM. %**
JANUARY	155,842	155,842	14.5	14.5
FEBRUARY	75,745	231,587	7.0	21.5
MARCH	84,861	316,448	7.9	29.4
APRIL	73,146	389,594	6.8	36.2
MAY	104,131	493,725	9.7	45.9
JUNE	104,502	598,227	9.7	55.6
JULY	82,807	681,034	7.7	63.3
AUGUST	59,556	740,590	5.5	68.8
SEPTEMBER	76,371	816,961	7.1	75.9
OCTOBER	100,342	917,303	9.3	85.2
NOVEMBER	85,359	1,002,662	7.9	93.1
DECEMBER	74,054	1,076,716	6.9	100
TOTAL	**1,076,716**			

Social Impacts

Establishing a quota to reduce landings by 31 percent will likely cause species substitution or effort shifts among commercial fishermen as discussed earlier. Gag is an important species in some regions, and the impacts will vary. If there is little opportunity for fishermen to shift their effort, then other means of recovering lost income will be needed. It is unlikely that other species will compensate entirely as a replacement for lost gag landings and fishermen will likely have to spread out the loss of that income in a variety of ways, though increased effort for other snapper grouper species, increasing effort or switching to other fisheries, like mackerel and possibly finding other types of work during the period when gag landings were important to household income.

Conclusion

The Council chose not to pursue this option because it is not equitable among resource harvesters and because the preferred option better addresses the problems and objectives identified. Therefore, the Council rejected this option.

Option 7. Increase the gag minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen, and prohibit all harvest January through March.

Biological Impacts

Prohibiting the harvest of gag during the spawning season would protect the spawning stock, particularly males which are more aggressive during this period and are more susceptible to being caught. However, this action may cause fishermen to redirect fishing effort to other species in order to avoid disruption of their fishing activities, or, alternatively increase effort outside the spawning season. Testimony at public hearings indicate the spawning season is different in some locations in the region. According to fishermen, spawning occurs in some areas around April/May, and in others around June/July. They also indicate this closure would impose more hardship on them since they already have a short fishing season. If the spawning season is variable as claimed by fishermen, a January through March closure would not protect the spawning stock in some areas.

Tables 49, 50, and 51 present the percent reduction in catch resulting from different commercial and recreational size limits using 1993 data. The 24" size limit would reduce total (recreational and commercial) catches by 42% in North Carolina, by 35% in South Carolina, by 6% in Georgia, and by 7% in Florida (Table 49).

The January through March closure would reduce commercial landings by 29% based on 1995 catches (Tables 53b and 60). Data on monthly recreational catch are not available.

Economic Impacts

Table 47 shows the percentage of catch sampled from 1993 landings that were below 24" TL. North Carolina had the highest (35%) for both commercial and recreational, and Georgia had the least (5%) for both sectors. For the entire South Atlantic region, 7% of the MRFSS catch and 2% of the headboat catch were below the legal size limit in 1996. Less than 1% of the commercial catch was below the legal size limit in 1996 (Table 48).

The 24" TL minimum size limit would reduce headboat catch by 27% in terms of numbers of fish, charterboat catch by 9% in terms of numbers of fish, and private/rental boat catch by 10% in terms of numbers of fish, based on 1995 data (Table 54). Assuming the recreational fishery is relatively inactive during the winter months (except for Florida), the January - March closure would have little or no impact on that sector. For the entire gag fishery (commercial and recreational), the minimum size limit alone would reduce total catch by 18% in numbers of fish in the first year.

Based on General Canvass data for the period 1993 – 1995, commercial landings for January - March was 273,360 pounds in 1993, 240,446 pounds in 1994, and 316,448 pounds in 1995 (Table 53b). Using landings for the three year period, and assuming that the landing trend continues, a January - March closure would reduce commercial landings by 276,758 pounds in the first year. This represents a 26% decrease in annual commercial landings in terms of numbers of fish. Based on an average exvessel price of $3.00 per pound (1995 Snapper Grouper Commercial Logbook Report), fishermen could experience a decrease of $830,000 in gross revenue in the first year.

The 24" TL minimum size limit with the January through March closure would reduce commercial landings by 48% in the first year. The combined measures would reduce total catch for the entire gag fishery (commercial and recreational) by 35% in the first year.

The prohibition on harvest during January - March would protect a majority of the spawning stock, particularly the males which are more susceptible at this time. This would increase recruitment and fishermen would benefit from increased stock density in the long-term. There is no quantitative information available to predict whether the long-term benefits would exceed the short-term costs that would have to be forgone by fishermen.

Although spawning closures may allow spawning fish to spawn more effectively because they are undisturbed by fishing activities, use of spawning closures to limit removals from the stock is not always successful. It is conceivable that fishing effort could increase before and/or after the spawning closure to keep overall harvest at the same level. Whether this occurs or not depends on the cost of fishing when the fish are not as aggregated as they are during the spawning or pre-spawning periods. If prices are high enough and additional fishing costs are such that fishing is still profitable, the total commercial catch could be nearly the same as without the closure. If this should occur, the biological goal may not be met while net producer benefits could be reduced because of reduced efficiency due to fishermen having to fish when fish are less concentrated. With this scenario, from solely and economic perspective, it would probably have been preferable to allow fishing during spawning aggregations while controlling total harvest with TAC and trip limit restrictions.

On the other hand, if fishing costs are far greater because fishing cannot take place when fish are less aggregated, and catch is actually reduced because of the spawning closure, then the spawning closure may meet its biological objective. Even if this is the case, it would have been better, from solely and economic perspective, to limit catch to the same level by TAC and trip limit, rather than incurring far greater fishing costs by making fishing inefficient. This is not to say that competitive fishing under TAC management does not promote negative economic effects. These occur through derby fishing, lower exvessel prices, possible shortening of the fishing season, and inefficiencies from incentives to add unnecessary capital goods and to fish in bad weather or when fishing is not necessarily good. Both types of controls may serve biological goals but have potentially large effects on the economics of the fishery. One positive aspect of spawning season closure is that during the fishing season, fishermen would not be racing against the threat of an early closure. Also, spawning closures enable fishermen to better plan their fishing year, and probably are easier and less costly for the government to monitor and enforce.

Social Impacts

Gag is an important commercial and recreational species in the South Atlantic, primarily in the northern region (Table 47). This action would disproportionately affect fishermen in North and South Carolina, reducing commercial landings by over 40 and 30 percent respectively for the commercial fisheries in those states. Recreational landings would also be reduced substantially. Again, as with previous actions, fishermen will likely seek substitutions if possible. There may also be substantial effort increases on gag prior to and after the closure to compensate for lost catch. Commercial fishermen will seek replacement of lost income through other fisheries or other means of compensation; this might entail other types of work or changes in household work patterns. The availability of work during the closure would become a factor if this were necessary.

Recreational fishermen may not substitute other species if the size limit is acceptable and the retention rate at that size limit is satisfying. However, it is likely that fishermen have been accustomed to catching and retaining gag at 20 inches and larger. Therefore, some species substitution is likely with such a reduction in the recreational catch through this action.

Conclusion

The Council rejected this option because of public comments, large negative impacts, and uncertainty about stock status. The Council has requested an updated stock assessment which will be presented at the November 1998 meeting.

4.2.7 ACTION 7. Increase the black grouper minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen; prohibit harvest and possession in excess of the bag limit during March and April; and prohibit purchase and sale during March and April.

These measures would apply to black grouper in or from the South Atlantic EEZ and black grouper in the South Atlantic harvested on board a permitted vessel (commercial or charter/headboat) without regard to where the black grouper is harvested or possessed. The prohibition on purchase would apply to all permitted dealers without regard to where the black grouper is harvested or possessed (i.e., state or federal waters). However, fish could be purchased from areas outside the South Atlantic provided there was an appropriate paper trail documenting the area of origin.

The latest NMFS assessment for black grouper was done in June 1992 (Huntsman et al., 1992):

Estimated catches of black grouper declined 61% by number (from 90,223 to 34,765 fish) and 32% by weight (from 240,476 to 164,018 kg) from 1988 to 1990. By number catches for all fishery sectors decreased substantially: commercial, -54%; headboat, -82%; MRFSS-estimate, -59%. The commercial fishery produces the bulk of the catch, 88% by number and 82% by weight. Because of confusion of common names the history of commercial catches of black grouper is nearly indecipherable. For headboats recorded catches peaked in 1983 at >4,000 fish weighing more than 25,000 kg and were down to about 400 fish weighing 1,500 kg in 1990.

Because samples of fish sizes are small it is difficult to assess the effects of Florida's 20 inch size limit on the catch. Of fish taken by traps, 92% exceeded the size limit in 1988, while commercial hook and line devices produced fish 75% of which were below the size limit. In 1990 about 10-15% of the hook and line catch was below the size limit. Headboat catches were about 33% undersized fish in 1990. Black grouper are so uncommon that the recreational bag limit probably had little effect on the catch. Models of SSR and Y/R for black grouper based on data collected in 1990 suggest little change in the population status since 1988. SSR is estimated at 0.43 versus 0.37 in 1988 and apparent F (0.20) is about two thirds that in 1988 (0.32). Again declining recruitment can cause underestimation of F. Given the substantial decline in catch, suspicion about the true state of the population is warranted. The present (1990) model predicts that a 20 inch size limit would produce an SSR of 0.47 at current F and preserve an SSR of 0.30 or greater through F = 0.34, nearly double that at present. A 25% gain in yield per recruit would result from the combination of F = 0.42 (about double present F) and a minimum size of

27 inches. That size limit with the present distribution of F would give an SSR of 0.47 and maintain an SSR of greater than 0.30 to F = 0.36.

Black grouper and gag are often times mixed in the reporting statistics. The following information is directly from the 1996 gag assessment report (Huntsman et al., 1996):

> *The common use by the public, principally in Florida, of the name "black grouper" for M. microlepis (instead of only for the true black grouper, M. bonaci) has resulted in incorrect identification of some commercial landings of gag as having been black grouper (headboat and MRFSS records are largely free of this flaw). To correct the misidentification, we extracted the ratio of occurrence by number of the two species from TIP samples for fish sizes for three subareas of Florida: (1) north Florida as described above [Editorial Note: Indian River County northward.], (2) south Florida exclusive of Monroe County, and (3) Monroe County. The ratios of gag to black grouper in the size samples were used to apportion the total gag-black commercial landings for the region. Interestingly, no black grouper at all occurred in TIP samples taken north of the Keys. Thus all landings of black grouper north of Monroe County were attributed to gag. In Monroe County the proportion of gag in the samples was 14 percent in 1986, 0 percent in 1987 and 1988, 8 percent in 1989, 3 percent in 1990, 33 percent in 1991, 28 percent in 1992, and 15 percent in 1993, and the black-gag total catches was so apportioned. The sequence of annual catch estimates usable for our analyses is short (1986 to 1993) because prior to 1986 either attribution of the catch to species is so vague as to be useless (e.g. "grouper") (primarily a problem for Florida catches), or because, no samples of fish sizes were taken from the commercial fishery, or both. Final estimates of catch were available only through 1993 at the inception of these analyses. The sophistication of analyses based on so little information is limited.*

Ault, Bohnsack, and Meester (Fish. Bull.; In Review) performed a retrospective (1979-1995) assessment of coral reef stocks in the Florida Keys. The material in Appendix H was excerpted from their paper. Their fishery-independent assessment used average size from a stationary visual survey method conducted by trained divers. They report results which are encouraging in terms of using average size as an indicator, however, they caution that the derived population estimates should be considered first-order approximations. Using a natural mortality rate (M) of 0.15, they estimated a spawning potential ratio (SPR) of 5% for black grouper.

Biological Impacts

Based on 1994 data, approximately 80% of the catch was harvested by commercial fishermen (141,000 kg or 311,000 lb) and 20% by recreational fishermen (35,000 kg or 77,000 lb). Figure 6 contains information for additional years on page 67.

Size at age information is presented in Table 61.

The black grouper minimum size limit of 20" was implemented in January 1992 (Snapper Grouper Amendment 4). Data from 1991 are included as a comparison of pre-size limit catches. During 1996, 4% of the headboat catch, 13% of the private/rental (MRFSS) catch, and 9% of the commercial catch was below the 20" minimum size limit (Table 62). Catches below the size limit are negatively impacting stock rebuilding.

Catches of black grouper have ranged from 211,000 pounds in 1990 to 130,000 pounds in 1995 (Table 63). The commercial catch would be reduced by 20% from the March/April closure (Table 64b).

A 24" size limit would reduce the commercial catch by 15% in numbers and 4% in weight (Bob Dixon, Size and Bag Limits Report, April 1997). The headboat catch would be reduced by 71% in terms of numbers of fish and 44% by weight (Table 64a). Although seven fish were recorded in the intercept data, no catch was estimated and no lengths were recorded for the charterboat sector. Only one fish was measured in the private/rental boat sector, so the impact of the 24" TL minimum size limit could not be estimated for those two sectors.

Increasing the size limit should result in an increase in yield. Huntsman et al. (1990) report a potential 25% increase in yield with a 27 inch minimum size limit.

Table 61. Black Grouper: Size at Age Relationship. (Source: Manooch and Mason, 1987: Northeast Gulf Science, 9 (2): 65 - 75).

AGE	LENGTH (INCHES)	LENGTH (MM)
1	10.2	260
2	15.6	397
3	19.8	504
4	23.3	591
5	26.1	664
6	28.9	734
7	31.7	806
8	34.4	873
9	36.4	925
10	38.4	975
11	39.8	1010
12	41.5	1054
13	42.4	1077
14	43.7	1110

Table 62. Percent of Black Grouper Catch Below Legal Size Limit.

Year	**Headboat**	**Recreational (MRFSS)**	**Commercial**
1996	4%	13%	9%
1995	29%	NO DATA	0
1994	0	4%	2%
1993	0	26%	8%
1992	18%	18%	11%
1991	0	11%	25%

Table 63. Black Grouper Commercial Landings (in pounds) by State for 1990 - 1995. (Source: Chuck Manooch and Linda Hardy from General Canvass Database, April 1997).

YEAR	NC	SC	GA	FLEC	TOTAL
1990		6,012	*	204,870	210,882
1991		983	*	127,232	128,215
1992	10,307	174	*	121,518	131,999
1993	10,701	*		144,007	154,708
1994	22	273	*	140,691	140,986
1995	836			128,870	129,706

Note: Because of confidentiality, 1993 data for NC and SC are combined; 1990-1992, and 1994 data for GA are combined with Florida's data for those years. Florida includes South Atlantic portion of Monroe County. * represents confidential data.

Table 64a. Reduction in Landings from Size and Bag Limits. Black Grouper - 24" Size Limit from 1995 Headboat Data. (Source: R. L. Dixon et al, NMFS Beaufort Laboratory, April 1997).

BAG LIMIT	HEADBOAT	
	% REDUC. #	% REDUC. WT.
1	71.4	44.2
2	**71.4**	**44.2**
3	71.4	44.2
4	71.4	44.2
5	**71.4**	**44.2**

Economic Impacts

A 24" TL minimum size limit would reduce commercial landings by 15% in terms of numbers of fish based on 1995 landings data (R. L. Dixon et al, NMFS Beaufort Laboratory, April 1997). Based on 1995 landings and exvessel value, commercial landings would be reduced by 19,458 pounds ($39,000) in the first year (1995 Snapper Grouper Commercial Logbook Report). Headboat catch would be reduced by 71% in terms of numbers of fish (Table 64a). Although seven fish were recorded in the intercept data, no catch was estimated and no lengths were recorded for the charterboat sector. The size limit alone would the commercial and headboat catch by 21% in the first year.

The March and April closure would reduce commercial landings by 20% in numbers of fish (Table 64b). This is equivalent to 25,340 pounds ($51,000 reduction in gross annual revenue). Thus, the size limit and closure combined would reduce commercial landings by 35% in numbers of fish, or 44,798 pounds ($90,000 reduction in gross annual revenue). Based on commercial and headboat landings data for 1995, this action would reduce black grouper landings for those two sectors by 39% in numbers of fish in the first year.

Table 64b. Monthly Landings of Black Grouper in 1995 for the entire South Atlantic Region from the General Canvass Data base. Source: Linda Hardy, NMFS Beaufort Laboratory, April 2, 1997.

MONTH	WEIGHT (LBS)	CUM. WEIGHT	# OF FISH
JANUARY	15,656	15,656	1,019
FEBRUARY	13,599	29,255	885
MARCH	13,571	42,826	883
APRIL	11,769	54,595	766
MAY	15,624	70,219	1,017
JUNE	8,953	79,172	583
JULY	9,088	88,260	591
AUGUST	7,339	95,599	478
SEPTEMBER	7,276	102,875	474
OCTOBER	8,871	111,746	577
NOVEMBER	10,163	121,909	661
DECEMBER	7,794	129,703	507
TOTAL	**129,703**		**8,441**
MARCH & APRIL CLOSURE		**Av. wt. = 15.37 pounds**	
Total savings (lbs):	**13,571 + 11,769 = 25,340**		
Total savings (# of fish):	**883 + 766 = 1,649**		
% reduction (# of fish):	**1,649/8,439 = 20%**		

In general, the economic effects of a minimum size increase include a reduction in landings and revenues in the short-term, with perhaps an increase in price to partially offset losses caused by the reduction in landings. Eventually over time, landings and revenues should increase if the size limit is effective in increasing the stock of older fish in the population. Recreational fishermen would lose benefits in the short-term and gain in the long-term if their satisfaction depends (at least partly) on quantities of fish kept. Recreational fishermen probably would lose in both the short- and long-term if satisfaction depends on numbers of fish kept. They would gain in both the short- and long-term if satisfaction depends on number of fish caught and released.

Social Impacts

Because black grouper and gag are often misidentified by fishermen, a same size limit and similar closure as gag will help avoid further confusion and provide protection for both species. The reduction in catch may mean effort shifts to other species by both commercial and recreational fishermen.

Recreational fishermen will also be impacted by the aggregate grouper bag limit which will limit them to 2 black grouper. With limited data it seems that the bag limit will have little effect on the headboat sector as the size limit will be primarily responsible for all the reduction in effort. It is not known what effect the bag limit will have on the charter or private/rental boat sectors.

This action must also be considered in conjunction with other actions in this amendment to determine the full impact within the snapper grouper fishery. As stated earlier, fishermen, both commercial and recreational may choose to fish other species given the restrictions placed on black grouper and gag. With the combined regulations on other species in this amendment, it is not known which species would be the target of any effort shifts. For further discussion, see the social impacts for previous actions on red porgy and gag.

Conclusion

The Council is unsure about the status of black grouper and is proposing an increase in the size limit to provide additional biological protection. Yield per recruit analyses indicate this should result in some increase in yield. It will also make the black grouper and gag minimum size limits the same. This should aid the public and enforcement since these two species are often confused.

The Council will monitor the stock status and if additional action is necessary to meet the mandates of the Magnuson-Stevens Act, the framework procedure will be used to implement additional regulations.

Other Possible Options for Action 7:

Option 1. No Action. Maintain the existing 20" TL size limit and the 5-grouper aggregate bag limit.

Biological Impacts

This option could lead to further depletion of gag grouper.

Economic Impacts

The no action option could lead to recruitment failure with severe economic, social, and biological consequences. This could require closing the fishery. A closure would occur if the spawning potential ratio falls below the threshold level.

Social Impacts

With no action there may be continued confusion over the identification of black grouper as gag or vice versa. Therefore, some gag may be harvested as black grouper with a smaller size limit, jeopardizing black grouper and gag stocks.

Conclusion

The Council is concerned about the status of black grouper. Therefore, the Council rejected the no action option. The no action option would not meet the mandates of the Magnuson-Stevens Act.

Option 2. Increase the black grouper minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen.

Biological Impacts

A 24" size limit would reduce the commercial catch by 15% in numbers and 4% in weight. The headboat catch would be reduced by 71% in terms of numbers of fish and 44% by weight (Table 64a). Although seven fish were recorded in the intercept data, no catch was estimated and no lengths were recorded for the charterboat sector. Only one fish was measured in the private/rental boat sector, so the impact of the 24" TL minimum size limit could not be estimated for those two sectors.

Increasing the size limit should result in an increase in yield. Huntsman et al. (1990) report a potential 25% increase in yield with a 27 inch minimum size limit.

Economic Impacts

A 24" TL minimum size limit would reduce commercial landings by 15% in terms of numbers of fish based on 1995 landings data (R. L. Dixon et al, NMFS Beaufort Laboratory, April 1997). Based on 1995 landings and exvessel value, commercial landings would be reduced by 19,458 pounds ($39,000) in the first year (1995 Snapper Grouper Commercial Logbook Report). Headboat catch would be reduced by 71% in terms of numbers of fish (Table 64a). Although seven fish were recorded in the intercept data, no catch was estimated and no lengths were recorded for the charterboat sector. Based on commercial and headboat landings data for 1995, this action would reduce total black grouper landings by 21% in numbers of fish in the first year.

In general, the economic effects of a minimum size increase include a reduction in landings and revenues in the short-term, with perhaps an increase in price to partially offset losses caused by the reduction in landings. Eventually over time, landings and revenues should increase if the size limit is effective in increasing the stock of older fish in the population. Recreational fishermen would lose benefits in the short-term and gain in the long-term if their satisfaction depends (at least partly) on quantities of fish kept. Recreational fishermen probably would lose in both the short- and long-term if satisfaction depends on numbers of fish kept. They would gain in both the short- and long-term if satisfaction depends on number of fish caught and released.

Social Impacts

Because black grouper and gag are often misidentified by fishermen, the same size limit as gag would help avoid further confusion, improve enforcement, and provide protection for both species. The reduction in catch may mean effort shifts to other species by both commercial and recreational fishermen.

Conclusion

The Council rejected this option in favor of the preferred action because of the additional biological protection provided with the two month closure.

4.2.8 ACTION 8. Specify that within the 5-fish aggregate grouper bag limit (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 fish may be gag or black grouper (individually or in combination).

Biological Impacts

To the extent catches would be reduced, there would be some biological gains. The analysis was done for all grouper species as an aggregate since there is no way of estimating what grouper species could be kept after an angler caught the bag limit of two gag or black grouper, or a combination of one gag and one black grouper. Also, reduction by weight could not be accurately estimated due to the variety of grouper species. The analysis is based on a 20" TL minimum size limit because the 24" TL minimum size limit leaves very few fish of legal size available to be caught by the recreational sector. Based on 1995 data, the headboat catch would be reduced by less than 1% (Table 65). The charterboat and private/rental boat catches would not be impacted.

Economic Impacts

Based on 1995 data, the headboat catch would be reduced by less than 1% (Table 65). The charterboat and private/rental boat catches would not be impacted. Thus, the impact on the recreational fishery would be negligible. However, if gag and black grouper are considered individually, there would be further reductions because of the 24" size limit for both species under Actions 6 and 7. The 2-fish bag limit would reduce gag landings by a further 13% for the charterboat sector. There would be no further reduction for headboats and private/rental boats (Table 54). There would be no further reduction for the black grouper headboat sector. No data are available for the black grouper charterboat and private/rental boat sectors.

Table 65. Aggregate Grouper Species: Reduction in Landings from Bag Limits and 20" Size Limit. (Source: R. L. Dixon et al, NMFS Beaufort Laboratory from MRFSS Database).

BAG LIMIT	HEADBOAT % REDUC. #	CHARTER BOAT % REDUC. #	PRIVATE BOAT % REDUC. #
1	13.8	21.9	18.2
2	5.1	11.0	5.2
3	2.4	7.1	0
4	1.5	3.2	0
5	0.9	0	0

Social Impacts

Again, because black grouper and gag are often misidentified as the same species, a similar bag limit requirement will help avoid confusion and will provide protection for both species. This action would reduce the bag limit for either species to 2 fish. There will likely be effort shifts to other species like snappers as a result, but proposed bag limits will place a cap on expected fishing mortality. As always there is an increased chance of release mortality if fishermen continue to fish after catching the bag limit. The impacts of this action must be considered in addition to the size limit changes, therefore, see social impacts under the previous actions for size limit changes and closures on gag and black grouper for further discussion.

Conclusion

The Council is modifying the 5-fish grouper aggregate bag limit as a means of providing some additional biological protection. This action would address the problem of gag and black grouper being misidentified while providing additional protection for both species by lowering the bag limit.

Other Possible Options for Action 8:

Option 1. No Action. Maintain the existing 5-fish aggregate grouper bag limit.

Biological Impacts

This option could lead to further depletion of the gag and black grouper stocks.

Economic Impacts

This option could lead to further depletion of the gag and black grouper stocks, particularly if the number of recreational fishermen keeps increasing over the years. It would not enhance or sustain satisfactory recreational fishing experience in the long-term.

Social Impacts

Having a similar bag limit for both gag and black grouper would provide protection for both species and avoid the confusion over misidentification.

Conclusion

The Council is using an aggregate bag limit as a management approach for the recreational fishery. The proposed action will provide some additional biological protection. Therefore, the Council rejected the no action option.

Option 2. Specify that within the 5-fish aggregate grouper bag limit (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 may be gag and no more than 2 may be black grouper.

Biological Impacts

To the extend catches would be reduced, there would be some biological gains.

Economic Impacts

See discussion under Action 8.

Social Impacts

Having a similar bag limit for both gag and black grouper will provide protection for both species and avoid the confusion over misidentification.

Conclusion

The Council rejected this option in favor of the proposed action because it provides more biological protection.

4.2.9 ACTION 9. Establish an aggregate recreational bag limit of 20 fish per person per day inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners).

Biological Impacts

Placing an aggregate bag limit on all other snapper grouper species presently without a bag limit will provide some biological protection for those species which may see increased fishing pressure as fishermen are constrained by other management regulations.

A 20-fish aggregate bag limit would reduce the headboat catch by 1% and the private/rental catch by 7% (Table 66). There would be no catch reduction for the charterboat sector.

Economic Impacts:

Table 66 shows the percent reduction in catch that should be expected with an aggregate bag limit, based on headboat, charterboat and private/rental boat data for 1995. The bag limit ranges from 10 to 30. A 20-fish aggregate bag limit would reduce headboat catch by 1%. There would be no catch reduction for the charterboat sector. The private/rental boat catch would be reduced by 7%. Total reduction in recreational catch would be less than 1%.

One problem with aggregate bag limit is that it tends to save more commonly encountered species. Rarely encountered species, some of which may be in an overfished state, receive relatively less protection.

Social Impacts:

Previous public hearings had mixed support for an aggregate bag limit. In many cases, comments suggested that 20-25 fish were too many, however, that was when the bag limit included species that already had bag limits. This bag limit could be combined with bag limits presently in place and is greater than the previously proposed bag limit. Therefore, overall support for this additional bag limit may not be as forthcoming.

Table 66. Aggregate Reef Fish Species: Reduction in Landings from Bag Limits. (Source: R. L. Dixon et al, NMFS Beaufort Laboratory from MRFSS Database).

BAG LIMIT	HEADBOAT % REDUC. #	CHARTER BOAT % REDUC. #	PRIVATE BOAT % REDUC. #
10	7.1	8.8	18.6
11	5.7	6.3	16.7
12	4.7	4.2	14.9
13	3.9	2.2	13.3
14	3.3	0.7	12.0
15	2.8	<0.1	10.9
16	2.4	0	10.0
17	2.0	0	9.1
18	1.7	0	8.4
19	1.4	0	7.7
20	**1.2**	**0**	**6.9**
21	1.0	0	6.5
22	0.9	0	6.1
23	0.7	0	5.7
24	0.6	0	5.3
25	0.6	0	4.8
26	0.5	0	4.5
27	0.4	0	4.2
28	0.4	0	3.9
29	0.4	0	3.6
30	0.3	0	3.4

Conclusion

The Council is using an aggregate bag limit as a management approach for the recreational fishery. There is a positive benefit to the commercial fishery in that where the Council limits commercial fishermen to the bag limit under certain conditions commercial fishermen would be able to harvest these other species once a bag limit is established. This action would also provide a future cap on exploitation as stocks improve.

Tomtate and blue runners were excluded because they are used for bait. There would be no bag limit for these species and fishermen would be allowed unlimited retention.

Other Possible Options for Action 9:

Option 1. No Action. There is currently no aggregate bag limit for species not under a bag limit.

Biological Impacts

This option could lead to further depletion of the fish stocks.

Economic Impacts

This option could lead to further depletion of the fish stocks, particularly if the number of recreational fishermen increase significantly in future years. It would not enhance or sustain satisfactory recreational fishing experience in the long-term.

Social Impacts

There was mixed support for the previous aggregate bag limit which would have included other snapper grouper species in the present bag limit which would have been more restrictive. Comments during public hearings indicated some fishermen thought a 20-25 snapper grouper bag limit was altogether too much. Others indicated that for some species, where fishermen expect to catch many fish, a 20-25 fish bag limit was sufficient, but shouldn't include all snapper grouper. However, the Council did consider the preferred action a preventative measure to cap recreational effort as that sector grows and the stock improves.

Conclusion

The Council is using an aggregate bag limit as a management approach for the recreational fishery. The proposed actions provides some additional biological protection. Therefore, the Council rejected the no action option.

4.2.10 ACTION 10. Specify that vessels with longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

There is a possession limit of 1 warsaw per trip already in place. Action 10 does not propose to change this provision. Action 10 is in addition to all other existing regulations that apply to longline gear and/or fishing with longlines.

A longline is defined as: A type of fishing gear consisting of a main line of any length that is suspended horizontally in the water column either anchored, or not, or attached to a vessel, and from which branch or dropper lines are attached.

The Council's intent is that all longline vessels (i.e., pelagic and bottom longlines) would be subject to this measure.

Biological Impacts

Bottom longline gear is currently only allowed in waters deeper than 50 fathoms, only north of St. Lucie Inlet, Florida, and only for species other than wreckfish. Reports have surfaced which indicate fishermen are landing with a species composition that would only be caught in waters less than 50 fathoms. As a way of increasing enforcement of the current provisions, the council is proposing the additional restriction that none of the shallow and mid-depth species could be possessed on vessels with longline gear. A vessel with longline gear may only possess deepwater species.

Economic Impacts

Bottom longline gear which is only allowed outside the 50 fathom contour and only north of St. Lucie Inlet, Florida is used to catch mainly deep water snapper grouper species except wreckfish. This current restriction to the use of bottom longline gear is to prevent the destruction of live bottom habitat. The proposed action would prohibit vessels carrying longline gear on board from possessing snapper grouper species other than those listed in the action in the entire south Atlantic EEZ. Specifying that only deep water snapper grouper species can be possessed by vessels carrying longline gear implies that fishermen using longlines cannot make multiple gear trips involving the use of longlines. For example, fishermen carrying bandit reels to fish for mid–shelf snapper grouper species would not be able to carry longlines on the same trips. Presently, the regulations do not prohibit carrying multiple gear on board a vessel and fishermen in some areas are used to carrying more than one gear. They would fish outside the continental shelf with bottom longlines for deep water snapper grouper species when weather conditions are favorable and when they are faced with strong currents, move into the mid–shelf area to fish with bandit reels. This action would eliminate this practice.

There have been reports that some fishermen have been using bottom longlines to fish for species within the 50 fathom contour and that it has been problematic to verify this with dockside enforcement. The current regulation states that south of 27° 10' North latitude and inside 50 fathoms north of 27° 10' North latitude, a person on board a vessel with a longline gear is limited on that trip to the bag limit for South Atlantic snapper grouper species for which a bag limit is specified, and zero for all other South Atlantic snapper grouper species under management. There is no longline bycatch restriction for areas open to longline gear. This action would prevent fishermen from possessing more than the bag limit of any snapper grouper species under management other than deep water snapper grouper species when they are carrying longlines.

Longline landings reported to the snapper grouper logbook program were separated into deep water snapper grouper species, mid-shelf snapper grouper species, and other snapper grouper species for 1994 through 1996. Total landings (all snapper grouper species) declined from 1,068,802 pounds (632 trips) in 1994 to 639,521 pounds (512 trips) in 1996 (Table 67). However, landings of mid-shelf snapper grouper species increased for the same period. In 1994, 93% of the total landings were deep water species and only 5% were mid-shelf species. In 1995, mid-shelf species accounted for 11% of the total landings with deep water species accounting for 89%. In 1996, mid-shelf species represented 24% and deep water species 72% of the total landings by longline vessels (Table 67).

Based on landings from 1994 to 1996, an average of 579 trips landed an average of 104,397 pounds of mid-shelf species annually. This means that the average annual landings of mid-shelf snapper grouper species by these vessels would have been reduced by 104,397 pounds assuming it was still profitable for those vessels to make those trips. Using an average exvessel price of $1.50 per pound for mid-shelf snapper grouper species, annual gross revenue to longline vessels would be reduced by $157,000 in the first year.

Social Impacts

Specifying only those species which can be possessed by longline vessels reinforces previous regulations which restrict this type of gear to outside of fifty fathoms and north of St. Lucie Inlet. This action would further clarify the Council's intent regarding the use of bottom longlines in the snapper grouper fishery, but will extend this prohibition to all longline gear. There have been reports of longline fishermen landing other species of snapper grouper that are commonly found inside of fifty fathoms. This creates difficulty for enforcement because it is almost impossible to determine whether mid-shelf species commonly found inside of fifty fathoms were caught using longline gear without catching someone in the act. There are however, fishermen in the northern area who make multi-gear trips and fish for snapper grouper with vertical lines inside fifty fathoms. These individuals will be forced to return to port in order to exchange gear adding to the costs of their fishing operation.

Conclusion

The Council is concerned bottom longlines are being used in areas which could damage the bottom habitat. This action would further support keeping bottom longlines out of sensitive habitat areas, thereby meeting the Magnuson-Stevens Act mandate to protect essential fish habitat. This action may also provide some additional biological protection for mid-shelf species.

Other Possible Options for Action 10:

Option 1. No Action. Maintain the existing allowance of bottom longline gear in waters deeper than 50 fathoms, only north of St. Lucie Inlet, and only for species other than wreckfish.

Biological Impacts

Bottom habitat could be damaged which could negatively affect the long-term health of the snapper grouper resource.

Economic Impacts

This option would not aid enforcement of current regulations prohibiting use of bottom longlines inside the 50 fathom contour. If the practice of using bottom longline inside the 50 fathom contour continues, live bottom habitat which provides spawning grounds and habitat for snapper grouper species would be further damaged. This would cause decline in stock abundance because of reduced essential habitat. In the long-term, net benefits from the fishery would likely be reduced.

Social Impacts

With no action, enforcement of bottom longline restrictions may continue to be problematic. This would continue to allow fishermen to make multi-gear trips and allow them to take advantage of weather changes and differing catch rates between these species groups.

Conclusion

The Council rejected this option because it would not protect sensitive habitat and because there is not sufficient law enforcement to enforce the current regulations. This option would not meet the mandates of the Magnuson-Stevens Act.

Table 67. Longline catches by deep and mid-depth complexes (Source: Nelson Johnson from Logbook Database).

LONG-LINE CATCHES BY DEEP AND MID-DEPTH COMPLEXES . OTHER SNG SPECIES ARE OTHER SNG MANAGEMENT SPECIES NOT IN THE DEEP OR MID-DEPTH COMPLEX. ALL DATA IS FROM SOUTH ATLANTIC WATERS. ALL WEIGHT IS IN WHOLE POUNDS. ONLY SPECIES IN THE SNG MANAGEMENT COMPLEX WERE USED IN THIS ANALYSIS.

YEAR	MONTH	DEEP SPECIES	% OF TOTAL	MID-DEPTH SPECIES	% OF TOTAL	OTHER SNG SPECIES	% OF TOTAL	TOTAL (ALL SPECIES)	TRIPS
94	JANUARY	60,092	95%	1,331	2%	2,059	3%	63,482	47
94	FEBRUARY	104,224	91%	3,268	3%	7,154	6%	114,646	59
94	MARCH	104,891	94%	5,069	5%	1,253	1%	111,213	71
94	APRIL	76,860	89%	7,275	8%	1,778	2%	85,913	55
94	MAY	94,220	95%	2,632	3%	2,266	2%	99,118	61
94	JUNE	113,313	91%	7,596	6%	3,356	3%	124,265	64
94	JULY	68,519	85%	8,521	11%	3,633	5%	80,673	47
94	AUGUST	75,603	92%	6,093	7%	696	1%	82,392	53
94	SEPTEMBER	113,862	95%	4,917	4%	792	1%	119,571	62
94	OCTOBER	87,948	96%	3,855	4%	16	0%	91,819	52
94	NOVEMBER	43,388	97%	1,105	2%	27	0%	44,520	34
94	DECEMBER	50,060	98%	1,103	2%	27	0%	51,190	27
94	TOTAL	992,980	93%	52,765	5%	23,057	2%	1,068,802	632
95	JANUARY	32,980	95%	1,620	5%	0	0%	34,600	31
95	FEBRUARY	21,126	84%	3,822	15%	153	1%	25,101	42
95	MARCH	97,503	94%	4,813	5%	1,318	1%	103,634	59
95	APRIL	61,454	93%	4,088	6%	865	1%	66,407	53
95	MAY	82,945	95%	4,504	5%	214	0%	87,663	45

YEAR	MONTH	DEEP SPECIES	% OF TOTAL	MID-DEPTH SPECIES	% OF TOTAL	OTHER SNG SPECIES	% OF TOTAL	TOTAL (ALL SPECIES)	TRIPS
95	JUNE	88,855	90%	9,859	10%	240	0%	98,954	43
95	JULY	62,935	89%	7,296	10%	661	1%	70,892	52
95	AUGUST	109,168	88%	14,155	11%	239	0%	123,562	56
95	SEPTEMBER	121,655	95%	5,656	4%	470	0%	127,781	66
95	OCTOBER	87,853	90%	8,312	9%	1,062	1%	97,227	50
95	NOVEMBER	91,040	84%	15,477	14%	1,572	1%	108,089	53
95	DECEMBER	60,735	66%	30,041	33%	1,527	2%	92,303	42
95	TOTAL	918,249	89%	109,643	11%	8,321	1%	1,036,213	592
96	JANUARY	32,977	55%	25,719	43%	1,612	3%	60,308	42
96	FEBRUARY	42,675	53%	32,856	41%	4,900	6%	80,431	68
96	MARCH	20,103	44%	24,430	53%	1,336	3%	45,869	45
96	APRIL	32,880	64%	15,670	30%	2,833	6%	51,383	69
96	MAY	66,462	85%	10,106	13%	1,586	2%	78,154	51
96	JUNE	43,671	89%	5,075	10%	141	0%	48,887	42
96	JULY	24,813	56%	14,053	32%	5,473	12%	44,339	36
96	AUGUST	63,187	96%	2,878	4%	46	0%	66,111	40
96	SEPTEMBER	36,368	96%	1,348	4%	66	0%	37,782	31
96	OCTOBER	27,258	72%	2,797	7%	7,689	20%	37,744	31
96	NOVEMBER	50,703	81%	10,090	16%	1,890	3%	62,683	37
96	DECEMBER	18,573	72%	5,760	22%	1,497	6%	25,830	20
96	TOTAL	459,670	72%	150,782	24%	29,069	5%	639,521	512

4.3. Research Needs

The research needs are listed in the original FMP (SAFMC, 1983) and Amendments 1-7 for snapper grouper. Also, the Council works with NMFS on an annual "Operations Plan" which identifies specific items to be done during the next year and identifies research needs.

4.4. Unavoidable Adverse Effects

The following summarizes the short-term losses which will be mitigated by long-term gains with the snapper grouper resources at Optimum Yield (see Table 1 and the discussion under each action item for more details):

Action 1. Increase red porgy minimum size limit, establish a recreational bag limit, and prohibit harvest, possession, purchase and sale during March and April: Estimated reduction in commercial fishermen's gross annual revenue of $268,000 and 50% reduction in numbers of fish to the recreational sector in the short-term.

Action 2. Increase the black sea bass minimum size limit and establish a recreational bag limit: Estimated reduction in commercial fishermen's gross annual revenue of $242,000 and 40% reduction in numbers of fish to the recreational sector in the short-term.

Action 3. Require escape vents and escape panels with degradable fasteners in black sea bass pots: One time increase in capital investment estimated at $25,000 to black sea bass pot fishermen.

Action 4. Establish measures for greater amberjack: Estimated reduction in commercial fishermen's gross annual revenue of between $352,000 and $397,000, and an 11% reduction in numbers of fish to the recreational sector in the short-term.

Action 5. Increase the recreational vermilion snapper minimum size limit: Estimated reduction of 34% in numbers of fish to the recreational sector in the short-term. Total catch would be reduced by 13% in numbers of fish in the first year.

Action 6. Increase the gag minimum size limit and prohibit harvest, possession, purchase and sale during March and April: Estimated reduction in commercial fishermen's gross annual revenue of $1,186,000 and 13% reduction in numbers of fish to the recreational sector in the short-term. Fishermen may have to switch to other species during the closure. Also, fishermen may increase effort before and /or after closure, dissipating any positive effects of the closure.

Action 7. Increase the black grouper minimum size limit and prohibit harvest, possession, purchase and sale during March and April: Estimated reduction in commercial fishermen's gross annual revenue of $90,000 and 71% reduction in numbers of fish to the headboat sector in the short-term.

Action 8. Specify that within the 5-fish aggregate grouper bag limit no more than 2 fish may be gag or black grouper: Minimal reduction in recreational catch (estimated at 1%) in the short-term.

Action 9. Establish an aggregate recreational bag limit of 20 fish for species currently without a bag limit, excluding tomtate and blue runners: Minimal reduction in recreational catch (estimated at 1%) in the short-term.

Action 10. Specify that vessels with longline gear aboard may only possess deep water species: Estimated $157,000 reduction in commercial fishermen's gross annual revenue in the short-term. Would prevent fishermen using bottom longline gear from using bandit reels to catch mid-shelf species during the same trips.

There may also be some shift in effort to other fisheries, however, such shifts are expected to be minimal (see Section 7.6 under the heading "Effort Directed at or From Other Fisheries").

Without management, fishing effort would increase and catches in the snapper grouper fishery would decline. In the absence of additional management measures limiting fishing mortality rates, such declines would be expected to continue and could reach such low levels that the snapper grouper fishery would no longer be economically feasible. If this situation were allowed to continue, the fishery would ultimately collapse.

Therefore, the potential adverse effects resulting from a collapse of the snapper grouper resource will be avoided. Also, the resulting large negative social and economic costs will be avoided. For additional justification see Sections 1.4, 1.5, 3.4, 4.2, 4.7, 4.9, and Appendix H.

4.5. Relationship of Short-term Uses and Long-term Productivity

The level of reduction proposed is necessary to ensure the long-term productivity of the snapper grouper fishery resource. Without such regulations, the long-term yield of snapper grouper species would be jeopardized. Again it must be remembered the proposed measures in Amendment 8 will establish a limited entry program which will change the way in which fishermen think about the snapper grouper resource. It would then be in their best interest to plan for the long-term and voluntary compliance would increase. They would bear the burden of management regulations (e.g., size limits, quotas, etc.) but the benefits would not be reduced by new entrants to the fishery.

The Council weighed the likely short-term losses to fishermen against the long-term yield in target species and the effect of the snapper grouper fishery on the ecosystem, and concluded the proposed actions would likely result in net benefits to society. For additional justification see Sections 1.4, 1.5, 3.4, 4.2, 4.7, 4.9, and Appendix H.

4.6. Irreversible and Irretrievable Commitments of Resources

There are no irreversible or irretrievable commitments of resources associated with the proposed actions. If the Council does not take action to regulate the snapper grouper fisheries there will be a reduction in yields, damage to essential bottom habitat, and excessive investment in the fishery.

4.7. Effects of the Fishery on the Environment

4.7.1 Damage to Ocean and Coastal Habitats

The proposed actions, and their alternatives, are not expected to have any adverse effect on the ocean and coastal habitats. In fact, the measures will protect essential ocean and coastal habitats by reducing the negative impact of the fishery on the environment.

Management measures adopted in the original management plan through Amendment 7 combined have significantly reduced the impact of the fishery on essential habitat. The Council has reduced the impact of the fishery and protected essential habitat by prohibiting the use of poisons and explosives, prohibiting use of fish traps and entanglement nets in the EEZ, banning use of bottom trawls on live/hard bottom habitat north of Cape Canaveral, Florida, restricting use of bottom longlines to depths greater than 50 fathoms north of St. Lucie Inlet and only for species other than wreckfish and prohibit use of bottom longlines south of St. Lucie Inlet, and prohibiting use of black sea bass pots south of Cape Canaveral, Florida. These gear restrictions have significantly reduced the impact of the fishery on coral and live/hard bottom habitat in the South Atlantic region. For additional discussion see Sections 1.3, 8.4, and Appendix H.

Additional management measures proposed in Amendment 8, including specifying allowable bait nets and capping effort, will protect habitat by making existing regulations more enforceable. Establishing a controlled effort program will limit overall fishing effort and to the extent there is damage to the habitat from the fishery (e.g., black sea bass pots, anchors from fishing vessels, impacts of weights used on fishing lines and bottom longlines), such impacts will be limited.

In addition, measures in Amendment 9, which include further restricting longlines to retention of only deepwater species and requiring that black sea bass pots have escape vents and escape panels with degradable fasteners, will reduce the catch of undersized fish and bycatch and ensure that the pot, if lost, will not continue to "ghost" fish. Also, limiting the overall fishing mortality will reduce the likelihood of overharvesting of species with the resulting loss in genetic diversity, ecosystem diversity, and sustainability. For additional discussion see the information under each of the proposed measures in Section 4.2.

Measures adopted in the coral plan and shrimp plan have further restricted access by fishermen that had potential impacts on essential snapper grouper habitat. These measures include the designation of the Oculina Bank Habitat Area of Particular Concern and the Rock shrimp closed area (see Section 8.0 of this document and the Shrimp and Coral FMP/Amendment documents for additional information).

4.7.2 Public Health and Safety

The proposed actions, and their alternatives, are not expected to have any substantial adverse impact on public health or safety. The proposed measures do not increase hazards for vessels or crew safety.

4.7.3 Endangered Species and Marine Mammals

The original FMP prohibited use of poisons and explosives and limited use of fish traps to depths greater than 100 feet. In 1983, a Section 7 consultation under the ESA with NMFS concluded that the management actions contained in the Snapper Grouper FMP were not likely to adversely affect the continued existence of threatened or endangered sea turtles or marine mammals or result in the destruction or adverse modification of habitat that may be critical to those species. Amendment 1 to the FMP prohibited roller-rig trawls. Amendment 4 prohibited the use of fish traps and entanglement nets in the fishery. In addition, an "allowable gear" provision was implemented. Subsequent amendments have limited the use of sea bass pots to north of Cape Canaveral, Florida; limited the use of bottom longlines to depths greater than 50 fathoms and to areas north of St. Lucie Inlet, Florida; established special management zones where all gear other than hook-and-line and diving are prohibited; and prohibited fishing for bottom species in the Oculina Bank HAPC. Consultations on these actions concluded on April 28, 1989; July 6, 1990; March 7, 1991; May 3, 1991; September 19, 1991; December 30, 1992; September 21, 1993; and March 18, 1994. The latest consultation was for Amendment 8 on May 16, 1997. All consultations concluded that neither the proposed management measures nor the fishery would adversely affect the recovery of endangered or threatened species, or their critical habitat. A description of the need for management and fishing practices is given in Section 1 and Section 3.3.

The gear currently allowed, as described above, are believed to have few, if any interactions with endangered species and marine mammals. NMFS currently has no information on documented interactions with marine mammals or endangered species in this fishery.

Consequently, the fishery is listed as a Category III fishery (indicating interactions are rare to non-existent) in the 1997 List of Fisheries.

Amendment 9 will further reduce fishing pressure. Therefore, the Council has concluded that neither the proposed management measures in Amendment 9 nor the fishery will adversely affect the recovery of endangered or threatened species, or their critical habitat.

4.7.4 Cumulative Effects

The proposed actions, and their alternatives, are not expected to result in cumulative adverse effects that could have a substantial effect on the snapper grouper resource or any related stocks, including endangered and threatened species, such as turtles. In fact, the proposed measures will improve status of stocks, minimize habitat damage, rebuild overfished stocks, minimize user conflicts, protect threatened and endangered species, minimize overcapitalization and other adverse economic impacts that result from unlimited access to this fishery, and enhance compliance with existing regulations because fishermen will benefit from these measures. See Table 1 for more information.

There will also be cumulative positive effects. Rebuilding the overfished species and preventing overfishing in the other species will ensure the long-term productivity of the snapper grouper resource. This will achieve the Council's biological objectives of preventing overfishing, minimizing localized depletion, and minimizing habitat damage.

4.7.5 Effects of Fishery on Human Environment

The size and capacity of the fleet have increased significantly in recent years. Despite bag and trip limits, and other regulatory measures, some of the stocks are still overfished or near the overfished stage. Any gains from current regulatory measures under the open access situation are likely to attract new entrants to the fishery and provide incentive for those already in the fishery to increase harvest capacity even when gains in production are marginal or when economies of scale are not necessarily realized. This results in excess capacity or overcapitalization, inefficiency, low conservation and compliance incentives, potential conflicts among participants, high regulatory costs and low marketing incentives (see Sections 1.1 and 1.2 for more information about these problems).

Amendment 9 proposes measures to address these problems by specifying that vessels with longline gear aboard may only possess deepwater species (Action 10). For additional discussion please refer to the information presented for each Action in Section 4.2.

Social and economic information on fishermen is extremely limited. Surveys of portions of the commercial snapper grouper fishery have been recently completed. Preliminary results are included in Section 3.3.1 and have been used in analyzing the social and economic impacts of each Action as shown in Section 4.2.

Detailed discussions of the proposed measures on the human environment are presented under each Action in Section 4.2. For a summary of the economic and social impacts please refer to Tables 1 and 2 which summarize the impacts described in Section 4.2.

4.8. Public and Private Costs

Preparation, implementation, enforcement, and monitoring of this and any federal action involves expenditure of public and private resources which can be expressed as costs associated with the regulation. Costs associated with Amendments 8 and 9 include (Note: Items in Amendment 9 were originally part of Amendment 8.):

Council costs of document preparation, meetings, scoping meetings, public hearings and information dissemination	$75,000
NMFS administrative costs of document preparation, meetings and review	$52,500
NMFS law enforcement costs	$?

Total	$127,500+

4.9 Effects on Small Businesses: Initial Regulatory Flexibility Analysis

The Regulatory Flexibility Act requires a determination as to whether or not a proposed rule has a significant impact on a substantial number of small entities. If the rule does have this impact then an Initial Regulatory Flexibility Analysis (IRFA) has to be completed for public comment. The IRFA becomes final after the public comments have been addressed. If the proposed rule does not meet the criteria for "substantial number" and "significant impact" then a certification to this effect must be prepared.

This proposed rule, if promulgated, will :

(i) Increase the red porgy minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen; establish a recreational bag limit of 5 fish per person per day; prohibit harvest and possession in excess of the bag limit during March and April; prohibit purchase and sale during March and April.

(ii) Increase the black sea bass minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen and establish a recreational bag limit of 20.

(iii) Require escape vents and escape panels with degradable fasteners in black sea bass pots.

(iv) Establish measures for greater amberjack that will: reduce the recreational bag limit from 3 to 1 fish per person per day; prohibit harvest and possession in excess of the bag limit throughout the EEZ during April; establish a 1,000 pound daily commercial trip limit; establish a quota at 63% of 1995 landings (1,169,931 pounds); begin the fishing year on May 1; prohibit sale of fish harvested under the bag limit when the season is closed; and prohibit coring.

(v) Increase the recreational vermilion snapper minimum size limit from 10" TL to 11" TL and retain the current 10-fish bag limit.

(vi) Increase the gag minimum size limit from 20" TL to 24" TL for recreational and commercial fishermen; prohibit harvest and possession in excess of the bag limit during March and April; prohibit purchase and sale during March and April.

(vii) Increase the black grouper minimum size limit from 20" TL to 24" TL for recreational and commercial fishermen; prohibit harvest and possession in excess of the bag limit during March and April; prohibit purchase and sale during March and April.

(viii) Specify that within the 5-fish aggregate grouper bag limit (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 fish may be gag or black grouper individually or in combination.

(ix) Establish an aggregate recreational bag limit of 20 fish inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners).

(x) Specify that vessels with longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

All of the commercial and recreational (headboats, charter boats, and private / rental boats) entities harvesting snapper grouper species affected by the rule will qualify as small business entities because their gross revenues are less than $3.0 million annually. Hence, it is clear that the criterion of a substantial number of the small business entities comprising the snapper grouper harvesting industry being affected by the proposed rule will be met. The outcome of "significant impact" is less clear but can be triggered by any of the five conditions or criteria discussed below.

The regulations are likely to result in a change in annual gross revenues by more than 5 percent. The discussions under economic impacts in Section 4 details the effects on commercial and recreational entities for each proposed action to the extent possible. For the commercial sector, it is estimated that the red porgy action would reduce annual gross revenue by approximately $268,000 in the first year. The black sea bass actions would reduce annual gross revenue by an estimated $242,000 in the first year. The greater amberjack action would reduce annual gross revenue by $352,000 to $397,000 in the first year. The gag action would reduce annual gross revenue by an estimated $1,186,000 in the first year. It is estimated that Actions 7 and 10 would reduce gross revenue by an estimated $90,000 and $157,000 respectively, in the first year.

The reduction in annual gross revenue to snapper grouper commercial fishermen from the combined actions is estimated at between $2,295,000 and $2,340,000 in the first year. Based on an estimated exvessel value of $15,500,000 for the snapper grouper fishery in 1995 extrapolated from the General Canvass data, the reduction in annual gross revenue in the first year represents approximately 15% of the 1995 estimated value of the fishery.

The recreational entities that are likely to experience any change in annual gross revenue as a result of the proposed actions are the headboat and charter boat sectors. This will occur if increase in minimum size limits, decrease in bag limits for individual species, and establishment of an aggregate recreational bag limit for species not currently under bag limits cause decreased recreational satisfaction to anglers to the extent that demand for headboat and charter boat trips declines. While it is likely that the proposed actions would cause some decrease in recreational satisfaction, there is no indication that it would lead to a decline in the demand for headboat and charter boat trips. Given that the number of recreational anglers has increased steadily over the years, it is unlikely that there will be any real decrease in the demand for headboat and charter boat trips.

Annual compliance costs (annualized capital, operating, reporting, etc.) increase total costs of production for small entities by more than 5 percent. The action requiring escape vents and escape panels with degradable fasteners in black sea bass pots will involve some added costs to fishermen. Black sea bass pots are utilized mainly in North Carolina and South Carolina. The latest figures available indicate that in 1994, 142 fishermen with permits operated 4,980 pots in North Carolina. Thus the average number of pots per permit holder was 35. A total of 61 fishermen held permits in South Carolina and operated 1,181 pots. Thus the average number of pots per permit holder was 19. Given an average cost of $30.00 per pot, including ropes and buoys (adjusted for depreciation), the total value of black sea bass pots in North Carolina and South Carolina is estimated at $185,000. The materials required for including escape vents and escape panels are readily available. It is estimated that the one time cost would not exceed $3.00 to $5.00 per pot. Assuming an average cost of $4.00, the cost for fitting the 6,161 pots with escape vents and escape panels would be approximately $25,000 (Jodi Gay, pers. comm.). This represents a 13% increase in capital investment for black sea bass pot fishermen in the first year.

The action specifying that vessels carrying longline gear aboard can only possess certain snapper grouper species above the bag limit would prevent some commercial fishermen from making multiple gear trips. Fishermen, particularly in North Carolina have claimed that multiple gear trips are necessary to ensure profitability because of the long distance they travel from shore and weather conditions. These are fishermen who carry bandit reels for fishing mid-shelf species in addition to the longline gear used for fishing deep shelf species. The discussion under "Economic Impacts" for Action 10 (Section 4.2) details the percent of mid-depth species landings that could be affected based on data for 1994 - 1996. It is estimated that gross revenue could be reduced by as much as $157,000 in the first year.

Compliance costs as a percent of sales for small entities are at least 10 percent higher than compliance costs as a percent of sales for large entities. All the firms expected to be impacted by the rule are small entities and hence there is no differential impact.

Capital costs of compliance represents a significant portion of capital available to small entities considering internal cash flow and external financing capabilities. The proposed actions do not require any existing fishing entity to acquire new equipment or to completely refit existing equipment for compliance purposes. The action requiring escape vents and escape panels in black sea bass pots would involve minor modifications to the pots. This is discussed above and the increase to capital investment is indicated.

The requirements of the regulation are likely to result in a number of the small entities affected being forced to cease business operations. This number is not precisely defined by SBA but a "rule of thumb" to trigger this criterion would be two percent of the small entities affected. The analyses under economic impacts for each proposed action do not indicate that any entity will be forced out of business. On the contrary, the results show that there would be some short-term reduction in annual gross revenue and some increase in operating costs, but these would be compensated for by the projected increase in overall net benefits from the fishery in the long-term.

Considering all the criteria discussed above, the conclusion is that small businesses will be significantly affected by the proposed rule. Hence, the determination is made that the proposed rule will have a significant impact on a substantial number of small business entities and an Initial Regulatory Flexibility Analysis (IRFA) is required.

The full details of the economic analyses conducted for the proposed rule are contained in the RIR under the heading "Economic Impacts" in Section 4. Some of the relevant results are summarized below for the purposes of the IRFA.

Description of the reasons why action by the agency is being considered. The Magnuson- Stevens Fishery Conservation and Management Act provides for the management of fish stocks at the maximum sustainable yield (MSY) level. This will require rebuilding schedules for fish stocks that are below such level. Excessive fishing mortality are currently being applied to some fish stocks thus jeopardizing the biological integrity of those stocks. The use of some types of fishing gear results in habitat degradation which adversely affects fish stocks and associated habitat.

Statement of the objectives of, and legal basis for, the proposed rule. The following objectives are a part of these actions: (1) Prevent overfishing in all species by maintaining the spawning potential ratio (SPR) at or above optimum yield levels; (2) Minimize habitat damage due to direct and indirect effects of recreational and commercial fishing activities as well as other non-fishery impacts; Promote stability and facilitate long-term planning; (3) Create market driven harvest pace and increase product continuity; (4) Decrease incentives for overcapitalization and; (5) Evaluate and minimize localized depletion. The Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265) as amended through October 11, 1996 provides the legal basis for the rule.

Description and estimate of the number of small entities to which the proposed rule will apply: The proposed rule will apply to all of the entities that will qualify for snapper grouper permit under the limited entry program to be implemented in Amendment 8 and recreational fishermen (including headboats, charter boats, and private / rental boats). It is estimated that about 2,000 commercial vessels would likely qualify for snapper grouper permits under the limited entry program. Preliminary results from an economic survey of commercial snapper grouper fishermen conducted in 1994 (Waters, pers. comm.) indicate that the average investment in vessel and equipment ranged from $53,000 for vessels operating with vertical lines to $237,000 for vessels operating with bottom longlines. The estimated cost of new vessels comparably equipped ranged from an average of $113,000 for vessels with vertical lines to $340,000 for vessels with bottom longlines. Data extrapolated from the General Canvass data for 1995 indicate an estimated annual exvessel value of $15.5 million generated by commercial vessels that landed snapper grouper species.

Description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or records: The proposed rule will not require any additional reporting or recordkeeping on the part of commercial and recreational entities. Compliance will be monitored through existing systems established by the National Marine Fisheries Service and the U.S. Coast Guard. The professional skills necessary to meet these requirements will not change relative to the level that all the fishermen are familiar with and have previously used.

Identification of all relevant Federal rules which may duplicate, overlap or conflict with the proposed rule. No duplicative, overlapping or conflicting Federal rules have been identified.

Description of significant alternatives to the proposed rule and discussion of how the alternatives attempt to minimize economic impacts on small entities. In Section 4, each proposed action includes a number of options under the heading: "Other Possible Options for Actions 1 - 10". Each of these options include an economic impact assessment. Refer to Section 4.2: "Management Options" for details of the economic impact assessment on small entities for each option. The status quo or "no action" option was also considered for each proposed action. Relative to the proposed actions, all the other possible options would result in lesser net benefits from the fishery in the long-term. Some of the options would minimize economic impacts on small entities in the short-term, but would not achieve the council's goal of managing species in the management unit at the optimum yield level. Thus, these options would not meet the stated objectives of the Snapper Grouper FMP.

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SAFMC Snapper Grouper Advisory Panel
SAFMC Scientific and Statistical Committee
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South Carolina Coastal Zone Management Program
Florida Coastal Zone Management Program
Florida Department of Environmental Protection
Florida Marine Fisheries Commission
Georgia Department of Natural Resources
Gulf and South Atlantic Fisheries Development Foundation
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New River Fisherman's Association
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Atlantic Coast Conservation Association
Atlantic States Marine Fisheries Commission
North Carolina Fisheries Association
Organized Fishermen of Florida
Recreational Fishing Alliance (RFA)
Southeastern Fisheries Association

7.0 OTHER APPLICABLE LAW

7.1 Vessel Safety

PL. 99-659 amended the Magnuson Act to require that a fishery management plan or amendment must consider, and may provide for, temporary adjustments (after consultation with the U.S. Coast Guard and persons utilizing the fishery) regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safety of the vessels.

No vessel will be forced to participate in the fishery under adverse weather or ocean conditions as a result of the imposition of management regulations set forth in this amendment. Therefore, no management adjustments for fishery access will be provided.

There are no fishery conditions, management measures, or regulations contained in this amendment which would result in the loss of harvesting opportunity because of crew and vessel safety effects of adverse weather or ocean conditions. No concerns have been raised by people engaged in the fishery or the Coast Guard that the proposed management measures directly or indirectly pose a hazard to crew or vessel safety under adverse weather or ocean conditions. Therefore, there are no procedures for making management adjustments in this amendment due to vessel safety problems because no person will be precluded from a fair or equitable harvesting opportunity by the management measures set forth.

There are no procedures proposed to monitor, evaluate, and report on the effects of management measures on vessel or crew safety under adverse weather or ocean conditions.

Amendment 8 to the Snapper Grouper Fishery Management Plan established a limited entry program. This program will remove much of the potential for creating "derby" fishing. Fishermen in the snapper grouper fishery will be better able to plan their fishing trips and avoid areas/times which pose safety risks (e.g., due to weather conditions).

7.2 Coastal Zone Consistency

Section 307(c)(1) of the federal Coastal Zone Management Act of 1972 requires that all federal activities which directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. While it is the goal of the Council to have complementary management measures with those of the states, federal and state administrative procedures vary and regulatory changes are unlikely to be fully instituted at the same time. Based upon the assessment of this amendment's impacts in previous sections, the Council has concluded this amendment is an improvement to the federal management measures for snapper grouper species.

This amendment is consistent with the Coastal Zone Management Plans of Florida, South Carolina, Georgia, and North Carolina to the maximum extent practicable.

This determination was submitted to the responsible state agencies under Section 307 of the Coastal Zone Management Act administering approved Coastal Zone Management Programs in the states of Florida, South Carolina, and North Carolina.

7.3 Endangered Species and Marine Mammal Acts

The original FMP prohibited the use of poisons and explosives and limited the use of fish traps to depths greater than 100 feet. In 1983, a Section 7 consultation under the ESA with NMFS concluded that the management actions contained in the Snapper Grouper FMP were not likely to adversely affect the continued existence of threatened or endangered sea turtles or marine mammals or result in the destruction or adverse modification of habitat that may be critical to those species. Amendment 1 to the FMP prohibited roller-rig trawls. Amendment 4 prohibited the use of fish traps and entanglement nets in the fishery. In addition, an "allowable gear" provision was implemented. Subsequent amendments have limited the use of sea bass pots to north of Cape Canaveral, Florida; limited the use of bottom longlines to depths greater than 50 fathoms and to areas north of St. Lucie Inlet, Florida; established special management zones where all gear other than hook-and-line and diving are prohibited; and prohibited fishing for bottom species in the Oculina Bank HAPC. Consultations on these actions concluded on April 28, 1989; July 6, 1990; March 7, 1991; May 3, 1991; September 19, 1991; December 30, 1992; September 21, 1993; and March 18, 1994. The latest consultation was for Amendment 8 on May 16, 1997. All consultations concluded that neither the proposed management measures nor the fishery would adversely affect the recovery of endangered or threatened species, or their critical habitat. A description of the need for management and fishing practices is given in Section 1 and Section 3.3.

The gear currently allowed, as described above, are believed to have few, if any interactions with endangered species and marine mammals. NMFS currently has no information on documented interactions with marine mammals or endangered species in this fishery. Consequently, the fishery is listed as a Category III fishery (indicating interactions are rare to non-existent) in the 1997 List of Fisheries.

Amendment 9 will further restrict use of allowable gear and reduce fishing pressure. Therefore, the Council has concluded that neither the proposed management measures in Amendment 9 nor the fishery will adversely affect the recovery of endangered or threatened species, or their critical habitat.

Listed and protected species under the Endangered Species Act (ESA) and Marine Mammals Protection Act (MMPA) and governed by the jurisdiction of NMFS include:

	Whales:	Date Listed
(1)	The northern right whale- *Eubalaena glacialis* (ENDANGERED)	12/2/70
(2)	The humpback whale- *Magaptera novaeangliae* (ENDANGERED)	12/2/70
(3)	The fin whale- *Balaenoptera physalus* (ENDANGERED)	12/2/70
(4)	The sei whale- *Balaenoptera borealis* (ENDANGERED)	12/2/70
(5)	The sperm whale- *Physeter macrocephalus* (ENDANGERED)	12/2/70
(6)	The blue whale- *Balaenoptera musculus* (ENDANGERED)	

	Sea Turtles:	Date Listed
(1)	The Kemp's ridley turtle- *Lepidochelys kempii* (ENDANGERED)	12/2/70
(2)	The leatherback turtle- *Dermochelys coriacea* (ENDANGERED)	6/2/70
(3)	The hawksbill turtle- *Eretmochelys imbricata* (ENDANGERED)	6/2/70
(4)	The green turtle- *Chelonia mydas* (THREATENED/ENDANGERED)	7/28/78
(5)	The loggerhead turtle- *Caretta caretta* (THREATENED)	7/28/78

Other:

(1) The manatee- *Trichechus manatus* (ENDANGERED)

7.4 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to control paperwork requirements imposed on the public by the federal government. The authority to manage information collection and record keeping requirements is vested with the Director of the Office of

Management and Budget. This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

The Council is not proposing measures under this amendment that will involve increased paperwork and consideration under this Act.

7.5 Federalism

No federalism issues have been identified relative to the actions proposed in this amendment and associated regulations. The affected states have been closely involved in developing the proposed management measures and the principal state officials responsible for fisheries management in their respective states have not expressed federalism related opposition to adoption of this amendment.

7.6 National Environmental Policy Act

The discussion of the need for this amendment, proposed actions and alternatives, and their environmental impacts are contained in Sections 1.0 and 2.0 of this amendment and the supplemental environmental impact statement. A description of the affected environment is contained in Section 3.0 and Council recommendations for protection and restoration of essential snapper grouper habitat and are contained in Section 8.0.

The proposed amendment is a major action having a significant positive impact on the quality of the marine and human environment of the South Atlantic. The proposed action will have a significant positive impact by reducing fishing mortality on overfised species. A formal Environmental Impact Statement (EIS) was prepared for the snapper grouper fishery for the original fishery management plan (SAFMC, 1983).

Mitigating measures related to proposed actions are unnecessary. No unavoidable adverse impacts on protected species, wetlands, or the marine environment are expected to result from the proposed management measures in this amendment.

The proposed regulations will further protect other species presently caught and discarded as unwanted bycatch. Overall, the benefits to the nation resulting from implementation of this amendment are greater than management costs.

Environmental Significance and Impact of the Fishery, Proposed Action and Alternatives.

Section 4.0 describes the Council's management measures in detail. Section 1508.27 of the CEQ Regulations list 10 points to be considered in determining whether or not impacts are significant. The analyses presented below are based on the detailed information contained in Section 4.0 Environmental Consequences including the Regulatory Impact Review, Regulatory Flexibility Determination, and Social Impact Assessment.

Beneficial and Adverse Impacts

There are beneficial and adverse impacts from the proposed actions. The impacts are described for each action in Section 4.0 and summarized in Section 2.0.

The Council is proposing to: Increase the **red porgy** minimum size limit from 12" TL to 14" TL for both recreational and commercial fishermen, establish a recreational bag limit of 5 red porgy per person per day, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase **the black sea bass** minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day; **Require escape**

vents and escape panels with degradable fasteners in black sea bass pots; Establish measures for **greater amberjack** that will: reduce the recreational bag limit from 3 to 1 greater amberjack per person per day, prohibit harvest and possession in excess of the bag limit during April throughout the EEZ, establish a 1,000 pound daily commercial trip limit, establish a quota at 63% of 1995 landings (quota=1,169,931 pounds), begin the fishing year on May 1, prohibit sale of fish harvested under the bag limit when the season is closed, and prohibit coring; Increase the recreational **vermilion snapper** minimum size limit from 10" to 11" TL and retain the current 10-fish bag limit; Increase the **gag grouper** minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Increase the **black grouper** minimum size limit from 20" to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; Specify that within the **5-fish aggregate grouper bag limit** (which currently includes tilefish and excludes jewfish and Nassau grouper), no more than 2 may be gag grouper or black grouper (individually or in combination); Establish an **aggregate recreational bag limit** of 20 fish per person per day inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners (there would be no bag limit on tomtate and blue runners); and Specify that **vessels with longline gear** aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

Summary of Adverse Impacts: There will be short-term economic losses to both the commercial and recreational fisheries. These short-term losses are necessary to rebuild overfished stocks and prevent overfishing of other species. The short-term losses will be outweighed by the long-term benefits from a sustainable snapper grouper resource.

Without management, fishing effort would increase and catches in the snapper grouper fishery would decline. In the absence of additional management measures limiting fishing mortality rates, such declines would be expected to continue and could reach such low levels that the snapper grouper fishery would no longer be economically feasible. If this situation were allowed to continue, the fishery would ultimately collapse. For a detailed discussion of the biological, social, and economic adverse impacts of the proposed measures refer to the biological, social, and economic impact discussions under each Action in Section 4.2.

Summary of Beneficial Impacts: The proposed measures will limit fishing mortality and prevent future declines in the snapper grouper resource. These measures will, over time, result in rebuilding the resource to the long-term goal (Optimum Yield) of 40% static SPR. For a detailed discussion of the biological, social, and economic beneficial impacts of the proposed measures refer to the biological, social, and economic impact discussions under each Action in Section 4.2.

Public Health or Safety

The proposed actions, and their alternatives, are not expected to have any substantial adverse impact on public health or safety. The proposed measures do not increase hazards for vessels or crew safety.

Unique Characteristics

The proposed actions have no impacts on characteristics of the area such as proximity to historic or cultural resources, park lands, wetlands, or ecologically critical areas.

Prior amendments (see snapper grouper, shrimp, and coral amendments) established an experimental closed area in the Oculina Habitat Area of Particular Concern (see Section 8.4). This area is being studied to evaluate the effectiveness of closed areas for protecting long-lived species such as snapper and groupers (see Section 1.5). Such areas are useful in preserving the genetic diversity present in such species. In addition, special management zones have been established around artificial reefs to preserve the original intent of such areas.

Controversial Effects

The proposed actions are not expected to have significant controversial effects. The Council is providing extensive opportunity for input by holding scoping meetings, public hearings, and by providing the opportunity for interested persons to provide written comments. During development of this amendment, the Council has incorporated suggestions from the public. Additionally, states incorporate public input into their management measures which track the federal measures.

Section 1.3.2 describes the extensive public input received thus far on measures within Amendment 9.

Uncertainty or Unique/Unknown Risks

The proposed actions are not expected to have any significant effects on the human environment that are highly uncertain or involve unique or unknown risks. Benefits from management cannot be quantified but the direction and relative magnitude are known and are positive. If the proposed actions were not implemented there would be a high level of uncertainty as to the future status of the species being impacted.

Precedent/Principle Setting

The proposed actions are not expected to have any significant effects by establishing precedent and do not include actions which would represent a decision in principle about a future consideration.

Relationship/Cumulative Impact

The proposed actions, and their alternatives, are not expected to result in cumulative adverse effects that could have a substantial effect on the snapper grouper resource or any related stocks, including endangered and threatened species, such as turtles. In fact, the proposed measures will improve status of stocks, minimize habitat damage, rebuild overfished stocks, minimize user conflicts, and protect threatened and endangered species. See Table 1 for more information.

The Council recognizes the actions proposed in Amendment 9 will result in some effort shift into other fisheries. Section 4.2.1 presents information on the other fisheries for which snapper grouper permit holders also qualify. It should be remembered these individuals are currently permitted in these fisheries and as a result would not represent "new" effort.

Fishermen have suggested the Council consider establishing a limited entry program for commercial fishermen versus the current fishery specific approach. The Council has discussed this in the past and will over the next two years further evaluate establishing a "Comprehensive Commercial Fishing Limited Entry Program" that crosses all fisheries under the Council's jurisdiction.

There will also be cumulative positive effects. Rebuilding the overfished species and preventing overfishing in the other species will ensure the long-term productivity of the snapper grouper resource. This will achieve the Council's biological objectives of preventing overfishing, minimizing localized depletion, and minimizing habitat damage.

Historical/Cultural Impacts

The proposed actions are not expected to have any significant effects on historical sites listed in the National Register of Historic Places and will not result in any significant impacts on significant scientific, cultural, or historical resources. Establishment of the experimental closed area under Amendment 6 provides a unique opportunity to study the impacts of no fishing on the ecosystem and genetic diversity of snapper grouper species. Ongoing studies are expected to yield positive results over the next four to six years.

Endangered/Threatened Species Impacts

The original FMP prohibited the use of poisons and explosives and limited the use of fish traps to depths greater than 100 feet. In 1983, a Section 7 consultation under the ESA with NMFS concluded that the management actions contained in the Snapper Grouper FMP were not likely to adversely affect the continued existence of threatened or endangered sea turtles or marine mammals or result in the destruction or adverse modification of habitat that may be critical to those species. Amendment 1 to the FMP prohibited roller-rig trawls. Amendment 4 prohibited the use of fish traps and entanglement nets in the fishery. In addition, an "allowable gear" provision was implemented. Subsequent amendments have limited the use of sea bass pots to north of Cape Canaveral, Florida; limited the use of bottom longlines to depths greater than 50 fathoms and to areas north of St. Lucie Inlet, Florida; established special management zones where all gear other than hook-and-line and diving are prohibited; and prohibited fishing for bottom species in the Oculina Bank HAPC.

The gear currently allowed, as described above, are believed to have few, if any interactions with endangered species and marine mammals. NMFS currently has no information on documented interactions with marine mammals or endangered species in this fishery. Consequently, the fishery is listed as a Category III fishery (indicating interactions are rare to non-existent) in the 1997 List of Fisheries.

Amendment 9 will further restrict use of allowable gear and reduce fishing pressure. Therefore, the Council has concluded that neither the proposed management measures in Amendment 9 nor the fishery will adversely affect the recovery of endangered or threatened species, or their critical habitat.

Interaction With Existing Laws for Habitat Protection

The proposed actions are not expected to have any significant interaction which might threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment. The habitat of stocks comprising the management unit is described in Section 8.2 and existing habitat protection programs are described in Section 8.2.4. Habitat areas of particular concern are described in Section 8.4. Federal habitat protection laws, programs, and policies are described in Section 8.5.1 and State habitat protection programs are described in Section 8.5.2.

The Council has adopted a habitat policy which is included Section 8.3.1. In addition, the Council has prepared and adopted a number of positions that direct the protection of essential habitat (see Sections 8.3.2, 8.3.3, 8.3.4, and 8.3.5. The Council has subsequently adopted a seagrass policy statement and presented available distribution maps (maps are in SAFMC, 1996) of this habitat essential to various snapper grouper species (including gag) as well as many other managed and non-managed species. This and other habitat policy statements are included in Section 8.3.2.

Effects of the Fishery on the Environment

Section 8.2 describes the habitat essential to species in the snapper grouper management unit. Section 3.0 Affected Environment combined with Section 4.0 Environmental Consequences, present the detailed information on the impacts of the proposed actions and alternatives on the environment.

Management measures adopted in the original management plan through Amendment 7 combined have significantly reduced the impact of the fishery on essential habitat. The Council has reduced the impact of the fishery and protected essential habitat by prohibiting use of poisons and explosives, prohibiting use of fish traps and entanglement nets in the EEZ, describing allowable gear, banning use of bottom trawls on live/hard bottom habitat north of Cape Canaveral, Florida, restricting use of bottom longlines to depths greater than 50 fathoms north of St. Lucie Inlet and only for species other than wreckfish and prohibiting use of bottom longlines south of St. Lucie Inlet, and prohibiting the use of black sea bass pots south of Cape Canaveral, Florida. These gear restrictions have significantly reduced the impact of the fishery on coral and live/hard bottom habitat in the South Atlantic region. For additional discussion see Sections 1.3, 8.4, and Appendix H.

Additional management measures proposed in Amendment 9, further restricting longlines to retention of only deepwater species, will protect habitat by making existing regulations more enforceable. In addition, the requirement that black sea bass pots have escape vents and escape panels with degradable fasteners will reduce catch of undersized fish and bycatch and insure that the pot, if lost, will not continue to "ghost" fish. Also, limiting the overall fishing mortality will reduce the likelihood of overharvesting of species with the resulting loss in genetic diversity, ecosystem diversity, and sustainability. For additional discussion see the information under each of the proposed measures in Section 4.2.

Measures adopted in the coral plan and shrimp plan have further restricted access by fishermen that had potential impacts on essential snapper grouper habitat. These measures include the designation of the Oculina Bank Habitat Area of Particular Concern and the Rock shrimp closed area (see Section 8.0 of this document and the Shrimp and Coral FMP/Amendment documents for additional information).

Bycatch

Prior Council actions prohibiting roller-rig trawls (Snapper Grouper Amendment 1); prohibiting entanglement nets and fish traps, establishing allowable gear, and bottom longline restrictions (Snapper Grouper Amendment 4) have reduced bycatch in the snapper grouper fishery.

Measures proposed in Amendment 9 to address bycatch include: requiring escape vents and escape panels with degradable fasteners in black sea bass pots (Action 3), additional restrictions on longline gear (Action 10), and establishment of an aggregate recreational bag limit (Action 9). These actions will result in there being less of a bycatch issue in the snapper grouper fishery.

Effort Directed at or From Other Fisheries

The Council recognizes the actions proposed in Amendment 9 will result in some effort shift into other fisheries. It should be remembered these individuals are currently permitted in these fisheries and as a result would not represent "new" effort. Further, those not included in the limited entry program currently catch limited amounts of snapper grouper species and therefor must be actively fishing in these other fisheries. If this is the case, then any impacts from effort shifting would be expected to be minimal.

8.0 DESCRIPTION OF HABITAT AND STOCKS COMPRISING THE MANAGEMENT UNIT

8.1 Description of the Stocks Comprising the Management Unit

Sections 8.1.1 through 8.1.10 of the original snapper grouper FMP (SAFMC, 1983), and the draft revised source document (SAFMC, 1991c) present detailed information on the stocks comprising the management unit. A complete list of species in the management unit is contained in Appendix A.

8.2 Description of Habitat of the Stocks Comprising the Management Unit

Snapper grouper utilize both pelagic and benthic habitats during their life cycle. A planktonic larval stage lives in the water column and feeds on zooplankton and phytoplankton. Juveniles and adults are typically demersal and usually associated with bottom topographies on the continental shelf (less than 100 m) that have high relief; i.e., coral reefs, artificial reefs, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings. More detail on these habitat types is found in the Fishery Management Plan for Corals and Coral Reefs (GMFMC and SAFMC, 1982). However, several species are found over sand and soft-bottom substrates. Some juvenile snapper and grouper such as *Lutjanus analis*, *L. griseus*, *L. jocu*, *L. synagris*, *Ocyurus chrysurus*, *Epinephelus itajara*, *E. morio*, *Mycteroperca microlepis* and *M. venenosa*, may occur in inshore seagrass beds, mangrove estuaries, lagoons, and bay systems.

The principal snapper grouper fishing areas are located in live bottom and shelf-edge habitats, and to a lesser extent the lower habitat. Temperatures range from 11° to 27° C over the continental shelf and shelf-edge due to the proximity of the Gulf Stream, with lower shelf habitat temperatures varying from 11° to 14° C. Depths range from 54 to 90 feet or greater for live-bottom habitats, 180 to 360 feet for the shelf-edge habitat, and from 360 to 600 feet for the lower-shelf habitat.

The exact extent and distribution of productive snapper grouper habitat on the continental shelf north of Cape Canaveral is unknown. Current data suggest that from 3 to 30 percent of the shelf is suitable bottom. These hard, live-bottom habitats may be low relief areas supporting sparse to moderate growth of sessile invertebrates, moderate relief reefs from 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 fans. Live-bottom habitat is scattered irregularly over most of the shelf north of Cape Canaveral, but is most abundant off northeastern Florida.

South of Cape Canaveral the continental shelf narrows from 35 to 10 miles and less 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 characteristics. The coral rock reefs, from 30 to 46 feet at the shallowest lies between West Palm Beach and Miami and from 80 to 125 feet for the deepest most rugged reefs, are natural habitats for snappers and groupers. These reefs comprise from 20 to 30 percent of the shelf area south of Cape Canaveral.

Man-made artificial reefs also are utilized to attract fish and increase fish harvests. Research on man-made reefs including those composed of cars, tires, pipes, etc., is limited and opinions differ as to whether or not artificial structures actually promote an increase of biomass or merely concentrate fishes by attracting them from nearby natural areas. Some evidence indicates that artificial reefs actually increase the standing stock of snappers and groupers (Stone, 1978; Stone et al., 1979). Driessen (1985) believes that, "offshore platforms and other artificial reefs raise primary productivity levels, create new habitats, augment carrying capacities, and increase the variety, numbers, range, size, and growth rates of highly desirable fish and shellfish." The following excerpt from Bohnsack and Sutherland (1985) adequately portrays the current state of knowledge on artificial reefs:

"Artificial reef literature was critically reviewed to determine what knowledge about the biology, ecology, and economics of artificial reefs had been scientifically established and to identify and recommend future projects, areas, and methods of research. General agreement exists that artificial reefs are effective fish attractants and an important fishery management tool. Most published papers deal with building artificial reefs or are qualitative descriptive studies detailing successional changes and species observed. Conclusions were often based on little or no scientific data. Few studies used quantitative experimental methods and many lacked scientifically valid controls.

Drastically different approaches to artificial reefs in terms of purpose, funding, research, materials, and size have been taken by Japan and the United States. Most marine artificial reefs in the United States are large, low budget, and haphazardly constructed from scrap materials, using volunteer labor. These reefs are usually built in deeper offshore waters for use by recreational fishermen with boats. Japan's artificial reefs, however, are designed and constructed by engineers, built of durable, non-waste, prefabricated materials, placed in scientifically selected sites in shallow and deep water, and are primarily used by commercial fishermen.

In this paper, 29 recommendations are made for future studies. Improved professional publication standards and more carefully controlled studies using an experimental approach are suggested. Greater emphasis should be placed on determining optimal design, size, and placement of artificial reefs to maximize production. More attention should be given to small, shallow, nearshore artificial reefs that are accessible without a boat. Also, reefs designed for increasing larval and juvenile recruitment, survival, and growth should be considered. Improved quantitative assessment techniques are needed to describe artificial reefs, reef communities, and to monitor biotic changes. Artificial reef data bases should be maintained so that the effectiveness of various artificial reefs can be more easily assessed. The importance of fish attraction versus fish production and the relationship between standing crop and fish catch have not been adequately addressed. The economics and social impact of artificial reefs also have not been carefully examined, especially the benefits from alternative designs and approaches."

Currently, Florida has the most active artificial reef program in the nation with over 300 constructed since 1986 representing over 50% of reefs created in US waters to date (Lindberg, 1996). Artificial reef programs also are underway in Georgia, South Carolina, and North Carolina.

8.2.1 Habitat Condition

Offshore areas used by adults appear to be the least affected by nearshore habitat alterations and water quality degradation. Since most of the catch comes from offshore in deeper water, there is an unknown effect of pesticides, herbicides, and other harmful wastes which have been considered as deleterious to many inshore fisheries (Ketchum, 1972; Walsh et al., 1981;

Walsh, 1984). Nearshore reefs have been adversely affected to various degrees by man (see later discussion), but overall are in good condition. Some coral reef tracts are protected. These include Dry Tortugas (Ft. Jefferson National Monument), Looe Key, Biscayne National Park, and Grays Reef. Other important areas are listed below.

The estuarine phase of juveniles, if obligatory, may be critical as alterations of the environment coupled with local changes in environmental parameters, such as temperature and salinity occurred to a large extent in estuaries. Natural and man-induced changes have altered freshwater inflow and removed much habitat. Natural wetland losses result from forces such as erosion, sea level rises, subsidence, and accretion. The major man-induced activities that have impacted environmental gradients in the estuarine zone are:

- construction and maintenance of navigation channels;
- discharges from wastewater plants and industries;
- dredge and fill for land use development;
- agricultural runoff;
- ditching, draining, or impounding wetlands;
- oil spills;
- thermal discharges;
- mining, particularly for phosphate, and petroleum;
- entrainment and impingement from electric power plants;
- dams;
- marinas;
- alteration of freshwater inflows to estuaries;
- saltwater intrusion;
- non-point-source discharges of contaminants.

All South Atlantic estuaries have been impacted to some degree by one or more of the above activities. Estuaries also have been the most impacted by water quality degradation. Numerous pollution-related reports and publications exist, but there still is no complete list of chemical contaminants, their effects, or concentrations. A comprehensive inventory to assess how seriously the South Atlantic's estuaries are polluted also is needed. The majority of snappers and groupers spend their entire life cycle offshore where environmental conditions are more stable and man's effect on estuaries is less severe. However, if an obligatory relationship between juveniles and estuarine habitats is determined, estuaries will have to be managed to the same degree for snappers and groupers as for other estuarine-dependent species such as shrimp.

Important coral reef tracts have been identified in the South Atlantic in the Corals and Coral Reefs Fishery Management Plan (GMFMC and SAFMC, 1982). These include the Key Largo Coral Reef, Looe Key, Dry Tortugas, Biscayne National Park, *Oculina* Banks, and Grays Reef. Since these reefs play an essential role in the life cycle of the species by providing excellent snapper grouper habitat, they are again identified here.

Other valuable areas include John Pennekamp Coral Reef State Park at Key Largo, Florida, the Florida Reef Tract and the other reefs and live bottoms between North Carolina and Cape Canaveral, Florida. The relationship between snapper grouper and the estuaries is still poorly understood. If an obligatory relationship is determined in specific estuaries, then these estuaries also will be listed as Habitat Areas of Particular Concern.

We are unaware of any current habitat condition that affects the ability to harvest and market snapper grouper resources. The same applies to recreationally caught fish. Stout (1980), however, has found low levels of DDT, PCB, endrin, and dieldrin organochlorines in red and black grouper, gag, and red snapper. If the residue levels of organochlorines or other pesticides ever become dangerous to humans it is likely that the marketability of snapper and grouper could be adversely affected.

8.2.2 Habitat Threats

Currently, the primary threat to offshore habitat comes from oil and gas development and production, offshore dumping, and the discharge of contaminants by river systems. The destruction of suitable reefs (natural and man-made) or other types of live bottom areas also may prove deleterious to this fishery as most of the current data indicate an affinity for these habitats by snapper grouper (Starck, 1968; Shinn, 1974; Huntsman and Waters, 1987). Natural impacts on reef habitat may arise from severe weather conditions such as hurricanes and excessive freshwater discharge resulting from heavy rain. Human impacts on reef habitat result from activities such as pollution, dredging and treasure salvage, boat anchor damage, fishing and diving-related perturbations, and petroleum hydrocarbons (Jaap, 1984). Ocean dumping and nutrient over-enrichment also may cause local problems. Discussion of some of these factors occurs in the Corals and Coral Reefs Fishery Management Plan (GMFMC and SAFMC 1982) and will not be repeated here.

Nearshore reefs, especially off Florida, may be impacted by coastal pollution such as sewage and non-point-source discharges, urban runoff, herbicides, and pesticides (Jaap, 1984). Residues of the organochlorine pesticides DDT, PCB, dieldrin, and endrin have been found in gag, red grouper, black grouper, and red snapper (Stout, 1980). Heavy metal accumulations in sediment and reef biota near population centers have been noted (Manker, 1975). Disposal of wastes has created local problems. Jaap (1984) reports of batteries and refuse disposed of on the reef flat at Carysfort Lighthouse in Florida. Juvenile snapper and grouper temporarily residing in estuaries may be adversely affected by coastal pollutants and alterations (Figure 12).

Any life stage of snapper grouper species may be affected by pollution (Figure 11) but during the first months is the time when fish can be particularly sensitive to toxins. Factors affecting prerecruit mortality are more significant in determining long-term population stability (Sindermann, 1994). Critical aspects determining the effects of pollution on fish presented by Sindermann (1994) include:

- location of spawning (freshwater, estuarine, coastal, offshore)
- location of egg deposition (pelagic, demersal)
- depth preference of hatched larvae in the water column - surface film to bottom
- location of nursery area for postlarvae and juveniles
- feeding behavior and diets of all life stagers
- extent of migration into and out of polluted zones, and duration of occupation of those zones

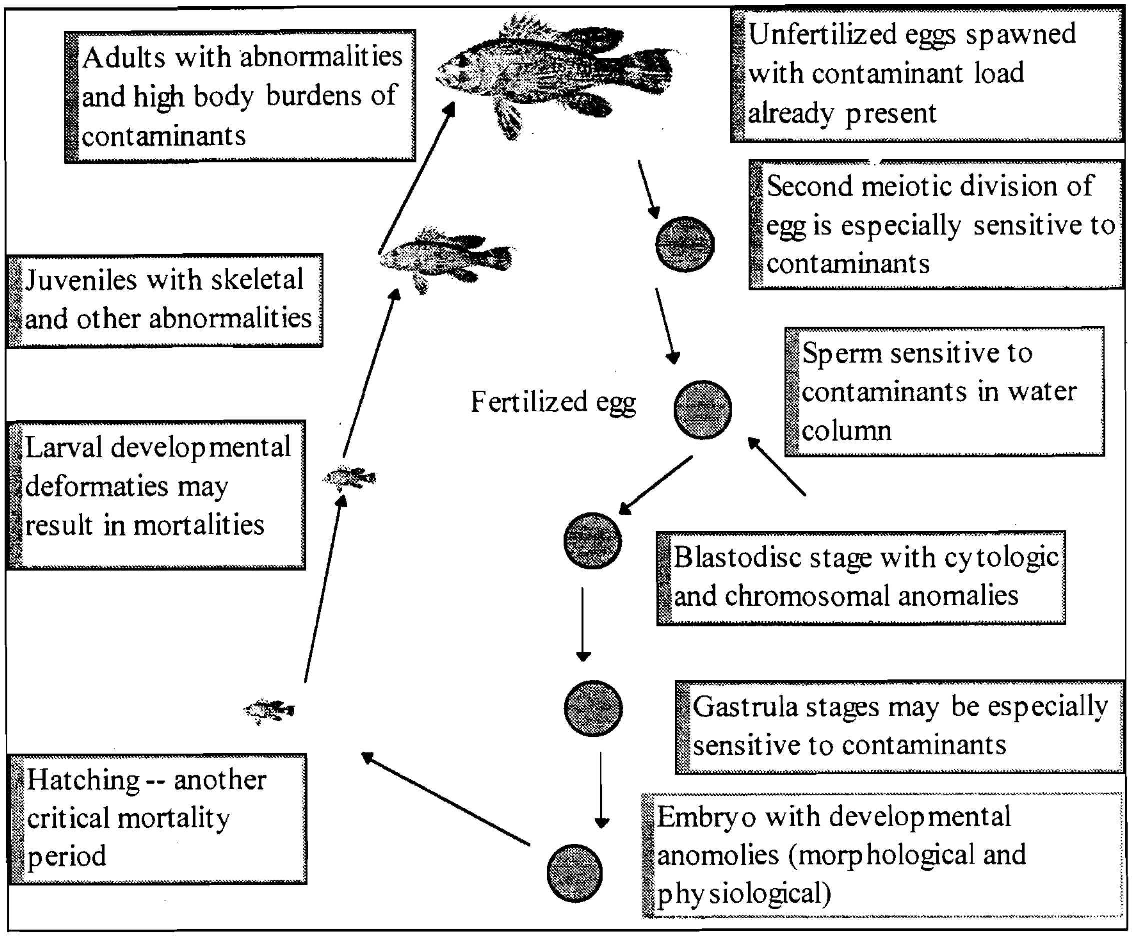


Figure 11. Points in life cycle where snapper grouper species are especially sensitive to pollutants (Adapted from Sinderman, 1994).

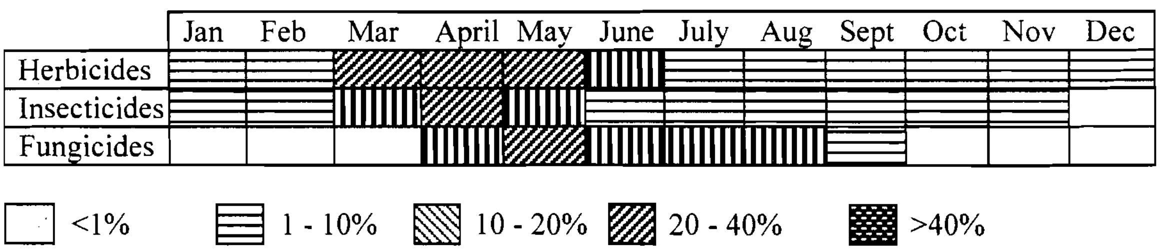


Figure 12. Seasonal application of pesticides in the South Atlantic region (Data Source: NOAA, 1992b).

Hydrocarbon pollution also may adversely affect fish and other biota. Malins (1982) reviewed laboratory experiments describing the deleterious effects of petroleum fractions on fish. Pierce et al. (1980) documented that wild fish have been injured by petroleum pollutants. Grizzle (1983) suggested that larger liver weights in fish collected in the vicinity of production platforms versus control reefs could have been caused by increased toxicant levels near the platforms. He also suspected that severe gill lamella epithelium hyperplasia and edema in red snapper, vermilion snapper, wenchman, sash flounder, and creole fish were caused by toxicants near the platforms. These types of lesions are consistent with toxicosis.

Dredging and salvaging near or on reefs is potentially the most damaging physical human activity. Dredge gear impacts reefs by dislodging corals and other organisms and by creating lesions or scars that lead to infection or mortality. Sedimentation from dredging may seriously damage reefs. Dredged sediments may be anaerobic and bind up available oxygen thereby stressing corals and other sessile reef organisms. If the organisms cannot purge the sediments deposited on them, they generally are killed. Silt generated by dredging may remain in the area for long periods and continue to impact reefs when suspended during storms. Reef habitat also may be removed by dredging for borrow materials and disposal on beaches and by dredging and filling associated with navigation channel construction and maintenance.

Anchor damage is a significant threat to reefs, especially those composed of corals. Anchors, ground tackle, lines, and chains can break hard and soft corals, scar reefs, and open lesions which can become infected. Heavy use of reef areas by boaters can compound the problem. Although anchoring by oil and gas lease operators is prohibited on most of the coral reefs, anchoring for other purposes is not restricted. Fishing gear such as bottom trawls, bottom longlines, and traps also damage reefs. Effects are similar to anchor damage and in many cases more widespread. Hook and line fishing and related losses of line, leaders, hooks, and sinkers also may damage corals. Disposal of garbage by boats has been identified as a problem at Pulaski Shoal near Dry Tortugas (Jaap, 1984).

Recreational spearfishing, especially with explosive power heads, has damaged corals and may become more of a problem in areas of heavy diver concentration. Divers often overturn corals and cause other damage. Specimen collecting also may result in localized reef damage, especially when chemical collecting agents are improperly used. Collecting corals and the use of chemicals are regulated under the Coral Fishery Management Plan (GMFMC and SAFMC, 1982).

8.2.3 Habitat Information Needs

The vast majority of our highly valued living marine resources are critically dependent upon healthy environments. Declines in several of these commercially and recreationally important fisheries have been attributed to overfishing, loss of habitat, pollution, environmental alteration, disease, and natural variability of the stocks. Effective fisheries management requires an improved understanding of these factors.

The Council's chief concern related to living marine resources is how human activities impact fishery productivity. Research is needed to provide knowledge of the factors that affect energy flow. This understanding of ecological processes must then be combined with information on the health, distribution, and abundance of ecologically important organisms. By understanding the ecological linkages and information on the status of fishery stocks, managers of fisheries and habitat will be better able to manage estuarine dependent living marine resources.

To understand the causes of fishery declines and better predict the effects of human activities on fishery populations, the following research needs relative to snapper grouper habitat are provided so that state, federal, and private research efforts can focus on those areas that would allow the South Atlantic Fishery Management Council to develop measures to better manage snapper grouper and their habitat:

1. Identify optimum snapper grouper habitat and environmental and habitat conditions that limit snapper grouper production (e.g., what are the critical fisheries habitats for food, cover, spawning, nursery areas, and migration?);

2. Determine the relationship between juvenile snapper grouper and estuarine habitat. If an obligatory relationship is found, determine the distributions, rates of change, and documented causes of loss for estuarine habitat types;

3. Quantify the relationships between snapper grouper production and habitat (e.g., what are the key trophic pathways in the ecosystem, and how does the flux of essential nutrients, carbon compounds, and energy through these systems influence fisheries productivity?);

4. Determine the relative effects of fishing, pollution, and natural mortality on fishery population dynamics. Also determine the effects of cumulative habitat loss on fisheries productivity and economic value;

5. Determine methods for restoring snapper grouper habitat and/or improving existing environmental conditions that adversely affect snapper grouper production. The 29 recommendations for future studies in Bohnsack and Sutherland (1985) are supported here; and

6. Identify areas of particular concern for snapper grouper.

8.2.4 Habitat Protection Programs

State and Federal laws and policies that affect snapper grouper habitat are found in Section 8.3. Specific involvement by other federal agencies are noted as follows:

Office of Coastal Zone Management, Marine Sanctuaries Program, National Oceanic and Atmospheric Administration. Specifically, this program manages and funds the marine sanctuaries program. On-site management and enforcement are generally delegated to the states through special agreements. Funding for research and management is arranged through grants.

National Marine Fisheries Service. The Magnuson-Stevens Act provides for exclusive management of fisheries seaward of state jurisdiction. This includes both specific fishery stocks and habitat. The process for developing Fishery Management Plans is highly complex. It includes plan development by various procedures through fisheries management councils. National Marine Fisheries Service implements approved plans. The Coast Guard, National Marine Fisheries Service, and states enforce Fishery Management Plans. The National Marine Fisheries Service is responsible for data collection, research and resource assessment in support of Fishery Management Plans. Fishery Management Plans under authority of the South Atlantic Fishery Management Council for corals and coral reefs, snapper grouper, shrimp, golden crab, coastal migratory pelagics, and spiny lobster are in force.

National Park Service. National parks and monuments are under the jurisdiction of the National Park Service. Management, enforcement, and research are accomplished within the agency.

Minerals Management Service. This agency has jurisdiction over mineral and petroleum resources on the continental shelf. Management has included specific lease regulations and mitigation of exploration and production activities in areas where coral resources are known to exist.

Fish and Wildlife Service. Fish and Wildlife Service assists with environmental impact review, develops biological resource evaluations, and administers the endangered species program with the National Marine Fisheries Service. The Fish and Wildlife Service manages parks and refuges for wildlife in the South Atlantic.

Geological Survey. In the coral reef areas Geological Survey has conducted considerable reef research and assisted or cooperated with other institutions and agencies to facilitate logistics and support of coral reef research.

U.S. Coast Guard. The 1978 Waterways Safety Act charges the Coast Guard with marine environmental protection. The Coast Guard is the general enforcement agency for all marine activity in the federal zone. Among the duties are enforcement of sanctuary and fishery management regulations, managing vessel salvage, and coordinating oil spill cleanup operations at sea.

U.S. Army Corps of Engineers. The Corps of Engineers contracts and regulates coastal engineering projects, particularly harbor dredging and beach renourishment projects. The Corps of Engineers also reviews and is the permitting agency for coastal development projects, artificial reefs, and offshore structures.

Environmental Protection Agency. This agency has a general responsibility for controlling air and water pollution. Disposal of hazardous wastes and point-source discharge permitting are Environmental Protection Agency functions. Certain mineral and petroleum exploration and production activities are managed by Environmental Protection Agency. Environmental research germane to waste disposal and pollution also are funded.

Federal environmental agencies such as the National Marine Fisheries Service, Mineral Management Service, Fish and Wildlife Service, and the Environmental Protection Agency also analyze projects proposing inshore and offshore alterations for potential impacts on resources under their purview. This is similar to the function of the South Atlantic Fishery Management Council Habitat Committee. Recommendations resulting from these analyses are provided to the permitting agencies (the Corps of Engineers for physical alterations in inshore waters and territorial sea, the Mineral Management Service for physical alterations in the Outer Continental Shelf or the offshore Exclusive Economic Zone and Environmental Protection Agency for chemical alterations). Even though the Corps of Engineers issues permits for oil and gas structures in the Exclusive Economic Zone, they only consider navigation and national defense impacts, thus leaving the rest to the Department of Interior, in a nationwide general permit.

In administering the oil and gas resources on the Outer Continental Shelf, the Department of Interior through the Mineral Management Service has not been recognizing the authority of the Fish and Wildlife Coordination Act. Instead they have contended that the Outer Continental Shelf Lands Act, as amended, supersedes the Fish and Wildlife Coordination Act. They also require that the oil and gas lease permit stipulations be more closely coordinated with other

Department of Interior bureaus, e.g., Fish and Wildlife Service, as provided in Departmental Manual 655. Coordination with other federal and state agencies is less frequent. For example, coordination between National Marine Fisheries Service and Mineral Management Service results from NOAA participation in the Outer Continental Shelf Advisory Board and from authorities under the Endangered Species Act and National Environmental Policy Act. The latter involves the periodic review of environmental statements for proposed lease sales. While review under Endangered Species Act generally involves exploration and development plans, it is very difficult for agencies like National Marine Fisheries Service to have Mineral Management Service implement less environmentally damaging procedures in oil and gas operations around reefs, etc., if the Fish and Wildlife Service has not already objected to the procedure during the Department of Interior, Departmental Manual 655 coordination. However, though not required to do so, Fish and Wildlife Service frequently informally coordinates their proposed actions under Departmental Manual 655 with National Marine Fisheries Service. None of the fish and wildlife agencies have veto power over Mineral Management Service permitting for oil and gas exploration, development and production on the Outer Continental Shelf, or on essentially the Exclusive Economic Zone.

Environmental Protection Agency is the permitting agency for chemical discharges into waters of the South Atlantic, under the National Pollution Discharge Elimination System program of the Clean Water Act for chemicals used or produced in the South Atlantic (i.e., drilling muds, produced water or biocides) and then released, or under the Ocean Dumping Regulations of the Marine Protection, Research and Sanctuaries Act if the chemicals are transported into the Atlantic Ocean for the purpose of dumping. When discharge or dumping permits are proposed, federal and state fish and wildlife agencies may comment and advise under the Fish and Wildlife Coordination Act and National Environmental Policy Act. The South Atlantic Fishery Management Council may do likewise under the Magnuson-Stevens Act and National Environmental Policy Act. The South Atlantic Fishery Management Council also protects snapper grouper habitat under both the Coral, Coral Reefs and Live/Hard Bottom Habitat Fishery Management Plan and the Shrimp Fishery Management Plan.

8.2.5 Pollution and Habitat Degradation along the Atlantic Coast

8.2.5.1 Concerns in the South Atlantic States

Effects of pollution on snapper grouper species are not well documented, yet generally it can be assumed that degradation of water quality and sediments in estuarine, nearshore, and offshore environments will impact adults, juveniles, larvae, and eggs to some degree. Pollutant-related stresses may reduce fecundity or viability of ova; decrease survival of larvae, postlarvae, juveniles, and adults, increase vulnerability to disease and predation; and reduce growth rates.

The Council's habitat and environmental protection advisory panel has developed a list of major fishery habitat concerns:

<u>North Carolina</u>
- Non-point source pollution (i.e., nutrient loading).
- Impacts of high density development on barrier islands and ocean outfalls for island development.
- Marina development.
- Ulcerative mycosis and its occurrence in virtually all species in specific parts of the estuarine system.
- Identification of critical habitats such as nursery habitats.
- Hydrologic changes in instream flow.
- Land use changes resulting in freshwater impacts changing salinity regimes, phosphate mining, and loss of 404 wetlands.
- Chemical discharges from offshore phosphate mining.
- Impacts of peat mining.

South Carolina
- Dredged material disposal for port development.
- Increased barrier island development.
- Impacts of beach renourishment projects.
- Non-point source pollution.
- Impoundment of wetland areas.
- Lack of chemical water quality standards.
- Instream flow and aquaculture in pumping water from the estuarine system.

Georgia
- Freshwater drainage from silvaculture.
- Changing time period of water affecting low salinity nursery areas.
- Siting of marinas.
- Port development.
- Dredge disposal.
- Increased salinity of Savannah River.

Florida
- Impoundments for mosquito control and need to pursue increased rotational impoundment management.
- Impacts of beach renourishment.
- The designation of a marine sanctuary in the Indian River Area.
- Dredge and fill operations.
- Freshwater inflow alterations.
- Water pollution.
- Seagrass dieoffs.
- Extensive coastal development and related problems.

8.2.5.2 SAFMC Habitat Priorities

In cooperation with the four state habitat advisory panels, the SAFMC developed a list of habitat priorities to aid in the review of projects or policies affecting fisheries habitat and in development of policy statements on such activities. The following list in priority order was approved by the SAFMC:

1. impoundment, dredging, or filling of wetlands
2. point and non-point source pollution
3. identification and acquisition of important fishery habitats
4. chemical water quality standards
5. beach renourishment
6. dredge and fill of seagrass beds
7. ocean incineration
8. offshore mineral mining
9. silvaculture
10. plastic pollution
11. ocean outfalls
12. aquaculture in wetlands
13. habitat restoration, enhancement, and artificial reefs
14. anchoring on reefs and groundings
15. habitat utilization documentation
16. impacts of fishing techniques
17. sea level rise
18. impacts of jetties and groins
19. mandatory boat access

8.2.5.3 Habitat Loss

Degradation of estuarine, nearshore, and offshore environments is in direct conflict with attempts to maintain optimal habitat conditions for shrimp spawning, survival, and growth. The loss of seagrass beds in North Carolina and Florida has reduced preferred habitat areas available to larval, juvenile, and adult shrimp. These losses are due in part to dredge and fill operations; to increased turbidity resulting from discharges of waste materials and runoff; and from elevated levels of suspended solids. In addition to seagrass losses, the entire Atlantic Coast has had a large portion of its salt marsh and estuarine systems degraded or lost to development through dredge and fill operations. In South Carolina and Georgia the marsh systems are of principal importance as nursery areas. Major threats to shrimp habitat include: impoundment of unaltered estuarine wetlands and the reimpoundment of wetlands that have reverted to productive estuarine wetlands; open water disposal of dredged material in shallow water estuarine bottom; and agricultural practices that allow rapid introduction of soil and pesticides into the marine environment. Tables 68 and 69 present baseline estimates of coastal wetland acreage by estuarine drainage area in the South Atlantic region compiled through a cooperative effort of NOAA and USFWS (NOAA 1991a).

Table 68. Estimated wetlands acreage remaining (in thousands of acres), by Atlantic coast state as derived from the National Wetland Inventory Program. (Source: DOC, 1987).

State	Salt Marsh	Fresh Marsh	Tidal Flats	Swamp	Total
North Carolina	158.8	92.0	N/A	2,107.5	2,358.3
South Carolina	369.5	64.5	N/A	N/A	434.0
Georgia	374.3	31.5	9.5	286.0	701.3
Florida	95.9	383.4	N/A	259.0	738.3
South Atlantic Total					4,231.9

N/A - not available.

Table 69. Coastal wetlands by estuarine drainage area in the south Atlantic. (Source: NOAA 1991a).

	(Acres X 100)				
Estuarine Drainage Area[a]	Salt Marsh[b]	Fresh Marsh[b]	Forested and Scrub[b]	Tidal Flats[b]	Total[b]
1 Albemarle/Pamlico Sounds (8)	1,576 (14)	365 (3)	9,062 (80)	311 (3)	11,314
2 Bogue Sound (65)	211 (22)	11 (1)	616 (64)	118 (12)	956
3 New River (46)	41 (16)	5 (2)	203 (81)	45 (1)	252
4 Cape Fear River (13)	90 (6)	97 (6)	1,291 (86)	20(1)	1,498
5 Winyah Bay (30)	124 (2)	308 (5)	5,472 (93)	6 (0)	5,910
6 North and South Santee Rivers (88)	129 (7)	174 (9)	1,613 (84)	1 (0)	1,916
7 Charleston Harbor (10)	268 (14)	169 (9)	1,540 (78)	8 (0)	1,985
8 St. Helena Sound (100)	916 (21)	321 (7)	3,036 (71)	25 (1)	4,299
10 Savannah Sound (100)	322 (11)	141 (5)	2,428 (84)	9 (0)	2,900
11 Ossabaw Sound (82)	245 (10)	40 (2)	2,282 (89)	4 (0)	2,571
12 St. Catherines/ Sapelo Sounds (29)	352 (40)	46 (5)	461 (53)	13 (2)	872
13 Altamaha River (35)	79 (7)	81 (7)	976 (86)	2 (0)	1,138
14 St. Andrews/ Simmons Sounds (66)	1,134 (20)	157 (3)	4,420 (77)	59 (1)	5,771
15 St Marys R./Cumberland Sound	N/A	N/A	N/A	N/A	N/A
16 St. Johns River (96)	168 (2)	2,646 (25)	7,665 (73)	2 (0)	10,481
17 Indian River (95)	24 (2)	591 (57)	368 (36)	45 (4)	1,028
18 Biscayne Bay (79)	104 (3)	1,556 (41)	2,059 (55)	49 (1)	3,769
South Atlantic Total	66,666 (11)	6,743 (11)	44,615 (76)	747 (1)	58,770

a. Values in parentheses represent the percent of county grid sampled by NOAA. Areas with less than 100 percent coverage may not be completely mapped by the U. S. Fish and Wildlife Service.
b. Values in parentheses represent the percent of total Estuarine Drainage Area wetlands grid sampled by NOAA.

More detailed estimates of wetland by county are presented in Appendix G of the Shrimp FMP (SAFMC, 1993a). This compilation of existing wetland habitat may, as refined to hydrological units, begin to serve as a baseline upon which to implement the policy directive of no net loss and the long-term objective of a net gain of wetland habitats in the South Atlantic region. One program that is presently being developed in response to the National Wetlands Policy Forum recommendation to improve inventory, mapping, and monitoring programs by USFWS and NOAA is Coastwatch. The Coastwatch program's purpose is to develop a nationally standardized geographic information system using ground-based and remote sensing data to assess changes in land cover and habitat in U.S. coastal regions to improve understanding of coastal uplands, wetlands, and seagrass beds and their links to distribution, abundance, and health of living marine resources.

One way to control wetland loss is through restoration, generation, or enhancement of habitat. Mitigation, however, often may not be desirable since some of the mitigation technologies still are poorly understood. Wetland creation technology is an emerging science that requires more development before it can be applied routinely. Moreover, optimum habitat and environmental conditions must be determined for each estuary so that the best habitat conditions can be created when the methodologies are adequately developed.

8.2.5.4 Plastic Pollution (Persistent Marine Debris)

The production of plastic resin in the U.S. increased from 6.3 billion pounds in 1960 to 47.9 billion pounds in 1985. The increased production, utilization, and subsequent disposal of petro-chemical compounds known as plastics has created a serious problem of persistent marine debris. Marine ecosystems have, over the years, become the final resting place for a variety of plastics originating from many ocean and land-based sources including the petroleum industry, plastic manufacturing and processing activities, sewage disposal, and littering by the general public and government entities (commercial fishing industry, merchant shipping vessels, the U.S. Navy, passenger ships, and recreational vessels) (Department of Commerce, 1988c).

The impacts of persistent marine debris on the Atlantic Coast snapper grouper species population are not well known at this time, but might include pollution related mortality resulting from ingestion of plastic materials. As part of the NMFS Marine Entanglement Research Program in the northern Gulf of Mexico, fish samples are being collected and evaluated to determine the presence of plastic particles small enough to be ingested by larval and juvenile fish. Researchers have noted the possibility of mapping the distribution and abundance of plastic particles relative to larval and juvenile fish concentrations (Department of Commerce, 1988b). Effective January 1, 1989, the disposal of plastic into the ocean is regulated under the Plastic Pollution Research and Control Act of 1987 implementing MARPOL Annex V (Appendix C).

Recognizing worldwide concern for preservation of our oceanic ecosystems, the Act prohibits all vessels, including commercial and recreational fishing vessels, from discharging plastics in U.S. waters and severely limits the discharge of other types of refuse at sea. This legislation also requires ports and terminals receiving these vessels to provide adequate facilities for in-port disposal of non-degradable refuse, as defined in the Act.

The utilization of plastics to replace many items previously made of natural materials in commercial fishing operations has increased dramatically. The unanticipated secondary impact of this widespread use of plastics is the creation of persistent marine debris. Commercial fishing vessels have historically contributed plastics to the marine environment through the common practice of dumping garbage at sea before returning to port and the discarding of spent gear such as lines, traps, nets, buoys, floats, and ropes. Two types of nets are routinely lost or discarded drift gill nets and trawl nets (Department of Commerce, 1988c). These nets are durable and may entangle marine mammals and endangered species as they continue to fish or when lost or discarded.

An estimated 16 million recreational boaters utilize the coastal waters of the United States (Department of Commerce, 1988c). Disposal of spent fishing gear (e.g., monofilament fishing line), plastic bags, tampon applicators, six pack yokes, Styrofoam coolers, cups and beverage containers, etc. is a significant source of plastic entering the marine environment.

In the mid 1970s, the National Academy of Science (NAS) estimated that approximately 14 billion pounds of garbage was disposed of annually into the world's oceans. Approximately 85% of total trash is produced from merchant vessels, with 0.7% of that total, or eight million pounds annually being plastic. The use of plastics has risen dramatically since the NAS study. At present, 20% of all food packaging is plastic and by the year 2000 this figure may rise to 40% (CEE, 1987).

The main contribution of plastic to the marine environment from cruise ships is the disposal of domestic garbage at sea. Ships operating today carry between 200 and 1,000 passengers and dispose of approximately 62 million pounds of garbage annually, of which a portion is plastics (CEE, 1987).

The U.S. Navy operates approximately 600 vessels worldwide, carrying about 285,000 personnel and discharging nearly four tons of plastic refuse into the ocean daily (Department of Commerce, 1988a). The U.S. Coast Guard and NOAA operate 226 vessels which carry nearly 9,000 personnel annually and have internal operating orders prohibiting the disposal of plastic at sea. MARPOL Annex V does not apply to public vessels although the Plastic Pollution Research Control Act of 1987 requires all Federal agencies to come into compliance by 1994 (CEE, 1987).

8.2.5.5 Oil and Gas Exploration

Exploration for oil and gas in South Carolina and Georgia's coastal plain has not occurred. The major interest on the Atlantic coast lies within offshore areas. Oil and gas exploration is presently under way along the Atlantic coast outer continental shelf. Four offshore areas on the Atlantic coast are being investigated: the Blake Plateau, the Southeast Georgia Embayment, Baltimore Canyon, and Georges Bank. Forty three tracts totaling 244,812 acres have been leased in the South Atlantic region (Fish and Wildlife Service, 1980). Potential adverse effects associated with offshore petroleum production include development effects from the construction of the pipeline, chronic small spills, and catastrophic spills of crude oil or refined products (Fish and Wildlife Service, 1980). Impacts associated with drilling include the introduction of large amounts of drilling muds into the marine environment. Secondary impacts include the proliferation of on-shore support facilities that could result in greater pressure to develop wetlands. If a pipeline is constructed from the site to the mainland, it is estimated that approximately one to three million cubic yards of dredge material will result from laying the line which would be 150 to 320 miles long. A large oil spill can be lethal to sea birds, marine mammals, marsh vegetation, fish, and invertebrates. Wetland vegetation may suffer from smothering or toxicity. Benthic marine life and larval fishes are often eliminated (Fish and Wildlife Service, 1980). In addition to leases previously mentioned, pre-sale information and Environmental Impact Statements have been prepared for Mid-Atlantic Sale 121 and South Atlantic Sale for the exploration of oil and gas offshore of Cape Hatteras, North Carolina. Mobile Oil Company currently plans to drill an exploratory well off North Carolina's Outer Banks. Should gas or oil be found, the laying of pipe to North Carolina's shoreline facilities would likely have to traverse wetlands and/or barrier island grass flats. Since juvenile shrimp occur along most shoreline habitats, local production could be adversely affected by dredging and pipe laying activities. Increased industrial activities could also affect adult migrations and behavior, since they react to man-made disturbances. Minerals Management Service has developed an Environmental Impact Statement for 1992-1997 offshore drilling leases and

SAFMC recommendations submitted to MMS pertaining to this EIS are contained in Section 8.3.4.

8.2.5.6 Ocean Dumping

The western Atlantic Ocean, including state territorial seas and the EEZ off the eastern United States, have long been used for disposal of such wastes as dredged material, sewerage sludge, chemical waste, plastic waste, and radioactive material. Approximately 149 million metric tons (wet) of dredge material is disposed in estuaries, the territorial seas, and areas of the EEZ along the entire Atlantic coast and Gulf of Mexico. Approximately 27.8 million metric tons (wet) of dredge spoil, is presently disposed of in the EEZ. Composition of dredge material varies among areas with some being contaminated with heavy metals and organic chemicals originating from industrial and municipal discharges and non-point source pollution. The U.S. Army Corps of Engineers classifies only a small portion of the total dredge material as contaminated, but presently has no specific numerical criteria to define such contamination (Office of Technology and Assessment, 1987). The SAFMC has adopted a policy statement on ocean dumping (Section 8.3.2).

8.2.5.7 Trends in Human Population and Recreational Boat Registration in the South Atlantic Region

As coastal populations in the South Atlantic region continue to increase so does recreational boating and fishing activity. Snapper grouper species are vulnerable to harvest by an ever-increasing number of coastal recreational fishermen. Recreational boat registrations in the South Atlantic states increased 70% between 1976 and 1986. As numbers of recreational vessels increase, so will the need for increased boat landings and marinas to afford access to the ocean, rivers, harbors, bays, and estuaries. All these factors will result in increased pressure on the South Atlantic snapper grouper species resource and habitat.

8.2.5.8 Relationship of Habitat Quality to the Ability to Harvest Snapper Grouper Species

Preservation of quantity and environmental quality of estuarine, nearshore, and offshore habitat in the South Atlantic region is essential to maintaining snapper grouper species stocks. Discharge of pollutants may result in direct mortality of snapper grouper species at various stages of their life history. Exposure to certain chemicals could limit the desirability or the possibility of consumption, as occurred in bluefish with PCBs. Presently there is limited information on the concentrations or occurrence of chemicals such as PCBs or Dioxin in snapper grouper species coastwide.

Pesticides, herbicides, fungicides, oil, grease, heavy metals are all resident in sediments of certain coastal estuaries, rivers, bays and harbors. These pollutants have the potential to impact the aquatic resources utilizing the system. Pollutant sources are as diverse as point source discharges from industry and sewerage disposal from municipalities, to non-point source runoff from residential neighborhoods and agricultural fields. Various pollutants known to be harmful to fish and humans when consumed have been identified in bottom sediments of various southeastern estuary systems.

A 1989 National Research Council report indicated there may be substantial risk to the ecosystem and potentially human health from contaminated sediments (NRC, 1989). "In addition to the carcinogenic nature of many of these contaminants, reproductive impairments and other sub-lethal effects in humans are concerns that require increased attention."

Table 70 presents sites NOAA has identified in the South Atlantic region with concentrations of PCB, DDT, PAH, mercury, and lead in excess of levels that cause adverse biological effects (Millemann and Kinney, 1992).

Table 70. South Atlantic sites identified by NOAA as having sediments containing PCB, DDT, PAH, mercury, or lead, in excess of levels that cause biological effects (Source: Millerman and McKinney, 1992).

NOAA Sediment Sites with Concentrations of PCBs, DDT, PAHs, Mercury and Lead in Excess of Levels Adverse Biological Effects					
States and Sites	**PCBs (50-380ppb)**	**DDT (3-350ppb)**	**PAHs (4,000-35,000 ppb)**	**Mercury (0.15-1 ppm)**	**Lead (35-110ppm)**
South Carolina					
Charleston Harbor		3.5			
Georgia					
Sapelo Island		3.2			
Florida					
Apalachicola Bay		5.2			
Choctawhatchee Bay		818.3			86.7
Choctawhatchee Bay		12.5			
Saint Andrews Bay	940.8	41.1	9,233	0.32	40.9
Saint Johns River		8.2			
St. Johns River	98				

Research is underway and as information becomes available, the Council will readdress the issue and include information in subsequent amendments to the snapper grouper species management plan.

8.2.5.9 National Status and Trends Program

The Mussel Watch Project, a component of NOAA's National Status and Trends Program (NSTP) (NOAA, 1989) has annually collected contaminant data for 12 fixed stations along the Atlantic Coast. The chemical contaminants analyzed included polyaromatic hydrocarbons, polychlorinated biphenyls, chlorinated pesticides, and 12 trace elements. Aquatic organisms, especially shellfish like mussels and oysters, accumulate contaminants within their tissue at higher levels than surrounding waters. Contaminant levels therefore increase or decrease depending on the condition of the surrounding waters. The NSTP was initiated to monitor and assess temporal trends in coastal and estuarine waters of the United States. Based on data compiled from 1986 through 1988, the following trends were noted for some southeast estuaries: cadmium levels in the Charleston Harbor (SC) and the Sapelo Sound (GA) sites were decreasing; chromium levels in the Savannah River estuary and Matanzas River (FL) sites were increasing; copper levels in Sapelo Sound were decreasing; levels of mercury for Roanoke Sound (NC), Cape Fear (NC) and Matanzas River were increasing; nickel concentrations were increasing in both the Pamlico Sound (NC) and Savannah River sites; silver levels were decreasing at both the Roanoke River and Cape Fear (NC) sites; zinc concentrations were shown to be decreasing in the Matanzas River site; and only the Matanzas River site was shown to have concentrations of more than two contaminants showing statistically significant changes with arsenic, chromium, and mercury increasing and zinc decreasing.

8.2.5.10 National Coastal Pollutant Discharge Inventory Program

NOAA's National Coastal Pollutant Discharge Inventory Program (NCPDI) was developed and started in 1982 to assess the sources, magnitudes, and impacts of point and nonpoint source pollutant discharges into the United States coastal and estuarine areas (NOAA, 1992a). A major component of the NCPDI is the comprehensive data base which contains pollutant estimates for point and non-point and riverine sources located in coastal counties or the United States Exclusive Economic Zone. Seasonal and annual discharge estimates are currently made for 17 pollutant parameters including runoff, sediment, and nutrients for urban, agricultural, forest, pasture, and range lands discharging into riverine estuarine and coastal waters. The entire inventory has been updated through 1991 and when available the information pertaining to the southeast will be included in subsequent amendments to this plan. Appendix F presents a table that describes the pollutants included in the NCPDI, their definition and effects on the environment, marine organisms, and humans.

8.2.5.11 Agricultural Pesticide use in Coastal Areas

Pesticides including herbicides, insecticides, fungicides, nematicides, algaecides, wood preservatives, and fumigants have been used extensively in the southeast coastal zone (Table 71 and Figures 13-16). Despite the fact that most organochlorine pesticides are no longer approved for agricultural use in the U. S., 29.4 million pounds of pesticides were applied to U.S. coastal watersheds in 1987 (NOAA, 1992b) with over 33% or 9.8 million pounds being applied in the southeast coastal region alone. As part of the NCPDI, NOAA accomplished a comprehensive review of pesticide use in coastal areas (Table 71). Detailed information on use and impacts of pesticides in the southeast based on NOAA's final national summary of agricultural pesticide use in coastal areas in the South Atlantic region follows.

The transport of pesticides from agricultural areas upstream may impact coastal water quality. Assuming pesticide use upstream provides an indicator of pesticide sources. The use of pesticides, herbicides, and fungicides varies substantially between South Atlantic states. To a degree, this is related to agricultural and pest patterns in each area. Major harvested crops in the South Atlantic region include soybean, corn, wheat, and peanuts. Other important crops in the region include tobacco, cotton, and citrus. The Albemarle/Pamlico Sound estuarine drainage area (EDA) has the second highest pesticide use in the U.S. (40 million pounds).

Table 71. List of Selected Agricultural pesticides used in the South Atlantic region (Data Source: NOAA, 1992b).

Number	Pesticide	Pounds Used
1	2,4-D	568,000
2	Alachlor	2,025,000
3	Atrazine	1,579,000
4	Butylate	691,000
5	Metolachlor	503,000
6	Carbaryl	613,000
7	Carbofuran	461,000
8	Chloropyrifos	398,000
9	Terbufos	243,000
10	Chlorothalonil	614,000

Herbicides were used the most in the Albemarle/Pamlico Sound EDA in 1987, followed by use in Winyah Bay, South Carolina. and Cape Fear, North Carolina. The major herbicide used in the region was athrazine. Around Biscayne Bay, Florida, over 163,000 pounds of atrazine was used the same year. 937,000 pounds of insecticides representing 26% of all used in 1987, were applied in the Albemarle/Pamlico Sound EDA. In addition, the amount used in Winyah Bay area amounted to 760,000 pounds and 273,000 pounds were used in 1987 in the Cape Fear area. The highest use of fungicides occurred in the St. Andrews / St. Simon EDA with 159,000 pounds total of which 132,000 was chlorothalonil. Herbicides were mostly applied March through June (Figure 14) as pretreatment for grass and weeds. However, in Florida, alachlor and atrazine were used in August and September. Insecticides were generally applied March through September but are used to a degree throughout the year. The fungicide chlorothalonil is predominantly applied to peanuts and tomatoes from April through September (Figures 13-16).

Fish kills, pesticide residues in aquatic organisms, and changes in community biomass are examples of stresses on the marine environment caused by pesticides (NOAA, 1992b). Due to the development of pesticides that have shorter persistence, lower bioconcentration potential, lower application rates, coupled with a greater public awareness, the impact of pesticides on the marine environment has somewhat been reduced. However, even with the overall degree of reduced impacts (as compared to the use of DDT), impacts are still significant because the compounds are just as toxic to aquatic biota (NOAA, 1992b). Some pesticides cause greater impacts and are more hazardous. Endosulfan for example, was responsible for most fish kills in US estuaries between 1980 and 1989. It was the most often found pesticide and is considered to be the most hazardous because it is highly toxic, may affect estuarine biomass, has a high bioaccumulation factor, and has a long soil half-life.

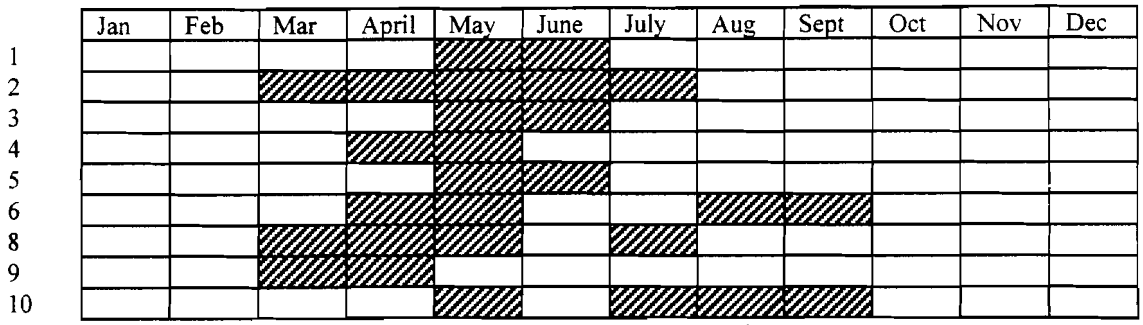


Figure 13. Seasonality of selected pesticides in North Carolina (Data Source: NOAA, 1992b).

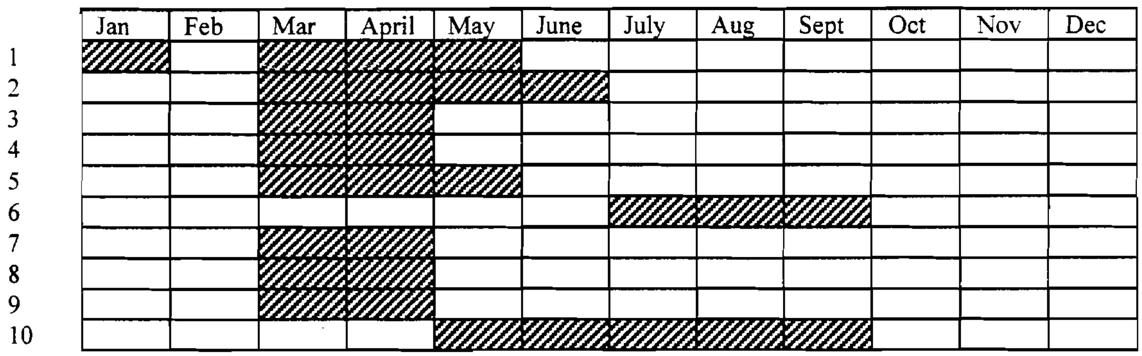


Figure 14. Seasonality of selected pesticides in South Carolina (Data Source: NOAA, 1992b).

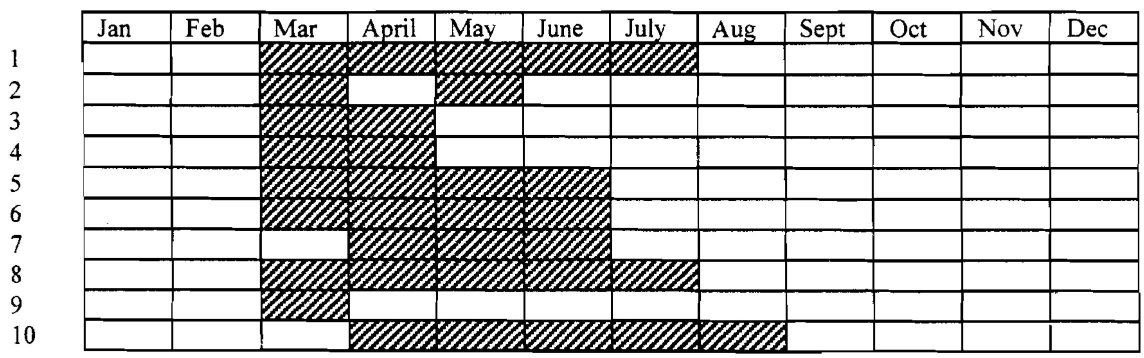


Figure 15. Seasonality of selected pesticides in Georgia (Data Source: NOAA, 1992b).

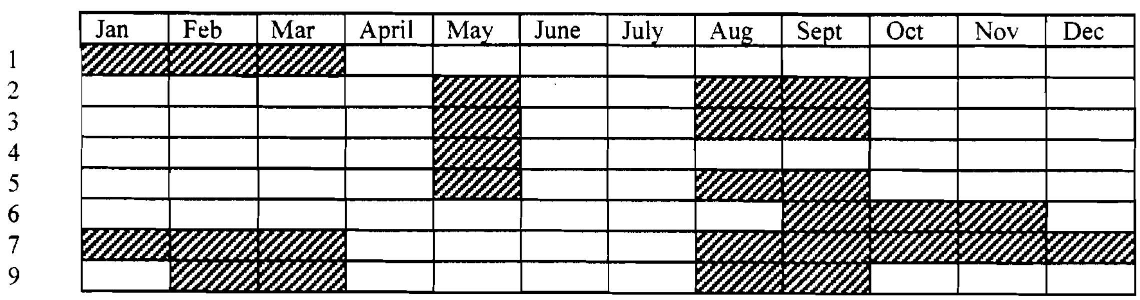


Figure 16. Seasonality of selected pesticides in Florida East Coast (Data Source: NOAA, 1992b).

The insecticide which was found the most in aquatic biota was chloropyrifos; also one of the most hazardous pesticides in the NOAA inventory. The herbicide trifluralin readily bioaccumulates and is again very toxic to aquatic organisms. Combined endosulfan, chloropyrifos, and trifluralin are the most commonly found pesticides as well as being the most toxic (NOAA, 1992b). Other pesticides which are hazardous to aquatic biota include fenvalerate, phorate, and chlorothalonil. Malathion is also highly toxic and responsible for the second highest number of fish kills, over 50% attributable to spraying for mosquitoes. Most fish kills occurred in the spring and summer months corresponding to major growing seasons in coastal areas. Methyl parathion an organophosphorous insecticide, found in water and sediment, is rarely found in tissue. The organophosphorous insecticides (diazinon, malathion, methyl parathion) do not have a high bioaccumulation factor however they are all extremely toxic especially to crustaceans.

The Albemarle/Pamlico Sound EDA has the highest hazard rating of any EDA in the U.S. followed by the Chesapeake Bay and then Winyah Bay.

Very few studies have been accomplished to determine the long-term effects of pesticides on aquatic environments and aquatic communities. In the South Atlantic region one study was undertaken on the North Edisto River in South Carolina. The study showed that the biomass in the control site in a non-agricultural area, was 5 times greater than in the site impacted by agricultural runoff .

8.3 Habitat Preservation Recommendations

8.3.1 SAFMC Habitat and Environmental Protection Policy

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

8.3.2 SAFMC Policy Statement Concerning Dredging and Dredge Material Disposal Activities

8.3.2.1 Ocean Dredged Material Disposal Sites (ODMDS) and SAFMC Policies

The shortage of adequate upland disposal sites for dredged materials has forced dredging operations to look offshore for sites where dredged materials may be disposed. These Ocean

Dredged Material Disposal Sites (ODMDSs) have been designated by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) as suitable sites for disposal of dredged materials associated with berthing and navigation channel maintenance activities. The South Atlantic Fishery Management Council (SAFMC; the Council) is moving to establish its presence in regulating disposal activities at these ODMDSs. Pursuant to the Magnuson Fishery Conservation and Management Act of 1976 (the Magnuson Act), the regional fishery management Councils are charged with management of living marine resources and their habitat within the 200 mile Exclusive Economic Zone (EEZ) of the United States. Insofar as dredging and disposal activities at the various ODMDSs can impact fishery resources or essential habitat under Council jurisdiction, the following policies address the Council's role in the designation, operation, maintenance, and enforcement of activities in the ODMDSs:

The Council acknowledges that living marine resources under its jurisdiction and their essential habitat may be impacted by the designation, operation, and maintenance of ODMDSs in the South Atlantic. The Council may review the activities of EPA, COE, the state Ports Authorities, private dredging contractors, and any other entity engaged in activities which impact, directly or indirectly, living marine resources within the EEZ.

The Council may review plans and offer comments on the designation, maintenance, and enforcement of disposal activities at the ODMDSs.

ODMDSs should be designated or redesignated so as to avoid the loss of live or hard bottom habitat and minimize impacts to all living marine resources.

Notwithstanding the fluid nature of the marine environment, all impacts from the disposal activities should be contained within the designated perimeter of the ODMDSs.

The final designation of ODMDSs should be contingent upon the development of suitable management plans and a demonstrated ability to implement and enforce that plan. The Council encourages EPA to press for the implementation of such management plans for all designated ODMDSs.

All activities within the ODMDSs are required to be consistent with the approved management plan for the site.

The Council's Habitat and Environmental Protection Advisory Panel when requested by the Council will review such management plans and forward comment to the Council. The Council may review the plans and recommendations received from the advisory sub-panel and comment to the appropriate agency. All federal agencies and entities receiving a comment or recommendation from the Council will provide a detailed written response to the Council regarding the matter pursuant to 16 U.S.C. 1852 (i). All other agencies and entities receiving a comment or recommendation from the Council should provide a detailed written response to the Council regarding the matter, such as is required for federal agencies pursuant to 16 U.S.C. 1852 (i).

ODMDSs management plans should indicate appropriate users of the site. These plans should specify those entities/ agencies which may use the ODMDSs, such as port authorities, the U.S. Navy, the Corps of Engineers, etc. Other potential users of the ODMDSs should be acknowledged and the feasibility of their using the ODMDSs site should be assessed in the management plan.

Feasibility studies of dredge disposal options should acknowledge and incorporate ODMDSs in the larger analysis of dredge disposal sites within an entire basin or project. For example, Corps of Engineers analyses of existing and potential dredge disposal sites for harbor maintenance projects should incorporate the ODMDSs as part of the overall analysis of dredge disposal sites.

The Council recognizes that EPA and other relevant agencies are involved in managing and/or regulating the disposal of all dredged material. The Council recognizes that disposal activities regulated under the Ocean Dumping Act and dredging/filling carried out under the Clean Water Act have similar impacts to living marine resources and their habitats. Therefore, the Council urges these agencies apply the same strict policies to disposal activities at the ODMDSs. These policies apply to activities including, but not limited to, the disposal of contaminated sediments and the disposal of large volumes of fine-grained sediments. The Council will encourage strict enforcement of these policies for disposal activities in the EEZ. Insofar as these activities are relevant to disposal activities in the EEZ, the Council will offer comments on the further development of policies regarding the disposal/ deposition of dredged materials.

The Ocean Dumping Act requires that contaminated materials not be placed in an approved ODMDS. Therefore, the Council encourages relevant agencies to address the problem of disposal of contaminated materials. Although the Ocean Dumping Act does not specifically address inshore disposal activities, the Council encourages EPA and other relevant agencies to evaluate sites for the suitability of disposal and containment of contaminated dredged material. The Council further encourages those agencies to draft management plans for the disposal of contaminated dredge materials. A consideration for total removal from the basin should also be considered should the material be contaminated to a level that it would have to be relocated away from the coastal zone.

8.3.2.2 Offshore and Near shore Underwater Berm Creation

The use of underwater berms in the South Atlantic region has recently been proposed as a disposal technique that may aid in managing sand budgets on inlet and beachfront areas. Two types of berms have been proposed to date, one involving the creation of a long offshore berm, the second involving the placement of underwater berms along beachfronts bordering an inlet. These berms would theoretically reduce wave energy reaching the beaches and/or resupply sand to the system.

The Council recognizes offshore berm construction as a disposal activity. As such, all policies regarding disposal of dredged materials shall apply to offshore berm construction. Research should be conducted to quantify larval fish and crustacean transport and use of the inlets prior to any consideration of placement of underwater berms. Until the impacts of berm creation in inlet areas on larval fish and crustacean transport is determined, the Council recommends that disposal activities should be confined to approved ODMDSs. Further, new offshore and near shore underwater berm creation activities should be reviewed under the most rigorous criteria, on a case-by-case basis.

8.3.2.3 Maintenance Dredging and Sand Mining for Beach Renourishment

The Council recognizes that construction and maintenance dredging of the seaward portions of entrance channels and dredging borrow areas for beach re-nourishment occur in the EEZ. These activities should be done in an appropriate manner in accordance with the policies adopted by the Council.

The Council acknowledges that endangered and threatened species mortalities have occurred as a result of dredging operations. Considering the stringent regulations placed on commercial fisherman, dredging or disposal activities should not be designed or conducted so as to adversely impact rare, threatened or endangered species. NMFS Protected Species Division should work with state and federal agencies to modify proposals to minimize potential impacts on threatened and endangered sea turtles and marine mammals.

The Council has and will continue to coordinate with Minerals Management Service (MMS) in their activities involving exploration, identification and dredging/mining of sand resources for beach renourishment. This will be accomplished through membership on state task forces or directly with MMS. The Council recommends that live bottom/hard bottom habitat and historic fishing grounds be identified for areas in the South Atlantic region to provide for the location and protection of these areas while facilitating the identification of sand sources for beach renourishment projects.

8.3.2.4 Open Water Disposal

The SAFMC is opposed to the open water disposal of dredged material into aquatic systems which may adversely impact habitat that fisheries under Council jurisdiction are dependent upon. The Council urges state and federal agencies, when reviewing permits considering open water disposal, to identify the direct and indirect impacts such projects could have on fisheries habitat.

The SAFMC concludes that the conversion of one naturally functioning aquatic system at the expense of creating another (marsh creation through open water disposal) must be justified given best available information.

8.3.3 SAFMC Policy on Oil & Gas Exploration, Development and Transportation

The SAFMC urged the Secretary of Commerce to uphold the 1988 coastal zone inconsistency determination of the State of Florida for the respective plans of exploration filed with Minerals Management Service (MMS) by Mobil Exploration and Producing North America, Inc. for Lease OCS-G6520 (Pulley Ridge Block 799) and by Union Oil Company of California for Lease OCS-G6491/6492 (Pulley Ridge Blocks 629 & 630). Both plans of exploration involve lease blocks lying within the lease area comprising the offshore area encompassed by Part 2 of Lease Sale 116, and south of 26° North latitude. The Councils objection to the proposed exploration activities is based on the potential degradation or loss of extensive live bottom and other habitat essential to fisheries under Council jurisdiction.

The SAFMC also supported North Carolina's determination that the plans of exploration filed with MMS by Mobil Exploration and Producing North America, Inc. for Lease OCS Manteo Unit are not consistent with North Carolina's Coastal Zone Management program.

The Council has expressed concern to the Outer Continental Shelf Leasing and Development Task Force about the proposed area and recommends that no further exploration or production activity be allowed in the areas subject to Presidential Task Force Review (the section of Sale 116 south of 26° N latitude).

The SAFMC recommends the following to the MMS when considering proposals for oil and gas activities for previously leased areas under Council jurisdiction:

1) That oil or gas drilling for exploration or development on or closely associated with live bottom habitat, or other special biological resources essential to commercial and recreational fisheries under Council jurisdiction, be prohibited.

2) That all facilities associated with oil and gas exploration, development, and transportation be designed to avoid impacts on coastal wetlands and sand sharing systems.

3) That adequate spill containment and cleanup equipment be maintained for all development and transportation facilities and, that the equipment be available on site within the trajectory time to land, and have industry post a bond to assure labor or other needed reserves.
4) That exploration and development activities should be scheduled to avoid northern right whales in coastal waters off Georgia and Florida as well as migrations of that species and other marine mammals off South Atlantic states.
5) That the EIS for lease Sale 56 be updated to address impacts from activities related to specifically natural gas production, safety precautions which must be developed in the event of a discovery of a "sour gas" or hydrogen sulfide reserve, the potential for southerly transport of hydrocarbons to near shore and inshore estuarine habitats resulting from the cross-shelf transport by Gulf Stream spin-off eddies, the development of contingency plans to be implemented if problems arise due to the very dynamic oceanographic conditions and the extremely rugged bottom, and the need for and availability of onshore support facilities in coastal North and South Carolina, and an analysis of existing facilities and community services in light of existing major coastal developments.

The SAFMC recommends the following concerns and issues be addressed by the MMS prior to approval of any application for a permit to drill any exploratory wells in Lease Sale 56 and that these concerns and issues also be included in the Environmental Impact Statement for the Outer Continental Shelf (OCS) Leasing Plan for 1992-1997:
1) Identification of the on-site fisheries resources, including both pelagic and benthic communities, that inhabit, spawn, or migrate through the lease sites with special focus on those specific lease blocks where industry has expressed specific interest in the pre-lease phases of the leasing process. Particular attention should be given to critical life history stages. Eggs and larvae are most sensitive to oil spills, and seismic exploration has been documented to cause mortality of eggs and larvae in close proximity.
2) Identification of on-site species designated as endangered, threatened, or of special concern, such as shortnose sturgeon, striped bass, blueback herring, American shad, sea turtles, marine mammals, pelagic birds, and all species regulated under federal fishery management plans.
3) Determination of impacts of all exploratory and development activities on the fisheries resources prior to MMS approval of any applications for permits to drill in the Exploratory Unit area, including effects of seismic survey signals on fish behavior, eggs and larvae; temporary preclusion from fishing grounds by exploratory drilling; and permanent preclusion from fishing grounds by production and transportation.
4) Identification of commercial and recreational fishing activities in the vicinity of the lease or Exploratory Unit area, their season of occurrence and intensity.
5) Determination of the physical oceanography of the area through field studies by MMS or the applicant, including on-site direction and velocity of currents and tides, sea states, temperature, salinity, water quality, wind storms frequencies, and intensities and icing conditions. Such studies must be required prior to approval of any exploration plan submitted in order to have an adequate informational database upon which to base subsequent decision making on-site specific proposed activities.
6) Description of required existing and planned monitoring activities intended to measure environmental conditions, and provide data and information on the impacts of exploration activities in the lease area or the Exploratory Unit area.

7) Identification of the quantity, composition, and method of disposal of solid and liquid wastes and pollutants likely to be generated by offshore, onshore, and transportation operations associated with oil and gas exploration development and transportation.

8) Development of an oil spill contingency plan which includes oil spill trajectory analyses specific to the area of operations, dispersant-use plan including a summary of toxicity data for each dispersant, identification of response equipment and strategies, establishment of procedures for early detection and timely notification of an oil spill including a current list of persons and regulatory agencies to be notified when an oil spill is discovered, and well defined and specific actions to be taken after discovery of an oil spill.

9) Studies should include detailing seasonal surface currents and likely spill trajectories.

10) Mapping of environmentally sensitive areas (e.g., spawning aggregations of snappers and groupers); coral resources and other significant benthic habitats (e.g., tilefish mudflats) along the edge of the continental shelf (including the upper slope); the calico scallop, royal red shrimp, and other productive benthic fishing grounds; other special biological resources; and northern right whale calving grounds and migratory routes, and subsequent deletion from inclusion in the respective lease block(s).

11) Planning for oil and gas product transport should be done to determine methods of transport, pipeline corridors, and onshore facilities. Siting and design of these facilities as well as onshore receiving, holding, and transport facilities could have impacts on wetlands and endangered species habitats if they are not properly located.

12) Develop understanding of community dynamics, pathways, and flows of energy to ascertain accumulation of toxins and impacts on community by first order toxicity.

13) Determine shelf-edge down-slope dynamics and resource assessments to determine fates of contaminants due to the critical nature of canyons and steep relief to important fisheries (e.g., swordfish, billfish, and tuna).

14) Discussion of the potential adverse impacts upon fisheries resources of the discharges of all drill cuttings that may result from activities in, and all drilling muds that may be approved for use in the lease area or the Exploration Unit area including: physical and chemical effects upon pelagic and benthic species and communities including their spawning behaviors and effects on eggs and larval stages; effects upon sight feeding species of fish; and analysis of methods and assumptions underlying the model used to predict the dispersion and discharged muds and cuttings from exploration activities.

15) Discussion of secondary impacts affecting fishery resources associated with on-shore oil and gas related development such as storage and processing facilities, dredging and dredged material disposal, roads and rail lines, fuel and electrical transmission line routes, waste disposal, and others.

The following section addresses the recommendations, concerns and issues expressed by the South Atlantic Council (Source: Memorandum to Regional Director, U.S. Fish and Wildlife Service, Atlanta, Georgia from Regional Director, Gulf of Mexico OCS Region dated October 27, 1995):

"The MMS, North Carolina, and Mobil entered into an innovative Memorandum of Understanding on July 12, 1990, in which the MMS agreed to prepare an Environmental Report (ER) on proposed drilling offshore North Carolina. The scope of the ER prepared by the MMS was more comprehensive than and EIS would be. The normal scoping process used in preparation of a NEPA-type document would not only "identify significant environmental issues deserving of study" but also "deemphasize insignificant issues, narrowing the scope" (40 CFR 1500.4) by scoping out issues not ripe for decisions.

Of particular interest to North Carolina are not the transient effects of exploration, but rather the downstream and potentially broader, long-term effects of production and development. The potential effects associated with production and development would normally be "scoped out" of the (EIS-type) document and would be the subject of extensive NEPA analysis only after the exploration phase proves successful, and the submittal of a full-scale production and development program has been received for review and analysis. The ER addressed three alternatives: the proposed Mobil plan to drill a single exploratory well, the no-action alternative; and the alternative that the MMS approve the Mobil plan with specific restrictions (monitoring programs and restrictions on discharges). The ER also analyzes possible future activities, such as development and production, and the long-term environmental and socioeconomic effects associated with such activities. The MMS assured North Carolina that all of the State's comments and concerns would be addressed in the Final ER (MMS, 1990).

The MMS also funded a Literature Synthesis study (USDOI MMS, 1993a) and a Physical Oceanography study (USDOI MMS, 1994), both recommended by the Physical Oceanography Panel and the Environmental Sciences Review Panel (ESRP). Mobil also submitted a draft report to the MMS titled, Characterization of Currents at Manteo Block 467 off Cape Hatteras, North Carolina. The MMS also had a Cooperative Agreement with the Virginia Institute of Marine Science to fund a study titled, Seafloor Survey in the Vicinity of the Manteo Prospect Offshore North Carolina (USDOI MMS, 1993b). The MMS had a Cooperative Agreement with East Carolina University to conduct a study titled, Coastal North Carolina Socioeconomic Study (USDOI MMS, 1993c). The above-mentioned studies were responsive to the ESRP's recommendations as well as those of the SAFMC and the State of North Carolina.

Citations:

USDOI, MMS. 1990. Atlantic Outer Continental Shelf, Final Environmental Report on Proposed Exploratory Drilling Offshore North Carolina, Vols. I-III.

USDOI, MMS. 1993a. North Carolina Physical Oceanography Literature Study. Contract No. 14-35- 0001-30594.

USDOI, MMS. 1993b. Benthic Study of the Continental Slope Off Cape Hatteras, North Carolina. Vols. I-III. MMS 93-0014, -0015, -0016.

USDOI, MMS. 1993c. Coastal North Carolina Socioeconomic Study. Vols. I-V. MMS 93-0052, -0053, -0054, -0055, and -0056.

USDOI, MMS. 1994. North Carolina Physical Oceanographic Field Study. MMS 94-0047.

Copies of these studies can be acquired from the address below:

Minerals Management Service
Technical Communication Services
MS 4530
381 Elden Street
Herndon, VA 22070-4897
(703) 787-1080

8.3.4 SAFMC Policy for Protection and Enhancement of Marine Submerged Aquatic Vegetation (SAV) Habitat.

The South Atlantic Fishery Management Council (SAFMC) and the Habitat and Environmental Protection Advisory Panel has considered the issue of the decline of Marine Submerged Aquatic Vegetation SAV (or seagrass) habitat in Florida and North Carolina as it relates to Council habitat policy. Subsequently, the Council's Habitat Committee requested that the Habitat Advisory Panel develop the following policy statement to support Council efforts to protect and enhance habitat for managed species.

Description and Function:

In the South Atlantic region, SAV is found primarily in the states of Florida and North Carolina where environmental conditions are ideal for the propagation of seagrasses. The distribution of SAV habitat is indicative of its importance to economically important fisheries: in North Carolina, total SAV coverage is estimated to be 200,000 acres; in Florida, the total SAV coverage is estimated to be 2.9 million acres. SAV serves several valuable ecological functions in the marine systems where it occurs. Food and shelter afforded by SAV result in a complex and dynamic system that provides a primary nursery habitat for various organisms that is important both to the overall system ecology as well as to commercial and recreationally important fisheries. SAV habitat is valuable both ecologically as well as economically; as feeding, breeding, and nursery ground for numerous estuarine species, SAV provides for rich ecosystem diversity. Further, a number of fish and shellfish species, around which is built several vigorous commercial and recreational fisheries, rely on SAV habitat for a least a portion of their life cycles. For more detailed discussion, please see Appendix 1.

Status:

SAV habitat is currently threatened by the cumulative effects of overpopulation and consequent commercial development and recreation in the coastal zone. The major anthropogenic threats to SAV habitat include:

(1) mechanical damage due to:
- (a) propeller damage from boats,
- (b) bottom-disturbing fish harvesting techniques,
- (c) dredging and filling;

(2) biological degradation due to:
- (a) water quality deterioration by modification of temperature, salinity, and light attenuation regimes;
- (b) addition of organic and inorganic chemicals.

SAV habitat in both Florida and North Carolina has experienced declines from both natural and anthropogenic causes. However, conservation measures taken by state and federal agencies have produced positive results. The national Marine Fisheries Service has produced maps of SAV habitat in the Albemarle-Pamlico Sound region of North Carolina to help stem the loss of this critical habitat. The threats to this habitat and the potential for successful conservation measures highlight the need to address the decline of SAV. Therefore, the South Atlantic Council recommends immediate and direct action be taken to stem the loss of this essential habitat. For more detailed discussion, please see Appendix 2.

Management:

Conservation of existing SAV habitat is critical to the maintenance of the living resources that depend on these systems. A number of federal and state laws and regulations apply to modifications, either direct or indirect, to SAV habitat. However, to date the state and federal regulatory process has accomplished little to slow the decline of SAV habitat. Furthermore, mitigative measures to restore or enhance impacted SAV have met with little success. These habitats cannot be readily restored; the South Atlantic Council is not aware of any seagrass restoration project that has ever prevented a net loss of SAV habitat. It has been difficult to implement effective resource management initiatives to preserve existing seagrass habitat resources due to the lack of adequate documentation and specific cause/effect relationships. (for more detailed discussion, please see Appendix 3)

Because restoration/enhancement efforts have not met with success, the South Atlantic Council considers it imperative to take a directed and purposeful action to protect remaining SAV habitat. The South Atlantic Council strongly recommends that a comprehensive strategy to address the disturbing decline in SAV habitat in the South Atlantic region. Furthermore, as a stepping stone to such a long-term protection strategy, the South Atlantic Council recommends that a reliable status and trend survey be adopted to verify the scale of local declines of SAV.

The South Atlantic Council will address the decline of SAV, and consider establishing specific plans for revitalizing the SAV resources of the South Atlantic region. This may be achieved by the following integrated triad of efforts:

Planning:

- The Council promotes regional planning which treats SAV as a integral part of an ecological system.
- The Council supports comprehensive planning initiatives as well as interagency coordination and planning on SAV matters.
- The Council recommends that the Habitat Advisory Panel members actively seek to involve the Council in the review of projects which will impact, either directly or indirectly, SAV habitat resources.

Monitoring and Research:

- Periodic surveys of SAV in the region are required to determine the progress toward the goal of a net resource gain.
- The Council supports efforts to
  (1) standardize mapping protocols,
  (2) develop a Geographic Information System databases for essential habitat including seagrass, and
  (3) research and document causes and effects of SAV decline including the cumulative impacts of shoreline development.

Education and Enforcement:

- The Council supports education programs designed to heighten the public's awareness of the importance of SAV. An informed public will provide a firm foundation of support for protection and restoration efforts.

- Existing regulations and enforcement need to be reviewed for their effectiveness.

- Coordination with state resource and regulatory agencies should be supported to assure that existing regulations are being enforced.

SAFMC SAV Policy Statement- Appendix 1

DESCRIPTION AND FUNCTION

Worldwide, Submerged Aquatic Vegetation (SAV) constitutes one of the most conspicuous and common shallow-water habitat types. These angiosperms have successfully colonized standing and flowing fresh, brackish, and marine waters in all climatic zones, and most are rooted in the sediment. Marine SAV beds occur in the low intertidal and subtidal zones and may exhibit a wide range of habitat forms, from extensive collections of isolated patches to unbroken continuous beds. The bed is defined by the presence of either aboveground vegetation, its associated root and rhizome system (with living meristem), or the presence of a seed bank in the sediments, as well as the sediment upon which the plant grows or in which the seed back resides. In the case of patch beds, the unvegetated sediment among the patches is considered seagrass habitat as well.

There are seven species of seagrass in Florida's shallow coastal areas: turtle grass (Thalassia testudium); manatee grass (Syringodium filiforme); shoal grass (Halodule wrightii); star grass (Halophila engelmanni); paddle grass (Halophila decipiens); and Johnson's seagrass (Halophila johnsonii) (See distribution maps in Appendix 4). Recently, H. johnsonii has been proposed for listing by the National Marine Fisheries Service as an endangered plant species. Areas of seagrass concentration along Florida's east coast are Mosquito Lagoon, Banana River, Indian River Lagoon, Lake Worth and Biscayne Bay. Florida Bay, located between the Florida Keys and the mainland, also has an abundance of seagrasses, but is currently experiencing an unprecedented decline in SAV distribution.

The three dominant species found in North Carolina are shoalgrass (Halodule wrightii), eelgrass (Zostera marina), and widgeongrass (Ruppia maritima). Shoalgrass, a subtropical species has its northernmost distribution at Oregon Inlet, North Carolina. Eelgrass, a temperate species, has its southernmost distribution in North Carolina. Areas of seagrass concentration in North Carolina are southern and eastern Pamlico Sound, Core Sound, Back Sound, Bogue Sound and the numerous small southern sounds located behind the beaches in Onslow, Pender, Brunswick, and New Hanover Counties (See distribution maps in Appendix 4).

Seagrasses serve several valuable ecological functions in the marine estuarine systems where they occur. Food and shelter afforded by the SAV result in a complex and dynamic system that provides a primary nursery habitat for various organisms that are important both ecologically and to commercial and recreational fisheries. Organic matter produced by these seagrasses is transferred to secondary consumers through three pathways: herbivores that consume living plant matter; detritivores that exploit dead matter; and microorganisms that use seagrass-derived particulate and dissolved organic compounds. The living leaves of these submerged plants also provide a substrate for the attachment of detritus and epiphytic organisms, including bacteria, fungi, meiofauna, micro- and marcroalgae, macroinvertebrates. Within the seagrass system, phytoplankton also are present in the water column, and macroalgae and microalgae are associated with the sediment. No less important is the protection afforded by the variety of living spaces in the tangled leaf canopy of the grass bed itself. In addition to biological benefits, the SAVs also cycle nutrients and heavy metals in the water and sediments, and dissipate wave energy (which reduces shoreline erosion and sediment resuspension).

There are several types of association fish may have with the SAVs. Resident species typically breed and carry out much of their life history within the meadow (e.g., gobiids and syngnathids). Seasonal residents typically breed elsewhere, but predictably utilize the SAV during a portion of their life cycle, most often as a juvenile nursery ground (e.g., sparids and lutjanids). Transient species can be categorized as those that feed or otherwise utilize the SAV only for a portion of their daily activity, but in a systematic or predictable manner (e.g., haemulids).

In Florida many economically important species utilize SAV beds as nursery and/or spawning habitat. Among these are spotted seatrout (Cynoscion nebulosus), grunts (Heaemulids), snook (Centropomus sp.), bonefish (Albulu vulpes), tarpon (Megalops atlanticus) and several species of snapper (Lutianids) and grouper (Serranids). Densities of invertebrate organisms are many times greater in seagrass beds than in bare sand habitat. Penaeid shrimp, spiny lobster (Panulirus argus), and bay scallops (Argopecten irradians) are also dependent on seagrass beds.

In North Carolina 40 species of fish and invertebrates have been captured on seagrass beds. Larval and juvenile fish and shellfish including gray trout (Cynoscion regalis), red drum (Sciaenops ocellatus), spotted seatrout (Cynoscion nebulosus), mullet (Mugil cephalus), spot (Leiostomus xanthurus), pinfish (Orthopristis chrysoptera), gag (Mycteroperca microlepis), white grunt (Haemulon plumieri), silver perch (Bairdiella chrysoura), summer flounder (Paralichthys dentatus), southern flounder (P. lethostigma), blue crabs (Callinectes sapidus), hard shell clams (Mercenaria mercenaria), and bay scallops (Argopecten irradains) utilize the SAV beds as nursery areas. They are the sole nursery grounds for bay scallops in North Carolina. SAV meadows are also frequented by adult spot, spotted seatrout, bluefish (Pomatomus saltatrix), menhaden (Brevortia tyrannus), summer and southern flounder, pink and brown shrimp, hard shell clams, and blue crabs. Offshore reef fishes including black sea bass (Centropristis striata), gag (Mycteroperca microlepis), gray snapper (Lutianus griseus), lane snapper (Lutjanus synagris), mutton snapper (Lutianus annalis), and spottail pinfish (Displodus holbrooki). Ospreys, egrets, herons, gulls and terns feed on fauna in SAV beds, while swans, geese, and ducks feed directly on the grass itself. Green sea turtles (Chelonia mydas) also utilize seagrass beds, and juveniles may feed directly on the seagrasses.

SAFMC SAV Policy Statement- Appendix 2

STATUS

The SAV habitat represents a valuable natural resource which is now threatened by overpopulation in coastal areas. The major anthropogenic activities that impact seagrass habitats are: 1) dredging and filling, 2) certain fish harvesting techniques and recreational vehicles, 3) degradation of water quality by modification of normal temperature, salinity, and light regimes, and 4) addition of organic and inorganic chemicals. Although not caused by man, disease ("wasting disease" of eelgrass) has historically been a factor. Direct causes such as dredging and filling, impacts of bottom disturbing fishing gear, and impacts of propellers and boat wakes are easily observed, and can be controlled by wise management of our seagrass resources (See Appendix 3). Indirect losses are more subtle and difficult to assess. These losses center around changes in light availability to the plants by changes in turbidity and water color. Other indirect causes of seagrass loss may be ascribed to changing hydrology which may in turn affect salinity levels and circulation. Reduction in flushing can cause an increase in salinity and the ambient temperature of a water body, stressing the plants. Increase in flushing can mean decreased salinity and increased turbidity and near-bottom mechanical stresses which damage or uproot plants.

Increased turbidity and decreasing water transparency are most often recognized as the cause of decreased seagrass growth and altered distribution of the habitats. Turbidity may result from upland runoff, either as suspended sediment or dissolved nutrients. Reduced transparency due to color is affected by freshwater discharge. The introduction of additional nutrients from terrigenous sources often leads to plankton blooms and increased epiphytization of the plants, further reducing light to the plants. Groundwater enriched by septic systems also may infiltrate the sediments, water column, and near-shore seagrass beds with the same effect. Lowered dissolved oxygen is detrimental to invertebrate and vertebrate grazers. Loss of these grazers results in overgrowth by epiphytes.

Large areas of Florida where seagrasses were abundant have now lost these beds from both natural and man-induced causes. (This is not well documented on a large scale except in the case of Tampa Bay). One of these depleted areas is Lake Worth in Palm Beach County. Here, dredge and fill activities, sewage disposal and stormwater runoff have almost eliminated this resource. North Biscayne Bay lost most of its seagrasses from urbanization. The Indian River Lagoon has lost many seagrass beds from stormwater runoff has caused a decrease in water transparency and reduced light penetration. Many seagrass beds in Florida have been scarred from boat propellers disrupting the physical integrity of the beds. Vessel registrations, both commercial and recreational, have tripled from 1970-71 (235, 293) to 1992-93 (715,516). More people engaged in marine activities having an effect on the limited resources of fisheries and benthic communities, Florida's assessment of dredging/propeller scar damage indicates that Dade, Lee, Monroe, and Pinellas Counties have the most heavily damaged seagrass beds. Now Florida Bay, which is rather remote from human population concentrations, is experiencing a die-off of seagrasses, the cause of which has not yet been isolated. Cascading effects of die-offs cause a release of nutrients resulting in algal blooms which, in turn, adversely affect other seagrass areas, and appear to be preventing recolonization and natural succession in the bay. It appears that Monroe County's commercial fish and shellfish resources, with a dockside landing value of $50 million per year, is in serious jeopardy.

In North Carolina total SAV coverage is estimated a 200,000 acres. Compared to the state's brackish water SAV community, the marine SAVs appear relatively stable. The drought and increased water clarity during the summer of 1986 apparently caused an increase in SAV abundance in southeastern Pamlico Sound and a concomitant increase in bay scallop densities. Evidence is emerging, however, that characteristics of "wasting disease" are showing up in some of the eelgrass populations in southern Core Sound, Back Sound, and Bogue Sound. The number of permits requested for development activities that potentially impact SAV populations is increasing. The combined impacts of a number of small, seemingly isolated activities are cumulative and can lead to the collapse of large seagrass biosystems. Also increasing is evidence of the secondary removal of seagrasses. Clam-kicking (the harvest of hard clams utilizing powerful propeller wash to dislodge the clams from the sediment) is contentious issue within the state of North Carolina. The scientific community is convinced that mechanical harvesting of clams damages SAV communities. The scallop fishery also could be harmed by harvest-related damage to eelgrass meadows.

SAFMC SAV Policy Statement- Appendix 3

MANAGEMENT

Conservation of existing SAV habitat is critical to the maintenance of the living resources that depend on these systems. A number of federal and state laws require permits for modification and/or development in SAV. These include Section 10 of the Rivers and Harbors Act (1899), Section 404 of the Clean Water Act (1977), and the states' coastal area management programs. Section 404 prohibits deposition of dredged or fill material in waters of the United States without a permit from the U.S. Army Corps of Engineers. The Fish and Wildlife Coordination Act gives federal and state resource agencies the authority to review and comment on permits, while the National Environmental Policy Act requires the development and review of Environmental Impact Statements. The Magnuson Fisheries Conservation and Management Act has been amended to require that each fishery management plan include a habitat section. The Council's habitat subcommittee may comment on permit requests submitted to the Corps of Engineers when the proposed activity relates to habitat essential to managed species.

State and federal regulatory processes have accomplished little to slow the decline of SAV habitat. Many of the impacts cannot be easily controlled by the regulations as enforced. For example, water quality standards are written so as to allow a specified deviation from background concentration, in this manner standards allow a certain amount of degradation. An example of this is Florida's class III water transparency standard, which defines the compensation depth to be where 1% of the incident light remains. The compensation depth for seagrass is in excess of 10% and for some species is between 15 and 20%. The standard allows a deviation of 10% in the compensation depth which translates into 0.9% incident light or an order of magnitude less than what the plants require.

Mitigative measures to restore or enhance impacted areas have met with little success. SAV habitats cannot be readily restored; in fact, the South Atlantic Council is not aware of any seagrass restoration project that has ever avoided a net loss of seagrass habitat. It has been difficult to implement effective resource management initiatives to preserve seagrass habitat due to the lack of documentation on specific cause/effect relationships. Even though studies have identified certain cause/effect relationships in the destruction of these areas, lack of long-term, ecosystem-scale studies precludes an accurate scientific evaluation of the long-term deterioration of seagrasses. Some of the approaches to controlling propeller scar damage to seagrass beds include: education, improved channel marking restricted access zones, (complete closure to combustion engines, pole or troll areas), and improved enforcement. The South Atlantic Council sees the need for monitoring of seagrass restoration and mitigation not only to determine success from plant standpoint but also for recovery of faunal populations and functional attributes of the essential habitat type. The South Atlantic Council also encourages long-term trend analysis monitoring of distribution and abundance using appropriate protocols and Geographic Information System approaches.

SAFMC SAV Policy Statement- Appendix 4
(SAV Distribution Maps in SAFMC 1995)

8.3.5 Joint Agency Habitat Statement

The SAFMC has endorsed a "Joint Statement to Conserve Marine, Estuarine, and Riverine Habitat" to promote interagency coordination in the preservation, restoration, and enhancement of fishery habitat. This statement as adopted by state, Federal, and regional bodies concerned over fishery habitat, is presented in Appendix D along with the Atlantic States Marine Fisheries Commission policy on marine, estuarine and riverine habitat.

8.4 Habitat Areas of Particular Concern

No habitat areas of particular concern are proposed or designated for species in the snapper grouper management unit. However, important habitat includes those areas required during the each individual species life cycle. Offshore and nearshore areas of particular concern include those habitats required during larval, postlarval, juvenile and adult stages. Although these areas are generally less vulnerable to habitat alteration than the salt marsh and estuarine areas, deep water mining (oil, gas and sand) and fishing gear-related damage (traps, anchors and grapples) can result in habitat and water quality degradation.

Oculina coral (*Oculina varicosa*) is distributed along the South Atlantic shelf with concentrations occurring off the central east coast of Florida (Reed, 1992). According to Reed (1980) the majority of massive *Oculina* growth occurs between 27° 30' N. latitude and 28° 30' N. latitude. *Oculina*, a slow growing coral species, constitutes essential habitat to a complex of species, including those managed under the snapper grouper fishery management plan (SAFMC, 1983).

Deep water coral communities support a very rich and diverse community composed of large numbers of species of mollusks, amphipods, echinoderms with *Oculina varicosa* , *Lophelia prolifera*, and *Emallopsamia profunda* constituting the dominant species. The diversity of this system is equivalent to that of many tropical reef systems (Reed, 1992). The geomorphological nature of the deep water Oculina Banks is characterized by high current regimes which trap fine sand, mud and coral debris forming the basis for the diverse invertebrate community (Reed, 1992).

Lophelia prolifera is similar in gross morphology to *Oculina varicosa* but is distributed in depths from 60-2,170 meters. *Emallopsamia profunda* banks are found at depths from 500-800 meters between Miami and South Carolina, and between 640 and 869 meters in over 200 banks mapped on the outer eastern edge of the Blake Plateau.

Reed (1992) contains a detailed description of submersible studies of deep water *Oculina*, *Lophelia* and *Emallopsamia* conducted along the shelf edge off central Florida over the last ten years and includes information on distribution, structure, and function of this protected coral resource and essential habitat.

To protect this fragile and limited coral habitat, a 92 square mile Oculina Bank Habitat Area of Particular Concern (HAPC) was established under the Federal Fishery Management Plan for Coral and Coral Reefs (GMFMC and SAFMC, 1982) (Figure 17). Existing regulations protecting the Oculina HAPC are as follows:

Regulations in the Snapper Grouper and Coral Fishery Management Plans:

The Oculina Bank is located approximately 15 nautical miles east of Fort Pierce, Florida, at its nearest point to shore and is bounded on the north by 27° 53' N. latitude., on the south by 27° 30' N. latitude, on the east by 79° 56' W. longitude, and on the west by 80° 00' W. longitude.

In the HAPC, fishing with bottom longlines, traps, pots, dredges, or bottom trawls is prohibited. Additional prohibitions on fishing for snapper-grouper in the Oculina Bank HAPC.

No fishing for fish in the snapper-grouper fishery may be conducted in the Oculina Bank HAPC; such fish may not be retained in or from the Oculina Bank HAPC. Fish in the snapper-grouper fishery taken incidentally in the Oculina HAPC by hook-and-line must be released immediately by cutting the line without removing the fish from the water. It is a rebuttable presumption that fishing aboard a vessel that is anchored in the HAPC constitutes fishing for fish in the snapper-grouper fishery.

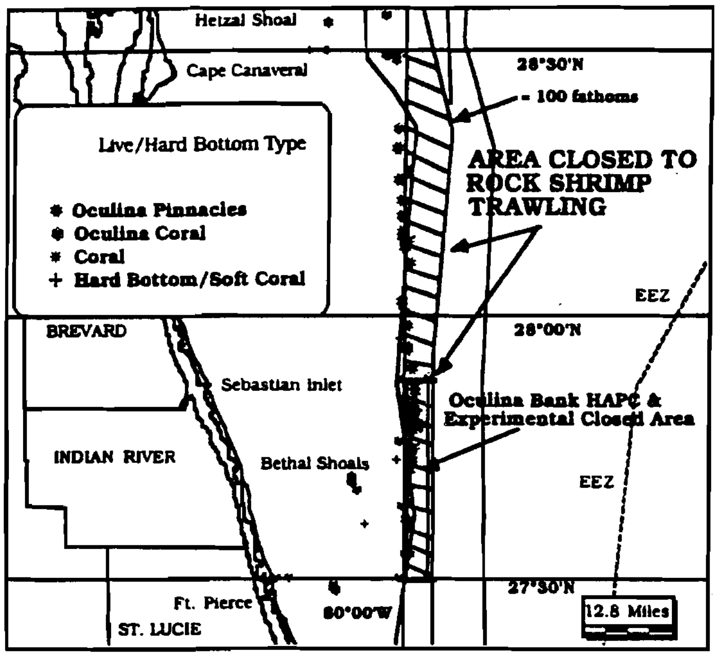
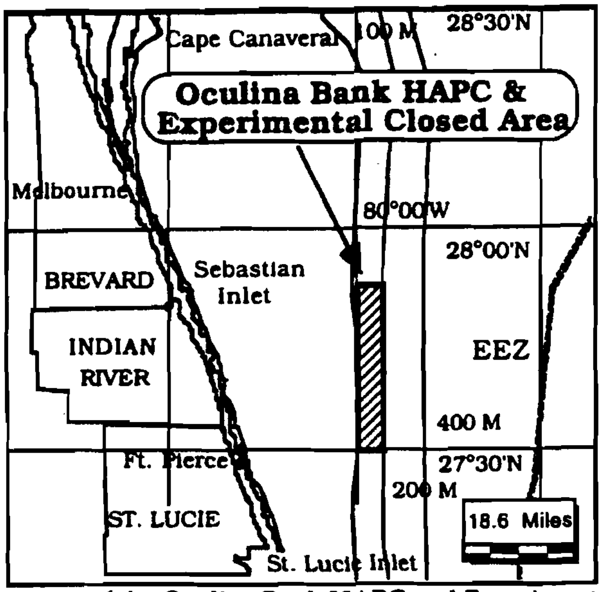


Figure 17. Florida east coast showing location of Oculina Bank Habitat Area of Particular Concern (HAPC). Source: SAFMC, 1996.

South Atlantic Rock Shrimp Regulations.

South Atlantic EEZ Area Closure:

Effective October 9, 1996, no person may trawl for rock shrimp in area east of 80°.00' W. longitude between 27° 30' N. latitude and 28° 30' N. latitude shoreward of the 100-fathom (183-m) contour (Figure 18), as shown on the latest edition of NOAA chart 11460; and no person may possess rock shrimp in or from this area on board a fishing vessel.



Location of the Oculina Bank HAPC and Experimental Closed Area.

Figure 18. Area closed to protect Oculina coral and live / hard bottom habitat from rock shrimp trawling

8.4.1 Federal Habitat Protection Laws, Programs, and Policies.

See Appendix E for a listing and brief description of environmental laws directly, or indirectly protecting marine resources and the habitat they depend on. One program is discussed below, the Florida Keys National Marine Sanctuary.

The Florida Keys National Marine Sanctuary is part of a national system of marine sanctuaries around the U.S. Four sanctuaries have been established in the South Atlantic Region based on the existence of significant natural or cultural resources. These sanctuaries include: Grays Reef, Key Largo, Looe Key and the Florida Keys National Marine Sanctuary (Figure 19).

The most recent sanctuary designated in the South Atlantic is the Florida Keys National Marine Sanctuary. The measures will adopted will protect essential snapper grouper habitat including coral reefs and the surrounding marine communities. The problems addressed in the sanctuary plan include the following:

- Deteriorating water quality
- Declining health of the living coral reefs
- Physical damage to the coral reefs and seagrass communities
- User conflict
- Visitor safety
- Quality of life
- Declining marine resources

The following ten action plans were developed to address the problems identified, mainly through non-regulatory actions.

- Channel / reef marking
- Education / outreach
- Mooring buoys
- Regulatory measures
- Research and monitoring
- Submerged cultural resources
- Water quality
- Volunteer
- Zoning.

For details on the measures included in the plan refer to the Florida Keys National Marine Sanctuary Plan and Environmental Impact Statement (FKNMS, 1996).

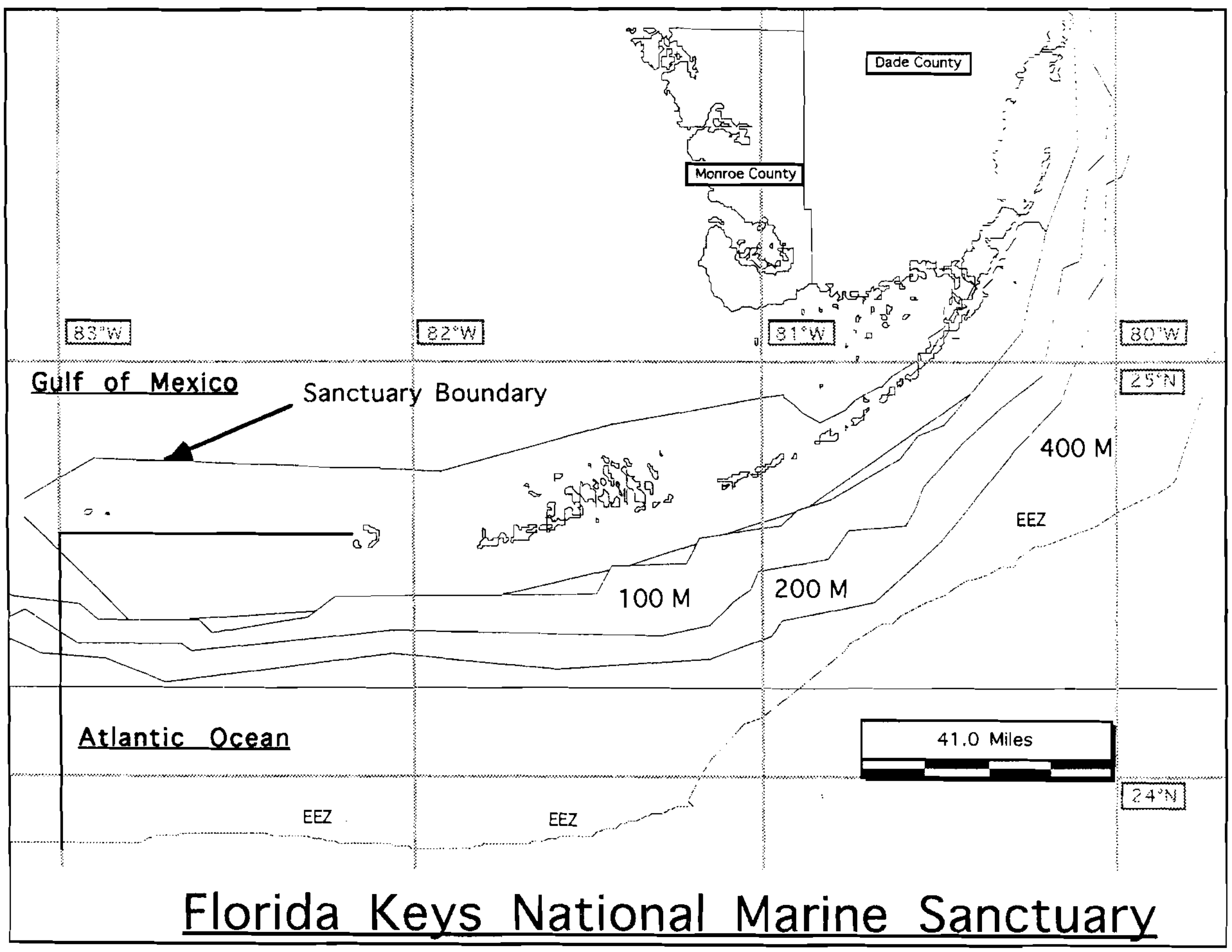


Figure 19. Florida Keys National Marine Sanctuary.

8.4.2 State Habitat Protection Programs

8.4.2.1 North Carolina

The Coastal Area Management Act was passed in 1974 to protect North Carolina's fragile coastal resources through planning and management at the state and local level. The Department of Environment, Health and Natural Resources administers the program. Policy direction is provided by the Coastal Resources Commission, a 15 member group of citizens appointed by the Governor. The coastal program requires that land use plans be developed and adopted by county governments. Municipalities may also elect to develop plans. The Coastal Resources Commission has authority to prepare plans should the county fail to do so. Once approved, these plans are the basis for permitting. Currently, there are approved land use plans for all 20 coastal counties and approximately 55 coastal municipalities. These plans are revised regularly to address new management concerns. The regulatory program applies in areas designated as Areas of Environmental Concern which are considered the most sensitive. Activities occurring in these areas require coastal development permits. Permits for "major development" are issued by the Department of Environment, Health and Natural Resources. All other development activity is considered "minor development" and the corresponding permits are issued by local government (Department of Commerce, 1987).

8.4.2.2 South Carolina

The Office of Ocean and Coastal Management implements the Coastal Management Act. The Office has authority to formulate and implement a comprehensive coastal management program and direct control through a permit program that oversees activities in critical areas that include coastal waters, tidelands, beaches, and primary ocean-front sand dunes. Indirect management authority of coastal resources is granted to the Office in counties containing one or more of the critical areas. In issuing permits, the Coastal Management Act requires that the Office consider the effects of proposed alterations on the production of fish, shrimp, oysters, crab, or any marine life, wildlife, or other natural resources.

8.4.2.3 Georgia

The State of Georgia, until recently, did not participate in the Federal Coastal Zone Management Program. However, the Coastal Marshlands Protection Act of 1970 and the Shore Assistance Act of 1979 were passed to protect the state's beaches, dunes, and marshes. These acts created two statutory committees to consider permit applications for developing or altering marshes or sand sharing systems (beaches, sand dunes, or near shore sand bars). The committees are composed of two top managers of the Georgia Department of Natural Resources, an oceanographer, and a professional engineer, who regularly convene at monthly public meetings.

Under authority of these acts, the Marsh and Beach Section, the Coastal Resources Division of the Georgia Department of Natural Resources, has resource management responsibility for marshes, dunes, and beaches. Management is administered by a permit system for all activities and structures that alter any marshland, sand dunes, beaches, and submerged sandbars and shoals.

In January 1992, Georgia Department of Natural Resources was designated as the lead agency to develop and implement Georgia's coastal management program. A management plan and program for the state has been developed with the input of an 18 member advisory committee appointed by the Governor. The goals of the program will be to protect coastal resources, manage coastal resources, and simplify the permitting process.

8.4.2.4 Florida

The Florida Coastal Management Program was approved by the Secretary of Commerce in September 1981. The Department of Environmental Protection is responsible for coordinating and monitoring implementation of the laws and rules which comprise the Coastal Management Program.

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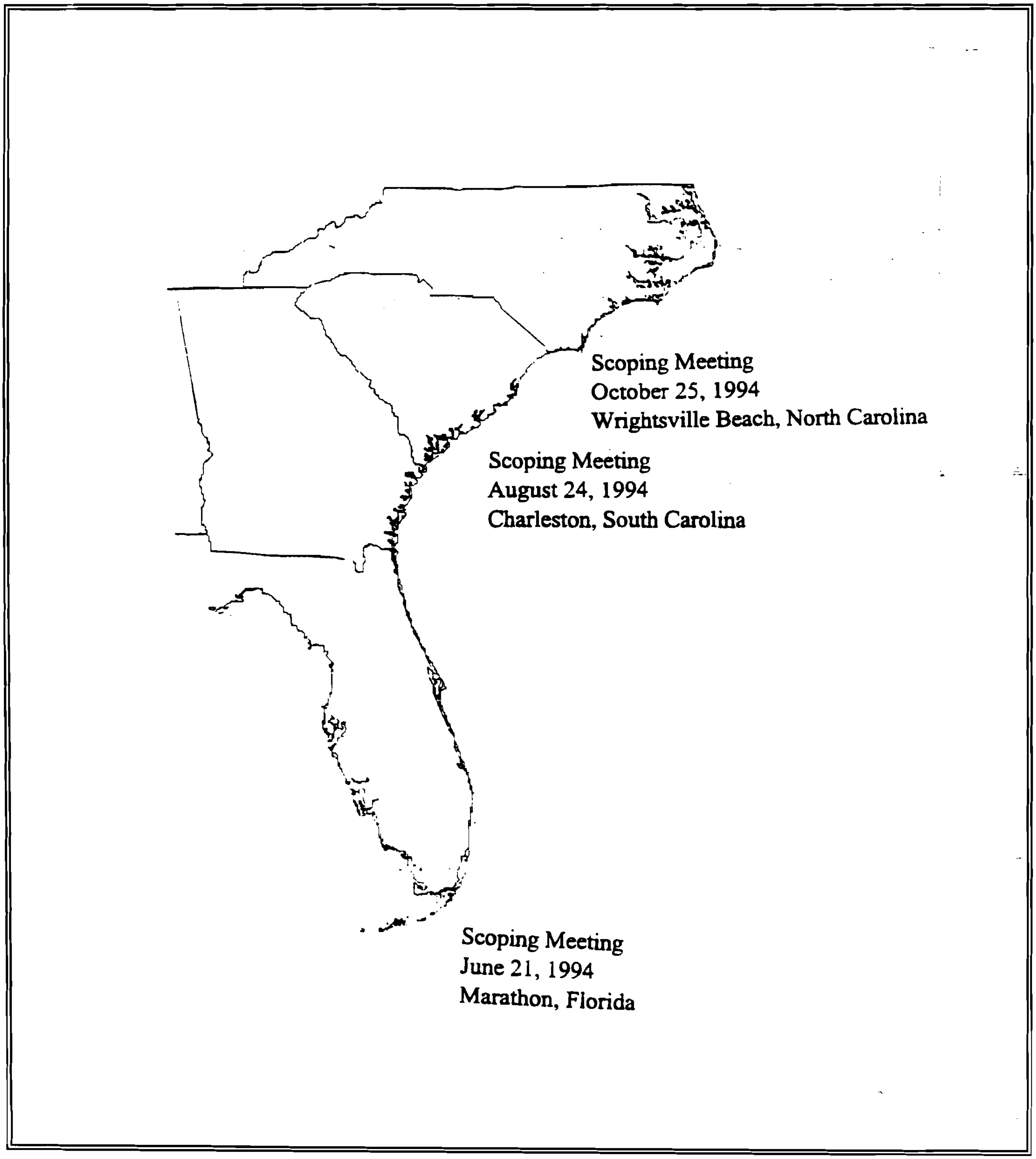
10.0 SCOPING MEETINGS AND PUBLIC HEARING LOCATIONS AND DATES

10.1 Scoping Meeting Locations and Dates



10.2 Public Hearing Locations and Dates

SNAPPER GROUPER AMENDMENT 8
(included many of the items now in Amendment 9)

January 6, 1997 (Monday)
Ramada Inn
301 Governor Treulten Drive
Pooler, GA 31322

January 7, 1997 (Tuesday)
Comfort Inn Oceanfront
1515 N. 1st Street
Jacksonville Beach, FL 32250

January 8, 1997 (Wednesday)
Holiday Inn
1300 N. Atlantic Avenue
Cocoa Beach, FL 32931

January 9, 1997 (Thursday)
Sheraton Hotel
630 Clearwater Park Road
West Palm Beach, FL 33401

January 10, 1997 (Friday)
Banana Bay Resort
4590 Overseas Highway
Marathon, FL 33050
(**rescheduled** to January 24)

January 13, 1997 (Monday)
Town & Country Inn
2008 Savannah Highway
Charleston, SC 29407

January 14, 1997 (Tuesday)
Holiday Inn
1601 Virginia Dare Trial
Kill Devil Hills, NC 27948

January 15, 1997 (Wednesday)
Sheraton Resort
Salter Path Road
Atlantic Beach, NC 28512

January 16, 1997 (Thursday)
Holiday Inn
4903 Market Street
Wilmington, NC 28405

January 17, 1887 (Friday)
Myrtle Beach Martinique Hotel
7100 N. Ocean Blvd.
Myrtle Beach, SC 29572

January 24, 1997 (Friday)
Monroe County Regional Service Center
2798 Overseas Highway
(Mile Marker 47.5 Gulf Side)
Marathon, FL 33050

SNAPPER GROUPER AMENDMENT 9

June 17, 1997 (Tuesday)
Pier House Resort
One Duval Street
Key West, FL 33040
telephone: 305-296-4600; 1-800-327-8340

June 24, 1997 (Tuesday)
Comfort Inn
5308 New Jesup Hwy
Brunswick, GA 31525
telephone: 912-264-6540

June 25, 1997 (Wednesday)
Ramada Inn Daytona Speedway
1798 W International Speedway Blvd.
Daytona Beach FL 32114
telephone: 904-255-2422

June 26, 1997 (Thursday)
Holiday Inn On The Oceanfront
1350 S Ocean Blvd
Pompano Beach, FL 33062
telephone: 954-941-7300

June 30, 1997 (Monday)
Sheraton Atlantic Beach
Salter Path Road
Atlantic Beach, NC 28512
telephone: 919-240-1155

July 1, 1997 (Tuesday)
Holiday Inn Wilmington
4903 Market Street
Wilmington, NC 28405
telephone: 910-799-1440

July 2, 1997 (Wednesday)
Town & Country Inn
2008 Savannah Hwy
Charleston, SC 29407
telephone: 803-571-1000

11.0 APPENDICES

Appendix A. Species in the snpper grouper management unit.

SPR Estimates Available

Lane snapper	*Lutjanus synagris*
Yellowtail snapper	*Ocyurus chrysurus*
Gray snapper	*Lutjanus griseus*
Mutton snapper	*Lutjanus analis*
Vermilion snapper	*Rhomboplites aurorubens*
Red Snapper	*Lutjanus campechanus*
SPR Estimates Unavailable	
Black snapper	*Apsilus dentatus*
Queen snapper	*Etelis oculatus*
Schoolmaster	*Lutjanus apodus*
Blackfin snapper	*Lutjanus buccanella*
Cubera snapper	*Lutjanus cyanopterus*
Mahogany snapper	*Lutjanus mahogoni*
Dog snapper	*Lutjanus jocu*
Silk snapper	*Lutjanus vivanus*

SEA BASSES - Serranidae

SPR Estimates Available

Black sea bass	*Centropristis striata*
SPR Estimates Unavailable	
Bank sea bass	*Centropristis ocyurus*
Rock sea bass	*Centropristis philadelphica*

GROUPERS = Serranidae

SPR Estimates Available

Gag	*Mycteroperca microlepis*
Scamp	*Mycteroperca phenax*
Red grouper	*Epinephelus morio*
Black grouper	*Mycteroperca bonaci*
Speckled hind*	*Epinephelus drummondhayi*
Snowy grouper*	*Epinephelus niveatus*
Warsaw grouper*	*Epinephelus nigritus*
Wreckfish	*Polyprion americanus*
SPR Estimates Unavailable	
Rock hind	*Epinephelus adscensionis*
Graysby	*Epinephelus cruentatus*
Yellowedge grouper*	*Epinephelus flavolimbatus*
Coney	*Epinephelus fulva*
Red hind	*Epinephelus guttatus*
Jewfish	*Epinephelus itajara*
Misty grouper*	*Epinephelus mystacinus*
Nassau grouper	*Epinephelus striatus*
Yellowmouth grouper	*Mycteroperca interstitialis*
Tiger grouper	*Mycteroperca tigris*
Yellowfin grouper	*Mycteroperca venenosa*

SPR Estimates Available

Red porgy	*Pagrus pagrus*
SPR Estimates Unavailable	
Sheepshead	*Archosargus probatocephalus*
Grass porgy	*Calamus arctifrons*
Jolthead porgy	*Calamus bajonado*
Saucereye porgy	*Calamus calamus*
Whitebone porgy	*Calamus leucosteus*
Knobbed porgy	*Calamus nodosus*
Longspine porgy	*Stenotomus caprinus*
Scup	*Stenotomus chrysops*

TRIGGERFISHES - Balistidae

SPR Estimates Available

Gray triggerfish	*Balistes capriscus*
SPR Estimates Unavailable	
Queen triggerfish	*Balistes vetula*
Ocean triggerfish	*Canthidermis sufflamen*

JACKS - Carangidae

SPR Estimates Available

Greater amberjack	*Seriola dumerili*
SPR Estimates Unavailable	
Yellow jack	*Caranx bartholomaei*
Blue runner	*Caranx crysos*
Crevalle jack	*Caranx hippos*
Bar jack	*Caranx ruber*
Almaco jack	*Seriola rivoliana*
Lesser amberjack	*Seriola fasciata*
Banded rudderfish	*Seriola zonata*

***These species form the deep water grouper fishery.**

Appendix A. Species in the snpper grouper management unit. (cont.)

GRUNTS - Pomadasyidae

SPR Estimates Available

White grunt	*Haemulon plumieri*

SPR Estimates Unavailable

Black margate	*Anisotremus surinamensis*
Porkfish	*Anisotremus virginicus*
Margate	*Haemulon album*
Tomtate	*Haemulon aurolineatum*
Smallmouth grunt	*Haemulon chrysargyreum*
French grunt	*Haemulon flavolineatum*
Spanish grunt	*Haemulon macrostomum*
Cottonwick	*Haemulon melanurum*
Sailors choice	*Haemulon parrai*
Blue striped grunt	*Haemulon sciurus*

TILEFISHES - Malacanthidae

SPR Estimates Available

Tilefish (Golden)*	*Lopholatilus chamaeleonticeps*

SPR Estimates Unavailable

Blueline tilefish*	*Caulolatilus microps*
Sand tilefish*	*Malacanthus plumieri*

SPR ESTIMATES ARE UNAVAILABLE FOR THE FOLLOWING SPECIES

SPADEFISHES - Ephippidae

Spadefish	*Chaetodipterus faber*

WRASSES - Labridae

Hogfish	*Lachnolaimus maximus*
Puddingwife	*Halichoeres radiatus*

***These species form the deep water grouper fishery.**

Appendix B. MAFMC Black Sea Bass FMP Management Actions (Source: MAFMC 1996).

AMENDMENT 9 TO THE SUMMER FLOUNDER FISHERY MANAGEMENT PLAN:

FISHERY MANAGEMENT PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR THE

BLACK SEA BASS FISHERY

June 1996

Mid-Atlantic Fishery Management Council

in cooperation with the

Atlantic States Marine Fisheries Commission,

the National Marine Fisheries Service,

the New England Fishery Management Council,

and

the South Atlantic Fishery Management Council

Draft adopted by MAFMC: 14 April 1994
Final Adopted by MAFMC: 15 May 1996
Final approved by NOAA: 17 October 1996

A Publication of the Mid-Atlantic Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award No. NA17FC0045-03

17 June 1996

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2. SUMMARY

This Fishery Management Plan for the Black Sea Bass Fishery (FMP), prepared by the Mid-Atlantic Fishery Management Council (Council), is intended to manage the black sea bass (*Centropristis striata*) fishery pursuant to the Magnuson Fishery Conservation and Management Act of 1976, as amended (MFCMA). The management unit is black sea bass in US waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US-Canadian border. The objectives of the FMP are to:

1. Reduce fishing mortality in the black sea bass fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature black sea bass to increase spawning stock biomass.

3. Improve the yield from the fishery.

4. Promote compatible management regulations between State and Federal jurisdictions.

5. Promote uniform and effective enforcement of regulations.

6. Minimize regulations to achieve the management objectives stated above.

Overfishing for black sea bass is defined as fishing in excess of the F_{max} level. Based on current conditions in the fishery, F_{max} is 0.29 (an annual exploitation rate of 23%).

The recovery strategy calls for minimum fish sizes and commercial gear regulations in year 1 (1996) and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}.

The following is a summary of the management measures adopted by the Council and Commission to implement the fishing mortality rate reduction strategy (a complete description of the adopted management measures is in section 9.1):

Management measures for all years

1. Operator permits for commercial and party and charter boats.

2. Vessel permits for party and charter boats.

3. Vessel permits for commercial vessels (permits to sell) under a moratorium on entry of additional vessels into the fishery. Vessels with documented landings of black sea bass for sale between 26 January 1988 and 26 January 1993 qualify for a moratorium permit to land and sell black sea bass under this moratorium program.

4. Dealer permits (permits to purchase).

5. Permitted vessels may only sell to permitted dealers.

6. Party and charter boat, commercial vessel, and dealer reports.

7. The hinges and fasteners of one panel or door in black sea bass pots or traps must be made of one of the following degradable materials:

   a. untreated hemp, jute, or cotton string of 3/16" (4.8 mm) diameter of smaller;

   b. magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners; or

   c. ungalvanized or uncoated iron wire of 0.094" (2.4 mm) diameter or smaller.

8. A maximum size of 18" diameter for rollers used in roller rig trawl gear.

9. Special management zones around artificial reef areas.

Management Measures for Years 1 and 2

1. A 9" total length (TL) minimum fish size in all fisheries. Black sea bass less than 9" TL could not be sold.

2. The minimum otter trawl mesh size for vessels retaining more than 100 lbs of black sea bass would be 4.0" or 3.5" square (stretch mesh inside measure).

3. Black sea bass pots would be required to have a minimum escape vent of 1 - 1/8" X 5 3/4", 2.0" in diameter, or 1.5" square. The escape vent provision would be implemented at the start of the first calendar year following FMP approval so the fishermen would not be required to pull their pots and rebuild them in the middle of the season.

Management Measures for Years 3 and Subsequent

1. Prior to year three and annually thereafter, the Council, working through a Monitoring Committee, would evaluate the success of the FMP relative to the overfishing reduction goal and propose adjustments to the management system. Beginning with year three, additional measures would include:

   a. A commercial quota with Federal permit holders being prohibited from landing (selling) after the quota had been landed. Quota overruns would be deducted from the subsequent year. All states would need to prohibit black sea bass sales following federal sales prohibition.

   b. A coastwide possession limit, season, and recreational harvest limit.

2. The minimum fish size, minimum mesh size and threshold, escape vent size, possession limit, and recreational season could be adjusted annually through framework action.

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APPENDICES

9.2.2.2.4. Maximum roller diameter

It would be illegal for owners or operators of vessels issued moratorium permits to use roller rig trawl gear equipped with rollers greater than 18" in diameter. A 18" diameter corresponds to the maximum roller diameter limitation imposed by the state of Massachusetts to regulate this gear in state waters.

Roller diameter is correlated with vessel size and the ability of vessels to fish rough, hard bottom areas. Larger roller sizes require larger engine sizes to pull the net. An engine size with an associated horsepower of 800-900 hp is required to tow a net with 18" to 24" rollers whereas 10" to 12" rollers can be pulled by a boat using a 175-200 hp engine (D. Simpson pers. comm.).

Information is lacking as to the relationship between roller diameter and the size of obstruction that it can clear. In general, 10-12" diameter rollers can be used for fishing over rough bottom that can include ledges and cliffs. Limitations on roller size will make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas. As a result, black sea bass associated with these areas would be protected from harvest allowing more fish to grow to maturity and spawn increasing stock biomass and yields.

9.2.2.2.5. Minimum escape vent requirement

Black sea bass pots are required to have a minimum escape vent of 1 1/8" x 5 3/4" or 2.0" in diameter or 1.5" square (inside measure). For wooden pots, the plan would require that the spacing between one set lathes in the parlor portion of the pot be 1 1/8". The escape vent provision would be implemented at the start of the first calendar year following FMP approval so that fishermen would not be required to pull their pots and add vents in the middle of the season.

During the development of this plan, Council staff proposed that black sea bass pots or traps have escape vents that would allow for the release of undersized fish. Although there were a number of studies that indicated that escape vents release fish from pots and traps, there were a lack of specific studies on black sea bass. MAFMC staff initiated a project in 1994 to determine the size selectivity of traps fitted with vents of various sizes. The objective of the study was to determine the vent size which allowed 50% escapement of black sea bass below the proposed minimum size limits of 9" and 10" TL.

In the study, the catch and size distribution of black sea bass taken in commercial sea bass pots fitted with escape vents was compared to catches from unvented traps. Four strings of 25 traps (100 traps) were fished from May through October, 1994 on commercial fishing grounds in areas offshore from Cape May, NJ to Ocean City, MD. A total of 9 trips were made to haul the traps.

A total of 100 traps were assigned a vent size of 1 1/8" x 6", 1 1/4" x 6", 1 3/8" x 6", 1 ½" x 6", or no vent (control). The traps with the various vent sizes were randomly placed in groups of five on the four strings. The vents were made from aluminum and were patterned after the vents used in lobster traps. Vents were placed vertically in the door of the trap such that they would allow fish to escape from the lower corner of the parlor portion of the trap. The lower corner location was used as the result of aquarium studies that indicated sea bass almost always tried to escape from a lower corner after they were placed in a trap (G. Shepherd pers. comm.).

Traps were fished under normal commercial fishing conditions. Soak time, the period between hauls, averaged 14 days. The catch from each trap was retained separately and all black sea bass were measured to the nearest half cm TL.

Length frequency distributions were constructed for black sea bass from each of the treatment vent sizes and control. Proportions retained at length were computed as the ratio between the number of fish taken in vented traps and the number taken at that length in the control traps. The length at 50% retention for each vent size was estimated by fitting a logistic curve to the proportion retained at length data for each vent size.

A total of 5574 black sea bass were measured from the 100 traps from April through October. Black sea bass ranged in size from 16.5-36.5 cm. The control traps caught the largest number of sea bass (n = 1534) followed in descending order by traps with the experimental vents: 1 1/8" (n=1164), 1 1/4" (n=644) 1 3/8" (n=397) and 1 ½" (n=305).

Results indicate that vents do release undersized black sea bass. Length frequency histograms for black sea bass from each vent size compared to the control are presented in Figures 12 - 15. Based on these length frequencies, the L_{50} derived for traps fitted with the 1 1/8" and 1 1/4" vents was 8.7" TL and 10.1" TL, respectively (Table 49). Based on these results, a 1 1/8" x 6" vent would be required for traps when the size limit was 9" TL.

During plan development, the Council and Commission determined that the size of the rectangular vent should be modified to more closely correspond to the dimension of vents required in lobster pots, 1 7/8" x 5 3/4". Specifically, they modified the dimension of the vent to 1 1/8" x 5 3/4". By maintaining the same length as the lobster vent, it will be easier for manufacturers to make black sea bass vents without major modifications to their equipment.

Studies were not conducted to determine the selectivity of traps fitted with circular or square escape vents. A body length/depth relationship (Weber and Briggs 1983) was used to derive the minimum sizes of black sea bass that would be retained by fish traps fitted with these escape vents (Table 50). However, members of industry indicated that the vents sizes based on morphology were too large and demonstrated to the Council and Commission that smaller vent sizes were appropriate for circular and square escape vents. As such, the proposed dimensions for these vents were 2.0" in diameter (circular) or 1.5 " square (inside measure).

Pots and traps accounted for approximately 33% of the total commercial landings for the period 1983-1992 (Table 10). However, in recent years the proportion of the landings attributable to this gear has generally increased. In 1991, this gear accounted for almost 62% of the landings (Table 12). The escape vents will allow for a significant proportion of undersized fish to escape alive. Currently, relatively few sea bass fishermen in the Mid-Atlantic have escape vents in their pots and traps. This gear is fished at varying depths and hauled to the surface quickly with hydraulic or electric pot hauler. As a result, fish may experience internal trauma due to changes in pressure and a significant portion may not survive (Rogers *et al.* 1986). Although many pot fishermen use sorters on deck to release nonmarketable fish, the escape of these fish from the traps before they are hauled will significantly increase survival.

In addition, fishermen are encouraged to use sorting devices that allow for undersized fish to be returned quickly to the water. Combined, the escape vent provisions and sorting devices will significantly reduce the number of undersized fish that are killed by pot fishermen. This reduction in sublegal mortality will increase yields and the amount of mature fish in the stock.

9.2.2.2.6. Degradable fasteners in traps

Black sea bass pots would be required to have hinges and fasteners of one panel or door made of degradable materials. The panel would have to cover an opening of at least 3" x 6". Degradable materials would allow the door or panel of a trap to fall away from an unattended trap. This would prevent lost traps from "ghost fishing", i.e., continuing to catch and retain fish that could not be removed from the trap. Thus black sea bass and other species of fish and invertebrates typically caught by these traps could escape preventing waste and lost yields in a number of fisheries.

9.2.2.2.7. Commercial quota

Beginning in year 3 a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on stock assessment information on projected stock size estimates for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings for 1983 to 1992, 49% of the total target would be allocated to the commercial fishery.

Table 49. The total length (inches) at which 50% of the black sea bass would be retained (L_{50}) by a fish trap fitted with escape vents (inches). The vent size in the table is the width of a rectangular vent that was also 6" in length. The derived fish lengths are based on the results of a Mid-Atlantic Council study conducted in 1994.

Vent	L_{50}
1.125	8.7
1.250	10.1
1.375	11.5
1.500	12.0

Table 50. The minimum theoretical size of black sea bass (TL inches) that would be retained by a fish trap fitted with escape vents (inches). The derived lengths are based on the body depth/total length relationship for black sea bass derived by Weber and Briggs (1983).

Vent Diameter	Size (TL)
1.9	7
2.2	8
2.5	9
2.76	10
3.0	11
3.31	12

Table 51. State shares of a coastwide quota of 2.6 million pounds for black sea bass. Shares are based on five years of landings data, 1988 - 1992.

State	Percent	Pounds
ME	0.046%	1,184
MA	9.472%	246,272
RI	5.124%	133,215
CT	0.600%	15,609
NY	2.892%	75,190
NJ	32.296%	839,707
DE	5.102%	132,653
MD	12.103%	314,675
VA	20.799%	540,786
NC	11.566%	300,709
Total	100.00%	2,600,000

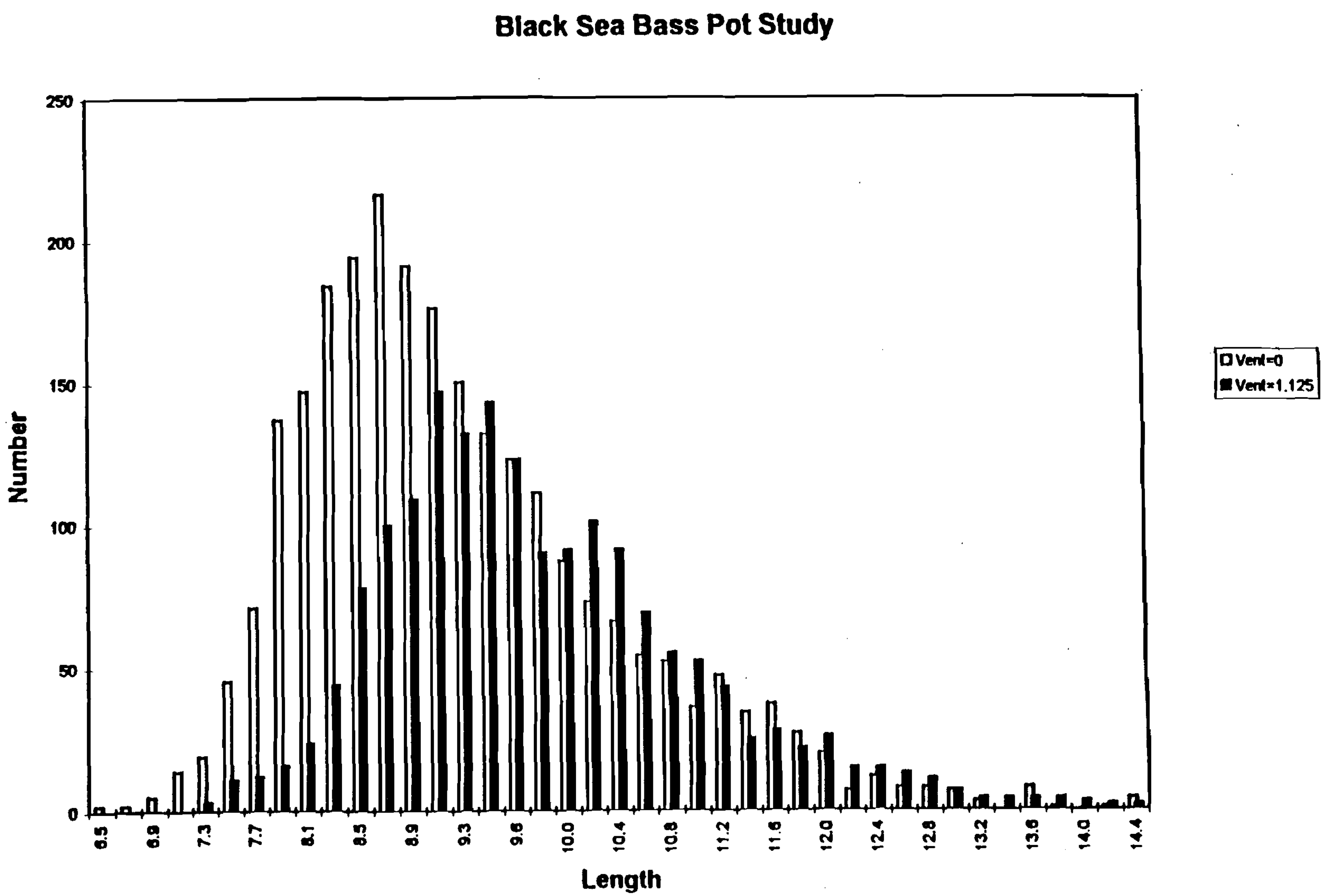


Figure 12. Total lengths of black sea bass from traps with escape vents of 1.125 x 6" and traps with no vents (control).

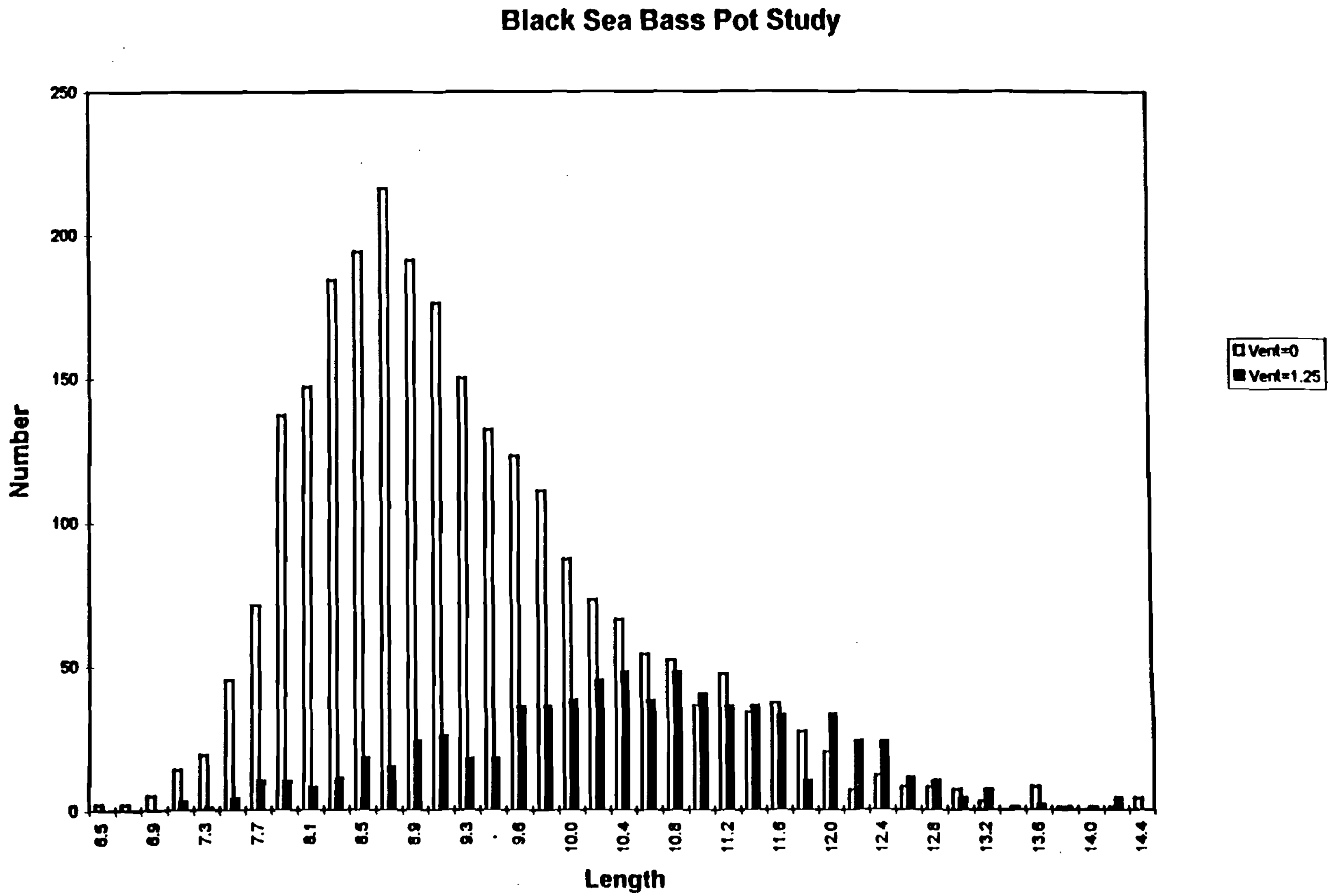


Figure 13. Total lengths of black sea bass from traps with escape vents of 1.25 x 6" and traps with no vents (control).

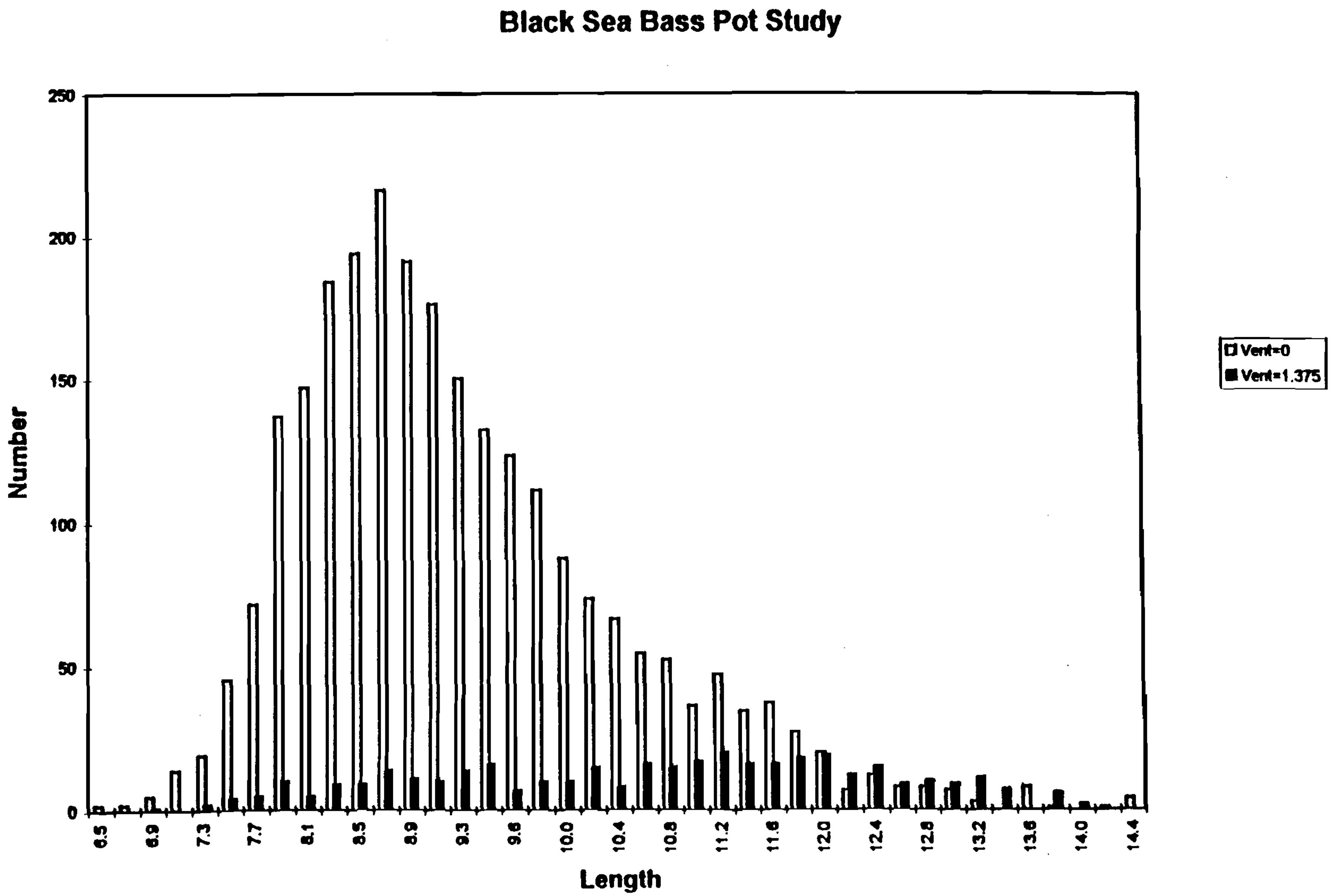


Figure 14. Total lengths of black sea bass from traps with escape vents of 1.375 x 6" and traps with no vents (control).

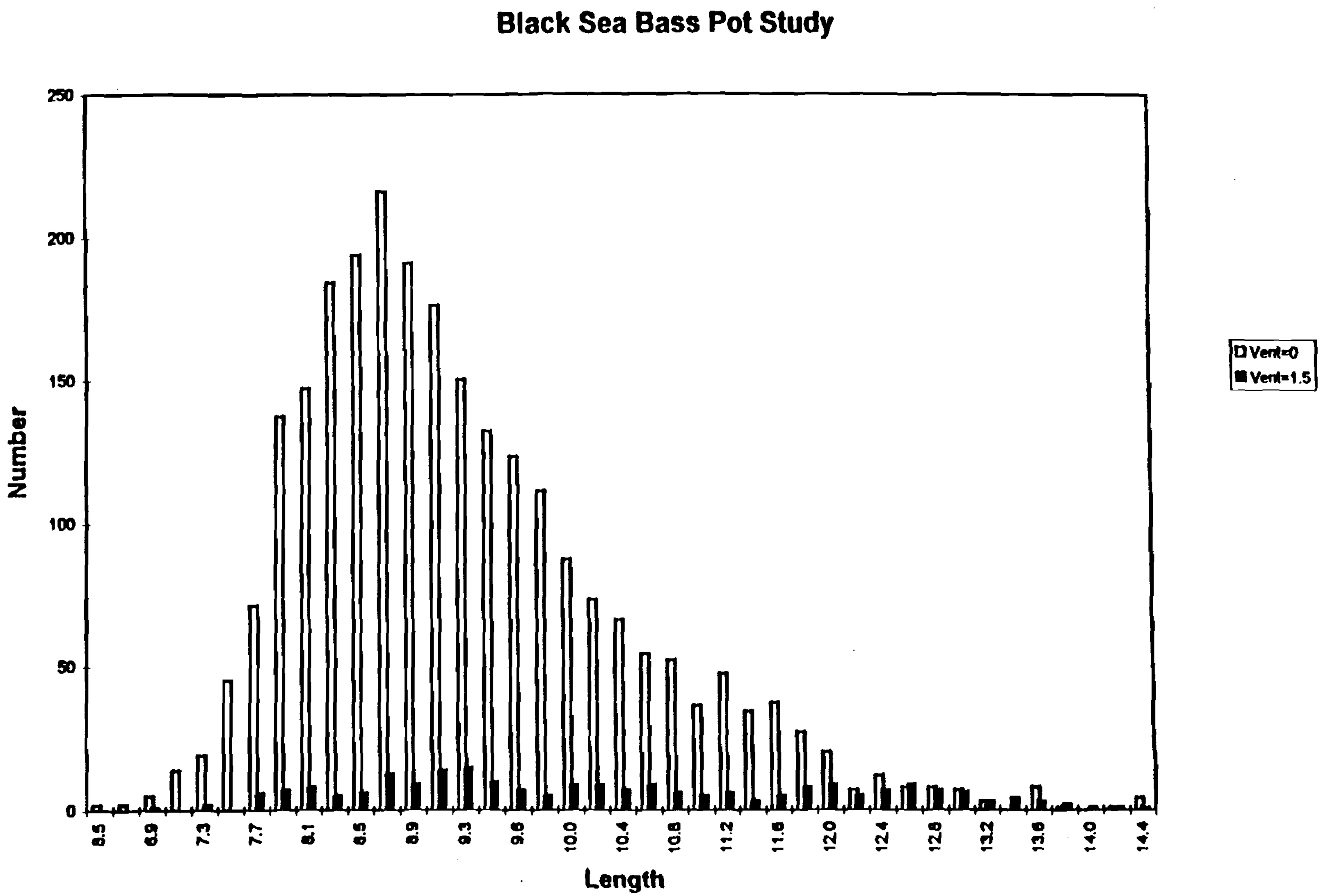


Figure 15. Total lengths of black sea bass from traps with escape vents of 1.5 x 6" and traps with no vents (control).

Appendix D. ASMFC Habitat Statement (Source: ASMFC 1994).

JOINT STATEMENT TO CONSERVE MARINE, ESTUARINE AND RIVERINE HABITAT

presented at

Atlantic States Marine Fisheries Commission Meeting
Washington, DC

May 16, 1990
Final Revision November 7, 1990

Statement:

The undersigned parties agree to use available mandates and to expand interagency efforts to minimize adverse effects of human activities on marine, estuarine, and riverine species and their habitats. This statement offers general guidance to states, federal agencies and regional bodies that share responsibility for fish habitats through their respective roles in decisions on research, management, and specific human activities. All decisions related to habitat conservation and use must accommodate the ecological needs of living natural resources in marine, estuarine, and riverine systems.

Objectives:

1. To minimize avoidable adverse impacts to fish stocks and their habitat. Our shared intent is to grant these valuable resources an appropriate level of management concern that reflects their tremendous socioeconomic-cultural value to the Nation. Any determination of public interest should balance these values with other uses.

2. To conserve, restore, and enhance fish habitats for the long-term benefit of all users. This applies equally to habitats of existing fish stocks and the historic ranges of stocks covered by a restoration plan. Aggressive action may be warranted to recover lost benefits.

3. To promote innovative programs that will increase our knowledge of management strategies that may reduce habitat loss or augment fish stocks, including:

    a) Beneficial uses of dredged material;

    b) Mitigation techniques for specific habitats accomplished in a manner that does not adversely impact the habitat needs of other important living natural resources.

    c) Restoration measures for specific stocks.

4. To improve our use of existing authorities and adopt new interagency procedures that will improve our habitat management efforts, including:

    a) Policies, guidelines, and/or regulations regarding "no net loss" of wetlands;

b) Recognition, support, and promotion of ecologically responsible wetland enhancement and management techniques that will add benefits for living resources of special concern while maintaining values for other important living resources.

c) Early identification procedures to accord special recognition to deserving habitats; and,

d) Incorporating all agencies into such efforts as fishery management plans (with the Fishery Management Councils established under the Magnuson Fishery Conservation and Management Act and with the Atlantic States Marine Fisheries Commission).

5. To foster greater interagency cooperation and collaboration, including:

a) Shared priority statements, policies and management plans that will improve overall awareness of habitat programs in other agencies;

b) Joint research and management initiatives to address common issues and needs; and,

c) Improved decision-making protocols, including mechanisms to incorporate best-available information into decisions affecting living resources and their habitat in ecological units within meaningful bio-geographic regions rather than administrative or political jurisdictions.

Recommended Actions:

Our shared responsibilities for marine, estuarine, and riverine habitats invite frequent opportunities for collaboration, including:

1) Share general information, recommendations, and decisions for other important living resources that relate to habitats or related resources, e.g., habitat policies or habitat discussions in Fishery Management Plans.

2) Collaborate with other parties on actions that relate to habitat or living resources, e.g., management plans or mitigation protocols.

3) Initiate new agreements to improve our efforts to conserve and manage living resources and their habitat, e.g. development and implementation of strategic multi-objective resource plans to address issues in resource or habitat management.

This statement of intent to conserve and manage marine, estuarine and riverine habitat is endorsed by the following agencies, states, and regional bodies:

RESOLUTION #1

MARINE, ESTUARINE AND RIVERINE HABITAT POLICY

RESOLUTION OF AGREEMENT

WHEREAS, the fishery stocks which inhabit the coastal rivers, estuaries, and shelf waters of the eastern seaboard of the United States represent commercial and recreational resources of enormous economic and social value to the citizens of our country; and,

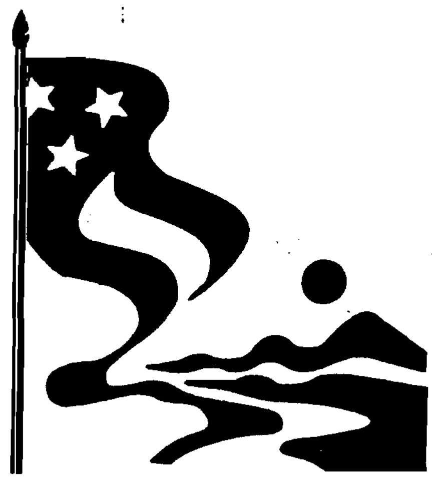
WHEREAS, management of these resources is the responsibility of the states, the Atlantic States Marine Fisheries Commission, and the federal government acting through the three regional Fishery Management Councils, namely, New England, Mid-Atlantic, and South Atlantic, and,

WHEREAS, the efforts to conserve and manage these fishery resources, the necessary habitat, and water quality are the management responsibilities of the aforementioned organizations; and, further that Fishery Management Plans (FMPs) developed by the Commission and Regional Councils include a detailed Habitat Section dealing with the preservation of the fishery environment and the assessment of the degradation caused by human activities; and,

WHEREAS, the state, interstate, and federal agencies that enforce laws or are designated and authorized by law to monitor, assess, permit and/or regulate human activities that affect the habitat, water quality, and the fish stocks; and, further that these agencies (state agencies, interstate compacts, and NOAA/National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Coast Guard, U.S. Army Corps of Engineers, and U.S. Environmental Protection Agency), share with the Commission and Fishery Management Councils a pressing responsibility to address the impact of their planning and regulatory activities affecting the status of fishery resources which are clearly defined in the provisions of FMPs;

NOW THEREFORE BE IT RESOLVED that the Commission, recognizing the requirement for improved coordination, agrees to actively implement the "unified marine habitat policy statement" presented on May 16, 1990 in Washington, D.C. with final revision dated November 7, 1990 attached hereto and made a part hereof, and calls upon the Regional Councils and federal agencies named above to do so also.

Appendix E. Habitat laws (Source: EPA 1994).



major environmental laws

If you are interested in becoming active in environmental, health, and community safety issues, you will need to understand many of the following federal laws. These laws, and others enacted by states, have various requirements and are enforced by various agencies. We have presented a brief description of the intent of each law. For more details, you should obtain a copy from your local library, state library, or the relevant federal or state agency. Federal and state officials, community organizations, and interest groups will help you gain a working knowledge of these laws.

the clean air act (CAA)

42 U.S.C. s/s 7401 et seq. (1970)

The Clean Air Act is the comprehensive federal law which regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The goal of the Act was to set and achieve NAAQS in every state by 1975. This setting of maximum pollutant standards was coupled with directing the states to develop state implementation plans (SIPs) applicable to appropriate industrial sources in the state.

The Act was amended in 1977 primarily to set new goals (dates) for achieving attainment of NAAQS since many areas of the country had failed to meet the deadlines. The 1990 amendments to the Clean Air Act in large part were intended to meet unaddressed or insufficiently addressed problems such as acid rain, ground level ozone, stratospheric ozone depletion, and air toxics.

the clean water act (CWA)

33 U.S.C. s/s 121 et seq. (1977)

The Clean Water Act is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants to waters of the United States. This law gave EPA the authority to set effluent standards on an industry-by-industry basis (technology-based) and continued the requirements to set water quality standards for all contaminants in surface waters. The CWA makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a permit (NPDES) is obtained under the Act. The 1977 amendments focused on toxic pollutants. In 1987, the CWA was reauthorized and again focused on toxic substances, authorized citizen suit provisions, and funded sewage treatment plants (POTWs) under the Construction Grants Program.

The CWA provides for the delegation by EPA of many permitting, administrative, and enforcement aspects of the law to state governments. In states with the authority to implement CWA programs, EPA still retains oversight responsibilities.

the comprehensive environmental response, compensation, and liability act (CERCLA or Superfund)

42 U.S.C. s/s 9601 et seq. (1980)

CERCLA (pronounced SERK-la) provides a federal "Superfund" to clean up uncontrolled or abandoned hazardous waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through the Act, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup. EPA cleans up orphan sites when potentially responsible parties (PRPs) cannot be identified or located, or when they fail to act. Through various enforcement tools, EPA obtains private party cleanup through orders, consent decrees, and other small party settlements. EPA also recovers costs from financially viable individuals and companies once a response action has been completed.

EPA is authorized to implement the Act in all 50 states and U.S. territories. Superfund site identification, monitoring, and response activities in states are coordinated through the state environmental protection or waste management agencies.

the emergency planning & community right-to-know act (EPCRA)

42 U.S.C. 11011 et seq. (1986)

Also known as Title III of SARA, EPCRA was enacted by Congress as the national legislation on community safety. This law was designed to help local communities protect public health, safety, and the environment from chemical hazards.

To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC). The SERCs were required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee (LEPC) for each district. Broad representation by fire fighters, health officials, government and media representatives, community groups, industrial facilities, and emergency managers ensures that all necessary elements of the planning process are represented.

the endangered species act

7 U.S.C. 136; 16 U.S.C. 460 et seq. (1973)

The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The U.S. Fish and Wildlife Service (FWS) of the Department of Interior maintains the list of 632 endangered species (326 are plants) and 190 threatened species (78 are plants). Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. Anyone can petition FWS to include a species on this list or to prevent some activity, such as logging, mining, or dam building. The law prohibits any action, administrative or real, that results in a "taking" of a listed species, or adversely affects habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.

EPA's decision to register a pesticide is based in part on the risk of adverse effects on endangered species as well as environmental fate (how a pesticide will effect habitat). Under FIFRA, EPA can issue emergency suspensions of certain pesticides to cancel or restrict their use if an endangered species will be adversely affected. Under a new program, EPA, FWS, and USDA are distributing hundreds of county bulletins which include habitat maps, pesticide use limitations, and other actions required to protect listed species.

In addition, we are enforcing regulations under various treaties, including the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The U.S. and 70 other nations have established procedures to regulate the import and export of imperiled species and their habitat. The Fish and Wildlife Service works with U.S. Customs agents to stop the illegal trade of species, including the Black Rhino, African elephants, tropical birds and fish, orchids, and various corals.

the federal insecticide, fungicide and rodenticide act (FIFRA)

7 U.S.C. s/s 135 et seq. (1972)

The primary focus of FIFRA was to provide federal control of pesticide distribution, sale, and use. EPA was given authority under FIFRA not only to study the consequences of pesticide usage but also to require users (farmers, utility companies, and others) to register when purchasing pesticides. Through later amendments to the law, users also must take exams for certification as applicators of pesticides. All pesticides used in the U.S. must be registered (licensed) by EPA. Registration assures that pesticides will be properly labeled and that, if used in accordance with specifications, will not cause unreasonable harm to the environment.

the (federal) freedom of information act (FOIA)

U.S.C. s/s 552 (1966)

The Freedom of Information Act provides specifically that "any person" can make requests for government information. Citizens who make requests are not required to identify themselves or explain why they want the information they have requested. The position of Congress in passing FOIA was that the workings of government are "for and by the people" and that the benefits of government information should be made available to everyone.

All branches of the federal government must adhere to the provisions of FOIA with certain restrictions for work in progress (early drafts), enforcement confidential information, classified documents, and national security information.

the national environmental policy act (NEPA)

42 U.S.C. s/s 4321 et seq. (1969)

The National Environmental Policy Act was one of the first laws ever written that establishes the broad national framework for protecting our environment. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action which significantly affects the environment. NEPA requirements are invoked when airports, buildings, military complexes, highways, parkland purchases, and other such federal activities are proposed. Environmental Assessments (EAs) and Environmental Impact Statements (EISs), which are assessments of the likelihood of impacts from alternative courses of action, are required from all federal agencies and are the most visible NEPA requirements.

the occupational safety and health act

29 U.S.C. 61 et seq. (1970)

Congress passed the Occupational and Safety Health Act to ensure worker and workplace safety. Their goal was to make sure employers provide their workers a place of employment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions. In order to establish standards for workplace health and safety, the Act also created the National Institute for Occupational Safety and Health (NIOSH) as the research institution for the Occupational Safety and Health Administration (OSHA). OSHA is a division of the U.S. Department of Labor which oversees the administration of the Act and enforces federal standards in all 50 states.

the pollution prevention act

42 U.S.C. 13101 and 13102, s/s 6602 et seq. (1990)

The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution produced through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are often not realized because existing regulations, and the industrial resources required for compliance, focus on treatment and disposal. Source reduction is fundamentally different and more desirable than waste management or pollution control. Pollution prevention also includes other practices that increase efficiency in the use of energy, water, or other natural resources, and protect our resource base through conservation. Practices include recycling, source reduction, and sustainable agriculture.

the resource conservation and recovery act (RCRA)

42 U.S.C. s/s 321 et seq. (1976)

RCRA (pronounced "rick-rah") gave EPA the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes.

The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned or historical sites (see CERCLA).

HSWA (pronounced "hiss-wa") - The federal Hazardous and Solid Waste Amendments. The 1984 amendments to RCRA which required phasing out land disposal of hazardous waste. Some of the other mandates of this strict law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.

the safe drinking water act (SDWA)

43 U.S.C. s/s 300f et seq. (1974)

The Safe Drinking Water Act was established to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources. The Act authorized EPA to establish safe standards of purity and required all owners or operators of public water systems to comply with primary (health-related) standards. State governments, which assume this power from EPA, also encourage attainment of secondary standards (nuisance-related).

the superfund amendments and reauthorization act (SARA)

42 U.S.C. 9601 et seq. (1986)

The Superfund Amendments and Reauthorization Act of 1986 reauthorized CERCLA to continue cleanup activities around the country. Several site-specific amendments, definitions, clarifications, and technical requirements were added to the legislation, including additional enforcement authorities.

Title III of SARA also authorized the Emergency Planning and Community Right-to-Know Act (EPCRA).

the toxic substances control act (TSCA)

15 U.S.C. s/s 2601 et seq. (1976)

The Toxic Substances Control Act of 1976 was enacted by Congress to test, regulate, and screen all chemicals produced or imported into the U.S. Many thousands of chemicals and their compounds are developed each year with unknown toxic or dangerous characteristics. To prevent tragic consequences, TSCA requires that any chemical that reaches the consumer market place be tested for possible toxic effects prior to commercial manufacture.

Any existing chemical that poses health and environmental hazards is tracked and reported under TSCA. Procedures also are authorized for corrective action under TSCA in cases of cleanup of toxic materials contamination. TSCA supplements other federal statutes, including the Clean Air Act and the Toxic Release Inventory under EPCRA.

Appendix F. Pollutants included in the National Pollutant Discharge Inventory, and Their Effects on the Environment, Marine Organisms and Humans (Source: NOAA, 1985).

Pollutant	Definition	Effects
1. **Oxygen-Demanding Materials** Biochemical Oxygen Demand (BOD)	Measure of organic material in a discharge that can be readily oxidized through microbial decomposition.	Can result in depletion of dissolved oxygen concentration: low concentration can result in death to marine organisms.
2. **Particulate Matter** Total Suspended Solids	Measure of suspended solid material.	Increases turbidity and bottom deposition: many toxic compounds are bound to, carried by, and deposited with TSS particles.
3. **Nutrients** a. Total Nitrogen (N)	Measure of all forms of nitrogen, i.e., nitrite, nitrate, ammonia-N, and organic forms.	N and P are major plant nutrients. Excessive amounts in water overstimulate plant growth; resultant oxygen depletion may have lethal effects on marine organisms.
b. Total Phosphorous	Measure of all forms of phosphorus, i.e., ortho and para-compounds.	
4. **Heavy Metals** a. Arsenic(As) b. Cadmium (Cd) c. Copper (Cu) e. Iron (Fe) f. Lead (Pb) g. Mercury (Mg)	A group of elements present in the environment from natural and anthropogenic sources that can produce toxic effects: determination based on EPA standard methods that measure environmentally available "metals".	Can be toxic to marine organisms and potentially to humans through consumption of contaminated water and organisms.
5. **Petroleum Hydrocarbons** (Pet HC)	A mixture of hydrocarbons found in petroleum comprised of hundreds of chemical compounds.	Acute lethal and chronic sublethal toxicity to marine organisms; interference with cellular and physiological processes, e.g., feeding and reproduction.
6. **Chlorinated Hydrocarbons** a. Polychlorinated Biphenyls (PCBs)	A group of aromatic compounds of two fused benzene rings and two or more chlorine atoms: used in heat exchange and insulating fluids.	Toxic to marine organisms; highly persistent; potential human carcinogen through consumption of contaminated water or organisms.
b. Chlorinated hydrocarbons other than PCBs (CHP)	Includes the chlorinated pesticides, aromatic, and nonaromatic.	Varying degree of acute and chronic aquatic toxicity, persistence, and human carcinogenicty.
7. **Pathogens** Fecal coliform bacteria (FCB)	Enteric bacteria which enter water in fecal material of human or animal origin: presence of pathogens.	Main effects are on public health and quality and safety of seafood.
8. **Sludges**	Solids or semi-solid materials generated as a result of potable or industrial water supply treatment, sanitary or industrial wastewater treatment, or flue gas scrubbing using wet processes.	May contain concentrated levels of contaminants found in wastewater, especially pathogens, heavy metals, and toxic organics, contaminants found in flue gases.
9. **Wastewater**	Water that has come in contact with pollutants as a result of human activities and is not used in a product, but discharged as a waste stream.	May contain concentrations of various pollutants or be contaminated by heat, or when discharged into marine waters the extra influx of fresh water may affect salinity gradients.

Appendix G. Longline catch composition (Source: NMFS 1996).

Longline	# Pounds			Catch / Day			# Trips		
	'93	'94	'95	'93	'94	'95	'93	'94	'95
AMBERJACK	63	0	0	9	0	0	1	0	0
AMBERJACK, GREATER	23823	17798	19341	45	27	34	116	108	92
AMBERJACK, LESSER	503	1067	537	16	30	14	5	6	8
BANDED RUDDERFISH	237	726	312	7	24	17	5	5	3
BANK SEA BASS (KELP, ROCK)	0	0	27	0	0	5	0	0	1
BARRACUDA	140	63	183	7	21	10	5	2	6
BARRELFISH	805	1034	789	12	6	5	10	22	24
BIG EYE	0	0	72	0	0	12	0	0	1
BLUE RUNNER	4	0	0	4	0	0	1	0	0
BLUEFISH	0	0	13	0	0	3	0	0	1
COBIA	1781	1790	3060	17	16	12	35	38	62
COD, UNC	71	0	0	14	0	0	1	0	0
DOLPHIN	5582	9425	14738	12	15	20	104	127	161
EEL, COMMON	1303	1376	2184	11	7	7	17	24	36
EEL, CONGER	4	295	194	0	25	22	1	2	1
FINFISHES UNC FOR BAIT	57	0	3	14	0	3	1	0	1
FINFISHES UNC FOR FOOD	756	463	36	18	17	1	7	6	5
GROUPER, BLACK	4688	4646	6002	40	22	25	26	42	39
GROUPER, GAG	7070	3855	4311	47	33	26	33	28	38
GROUPER, MISTY	0	37	0	0	3	0	0	2	0
GROUPER, RED	9605	14723	43502	59	76	129	43	43	58
GROUPER, SCAMP	3410	1313	2124	18	9	12	30	27	27
GROUPER, SNOWY	158970	103640	113004	118	78	87	282	232	242
GROUPER, UNC	401	0	144	100	0	6	2	0	4
GROUPER, WARSAW	4987	2662	763	47	46	32	21	11	4
GROUPER, YELLOWEDGE	18986	18490	20615	35	32	39	103	92	89
GROUPER, YELLOWFIN	5898	624	519	58	52	15	23	3	5
GRUNT, BLUE STRIPED	22	0	0	2	0	0	2	0	0
GRUNT, FRENCH	0	10	0	0	2	0	0	1	0
GRUNT, UNC	0	0	25	0	0	2	0	0	2
GRUNT, WHITE	0	57	0	0	10	0	0	1	0
HAKE, UNC	149	0	0	15	0	0	1	0	0
HAKE, WHITE	2167	708	597	18	8	8	15	12	9
HIND, RED	53	158	90	18	8	4	1	5	2
HIND, ROCK	437	4	92	7	1	3	9	1	5
HIND, SPECKLED	697	137	78	12	5	16	9	5	4

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Appendix G. Longline catch composition (cont.).

Longline	# Pounds			Catch / Day			# Trips		
	'93	'94	'95	'93	'94	'95	'93	'94	'95
HOGFISH	440	36	35	19	1	2	5	4	2
JACK, ALMACO	7059	803	1538	52	16	30	35	7	10
MACKEREL, KING & CERO	0	61	84	0	4	3	0	4	6
MACKEREL, SPANISH	12	0	0	2	0	0	2	0	0
MARGATE	22	81	116	1	4	2	2	5	7
OCEAN PERCH	1413	0	0	236	0	0	1	0	0
PORGY, JOLTHEAD	282	361	89	20	8	3	7	7	3
PORGY, KNOBBED	120	335	0	17	26	0	7	4	0
PORGY, RED	609	722	669	3	3	3	33	40	34
PORGY, WHITEBONE	226	397	6	7	9	1	7	7	1
PORGY/SCUP, UNC	0	0	49	0	0	6	0	0	2
RAYS, UNC	300	0	0	150	0	0	1	0	0
ROSEFISH, BLACKBELLIED	72859	101847	129592	132	148	193	84	98	105
RUDDERFISH	0	230	0	0	46	0	0	2	0
SCORPIONFISH-THORNYHEADS	220	403	1016	10	4	4	3	12	32
SEA BASS, BLACK	269	35	63	10	1	4	4	6	5
SEA CATFISH	0	0	24	0	0	4	0	0	1
SEA TROUT, WHITE	2	0	0	1	0	0	1	0	0
SHARK, AT SHARPNOSE	432	1639	11469	72	234	637	2	2	5
SHARK, BIGNOSE	163	0	0	27	0	0	1	0	0
SHARK, BLACKTIP	81	2740	3867	7	457	161	2	4	4
SHARK, BULL	8437	0	0	384	0	0	7	0	0
SHARK, DOGFISH UNC	7	8	2708	2	2	54	1	1	7
SHARK, DUSKY	487	0	2588	97	0	235	1	0	2
SHARK, HAMMERHEAD	36780	59113	34778	334	193	128	27	67	62
SHARK, LEMON	0	0	482	0	0	80	0	0	1
SHARK, LONGFIN MAKO	2139	2405	9704	40	21	211	8	15	12
SHARK, SANDBAR	58344	9165	59741	1061	218	235	15	11	47
SHARK, SILKY	45	78	140	23	16	18	1	1	2
SHARK, SHORTFIN MAKO	327	0	0	22	0	0	2	0	0
SHARK, THRESHER	139	153	0	46	22	0	1	1	0
SHARK, TIGER	80	245	564	20	14	28	1	4	3
SHARK, UNC	236474	335080	259533	466	287	303	133	283	246
SHEEPHEAD	2	0	0	1	0	0	1	0	0
SNAPPER, BLACKFIN	407	2092	98	23	105	9	2	5	2
SNAPPER, CUBERA	0	0	67	0	0	10	0	0	2
SNAPPER, LANE	2	102	53	1	3	1	1	8	4

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Appendix G. Longline catch composition (cont.).

Longline	# Pounds			Catch / Day			# Trips		
	'93	'94	'95	'93	'94	'95	'93	'94	'95
SNAPPER, MANGROVE	159	550	153	5	16	6	4	6	4
SNAPPER, MUTTON	14779	10946	2549	172	96	16	39	30	28
SNAPPER, QUEEN	0	0	28	0	0	2	0	0	3
SNAPPER, RED	590	801	13502	6	5	98	21	33	23
SNAPPER, SILK	24	679	170	2	32	7	3	3	7
SNAPPER, UNC	258	704	218	4	6	2	12	18	17
SNAPPER, VERMILION	344	793	634	3	3	2	18	36	34
SNAPPER, YELLOWTAIL	90	769	82	5	43	2	4	2	4
SPADEFISH	1360	3291	29	194	549	7	1	2	1
STRIPED BASS, UNC	0	3	0	0	1	0	0	1	0
SWORDFISH	288	76	0	32	15	0	3	1	0
TILEFISH, BLUELINE	98492	105429	100865	90	101	120	222	167	145
TILEFISH, GOLDEN	898918	762033	682459	368	325	342	649	539	466
TRIGGERFISH, GRAY	3039	7879	4791	32	77	35	14	16	22
TRIGGERFISH, QUEEN	5	2	69	1	0	3	1	1	2
TRIGGERFISH, UNC	104	0	0	21	0	0	1	0	0
TUNA, BLACKFIN	713	0	0	119	0	0	3	0	0
TUNA, UNC	85	38	0	12	4	0	1	1	0
TUNA, YELLOWFIN	179	697	179	5	9	7	5	12	4
WAHOO	606	494	7243	7	5	315	16	16	6
TOTAL	1700881	1598416	1565399	N/A					

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Appendix H. A Retrospective (1979-1995) Multispecies Assessment of Coral Reef Fish Stocks in the Florida Keys.

A Retrospective (1979-1996) Multispecies Assessment of Coral Reef Fish Stocks in the Florida Keys USA

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Running Headline: *Multispecies Coral Reef Fish Assessment*

Key Words: Reef fisheries, Florida Keys, stock assessments, overfishing, fishery management

Journal: Fishery Bulletin
To be published in Issue 96(3) in July 1998

Ault, J.S., Bohnsack, J.A. and G.A. Meester. 1997. A retrospective (1979-1996) multispecies assessment of coral reef fish stocks in the Florida Keys USA. *Fishery Bulletin*

Abstract.- A baseline assessment for 35 economically and ecologically important Florida Keys reef fish stocks is provided using a systems approach that integrates sampling, statistics, and mathematical modeling. Quantitative fishery-independent data from reef fish visual surveys conducted by SCUBA divers from 1979-1996 were used to develop estimates of population abundance, assemblage composition, and stock structures in relation to key physical and habitat factors. Exploitation effects were assessed using a new length-based algorithm that calculates total mortality rates from estimates of 'average length of fish in the exploitable phase of the stock'. These estimates were highly correlated for two statistically independent data sources on reef fish: fishery-independent diver observations and fishery-dependent head boat catches. We developed a Reef-fish Equilibrium Exploitation Simulation (REEFS) model and used estimates of fishing mortality to assess yield-per-recruit relative to fishing intensity and gear selectivity, and spawning potential ratio (SPR) relative to U.S. federal 'overfishing' standards. Our analyses show that 13 of 16 groupers (*Epinephilinae*), 7 of 13 snappers (*Lutjanidae*), one wrasse (*Labridae*), and 2 of 5 grunts (*Haemulidae*) are below the 30% SPR overfishing minimum. Some stocks appear to have been chronically overfished since the late 1970's. The Florida Keys reef fishery exhibits classic 'serial overfishing' in which the largest, most desirable and vulnerable species are depleted by fishing. Rapid growth of the barracuda population (*Sphyraenidae*) during the same period suggests that fishing has contributed to substantial changes in community structure and dynamics.

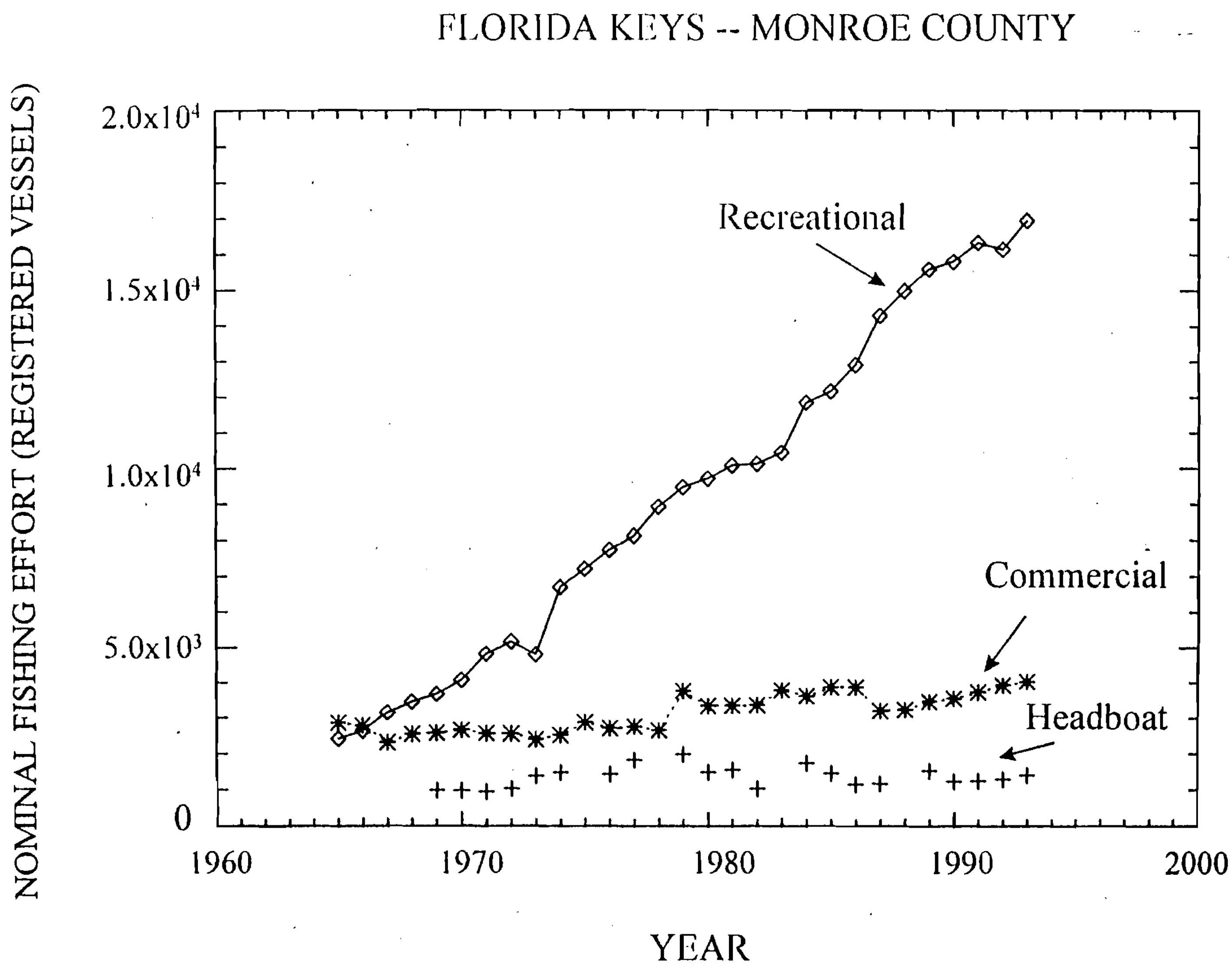
FLORIDA KEYS -- MONROE COUNTY
NOMINAL FISHING EFFORT (REGISTERED VESSELS)
2.0x10⁴
1.5x10⁴
1.0x10⁴
5.0x10³
0
1960
1970
1980
1990
2000
YEAR
Recreational
Commercial
Headboat

Fig. 3

FLORIDA KEYS REEF FISH

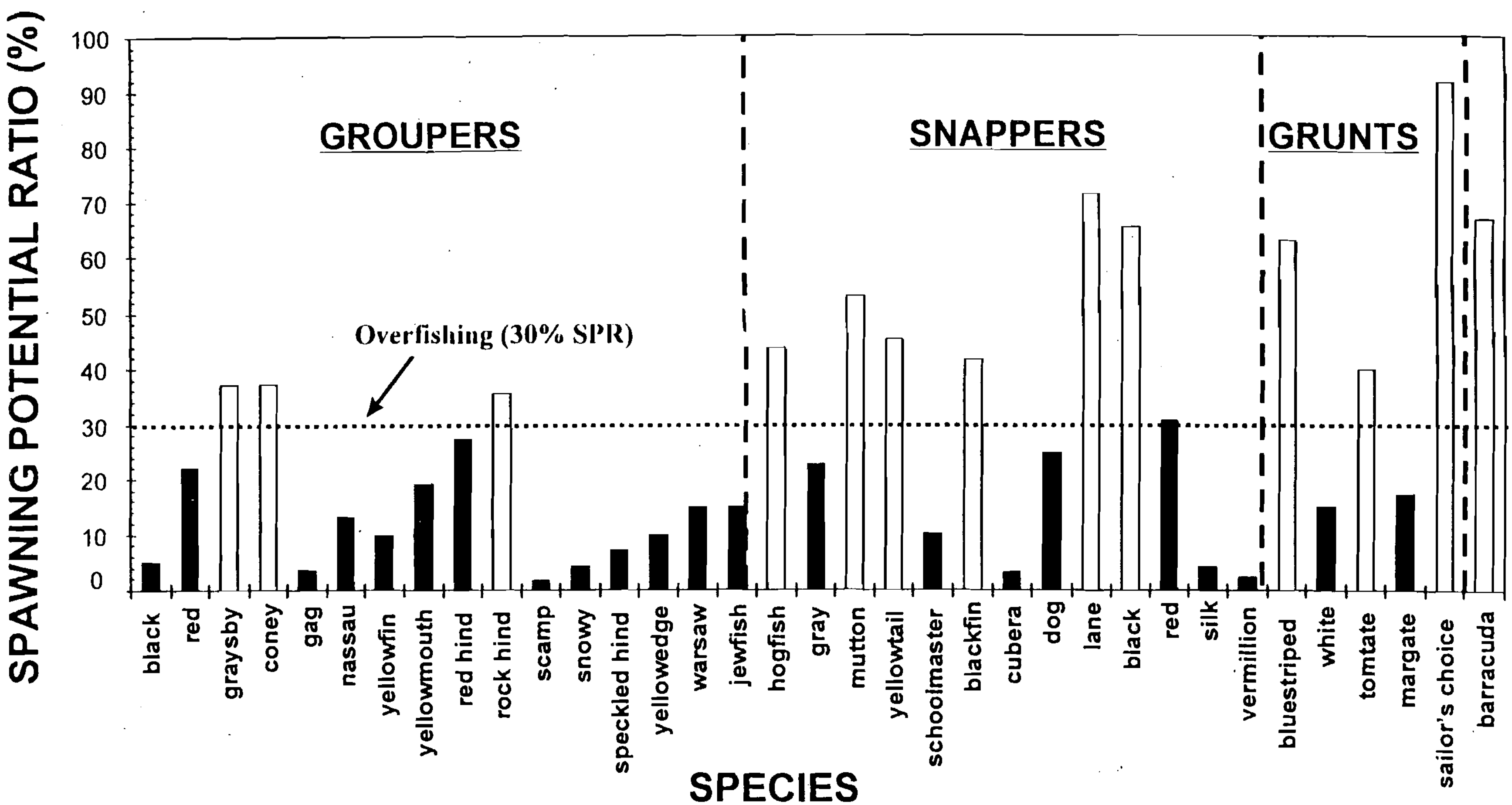

Table 3: FKNMS reef fish population dynamics parameters for 46 reef fish species used in mortality estimations and fishery simulations. Population dynamics parameter definitions and units are given in Table 2. The symbols ∗ indicate the species is present in recreational catch, but not headboat catches or the visual survey. The symbols --- indicate that insufficient population dynamic data was available to conduct a management analysis. Complete parameter sets were available for 35 species.

(A) GROUPERS (n=18)

	Population Parameters											
Common Name / *Scientific Name*	**M**	t_λ	L_∞	W_∞	**K**	t_0	t_m	**L'**	**t'**	α_{WL}	β_{WL}	L_λ
Black Grouper *Mycteroperca bonaci*	0.150	20	1200.0	31.6	0.160	-0.300	48	508.0	39	4.27E-06	3.2051	1153.1
Coney *Epinephelus fulvus*	0.180	17	698.9	1.5	0.145	-1.080	13	203.2	19	7.29E-05	2.5700	332.5
Gag Grouper *Mycteroperca microlepis*	0.200	13	1187.2	25.1	0.149	-0.802	60	508.0	36	1.21E-05	3.0305	1034.4
Graysby *Epinephelus cruentatus*	0.200	15	415.0	1.1	0.130	-0.940	36	203.2	52	1.22E-05	3.0439	362.5
Jewfish *Epinephelus itajara*	0.081	37	2394.0	244.9	0.054	-3.616	72	508.0	68	2.09E-05	2.9797	2328.0
Marbled Grouper ∗ *Epinephelus inermis*	---	---	---	---	---	---	---	---	---	---	---	---
Misty Grouper ∗ *Epinephelus mystacinus*	---	---	---	---	---	---	---	---	---	---	---	---
Nassau *Epinephelus striatus*	0.180	17	698.9	5.9	0.145	-1.080	83	508.0	95	3.83E-06	3.2292	648.2
Red Grouper *Epinephelus morio*	0.180	17	938.0	11.9	0.153	-0.099	48	508.0	61	1.13E-05	3.0350	869.0
Red Hind *Epinephelus guttatus*	0.180	17	392.7	1.1	0.207	-0.831	49	203.2	33	1.80E-04	2.6140	382.9
Rock Hind *Epinephelus adscensionis*	0.250	12	486.1	2.3	0.191	-2.160	48	203.2	9	6.00E-06	3.1930	453.3
Scamp *Mycteroperca phenax*	0.143	21	999.7	19.3	0.126	-1.357	48	508.0	52	2.02E-05	2.9932	932.2
Snowy Grouper *Epinephelus niveatus*	0.130	15	1091.3	19.5	0.113	-0.915	48	508.0	57	2.45E-05	2.9300	909.0
Speckled Hind *Epinephelus drummondhayi*	0.200	15	967.0	16.6	0.130	-1.010	48	508.0	58	1.11E-05	3.0730	861.0
Warsaw Grouper *Epinephelus nigritus*	0.080	41	2394.0	244.9	0.054	-3.616	48	508.0	68	2.09E-05	2.9797	2328.0
Yellowedge Grouper *Epinephelus flavolimbatus*	0.180	15	860.0	15.7	0.170	0.000	67	508.0	64	2.82E-05	2.9800	960.0
Yellowfin Grouper *Mycteroperca venenosa*	0.180	15	860.0	15.7	0.170	0.000	67	508.0	64	2.82E-05	2.9800	960.0
Yellowmouth Grouper *Mycteroperca interstitialis*	0.180	17	881.8	8.6	0.063	-9.030	36	508.0	56	2.58E-05	2.8937	710.7

Table 3: (continued)

(B) SNAPPERS (n=13) and HOGFISH (n=1)

Common Name *Scientific Name*	Population Parameters											
	M	t_λ	L_∞	W_∞	K	t_0	t_m	L'	t'	α_{WL}	β_{WL}	L_λ
Black Snapper *Apsilus dentatus*	0.300	10	618.3	3.2	0.097	-1.728	29	203.2	30	4.52E-05	2.8146	418.4
Blackfin Snapper *Lutjanus buccanella*	0.230	9	729.7	2.4	0.084	-2.896	20	304.8	43	7.40E-06	2.9735	458.8
Cubera Snapper *Lutjanus cyanopterus*	0.150	20	1200.0	34.9	0.160	-0.300	28	304.8	19	1.32E-05	3.0601	910.0
Dog Snapper *Lutjanus jocu*	0.333	9	854.0	10.2	0.100	-2.000	28	304.8	30	4.28E-05	2.8574	790.0
Gray Snapper *Lutjanus griseus*	0.300	10	722.3	5.2	0.136	-0.863	24	254.0	29	3.05E-05	2.8809	556.2
Lane Snapper *Lutjanis synagris*	0.300	10	618.3	3.2	0.097	-1.728	29	203.2	30	4.52E-05	2.8146	418.4
Mahogony Snapper *Lutjanus mahogoni*	0.300	10	618.3	3.2	0.097	-1.728	29	304.8	64	8.18E-05	2.7190	418.4
Mutton Snapper *Lutjanus analis*	0.214	14	938.7	14.1	0.129	-0.738	24	304.8	29	1.57E-05	3.0112	797.8
Red Snapper *Lutjanus campechanus*	0.190	16	975.0	13.7	0.162	-0.010	28	508.0	55	2.04E-05	2.953	955.0
Schoolmaster *Lutjanus apodus*	0.250	12	570.0	3.3	0.180	0.000	20	254.0	40	2.04E-05	2.9779	503.8
Silk Snapper *Lutjanus vivanus*	0.230	9	781.1	9.3	0.092	-2.309	37	304.8	38	1.00E-05	3.1000	512.0
Vermillion Snapper *Rhomboplites aurorubens*	0.230	10	613.6	2.8	0.206	0.111	43	254.0	33	1.72E-05	2.9456	541.6
Yellowtail Snapper *Lutjanus chrysurus*	0.214	14	454.7	1.3	0.209	-0.712	24	304.8	56	7.75E-05	2.7180	433.4
Hogfish *Lachnolaimus maximus*	0.250	12	566.0	3.8	0.190	-0.776	18	203.2	20	2.55E-05	2.9700	439.0

Table 3: (continued)

(C) GRUNTS (n=13) and BARRACUDA (n=1)

Common Name / *Scientific Name*	Population Parameters											
	M	t_λ	L_∞	W_∞	K	t_0	t_m	L'	t'	α_{WL}	β_{WL}	L_λ
Black Margate *Anisotremus surinamensis*	---	---	---	---	---	---	33	203.2	---	2.39E-06	3.3916	---
Bluestriped Grunt *Haemulon sciurus*	0.500	6	289.6	0.47	0.484	-0.011	12	203.2	31	1.94E-05	2.9996	273.5
Caesar Grunt *Haemulon carbonarium*	---	---	---	---	---	---	27	203.2	---	1.29E-05	3.0559	---
Cottonwick *Haemulon melanurum*	---	---	---	---	---	---	27	203.2	---	2.52E-05	2.9527	---
French Grunt *Haemulon flavolineatum*	---	---	---	---	---	---	18	203.2	---	9.06E-06	3.1581	---
Margate *Haemulon album*	0.374	8	752.6	8.57	0.174	-0.450	34	203.2	17	1.52E-05	3.0423	578.4
Porkfish *Anisotremus virginicus*	---	---	---	---	---	---	25	203.2	---	1.01E-05	3.1674	---
Sailors Choice *Haemulon parrai*	0.428	7	400.2	1.24	0.220	-0.355	12	203.2	35	2.02E-05	2.9932	320.1
Smallmouth Grunt *Haemulon chrysargyreum*	---	---	---	---	---	---	24	203.2	---	2.77E-03	2.1567	---
Spanish Grunt *Haemulon macrostomum*	---	---	---	---	---	---	39	203.2	---	2.28E-05	3.0295	---
Striped Grunt *Haemulon striatum*	---	---	---	---	---	---	21	203.2	---	1.39E-05	3.0988	---
Tomtate *Haemulon aurolineatum*	0.333	9	441.6	1.89	0.091	-2.095	24	203.2	57	6.19E-06	3.2077	279.9
White Grunt *Haemulon plumieri*	0.375	8	511.9	3.06	0.186	-0.776	18	203.2	24	8.35E-06	3.1612	410.3
Great Barracuda *Sphyraena barracuda*	0.200	15	1238.3	14.03	0.172	-0.461	36	619.2	44	4.11E-06	3.0825	1151.5

Appendix J. Proposed Rule for Snapper Grouper Amendment 9.

Billing Code:

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 622

[Docket No. ; I.D.]

Fisheries of the Caribbean, Gulf of Mexico, and South Atlantic;
Snapper-grouper Fishery off the Southern Atlantic States;
Amendment 9

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule.

SUMMARY: NMFS issues this proposed rule to implement Amendment 9 to the Fishery Management Plan for the Snapper-Grouper Fishery of the South Atlantic Region (FMP). This rule would increase the red porgy minimum size limit from 12" TL (total length) to 14" TL for both recreational and commercial fishermen, establish a recreational bag limit of 5 red porgy per person per day, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; increase the black sea bass minimum size limit from 8" TL to 10" TL for both recreational and commercial fishermen, and establish a recreational bag limit of 20 black sea bass per person per day; require escape vents and escape panels with degradable fasteners in black sea bass pots; establish measures for greater amberjack that will reduce the recreational bag limit from 3 to 1 greater amberjack per person per day, prohibit the harvest and possession in excess of the bag limit during April throughout the EEZ, establish a 1,000 pound daily commercial trip limit, establish a quota at 63% of 1995 landings (quota=1,169,931 pounds), begin the fishing year on May 1, prohibit sale of fish harvested under the bag limit when the season is closed, and prohibit coring; increase the recreational vermilion snapper minimum size limit from 10" to 11" TL and retain the current 10-fish bag limit; increase the gag grouper minimum size limit from 20" TL to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and prohibit purchase and sale during March and April; increase the black grouper minimum size limit from 20" to 24" TL for both recreational and commercial fishermen, prohibit harvest and possession in excess of the bag limit during March and April, and