FINAL

AMENDMENT 7, REGULATORY IMPACT REVIEW AND ENVIRONMENTAL ASSESSMENT

FOR THE

SNAPPER GROUPER FISHERY OF THE SOUTH ATLANTIC REGION

JUNE 1994

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prepared by the
South Atlantic Fishery Management Council

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LIST OF ACTIONS IN SNAPPER GROUPER AMENDMENT 7

Amendment 7 contains the following items:

Action 1. Establish a minimum size limit of 12" fork length (FL) for hogfish. PAGE 26

Action 2. Increase the mutton snapper minimum size limit from 12" to 16" TL. 33

Action 3. Require all dealers who want to receive species in the management unit taken from the Exclusive Economic Zone (EEZ) to obtain a federal dealer permit. Dealers who handle these fish must fill out reports as required. Requirements for a federal dealer permit are that the applicant possess a state dealer's license, and that the applicant must have a physical facility at a fixed location in the state wherein the dealer has a state dealer's license. A fee will be charged to cover the administrative costs of issuing federal dealer permits. To purchase fish harvested in the EEZ from a fisherman, a person or business (including a restaurant) must have a federal dealer permit.

Fish taken from the EEZ may only be sold to federally permitted dealers. For species managed with a quota, 100% of dealers are required to report. 44

Action 4. Allow sale of species in the snapper grouper management unit caught in the exclusive economic zone (EEZ) under the following conditions:

1. Fish caught under the bag limit may be sold if the individual possess a federal permit or a state (i.e., commercial) license to sell fish. If bag limit fish are sold, they must be sold to a federally permitted snapper grouper dealer and must be reported through the state's trip ticket system, other mandatory reporting system or federal port canvass as applicable.
2. Fish caught in excess of the bag limit may be sold only if the indivudual possesses the federal permit to exceed the bag limit. If fish are sold, they must be sold to a federally permitted snapper grouper dealer and must be reported through the state's trip ticket system, other mandatory reporting system or federal port canvass as applicable.

Existing permit requirements to exceed the bag limit will continue to apply with clarification concerning the gross sales level:

A. For a vessel owned by a corporation to be eligible for a vessel permit, the corporation or a shareholder or officer of the corporation or the vessel operator must have realized gross sales of seafood of $20,000 (clarify original intent that seafood is to be caught/landed by subject vessel) during one of the last three calendar years preceding the application. For partnerships to be eligible for a vessel permit, the general partner or vessel operator must qualify.

B. For non-corporation/partnership vessels, permit applicants must provide the relevant information as required by the Regional Director. This will include a sworn statement by the applicant certifying that 50% of his or her earned income was derived from commercial, charter, or headboat fishing, or that they realized gross sales of seafood of $20,000, whichever is less, during one of the last three calendar years preceding the application. The Regional Director may require the applicant to provide documentation supporting the sworn statement before a permit is issued or to substantiate why such a permit should not be denied, revoked, or otherwise sanctioned.

C. Other permit requirements as specified in Amendment 4 also apply. 48

Action 5. Require all charter and headboats fishing for or possessing species in the management unit, on a for hire basis, to annually obtain a federal permit. The Science and Research Director will select the appropriate number of individuals to maintain logbooks and those individuals selected will be required to maintain a fishing record for each fishing trip as specified by the Science and Research Director. In those states (e.g., South Carolina) with existing mandatory reporting requirements, state required logbooks could be used in lieu of additional reporting requirements as long as the necessary information was being collected. The Council is not specifying 100% logbook coverage because of the existence of state logbooks. NMFS is to specify charter and headboat reporting requirements. 54

Action 6. The following gear represent the only gear allowable in the **directed snapper grouper fishery:**

A. Vertical hook-and-line gear:

(a) Hand-held hook-and-line gear - includes manual, electric, or hydraulic rod and reels.

(b) Bandit gear - includes manual, electric, or hydraulic reels attached to the boat.

B. Spearfishing gear without rebreathers - includes powerheads (which is any device with an explosive charge usually attached to a speargun, spear, pole, or stick, which fires a projectile upon contact), except where expressly prohibited. In addition, the use of explosive charges (including powerheads) to harvest species in the snapper grouper management plan is not allowed in the EEZ off South Carolina.

C. Bottom longline - this gear is allowed only in waters deeper than 50 fathoms, only for species other than wreckfish, and only north of St. Lucie Inlet, Florida.

D. Black sea bass pot except where expressly prohibited (i.e., within Special Management Zones) and only north of Cape Canaveral - a trap limited to a six-sided rectangular shape with no dimensions exceeding 25 inches (other than the diagonal). This would exclude traps that use flexible mesh or webbing to increase the effective size of the trap. To clear up some confusion over mesh sizes, minimum sizes for mesh are specified as follows: hexagonal mesh ("chicken wire") must be at least one and one-half inches between the wrapped, parallel sides; square mesh must be at least one and one-half inches between sides; and rectangular mesh must be at least one inch between the longer sides and two inches between the shorter sides. Pot throat dimensions remain unspecified.

See Action 8 for discussion allowing possession of sink nets on multi-gear trips only off North Carolina. 56

Action 7. The Regional Director may issue permits for experimental gear on a limited basis provided that a process is implemented to collect data on the use of the particular gear concurrently with issuance of the permit. It is the Council's intent to allow sale of the catch from experimental gear. 66

Action 8. Allow sink net fishermen (only off North Carolina) fishing for spot, croaker, and weakfish to make multi-gear trips, and allow retention of all fish harvested with black sea bass pots and/or bandit gear that meet the minimum size limits. 67

Action 9. Add the following to the list of problems: "Localized depletion where a species' abundance in an area is reduced by high fishing effort can cause conflict among fishermen." 72

Action 10. Add the following to the list of objectives: "Evaluate and minimize localized depletion." 75

Action 11. Specify a maximum of a two day possession limit for all charter and headboats making multi-day trips regardless of the number of captains on board. This would apply to persons aboard charter and headboats on trips exceeding 24 hours provided that each passenger has a receipt verifying the trip length. Excursion vessels are allowed up to a 3-day possession limit provided they can document that fishing was conducted on at least 3 days. (Note: The effect of this action is to drop the requirement for two captains; the remainder of the items are currently in effect.) 77

Action 12. Maintain the crew specification of three on charter/headboats unless the vessel possesses a "certificate of inspection" in which case crew size is limited to the crew number on the certificate. A procedure is to be established whereby a charter/headboat can relinquish their charter/headboat license seasonally (winter in the Carolinas), and fish solely as a commercial vessel. This procedure is to be worked out between NMFS and Council staff, and depending on the outcome, an administrative fee may be required. 80

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Action 13. Modify the management unit for scup (*Stenotomus chrysos*) to apply south of Cape Hatteras, North Carolina. 88

Action 14. Modify the framework (wording included under discussion below) by inserting "where appropriate" after "report" in (3): "...accompanied by the Group's report (where appropriate) ..." Modify the last sentence in (3) to read: "For wreckfish and any other species under limited access, this report will be submitted each year at least 60 days prior to the start of the fishing season; for all other species and/or changes, this report will be submitted by any such date as may be specified by the Council but at least 60 days prior to the desired effective date." Also, modify the last sentence in (4) to read: "...changes for species managed under limited access prior to the fishing year, and for all other species and/or changes on such dates as may be agreed upon with the Council." 85

The following alternatives were eliminated from detailed consideration and/or no action was proposed. They are discussed in Appendix C. This information is included to provide a record of the Council's deliberations during development of Amendments 6 and 7.

ACTION 1. RED PORGY QUOTA C-1
ACTION 2. RED PORGY TRIP/BYCATCH LIMITS C-4
ACTION 3. RED PORGY SIZE/BAG LIMITS C-9
ACTION 4. RED SNAPPER SIZE/BAG LIMITS C-11
ACTION 5. WHITE GRUNT SIZE/BAG LIMITS C-15
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REGULATORY IMPACT REVIEW

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Introduction

The National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (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 that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way.

The RIR 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).

Problems and Objectives

The general problems and objectives are found in the FMP (Appendix A). This amendment proposes to rebuild the hogfish resource; protect the mutton snapper resource; provide a mechanism to collect necessary data and track quotas; and address a number of gear and user group related issues. Further exposition of these issues are found in Section 1 under "Purpose and Need".

Methodology and Framework for Analysis

This RIR analyzes the probable impacts on fishery participants of the proposed plan amendment to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (FMP). The discussions for the proposed actions are incorporated in the text under socioeconomic impacts in Section 4. 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 surplus to the harvest sector, net profits to the intermediate sector, and consumer surplus to the final users of the resource.

The harvest sector refers to harvesters of fish in the snapper grouper fishery and the intermediate sector to processors and dealers of snapper grouper species. Final users of the resource are taken to refer to the individuals that derive benefits from consuming species in the snapper grouper fishery. Ideally, all these changes in costs amd benefits need to be accounted for in assessing the net economic benefit to society from the management of the snapper grouper fishery. However, lack of data does not allow for this type of analysis. The RIR attempts to determine these changes to the extent possible, albeit in a very qualitative manner.

In addition to discussions on net economic benefits, some consideration is given to other issues such as community employment and income opportunity, acceptability of the regulatory measures and present and historical participation in the fishery.

1.0 PURPOSE AND NEED

Amendment 7 to the Snapper Grouper Fishery Management Plan was developed to rebuild the hogfish resource; protect the mutton snapper resource; provide a mechanism to collect necessary data and track quotas; and address a number of gear and user group related issues. The South Atlantic Fishery Management Council is concerned about these resources, and is proposing to implement size and bag limits; require dealer, charter, and headboat permits; specify allowable gear and a procedure to evaluate new gear; make an allowance for the sink net fishery in North Carolina; modify the crew specification on charter and headboats; modify the management unit for scup; and modify the framework procedure.

The stock status of some of these species is poorly understood due to severely limited data. The Council has evaluated all readily available information in designing the management measures contained in this amendment. The framework procedure contained in the fishery management plan will be used to monitor and adjust management as necessary.

The original management plan (SAFMC, 1983a) included a Final Environmental Impact Statement. Amendments 4, 5, and 6 included Environmental Assessments. Amendment 7 includes an Environmental Assessment. New information will be available concerning the economics of the fishery in early 1995. This information will allow us to quantify the socioeconomic impacts of management regulations; such information is not available at this time. The Council intends to prepare a Supplemental Environmental Impact Statement with preparation of Amendment 8 during 1995 utilizing the new socioeconomic information from the South Carolina Wildlife & Marine Resources Department's survey of snapper grouper fishermen and any other information that becomes available.

Management Objectives

Objectives addressed in this amendment are presented below. See Appendix A for a complete listing of objectives from the Snapper Grouper Fishery Management Plan.

- Prevent overfishing in all species.
- Collect necessary data.
- Promote orderly utilization of the resource.
- Provide for a flexible management system.
- Minimize habitat damage.
- Promote voluntary compliance.

Issues/Problems to be Considered

Issues/problems addressed in this amendment are as follows. See Appendix A for a complete listing of issues/problems from the Snapper Grouper Fishery Management Plan.

Overfishing

- What is the best approach to prevent overfishing of hogfish and mutton snapper?

Data

- How should the quotas be monitored?
- How can the estimates of catches be improved?
- How can the necessary research for gag be planned and conducted?

Orderly Utilization (includes Socio-Economic Impacts)

- Which gear should be allowed in the fishery?
- Should multi-gear trips be allowed in the sink net fishery?
- What should be done to allow charter and headboats to fish commercially?
- Should multi-day bag limits be altered?
- What provisions should be made for the recreational fishery?

Flexible Management

- Should the management unit for scup be modified?
- Should the framework procedure be modified?

Habitat Damage

- What gear should be allowed in the fishery?

Compliance

- What approaches will ensure and/or promote voluntary compliance?

History of Management

The Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region was prepared by the South Atlantic Fishery Management Council (SAFMC, 1983a) to address overfishing in 13 species and to establish a procedure for preventing overfishing in other species. Amendment 1 (SAFMC, 1988) prohibited use of trawl gear in the snapper grouper fishery to prevent habitat damage and overfishing. Amendment 2 (SAFMC, 1990a) protected jewfish and Amendment 3 (SAFMC, 1990b) established a management program for wreckfish. A comprehensive expansion of the snapper grouper management program was accomplished in Amendment 4 (SAFMC, 1991a) and wreckfish individual transferable quotas (ITQs) were implemented in Amendment 5 (SAFMC, 1991b). Measures were proposed for the deep water species in Amendment 6 (SAFMC, 1993). Other management adjustments and details for prior amendments are found in Appendix B.

Issues/Problems Requiring Amendment 7

Species thought to be overfished but for which data are insufficient to calculate SSRs include:

- **Hogfish**

The Council is concerned about the biological status of the following:

- **Gag**
- **Mutton Snapper**

The original Snapper Grouper Fishery Management Plan (SAFMC, 1983a) established a management program for the snapper grouper resource in the south Atlantic which included minimum sizes for six species identified as being overfished. The first assessment of the status of species in the snapper grouper fishery was prepared by the National Marine Fisheries Service, Beaufort Laboratory, with input from the South Atlantic Council's Plan Development Team (PDT), and presented to the Council in August 1990. This assessment became the basis for Amendment 4 (SAFMC, 1991a).

The 1991 assessment prepared by the National Marine Fisheries Service was presented to the Council in June 1991 and consisted of the following: (1) Survival of released reef fish: A summary of available data (Parker, 1991); (2) The relationship between spawning season and landings of selected reef fishes (Burton, 1991) ; and (3) South Atlantic snapper grouper assessment 1991 (NMFS, 1991a). This assessment confirmed the status of the stocks as indicated in the 1990 report and represents the biological information supporting Amendment 7. The 1991 assessment concluded that:

> "For most species, overall regional estimates of SSR and present Y/R predominantly reflect values resulting from recreational fishing as reported in the 1990 assessment. The estimates are of course affected more by numbers of fish caught than by weight caught and given that recreational fisheries, by and large, take smaller fish of a species, a recreational fishery of less poundage than a simultaneous commercial fishery can influence SSR and Y/R values more. In particular, inclusion of the MRFSS data, with the associated very large, non-headboat recreational catches, often had a dramatic effect on region wide estimates of SBR.
>
> Overall, nine of 19 species have SSR values of less than 0.30, the criterion value designating overfishing. Another four species have values of from 0.34 to 0.30, very close to the criterion level, while 16 of 19 species have SSR values at 0.38 or less. Of the remaining three species the SSR value for greater amberjack, 0.79, is highly suspect because of the unusual distribution of samples sizes."

The level of overfishing and need for management are supported by the 1990 conclusions of the Plan Development Team report. Based on the overfished status of many species in the management unit, the PDT recommended establishment of reef fish reserves equal in area to 20% of the "live bottom" along the southeastern United States in conjunction with the 20% spawning stock ratio. If the level of spawning stock ratio was increased or decreased, then the corresponding percentage of area in the reserve would change accordingly (PDT, 1990). The Council conducted scoping meetings on the concept and use of reserves in fisheries management. The Council reviewed comments received during the scoping meetings and requested NMFS convene a scientific panel to evaluate this concept.

The National Marine Fisheries Service presented a stock assessment (Huntsman et al., 1992) to the Council in June 1992 and confirmed the status of the stocks as indicated in the 1991 report, with several species having different spawning stock ratio values. This assessment represents further biological information supporting Amendment 7. The 1992 assessment concluded that:

> "SSR increased for eight of the 19 species studied, decreased for nine, and remained the same for two. Five species apparently changed state relative to overfishing: black sea bass, yellowtail snapper, gray triggerfish and tilefish displayed SSR values less than 0.3 in the new analysis, and the SSR for gray snapper now appears greater than 0.30."

Amendment 6 originally contained 35 actions addressing gear regulations, minimum size limits, bag limits, and other management adjustments. The Council was concerned about the deep water species and red porgy, given their severely overfished stock status. At the August 1993 meeting, the Council separated management of the deep water component and red porgy into Amendment 6 and the balance of proposed measures as Amendment 7.

Additional red porgy information was reviewed at the November 1993 meeting. The SSR increased from 8%, based on the 1992 stock assessment, to 22% based on more recent maturity schedule information. The quota proposed for red porgy would have been 671,417 pounds and it was anticipated that this quantity would have been caught by early September, assuming that 1994 monthly catches were similar to 1992. Amendment 6 did not include a trip limit and it is possible that there may have been some targeting of red porgy which would have resulted in an earlier closure. Once the quota was filled, commercial fishermen would not have been able to possess red porgy. Fishermen would probably have continued to fish but targeting vermilion and discarding red porgy, the majority of which would have been dead. Given the uncertainty about the stock status of red porgy and the potential for high discards, the Council decided to remove consideration of red porgy management from Amendment 6. Red porgy management options were included in Amendment 7. The Council is not proposing action on red porgy because existing regulations provide sufficient protection at this time (See Appendix C). The Council will monitor the red porgy resource, and if action becomes necessary, regulations will be implemented through the framework procedure.

Appendix C contain alternatives considered by the Council to address red porgy and a number of other species for which the Council concluded that no action was necessary at this time. If action becomes necessary in the future, the framework procedure will be used to implement the necessary regulations.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Section 2.0 summarizes Section 4.0 Environmental Consequences. Matrices are used to contrast each of the management alternatives with the issues/problems. It is intended that each matrix provide the reader with an overview of the alternatives considered and resulting impacts for each management measure.

The Council's objective of "orderly utilization" includes social and economic considerations. The objective "flexible management" is not included in the matrices as it only applies to the modifications to the scup management unit and the framework procedure.

The objective to "minimize habitat damage" is only applicable for the actions addressing gear regulations (Action 6, 7, and 8). Specifying allowable gear (Action 6) will minimize/prevent habitat damage and the procedure for experimental gear (Action 7) will allow fishermen to experimentally test and evaluate new gear that may reduce adverse impact on the habitat. The allowance for sink net gear (Action 8) will not adversely impact the habitat because these nets are not used on hard bottom.

Management measures (proposed actions) are intended to address the management objectives and issues discussed above. Each management measure has a number of alternatives that have been considered by the Council. The following tables summarize the alternatives and how they address the problems/issues identified by the Council. Management alternatives are presented in the rows and issues/problems in the columns.

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

ACTION 1. HOGFISH:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
12" FL	Solves over-fishing problem Increases YPR	No effect	Short-term revenue loss Long-term positive	Dockside enforcement
No Action	Continues overfishing	No effect	Long-term revenue loss	Low due to inconsistent regs
10" FL	Continues overfishing	No effect	Long-term revenue loss	Low due to inconsistent regs
8" FL	Continues overfishing	No effect	Long-term revenue loss	Low due to inconsistent regs
12" FL & incl in 10 snapper bag	Solves overfishing Increases YPR	No effect	Short-term revenue loss Long-term positive	Low for bag limit due to inconsistent regs

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

ACTION 2. MUTTON SNAPPER:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
16" TL	Provides more protection Increases YPR	No effect	Short-term revenue loss. Long-term revenue gains	Compatible state/federal
No Action	Risk of overfishing	No effect	Long-term efficiency losses	Less compliance
Increase size limit (16", 17", 18" & 20")	Provides protection Increases YPR	No effect	Large short-term revenue loss	Less compliance except 16"
No possession during May & June	Provides protection	No effect	Large short-term revenue loss	High costs
Remove multi-day bag limits	Reduce fishing mortality	No effect	Revenue loss to headboats	High costs
No sale during May & June	May reduce fishing mortality	No effect	Large revenue loss	High costs
20" TL & 2-fish bag limit	Prevents overfishing Increases YPR	No effect	Large revenue loss	Less compliance High costs
Increase size limit of 12" by 2"/year	Allows risk of overfishing	No effect	Minimal short-term revenue losses	Confusing, less compliance
Recreational bag limit 1/day all year	Reduces fishing mortality	No effect	Large revenue loss	Less compliance
Repeal spawning limitation (May & June)	Risk of overfishing	No effect	Short-term revenue increase	Lowers costs
16" TL and bag limit 2-fish recreational	May prevent overfishing Increases YPR	No effect	Large revenue loss	Less compliance

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

ACTION 3. DEALER PERMITS:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Require dealer permit	No effect	Improves data collection	Long-term benefits	Better compliance
Do not require dealer permits	No effect	Potential problem	Forgone long-term benefits	Less compliance
Specify permit sanctions	No effect	Improves data collection	No effect	Better compliance
Dealer requirements similar to wreckfish	No effect	Improves data collection	Revenue losses to fishermen/dealers. Higher prices to consumers	Better compliance
Require dealer permit regardless of where fish caught	No effect	Improves data collection	Revenue losses to fishermen/dealers. Higher prices to consumers	Better compliance
Require dealer permit & reporting similar to summer flounder	No effect	Improves data collection	Higher operating cost to dealers. Higher prices to consumers	Better compliance

ACTION 4. REQUIRE COMMERCIAL PERMIT TO SELL FISH:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Allow sale consistent with state regulations	No effect	No data	Maintains supply of fresh fish to hotels, restaurants, etc.	Higher costs
Require federal permit to sell	No effect	Increases data	Some effects on part-time fishermen	Higher costs
Require permit regardless of where fish caught	No effect	Increases data	Reduce supply of fresh fish to hotels, restaurants, etc.	Higher costs
Require part-time permit	No effect	Increases data	Increased management costs	Higher costs
No Action	No effect	No data	Potential health risks	Less costs

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

ACTION 5. CHARTER AND HEADBOAT PERMITS:
ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Require charter & headboats to have permit	No effect	Increases data	Unknown	Good compliance
Do not require permit	No effect	No data	No effect	No effect
Specify permit sanctions	No effect	Increases data	Unknown	Good compliance

ACTION 6. SPECIFY ALLOWABLE GEAR:
ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Specify allowable gear	Helps prevent overfishing	More data needed	Some adverse effects	Increases compliance
No action	Complicates problem	More data needed	Potential adverse effects	Difficult to enforce
Exemption for short bottom longlines	Increases mortality	More data needed	Increased management costs	Difficult to enforce
Exclude sleds/scooters from allowable gear	Some effect possible	No effect	Minimal effects	Difficult to enforce
Exclude powerheads from allowable gear	Some effect possible	No effect	Adverse effects	Difficult to enforce
Bottom longlines only north of Cape Canaveral	Some effect possible	More data needed	Moderate effects	Increases compliance
Commercial trip limit & recreational bag limit for powerheads off SC	Some effect possible	More data needed	Some effects	Difficult to enforce
Allow only vertical hook-and-line gear	Some effect possible	No effect	Large adverse effects	Lower costs
Vertical H&L, spearfishing w/o rebreathers, powerheads and bottom longlines	Some effect possible	No effect	Adverse effects	High costs
Trip limit off SC and allow powerheads	Some effect possible	More data needed	Some effects	Difficult to enforce
As stated and allow powerheads off SC	Some effect possible	No effect	Some effects	Improves compliance

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

ACTION 7. PROCEDURE FOR EXPERIMENTAL GEAR:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Establish procedure to evaluate experimental gear	May solve some of the problem	Data & research costs	Unknown	Moderate enforcement costs
No action	Does not eliminate problem	No effect	Possible future benefits forgone	No effect

ACTION 8. SINK NET FISHERY:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Allow multi-gear trips off NC only	No effect	Data collection costs	Positive effects	Better compliance
No Action	No effect	No effect	Potential adverse effects	Less compliance
Sink net fishermen can retain sea bass only	No effect	Data collection costs	Potential adverse effects	Less compliance

ACTION 9. NEW PROBLEM:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Localize depletion	Addresses problem	Requires data	Decreased revenue to fishermen	No effect
No Action	Does not address problem	No effect	Decreased revenue. Increased competition in other areas	No effect
Conflict from public perception issue	No effect	No effect	Possible negative effects	Less compliance
Gear competition & evaluation	No effect	Requires data	Possible benefits to some at the expense of others	Effects unknown
Mutton snapper 3-day multi-day bag limit	No effect	No effect	Long-term negative effects	Effects unknown

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

ACTION 10. NEW OBJECTIVE:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Evaluate & minimize localized depletion	Addresses problem	Requires data	Potential long-term benefits possible	No effect
No Action	Does not address problem	No effect	Potential long-term negative effects	No effect
Marine reserve-related problems	Addresses problem	Requires data	Unknown	No effect

ACTION 11. MULTI-DAY BAG LIMITS:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Maximum 2-day possession limit; 3-day for excursion vessels; drop 2-captain requirement	No reduction in mortality	No effect	Some negative effects	Lower in Florida due to inconsistent regulations
No Action	Does not reduce mortality	No effect	No short-term effect	Complicates enforcement
Maximum 3-day possession limit	Increases mortality	No effect	Some negative effect	Voluntary compliance
Maximum 2-day possession limit	May reduce mortality	No effect	Minimal negative effect	Voluntary compliance

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

ACTION 12. CHARTER/HEADBOAT CREW SPECIFICATION:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Maintain specification of 3 unless "certificate of inspection"	No effect	No effect	Potential net benefits	Some costs
No Action	No effect	No effect	Negative effects	No effect
Modify with proposed Coast Guard wording	No effect	No effect	Positive effects	Some costs
Change from 3 to 4 or 5	No effect	No effect	Increased enforcement costs	Some costs
Require special day permit	No effect	No effect	Increased management & enforcement costs	Increases costs
Choose either recreational or commercial	No effect	No effect	Large negative effects	Increases costs
Change from 3 to 4 or 5 only for headboats	No effect	No effect	Increased enforcement costs	Increases costs

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

ACTION 13. MODIFY THE MANAGEMENT UNIT FOR SCUP:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Management unit is south of Cape Hatteras	Addresses the problem	No effect	Minimizes effects	Increases costs
No Action	Will not address problem	No effect	May result in negative effects	No effect

ACTION 14. MODIFY THE FRAMEWORK PROCEDURE:

ISSUES/PROBLEMS

Alternatives	Overfishing	Data	Socioeconomic Impacts	Compliance
Modify framework procedure	No effect	No effect	Positive effects	No effect
No Action	No effect	No effect	Negative effects	No effect
Modify but all quota changes 60 days prior to fishing year	No effect	No effect	May result in negative effects	No effect

3.0 AFFECTED ENVIRONMENT

The following information contains a description of the existing environment for the snapper grouper fishery. The original Fishery Management Plan (SAFMC, 1983a), original Source Document (SAFMC, 1983b), Amendment 4 (SAFMC, 1991a), and the draft update of the Source Document (SAFMC, in prep.) contain additional information on the fishery and utilization patterns. Appendix D contains the Council's habitat concerns. Table 1 lists species in the management unit according to our knowledge about their spawning stock ratios and Table 2 shows the actual SSR values.

A. Optimum Yield

Optimum yield (OY) is any harvest level for a species which maintains, or is expected to maintain, over time, a survival rate of biomass into the stock of spawning age fish to achieve at least a 30% spawning stock biomass per recruit (SSBR; equivalent to SSR) population level, relative to the SSBR that would occur with no fishing (SAFMC, 1990b).

B. Definition of Overfishing

Overfishing for all species other than jewfish is defined as follows (SAFMC, 1990b):

(i) A snapper grouper stock or stock complex is overfished when it is below the level of 30% of the spawning stock biomass per recruit which would occur in the absence of fishing.

(ii) When a snapper grouper stock or stock complex is overfished, overfishing is defined as harvesting at a rate that is not consistent with a program that has been established to rebuild the stock or stock complex to the 30% spawning stock biomass per recruit level. (Note: For jewfish 40% was used.)

(iii) When a snapper grouper stock or stock complex is not overfished, overfishing is defined as a harvesting rate that, if continued, would lead to a state of the stock or stock complex that would not at least allow a harvest of OY on a continuing basis.

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. Year 1 was the 1991 fishing year. The recovery time period may be modified by the framework (regulatory amendment) procedure. 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.

C. Commercial Fishery

In general, total landings, mean size of fish captured, and nominal catch per trip in the commercial snapper grouper fishery have declined as indicated in the charts that follow. Also, the commercial sector has shifted offshore and changed target species as traditional species became less abundant. In addition, the commercial fishery developed with relatively inefficient hook-and-line gear and then switched to more

TABLE 1. SPECIES IN THE MANAGEMENT UNIT GROUPED ACCORDING TO KNOWLEDGE ABOUT SSR.

SNAPPERS - Lutjanidae

SSR 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*
SSR 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

SSR Estimates Available	
Black sea bass	*Centropristis striata*
SSR Estimates Unavailable	
Bank sea bass	*Centropristis ocyurus*
Rock sea bass	*Centropristis philadelphica*

GROUPERS = Serranidae

SSR 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*
SSR 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*
Wreckfish	*Polyprion americanus*

***These species form the deep water grouper fishery.**

PORGIES - Sparidae

SSR Estimates Available	
Red porgy	*Pagrus pagrus*
SSR 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

SSR Estimates Available	
Gray triggerfish	*Balistes capriscus*
SSR Estimates Unavailable	
Queen triggerfish	*Balistes vetula*
Ocean triggerfish	*Canthidermis sufflamen*

JACKS - Carangidae

SSR Estimates Available	
Greater amberjack	*Seriola dumerili*
SSR 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*

SSR ESTIMATES ARE UNAVAILABLE FOR THE FOLLOWING SPECIES

SPADEFISHES - Ephippidae

Spadefish	*Chaetodipterus faber*

GRUNTS - Pomadasyidae

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*
White grunt	*Haemulon plumieri*
Blue striped grunt	*Haemulon sciurus*

TILEFISHES - Malacanthidae

Blueline tilefish*	*Caulolatilus microps*
Tilefish (Golden)*	*Lopholatilus chamaeleonticeps*
Sand tilefish*	*Malacanthus plumieri*

WRASSES - Labridae

Hogfish	*Lachnolaimus maximus*
Puddingwife	*Halichoeres radiatus*

TEMPERATE BASSES - Percichthyidae (SSR Available)

Wreckfish	*Polyprion americanus*

74 SPECIES

TABLE 2. AREA-WIDE SSR VALUES BY SPECIES WITH AND WITHOUT MINIMUM SIZES. (Bold=Overfished)

	COUNCIL'S	1990 Assessment*		1990 Assessment*		1991 Assessment**		1992 Assessment***		1993 Assessment+	
	OVERFISHED	SSR % w/o Minimum Size		SSR % with Minimum Size		Overall	SSR% with	Overall	SSR% with	Overall	SSR% with
	SSR %	Recreational	Commercial	Recreational	Commercial	SSR %	Minimum Sizes	SSR %	Minimum Sizes	SSR %	Minimum Sizes
I. MINIMUM SIZE = 8" (203 MM) TOTAL LENGTH											
Lane snapper	30%	FL=47-50%	NFL = 47%	31%	47%	58%	59%	58%	63%		
Black sea bass	30%	Car = 15%	CarHLL=39%	30%	47%	34%	48%	29%	38%		
		FL=17-26%	CarTRPS=40%								
II. MINIMUM SIZE = 12" (305 MM) TOTAL LENGTH											
Yellowtail snapper	30%	FL=43-40%	SFL = 42%	56%	55%	38%	55%	19%	28%	24%	30%
Gray snapper	30%	FL=56-29%	NFLHLL=19%	32%	25%	12%	14%	49%	52%	41%	45%
Mutton snapper	30%	FL=49-47%		49%		38%	44%	51%	51%	43%	45%
Vermilion snapper (10" rec. & 12" com.)	30%	Car = 19%	Car=20-28%	30%	25%	23%	28%	20%	27%	16%	27%
		FL=26-19%	FL=17-27%								
Red porgy	30%	Car = 18%	Car = 29%	33%	38%	11%	15%	8%	12%		
		FL=45-19%									
Schoolmaster snapper	30%										
Queen snapper	30%										
Blackfin snapper	30%										
Cubera snapper	30%										
Dog snapper	30%										
Mahogany snapper	30%										
Silk snapper	30%										
III. MINIMUM SIZE = 20" (508 MM) TOTAL LENGTH											
Red snapper	30%	Car = 15%	Car = 24%	33%	40%	8%	34%	13%	35%		
		NFL = 5%	FL=17-55%								
Gag	30%	Car = 19%	Car = 47%	30%	67%	32%	34%	35%	39%		
		FL=32-30%	FL=54-56%								
Scamp (Fork Length)	30%	Car = 18%	Car = 28%	Car = 42%	Car = 50%	28%	42%	20%	30%		
		NFL = 42%	NFL = 49%	NFL = 74%	NFL = 60%						
Red grouper (SAFMC currently 12" TL)	30%	Car = 24%	Car = 34%	FL=51-62%	FL = 37%	41%	50%	61%	68%		
		FL=11-28%	SFLTRP=15%								
			SFLHLL=45%								
Black grouper	30%	SFL = 40%	NFL = 45%	43%	50%	37%	42%	43%	47%		
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%	Car = 17%	27%	27%	43%	79%		51%	62%	45%	54%
		NFL = 18%								New amberjack aging:	
										64%	67%
V. OTHER SPECIES											
Speckled hind	30%	Car = 22%	Car = 37%			25%		12%			
		SFL = 48%	FL=42-45%								
Snowy grouper	30%	Car = 10%	Car = 15%			15%		15%			
			FL=36-40%								
Warsaw grouper	30%		12%			0.2%		6%			
Misty grouper	30%										
Yellowedge grouper	30%										
Golden tilefish	30%		Car=35%			31%		21%			
			NFL=28%;SFL=42%								
VI. SPECIES WITH NO MANAGEMENT											
White Grunt	30%					17%		19%			
Gray triggerfish	30%	Car = 43%	Car = 36%	Car = 44%	Car = 39%	30%		27%			
		FL=22-18%	NFL = 38%	FL= 26-22%							

Abbreviations: FL=Florida; Car=Carolinas; NFL=North Florida; SFL=South Florida, HLL=hook&line,longline; TRP=traps

*1990 Assessment included data from 1972 through 1988/89.

**1991 Assessment applied models to catch data from 1988.

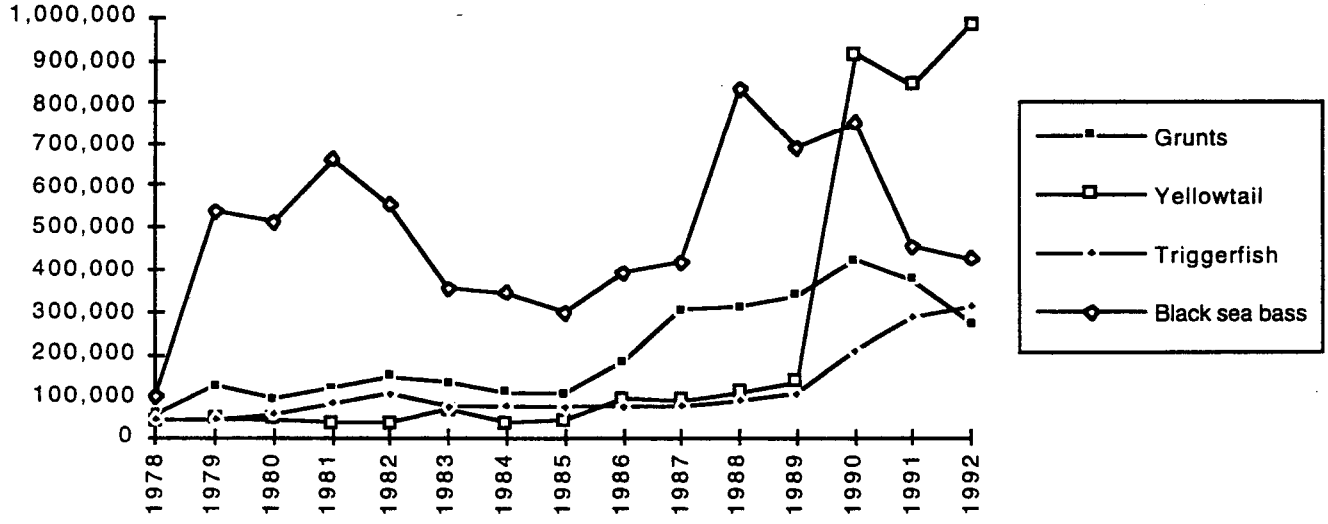
***1992 Assessment applied models to catch data from 1990.

+1993 Assessment applied models to catch data from 1991.

efficient longline and trap gear in order to catch enough fish to operate profitably. In a relatively unexploited fishery, the fish population is high, and use of relatively inefficient hook-and-line gear can result in a sufficient harvest to make a trip economically feasible. However, as exploitation continues, the fish population declines and the poundage produced by hook-and-line gear becomes uneconomical. Fishermen switch to gear (such as longlines and trap gear) that is more efficient at harvesting sufficient pounds when the fish population is reduced. This switch in gear is an indication of high exploitation.

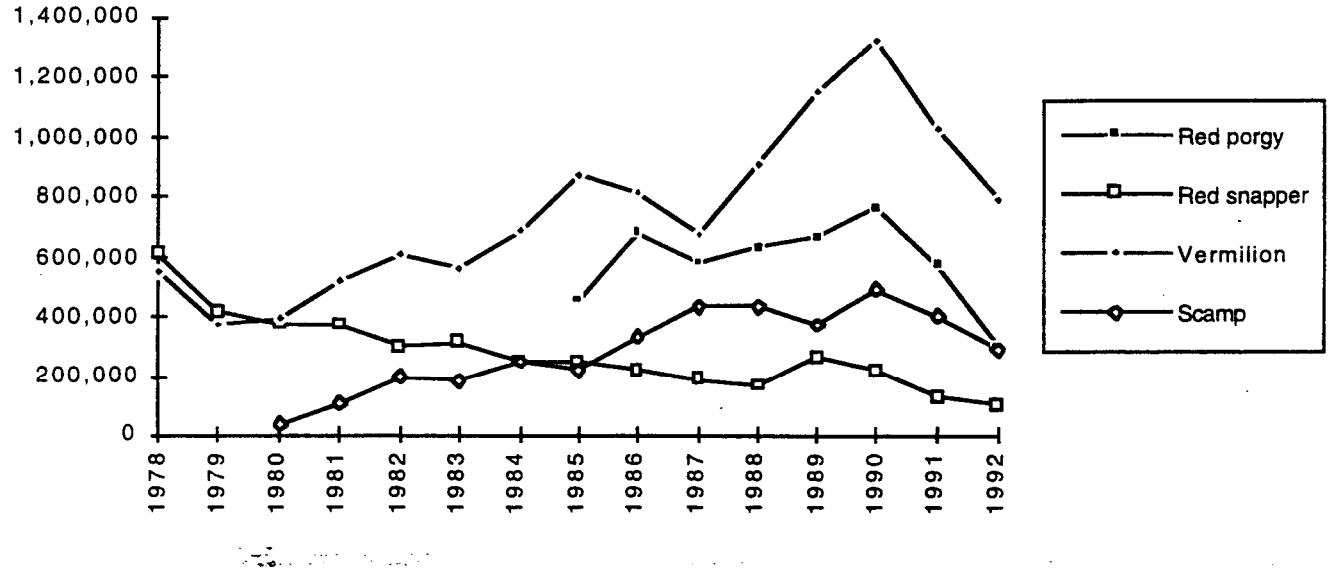
Catches (in pounds) of shallow depth species from 1978 through 1992 are shown below (Source: NMFS & States; see Appendix F). While yellowtail snapper and triggerfish catches have increased since 1989, catches of black sea bass and grunts have declined. Triggerfish were not targeted until recently, and are an example of a species shift due to declines in abundance of more popular species. Yellowtail snapper landings increased in 1990 due to increased fishing effort.

COMMERCIAL HARVEST (POUNDS) OF SHALLOW DEPTH SPECIES



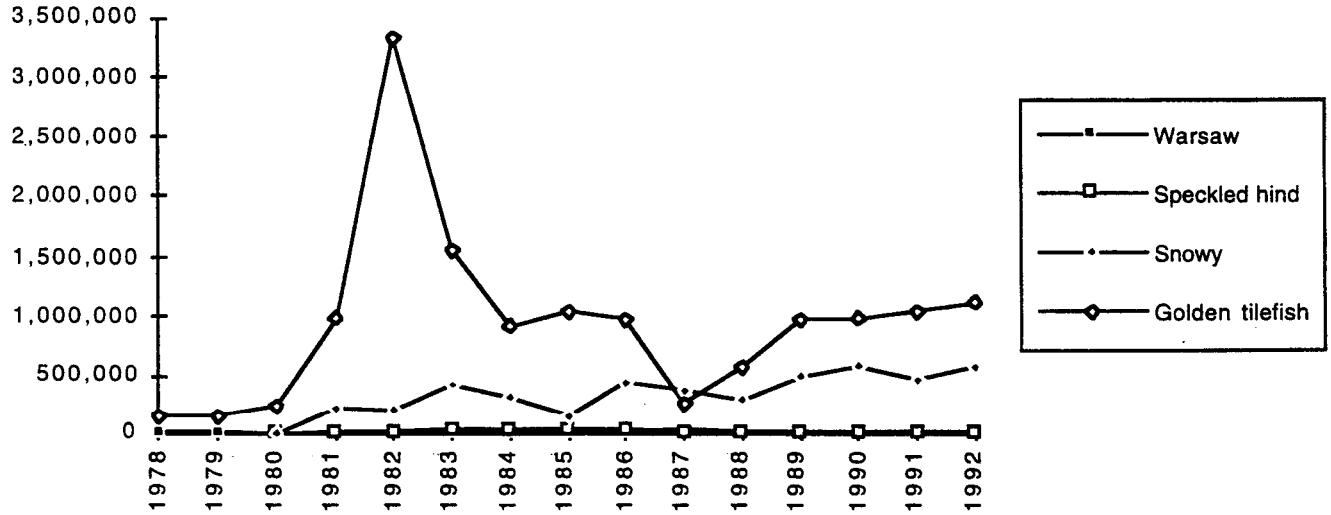
Catches (in pounds) of mid/shallow depth species from 1978 through 1992 are shown on the next page (Source: NMFS & States; see Appendix F). Catches of red porgy, red snapper, vermilion snapper, and scamp have all declined in recent years.

COMMERCIAL HARVEST (POUNDS) OF MID/SHALLOW DEPTH SPECIES



Catches (in pounds) of deep water species from 1978 through 1992 are shown below (Source: NMFS & States; see Appendix F). Catches of golden tilefish peaked in 1982 at almost 3.5 million pounds but have remained around 1 million pounds in recent years. Snowy grouper catches have fluctuated around one-half million pounds recently, and catches of warsaw and speckled hind are rare.

COMMERCIAL HARVEST (POUNDS) OF DEEP WATER SPECIES



Commercial landings and value for 1978 through 1992 are available by state but contain confidential data. Council members and staff have access to confidential data and have viewed this detailed information.

Such detailed information cannot be included in this amendment, but the tables in Appendix F show a summary of landings and value for all states in the south Atlantic region.

D. 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. 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 catches from 1991 are shown in Table 3. Data on recreational catches and impacts of size limits from Amendment 4 are shown in Table 4. A comparison of recreational and commercial catches appears as Table 5a & 5b. The following table compares the proportion of total catch harvested by recreational and commercial fishermen for two time periods for North Carolina, South Carolina, and Georgia combined, and for Florida separately:

COMPARISON OF RECREATIONAL & COMMERCIAL CATCHES

	1988/89		1990/91	
	Million Pounds	Percentage	Million Pounds	Percentage
Commercial				
NC/SC/GA	7.6	62%	8.0	50%
Florida	4.6	38%	8.0	50%
Total	12.2	59%	16.0	77%
Recreational				
MRFSS	6.7	78%	3.6	73%
Headboat	1.9	22%	1.3	27%
Total	8.6	41%	4.9	23%
Grand Total	20.8		20.9	

MRFSS (Marine Recreational Fishing Statistical Survey conducted by the NMFS) data are 1986 numbers of fish multiplied by 1989 headboat average weight of fish. Pounds in 1990/91 are millions of pounds commercial for 1990 (latest year available for catches by gear); MRFSS figures are 1991 catches.

Landings and average weight from the headboat fishery are shown on pages 22-24 (Data supplied by R. Dixon, NMFS Beaufort Lab). Data from 1978-80 for warsaw grouper, scamp, speckled hind, and snowy grouper are not available; black sea bass includes minor amounts (<5%) of bank sea bass

Table 3. Estimated numbers & total weight of fish caught by anglers by species groups and subregion for 1991 Headboat & 1991 MRFSS (Catch type A).

					HEADBOAT*				MRFSS
SPECIES	North Carolina		South Carolina		Florida east coast		TOTAL	TOTAL	TOTAL
	numbers	pounds	numbers	pounds	numbers	pounds	numbers	pounds	pounds
Black sea bass	39,234	15,001	319,002	75,251	148,112	39,582	506,348	129,834	660,790
Epinephelus groupers	1,051	2,286	1,262	1,915	6,942	8,611	9,255	12,812	<66,300
Mycteroperca groupers	22,676	78,030	8,351	29,600	6,576	24,385	37,603	132,015	<66,300
other sea basses	14,095	3,847	33,576	6,176	13,380	2,056	61,051	12,079	<66,300
crevalle jack									209,950
greater amberjack	1,832	15,891	3,800	26,708	3,077	22,488	8,709	65,087	<66,300
other jacks	255	1,265	366	1,712	3,991	8,246	4,612	11,223	90,610
gray snapper	11	15	627	866	29,600	24,531	30,238	25,412	179,010
red snapper	725		3,290	11	9,842	19,635	13,857	19,646	72,930
lane snapper		7,253	25	9,879	59,414	15,539	59,439	32,671	<66,300
vermilion snapper	159,682	182,633	174,055	49,617	266,764	43,440	600,501	275,690	72,930
yellowtail	2	0	114	44	207,374	153,605	207,490	153,649	<66,300
other snappers	3,713	1,944	193	166	22,561	38,190	26,467	40,300	<66,300
pigfish									64,090
white grunts	99,577	94,053	23,247	15,106	114,717	31,124	237,541	140,283	97,240
other grunts	71,324	13,301	80,719	13,127	197,019	26,303	349,062	52,731	33,150
sheepshead									1,365,780
red porgy	68,515	32,138	54,223	26,284	7,141	5,452	129,879	63,874	37,570
other porgies	48,778	23,049	21,274	24,457	29,871	17,712	99,923	65,218	<66,300
hogfish									<66,300
triggerfish & filefish	23,718	34,498	10,267	10,423	53,992	31,056	87,977	75,977	<66,300
TOTAL	555,188	505,204	734,391	291,342	1,180,373	511,955	2,469,952	1,308,501	3,547,050

*Georgia not included in Headboat Survey

TABLE 4. RECREATIONAL CATCHES AND IMPACTS OF SIZE LIMITS.

						% REC CATCH	% HEADBOAT
	MRFSS—1986		HEADBOAT FOR 1989			Below Min Size	Below Min Size
	NUMBERS	WEIGHT(LB)+	NUMBERS	WEIGHT (KG)	WEIGHT (LB)	(1989 Data)	(1989 Data)
I. 8" (203MM) TL							
Lane Snapper	45,000	33,377	140,096	47,134	103,912	FL 0%	0%
Black Sea Bass	1,677,000	1,031,643	808,497	225,603	497,364	NC 17%; SC 16%	9%
						GA 29%; FL 5%	
II. 12" (305MM) TL							
Yellowtail Snapper	278,000	381,329	160,021	99,564	219,499	FL 21%	4%
Gray Snapper	529,000	1,093,472	28,963	27,156	59,868	FL 79%	22%
Mutton Snapper			25,948	48,801	107,587	FL 0%	0%
Vermilion Snapper	56,000	29,348	661,251	157,189	346,539	NC79%;GA100%	86%
Red Porgy	11,000	12,394	146,488	74,865	165,047	NC 44%;SC 80%	40%
Gray Triggerfish (FL)			37,367	38,725	85,373	NC 7%; FL 39%	48%
Schoolmaster Snapper			989	493	1,087		50%
Queen Snapper							
Blackfin Snapper							91%
Cubera Snapper			53	208	459		0%
Dog Snapper							
Mahogany Snapper							
Silk Snapper			3,919	1,241	2,736		92%
Snappers	134,000	64,560	2,082	455	1,003		
Triggerfishes	45,000	102,812					
III. 20" (508MM) TL							
Red Snapper	210,000	633,916	23,453	32,113	70,796	NC 63%;SC100%	81%
						GA100%;FL 85%	
Gag						NC 54%;SC 36%	25%
Scamp (FL)							80%
Red Grouper						NC 73%	46%
Black Grouper							25%
Yellowfin Grouper							100%
Yellowmouth Grouper							
Groupers	156,000	672,371					
Groupers (Epinephelus)			8,516	16,653	36,713		
Groupers (Mycteroperca)			35,248	102,498	225,967		
IV. 28" (711MM) FL							
Greater Amberjack	123,000	2,656,577				NC 5%; FL 0%	63%
V. NO RETENTION							
Nassau Grouper							
Speckled Hind							
Snowy Grouper							
Warsaw Grouper							
Misty Grouper							
Yellowedge Grouper							
Golden Tilefish							
TOTALS	3,264,000	6,711,800	2,082,893	872,698	1,923,950		

% Recreational catch below the minimum size is from 1989 MRFSS data; Roger Pugliese & John Gauvin.

%Headboat catch below the minimum size is from Huntsman & Dixon; NMFS Beaufort Lab.

+Recreational weight from the MRFSS was calculated from MRFSS numbers and Headboat avg. wt.

Total weight for MRFSS include amberjacks with avg. wt. from MRFSS.

TABLE 5a. SUMMARY OF RECREATIONAL AND COMMERCIAL SNAPPER GROUPER CATCH BY GEAR.

	Hand Line+		Elec/Hyd Reel		Rod & Reel		Bottom LL		Fish Traps		Diving		Entanglement Nets		Other gear*		All Gear
	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds
Commercial (1988)																	
NC->GA	3,069,334	41%	66,988	1%	13,479	0%	470,306	6%	553,363	7%	16,239	0%	1,398	0%	3,380,818	45%	7,571,925
Florida	3,219,115	70%	0	0%	0	0%	576,310	13%	410,791	9%	52,122	1%	253,739	6%	84,979	2%	4,597,056
Total	6,288,449		66,988		13,479		1,046,616		964,154		68,361		255,137		3,465,797		12,168,981
Recreational																	
MRFSS**					6,711,800												
Headboat (1989)					1,923,950												
Total					8,635,750												8,635,750
Grand Total	6,288,449		66,988		8,649,229		1,046,616		964,154		68,361		255,137		3,465,797		20,804,731

+Handline includes catches by electric/hydraulic reels.
*Other gear includes catches for which the gear type is unknown as well as catches by other gear types.
**MRFSS=Marine Recreational Fishing Statistical Survey= (1986 MRFSS Number Fish) X (1989 Headboat Average Weight)

TABLE 5b. SUMMARY OF RECREATIONAL AND COMMERCIAL SNAPPER GROUPER CATCH BY GEAR (1990/91).

	Hand Line		Elec/Hyd Reel		Rod & Reel		Bottom LL		Fish Traps		Diving		Entanglement Nets		Other gear*		All Gear
	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds
Commercial (1990)																	
NC->GA	1,500,231	19%	57,981	1%	8,395	0%	696,680	9%	798,279	10%	4	0%	12,754	0%	4,957,047	62%	8,031,371
Florida	3,364,076	42%	428,734	5%	0	0%	481,369	6%	299,389	4%	49,313	1%	320,379	4%	3,038,455	38%	7,981,714
Total	4,864,307	30%	486,715	3%	8,395	0%	1,178,049	7%	1,097,668	7%	49,317	0%	333,133	2%	7,995,502	50%	16,013,085
Recreational (1991)																	
MRFSS					3,547,050												3,547,050
Headboat					1,308,501												1,308,501
Total					4,855,551												4,855,551
Grand Total	4,864,307		486,715		4,863,946		1,178,049		1,097,668		49,317		333,133		7,995,502		20,868,636

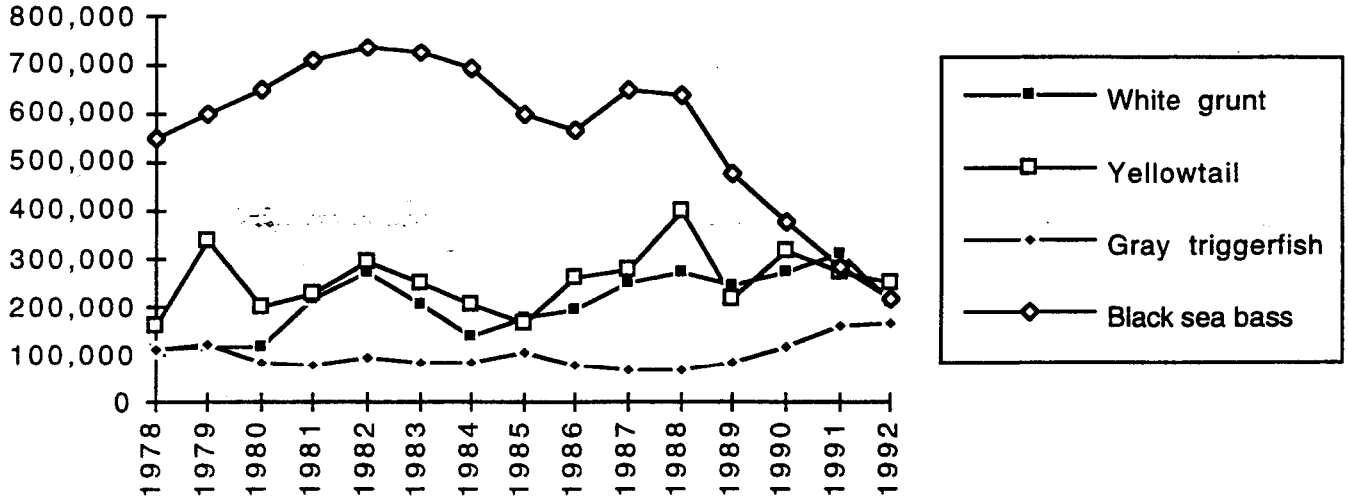
*Other gear includes catches for which the gear type is unidentified as well as catches by other gear types.

SOURCE: MRFSS; NMFS BEAUFORT; NMFS MIAMI

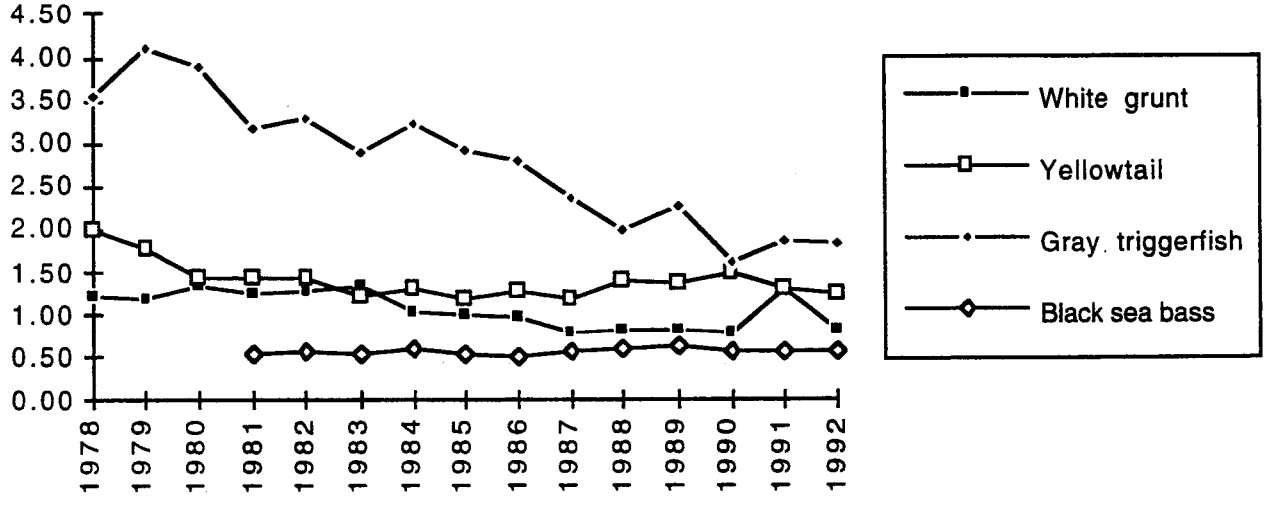
in 1978, 1979, and 1980; and yellowtail catches north of Fort Pierce, Florida were not included in 1978-1980.

Headboat catches of black sea bass have declined from 1982 through 1992 while the average weight declined slightly. Catches for the remaining species have fluctuated but remained relatively constant. The average weight of gray triggerfish has declined from a little over 4 pounds in 1979 to less than 2 pounds in 1992. The average weight of yellowtail declined slightly; however, the average weight of black sea bass remained relatively constant.

HEADBOAT HARVEST (POUNDS) OF SHALLOW DEPTH SPECIES

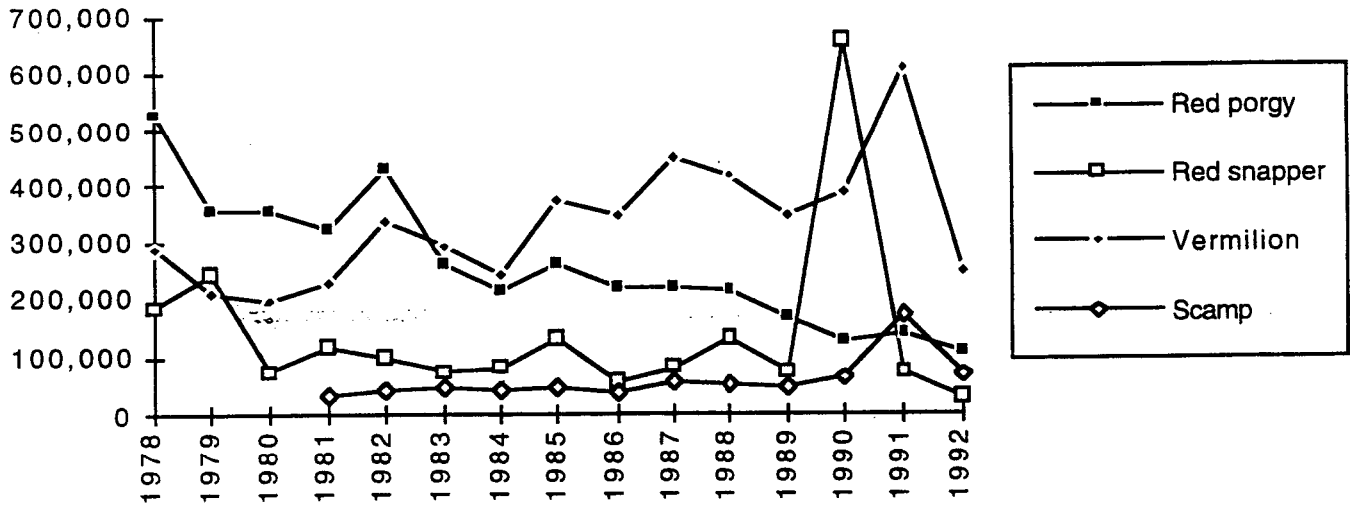


AVERAGE WEIGHT (POUNDS) OF SHALLOW DEPTH SPECIES IN HEADBOAT CATCHES

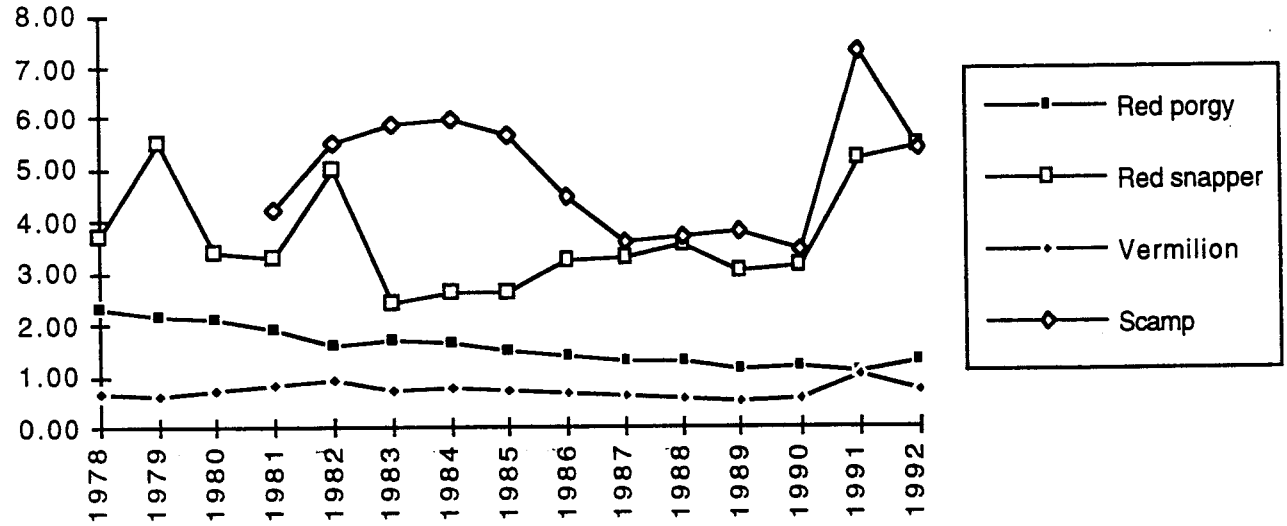


Annual headboat catches and average weight of red porgy have declined over time. Catches of vermilion snapper increased through 1991 but, declined significantly in 1992; average size has been relatively constant, with a slight increase in 1991. Red snapper catches have been relatively constant with the exception of a large increase in 1990; average weight has varied between 2.5 and 5.5 pounds. Catches of scamp have been constant with a slight increase in 1991; average weight has been variable.

HEADBOAT HARVEST (POUNDS) OF MID-DEPTH SPECIES

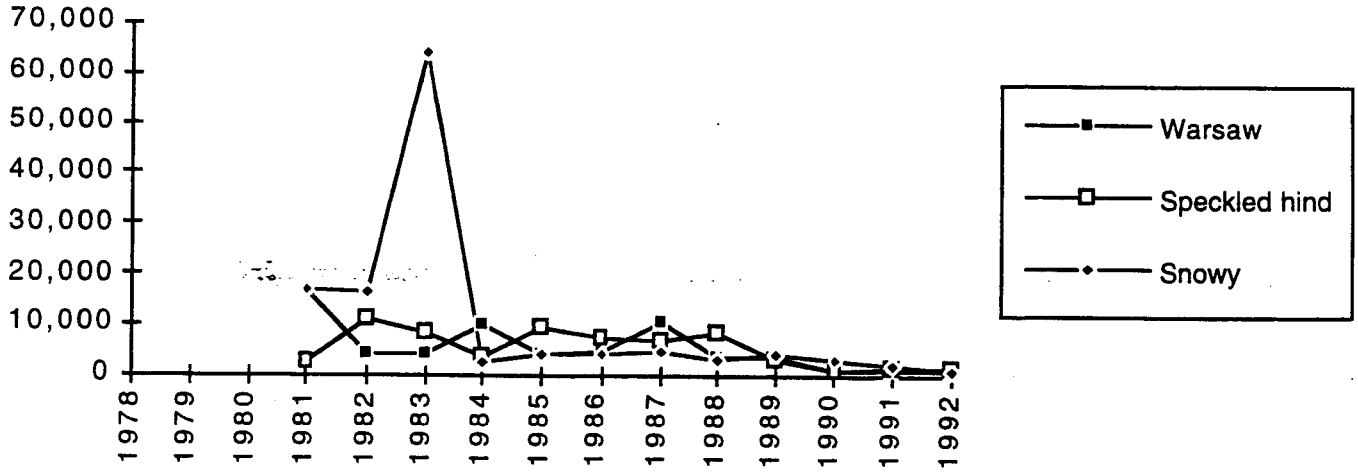


AVERAGE WEIGHT (POUNDS) OF MID-DEPTH SPECIES IN HEADBOAT CATCHES

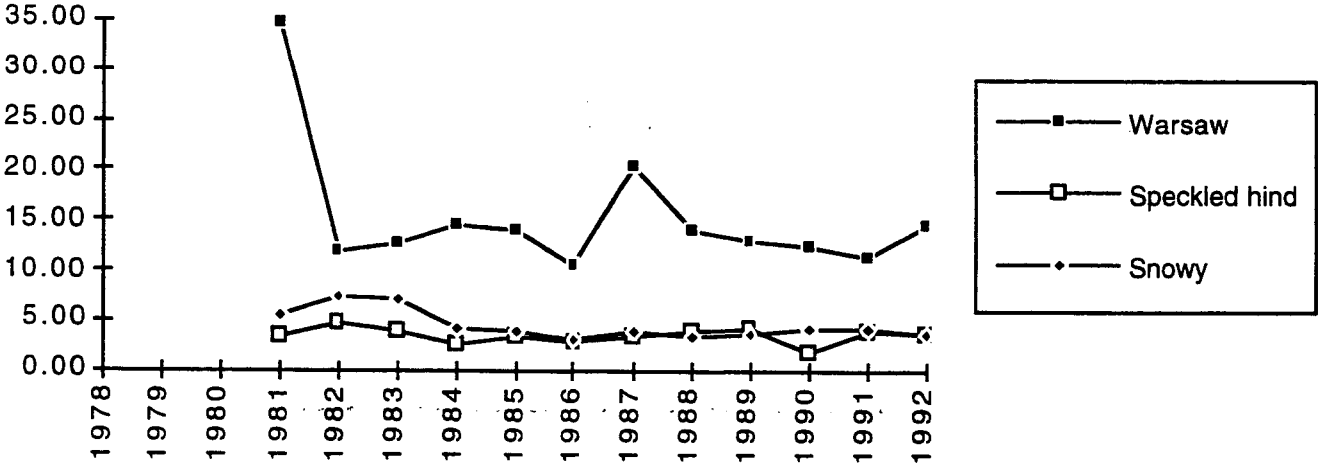


Headboat catches of speckled hind and warsaw grouper have been constant and for the most part less than 10,000 pounds. Average weight of warsaw grouper declined from a high of 35 pounds in 1981 to about 15 pounds in 1992, while the average weight of speckled hind has been relatively constant. Snowy grouper catches increased from less than 20,000 pounds in 1982 to approximately 65,000 pounds in 1983, and then declined to less than 5,000 pounds annually. Average weight declined from slightly above 5 pounds in 1982/83 to between 4 and 5 pounds annually.

HEADBOAT HARVEST (POUNDS) OF DEEP WATER SPECIES



AVERAGE WEIGHT (POUNDS) OF DEEP WATER SPECIES IN HEADBOAT CATCHES



E. Status of the Stocks

Table 2 shows Spawning stock ratios (SSRs), where estimates are available, for key species in the management unit from each of the three stock assessments. (See discussion under "Problems Requiring Amendment 7" for more information on status of the stocks.) Many highly prized species in the snapper grouper complex are overfished as indicated by their SSRs. Examples include red snapper, vermilion snapper, black sea bass, and several groupers.

Spawning stock ratios (SSRs) from the 1992 assessment which includes data through 1990, show that 12 of 19 species have SSR values of less than 30% indicating overfishing; five species have values between 30% and 51%; two have SSR values of 58% and 61% (Table 2). Presently, 12 species (Table 2) are in a documented state of overfishing. Fifteen other species are thought to be overfished. Recreational fishing pressure by private boats will likely continue to increase as the coastal population continues to grow in the south Atlantic. SSR value for mutton snapper, which is included in this amendment, is from the 1993 assessment:

Mutton Snapper	43%
Hogfish	unknown

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.

4.0 ENVIRONMENTAL CONSEQUENCES

A. Introduction

This section is divided into two major parts. The first part addresses management measures and alternatives considered by the Council. The second depicts the consequences of management. The regulatory impact review (RIR) and initial regulatory flexibility analysis (IRFA) analyses are incorporated into the discussion under each of the proposed action items.

The Regulatory Impact Review (RIR) is part of the process of developing and reviewing fishery management plans and amendments and is prepared by the Regional Fishery Management Councils with assistance from the National Marine Fisheries Service, 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 regulatory impact review also serves as the basis for determining if the proposed regulations are major under Executive Order 12866. If the proposed regulations are deemed to have a significant impact on a substantial number of small entities, then an Initial Regulatory Flexibility Analysis (IRFA) must be prepared and incorporated into a joint document that meets the requirements of the Regulatory Flexibility Act (RFA). 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. In as much as Executive Order 12866 encompasses the RFA requirements, the regulatory impact review usually meets the requirements of both.

Each Action is followed by four subheadings: Biological Impacts, Enforcement Impacts, Socioeconomic Impacts, and Conclusion. These are self explanatory with the first three presenting the impacts of each measure considered. The Council's rationale is presented under the heading "Conclusion".

Alternatives that were eliminated from detailed consideration and/or for which no action is being proposed are included in Appendix C. This information is included to provide a complete record of all alternatives considered by the Council during development of Amendment 7. The framework may be utilized in the future to implement a number of these measures.

B. Size Limits

ACTION 1. HOGFISH

Establish a minimum size limit of 12" fork length (FL) for hogfish.

Biological Impacts

J.C. Davis (1976) completed a Master's Thesis on hogfish and the following material is quoted extensively from his work. Hogfish reach a weight of 11.4 kg or 25 pounds (cited from Randall and Warmke, 1967). Approximately 9,900 kg (21,826 pounds) per year are landed commercially in Florida with 7,470 kg (16,468 pounds) landed in 1974 (cited from Snell, 1976). Davis noted that the amount of the

sport catch is unknown, but it certainly exceeds the commercial landings. Recent landings and value information is given in Appendix F and Tables 6-8. The 1992 South Atlantic commercial catch was 89,476 pounds worth $127,042 (Appendix F).

Abstract: "The hogfish, Lachnolaimus maximus (Walbaum), was collected by spearfishing during the 13 months, August, 1973, through August, 1974, from three reef areas near Islamorada, Florida. Distribution, age and growth, survival rate, reproductive biology, and feeding habits of the population were studied.

Mean length at capture was 284 mm for females and 369 mm for males. Hogfish were smaller and younger on the patch reefs than on the outer reefs. Where abundant, they aggregate by size, with a single male being the largest fish present. Age and growth in female hogfish were reliably determined through age group III, using the scale method of ageing. Annuli could not be determined on the male scales. Therefore, males were not aged. Mean back calculated length at ages I-III in females were 265 mm, 317 mm, and 360 mm. Length-weight relations differed with sex; males weighed less than females at a given length. Survival estimates, corrected for rejected females and sexual transformation were S = 0.37 and S = 0.37 $\pm$ 0.04 for Heincke's estimate and Robson/Chapman's estimate.

Hogfish are dichromatic, protogynous hermaphrodites in which transformation of sex, color and morphology coincide. All males are sex-reversed females. Sexual transformation may be regulated by a combination of size and possibly social control, particularly in small and medium size fish. All females eventually transform. Peak spawning occurred in February and March with some spawning occurring from September to April. Fecundity, ranging from 41,061 to 146,813 in 12 females, increased approximately linearly with weight and exponentially with length. Mean relative fecundity was 158.3 ova/g and showed no relation to weight or length.

Hogfish are opportunistic, non-specific predators on hard shelled, sessile, or slow moving organisms, primarily pelecypods and crustaceans. Gut contents, particularly Crustacea and Echinoidea, varied directly with fish size, season, age, and area, but did not vary with sex."

Davis' study area was off Islamorada, Florida between Alligator and Crocker reefs with a water depth between 6 and 18 m (18 and 54 feet). Hogfish were collected by spearfishing, free diving with a Hawaiian sling; SCUBA was not used. The length range of females collected during the study was 149 mm to 542 mm (6-22 in). Only four females less than 190 mm (8 in) were taken. Males ranged from 258 mm to 614 mm (10-25 in). Mean length of all fish was 290 mm (12 in).

Of the females examined, only one showed any indication of sex changes based on examination of the gonads. This fish, 137 mm (5 in) FL was taken from a grass bed in Biscayne Bay. The smallest fish to show any morphological characters of a male was 258 mm (10 in) which showed weak external male characters. The ratio of females to males decreased with length from 89.6:1 between 250 and 299 mm (10-12 in) to 0.25:1 between 500 and 549 mm (20-22 in). No females that exceeded 550 mm (22 in) length were collected during Davis' study period. Length and weight at first maturity for females are approximately 198 mm (8 in) and 140 grams (5 oz). That was the size of the smallest female taken with ovaries near spawning condition. In males, size at first maturity probably coincides with size at sexual transformation. This occurs at no less than 258 mm (10 in) and 350 grams (12 oz), the size of the smallest transforming male. The smallest male taken which had completed sexual transformation was 295 mm (12 in) and 500 grams (18 oz).

A 12 inch minimum size limit would be equivalent to the smallest male that completed sex transformation from Davis' (1976) study. Davis noted that sexual transformation may be regulated by a

combination of size and possibly social control, particularly in small and medium size fish. This size limit would allow fish to grow to a size where they begin to change from females to males based on morphology. Based on examination of gonads, males first mature at 10 inches and females at 8 inches. This size limit corresponds to a fish about age II (mean size at age II - 12.7 inches; Davis, 1976). This option is the most conservative in that it allows females to mature before harvest and allow for females to begin transforming to males.

Enforcement Impacts

A 12" minimum size limit would put hogfish into the 12" grouping thereby not creating another minimum size grouping which reduces confusion and promotes compliance. This option would track the size limit proposed by the Florida Marine Fisheries Commission which will result in compatible state and federal regulations. This is especially important for hogfish because the majority of the harvest is off Florida.

Enforcement costs are expected to be low since fishermen are in favor of the minimum size limit. However, the States of North Carolina, South Carolina, and Georgia will have to implement similar regulations to be compatible so that enforcement can be done dockside.

Socioeconomic Impacts

The 1992 commercial catch by month from the 1992 logbook report (Harris et al., 1993) is shown in Table 6. Approximately half the catch was harvested by hook and line gear and half by divers.

Annual commercial landings of hogfish have increased since 1988 except for 1991 when there was a decrease (Appendix F). In 1992 landings were 100,386 pounds as estimated from the logbook report. Florida accounted for 37%, South Carolina 17%, and North Carolina 46%. Catches in 1992 were distributed equally between hook-and-line and diving gear. Hogfish landings by gear (1988-91) from the general canvass data are shown in Table 7. In Florida where hogfish occurs in shallow waters, spearguns are mainly used to harvest them. In other states, hogfish occur mainly as a bycatch with other species.

Table 6. Commercial hogfish catch (pounds) from the 1992 logbook data.

Hogfish	Monthly Catch ('92 Logbook)
January	6,357
February	4,241
March	2,815
April	3,282
May	8,069
June	17,282
July	12,941
August	7,671
September	11,162
October	8,617
November	12,013
December	5,936
Total	100,386

Table 7. Hogfish commercial landings by gear from 1988-91 (SOURCE: NMFS general canvass data.)

	1988		1989		1990		1991	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Florida								
Fish pots & traps	224	$282	3,185	$4,014				
Unknown	64,002	$96,372	75,305	$110,190	76,056	$117,857	62,710	$97,521
Georgia								
Rod & reel	4	$8	10	$15			28	$21
Unknown							14	$14
South Carolina								
Fish Trawl	47	$77						
Fish pots & traps	19	$30			350	$648		
Hand line	1,219	$1,840	4,400	$6,672	3,011	$4,796		
Bottom longline					277	$556		
Other diving	1,654	$3,358	1,186	$2,935				
North Carolina								
Otter Trawls			4	$6				
Fish pots & traps			143	$22	12,478	$14,329	10,684	$12,407
Other handline	5,518	$6,883	8,862	$11,416	11,032	$13,747	8,170	$10,411
Bottom longline	1,725	$2,331	572	$756	706	$941	572	$803
TOTALS	74,412	$111,181	93,667	$136,026	103,910	$152,874	82,178	$121,177

Recreational hogfish catches are unknown. Catches of wrasse (including hogfish) are shown in Table 8. Some portion of these numbers are hogfish but the actual level is not known. However, hogfish are popular among recreational divers and it is expected that the actual recreational catch exceeds the commercial catch. The bulk of the recreational catch is harvested in Florida.

Table 8. MRFSS Recreational wrasse catches for 1990 and 1991 (SOURCE: MRFSS).

Recreational Wrass Catches (thousands of fish)

	N.Carolina	S. Carolina	Georgia	Florida (EC)	Total
1990					
Other Wrasses*	<30,000	0	0	<30,000	<30,000
1991					
Other Wrasses*	<30,000	0	0	32,000	32,000

*Other Wrasses include the following:

Labridae	wrasse family
Bodianus rufus	Spanish hogfish
Decodon puellaris	red hogfish
Halichoeres bivittatus	slippery dick
Lachnolaimus maximus	hogfish

Appendix H contains SAFMC staff and NMFS analyses done for hogfish (pages 22-26). Across all gear, the 12" size limit would impact 20% of the commercially caught hogfish based on 1991-1992 catches. This would translate into an initial decrease in annual revenues of $23,356. About 23% of the commercial "diving" catch is below 12 inches and 8% of the "other hand lines and spiny lobster traps" catch is below 12 inches. Commercial divers would lose $14,713 in annual revenues. Analyses from the MRFSS data indicate that 45% of the catch is below 12 inches. Approximately 7% of the headboat catch is below this size limit. However, it is not possible to separate recreational hogfish landings from recreational wrasse landings, thus estimates of changes in consumer surplus for the recreational sector resulting from a 12" size limit cannot be calculated. Based on the assumption that recreational landings are higher than commercial landings, decreases in consumer surplus would likely be higher for the recreational sector.

In the short-term, decreases in recreational surplus could exceed that for the commercial sector. Although there is no data to verify that the stocks are currently overfished, the 12" minimum size limit would likely aid recruitment by allowing more females to undergo sex change and become males. This could improve the stock level in the long-term.

Conclusion

There are no regulations in place for hogfish; Florida will disignate hogfish as a "restricted species", establish a minimum size limit of 12" FL, and establish a daily recreational bag limit of 5 hogfish per person, effective July 1, 1994. The advisory panel felt that particularly in Florida, hogfish need to be considered for management due to the declining size at which females change to males. This declining size indicates a high harvest rate.

The information presented above indicate the importance of protecting the stock up to the size at first maturity and/or the size when females begin transforming to males. Failure to protect this sector of the stock could lead to decreased recruitment and would be expected to result in continued growth overfishing.

Rejected Options for Action 1

Rejected Option 1. No action.

Biological Impacts

There are no regulations in place for hogfish. The advisory panel felt that particularly in Florida, hogfish need to be considered for management due to the declining size at which females change to males. This declining size indicates a high harvest rate.

The information presented above indicate the importance of protecting the stock up to the size at first maturity and/or the size when females begin transforming to males. Failure to protect this sector of the stock could lead to decreased recruitment and result in continued growth overfishing and losses due to a lower yield per recruit.

Enforcement Impacts

This option would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement.

Socioeconomic Impacts

This option would forego the long-term benefits that would result from protecting the hogfish resource. Based on the evidence that the size at which sex conversion occurs is declining, it is possible that fishing pressure is driving the average length of individual fish down. If this continues, the percentage of males in the population would decline significantly and recruitment would be affected. In the long-term, producer surplus will decline as catch levels fall.

Conclusion

This option was rejected by the Council because it would not have provided the necessary biological protection and because it would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations. The States of North Carolina, South Carolina, and Georgia would have had to implement similar regulations to be compatible so that enforcement could be done dockside.

Rejected Option 2. Establish a minimum size limit of 10 inches fork length (FL).

Biological Impacts

A 10 inch minimum size limit would be equivalent to the first mature male based on examination of gonads from Davis' (1976) study. This size limit would allow fish to grow to a size where males begin to mature; females begin to mature at 8 inches. However, this size limit is less than the size at which females transform into males which could impact social behavior and reproductive success. This size limit corresponds to a fish about age I (mean size at age I = 10.6 inches; Davis, 1976). This option is less conservative than Option 1 in that it allows females to mature before harvest and corresponds to the size when males first mature but does not protect fish up to the size where females begin transforming to males.

The information presented indicates the importance of protecting the stock up to the size at first maturity and/or the size when females begin transforming to males. Failure to protect this sector of the stock could lead to decreased recruitment and result in continued growth overfishing and losses due to a lower yield per recruit.

Enforcement Impacts

A 10 inch minimum size limit would have put hogfish into the same grouping as vermilion snapper thereby not creating another minimum size grouping which reduces confusion and promotes compliance. This option would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. The States of North Carolina, South Carolina, and Georgia would have had to implement similar regulations to be compatible so that enforcement could be done dockside.

Socioeconomic Impacts

Appendix H contains SAFMC staff and NMFS analyses done for hogfish (pages 22-26). Across all gears, the 10" limit would impact 1% of the commercially caught hogfish based on 1991-1992 catches. The decline in annual producer surplus would be less than $1,200. Analyses from the MRFSS data

indicate that 8% of the recreational catch is below 10 inches. The decrease in annual producer surplus would likely exceed $2,000. None of the headboat catch is below this size limit. Decreases in revenues for both commercial and recreational sectors would be minimal in the short-term. However, if the 10" size limit results in decreased recruitment and overfishing, revenue losses would be large in the long-term.

Conclusions

This option was rejected by the Council because it would not have provided the necessary biological protection and because it would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations.

Rejected Option 3. Establish a minimum size limit of 8 inches fork length (FL).

Biological Impacts

An 8 inch minimum size limit would be equivalent to the first mature female based on examination of gonads from Davis' (1976) study. This size limit would allow fish to grow to a size where females begin to mature; however, males do not begin to mature until reaching 10 inches. This size limit is less than the size at which females transform into males and less than the size at male maturity which could impact social behavior and reproductive success. This size limit corresponds to a fish less than one year old (mean size at age I = 10.6 inches; Davis, 1976). This option is less conservative than Options 1 and 2 in that it corresponds to the size when females first mature but does not protect fish up to the size where males first mature or females begin transforming to males.

The information presented indicates the importance of protecting the stock up to the size at first maturity and/or the size when females begin transforming to males. Failure to protect this sector of the stock could lead to decreased recruitment and result in continued growth overfishing and losses due to a lower yield per recruit.

Enforcement Impacts

An 8 inch minimum size limit would have put hogfish into the same grouping as lane snapper thereby not creating another minimum size grouping which reduces confusion and promotes compliance.

This option would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would have hindered enforcement. The States of North Carolina, South Carolina, and Georgia would have had to implement similar regulations to be compatible so that enforcement could be done dockside.

Socioeconomic Impacts

Appendix H contains SAFMC staff and NMFS analyses done for hogfish (pages 22-26). Across all gears, the 8" limit would not impact any of the commercially caught hogfish based on 1991-1992 catches. Thus, there would be no decline in producer surplus. Analyses from the MRFSS data indicate that none of the catch is below 8 inches. Also, none of the headboat catch is below this size limit. There would be no short-term impact on the recreational sector. A decline in producer surplus should be

expected for the commercial sector and a decline in benefits for the recreational sector in the long-term due to decreased recruitment and growth overfishing.

Conclusions

This option was rejected by the Council because it would not have provided the necessary biological protection and because it would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations.

Rejected Option 4. Establish a minimum size limit of 12" fork length (FL) and include this species in the 10 snapper aggregate recreational bag limit.

Biological Impacts

See Action 1.

Enforcement Impacts

See Action 1.

The bag limit proposed by the Florida Marine Fisheries Commission is 5 hogfish/person/day and is scheduled to become effective July 1, 1994. The Council's proposal was to include hogfish in the 10 snapper aggregate bag limit recognizing that hogfish are not snappers but are a wrasse. This may have resulted in some confusion and some difficulty in enforcement.

Socioeconomic Impacts

See Action 1.

Conclusion

The Council included the size limit portion of this option as the proposed action (see Action 1) but rejected the bag limit portion because of the inconsistency with the State of Florida. The framework will be used to implement a bag limit if it becomes necessary in the future.

ACTION 2. MUTTON SNAPPER

Increase the mutton snapper minimum size limit from 12" to 16" TL.

Biological Impacts

A 16 inch TL minimum size limit would be equivalent to the size at sexual maturity (Druzhinin, 1970). This size limit corresponds to a fish about age III/IV (Gene Huntsman, NMFS Beaufort Laboratory, Appendix I). This option would provide protection until individuals reach the size of sexual maturity and would have positive benefits on the mutton snapper resource in terms of increasing yield-per-recruit and recruitment.

The following information is directly from the 1993 stock assessment; figures referenced are contained in the assessment (Huntsman et al., 1993a):

> "The catch of mutton snapper (Figures 16, 17, and 18) increased 31 percent by number (182,090 to 238,619) and 52 percent by weight (267,740 to 408,656 kg) from 1990 to 1991. The 1991 catch was more like that in 1988 when 230,388 fish weighing 356,878 kg were taken. The average weight increased markedly from 1988 and 1990 (1.55 and 1.47 kg) to 1.71 kg in 1991. Substantial landings

from the Dry Tortugas area, probably the Riley's Hump spawning aggregation, are most likely responsible for the increase.

Based on samples from 1991, F on fully recruited age classes over the entire south Atlantic range of mutton snapper was 0.14 while the estimate for 1990 was 0.12 and for 1988 was 0.17. SSR was 0.43 for 1991, 0.51 for 1990, and 0.38 for 1988. For the three years examined the estimates of F and SSR appear reasonably consistent, and all estimates are above the overfishing criterion. Because many fishermen apparently believe that the mutton snapper population is in worse condition than the estimates of SSR (relative to the overfishing criterion) indicate, we explored, further (Huntsman et al., 1992) the possibility that misrepresentative (over) sampling of large old fish caused low estimates of F and high estimates of SSR. The distribution by numbers of catch at age (Figure 18) showed for 1991, as did the distribution for 1990, a secondary mode at about 7 years (500-700 mm fork length). Fishermen reportedly fish the Riley's Hump spawning aggregation heavily, and those catches could cause the apparently disproportionate contribution of old fish. Also catches from the Riley's Hump area were selected preferentially for length sampling (Ed Little, NMFS, Key West, FL personal communication).

We attempted to remove the apparent effects of the spawning aggregation by deleting all samples from the commercial catch that came from Dry Tortugas during May and June, the principal spawning months. Visual inspection of the resulting distribution showed little change resulting from the deletion. Subsequently we segregated all Dry Tortugas commercial records and calculated F and SSR separately for the Dry Tortugas and for the remainder of the region. This segregation of data by area also had little effect, apparently because the MRFSS samples also display the secondary mode and represent a major part of the catch (50 percent by number).

Separating length samples from the Dry Tortugas in the MRFSS records from other lengths from Monroe County, FL is probably impossible.

Without the Dry Tortugas commercial records, F for the region is estimated at 0.14 and existing SSR at 0.42 (compared to F = 0.14, SSR = 0.43 with the Dry Tortugas lengths included). Mutton snapper in the Dry Tortugas catches are substantially larger than those in catches from the Keys year around, and fish taken during the spawning season in the Tortugas do not differ appreciably in size from those taken there in the remainder of the year. Based on samples from the Dry Tortugas, F on fully recruited ages was much higher (0.63) than the apparent F elsewhere (0.14) but the SSR (0.42) was almost identical despite the high F, because the apparent F on young fish (< age five) was very low.

Based on the computations of F and SSR for 1991 and for the entire region the 12 inch size limit will result in an SSR of 0.45. Allowing F approximately to double and establishing a size limit of 20 (19.30) inches will allow a 42 percent gain in yield per recruit and an SSR, at equilibrium, of about 0.64.

None of the estimates of SSR for mutton snapper suggests that the population is overfished. Thus either the general opinion of the stock status is wrong, the estimates of SSR are wrong, or the criterion designating overfishing (SSR < 0.30) is set improperly low. Understanding the confusing pattern of sizes of mutton snapper requires greater knowledge of the distribution of the species by age, of the relationship and distribution of subunits of the population, and possibly of the species' spawning behavior."

Enforcement Impacts

A 16 inch minimum size limit will create another minimum size grouping which may in the short run create some confusion; however, this option would track the size limit proposed by the Florida Marine Fisheries Commission which will result in compatible state and federal regulations. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Enforcement of the size limit and public education will have to be emphasized because 24% of the 1991 recreational catch and 10% of the 1992 recreational catch was below the existing 12" size limit based on MRFSS data (Huntsman et al., 1993b). From headboat catches, approximately 2% of the 1991 and 1992 catch was below the 12" size limit. Commercial landings below the size limit were 1% in 1991 and 3% in 1992.

Socioeconomic Impacts

The 1992 catch by month are shown below from the 1992 logbook report (Harris et al., 1993) and from NMFS general canvass data:

Table 9. Commercial mutton snapper catch (pounds).

Mutton Snapper	Monthly Canvass ('92)	Catch Logbook ('92)
January	23,376	3,857
February	20,507	2,075
March	24,290	4,447
April	26,775	10,912
May	32,866	17,940
June	44,829	32,315
July	29,567	18,408
August	15,824	15,483
September	12,918	14,116
October	16,579	23,168
November	20,226	2,770
December	24,751	16,273
Total	292,508	161,764

Mutton snapper catches during 1992 were predominantly from Florida as shown by the logbook data (Harris et al., 1993: Florida 95%; Georgia and North Carolina 2%; and South Carolina 1%).

Waters (1993) predicted that a 16" size limit would initially reduce commercial landings and producer surplus by approximately 12% and 8% respectively (Appendix J). Commercial landings would only increase in the long-term for release mortalities of 10% or less and this would depend on the discount rate. With a 10% discount rate, a positive net present value could only be realized in the long-term if there is no release mortality. The predicted change in net present value over 20 years was $35,200 (0.6%). Release mortalities of 10% and above yielded negative net present values at a 10% discount rate.

One important factor is that the 10% discount rate does not reflect the current market rate. When a discount rate of 4% (which is a better reflection of the current market rate) was used, the net present value, given a 16" minimum size limit and a 10% release mortality, was $81,700. This result shows that some positive benefits could accrue in the long-term with low release mortalities.

Appendix H contains SAFMC staff and NMFS analyses done for mutton snapper (pages 1-5). Across all commercial gears, a minimum size limit of 16" would reduce the catch by 17%. This would result in a decrease in producer surplus of $63,220 in the first year based on the value of 1992 landings. MRFSS catches would be reduced by 57% with a 16" size limit. Impacts to headboat catches would be a reduction of 30% at a size limit of 16".

The proposed increase in size limit would initially reduce the weight and numbers of mutton snapper caught by recreational fishermen by approximately 18% and 45% respectively (Waters, 1993). However, the numbers of mutton snapper caught by recreational fishermen, including those that might be caught more

than once, would increase in the long-term assuming that recruitment is increased from the additional protection afforded by the larger minimum size limit. There would be some loss in producer surplus for both sectors (as stated above) in the short-term. If release mortality is low, producer surplus would increase in the long-term as the stock rebuilds. With sustained optimum harvest level, the long-term increases would more than compensate for the short-term losses.

Conclusions

The advisory panel suggested that the limit should be bigger than 12" but 20" is too big; around 16" would be good in their opinion. They also suggested the Council prohibit all harvest during the spawning season (May and June). The 20" would be fine in north Florida because they do not see any small mutton snapper in north Florida; in fact, very few mutton snapper are harvested north of Florida. They felt a new size grouping at 16-17" would probably be better and also felt that there may be other species (e.g., red snapper and red grouper) that could be included. The plan development team (PDT) noted that there is a high release survival rate and larger size limits should be evaluated (e.g., 16" and 20"). The PDT felt that a spawning closure should also be evaluated.

The Council is concerned about the status of the mutton snapper stock and the inconsistency relative to this stock expressed between scientists and fishermen. In addition, the harvest during spawning and prespawning seasons and areas is of concern given the stock declines that have occurred in other fisheries (e.g., Nassau grouper). The Gulf Council prohibits any harvest from Riley's Hump off southeast Florida during May and June (beginning in 1994) to protect aggregations of spawning mutton snapper (GMFMC, 1993). This will provide protection to the mutton snapper stock beginning May/June 1994 and will provide for some protection within the South Atlantic Council's area of jurisdiction given the likely mix of stocks between the Gulf and south Atlantic.

However, the Council remains concerned about the status of mutton snapper and concluded that additional management is necessary in order to protect the mutton snapper resource in the south Atlantic. This is especially true given the uncertainty about the current stock status. Also, the larger minimum size limit will increase yield-per-recruit and should enhance recruitment.

Rejected Options for Action 2

Rejected Option 1. No action.

Biological Impacts

This option would continue the 12" TL size limit, the 10-snapper aggregate bag limit and limitation to the bag limit during May and June included in Amendment 4. The 1992 stock assessment concluded that... "Estimated F declined from 0.17 to 0.12 (29 percent) and estimated SSR increased from 0.38 to 0.51 (34 percent). Thus the SSR not only remained above the level designating overfishing, but actually increased. As discussed in the assessment based on data from 1988, the optimistic evaluation of the condition of the mutton snapper population does not agree with the observations of many well informed observers although

commercial catches remain near the mean for the period 1972 through 1988." The 1993 stock assessment estimated a SSR of 43%, between the prior two estimates.

Mutton snapper mature at 16" (Druzhinin, 1970) and the existing 12" size limit (no action) would continue to allow harvest of non-mature fish which could negatively impact recruitment and result in continued growth overfishing.

Enforcement Impacts

Compliance with the 12" size limit has not been high; 24% of the 1991 recreational catch and 10% of the 1992 recreational catch was below the existing 12" size limit based on MRFSS data (Huntsman et al., 1993). From headboat catches, approximately 2% of the 1991 and 1992 catch was below the 12" size limit. Commercially, these figures were 1% in 1991 and 3% in 1992.

This option would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. This was especially important for mutton snapper because the majority of the harvest was off Florida.

Socioeconomic Impacts

This option would continue the 12" TL size limit, the 10–snapper aggregate bag limit and limitation to the bag limit during May and June. Waters (1993) showed that only small increases in the net present value of producer surplus would be obtained with a 12" TL minimum size limit. The model predicted that with a 10% discount rate and no release mortality, the 14" and 16" TL size limit would yield higher net present values ($91,000 and $35,200) respectively, compared to the net present value for 12" TL minimum size limit ($34,700). Also, with the same discount rate and with 10% and 25% release mortalities, the net present values for 14" minimum size limit would be higher than that for 12" minimum size limit. Thus, there would be efficiency loss in maintaining the 12" minimum size limit. In addition, commercial catch across all gear would be reduced by 17% when compare to a 16" size limit. This could mean significant reduction in producer surplus to fishermen with no apparent long-term benefit. The 12" size limit would reduce short-term losses in pounds and numbers of mutton snapper kept by recreational fishermen because fewer fish would be protected by the size limit.

Conclusions

This option was rejected by the Council because it would not have provided the necessary biological protection needed and because it would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations.

Rejected Option 2. Increase the minimum size limit (evaluate 16", 17", 18" and 20").

Biological Impacts

The Council's preferred option is a 16" size limit. Size limits of 17", 18" or 20" would provide more biological protection given that mutton mature at 16". The 1993 stock assessment concluded that a 20" size limit and allowing fishing mortality to double, would result in a 42% increase in yield per recruit and a SSR of around 64%.

Enforcement Impacts

This option would not track action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Enforcement of a size limit and public education would have to be emphasized because 24% of the 1991 recreational catch and 10% of the 1992 recreational catch was below the existing 12" size limit based on MRFSS data (Huntsman et al., 1993). From headboat catches, approximately 2% of the 1991 and 1992 catch was below the 12" size limit. Commercially, these figures were 1% in 1991 and 3% in 1992.

Socioeconomic Impacts

Using a 10% discount rate, a 16" size limit would yield a net present value of $35,200 when there is no release mortality (Appendix J). With a release mortality of 10% and above, and 10% discount rate, the net present values obtained were negative over a 20–year period. At the same discount rate, 18" and 20" size limits produced only negative net present values over a 20–year period. Thus, the results show that size limits or 18" and 20" would not be beneficial to fishermen. However, it should be noted that the model assumes constant recruitment which underestimates benefits because the size limit should increase recruitment.

Appendix H contains SAFMC staff and NMFS analyses done for mutton snapper (pages 1-5). Across all commercial gears, a minimum size limit of 20" would reduce the catch by 26%. This would result in a decrease in producer surplus of $96,687 in the first year based on 1992 value of landings. Commercial catch reductions for 18", 17", and 16" size limits would be 20%, 18%, and 17% respectively. The loss in producer surplus in the first year would be $74,375, $66,937, and $63,220 respectively. MRFSS catches would be reduced by 71% at 20" and 18" size limits, and 61% at 17" and 57% at 16" size limits. Impacts to headboat catches would be reductions of 56%, 44%, 37%, and 30% at size limits of 20", 18", 17", and 16" respectively.

Conclusions

The Council accepted the 16" size limit (see Action 2) but the others in this option were rejected by the Council because they would have caused greater economic impacts on the users of the resource. Also, they would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations and because of the negative impacts to fishermen.

Rejected Option 3. Prohibit possession during the spawning season (May and June).

Biological Impacts

The relationship between spawning season and landings of selected reef fishes was analyzed by Burton (1991):

> "Mutton snapper have been observed spawning in groups (Thompson and Munro 1974), and the spawning season has been reported as July-August in U.S. waters (Jordan and Evermann 1922). Erdman (1977) reported the capture of ripe females in March in the northeastern Caribbean. South Atlantic headboat survey personnel have observed ripe females in the southeast Florida area in late March-early April (Pamela Washnock, personal communication).

Headboat catches of mutton snapper in southeast Florida fluctuate greatly in both numbers and weight of fish caught by month but there are definite peaks. Increased catches start in March and continue through July in most years, but until September in some (Fig. 1). Effort is highest March through July most years, with a peak in April and a second smaller or equal peak in July (Fig. 1a, 1b). Florida Keys headboats have their greatest landings in February and March (Fig. 2). By percentage as well annual landings for southeast Florida headboats start to increase in March, peak in July and then subside (Fig. 3). Headboats in the Florida Keys take the largest percentage of the annual catch from December through March, with a peak in February (Fig. 4). These four months account for almost 57 percent of the annual catch. Effort in the Florida Keys is highest January through April (Fig. 4a, 4b) with these four months accounting for 49 percent of annual effort. Mean percent of annual effort is highest (13 percent) in March.

Commercial landings from southeast Florida increase from March through September and peak usually during July or August (Fig. 5). commercial landings from the Florida Keys increase beginning in March, and usually peak in April or May (Fig. 6). By percentage commercial landings for southeast Florida (Fig. 7) gradually increase from a March percentage of five percent to a high of 12 percent in June, and then fluctuate at about 10 percent for the rest of the year. Florida Keys commercial catches increase by percentage beginning in March, rise to 20 percent of annual landings in June and then subside.

Both scientific observation and anecdotal information show mutton snapper to aggregate during spawning. The literature indicates spawning occurs from March through August. A large percentage of annual landings do occur during these months. Headboat effort is highest during these months of peak landings in both southeast Florida and the Florida Keys."

Currently all fishermen are limited to the 10-snapper aggregate bag limit during May and June in order to provide protection during the period of high catches during the mutton snapper spawning season. Prohibiting possession during May and June would provide additional biological protection because large catches are possible under the 10-snapper aggregate bag limit.

Enforcement Impacts

This option would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would have hindered enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Socioeconomic Impacts

Burton's (1991) report indicates that commercial landings in south east Florida usually increase from March through September, with peak landings occurring in July and August. Twelve percent of the annual landings is in June. In the Florida Keys, 20% of the annual landings is in June. Recreational catches increase from March through July in southeast Florida and the Florida Keys. A prohibition on possession during May and June would reduce both commercial and recreational catches significantly. Current stock assessment information do not indicate that the stock needs this kind of protection. In fact, fishing mortality is reported to be lower and SSR has increased. Recruitment has also improved. The prohibition would put unnecessary burden on fishermen as their producer surplus would decline by approximately $75,000 due to foregone catches.

Conclusions

Currently all harvesters are limited to the snapper aggregate bag limit of 10 (includes all snapper species except vermilion and a maximum of two red snappers) during May and June that was established in Amendment 4. This became effective January 1, 1992. Further, charter/head/excursion boats have multi-

day limits—provided the vessel has two licensed operators and passengers are issued receipts, charter/headboats may possess two bag limit on trips that span more than 24 hours and excursion boats may possess three bag limits on trips that span at least three days and more than 48 hours.

The Gulf Council, in Amendment 5 to the Reef Fish FMP (GMFMC, 1993), closed Riley's Hump to all fishing activity during the months of May and June; this will become effective in 1994. The Gulf Council's action will protect the known spawning aggregation around Riley's Hump.

This option was rejected by the Council because it was not necessary at the time and because it would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations. If the Council needs to modify its position in the future, the framework (regulatory amendment) process will be used.

Rejected Option 4. Remove the multi-day bag limits for charter/head/excursion boats.

Biological Impacts

This option would provide additional biological protection by reducing high catches by these boats that were reported to the Council.

Enforcement Impacts

This option would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would have hindered enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Socioeconomic Impacts

The impact of this option would be felt most by the headboat sector. However, there is no evidence to indicate that such an action would cause them to lose clientele for long–range excursion trips. In order to make enforcement more cost effective, the multi–day limit is being addressed collectively for all species (see discussion under socioeconomic impacts in Action 11).

Conclusions

One advisory panel member has pointed out that the multi-day limit allows these users to harvest large numbers of mutton snapper, particularly during the spawning season. Some of these fish are then sold. Rejected Option 3 above would have prohibited all harvest during the spawning season.

In the development of Amendment 4, these headboats indicated that they needed the multi-day limits in order to book extended trips. If anglers could only harvest the bag limit, they would not take the longer trips and the headboat sector would have been negatively impacted. The Council rejected this option in order to address the multi-day limit collectively for all species (see Action 11).

Rejected Option 5. Prohibit sale of mutton snapper during the spawning season.

Biological Impacts

This may have removed some of the incentive to harvest large numbers of mutton snapper during the spawning season under the recreational catch limits (including the multi-day limit). If harvest declined, some additional biological protection would have been provided.

Enforcement Impacts

This option would not track action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Socioeconomic Impacts

This option would prevent commercial fishermen from catching approximately 20% of their annual catch unless they are able to makeup for it before or after the prohibition. This would account for approximately $74,375 of their annual producer surplus and would impose some hardship on them. Recreational fishermen would also have to forego some reduction in their annual catch. This could be as high as 25%.

Conclusions

This option was rejected by the Council because it would not have tracked action by the Florida Marine Fisheries Commission which would have resulted in inconsistent state and federal regulations and because the Council concluded that this measure caused large socioeconomic impacts and was not necessary to protect the mutton snapper resource.

Rejected Option 6. Increase the minimum size limit to 20" and establish a daily recreational bag limit of 2 mutton snapper for recreational fishermen.

Biological Impacts

This option would provide more biological protection than the preferred action. The 1993 assessment (Huntsman al., 1993) concluded that, "Allowing F approximately to double and establishing a size limit of 20 (19.3) inches will allow a 42 percent gain in yield per recruit and an SSR, at equilibrium, of about 0.64."

Enforcement Impacts

This option would not track action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Socioeconomic Impacts

Table 10 shows the effect bag limits are expected to have on catches in Florida where the bulk of the catch occurs. A two fish bag limit would not significantly affect harvest (approximately a 6% reduction in expected catch). Catches in Florida will be reduced by 6%.

The 20" size limit would reduce commercial catch by 26%, resulting in a decrease in producer surplus of $96,687 in the first year based on 1992 values of landings. Recreational catches would be

reduced by 71% with a 20" minimum size limit which would have a large impact on recreational fishermen, particularly headboat fishermen (Appendix H).

Conclusions

This option was rejected by the Council because it would not have tracked action by the Florida Marine Fisheries Commission which would have resulted in inconsistent state and federal regulations and because the Council concluded that this measure caused large socioeconomic impacts and was not necessary to protect the mutton snapper resource.

Table 10. Percentage reduction in recreational harvest with a given bag limit for the Florida East Coast. (Source: Dr. Robert Muller, Florida Marine Research Institute.)

Bag Limit	% Reduction
1	26%
2	6%
3	2%
4	2%
5	1%

Rejected Option 7. Increase the existing minimum size limit of 12" by 2"/year and monitor.

Biological Impacts

Mutton snapper mature at 16" (Druzhinin, 1970) and increasing the existing 12" size limit by 2"/year would continue to allow harvest of non-mature fish which could negatively impact recruitment.

Enforcement Impacts

This option would not track action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Socioeconomic Impacts

This action would lessen the short-term impact on fishermen because it would give them time to adjust to the annual stepwise increase in minimum size. Lost revenues to fishermen would not be significant in the short-term, but the stock could decline due to poor recruitment. This could result in declining catches in the medium-term before recruitment increases in the long-term. Revenue losses in the short-term are expected to be minimal.

Conclusions

This option was rejected by the Council because it would not have provided the necessary biological protection needed would have been confusing to fishermen and would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations.

Rejected Option 8. Recreational bag limit of 1/day all year.

Biological Impacts

This option would decrease the recreational catch by 26% (Table 10) and would provide additional biological protection.

Enforcement Impacts

This option would not track action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Socioeconomic Impacts

The 26% reduction on harvest by recreational fishermen would have large but unquantifiable impacts on this user group. This would impact recreational catches, particularly headboats, causing a decrease in benefits.

Conclusions

This option was rejected by the Council because it would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations and because additional impacts on the recreational fishery are not warranted.

Rejected Option 9. Repeal limiting commercial fishermen to the bag limit during May & June.

Biological Impacts

This option would reduce the biological protection provided by increasing fishing mortality during May and June. If the stock is declining as some fishermen contend, further declines would be expected. If, on the other hand, the stock is not overfished at this time, additional fishing effort during the spawning season may cause stock declines or the stock may not be impacted at all. This reflects current uncertainty about stock status.

Enforcement Impacts

This option would not track action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Socioeconomic Impacts

This option would increase short-term catches to commercial fishermen. If the stock is in decline, such short-term benefits would be at the expense of potential long-term benefits that could result through conservation measures. Given that this period accounts for up to 25% of the annual commercial landings, producer surplus could increase by as much as $75,000 annually in the short-term, but this would be at the expense of a reduction in recruitment.

Conclusions

This option was rejected by the Council because it would not have provided the biological protection needed to ensure sufficient recruitment in the face of uncertainty and because it would not have tracked

action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations.

Rejected Option 10. In addition to the 16" TL size limit, establish a daily recreational bag limit of 2-mutton snapper for recreational fishermen.

Biological Impacts

A 16" TL minimum size limit would be equivalent to the size at sexual maturity (Druzhinin, 1970). This size limit corresponds to a fish about age III/IV (Gene Huntsman, NMFS Beaufort Laboratory, Appendix I). This option would provide protection up until the size of sexual maturity.

Enforcement Impacts

This option would not track action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations which would hinder enforcement. This is especially important for mutton snapper because the majority of the harvest is off Florida.

Socioeconomic Impacts

A 16" size limit would reduce the recreational catch by 57%. This would result in a decrease in benefits of over 50%, particularly for headboats. In addition, the 2-fish daily recreational bag limit will reduce catch by 6%. This action would impact headboats adversely. Loss in benefits would be large.

Conclusions

The minimum size limit portion of this option is the preferred position (see Action 2); however, the bag limit was rejected by the Council because it would not have tracked action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations and because of the impacts on the recreational fishery.

C. Permits

ACTION 3. DEALER PERMITS

Require all dealers who want to receive species in the management unit taken from the Exclusive Economic Zone (EEZ) to obtain a federal dealer permit. Dealers who handle these fish must fill out reports as required. Requirements for a federal dealer permit are that the applicant possess a state dealer's license, and that the applicant must have a physical facility at a fixed location in the state wherein the dealer has a state dealer's license. A fee will be charged to cover the administrative costs of issuing federal dealer permits. To purchase fish harvested in the EEZ from a fisherman, a person or a business (including a restaurant) must have a federal dealer permit.

Fish taken from the EEZ may only be sold to federally permitted dealers. For species managed with a quota, 100% of dealers are required to report.

Biological Impacts

Dealer permits will assist in tracking quotas effectively. The accuracy of quota tracking should be improved with dealer permits because reporting requirements can be better enforced, thereby reducing the likelihood of quota overruns. Dealer permits should make monitoring of logbook reporting more feasible

and should improve data on catch per fishing firm such that data would be more accurate for future allocation or verification of initial allocations under controlled access. If a state currently receives such data from dealers, it is not the Council's intent to establish a duplicate reporting system.

Enforcement Impacts

Dealer permits should increase compliance with quota management. Dealer permits should increase our ability to track quotas accurately and provide inducements for dealers to report quota busting infractions. Because dealers will be required to send in reports as part of the tracking system for quotas, requiring a permit will give management something that can be revoked for serious non-reporting incidents or other infractions. The requirement that dealers have a physical facility in a fixed location will help enforcement officers define the universe of fish houses and other establishments authorized to purchase fish from these fishermen.

This option also tracks the current dealer permit requirement in the wreckfish fishery as implemented in Amendment 5 (SAFMC, 1991b).

Socioeconomic Impacts

The measures in Amendment 6 (SAFMC, 1993) should improve the quality and value of fish sold to dealers and hence to consumers because of the control on fishing activities through effort limitation (trip limits and quotas). By preventing or restricting fishermen from engaging in intense fishing activities over a short time period within a fishing season, the quality of their products would improve through fishing efficiency and better handling. Assuming that the demand for species in the management unit is high and that the price of fish is also directly related to its quality, prices offered to harvesters would likely be higher. As such, dealers will charge higher prices to consumers. This will result in both increases in producer surplus and net profits to harvesters and dealers respectively. If the prices dealers charge consumers are high enough, these will offset the cost of the permit to dealers. In the long-term, the consistent supply of good quality products would be predictable and dealers can have more confidence in making investment decisions. Due to lack of data on changes in the market, it is not possible to predict the magnitude of the change in producer surplus to fishermen and the change in net profits to fish dealers. The provision of dealer permits would improve the data collection process, but will increase enforcement costs because of the universe of fish dealers (vendors, supermarkets, retail seafood markets, etc.).

Conclusion

The Council approved this measure given the large enforcement benefits, opportunity for improvement in product quality, and increased ability to accurately track quotas and avoid quota overruns.

Rejected Options for Action 3

Rejected Option 1. Do not require dealer permits.

Biological Impacts

Quota overruns are more likely under this option. Limiting catches to the TAC will ensure rebuilding of those species under quota management.

Enforcement Impacts

Without dealer permits detection and punishment of non-reporting would be significantly more difficult. Also, without dealer permits, enforcement would have little or no way of defining the universe of fish houses and other establishments that are authorized to purchase deep water species from fishermen.

This will allow the status quo to prevail and will not make for efficient monitoring of the effects of the regulatory measures. There would be no other means to double check the information provided by fishermen if they do not have to sell to permitted dealers only. It would make the process of monitoring and enforcement more difficult.

Socioeconomic Impacts

The long-term benefits of improved product quality, consistent supply and increased producer surplus to fishermen and profits to fish dealer would be lower due to poorer compliance and quota overruns.

Conclusion

The Council rejected this option because of the negative enforcement impacts and potential negative biological impacts.

Rejected Option 2. Specify permit sanctions.

Biological Impacts

This option could increase the likelihood of preventing quota overruns and the resulting negative biological impacts.

Enforcement Impacts

This option could increase the effectiveness of enforcement by creating a greater disincentive to not follow all regulations.

Socioeconomic Impacts

Presently, a dealer permit is required by all the four states. There does not appear to be any flagrant violation of the permit requirements at this time. The federal permit would be in line with the states' permit and would require similar reporting. Thus, there is no need to impose any permit sanction at this time.

Conclusion

The Council rejected this option because they concluded that NOAA General Counsel currently has the authority to pursue permit sanctions.

Rejected Option 3. Dealers who want to handle species in the snapper grouper management unit must obtain a federal dealer permit. Dealers who handle these fish must fill out monthly reports listing their total purchases. Requirements for a federal dealer permit are that the applicant possess a state dealer's license, and that the applicant must have a physical facility at a fixed location in the state wherein the dealer has a state dealers license. Dealers can use unpermitted agents to off-load and transport fish, but must comply with the 24 hour notice prior to offloading requirement. A fee will be charged to cover the administrative costs of issuing federal dealer permits.

Biological Impacts

See Action 3.

Enforcement Impacts

See Action 3.

Socioeconomic Impacts

This fishery presents a different situation than that in the wreckfish fishery. Landings of several species by a large number of fishermen are made at many locations. This option would impose unnecessary hardship on fishermen and dealers.

Conclusion

These dealer requirements would have been similar to those initially established for wreckfish with limitations on where and when fish can be landed. The Council rejected this option because it would have imposed unnecessary restrictions on fishermen and dealers and could result in revenue losses. Dealers may try to recover some of this by increasing the price of fish to consumers.

Rejected Option 4. Require dealer permit and specify that they must have the dealer permit to purchase fish "regardless of where fish caught."

Biological Impacts

See Action 3.

Enforcement Impacts

See Action 3.

The "regardless of where caught" would have the effect of requiring a dealer permit even if only fish harvested in state waters were purchased.

Socioeconomic Impacts

The additional requirement of "regardless of where caught" would impose unnecessary hardship on dealers resulting in a decrease in profits. Consumers may have to pay more for fish if dealers decide to maintain profit levels. This would depend on the elasticity of demand for these species. The more inelastic the demand, the more of the increased costs dealers will be able to recover from consumers in the form of higher prices.

Conclusion

The Council rejected this option because it would have imposed unnecessary restrictions on dealers and because NOAA General Counsel concluded that this option is illegal in that it would place an unfair restraint on trade.

Rejected Option 5. The Council considered the following specifics based on that currently in place for dealers who hold federal permits for summer flounder:

This option would require dealers to report, on a weekly basis, all species purchased, or received for a commercial purpose, from a fishing trip that includes landings of species in the snapper grouper management unit. Fish purchased from another dealer would not have to be reported. These reports would be submitted to NMFS via one of the following options within 3 days of the end of each reporting week. If mailing the report, the postmark must be within 3 days of the end of the reporting week. A reporting week is Sunday to Saturday.

Reporting Options: (1) Fill out a Weekly Quota Monitoring Report and fax, mail, or hand it to the NMFS statistics agent assigned to the dealer's state and follow with the completed Dealer Purchase Reports

(weighout) by the 15th of the following month (e.g., January weighouts are due by February 15); or (2) Complete a Dealer Purchase Report (weighout) and fax, mail, or hand it to the NMFS statistics agent or state port agent assigned to the dealer's state. Many dealers are accustomed to providing information to NMFS statistics agents. These agents will continue to visit dealers and are available to provide forms and to answer questions. If, however, an agent has not visited you within 3 days of the end of the reporting week, it is the responsibility of the dealer to submit the information through one of these options.

Federally permitted dealers may purchase species in the snapper grouper management unit from non-federally permitted vessels, provided that the fish being purchased was lawfully harvested exclusively in State waters. Federally permitted dealers must, however, report 100% of their purchases of such species regardless of the permit status of the vessel. The dealer permitting and reporting requirements extend to persons or business entities that sell species in the snapper grouper management unit on consignment basis, even if the product is consigned to a foreign country. Persons or business entities who transact the consigned sale between the vessel and wholesaler, or vessel and other buyer, are the primary dealers and must obtain a federal permit and report their purchases to NMFS.

Biological Impacts

See Action 3.

Enforcement Impacts

See Action 3.

These reporting requirements would have increased enforcement requirements.

Socioeconomic Impacts

This option would impose an additional reporting requirement on dealers and would require time and effort on their part to supply the information. Their operating cost would likely increase, and this could be passed on to consumers in the form of higher prices.

Conclusion

The Council rejected this option because it would have imposed unnecessary restrictions on dealers and agreed to let the NMFS track the quota in the manner the NMFS chooses.

ACTION 4. REQUIREMENTS TO SELL FISH

Allow sale of species in the snapper grouper management unit caught in the exclusive economic zone (EEZ) under the following conditions:

1. Fish caught under the bag limit may be sold if the individual possess a federal permit or a state (i.e., commercial) license to sell fish. If bag limit fish are sold, they must be sold to a federally permitted snapper grouper dealer and must be reported through the state's trip ticket system, other mandatory reporting system or federal port canvass as applicable.

2. Fish caught in excess of the bag limit may be sold only if the indivudual possesses the federal permit to exceed the bag limit. If fish are sold, they must be sold to a federally permitted snapper grouper dealer and must be reported through the state's trip ticket system, other mandatory reporting system or federal port canvass as applicable.

Existing permit requirements to exceed the bag limit will continue to apply with clarification concerning the gross sales level:

A. For a vessel owned by a corporation to be eligible for a vessel permit, the corporation or a shareholder or officer of the corporation or the vessel operator must have realized gross sales of seafood of $20,000 (clarify original intent that seafood is to be caught/landed by subject vessel) during one of the last three calendar years preceding the application. For partnerships to be eligible for a vessel permit, the general partner or vessel operator must qualify.

B. For non-corporation/partnership vessels, permit applicants must provide the relevant information as required by the Regional Director. This will include a sworn statement by the applicant certifying that 50% of his or her earned income was derived from commercial, charter, or headboat fishing, or that they realized gross sales of seafood of $20,000, whichever is less, during one of the last three calendar years preceding the application. The Regional Director may require the applicant to provide documentation supporting the sworn statement before a permit is issued or to substantiate why such a permit should not be denied, revoked, or otherwise sanctioned.

C. Other permit requirements as specified in Amendment 4 also apply.

Biological Impacts

This option will allow sale of bag limit caught fish to continue in those states where such sale is allowed. To the extent that allowing sale of bag limit caught fish increases the quantity of fish retained, this option may result in more fishing mortality from this sector than would occur if fish could not be sold. There is not data to answer this question. The quantity of bag limit fish sold is unknown but by requiring that such fish be sold to federally permitted dealers, NMFS will be able to collect the necessary data to determine the poundage being sold. Sale of bag limit caught fish (and fish sold but not recorded through the exising dealer system) represents a source of fishing mortality that is not accounted for in stock assessments and in quota tracking. This option will improve the biological stock assessments and allow the Council to better manage the snapper grouper resource by preventing overfishing.

Enforcement Impacts

Allowing sale of bag limit caught fish potentially makes it more difficult to accurately track the commercial quota because a greater portion of bag limit caught fish are sold directly to restaurants without going through a fishhouse. The requirement to sell to permitted dealers will ensure bag limit caught fish are counted in the commercial landings and will improve the accuracy of quota tracking.

All states require commercial permits to sell fish. Requiring fishermen to have either the federal permit or the state commercial license to sell fish will improve enforcement.

Socioeconomic Impacts

The intent of this option is to allow those part time fishermen who may represent an efficient scale of commercial operation in this fishery to continue to participate. It would enable them to sell their catches to hotels, restaurants, and other small businesses by possessing a federal permit or a state commercial license to sell fish. This is particularly important for the State of Georgia where these businesses depend on part-time fishermen for the supply of fresh fish. However, recent concerns over the health risks associated with seafood from unregulated sources by the Food and Drug Administration would likely lead to regulatory

measures to control such activities. All fishermen selling fish are subject to the FDA requirements. These part-time fishermen may lose considerable income if they are not allowed to sell their catches. Hotels, restaurants, etc. would have less variety of such seafood dishes on their menus unless the commercial sector can supply them with fresh fish.

Conclusion

The Council approved this option because the socioeconomic benefits from allowing sale exceed the costs. If this group of fishermen are not allowed to sell their catches, they will have to dispose of them other than through regulated means. The benefit of these catches being recorded and incorporated into the stock assessment would be lost. Consumers will have the benefit of selecting from a variety of seafood dishes from menus at hotels and restaurants. Fish dealers would not be affected since these catches will not enter their traditional markets.

The requirement that fish be sold to federally permitted dealers will result in documenting this previously unknown sector of the fishery. The continued sale of bag limit caught fish would not constitute any more of a health risk than sale of commercially caught fish.

The Council concluded that there would be no additional mortality as a result of this option (i.e., the concern that this option increases fishing mortality and hinders the effort to restore overfished stocks to a healthy level). Catch and release is not feasible for the deeper water species in this fishery due to mortality from the pressure change. The Council members prefer that the fish be consumed or made available to consumers rather than be thrown back dead and wasted. In addition, many of these trips are far offshore (20-50 miles) and fishermen tend to retain all fish caught that meet the minimum size and bag limits rather than catch 1-2 fish and then run back to shore. The established size and bag limits are intended to provide the appropriate level of protection and if greater biological protection is necessary, modification to size and bag limits would be appropriate rather than a prohibition on sale. These fishermen currently sell their fish and the measures proposed will allow this source of existing mortality to be incorporated into the stock assessment.

The Council concluded that if a fisherman sells his catch, they are then commercial fishermen and are subject to all appropriate state, federal, FDA and Coast Guard regulations as they pertain to commercial fishing. These requirements tend to put the fishermen selling bag limit caught fish on a more equal economic footing with commercial fishermen in that they all must meet the FDA and Coast Guard regulations.

The Council's original intent in Amendment 4 was that the $20,000 gross sales of seafood be caught/landed by the vessel for which the permit was being sought. Some individuals have been purchasing and reselling fish to qualify for a permit. This was never the Council's intent.

Rejected Options for Action 4

Rejected Option 1. Require a federal snapper grouper permit to sell species in the snapper grouper management unit caught in the exclusive economic zone (EEZ):

A. For a vessel owned by a corporation to be eligible for a vessel permit, the corporation or a shareholder or officer of the corporation or the vessel operator must have realized gross sales of seafood of $20,000 (clarify original intent that seafood is to be caught/landed by subject vessel) during one of the last three calendar years preceding the application. For partnerships to be eligible for a vessel permit, the general partner or vessel operator must qualify.

B. For non-corporation/partnership vessels, permit applicants must provide the relevant information as required by the Regional Director. This will include a sworn statement by the applicant certifying that 50% of his or her earned income was derived from commercial, charter, or headboat fishing, or that they realized gross sales of seafood of $20,000, whichever is less, during one of the last three calendar years preceding the application. The Regional Director may require the applicant to provide documentation supporting the sworn statement before a permit is issued or to substantiate why such a permit should not be denied, revoked, or otherwise sanctioned.

C. Other permit requirements as specified in Amendment 4 also apply. Also, it was the Council's intent that fish harvested in the EEZ must be sold to a federally permitted dealer.

Biological Impacts

The quantity of bag limit caught fish sold to establishments other than fish houses (i.e., sold to restaurants, private individuals, etc.) is unknown and represents a source of fishing mortality that is not accounted for in stock assessments and in quota tracking. This option would have disallowed sale of the recreational harvest and require all fish be sold to federally permitted dealers, both of which improve our understanding of the status of the resource.

To the extent recreational fishermen retain less fish due to not being able to sell fish, the fishing mortality rate would be reduced.

Enforcement Impacts

This option would result in improved monitoring and enforcement. Quota tracking would be more precise and the likelihood of quota overruns, reduced.

Socioeconomic Impacts

The intent of this action is to allow those who are more committed to commercial fishing (in terms of capital investment or earned income) to continue to make their livelihood from the resource. However, this requirement could exclude some part time fishermen who may represent an efficient scale of commercial operation in this fishery. Some commercial fishing opportunities in the snapper grouper fishery are inshore and do not require large scale capital investments. Thus, if some part time fishermen are excluded, society may be sacrificing the potential benefits from small operations and employment flexibility. Conversely, there is concern over the health risks associated with seafood from unregulated sources. This action would have streamlined the sources from which seafoods enter the market and provided a mechanism for identifying and checking the quality of seafood.

The system for collecting biological and economic information would be improved by this action and would lead to better protection of the resource. It would also allow for better assessment of the impacts of other regulatory measures. A fee would be imposed to cover the administrative costs for processing and tracking the permits (estimated at $40 annually for the first permit; each additional permit is $10).

This action was not expected to have any adverse impact on commercial fishermen. However, it could affect fish dealers, particularly restaurants and hotels in Georgia that are currently buying fresh fish from part-time fishermen unless they can obtain their supplies from commercial sources. This could be possible if commercial fishermen are able to supply restaurants and hotels with the products they require.

Conclusion

This option would have separated commercial and recreational fishermen and tracked the NMFS definitions for marine recreational fishing and fisherman as indicated in a letter from Dr. A. Kemmerer to R. Mahood dated February 22, 1993: (a) Marine recreational fishing is any fishing in marine waters that does not result in the sale or barter of all or part of the fish harvested; and (b) Marine recreational fisherman is any person who harvests fish in marine waters and does not sell or barter all or part of the catch. The terms angler and fisherman are considered one and the same.

Requiring a federal permit to sell would have tracked the Gulf Council's reef fish regulations.

The Council received information at the February 1994 meeting concerning health concerns about recreationally-caught fish. In April, the Council heard additional information presented during a public hearing and during the Council meeting by FDA personnel

The Council disapproved this measure because the same health requirements will apply to all fish sold and because the preferred options requires all fish be sold to federally permitted dealers, thereby documenting this level of harvest. Also, the Council determined that establishing the criteria for commercial sale of bag limit caught fish should be left up to each state. This would allow the states to license part time fishermen that supply fresh fish product to restaurants and consumers.

Rejected Option 2. Require permit to sell fish (this refers to existing commercial permit) and specify that they must possess the permit to sell species in the management unit "regardless of where fish caught" if that is the Council's intent.

Biological Impacts

See Action 4.

Enforcement Impacts

This option would increase enforcement because the area of catch would not be an issue.

Socioeconomic Impacts

See Action 4. In addition, the commercial permit would have been required even if a fishermen only fished in state waters.

Conclusion

The Council rejected this option because of the negative impacts on part-time fishermen and fishermen fishing exclusively in state waters, and because of resulting market disruptions.

Rejected Option 3. Require a "part-time" permit to sell bag limit caught fish; would be required to maintain logbook. This option would provide an estimate of the quantity of fish sold by this sector. Need to clarify:

A. Whether this would be a vessel permit or a permit issued to a person.
B. Only commercial sized fish can be sold.
C. When the quota is filled, no sale is allowed.
D. Whether these fish would count against the commercial quota.

Biological Impacts

See Action 4.

Enforcement Impacts

See Action 4.

Socioeconomic Impacts

This option would impose unnecessary burden on recreational fishermen. It would also increase monitoring costs.

Conclusion

The Council rejected this option because of the high monitoring costs and because of additional factors expressed by NMFS that fishing mortality might increase and that they could not administer such a system due to the large number of anglers.

Rejected Option 4. No action.

Biological Impacts

This option will continue to allow sale by recreational fishermen in those states where such sale is allowed. The quantity of fish sold by recreational fishermen is unknown and will continue to be unknown. This represents a source of fishing mortality that is not accounted for in stock assessments and in quota tracking. Resulting negative impacts will continue. NMFS also expressed concern that this would increase fishing mortality on overfished species.

Enforcement Impacts

Allowing sale of recreationally caught fish makes it difficult to accurately track the commercial quota.

Socioeconomic Impacts

This option would have a negative impact on commercial fishermen since recreational fishermen could sell their catches at lower prices to fish dealers. This could depress the market price. Recreational fishermen are not profit motivated and do not depend on fishing for their livelihood. Thus, they can afford to sell their catches below costs. The extent of the impact on commercial fishermen would depend on the volume of fish sold by recreational fishermen. The information required to estimate this impact is not available.

This option would allow those part time fishermen who may represent an efficient scale of commercial operation in this fishery to continue to participate. Some commercial fishing opportunities in the snapper grouper fishery are inshore and do not require large scale capital investments. Thus, if some part

time fishermen were excluded, society may be sacrificing the potential benefits from small operations and employment flexibility. It should be noted that some small operations could provide high quality products to local markets.

This would avoid imposing fees to cover administrative costs of permits and also avoid imposing economic hardship on part time commercial fishermen who may not be able to meet the income or gross sales requirements. To the extent that part time commercial fishermen exploit the resource in an efficient way, society would not be losing some of the benefits of efficient use of capital and employment flexibility for production under the no action alternative.

Conclusion

The Council rejected this option because they wanted to reiterate that the states would determine whether recreationally caught fish could be sold and wanted to clarify their intent with respect to the $20,000 gross sales requirement.

ACTION 5. CHARTER AND HEADBOAT PERMITS

Require all charter and headboats fishing for or possessing species in the management unit, on a for hire basis, to annually obtain a federal permit. The Science and Research Director will select the appropriate number of individuals to maintain logbooks and those individuals selected will be required to maintain a fishing record for each fishing trip as specified by the Science and Research Director. In those states (e.g., South Carolina) with existing mandatory reporting requirements, state required logbooks could be used in lieu of additional reporting requirements as long as the necessary information was being collected. The Council is not specifying 100% logbook coverage because of the existence of state logbooks. NMFS is to specify charter and headboat reporting requirements.

Biological Impacts

Charter and headboat permits will assist in estimating accurate harvest levels for these sectors. This will increase our biological understanding on status of the stocks.

Enforcement Impacts

This option will require additional enforcement effort. States that do not have a charter and headboat permit will have to adopt a similar requirement if regulations are to be enforced dockside. Permits will provide better enforcement by identifying the universe of charter operators which will assist in tracking violations and fishing activities.

Socioeconomic Impacts

This action would identify the universe of charter and headboats and greatly assist in gathering data from these user groups.

Presently, there is no information on the level of income commercial charter and headboat fishermen derive from the fishery. Although the impact of this action cannot be assessed at this time, no negative impact is expected since the proposed action does not impose any cap on the level of investment or income derived from the fishery on the part of the charter and headboat fishermen.

There will be costs associated with the permits, public burden associated with reporting and some level of enforcement costs. Benefits will accrue from enhanced data collection.

Conclusion

The Council concluded that charter and headboat permits are necessary to enhance monitoring of the effects of regulations and to improve the data collection system.

Rejected Options for Action 5

Rejected Option 1. Do not require charter and headboat permits.

Biological Impacts

Our estimate of harvest by these sectors will continue to be less accurate than one would like. This negatively impacts our understanding of the biological status of the stocks being harvested.

Enforcement Impacts

Charter and headboats are an integral part of the fishery and without permits, detection and punishment for non-reporting would be significantly more difficult.

Socioeconomic Impacts

The no action option would relieve charter and headboat fishermen of any fees that would be charged to cover administrative costs of the permit. However, the potential benefits from improved monitoring, enforcement and data collection to enhance management of the fishery would be foregone.

Conclusion

The Council rejected this option because it would not have improved data collection and law enforcement.

Rejected Option 2. Specify permit sanctions.

Biological Impacts

May provide some indirect benefits by increasing the likelihood of receiving accurate information which would increase our knowledge of the biological status of stocks being harvested.

Enforcement Impacts

Increases effectiveness of enforcement.

Socioeconomic Impacts

Some states already have mandatory reporting requirements for charter and headboat fishermen. It is not deemed necessary to impose any sanction at this time. This could be addressed through the framework provision if necessary.

Conclusion

The Council rejected this option because they concluded that NOAA General Counsel will have the authority to pursue permit sanctions once permits are required.

D. Gear Regulations

ACTION 6. SPECIFY ALLOWABLE GEAR

The following gear represent the only gear allowable in the **directed snapper grouper fishery:**

A. Vertical hook-and-line gear:
   (a) Hand-held hook-and-line gear - includes manual, electric, or hydraulic rod and reels.
   (b) Bandit gear - includes manual, electric, or hydraulic reels attached to the boat.

B. Spearfishing gear without rebreathers - includes powerheads (which is any device with an explosive charge usually attached to a speargun, spear, pole, or stick, which fires a projectile upon contact), except where expressly prohibited. In addition, the use of explosive charges (including powerheads) to harvest species in the snapper grouper management plan is not allowed in the EEZ off South Carolina. Mechanical sleds and scooters are allowed.

C. Bottom longline - this gear is allowed only in waters deeper than 50 fathoms, only for species other than wreckfish, and only north of St. Lucie Inlet, Florida.

D. Black sea bass pots except where expressly prohibited (i.e., within Special Management Zones) and only north of Cape Canaveral - a trap limited to a six-sided rectangular shape with no dimensions exceeding 25 inches (other than the diagonal). This would exclude traps that use flexible mesh or webbing to increase the effective size of the trap. To clear up some confusion over mesh sizes, minimum sizes for mesh are specified as follows: hexagonal mesh ("chicken wire") must be at least one and one-half inches between the wrapped, parallel sides; square mesh must be at least one and one-half inches between sides; and rectangular mesh must be at least one inch between the longer sides and two inches between the shorter sides. Pot throat dimensions remain unspecified.

See Action 8 for discussion allowing possession of sink nets on multi-gear trips only off North Carolina.

Biological Impacts

The types of gear listed above are the only gear types allowed in the directed snapper grouper fishery; all other gear types are prohibited. Fishermen off North Carolina using black sea bass pots, bandit gear and sink nets are allowed to retain all fish harvested with black sea bass pots and/or bandit gear that meet the minimum size limits (Action 8). Action 7 provides a mechanism for experimental gear to be evaluated. The Council's attempts to manage fisheries provide numerous examples of new gear that has been developed and had negative impacts on the fishery: (a) trawl gear in the snapper grouper fishery; (b) fish traps, entanglement nets, and bottom longlines in the snapper grouper fishery; (c) drift gill nets in the mackerel fishery; (d) purse seines in the mackerel fishery; and (e) drift gill nets in the swordfish fishery.

Certain gear types (e.g., black sea bass pots and nets) are currently prohibited on Special Management Zones (SMZs) and this action does not allow use of such gear.

Bottom longlines are currently only allowed in waters deeper than 50 fathoms and only for species other than wreckfish; allowing bottom longlines only north of St. Lucie Inlet, Florida is new. Input from

the advisory panel indicate that a bandit reel fishery could exist for tilefish in south Florida. Allowing only hook-and-line gear (including bandit gear) south of St. Lucie, Florida will result in a higher standing stock of tilefish and will aid in preventing growth and recruitment overfishing. Removal of bottom longlines in this area will lower fishing mortality and it is not expected that over the long-term, hook-and-line gear will result in as high a fishing mortality rate as bottom longlines given the widespread distribution of tilefish in this area.

Not allowing use of powerheads off South Carolina addresses localized depletion. Recreational fishermen and representatives from the State of South Carolina have indicated that use of powerheads results in localized depletion.

Rebreathers are not allowed with spearfishing gear but standard SCUBA gear is allowed. There was some input that rebreathers may be safer than SCUBA when used for spearfishing because fishermen would not need to hold their breath to stalk fish. However, the Council concluded that rebreathers could significantly increase the efficiency of divers through the elimination of bubbles which would allow divers to stalk fish more easily. Therefore, rebreathers are not included as allowable gear.

Specifying allowable gear reduces the negative impacts of bycatch from those gears that may be used in the fishery. This will provide some protection to the long-term biodiversity and stability of the ecosystem. New gear will not be allowed unless the benefits of reduced or no bycatch are established under the provisions of Action 7 - Procedures for experimental gear.

Enforcement Impacts

There will be positive impacts by specifying allowable gear. Enforcement will be simpler and more effective.

Representatives of the State of South Carolina have informed the Council that the State cannot enforce their State prohibition on use of powerheads/bang sticks and the federal prohibition on use of powerheads within SMZs if the practice is allowed in federal waters. Background information from South Carolina is included as Appendix G. It is the Council's intent that the possession of powerheads/bang sticks and mutilated fish be prohibited in the EEZ off South Carolina; possession of powerheads/bang sticks is allowed only for safety purposes. This will result in consistent state/federal regulations off the State of South Carolina which will reduce enforcement costs.

Socioeconomic Impacts

Specifications on allowable fishing gear can reduce consumer and producer surplus from fishery resources by impeding the adoption of more efficient gear and gear modifications. For fisheries managed by size limits and other traditional measures where there are no absolute caps on effort or catch (such as total allowable catch), monitoring and eventual regulation of new gear can involve potentially large management costs. These additional management costs may even outweigh the net benefit from efficiency when all costs and benefits are accounted for (provided data are available to measure all costs and benefits). This is particularly true if the fish stock in question is already overfished or stressed.

Measures such as size limits are indirect controls on effort based partially on assumptions about the fishing power of firms and their gear, with an overall aim at holding removals from the fishery indirectly to sustainable levels. Although fishermen are constantly improving their use of existing gear, the potential for large and rapid increases in removal rates probably comes more from gear introductions than from improvements in use of existing gear or from entry (particularly in already overcapitalized fisheries). To respond to increases in fishing mortality and catch under size limit regimes in already stressed fisheries, managers are forced to consider more rigorous size limits, or other traditional measures such as trip limits, quotas, or time and area closures. Consideration of more stringent measures must be undertaken quickly in stressed fisheries because the increase in fishing power not only creates conflict between traditional and new gear but also aggravates overfishing because there is no overall limit on catch.

Management responses of this sort involve high management costs because they must be developed rapidly. Such responses to increases in fishing power from new gear involve potential new regulated inefficiencies to slow down or limit the effects of the technical innovation. In this sense, specifications and procedures for allowing new gear can be beneficial because the economic and social costs and benefits from the new gear can be evaluated prior to the large scale introduction of the gear. Data from fishing new gear under experimental permits can be used to do this evaluation.

Evaluation of a new gear should include the economic tradeoff of potential new management costs and efficiency losses associated with controlling the use of the new gear compared to the efficiency gains associated with the new gear. New gear that also have potential for reducing bycatch or habitat damage should also have those benefits considered in the evaluation. It is also important that the evaluation procedure be applied in a standard manner to each case so that technological innovations are not thwarted because there is some guarantee that if the gear meets a certain level of acceptability, it can be allowed, thus compensating the developer and manufacturer.

It is important to realize that gear restrictions could encourage fishermen to explore other fishing methods which could lead to the development of new gear. This could produce both positive and negative results. If the new gear developed are selective in terms of fish size and efficient in reducing bycatch, the impact on the fish stocks would be positive. On the other hand, new gear could lead to rapid depletion of the fish stocks. Fishermen's activities should be monitored closely and other measures should be enforced to control fishing effort.

The 1992 logbook survey (Harris et al., 1993) provides information on the dive sector. A total of 53 vessels of the 1,887 permitted vessels identified themselves as using diving gear which would include powerheads. Seventeen commercial vessels landing in South Carolina reported using diving gear; a total of 179 commercial vessels reported landings in South Carolina. They reported that hook and line gear produced 66%, longlines 19%, black sea bass pots (7%), trolling (4%), diving gear (4%), and gill nets less than 1% of the total 1992 catch. The powerhead prohibition in the EEZ off South Carolina would affect about 17 out of a total of 179 vessels that made landings in South Carolina in 1992 (1992 Logbook Survey). This represents 10% of the total number of vessels. Flounders and lobsters formed the bulk of the landings

of these vessels; these species are managed under their own separate fishery management plans and not under the snapper grouper management plan.

It should be noted that the problem with the use of powerheads off the coast of South Carolina is more prevalent with recreational fishermen. According to SCWMRD, 23% of sportsdiving trips between July 8 and October 10, 1990 involved the use of powerheads (Appendix G, Table 1). The commercial and recreational harvest by powerheads is unknown due to continued lack of data. However, a number of reports to the SCWMRD have indicated that the use of powerheads by recreational fishermen is on the rise. This is confirmed by the increasing number of spent shell casings found in and around artificial reefs. These events indicate some of the negative impacts of competition between recreational and commercial and among the recreational user groups. Not allowing powerheads off South Carolina addresses these impacts.

This action will prohibit the use of bottom longline gear south of St. Lucie Inlet, Florida as well as powerheads in the EEZ off South Carolina. Landings data from longline fishing south of St. Lucie Inlet in 1990 and 1991 were 13,978 pounds and 98,482 pounds respectively (Bradford E. Brown, NMFS – memo of December 6, 1993 to Andrew J. Kemmerer). The 1991 figure represents a 600% increase in landings over the 1990 figure. Unclassified sharks accounted for 88% of the 1991 total landings while there was no reported landings of sharks in 1990. The 1990 landings included tilefish; snowy, yellowedge, red, and black grouper; and mutton and vermilion snapper. The 1991 landings included (in addition to the sharks mentioned earlier) tilefish; yellowedge, red, and warsaw grouper; and mutton and vermilion snapper. Although the gear prohibition would result in a decrease in producer surplus to fishermen, approximately 78% of this would be due to their foregone shark catches south of St. Lucie Inlet. The impact would likely be slight because sharks can be taken with the bag limit bycatch. It is expected some of this loss would accrue to hook and line commercial fishermen.

Conclusion

In Amendment 4 the Council prohibited the use of powerheads/bang sticks for harvesting species in the management unit within designated SMZs off South Carolina. The Council concluded this would address the problem with amberjacks as documented by South Carolina (documentation included as Appendix 3 in Amendment 4; also see page 57 of Amendment 4 for further rationale). Subsequent to Amendment 4, the State of South Carolina implemented a prohibition on landing fish that have been harvested by powerheads/bang sticks and requested that the Council implement a compatible regulation in the EEZ off South Carolina. The State of South Carolina has greatly expanded their artificial reef program and are preparing an "Artificial Reef Plan". They intend to request designation of additional special management zones (SMZs) around their artificial reefs and anticipate greater enforcement and user conflict in the future if powerheads are allowed. The argument against the prohibition included the fact that black sea bass pots are prohibited in SMZs off South Carolina and perhaps pots should also be banned. It was noted that black sea bass pots are not prohibited in South Carolina State waters as are powerheads and that black sea bass pots are a traditional gear whereas powerheads are relatively new. In addition, enforcement of the fish pot prohibition around SMZs can be enforced from the air whereas the powerhead prohibition requires

at sea enforcement. Another enforcement issue is identification of mutilated fish. Amberjacks may be landed without head, fins and tail (i.e., cored) but all other species in the management unit must be landed with head and fins intact. Thus, fish harvested with a powerhead are more easily identified than was thought to be the case using amberjack as an example.

User conflicts with use of powerheads occurs from commercial and recreational fishermen. Indeed, it appears that increased use of powerheads by recreational fishermen is responsible for a large portion of the conflict among the recreational sector. No documentation has been received indicating that use of sea bass pots or bandit gear is a problem on the order of magnitude of the conflict observed with powerheads. The level of user conflict may be less off other states because fishermen in those areas have worked out agreements that voluntarily separate the commercial divers and recreational fishermen (e.g., fishermen in the Jacksonville/St. Augustine, Florida area).

Fish tend to congregate around the artificial and natural reefs at certain times of the year and testimony from fishermen indicated that when commercial and recreational fishermen come through the SMZs illegally with powerheads, there is severe localized depletion on the SMZs. This is similar to the rationale used to prohibit black sea bass pots around the SMZs and the data available documented a decline in black sea bass abundance. That information is incorporated by reference. If the data were available for these other species, the Council concluded that the results would probably be the same.

After considering all the issues, the Council concluded that the benefits of having compatible regulations outweigh any negative impacts on fishermen that use powerheads or bang sticks off South Carolina.

The Council considered a request from Steve Grubish (dated November 22, 1993) wherein he suggested using Latitude 27°N (several miles further south) which would be easier to enforce. Mr. Grubish also suggesting another boundary at Longitude 82°W. Information from NMFS indicates that there are very few trips south of Cape Canaveral (see the discussion under Socioeconomic Impacts). The Council considered moving the line from St. Lucie to Cape Canaveral to provide more protection to the *Oculina* experimental closed area. In the end, the Council approved the St. Lucie boundary because it would minimize the impact on known bottom longlining based on information provided by Mr. Grubish and other public input at meetings and during the public hearings; it would provide an area south of St. Lucie Inlet that historically fishermen used bandit gear for golden tilefish which reduces competition; results in an area with a higher standing stock of tilefish that will aid in preventing growth and recruitment overfishing; provide an area where golden tilefish can only be harvested with hook-and-line gear thereby reducing competition between this gear and bottom longline gear; provide an area where traditionally vertical hook-and-line fishermen harvested golden tilefish in the past thereby recognizing and accommodating historical usage patterns which provides social benefits; and because it would reduce the fishing mortality rate on golden tilefish. Further justification for this boundary is that the 600-foot contour comes closer to this area than anywhere else in the snapper grouper management unit; the continental shelf starts to expand north of the Jupiter area, you start getting into the mud type habitats where you catch tilefish; and this area is readily

accessible to both recreational and commercial fishermen which will allow for an area for the recreational hook-and-line (and commercial hook-and-line) fishery to exist due to the higher standing stock of tilefish. In the past, a significant recreational fishery existed in waters deeper than 50 fathoms. As the tilefish standing stock declined, so did the recreational fishery. The proposed boundary at St. Lucie will allow for reestablishment of this fishery.

The Council chose not to allow bottom longline gear further south to the boundary with the Gulf Council to protect the coral reef and hard bottom habitat present in that area. Data from NMFS indicates little to no bottom longline catches from this area. In addition, allowing only vertical hook-and-line gear in this area provides an area where traditionally vertical hook-and-line fishermen harvested the bulk of the catch in the past thereby recognizing and accommodating historical usage patterns which provides social benefits; and because it would reduce competition for space in an area where the continental shelf is very narrow. Given that there is little to no bottom longline catches in this area, the Council did not want to see a bottom longline fishery develop.

The Council concluded that specifying allowable gear provides protection from potentially damaging gear being used without prior testing. The impacts on persons wishing to use new gear are outweighed by the positive benefits and are mitigated by Action 7 which specifies a procedure to evaluate new gear.

Rejected Option for Action 6

Rejected Option 1. No action.

Biological Impacts

This option could allow further depletion of stocks that are being overfished by continuing to allow efficient gear like bottom longlines. A bottom longline fishery could develop in south Florida which would result in further increases in fishing mortality when the management program is implementing measures to reduce fishing mortality. Habitat damage would also increase under the not action option. This would have negative long-term impacts for the status of stocks. Continued use of powerheads off South Carolina will result in localized overfishing and competition between users.

Enforcement Impacts

Enforcement requirements would consist of periodic checks to be sure nonconforming gear is not being used. The list of allowable gear is certainly easier to make the public aware of and adhere to than a large list of prohibited gear.

Socioeconomic Impacts

The potential economic benefits that would result from protecting overfished stocks could exceed management cost in the long-term. Not taking action refrains from limiting innovation in any way and thus encourages the development of new gear that provide large efficiency gains and associated gains in net benefits from the fishery. No action, however, might allow the introduction of new gear that make the size limit and other traditional management regime presently in place incapable of protecting the fishery from overfishing without modifications to management measures and associated management costs.

The no action option would result in increased competition and negative social impacts to the vertical hook-and-line fishery.

Conclusion

The no action alternative was rejected because it would not have provided protection from the negative impacts of new gear types being introduced in the future and because it would result in the negative impacts discussed above.

Rejected Option 2. Exemption for short, hand-operated bottom longlines.

Biological Impacts

Such an exemption would allow use of an efficient gear for species that are already overfished. This would likely continue to result in overfishing.

Enforcement Impacts

An exemption would increase enforcement costs and make the prohibition on bottom longlines more difficult to enforce.

Socioeconomic Impacts

Exemptions from gear specifications should not be necessary if the procedure to evaluate new gear is designed to be both fair and expeditious in its evaluation of the effects of the new gear on the fishery. Such an exemption could complicate enforcement and increase management cost with no added benefit. The number of potential fishermen affected is unknown.

Conclusion

The Council discussed a request by a Captain in Florida to exempt short (50-70 hooks), hand-operated cotton (or similar material) longlines fished within 50 fathoms. This option was rejected because effort in the snapper grouper fishery needs to be reduced and allowing more effort would have been counterproductive and such an exemption would have resulted in federal regulations being inconsistent with Florida State regulations. Action 7 provides a process to evaluate gear that may be considered for future use.

Rejected Option 3. Exclude mechanically propelled sleds/scooters from the list of allowable gear. Mechanically propelled means any type of sled other than a sled propelled by human action or towed (while attached) by a boat.

Biological Impacts

This gear could result in an increase in fishing mortality and result in further overfishing.

Enforcement Impacts

This would require at sea, underwater enforcement to observe fishermen using this gear.

Socioeconomic Impacts

The advisory panel does not think that exclusion of this device is necessary at this time. Public testimony at the scoping meeting indicated that sleds are used to travel from one area to another and are not used to chase fish. Information provided from the snapper grouper advisory panel in the past has indicated

that fishermen do use sleds to chase and harvest fish that would not be catchable without sleds. If this becomes a problem in the future, the framework mechanism will be used to address the issue.

Conclusion

The council considered not allowing mechanically propelled sleds/scooters but concluded that these sleds would not have resulted in a significant increase in efficiency of spearfishing gear. This could be addressed in the framework provision if it becomes necessary.

Rejected Option 4. Exclude powerheads from the list of allowable gear.

Biological Impacts

Excluding powerheads would eliminate a source of mortality.

Enforcement Impacts

Representatives from the State of South Carolina have indicated that they will only be able to enforce the federal prohibition on use of powerheads/bang sticks around special management zones and their State prohibition on use of this gear if powerheads/bang sticks are not allowed in federal waters.

Socioeconomic Impacts

The 1992 logbook survey (Harris et al., 1993) provides information on the dive sector. A total of 53 vessels of the 1,887 permitted vessels identified themselves as using diving gear which would include powerheads. Seventeen vessels landing in South Carolina reported using diving gear; a total of 179 vessels reported landings in South Carolina. They reported that hook and line gear produced 66% , longlines 19%, black sea bass pots (7%), trolling (4%), diving gear (4%), and gill nets less than 1% of the total 1992 catch.

This is only a problem in the EEZ off South Carolina and it is being addressed in the proposed action. It is not necessary to exclude it from other states. This could result in economic hardship for fishermen in the other states and in South Carolina.

Conclusion

The Council rejected this option because powerheads/bang sticks do not harvest a large proportion of snapper grouper catches, do not result in negative biological impacts, because of the potential negative impacts on fishermen in states other than South Carolina, and because it would then be inconsistent with state regulations if those states did not adopt similar regulations.

Rejected Option 5. Bottom longline gear is allowed only in waters deeper than 50 fathoms, only for species other than wreckfish, and only north of Cape Canaveral, Florida.

Biological Impacts

This option would provide some additional biological protection for golden tilefish in the area south of Cape Canaveral assuming that hook and line gear did not totally replace bottom longline mortality.

Enforcement Impacts

Same as the proposed measure.

Socioeconomic Impacts

The proposed action should address the problems (see discussion under Action 6) with bottom longline south of St. Lucie, Florida. The advisory panel feels that there is no need to move the line northward.

Conclusion

The Council rejected this option because of the negative socioeconomic impacts on fishermen in the area between Cape Canaveral and St. Lucie Inlet.

Rejected Option 6. Establish a commercial trip limit and recreational bag limit for divers using powerheads off the State of South Carolina.

Biological Impacts

This option has the potential to reduce the powerhead-induced fishing mortality off South Carolina.

Enforcement Impacts

Enforcement costs would increase and effectiveness decrease because the regulations would not be consistent with state regulations.

Socioeconomic Impacts

This would add to the enforcement cost and would not likely solve the problem.

Conclusion

The Council rejected this option because it would not be consistent with state regulations and because it would not solve the problems of localized depletion and user conflict discussed under the proposed action (Action 6).

Rejected Option 7. Allow only vertical hook-and-line gear.

Biological Impacts

This option could reduce fishing mortality to the extent that hook and line gear did not make-up for the mortality from gear that would be prohibited.

Enforcement Impacts

Enforcement could be dockside if state's adopted a similar regulation.

Socioeconomic Impacts

This would reduce fishermen's landings by 34% based on the 1992 Logbook report. It could cause significant hardship to fishermen using black sea bass pots, powerheads, and bottom longlines. The potential long-term benefit does not justify the short-term cost.

Conclusion

This Council rejected this option based on the negative socioeconomic impacts on fishermen. They concluded that the proposed measures will provide sufficient biological protection and if additional action becomes necessary in the future, the framework measure will be used to implement new regulations.

Rejected Option 8. Allow only vertical hook-and-line gear, spearfishing without rebreathers, powerheads and bottom longlines in waters deeper than 50 fathoms.

Biological Impacts

This would reduce fishing mortality to the extent the mortality from black sea bass pots is not replaced by mortality from the allowed gear types.

Enforcement Impacts

Enforcement costs would decrease because black sea bass pots would not be allowed.

Socioeconomic Impacts

This option is too restrictive and there is no justification to support it. Fishermen using black seabass pots would essentially be put out of business. This would cause considerable hardship in the short-term and could not be justified.

Conclusion

This Council rejected this option based on the negative socioeconomic impacts on black sea bass pot fishermen. They concluded that the proposed measures will provide sufficient biological protection and if additional action becomes necessary in the future, the framework measure will be used to implement new regulations.

Rejected Option 9. Rather than prohibit powerheads off SC, specify a trip limit of ____ lb.

Biological Impacts

This would reduce fishing mortality to the extent that the trip limit reduced effort by powerhead fishermen.

Enforcement Impacts

Trip limits require additional dockside enforcement. In addition, in certain instances (e.g., amberjack which can be landed without heads and fins) fish harvested by powerheads can be difficult to distinguish from fish harvested by hook and line gear. Enforcement could be difficult. This trip limit would be inconsistent with State of South Carolina regulations.

Socioeconomic Impacts

Fishermen can minimize its impact by making multiple trips. The impact would be minimal even with increased enforcement.

Conclusion

This Council rejected this option due to the difficulties in enforcement, because it would not conform to state regulations, and because it would not solve the problems of localized depletion and user conflict discussed under the proposed action (Action 6).

Rejected Option 10. Approve as stated and allow powerheads in the EEZ off South Carolina.

Biological Impacts

This option would continue fishing mortality at its present level.

Enforcement Impacts

This option would be inconsistent with South Carolina State regulations and would make enforcement more costly and difficult.

Socioeconomic Impacts

Apart from the increased enforcement cost and the inconsistency with South Carolina regulations, the long-term benefits that would likely result from reducing fishing mortality would be lost. Fishermen using powerheads in the EEZ off South Carolina would continue to enjoy the short-term benefits. However, they could face reduction in catches in the long-term.

Conclusion

The Council rejected this option because it would not be consistent with state regulations and because it would not solve the problems of localized depletion and user conflict discussed under the proposed action (Action 6).

ACTION 7. PROCEDURE FOR EXPERIMENTAL GEAR

The Regional Director may issue permits for experimental gear on a limited basis provided that a process is implemented to collect data on the use of the particular gear concurrently with issuance of the permit. It is the Council's intent to allow sale of the catch from experimental gear.

Biological Impacts

Specifying procedures for experimental gear indicate that the Council is concerned about bycatch in the snapper grouper fishery. If new gear/methods can be developed that would result in a reduction in bycatch, such innovations would provide positive biological benefits in the long run.

Enforcement Impacts

The law enforcement committee recommended a consistent policy to allow the sale of fish from experimental gear.

It is not the Council's intent that the data collection program prevent the Regional Director from revoking a permit if the situation indicates that such action is justified. The permit holder may be required to carry a scientific observer at the permit holder's expense and may also be required to carry transponders at the permit holder's expense.

The Regional Director will advise the Council upon issuance of any permit.

Socioeconomic Impacts

This action will enable fishermen to experiment with new gear. The impact of such experiments on the fishery cannot be predicted. It is possible that both potentially harmful and beneficial gear could be developed. If the gear developed is very efficient in terms of harvesting, it could have a negative effect on the fishery by accelerating the harvest rate. On the other hand, if the gear developed is selective, it could have a positive effect. It is important that data on the use of experimental gear be collected and evaluated in a timely manner so that decision could be made on whether experimentation with a particular gear should be allowed to continue.

However, a number of costs would have to be incurred. These costs would include the administrative costs of devising procedures and managing the process, costs of permitting, costs of monitoring and enforcement, and costs associated with evaluating the data associated with the experiments.

Conclusion

The data collected would be reviewed by the assessment review group as soon as possible after the gear has been in use for 12 months or some other specified period of time. The Council would review the data and the group's report and determine whether the gear should be allowed. Any changes would be made by plan amendment.

The Council concluded that this measure is appropriate so that gear may be evaluated for potential use in the future.

Rejected Option for Action 7

Rejected Option 1. No action.

Biological Impacts

Potentially beneficial gear could not be evaluated and the resulting benefits would be forgone.

Enforcement Impacts

None.

Socioeconomic Impacts

The no action option will eliminate the possibility of any gear being developed that will enhance management of the fishery, forgoing any possible future benefits. At the same time, it will also prevent the development of any gear that will have a negative effect on members of the industry. The latter could be avoided if data are collected and evaluated in a timely manner.

Conclusion

The no action alternative was rejected because it would not have provided a process for new gear to be developed and evaluated.

ACTION 8. SINK NET FISHERY

Allow sink net fishermen (only off North Carolina) fishing for spot, croaker, and weakfish to make multi-gear trips, and allow retention of all fish harvested with black sea bass pots and/or bandit gear that meet the minimum size limits.

Biological Impacts

Amendment 4 included the following prohibition (Action 25): "Prohibit the use of entanglement nets (including, but not limited to, gill nets and trammel nets) for the harvest of species in the snapper grouper management unit. It is the Council's intent that the simultaneous possession of entanglement nets and species in the management unit be prohibited except as provided for under Action 31." Action 31 stated that "Non-conforming gear is limited to the bag limit for species with a bag limit; for species with no bag limit, no retention is allowed." These measures result in the situation where entanglement nets targeting

species other than those included in the snapper grouper management unit (e.g., the sink net fishery for spot, croaker, and weakfish) are limited to the bag limits in the snapper grouper management plan if the species is under a bag limit, and if no bag limit is applicable, then no retention is allowed.

No biological impacts are expected from this action. The following information is taken from Francisconi (1993):

> During fall and winter, some fishermen in North Carolina have traditionally put sink nets on board vessels that sea bass pot and/or hook and line fish or that shrimp during the summer months. This sink net gear allows diversification of trips during periods of highly variable weather.
>
> Entanglement nets have not been used in the North Carolina snapper grouper fishery. The probability of causing severe damage to the net by snagging the leadline on the relief type bottom in this area discourages this netting activity. Once the leadline is snagged sometimes the only retrievable parts are the float line (cork line) and a portion of netting.
>
> Most sink netting occurs inside of three miles, however the activity will move seven to eight miles offshore as the near shore water temperature decreases.
>
> Sink nets are nothing more than well weighted gill nets. The fishermen here use a stretched mesh size of 3 to 4 3/4 inches depending on species targeted. The smallest mesh used is for sea mullet (*Menticirrhus* spp.) and the larger mesh is for king mackerel and large bluefish. The height of the net will consist of 30 to 40 meshes, i.e., eight to sixteen feet. Conditions that will affect the actual fishing height of the net are current, amount of loose grass near the bottom, build up of fish in net and slack which is built into the net. Sometimes various nets with different mesh sizes will be used simultaneously, alternating 100 yard segments (a.k.a. shots) of nets for a total of 1200 to 1400 yards of net.
>
> A net reel, specialized guides on the stern of the vessel, and deck mounted transmission and throttle controls assist in net retrieval so that usually, only two crew members are needed on board. Often the soak time is short, only 15 to 30 minutes is needed if the net has been placed on a good sonar mark of fish. Haul back time can vary depending on quantity and type of fish captured. With very good catches, the net along with the fish is piled directly on deck. Later at dockside when more persons are available, the net is cleared of fish.
>
> When these boats use bass pots, the pots are taken to and from the fishing grounds each day. The pots may be set and retrieved numerous times throughout the day. The bass pot grounds will average 10 to 25 miles off shore depending on water temperature, with the bass moving further offshore as temperatures decrease near shore.
>
> The hook and line gear is either used alone, or in conjunction with sea bass pots. Sometimes "testing the bottom" for black sea bass is necessary before pots are set. In the furthest north grounds, conditions are rarely favorable to fish traps to hand lines are most often used. This is because fair weather and slight currents are rare on the same day.
>
> The activity of vessels which may use sink nets and either hook and line or bass pots on the same trip is summarized by port of landing, inlets used, number of boats per port, gear utilized and months when multi-gear trips are made.

Bycatch is not a concern because sink nets have not been used to target snapper grouper species and use of entanglement nets for snapper grouper species is now prohibited. Sink nets are used to target on certain species (e.g., sea mullet, bluefish and king mackerel) and the time the net is in the water is short (15 to 30 minutes) and the net is constantly tended.

Enforcement Impacts

Under this measure, sink net fishermen would not be allowed to have anything other than the bag limit for snapper grouper species with a bag limit and no retention for species without a bag limit unless they

have black sea bass pots on board which would allow them to have black, bank, and rock sea bass. They would need a permit for the sea bass pots.

This option would allow the affected fishermen to make multiple gear trips but would require at-sea enforcement to ensure that the sink nets are not being used to harvest species in the snapper grouper management unit.

The law enforcement committee expressed concern about enforcing such a measure. The following options were discussed and/or surfaced during the law enforcement committee:

A. Require a special permit.

B. Allow for only a limited time period.

C. Only allow off North Carolina.

D. Limit the distance from shore where sink nets can be used.

E. Declare which gear will be used at the start of a trip.

F. Take the nets off the boats if fishing outside the 3 mile limit.

Table 11. Sink net catches by port of landing. In Hatteras Inlet (*) 20 vessels were rigged in a manner that would allow them to have sea bass but not all would be active in any one season. (Source: Jim Francesconi, North Carolina Division Marine Fisheries.)

Port of Landings	Number of Vessels	Gear	Months
Oregon Inlet	< 5	sink net; H&L	Sept-May
Hatteras Inlet	20*	sink net, H&L & pots	Sept-May
Harkers Island, Bardens & Beaufort Inlet	6	sink net & pots	Oct-May
Beaufort-Morehead City	4	sink net & pots	Oct-May
Swansboro; Bogue Inlet	3	sink net & pots	Oct-Dec
Sneads Ferry; New River Inlet	10	sink net & pots	Oct-Dec
Surf City & Topsail Beach; New Topsail Inlet	6	sink net & pots	Oct-Dec
Carolina Beach; Carolina Beach Inlet; & Cape Fear River Entrance	1	sink & shad net; pots	Oct-Dec
Total Number Vessels = 35			

Socioeconomic Impacts

This measure addresses fishermen in North Carolina that fish black sea bass pots and also have a net reel. When they leave the docks and travel up the inlet, they do not know whether or not the weather will permit them to go offshore to sea bass pot and they want the option to use their nets for fishing inshore if the weather and sea conditions did not permit them to fish for black sea bass. Otherwise, the decision would have to be made before they left the dock as to whether or not they would take the nets off the vessel before leaving the dock to fish for black sea bass. If they cannot fish for sea bass and did not have their nets along, they would lose a day of fishing. Francisconi (1993) asserts that fishermen cannot use their net gear for snapper grouper species. This measure would give them the option to fish for black sea bass with pots or

fish with the nets for other species (e.g., weakfish) based on the weather and sea conditions they might encounter. If these fishermen intended to use the nets for snapper grouper species they would have done so prior to implementation of Amendment 4 but they did not. The Council unintentionally prohibited this group of fishermen from doing something they have traditionally done for years in an attempt to provide for better enforcement.

Table 11 summarizes the activity of vessels which may use sink nets and either hook and line or black sea bass pots on the same trip by port of landing, inlets used, number of boats per port, gear utilized and months when multi-gear trips are taken.

To the greatest extent possible flexibility in regulations allows fishing firms to adjust to conditions and increase efficiency. Allowance for multiple gear trips helps to keep fishing costs down and can save fishermen fuel costs. Returning to the dock to pick up a different type of gear because the gear that was carried before was not suitable for use under the conditions that were encountered when the fishing vessel arrived at the area where fishing was to take place is not cost effective. Allowing multiple gear trips may cause the effectiveness of enforcement to be compromised, because enforcement then must detect a violator in the act of using a gear in a prohibited area or activity.

In this case, fishermen claim that sink nets are not suitable for use in snapper grouper fishing. They are only carried to diversify the fisherman's possible fishing opportunities by allowing him to go black sea bass potting, hook and line fishing, or sink net fishing for species other than snapper grouper species. The Council recently modified the black sea bass pot rule so that a sea bass pot as defined could be used on multiple gear trips where snapper grouper species other than black sea bass were in possession. An important difference was that there was both public input and scientific evidence from MARMAP studies in South Carolina that black sea bass pots are not effective for most snapper grouper species other than small scup and undersized vermilion snapper and red porgy, which could not be retained anyway. That type of multiple source evidence is not available in this case and this makes the potential negative aspects of the proposed measure greater than for black sea bass.

This action will allow vessels that may make multi–gear trips off North Carolina to continue their fishing activities. Over 35 vessels make multi–gear trips using sink net, shad net, hook & line and black sea bass pots. Some of them might not be able to operate if they are forced to carry only one type of gear per trip because of the extra fuel cost involved in going back to port to switch gear. Also, the timing of their fishing activities, oceanographic and weather conditions may not make a second trip possible. This could cause some hardship for them and create some unemployment. No data is available to predict the loss in revenues if fishermen cannot take multiple gear on their trips.

Conclusion

The Council approved this option recognizing the multi-gear nature of the fishery in North Carolina and the lack of biological impact on the resource. The Council concluded that the socioeconomic benefits to the affected fishermen outweigh the additional enforcement costs.

Rejected Options for Action 8

Rejected Option 1. No action.

Biological Impacts

This option would continue to provide some reduction in fishing mortality to the extent that fishermen are not able to make multi-gear trips and this effort is not replaced by other gear types.

Enforcement Impacts

No additional enforcement costs.

Socioeconomic Impacts

During recent public hearings on a similar issue with the black sea bass pot fishery, fishermen indicated that they are faced with a problem when they have a sink net reel and net on their boat which they use within state waters off North Carolina. They target spot, croaker, and weakfish, and do not catch snapper grouper species. However, on a given trip they may fish within state waters, or may run offshore to fish snapper grouper with bandit reels, or fish with black sea bass pots. They have requested consideration similar to that which the Council approved for fishermen fishing with black sea bass pots.

The no action option creates efficiency losses but avoids potentially large enforcement costs and potential losses from illegal use of net gear for snapper grouper species.

The no action option will impose a burden on fishermen and make some fishermen operate inefficiently. It is also possible that some fishermen may not find it profitable to continue fishing. The positive side of this option is that it will eliminate the need for stepping up monitoring and enforcement to prevent the use of net gear for harvesting snapper grouper species.

Conclusions

The no action alternative would continue to prohibit fishermen making multi-gear trips and possessing snapper grouper species in excess of the bag limit or possessing those with no bag limit when they have their net on board and was rejected by the Council due to the negative socioeconomic impacts on affected fishermen.

Rejected Option 2. Sink net fishermen are limited to the bag limit where specified (zero if no bag limit). If using sea bass pots and sink nets on the same trip, fishermen can possess black, bank, and rock sea bass. This is a special exception that applies only off North Carolina.

Biological Impacts

This option would provide some reduction in fishing mortality to the extent that fishermen are not able to make multi-gear trips and this effort is not replaced by other gear types.

Enforcement Impacts

Some additional enforcement cost would be required to ensure that fishermen using sink nets did not have species other than sea bass.

Socioeconomic Impacts

During recent public hearings on a similar issue with the black sea bass pot fishery, fishermen indicated that they are faced with a problem when they have a sink net reel and net on their boat which they

use within state waters off North Carolina. They target spot, croaker, and weakfish, and do not catch snapper grouper species. However, on a given trip they may fish within state waters, or may run offshore to fish snapper grouper with bandit reels, or fish with black sea bass pots. They have requested consideration similar to that which the Council approved for fishermen fishing with black sea bass pots.

This option creates efficiency losses but avoids additional enforcement costs and potential losses from illegal use of net gear for snapper grouper species. It will impose a burden on fishermen and make some fishermen operate inefficiently. It is also possible that some fishermen may not find it profitable to continue fishing. The positive side of this option is that it will limit the need for stepping up monitoring and enforcement to prevent the use of net gear for harvesting snapper grouper species.

Conclusions

This option would continue to prohibit fishermen making multi-gear trips from possessing species other than sea bass when they have their net on board and was rejected by the Council due to the negative socioeconomic impacts on affected fishermen.

E. Miscellaneous Items

ACTION 9. NEW PROBLEM

Add the following to the list of problems: "Localized depletion where a species' abundance in an area is reduced by high fishing effort can cause conflict among fishermen."

Biological Impacts

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, e.g., South Florida, 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.

A number of public comments during the hearing process for Amendment 6 suggested that there may be some localized depletion of black sea bass. Catches and the headboat average size are shown in Figure 1. Other species suspected to be experiencing localized depletion include greater amberjack, mutton snapper, grouper and snappers in southern Florida, and deep water species including golden tilefish.

Enforcement Impacts

None.

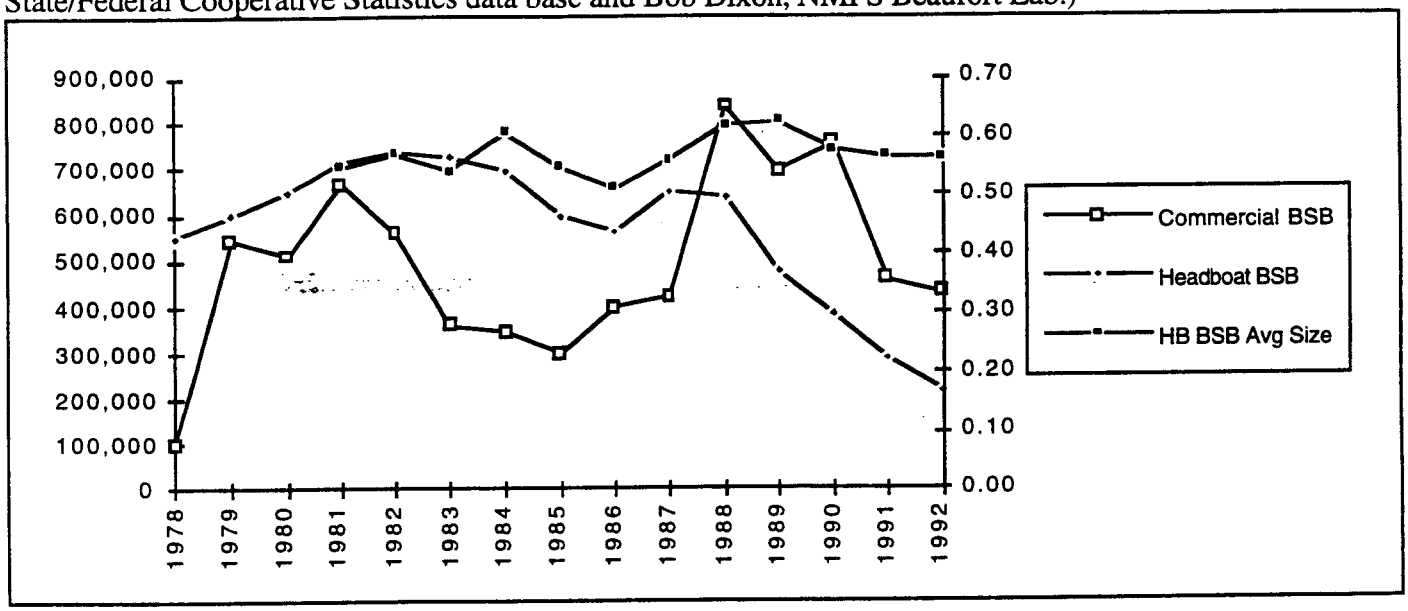
Socioeconomic Impacts

The issue of localized depletion needs to be addressed. However, the evidence to support actions to institute corrective measures is lacking. More studies are needed on fish behavior to understand whether some species are less susceptible to being caught at certain times. Such a behavior by some species could lead to low catch rates and can be interpreted as localized depletion. Regulations concerning localized depletion should be monitored closely to determine their impacts. Localized depletion could lead to

decreases in producer surplus for fishermen fishing in those areas. In the long-term, fishermen will move to other areas if possible and cause increased competition.

The magnitude of costs that could be attributed to inclusion of the new problem in the fishery management plan will be governed by the mechanism developed to address specific cases. To keep such costs at a minimum, the mechanism should be designed to ensure that frivolous "localized depletion" cases are not addressed.

Figure 1. Comparison of black sea bass (BSB) headboat (HB) and commercial catches (pounds) over time and the average weight (pounds) of black sea bass in the headboat catch over time. (Source: Data from State/Federal Cooperative Statistics data base and Bob Dixon, NMFS Beaufort Lab.)



Conclusion

The Council approved adding this new problem so that it can be evaluated and if action is needed, necessary regulations could be implemented through the framework.

Rejected Option For Action 9

Rejected Option 1. No action.

Biological Impacts

High fishing mortality in localized areas would continue.

Enforcement Impacts

None.

Socioeconomic Impacts

This would allow localized depletion to continue and could affect the fishery through lack of recruitment. Producer surplus to fishermen would decline and competition among fishermen would increase in other areas in the long-term as fishermen move to other areas that are more productive.

Conclusion

Problems exist in the deep water complex and amberjack fisheries, and additional measures are necessary to protect several other species. Taking no action would not address these problems and was rejected by the Council.

Rejected Option 2. Conflict resulting from the public having the perception that management is inequitable when regulations are different for recreational and commercial fishermen.

Biological Impacts

Compliance could decline resulting in increased mortality.

Enforcement Impacts

Voluntary compliance could decline.

Socioeconomic Impacts

Commercial fishermen are always concerned that recreational fishermen have considerable political influence and are in a better position to influence management decisions. They also feel that recreational fishermen are fishing for fun and depend on other sources for their livelihood. As such, the commercial fishermen's source of income is at stake. At the same time, recreational fishermen feel that commercial fishermen cannot claim any right to the fishery resources and therefore should not be given any preference. Regulations have to be sensitive to both sides while at the same time provide adequate protection for the fishery resources.

Conclusion

The Council discussed the public's perception that recreational and commercial fishermen are treated unfairly (bag limits and size limits in the recreational fishery versus size limits in the commercial fishery) but concluded that this could be best addressed by explaining the separate management approaches and rationale for each.

Rejected Option 3. Gear competition/evaluation.

Biological Impacts

Unknown.

Enforcement Impacts

Unknown.

Socioeconomic Impacts

This could create conflict between fishermen particularly when some gear are more efficient than others. Certain gear could impact fish stocks positively depending on whether they are selective or negatively depending on whether they are nondiscriminating. Where certain fishermen use more efficient gear, they are likely to obtain higher producer surplus through increased catch levels at the expense of fishermen using less efficient gear.

Conclusion

The Council discussed this issue but concluded that it is already addressed with the existing list of problems.

Rejected Option 4. Mutton snapper 3 day multi-day bag limit.

Biological Impacts

Recreational harvest during the spawning season can be high when combined with the 3 day multi-day limit. This represents high fishing mortality during a critical time in the species' life history.

Enforcement Impacts

Enforcement must determine whether the vessel has been out for 3 days which makes enforcement difficult.

Socioeconomic Impacts

The long-term benefits from improved recruitment would be sacrificed for short-term gains by recreational fishermen. Their catch levels would increase, but this would only be short-lived. Overfishing will eventually cause catch levels to decline, leading to decreases in benefits.

Conclusion

The Council discussed this issue and chose to address it as a concern with the multi-day limit in general. See Action 11.

ACTION 10. NEW OBJECTIVE

Add the following to the list of objectives: "Evaluate and minimize localized depletion."

Biological Impacts

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, e.g., South Florida, 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.

A number of public comments during the hearing process for Amendment 6 suggested that there may be some localized depletion of black sea bass. Catches and the headboat average size are shown in Figure 1.

Enforcement Impacts

None.

Socioeconomic Impacts

Such measures would address stock depletion in some areas while not affecting the activities of fishermen in areas where the fishery is not in any danger of being overfished. It will minimize the negative impact on the total number of fishermen in the fishery. However, stepped up enforcement would be necessary to protect the areas that are under stress. This also leaves the possibility for fishermen who are

affected by localized depletion to switch their effort to areas where there is no such depletion. If this should happen, producer surplus will fall in the long-term unless other measures are instituted.

Conclusion

The Council is concerned about high fishing mortality rates resulting in localized depletion in certain areas. There may be some cases where a stock as a whole is not overfished, but local abundance may be significantly reduced. Therefore, the Council is proposing measures to address this problem (mutton snapper size limit and allowable gear). Also, future measures to address localized depletion could be implemented through the framework. This objective justifys management measures for local areas.

Rejected Option For Action 10

Rejected Option 1. No Action.

High fishing mortality in localized areas would continue.

Enforcement Impacts

None.

Socioeconomic Impacts

This would allow localized depletion to continue and could affect the fishery through lack of recruitment. Producer surplus will decrease in the long-term as catch levels fall.

Conclusion

The Council rejected taking no action in order to address the problem of localized depletion.

Rejected Option 2. Marine reserve related problems.

Biological Impacts

Marine reserves can provide a number of biological benefits ranging from reducing fishing mortality to protecting the genetic characteristics of the population.

Enforcement Impacts

Enforcement costs associated with marine fishery reserves can be significant.

Socioeconomic Impacts

As stated in Amendment 6 (SAFMC, 1993) it is difficult to determine the benefits of a closed area because the concept of using a marine reserve to reduce overfishing on minor species and to increase the spawning stock of snapper grouper species has not been tried in this country. The extent to which minor species migrate and stay outside the reserve area during the year needs to be studied and fully understood. Also, it is not clear how the results would be used to determine whether the concept works.

Conclusion

The committee considered the following list of potential problems that could be addressed through use of marine fishery reserves but deferred addressing them to the future when the reserve concept will be more completely evaluated:

1. Protect critical spawning stock biomass from fishery depletion.
2. Protect intraspecific genetic diversity.

3. Maintain population age structure.
4. Ensure recruitment supply under environmental uncertainty.
5. Maintain areas with a natural equilibrium and ecosystem balance.
6. Provide insurance against management failure.
7. Protect from serial overfishing.

At the January 1993 meeting, the Council approved motions to drop the marine fishery reserve concept, request the NMFS to convene a scientific review panel to evaluate the marine fishery reserve concept, and request input from the snapper grouper plan development team on experimental closed area(s) for the deep water complex of snapper grouper species.

ACTION 11. MULTI-DAY BAG LIMITS

Specify a maximum of a two day possession limit for all charter and headboats making multi-day trips regardless of the number of captains on board. This would apply to persons aboard charter and headboats on trips exceeding 24 hours provided that each passenger has a receipt verifying the trip length. Excursion vessels are allowed up to a 3-day possession limit provided they can document that fishing was conducted on at least 3 days. (Note: The effect of this action is to drop the requirement for two captains; the remainder of the items are currently in effect. See the wording for the no action alternative.)

Biological Impacts

This action will not reduce the potential for large catches from excursion vessels and could contribute to overfishing and localized depletion.

Enforcement Impacts

Charterboats are usually uninspected and are limited to six or fewer passengers. Headboats are mostly inspected under designator "S" of 46 CFR Section 175.05-5(s) and normally carry more than six passengers for drift fishing parties of about four to six hours. They have no overnight accommodations and are limited to 20 miles offshore on their Certificate of Inspection. Excursion vessels are inspected under designator "L" of 46 CFR Section 175.05-5(b) and therefore are equipped with overnight accommodations to run multi-day voyages for over six passengers out to 100 miles offshore. (Source: Letter from Attorney Edward R. Fink to Russell S. Nelson dated February 25, 1991, and presented to the Council at its February/March, 1991 meeting.)

This action will not improve the efficiency of the enforcement process. The State of Florida implemented regulations to "allow a two-day possession limit statewide for persons aboard charter and headboats on trips exceeding 24 hours provided that the vessel is equipped with a permanent berth for each passenger aboard, and each passenger has a receipt verifying the trip length." The proposed action will result in inconsistent regulations with the State of Florida. The Gulf of Mexico Council does not provide for a three-day limit within their area of jurisdiction. This action will require changes by other states and Florida for regulations to be compatible.

Socioeconomic Impacts

This issue is fundamentally an equity issue stemming from a desire to address the subject of excessive shares. Multi-day charter and headboat operators offering excursion trips have claimed that they

cannot attract clientele for long-range excursion trips (three days or more) if bag limits do not allow clients to keep at least a bag limit equivalent to three days. There has never been a systematically conducted marketing study that has shown that for-hire fishing interests lose substantial segments of present or potential customers from bag limits that constrain catch to some reasonable levels. Thus the merit of the rationale offered by excursion boat operators have never been rigorously evaluated.

This option would give excursion boats a competitive advantage over charter/headboats in the long-range trip market. It could mean some loss in income for charter/headboat operators. The magnitude of this income loss cannot be determined.

Conclusion

This option addresses concerns raised during the public comment period by the excursion vessel sector. They feel that their investment is greater and that they need the three-day limit to operate economically. The Council concurred.

Rejected Options for Action 11

Rejected Option 1. No action. Amendment 4 specified that "possession limits are one day except for charter/headboats which may have a two day possession limit and for excursion boats which may have up to a three day possession limit." The snapper grouper regulations currently specify (Section 646.23) that : "(1) Except as specified in paragraph (c)(2) of this section, a person subject to a bag limit may not possess in or from the EEZ during a single day, regardless of the number of trips or the duration of a trip, any fish in the snapper-grouper fishery in excess of the bag limits specified in paragraph (b) of this section. (2) Provided the vessel has two licensed operators aboard, and each passenger is issued and has in possession a receipt issued on behalf of the vessel that verifies the length of the trip -- (i) A person aboard a charter vessel or headboat on a trip that spans more than 24 hours may possess no more than two daily bag limits; or (ii) A person aboard a headboat on a trip that spans more than 48 hours and who can document that fishing was conducted on at least 3 days may possess no more than three daily bag limits."

Biological Impacts

Fishing mortality will continue to be higher from the allowance of a 3 day trip limit.

Enforcement Impacts

This option will continue the status quo and complicate enforcement because it will be inconsistent with the State of Florida.

Socioeconomic Impacts

This option would give excursion boats a competitive advantage over charter/headboats in the long-range trip market. It could mean some loss in income for charter/headboat operators. The magnitude of this income loss cannot be determined. There is also the loss in recreational pleasure to those who would not go on charter/headboats trips because of the restriction and cannot makeup for it otherwise.

Conclusion

This option would continue the two day possession limit for charter/headboats and the three day possession limit for excursion boats but was rejected by the Council because it would continue the requirement for two captains.

Rejected Option 2. Specify a maximum of a three day possession limit for all charter and headboats making multi day trips regardless of the number of captains on board.

Biological Impacts

This could result in increasing mortality particularly for mutton snapper.

Enforcement Impacts

This option also addresses the equity issue but would be inconsistent with the State of Florida.

Socioeconomic Impacts

The equity issue between charter/headboats and excursion boats would be resolved. However, increased fishing mortality could result in stock depletion. This could cause catch rates to decline in the long-term making fishing trips less exciting and pleasurable for recreational fishermen.

Conclusion

This option would treat all charter and headboats making multi day trips equally thereby addressing concerns raised by fishermen but would increase the potential catch by these vessels and would be inconsistent with the State of Florida regulations. Therefore, this option was rejected by the Council.

Rejected Option 3. Specify a maximum of a two day possession limit for all charter and headboats making multi-day trips regardless of the number of captains on board. This would apply to persons aboard charter and headboats on trips exceeding 24 hours provided that the vessel is equipped with a permanent berth for each passenger aboard, and each passenger has a receipt verifying the trip length.

Biological Impacts

This action will reduce the potential mutton snapper catch and contribute to a reduction in fishing mortality thereby reducing local depletion.

Enforcement Impacts

This action will improve the efficiency of the enforcement process. The State of Florida proposes to "allow a two-day possession limit statewide for persons aboard charter and headboats on trips exceeding 24 hours provided that the vessel is equipped with a permanent berth for each passenger aboard, and each passenger has a receipt verifying the trip length." The proposed action will result in consistent regulations with the State of Florida. It will require changes by other states.

Socioeconomic Impacts

This issue is fundamentally an equity issue stemming from a desire to address the subject of excessive shares. Multi-day charter and headboat operators offering excursion trips have claimed that they cannot attract clientele for long-range excursion trips exceeding two days if bag limits do not allow clients to keep at least a bag limit equivalent to three days. There has never been a systematically conducted marketing study that has shown that for-hire fishing interests lose substantial segments of present or potential customers from bag limits that constrain catch to some reasonable levels. Thus the merit of the rationale offered by excursion boat operators has never been rigorously evaluated. There are probably enforcement benefits from standardizing multiple bag limits for multi-day trips so that boarding officers are not forced to inspect clients receipts to verify that the duration of the trip and the number of licensed captains on board does qualify the angler for a three day bag limit.

This option would remove the opportunity to take a long-range trip, with higher harvest limit, away from the fishing public.

Conclusion

This option would address concerns raised during the public comment period by affected charter boats that offer extended trips. Fishermen feel that limiting charter boats to a two day limit and excursion boats to a three day limit puts such charter boat operations at a competitive disadvantage. The Council rejected this option because a representative of the excursion boats testified that they had more money invested in their business, that they needed the three-day limit for extended trips, and that this regulation would put them out of business.

ACTION 12. CHARTER/HEADBOAT CREW SPECIFICATION

Maintain the crew specification of three on charter/head boats unless the vessel possesses a "certificate of inspection" in which case crew size is limited to the crew number on the certificate.

A procedure is to be established whereby a charter/headboat can relinquish their charter/headboat license seasonally (winter in Carolinas), and fish solely as a commercial vessel. This procedure is to be worked out between NMFS and Council staff, and depending on the outcome, an administrative fee may be required.

Biological Impacts

None.

Enforcement Impacts

The proposed measure is beneficial for regulatory enforcement purposes because it will clarify the number of passengers that can be on board as commercial crew members and allow large charter and headboat vessels that are being used to fish commercially to exceed the present maximum of three crew members if the vessel is documented to do so.

Socioeconomic Impacts

The main issue is how to determine whether a charter or headboat is carrying clients for recreational fishing or is engaged in commercial fishing. Also, whether the fishermen on board are paying customers who have to adhere to recreational bag limits or are commercial fishermen exempt from bag limits but constrained by commercial size limits, gear restrictions and quotas (when applicable).

A certificate of inspection is required to carry in excess of six passengers. This would allow the vessel to have up to the number specified on the certificate of inspection while fishing commercially. Larger charter/headboats would be able to fish commercially (when not operating as a for hire vessel) with a safe and economical number of crew members.

This measure will aid enforcement and provide a basis for determining whether a charter or headboat should be engaging in recreational or commercial fishing. However, there would have to be at–sea monitoring to enforce this management measure. This would involve additional costs in terms of monitoring and documentation. These costs should be compared to the potential benefits to determine whether there

would be net gains. This action will probably result in an increase in net benefits because it will allow for more efficient use of existing for-hire vessels.

Conclusion

The Council approved this measure to allow vessels to fish as commercial vessels when they do not have a charter onboard. They concluded that the socioeconomic benefits outweigh the additional enforcement costs.

Rejected Options for Action 12

Rejected Option 1. No action.

Biological Impacts

Amendment 4 included the following provision under Permits: .. "2. A qualifying owner or operator of a charter vessel or headboat may obtain a permit. However, a charter vessel or headboat must adhere to bag limits when under charter or carrying a passenger who fishes for a fee or when more than 3 persons are onboard, including captain and crew." This provision causes a problem for charter vessels and headboats that want to fish commercially while carrying a crew of more that three in total. Captains have indicated the need to carry more than three on these vessels for safety purposes and in order to fish economically.

Enforcement Impacts

No additional costs.

Socioeconomic Impacts

Charter and headboats that are prevented from fishing commercially because of having more than three crew members onbaord could lose large amounts of producer surplus, particularly if their charter activities end well before the fishing season ends. This could affect their ability to continue operating in the long run. Some could possibly go out of business.

Conclusion

The no action alternative would continue to prevent the affected vessels from fishing commercially with more than three crew in total if they also possess a charter/headboat permit. This measure may also raise safety related issues in that fishermen may be "forced" to fish a large vessel with an inadequate number of crew. Therefore, the Council rejected this option.

Rejected Option 2. Modify the second sentence in the regulations to read: "However, a charter vessel or headboat must adhere to bag limits when under charter or carrying a passenger; passenger means an individual carried on board a vessel except the owner or representative of the owner, the master or a crew member engaged in the business of the vessel who has not contributed consideration for carriage and who is paid for services on board." The definition of consideration means a past, present or anticipated economic benefit, inducement, right or profit, direct or indirect, including but not limited to pecuniary payment, economic advantage or business good will accruing to an individual, person or entity, but not including a voluntary donation of food, beverage or other items which is of a nominal value considering the circumstances.

Biological Impacts

None.

Enforcement Impacts

This option would maintain our enforcement capability but would require some additional clarification as far as documentation concerning "consideration".

Socioeconomic Impacts

This wording comes from the Coast Guard's proposed changes as indicated in an article from *Charter Industry* (July/August 1992). This option would allow charter/headboats to carry more than three crew while commercial fishing and will maintain our enforcement capability to limit them to the bag limit while under charter. This will provide more flexibility to charter/headboats and increase the possibility of increasing producer surplus. However, the potential benefits would likely not justify the increased enforcement effort and cost.

Conclusion

The Council rejected this option because the Coast Guard's proposed changes have not occurred and because this would be difficult to implement and enforce.

Rejected Option 3. Change the specification from 3 persons to 4 or 5.

Biological Impacts

None.

Enforcement Impacts

This option may increase enforcement costs.

Socioeconomic Impacts

This would address the problem that has surfaced with larger headboats being able to operate safely and in an economically efficient manner but may result in a number of charter vessels fishing commercially when they would not normally do so. There are approximately 88-90 headboats in the southeast region (Dr. Gene Huntsman, NMFS Beaufort, personal communication).

It would further complicate the process of determining whether a charter or headboat is carrying clients for commercial or recreational fishing. Action 12 offers an efficient way of making this determination.

Conclusion

The Council rejected this option because the preferred option is more easily enforced and because of the complications this option presents in determining whether a vessel is under charter.

Rejected Option 4. Require a special day permit for fishermen on charter and headboats. This would identify whether the vessel is under charter and then the specification on number of persons could be removed.

Biological Impacts

None.

Enforcement Impacts

This would increase the paperwork associated with the management program and would require additional resources to keep up with the permitting process and increase enforcement costs.

Socioeconomic Impacts

This would involve a lot of paperwork considering the number of charter and headboats that would have to be issued with permits on a daily basis. The administrative process would also be cumbersome if a large number of vessels have to be issued with permits each day. There would also be some private costs to charter and headboats operators in terms of permit fees, processing applications, and the time involved in obtaining the permits. These costs would undoubtedly be passed on to their clients. The costs would likely outweigh the potential benefits.

Conclusion

The Council rejected this option because the preferred option is more easily enforced and because of the complications and additional costs this option presents.

Rejected Option 5. Only allow charter and headboats to choose either recreational or commercial fishing.

Biological Impacts

None.

Enforcement Impacts

This could increase enforcement costs.

Socioeconomic Impacts

This would solve the problem but would also remove a potential source of income for these vessels when they are not under charter.

This option would restrict the activities of charter and headboat operators. A significant percentage of them carry clients who are commercial or recreational fishermen. If operators have to choose only one type of client they could lose considerable income.

Conclusion

The Council rejected this option because of the negative socioeconomic impacts on charter and headboat owners and operators.

Rejected Option 6. Change the specification from 3 person to 4 or 5 only for headboats.

Biological Impacts

None.

Enforcement Impacts

This option could increase enforcement costs.

Socioeconomic Impacts

This would address the specific problem that has surfaced with the larger headboats being able to operate safely and in an economically efficient manner. This option would not encourage change-over in the charter sector.

It would further complicate the process of determining whether a charter or headboat is carrying clients for commercial or recreational fishing. Action 12 offers an efficient way of making this determination.

Conclusion

The Council rejected this option because the preferred option is more easily enforced and because of the complications this option presents in determining whether a vessel is under charter.

ACTION 13. MODIFY THE MANAGEMENT UNIT FOR SCUP

Modify the management unit for scup (*Stenotomus chrysops*) to apply south of Cape Hatteras, North Carolina.

Biological Impacts

The scup fishery extends from the southern border of North Carolina northward to the US–Canadian border. Commercial landings declined substantially after landings peaked in 1981. The lowest landings during the ten–year period (1981–90) were recorded in 1989 at 8.2 million pounds. Landings increased in 1990 to 9.5 million pounds but were still below the ten–year average of 14.9 million pounds. Recreational landings of 4.6 million pounds in 1990 were well below the ten–year average of 6.5 million pounds (Mid–Atlantic Fishery Management Council Scup and Black Sea Bass Scoping Document, unpublished). Catch per unit of effort has also shown a decrease reflecting a decline in stock abundance. In addition, length frequency distribution of scup showed a shift to smaller sized fish (Moore, 1993). There has been more effort concentrated at this fishery because of declines in catch rates and management measures adopted to address overfishing in other major fisheries. If this is allowed to continue it is possible that more effort will be directed at this fishery, exacerbating the current problems of high exploitation rates.

The Mid–Atlantic Fishery Management Council is proposing a separate management plan for scup which will allow for a timely intervention and provide a vehicle for managing this fishery. It is likely that these measures will be frameworked. The South Atlantic Fishery Management Council is proposing similar measures by bringing the scup fishery into the snapper grouper management unit. The scoping document prepared by the Mid-Atlantic Council indicated that the current fishing mortality is well above the long-term sustainable yield and that the rate of exploitation should be reduced from 65 percent to 20 percent. The current instantaneous fishing mortality (F) is 1.2 while Fmax that would ensure long-term sustained harvest is 0.25. The measures that are being proposed include: minimum size limit, closed season or closed area, commercial vessels requiring permits to sell scup to permitted dealers, dealers requiring permits to buy scup from permitted vessels, operators of commercial vessels/party and charter boats to have permits, vessels should submit logbook reports, dealers should submit reports, and operators of charter and party boats should submit logbooks.

The 1987–1991 MRFSS intercept data for each state indicated that 42.6% of the catch was less than 8" TL, while the 1991 MRFSS intercept data for each state indicated that 64.5% of the catch was less than 8" TL for North Carolina (Tables 12-13). This shows that the frequency of smaller sized fish in the

catch for North Carolina has increased significantly over the period 1987–1991. Using North Carolina annual winter trawl data, the percentages under 8" TL have been fluctuating since 1982, but seem to be on an upward trend. During 1991–1992, 54.1% of the catch was under 8" TL (Table 14).

Presently the South Atlantic Council's snapper grouper fishery management plan contains an 8" TL minimum size limit for black seabass (which is another species that the Mid–Atlantic Fishery Management Council is developing a fishery management plan for) in the South Atlantic EEZ. Studies conducted by David Simpson indicate that an 8" TL minimum size limit on scup for both commercial and recreational fisheries will increase yield by approximately 12.5%. These studies also show changes in yield with alternative size limits. He noted that there is a slight change in Fmax with increasing size. The size at which 50% of scup are sexually mature is 6.8" TL (Moore, 1993).

Enforcement Impacts

Enforcement of any measures may be more difficult because they would only apply in a portion of North Carolina. This will require public education and a large amount of publicity.

Socioeconomic Impacts

Taking the average commercial landings and values for scup in North Carolina for 1990–1992, an 8" TL minimum size limit will initially reduce annual catch by 100,491 pounds (54%). This would result in lost producer surplus to commercial fishermen in North Carolina of $67,329 in the first year. No data is available to compute the expected benefits, but improved recruitment and yield would likely increase the long-term gains to fishermen. Recreational landings of scup in North Carolina are not available to calculate the loss in benefits that would result from an 8" size limit.

If a closed season is enforced, the percentage of annual landings that would be affected would depend on the timing of the closure. If closed season is enforced January–March, 82% of the annual landings would be affected; April–June, 17 percent; July–December; less than one percent (Moore, 1993).

Other measures involving vessel permit, dealer permit, operators permit, submission of logbooks and reports would not impose extra burden on fishermen since these measures are already in place or proposed for other species in the snapper grouper FMP. Including scup under this plan would provide necessary information for effective management of the fishery.

Table 12. The percent of measured scup (TL) less than a given size based on 1987–1991 MRFSS intercept data for each state.

State	< 7.0	< 8.0	< 9.0	< 10.0	N
ME	–	–	–	–	–
NH	–	–	–	–	–
MA	1.6	6.7	23.7	48.7	3725
RI	11.4	30.1	49.9	73	2281
CT	1.1	7.4	28.9	55.6	1397
NY	12.3	25.9	51.4	71.9	5250
NJ	4	32.1	84.5	96.7	705
DE	6.4	55.2	92	97	299
MD	0	13.3	86.7	100	15
VA	16.7	44.1	77.6	94.3	245
NC	16.7	42.6	63	85.2	54

Table 13. The percent of measured scup (TL) less than a given size based on 1991 MRFSS intercept data for each state.

State	< 7.0	< 8.0	< 9.0	< 10.0	N
ME	–	–	–	–	–
NH	–	–	–	–	–
MA	0.7	2.1	13.5	42.5	1,196
RI	12.7	28.9	37.4	57.6	727
CT	0.6	0.6	8.2	19.4	170
NY	5.5	15.6	35.0	57.1	1,467
NJ	2.9	33.9	86.7	96.6	384
DE	9.2	63.2	98.4	99.5	185
MD	0.0	0.0	71.4	100.0	7
VA	4.8	34.9	92.1	100.0	63
NC	29.0	64.5	83.9	96.8	31

Table 14. The percent of measured scup (TL) less than a given size based on 1982–1992 North Carolina winter trawl data.

Year	< 7.0	< 8.0	< 9.0	< 10.0	N
1982–1983	5.6	27.7	50.0	69.6	280,551
1983–1984	2.1	31.8	50.1	68.9	316,159
1984–1985	0.8	64.5	86.5	93.2	200,807
1985–1986	0.6	17.8	35.3	55.4	112,932
1986–1987	0.4	9.7	26.8	44.9	127,217
1987–1988	0.2	12.4	49.7	76.4	79,323
1988–1989	17.0	45.4	86.3	95.6	19,859
1989–1990	1.2	18.2	43.8	78.7	75,094
1990–1991	2.9	38.5	66.3	87.2	223,967
1991–1992	14.4	54.1	84.9	91.1	130,520

Conclusion

This option would track the management unit for black sea bass. It also meets the request of the Mid Atlantic Council. The stock structure of scup is poorly known; however, there is virtually no fishery for scup in the southeast other than a certain amount in North Carolina (Dr. Edwin Joseph, SCWMRD, personal communication). Mr. Spitsbergen and Dr. Joseph agreed that the North Carolina fishery was a mixed trawl fishery, operating out of places like Oregon Inlet with vessels moving north to participate in the Mid Atlantic fishery. They indicated there was no fishery for scup in the south Atlantic and there is no question that if there is a Mid Atlantic scup stock, it comes down to Cape Hatteras.

The Mid-Atlantic Council is developing an amendment to their management plan to address black sea bass and scup and have indicated that they would like to manage these two species down through Cape Hatteras.

The South Atlantic Council approved this option given the range of the fishery and the apparent stock separation north of Cape Hatteras.

Rejected Options for Action 13

Rejected Option 1. No action.

Biological Impacts

This option would leave the scup (*Stenotomus chrysops*) management unit as the area of authority of the South Atlantic Council and the waters within the seaward boundary of the states from North Carolina

through the east coast of Florida. This management unit applies for all species in the snapper grouper management plan except black sea bass. For black sea bass, the management unit is the area south of Cape Hatteras, North Carolina. The rationale from the original plan (SAFMC, 1983) is: "Cape Hatteras is the boundary between two distinct stocks of sea bass. Furthermore, black sea bass are taken north of Hatteras by trawls and south of Cape Hatteras primarily by trap, constituting different fisheries. The Mid-Atlantic Fishery management Council is developing a plan for sea bass north of Cape Hatteras."

Enforcement Impacts

No regulatory effort would be necessary for scup in the south Atlantic.

Socioeconomic Impacts

The no action option will allow fishermen to continue to harvest scup under 8" TL which will reduce recruitment and could result in recruitment overfishing. Producer surplus will decline as catches decline in the long-term. The magnitude of the decline will depend on the scale at which recruitment is affected.

Conclusion

The Mid Atlantic Council has requested that we modify the management unit for scup based on stock differences north and south of Cape Hatteras. The council rejected the no action option based on the range of the fishery and apparent stock separation at Cape Hatteras.

ACTION 14. MODIFY THE FRAMEWORK PROCEDURE

Modify the framework (wording included under discussion below) by inserting "where appropriate" after "report" in (3): "...accompanied by the Group's report (where appropriate)..." Modify the last sentence in (3) to read: "For wreckfish and any other species under limited access, this report will be submitted each year at least 60 days prior to the start of the fishing season; for all other species and/or changes, this report will be submitted by any such date as may be specified by the Council but at least 60 days prior to the desired effective date." Also, modify the last sentence in (4) to read: "...changes for species managed under limited access prior to the fishing year, and for all other species and/or changes on such dates as may be agreed upon with the Council."

Biological Impacts

The framework established in Amendment 4 has been interpreted to allow preseason changes for wreckfish prior to the April 16 start of the fishing season, and for all other species and/or changes prior to January 1. The alternatives discussed below will explore retaining the preseason timeframe for wreckfish but allow other changes as needed during the year.

Amendment 4 (SAFMC, 1991a; page 22) discusses the assessment group and annual adjustments. The wording currently in place is as follows:

> "3. If changes are needed in the maximum sustainable yield (MSY), total allowable catch (TAC), quotas, trip limits, bag limits, minimum sizes, gear restrictions, season/area closures (including spawning closures), timeframe for recovery of overfished species or fishing year, the Council will advise the Regional Director in writing of their recommendations accompanied by the Group's report, relevant background material, draft regulations, Regulatory Impact Review and public comments. This

report will be submitted each year at least 60 days prior to the start of the fishing season (currently April 16).

4. The Regional Director will review the Council's recommendations, supporting rationale, public comments and other relevant information. If the Regional Director concurs that the Council's recommendations are consistent with the goals and objectives of the fishery management plan, the national standards and other applicable law, the Regional Director will recommend that the Secretary publish proposed and final rules in the Federal Register of any changes prior to the appropriate fishing season (currently April 16)."

It is the Council's intent to make most changes prior to the appropriate fishing year (April 16 for wreckfish and January 1 for all other species). However, instances may arise that require action during the fishing year and may not require/allow for a report from the assessment group. This option would allow the Council to take appropriate action that would benefit the resource or the resource users without having to rely on emergency action. If this wording was in Amendment 4, the recent black sea bass pot changes would not have required emergency action. The NMFS Washington Office has made it clear that the Councils are to develop framework provisions that reduce the necessity of requesting emergency action. This change to "any such date as may be specified by the Council" tracks the mackerel framework.

This option would allow for an in-season adjustment to the quota for species managed under an open access quota management program. However, for species under a limited access management program, modifications to the quotas would be pre-season adjustments.

Enforcement Impacts

None.

Socioeconomic Impacts

Within season adjustments are important for flexible management that accommodates the needs of the resource as well as those of fishermen. Thus, within season adjustments could be beneficial. On the other hand, within season adjustments can be considered burdensome to commercial fishermen who are more involved with making a living than following regulatory changes. Such fishermen may be in violation because they were not aware of changes in regulations. Recreational fishermen who are not avid fishermen and are only peripherally involved with saltwater fishing may also be impacted by within season adjustments which may modify regulations without the prior knowledge of the angler and thus lead to violations. Fishermen are probably more apt to become aware of changes in regulations if they are implemented at the start of the fishing season rather than as issues come to the attention of managers. For this reason, additional or more effective publicity of changes in regulations will facilitate the process of informing fishermen of current changes in fishing regulations.

Although this action could provide for timely intervention, it could involve significant costs in terms of informing fishermen of changes in management measures within season. Another factor of importance is whether fishermen would be able to adjust their fishing activities within season to comply with certain changes. The outcome of any particular modification would depend on its nature, the flow of the information to the fishermen and the ease at which fishermen can make adjustments. It is not possible to predict whether

the gains that could be obtained from within season changes in management measures would exceed the costs. This has to be evaluated on a case by case basis.

Conclusion

The Council approved this option so that future changes may be accomplished through the framework procedure rather than emergency action or plan amendment. This will result in a more timely response to changes in the fishery.

Rejected Options for Action 14

Rejected Option 1. No action.

Biological Impacts

May have adverse impacts resulting from the Council being unable to react and take action to a crisis in the fishery. Not changing the wording in Amendment 4 will result in all changes, other than wreckfish, becoming effective on January 1. The report and associated material would be submitted at least 60 days prior to April 16 for wreckfish, and January 1 for all other species and/or changes. If future situations arise similar to the black sea bass issue (e.g., need for spawning closures, trip limits, etc.), options available to the Council would be emergency action or waiting until January 1 to have regulations become effective.

Enforcement Impacts

None.

Socioeconomic Impacts

The no action option will eliminate the possibility of taking timely action when this is necessary. This could allow a deteriorating situation to continue when it could have been addressed. If a stock is being overfished and this is allowed to continue, there could be significant loss in revenues in the long-term depending on how long it takes for the stock to recover once the problem is addressed.

Conclusion

The Council rejected this option because management would not have been able to respond in a timely fashion to changes in the fishery.

Rejected Option 2. Adopt the preferred option with the additional provision that after quotas for other species are established, subsequent quota modifications (or all modifications for that species) would be submitted at least 60 days prior to the associated fishing year.

Biological Impacts

This option would establish the Council's intent that all modifications of quotas be specified prior to the start of the fishing year. If an ITQ program is established at some future date, the Council may want to specify that all changes affecting the species under ITQ management be accomplished prior to the associated fishing year as has been done for wreckfish.

Enforcement Impacts

None.

Socioeconomic Impacts

This would make the management process more cumbersome and the 60 days provision may not be practical for all situations. For some situations it would amount to no action. This could result in overfishing and revenue losses in the long-term.

Conclusion

This option was rejected by the Council because it would limit flexibility to respond to changes in the fishery. For fisheries managed by ITQ the actions will take place prior to the start of the fishing year but if species are only managed with a quota, the Council wanted to maintain the flexibility to modify quotas as a within year adjustment.

F. Unavoidable Adverse Effects

Without management, fishing effort would increase and catches in the snapper grouper fishery would decline. The SSR values for a number of species have declined between the times of the 1990 and 1992 assessments (Table 2). 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.

Implementation of size limits for hogfish will initially reduce commercial and recreational catches by 20% and 45% respectively; for mutton snapper reductions are 12% and 18% respectively. These catch reductions will be temporary and will have minimal impacts on fishermen. The size limits will increase recruitment which should prevent growth and recruitment overfishing and will ultimately lead to a higher yield.

Implementation of permits, gear regulations, and the miscellaneous items will have minimal impacts.

G. Relationship of Short-term Uses and Long-term Productivity

Short-term uses will be impacted slightly. This level of reduction is necessary to rebuild these overfished stocks to non-overfished status to ensure the long-term productivity of these important species. Without such reductions, the long-term yield would be jeopardized.

The Council weighed the short-term losses to fishermen against the long-term yield and stability of these species and concluded that the proposed actions would result in net benefits to society.

H. Irreversible and Irretrievable Commitments of Resources

There are no irreversible or irretrievable commitments of resources associated with the proposed actions. If the Council had not taken action to reduce fishing mortality on these overfished species and to establish the other regulations, substantial reductions in catches and future net benefits would be expected.

I. Effects of the Fishery on the Environment

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. Habitat concerns are included in Appendix D.

Trawling for snapper grouper species was prohibited in Amendment 1 (SAFMC, 1988) and bottom longline gear for wreckfish was prohibited by emergency action effective April 19, 1991 and subsequently in Amendment 5 (SAFMC, 1991b) because of habitat damage. Bottom longline gear was restricted to waters deeper than 50 fathoms in Amendment 4 (SAFMC, 1991a) primarily to protect the live bottom habitat. Part of the rationale for the fish trap prohibition was habitat damage caused by deployment and retrieval of traps (SAFMC, 1991a).

Regulations within the existing *Oculina* Habitat of Particular Concern (HAPC) will be strengthened with the proposal in Amendment 6 to close the area to all bottom fishing and to prohibit fishing while anchored within the HAPC. Although aimed at reducing violations in the closed area, the limitations on anchoring will reduce damage to the fragile *Oculina* coral.

The fishery, as presently prosecuted, does not substantially impact the live bottom habitat that is essential to the reef species under Council management. The *Oculina* HAPC is discussed in Amendment 6. The Council will continue to monitor the fishery and if it becomes apparent that a particular gear or fishing practice results in habitat damage, action will be proposed through the framework procedures to mitigate or minimize damage.

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 Council discussed concerns about the impact sale of bag limit caught fish may have on seafood safety. After extensive public input, presentations, and discussion, the Council concluded, given that all seafood sold must meet FDA requirements, sale of bag limit caught fish did not pose any substantial adverse risk on public health or safety.

Endangered Species and Marine Mammals

The proposed actions, and their alternatives, are not expected to affect adversely any endangered or threatened species or marine mammal population.

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 sea turtles. In fact, the proposed measures will improve status of stocks and minimize habitat damage because overall fishing mortality will decrease.

J. Summary of Expected Changes in Net Benefits (Summary of Regulatory Impact Review-RIR)

ACTION	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
SIZE LIMITS			
Hogfish	Prevent overfishing. Ensure long-term economic viability.	20% & 45% initial reduction in commercial & recreational catches respectively.	Positive
Mutton Snapper	Prevent overfishing. Ensure long-term economic viability.	12% & 18% initial reduction in commercial & recreational catches respectively.	Positive
PERMITS			
Dealer Permits	Improve product quality. Long term consistent supply. Better business planning horizon.	Cost of permit estimated at $40 annually per fisherman. Additional permit - $10.	Positive
Requirements to Sell Fish	Improve data collection. Better tracking syatem.	Cost of permit estimated at $40 annually per fisherman. Additional permit - $10.	Positive
Charter & Headboats Permits	Enhance monitoring & improve data collection.	Cost of permit estimated at $40 annually per fisherman. Additional permit - $10.	Positive
GEAR REGULATIONS			
Allowed Gear	Prevent overfishing and protect ecosystem.	Initial decrease in producer surplus - amount unknown.	Positive
Procedure for Experimental Gear	Reduce waste, could be selective.	Could increase harvest rate resulting in stock depletion.	Unkown
Sink Net Fishery	Provide flexibility to fishermen making multi-gear trips in North Carolina.	Fishermen might try to use net to harvest species in the snapper grouper management unit.	Positive

MISCELLANEOUS ITEMS			
New Problem	Prevent localized overfishing.	Initial decrease in producer surplus.	Positive
New Objective	Prevent localized depletion.	Decrease in producer surplus in the long-term. Switch to other fishing grounds.	Positive
Mullti-Day Bag Limits	Improve enforcement. Provide equity between different groups.	Possible decrease in income to charter and headboat operators.	Positive
Charter/Headboat Crew Specification	Improve enforcement	None	Positive
Modify the Management Unit for scup	Prevent overfishing. Consistent & adequate enforcement.	Initial decrease in producer surplus during first year estimated at $67,400.	Positive
Modification to Framework Procedure	Enable timely intervention within season. Prevent fishing derby.	Possible initial decrease in producer surplus to fishermen. May also incur refitting cost within season.	Positive

K. Public and Private Costs

The 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 this specific action include:

Council costs of document preparation, meetings, public hearings and information dissemination	$78,560
NMFS administrative costs of document preparation, meetings and review	$25,000
NMFS law enforcement costs (additional agent in South Carolina)	$80,000
Public burden associated with permits, etc.	$0
Total	$183,560

No new costs for enforcement outside of South Carolina are anticipated because the HAPC already exists through prior regulations and the majority of the other regulations will be enforced dockside.

L. Effects on Small Businesses

Introduction

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. The category of small entities likely to be affected by the proposed plan is that of commercial hogfish fishermen, mutton snapper fishermen, charter/headboats, fishermen selling bag limit-caught fish, and restaurants and fish houses which have a high dependence on these species. The impacts of the proposed action on these entities have been discussed under each action in Section 4. The following discussion of impacts focuses specifically on the consequences of the proposed actions on the mentioned business entities. A "threshold-type analysis" is done to determine whether the impacts would have a "significant or non-significant economic impact on a substantial number of small entities." If impacts are determined to be significant, then an Initial Regulatory Flexibility Analysis (IRFA) is conducted to analyze impacts of the proposed action and alternatives on individual business entities. In addition to analyses conducted for the Regulatory Impact Review (RIR), the IRFA provides an estimate of the number of small businesses affected, a description of the small businesses affected, and a discussion of the nature and size of the impacts.

Determination of Significant Economic Impact on a Substantial Number of Small Entities

In general, a "substantial number" of small entities is more than 20 percent of those small entities engaged in the fishery (NMFS, 1991b). For the 1992 fishing season, the most recent year for which data on numbers of participants are available for all south Atlantic states, there were 1,887 individuals and corporations holding snapper grouper permits (Harris et al., 1993). The Small Business Administration (SBA) defines a small business in the commercial fishing activity as a firm with receipts of up to $2.0 million annually. All 1,887 holders of snapper grouper permits readily fall within the definition of small business. Since the proposed action will directly and indirectly affect many of these permittees, the "substantial number" criterion will be met.

Economic impacts on small business entities are considered to be "significant" if the proposed action would result in any of the following: a) reduction in annual gross revenues by more than 5%; b) increase in total costs of production by more than 5% as a result of an increase in compliance costs; c) compliance costs as a percent of sales for small entities are at least 10% higher than compliance costs as a percent of sales for large entities; d) capital costs of compliance represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities; or e) as a rule of thumb, 2% of small business entities being forced to cease business operations (NMFS, 1991b).

The Council examined the following actions and alternatives: (1) Hogfish minimum size limit of 12" fork length (pages 26-33), (2). Mutton snapper minimum size limit of 16" total length (pages 33-44), (3) Require dealer permits (pages 44-48), (4) Requirements to sell fish (pages 48-54), (5) Charter and headboat permits (pages 54-55), (6) Specify allowable gear and Procedure for experimental gear

(pages 56-67), (7) Sink net fishery (pages 67-72), (8) New problem and objective (pages 72-77), (9) Multi-day bag limits (pages 77-80), (10) Charter/headboat crew specification (pages 80-84), (11) Management unit for scup (pages 84-88), and (12) Modify the framework procedure (pages 88-91).

Given that for each action (a) any impact would be equivalent to much less than a 5% reduction in annual gross revenues, (b) any increase in compliance costs would be much less than a 5% increase in total costs of production, (c) all entities involved are small entities, (d) capital costs of compliance represent a very small portion of capital, and (e) no entities are expected to be forced to cease business operations, the Council determined that the resulting impacts will not have a significant economic impact on a substantial number of small entities.

Explanation of Why the Action is Being Considered

Refer to Section 1.0, Purpose and Need (pages 1-4). Basically, this amendment addresses overfishing of hogfish and mutton snapper, improving data collection, providing for orderly utilization and flexible management, reducing habitat damage, and improving compliance with fishing regulations.

Objectives and Legal Basis for the Rule

Refer to Section 1.0 (page 1) and Appendix A for the Management Objectives. Objectives addressed in this amendment are: (1) Prevent overfishing in all species, (2) Collect necessary data, (3) Promote orderly utilization of the resource, (4) Provide for a flexible management system, (5) Minimize habitat damage, and (6) Promote voluntary compliance. The Magnuson Fishery Conservation and Management Act of 1976 as amended provides the legal basis for the rule.

Demographic Analysis

Refer to the Source Document (SAFMC, 1983b) and Section 3.0 (pages 13-25) of this amendment. Data on fishermen is very limited. A costs and returns survey will be completed by the end of calendar year 1994 and a sociodemographic survey will be conducted during 1995. Results of these studies will be incorporated into future amendments.

Cost Analysis

Refer to the summary of the impacts (Section 4.0, Subsections I and J; pages 92-94) and the summary of government costs (Section 4.0, Subsection K; page 94). The Council concluded that the benefits of the preferred alternatives outweigh the costs.

Competitive Effects Analysis

The industry is composed entirely of small businesses (harvesters and fish houses). Since no large businesses are involved, there are no disproportional small versus large business effects.

Identification of Overlapping Regulations

The proposed action does not create overlapping regulations with any state regulations or other Federal laws.

Conclusion

The proposed measures will not have a significant effect on small businesses.

5.0 LIST OF PREPARERS

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The work of the Council's Snapper Grouper Plan Development Team, Scientific and Statistical Committee, and Advisory Panel is recognized. Members are as follows:

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The following individuals helped during development of this amendment by providing assistance with landings data and by providing snowy grouper and golden tilefish catch by trip information:

Fritz Rohde, North Carolina Division of Marine Fisheries
Joe Moran, South Carolina Wildlife & Marine Resources Department
Gina Gore, Georgia Department of Natural Resources
Dr. Joe O'Hop, Florida Marine Research Institute

The work of the NMFS Beaufort Laboratory is acknowledged. In particular Dr. Gene Huntsman, Dr. John Merriner, Robert Dixon, Mike Burton, Dr. Pete Parker and Nelson Johnson.

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6.0 LIST OF AGENCIES AND ORGANIZATIONS

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List of Agencies and Persons Consulted:
Atlantic Coast Conservation Association
Atlantic States Marine Fisheries Commission
SAFMC Law Enforcement Advisory Panel
SAFMC Snapper Grouper Advisory Panel
SAFMC Scientific and Statistical Committee
SAFMC Snapper Grouper Plan Development Team
North Carolina Coastal Zone Management Program
South Carolina Coastal Zone Management Program
Florida Coastal Zone Management Program
Florida Department of Natural Resources
Florida Marine Fisheries Commission
Georgia Department of Natural Resources
South Carolina Wildlife and Marine Resources Department
Marine Fish Conservation Network
North Carolina Department of Environment, Health, and Natural Resources
National Marine Fisheries Service
- Southeast Region
- Southeast Center

United States Coast Guard
United States Environmental Protection Agency, Region IV
Center for Marine Conservation
Gulf of Mexico & Mid-Atlantic Fishery Management Councils
Florida League of Anglers
South Atlantic Fisheries Development Foundation
Marine Advisory Agents
National Coalition for Marine Conservation
North Carolina Fisheries Association, Inc.
Southeastern NC Waterman's Association
Organized Fishermen of Florida
Southeastern Fisheries Association
Sportfishing Institute

7.0 APPLICABLE LAW

A. VESSEL SAFETY CONSIDERATIONS

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 to the Snapper Grouper Fishery Management Plan. 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.

B. 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 that this amendment is an improvement to the federal management measures for the deep water complex fishery.

This amendment is consistent with the Coastal Zone Management Plan of the States of Florida, South Carolina and North Carolina to the maximum extent possible; Georgia is in the process of developing a Coastal Zone Management Plan.

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. Florida responded that "the project is in accord with State plans, programs, procedures and objectives." South Carolina "certified that the above referenced project is consistent with the Coastal Zone Management Program." The State of North Carolina responded that we "cannot disagree with your determination that the proposed amendment is consistent with the North Carolina Coastal Management Program." They further stated that the Council give the comments from the North

Carolina Division of Marine Fisheries full consideration and that the recommendations therein be incorporated into the final amendment. The Council's final position does reflect suggestions from the Division of Marine Fisheries.

C. ENDANGERED SPECIES AND MARINE MAMMAL ACTS

The following information summarizes the Section 7 consultation process under the Endangered Species Act on this biological assessment of the snapper–grouper fisheries of the South Atlantic Region and the proposed management measures contained in Amendment 7 to the Fishery Management Plan for the Snapper–Grouper Fishery of the South Atlantic Region (SOURCE: Memorandum to Gregg Waugh, SAFMC Staff from Peter Eldridge, NMFS Southeast Region dated April 1, 1994).

1.0 Snapper–Grouper Fishery of the South Atlantic

1.1 Description of the Fishery

The primary gears in the fishery are sea bass pots (north of Cape Canaveral only), longlines (seaward of 50 fathoms), hook and line and spear guns. Fish traps, entanglement nets, roller trawls and destructive gear, such as explosives and poisons, are prohibited. There is a requirement that one must have at least 50% of earned income derived from fishing or gross sales of $20,000 annually for one of the preceding three years before one can obtain a vessel permit. Managers are in the process of restricting fishing pressure to the level that is consistent with providing a sustainable yield without damaging the reproductive capability of the snapper–grouper resource. Section 1.1 in memo to Jeffery Brown from Michael E. Justen (both NMFS Southeast Region) dated April 24, 1991 provides information on other aspects of the snapper–grouper fishery:

> The snapper grouper fishery has more than 70 species of fish from the families: snappers, Lutjanidae; temperate basses, Percichthyidae; sea basses and groupers, Serranidae; porgies, Sparidae; grunts, Haemulidae; tilefishes, Malacanthidae; triggerfishes, Balistidae; wrasses, Labridae; and jacks, Carangidae.
>
> The primary user groups are commercial and recreational fishermen. Commercial fishermen generally operate in water depths between the shoreline and about 2,500 feet while recreational fishermen tend to fish in waters with depths less than 200 feet. Both groups of fishermen operate throughout the year, and range from the North Carolina/Virginia border to the Gulf of Mexico/Atlantic Ocean boundary off the Florida Keys. Commercial fisheries for tilefish and the temperate sea basses generally operate in waters with depths greater than 300 feet.
>
> Commercial fishermen operate from ports along the east coast of Florida, Georgia, South Carolina, and Georgia. In 1988, landings were 9,053,000 pounds with an exvessel value of $13,937,000. Estimated number of vessels in this fishery is 700. Fishermen on commercial vessels use handlines, longlines, and traps. Most fish landed were caught by handline gear.
>
> The "for-hire" recreational fleet consists of charter and headboats. Charter vessels carry up to 6 passengers. Headboats carry more than 6 passengers. During 1990, the estimated number of charter vessels operating in this area was 1,072 with 694 operating from ports in Florida, 262 from ports in North Carolina, 80 from ports in South Carolina, and 36 from ports in Georgia. The average length of charter vessels was 35 feet. the predominate gear used were rod and reels and spear guns. Snappers and groupers account for about 8% of the catch by these fleets.
>
> During 1990, the estimated number of headboats in this area was 200 with 164 operating out of ports in Florida, 24 from ports in North Carolina, 7 from ports in Georgia, and 5 from ports in South

Carolina. The average length of these vessels was 51 feet. The predominate gear used is rod and reel. Snappers and groupers account for a significant portion of the catch by these fleets.

Recreational fishermen from Florida, Georgia, North Carolina, and South Carolina, consider snappers and groupers to be a primary target. These fishermen generally use rod and reels, and spear guns to catch these fish. During 1990, this group accounted for approximately 906,000 trips.

There is no foreign fishing in U.S. waters.

1.2 Interactions with Endangered Species

Section 1.2 in the memo from Michael E. Justen dated April 24, 1991 provides the following:

Five species of sea turtles regularly spend part of their lives in U.S. coastal waters of the Atlantic Ocean and Gulf of Mexico. These species are Kemp's ridley, *Lepidochelys kempii*; loggerhead, *Caretta caretta*; green turtle, *Chelonia mydas*; hawksbill, *Eretmochelys imbricata*; and leatherback, *Dermochelys coriacea*. These sea turtles are either threatened or endangered and are protected under the Endangered Species Act.

NMFS does not have any information to show that the snapper grouper fisheries kill any sea turtles. The potential for such situations to develop exists because hook-and-line gear may catch some turtles. Presumably, the fishermen would release the turtles. Although some species of sea turtles may enter fish traps and eat the catch, NMFS does not have any records of incidental capture. Amendment 1 prohibited use of trawl gear in these fisheries in 1989.

Collisions between commercial and recreational vessels and sea turtles may occur. The extent of this activity and the impact on the populations of sea turtles in unknown.

1.3 Federal and State Regulatory Jurisdictions

The Federal government, Florida, Georgia, North Carolina, and South Carolina regulate the snapper–grouper fisheries. Most species occur in commercial quantities in the waters of these states and the adjoining EEZ. Federal waters extend from 3 to 200 nautical miles in the south Atlantic and include the vast majority of the fishery.

Federal regulations are based on the Snapper–Grouper FMP. Final regulations implemented the FMP on September 28, 1983; Amendment 1 on January 12, 1989; Amendment 2 on October 30, 1990; Amendment 3 on January 31, 1991; Amendment 4 on January 1, 1992; Amendment 5 on April 6, 1992; and Amendment 6 on June 6, 1994 for trip limits and June 27, 1994 for the remainder of the items.

1.4 Amendment 7 to the Fishery Management Plan for the Snapper–Grouper Fishery of the South Atlantic

Amendment 7 will establish a minimum size limit of 12" fork length (FL) for hogfish; increase the mutton snapper minimum size limit from 12" to 16" TL; require dealers, who want to purchase species in the management unit taken in the EEZ, to obtain a federal dealer permit; require a federal permit to sell species taken in the EEZ; require charter and headboats to obtain a federal permit; specify allowable gear; establish a procedure for testing of gear; allow sink net fishermen, only off North Carolina, to make multi–gear trips and allow retention of all fish harvested with BSB pots and/or bandit gear that meet the minimum size limits; modifies the management unit for scup; and modifies the framework procedure to allow within season adjustments.

1.5 Previous Section 7 Consultations

In 1983, a Section 7 consultation under the ESA with NMFS concluded that the management actions contained in the Snapper– Grouper FMP was 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. These documents are incorporated by reference as authorized in 50 CFR Part 402.12(g).

On April 28, 1989, NMFS conducted a Section 7 consultation on the effects of commercial fishing activities in the southeast region on threatened and endangered species. This action was taken with the implementation of the Marine Mammal Protection Act, Fishery Exemption Amendment. The Biological Opinion concluded that the snapper–grouper fisheries are not likely to adversely affect endangered and threatened species. This document is incorporated by reference.

On July 6, 1990, a Section 7 consultation under the ESA with NMFS concluded that Amendment 3 to the Snapper–Grouper FMP was 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. This document is incorporated by reference.

On July 6, 1990, a Section 7 consultation under the ESA with NMFS concluded that an emergency rule to curtail the harvest of wreckfish in the south Atlantic was 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. This document is incorporated by reference.

On March 7, 1991, a Section 7 consultation under the ESA with NMFS concluded that an emergency rule to ban use of longline gear to harvest wreckfish in the south Atlantic was 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. This document is incorporated by reference.

On May 3, 1991, a Section 7 consultation under the ESA with NMFS concluded that management measures in Amendment 4 to the 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. This document is incorporated by reference.

On September 19, 1991, a Section 7 consultation under the ESA with NMFS concluded that management measures in Amendment 5 to the 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. This document is incorporated by reference.

On December 30, 1992, a Section 7 consultation under the ESA with NMFS concluded that management measures in an emergency rule to define sea bass pots, allow multi–gear trips, and allow retention of incidentally caught fish provided they were of legal size 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. This document is incorporated by reference.

On September 21, 1993, a Section 7 consultation under the ESA with NMFS concluded that management measures in Amendment 6 to the FMP were not likely to adversely affect the continued existence of threatened or endangered sea turtles or marine mammals or result in the destruction of adverse modification of habitat that may be critical to those species. This document is incorporated by reference.

1.6 Conclusion

Insofar as we can determine, neither the directed fisheries nor the proposed Amendment 7 for snapper–grouper will adversely affect the recovery of endangered or threatened species, or their critical habitat.

D. 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 does propose additional permit and data collection programs within this amendment. The Council has proposed that dealers, charter boats, and headboats obtain permits. Further, that they provide certain information.

E. 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.

F. NATIONAL ENVIRONMENTAL POLICY ACT — FINDINGS OF NO SIGNIFICANT IMPACT (FONSI)

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/environmental assessment. A description of the affected environment is contained in Section 3.0.

The proposed amendment is not a major action having significant impact on the quality of the marine or human environment of the South Atlantic. The proposed action is an adjustment of the original regulations of the fishery management plan to protect the snapper grouper resource from depletion. The proposed action should not result in impacts significantly different in context or intensity from those described in the Environmental Impact Statement (EIS) published with the initial regulations implementing the approved

fishery management plan. The preparation of a formal Supplemental Environmental Impact Statement (SEIS) is not required for this amendment by Section 102(2)(c)(c) of the National Environmental Policy Act or its implementation regulations.

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 protect the resource from depletion, better achieve the objectives of the fishery management plan, and lessen the environmental impacts of the fishery. Overall, the benefits to the nation resulting from implementation of this amendment are greater than management costs.

Finding of No Significant Environmental Impact (FONSI)

The Council's preferred action is to manage hogfish and mutton snapper with minimum size limits. 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. Impacts of these actions are relative to the individuals that will be required to forego catches in the short-term and to the individuals, and society, in the long-term, because higher and more stable catches will be maintained. The analyses presented below are based on the detailed information contained in Section 4.0 Environmental Consequences including the Regulatory Impact Review and Regulatory Flexibility Determination.

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 (See Section 4.0, Items J. Summary of Impacts and L. Effects on Small Businesses) and summarized in Section 2.0. Overall, the adverse impacts of the minimum size limits are expected to be minor. Beneficial impacts are unquantifiable but preventing overfishing will ensure the long-term economic viability of the recreational and commercial fisheries.

The beneficial and adverse impacts as analyzed in Section 4.0 are not significant.

Public Health or Safety

The proposed actions are not expected to have any significant adverse impact on public health or safety.

Unique Characteristics

The proposed actions are not expected to have any significant adverse impact on unique characteristics of the area such as proximity to historic or cultural resources, park lands, wetlands, or ecologically critical areas. Appendix D contains information on habitat concerns. The Council's positions on a number of habitat related issues are presented in this appendix. The Council evaluated the effects of the

fishery on the environment (Section 4.0, Item I) and concluded that the fishery, as presently prosecuted, does not significantly impact the live bottom habitat that is essential to the reef species under Council management.

Controversial Effects

The proposed actions are not expected to have any significant controversial issues. The Council has provided for extensive input by the public through committee and Council meetings that are open to the public, by providing copies of the amendment to the list of agencies and organizations listed in Section 6.0, through meetings with the snapper grouper advisory panel, by holding 13 public hearings, and by providing the opportunity for interested persons to provide written comments. Appendix E contains a summary of public hearing and written comments received by the Council. During development of this amendment, the Council has incorporated suggestions from the public, and the final document addresses all comments and suggestions received.

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 managed.

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 are not expected to have any significant cumulative impacts that could have a substantial effect on the snapper grouper resource or any related stocks, including sea turtles. (See Section 4.0, Item J. Summary of Impacts and L. Effects on Small Businesses) In fact, the proposed measures will improve status of stocks and minimize habitat damage because overall fishing mortality will decrease.

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.

Endangered/Threatened Impacts

The proposed actions are not expected to adversely affect any endangered or threatened species or marine mammal population. (See Section 7, Item C. Endangered Species and Marine Mammal Acts.) A Section 7 consultation was conducted with the NMFS Southeast Regional Office. A biological assessment was prepared which concluded that the proposed actions will not adversely affect any threatened or endangered species or marine mammals.

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 Council has adopted a number of positions that protect the habitat supporting the snapper grouper resources. These positions are contained in Appendix D. Habitat Concerns.

Additional points analyzed by the Council in determining that a SEIS was not necessary are presented below. The Council will be preparing a SEIS as a part of the next amendment to the snapper grouper fishery management plan. Additional information is being collected during 1994 that will allow analyses necessary for a SEIS.

Effects of the Fishery on the Environment

Appendix D contains information on habitat concerns. The Council's positions on a number of habitat related issues are presented in this appendix. The Council evaluated the effects of the fishery on the environment (Section 4.0, Item I) and concluded that the fishery, as presently prosecuted, does not significantly impact the live bottom habitat that is essential to the reef species under Council management.

Bycatch

Action 6 specifies allowable gear and Action 7 describes a procedure for evaluating experimental gear. The Council concluded that these measures will prevent bycatch from gear that is not allowed and will provide a mechanism whereby gear that will further reduce bycatch can be evaluated and implemented. Action 8 addresses the sink net fishery in North Carolina and allows fishermen to make multi-gear trips in a fashion that minimizes any bycatch of species in the management unit.

Having reviewed the environmental assessment and the available information relating to the proposed actions, I have determined that there will be no significant environmental impact resulting from the proposed actions.

Approved: _____

Assistant Administrator for Fisheries Date

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9.0 APPENDIXES

Appendix A. Existing FMP Problems (Issues) & Objectives

The problems (issues) of the Snapper Grouper Fishery Management Plan as modified by Amendment 4 (SAFMC, 1991) are:

1. Excessive fishing mortality is jeopardizing the biological integrity of the snapper grouper resource of the South Atlantic. First, thirteen species in the complex are in a documented state of overfishing, i.e., spawning stock ratio (SSR) is less than 30%. This group consists of black sea bass, gray snapper, vermilion snapper, red snapper, red porgy, gray triggerfish, gag, scamp, red grouper, speckled hind, snowy grouper, warsaw grouper, and greater amberjack. Second, fourteen species are thought to be overfished even though the SSRs are unknown. This group consists of golden tilefish, 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. Third, the jewfish resource is thought to be severely overfished throughout the Gulf of Mexico and South Atlantic even thought the SSR is unknown. Fourth, the rapid increase in number of vessels, effort, and catch in the newly developed wreckfish fishery threatens the wreckfish resource with overfishing even though the SSR is unknown. Fifth, additional species may be overfished or likely to experience overfishing in the near future.

2. Adequate management has been hindered by lack of current and accurate biological, statistical, social, and economic information. Data necessary to document growth and/or recruitment overfishing, and to calculate SSRs are very limited. Since the universe of participants is unknown, scientists are unable to estimate catch, effort, and other important information with desired accuracy. The present system of fishery dependent and fishery independent data collection provides limited information for assessment purposes and practically no economic or social data.

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.

The following problems were added in Amendment 5 (SAFMC, 1991):

1. Excess Capacity: The size and capacity of the wreckfish fleet exceeds that needed for present TAC as well as the range of TACs the Council is likely to approve in the foreseeable future. Additional vessels in the future would exacerbate this situation since the derby nature of an open access fishery encourages fishermen to add harvest capacity even when gains in production are marginal or when economies of scale are not necessarily realized.

2. Inefficiency: Past and present measures to control harvest (TAC, gear restrictions, trip limits) and future measures that would likely be needed under continued open access, increase fishing costs and decrease potential consumer and producer benefits from the fishery.

3. Low Conservation and Compliance Incentives: Under open access, incentives to promote conservation and voluntary compliance with regulations are low because the benefits from doing so may be appropriated by other fishermen or new entrants.

4. Potential Conflicts: Competitive fishing conditions may eventually lead to gear and area conflicts as a large number of vessels compete for available TAC.

5. High Regulatory Costs: Management and enforcement costs are unnecessarily high and are expected to increase under open access as the number of vessels increases and stricter management measures are needed to control excess fishing effort.

6. Low Marketing Incentives: Efforts by fish dealers to augment consumer acceptance of wreckfish have been thwarted by short-run oversupply and lack of product continuity. The likelihood of additional harvest restrictions under open access increases uncertainty and instability and discourages long-run planning and investment by dealers.

The management objectives of the Snapper Grouper Fishery Management Plan as modified by Amendment 4 (SAFMC, 1991) are:

1. Prevent overfishing in all species by maintaining the spawning stock ratio (SSR) 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 SSR 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.
6. Promote public comprehension of, voluntary compliance with, and enforcement of the management measures.

The following limited entry objectives were added in Amendment 5 (SAFMC, 1991) and now become numbers seven through 12:

7. Develop a mechanism to vest fishermen in the wreckfish fishery and create incentives for conservation and regulatory compliance whereby fishermen can realize potential long-run benefits from efforts to conserve and manage the wreckfish resource.
8. Provide a management regime which promotes stability and facilitates long-range planning and investment by harvesters and fish dealers while avoiding, where possible, the necessity for more stringent management measures and increasing management costs over time.
9. Develop a mechanism that allows the marketplace to drive harvest strategies and product forms in order to maintain product continuity and increase total producer and consumer benefits from the fishery.
10. Promote management regimes that minimize gear and area conflicts among fishermen.
11. Minimize the tendency for over-capitalization in the harvesting and processing/distribution sectors.
12. Provide a reasonable opportunity for fishermen to make adequate returns from commercial fishing by controlling entry so that returns are not regularly dissipated by open access, while also providing avenues for fishermen not initially included in the limited entry program to enter the program.

Although not an explicit objective at this time, the Council believes that portions or all of management and administrative costs should be recovered from those who hold individual quota shares in the wreckfish fishery, should recovery of those costs become permissible under future Magnuson Act (MFCMA) revisions. Those costs, or portions of them, would be recovered through such means as transfer fees or ad valorem taxes or other means available.

Appendix B. History of Management

The Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (SAFMC, 1983a) was prepared by the South Atlantic Fishery Management Council and implemented by the Secretary of Commerce on August 31, 1983 [48 Federal Register 39463]; final regulations became effective on September 28, 1983 The Fishery Management Plan 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 Fishery Management Plan established a 12" total length minimum size for red snapper, yellowtail snapper, red grouper and Nassau grouper; an 8" total length minimum size for black sea bass; and a four inch 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, 1990a) prohibited the harvest or possession of jewfish in or from the exclusive economic zone (EEZ) in the South Atlantic due to its overfished status and defined overfishing for jewfish and other snapper grouper species according to the 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, 1990b) 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 also would 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, 1991) 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 fisherman, and to gather the data necessary for management. Amendment 4 prohibits: (1) use of fish traps in the 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 and 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 bycatches 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 where 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% 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 a 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 the 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 prohibit 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, 1991) established an 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. The wreckfish fishery is currently under a 2 million pound TAC for fishing year 1993/94.

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 in the federal register 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 in the federal register on July 2, 1993 [58 Federal Register 35895] with an effective date of July 31, 1993.

Amendment 6 (SAFMC, 1993) 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.

Appendix C. Alternatives Eliminated from Detailed Consideration

A. Introduction

Throughout development of Amendments 6 and 7 the Council considered a range of possible alternatives to address the problems in the snapper grouper fishery. The Council decided to eliminate the following alternatives from detailed consideration for the reasons indicated. This information is included to provide a record of the Council's deliberations during development of Amendments 6 and 7.

B. Quota Management

ACTION 1. RED PORGY

Defer action on red porgy quota until a new assessment becomes available.

Biological Impacts

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

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" 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 SSR for red porgy is estimated to be 8% (Table 2). The 1992 assessment (Huntsman et al., 1992) provided the following:

> "..Vaughan et al. reported SSR values (based on the equilibrium assumption) of about 0.75 through 1979. SSR declined to about 0.24 by 1986. The SSR is now so small that the red porgy appears to be one of the most stressed species in the snapper grouper complex. Both the SSR model based on data from 1988 and that from 1990 agree that F of about 0.25 on full recruited ages is required to achieve SSR = 0.30 and that F must be reduced by over half (0.51 reduction based on 1988 data, 0.58 reduction - 1990 data)."

More recent analyses examining response of SSR to maturity schedule provided a SSR estimate of 0.22 (G. Huntsman, personal communication). The snapper grouper plan development team discussed the estimate of 0.08 versus 0.22 and members familiar with the red porgy analysis indicated that the value of 0.08 more accurately represented the current status of the red porgy resource.

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council approved this option because it will provide sufficient protection for red porgy at this time. The Council will monitor the red porgy resource, and if action becomes necessary, regulations will be implemented under the framework provision.

Rejected Options for Action 1

Rejected Option 1. Establish a commercial quota based on 1992 logbook data and phase-in the quota equally over three years. Year 1 is the 1994 fishing year.

Establish a recreational bag limit of four red porgy effective January 1, 1994.

	1992 Logbook	%Red. Base	Annual TAC
Red Porgy	831,991	19%	671,417
		39%	510,842
		58%	350,268
	Monthly Catches ('92 Logbook)	Cumulative Landings	
January	25,567	25,567	
February	41,214	66,781	
March	68,014	134,795	
April	86,892	221,687	
May	87,848	309,535	
June	106,762	416,297	
July	99,556	515,853	
August	92,523	608,376	
September	94,514	702,890	
October	50,724	753,614	
November	39,805	793,419	
December	38,572	831,991	
TOTAL	831,991		

Biological Impacts

The Council compared the average landings from 1990-92, including all porgies in Florida because red porgy is not separated in Florida's landings, with the estimate of landings from the 1992 logbook report (Harris et al., 1993). The Council's Scientific and Statistical Committee concluded that the logbook survey was more accurate than existing data collection programs and recommended using the same data base for setting and monitoring the quotas.

The Council concluded that the 1992 logbook catch estimate represented the best available information and used this figure (831,991 pounds) to calculate the quota for red porgy. The estimate from the average of 1990-92 landings (534,330 pounds) was significantly below the estimate of the 1992 logbook data in part because the 1992 landings data were not complete. The Council has also concluded that using the 1992 logbook figures is more appropriate because the fishermen have supplied this information and they should more readily accept a management program based on data they provided and that they feel is accurate. Public comments supported using the logbook data.

This option would establish a commercial quota in addition to the 12" size limit and is favored by fishermen who feel that the commercial fishery harvest is unlimited as long as they meet the minimum size. The Council concluded that a commercial quota with a recreational bag limit while maintaining the 12" limit would be deemed fair and acceptable by the user groups.

Enforcement Impacts

Socioeconomic Impacts

Commercial catches were 760,150 pounds in 1990, 570,092 pounds in 1991, and 299,659 pounds in 1992 (note: 1992 data not complete). These catches were worth $900,981 in 1990, $689,172 in 1991, and $355,352 in 1992.

Setting a quota is possible but problems with discards and high grading would be many. The Council recognized that there will likely be impacts from an effort shift targeting species like red porgy and has included specification of the proper data collection programs to document the level of catch by vessel. In addition, the Council has expressed their intent to evaluate an effort limitation program in the very near future.

The quota would be tracked using a fishing year beginning January 1 as for snowy and golden tilefish. The monthly distribution of red porgy catches is shown in Figure 4.

The four fish bag limit would reduce the recreational catch by 27% and the headboat catch by 17% (Appendix H). The Council considered a 3-fish bag limit but rejected that option in favor of the 4-fish limit based on extensive public support for a less restrictive bag limit. The Council will monitor the status of red porgy and if further reductions are necessary in order to rebuild red porgy by the year 2000, additional measures will be implement through the framework provisions.

The Council recognized that the percentage reductions specified differ for the recreational and commercial fisheries. The first year commercial quota is a 19% reduction with further reduction of approximately 19% in years two and three. The recreational bag limit of four will reduce the recreational catch by 27% and the headboat catch by 17%. The recreational catch will be monitored and if additional reductions become necessary, the Council will implement further regulations through the framework provision.

Conclusions

The Council rejected this option as being unnecessary given the status of the stock.

Rejected Option 2. Examine a pairing of a special management zone with and without a quota.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

This option was suggested by the plan development team and supported by some of the advisory panel members but was rejected by the Council as being too complicated given the difficulty in determining potential benefits from a special management zone. An experimental closed area will be established off the Florida east coast and will allow evaluation of potential benefits from an area closure.

Rejected Option 3. Calculate the commercial quota using the average 1990-92 landings data.

	90-92 Landings	Annual TAC	%Red Base
Red porgy	534,330	438,467	19.3
		333,605	38.6
		228,742	57.9

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council rejected this option based on the 1992 logbook data having been determined to be the best available information. See discussion under Action 2 for further rationale.

C. Trip/Bycatch Limits

ACTION 2. RED PORGY

Defer action on red porgy trip/bycatch limit until new assessment becomes available.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council approved this option because it will provide sufficient protection for red porgy at this time. The Council will monitor the red porgy resource, and if action becomes necessary, regulations will be implemented under the framework provision.

Rejected Options for Action 2

Rejected Option 1. Establish a _____ pound (gutted weight) red porgy trip/bycatch limit while the directed red porgy quota is open. Apply during the entire fishing year OR decrease to some lower level when the directed quota is taken.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Amendment 6 established a total allowable catch (TAC) of 671,417 pounds for 1994, 510,842 pounds for 1995 and 350,268 pounds for 1996. A trip/bycatch limit is being evaluated to spread the catch more evenly among participants for equity purposes. Trip limits have some effectiveness for decreasing the negative effects of competitive fishing under a restrictive TAC regime even though they tend to impair efficiency and decrease net producer and consumer economic benefits. In some cases, however,

fishermen simply make back to back trips and find ways to catch fish faster so that the trip limits cause inefficiency while not slowing down the fishing or spreading the catch among fishermen more equitably.

Red porgy 1992 catch per trip by state is presented in Tables 1-5 which show catch per trip frequencies and associated catches. Catches were estimated for North Carolina, South Carolina and Georgia using the midpoint of the pound interval.

Red porgy 1992 catches for North Carolina are shown in Table 1; one captain was responsible for trips in excess of 800 pounds, however, this vessel was sold in 1993. Based on the 1992 catch figures, the proposed 300 pound trip/bycatch limit would affect 10 percent of the trips. This would cause a decrease in annual landings of 4,800 pounds during the first year.

Table 1. North Carolina red porgy 1992 catch by trip. (Source: Fritz Rhode, NC Division Marine Fisheries.)

NORTH CAROLINA						
Pounds	No. Trips	% Trips	Cumulative % Trips	Pounds	% Pounds	Cumulative % Pounds
<100	134	49.8%	49.8%	6,700	16.7%	16.7%
100 - 199	76	28.3%	78.1%	11,400	28.5%	45.2%
200 - 299	31	11.5%	89.6%	7,750	19.4%	64.5%
300 - 399	16	5.9%	95.5%	5,600	14.0%	78.5%
400 - 499	5	1.9%	97.4%	2,250	5.6%	84.1%
500 - 599	1	0.4%	97.8%	550	1.4%	85.5%
600 - 699	2	0.7%	98.5%	1,300	3.2%	88.8%
700 - 799	1	0.4%	98.9%	750	1.9%	90.6%
800 - 899	1	0.4%	99.3%	850	2.1%	92.8%
900 - 999			99.3%			92.8%
1000 - 1099			99.3%			92.8%
1100 - 1199			99.3%			92.8%
1200 - 1299			99.3%			92.8%
1300 - 1399			99.3%			92.8%
1400 - 1499	2	0.7%	100.0%	2,900	7.2%	100.0%
TOTALS	269			40,050		

Table 2 presents the red porgy 1992 catches for South Carolina. Trips of more than 300 pounds accounted for eight percent of the trips. If catch is restricted to 300 pounds per trip, the reduction in annual landings for South Carolina would be 6,400 pounds during the first year.

Twenty–four percent of the trips in Georgia caught over 300 pounds per trip in 1992 (Table 3). Assuming that catch is restricted to 300 pounds per trip, there would be a decrease of 6,150 pounds in the annual landings for Georgia during the first year.

Table 2. South Carolina red porgy 1992 catch by trip. (Source: Joe Moran, SC Wildlife & Marine Resources Department.)

SOUTH CAROLINA						
Pounds	No. Trips	% Trips	Cumulative % Trips	Pounds	% Pounds	Cumulative % Pounds
<100	336	67.3%	67.3%	16,800	29.1%	29.1%
100 - 199	83	16.6%	84.0%	12,450	21.6%	50.7%
200 - 299	40	8.0%	92.0%	10,000	17.3%	68.1%
300 - 399	18	3.6%	95.6%	6,300	10.9%	79.0%
400 - 499	10	2.0%	97.6%	4,500	7.8%	86.8%
500 - 599	6	1.2%	98.8%	3,300	5.7%	92.5%
600 - 699	2	0.4%	99.2%	1,300	2.3%	94.8%
700 - 799	2	0.4%	99.6%	1,500	2.6%	97.4%
800 - 899	0	0.0%	99.6%		0.0%	97.4%
900 - 999	2	0.4%	100.0%	1,500	2.6%	100.0%
1000 - 1099						
1100 - 1199						
1200 - 1299						
1300 - 1399						
1400 - 1499						
TOTALS	499			57,650		

Table 3. Georgia red porgy 1992 catch by trip. (Source: Gina Gore, Georgia Department of Natural Resources.)

GEORGIA						
Pounds	No. Trips	% Trips	Cumulative % Trips	Pounds	% Pounds	Cumulative % Pounds
<100	40	39.2%	39.2%	2,000	8.8%	8.8%
100 - 199	21	20.6%	59.8%	3,150	13.8%	22.6%
200 - 299	16	15.7%	75.5%	4,000	17.5%	40.1%
300 - 399	7	6.9%	82.4%	2,450	10.7%	50.9%
400 - 499	4	3.9%	86.3%	1,800	7.9%	58.8%
500 - 599	4	3.9%	90.2%	2,200	9.6%	68.4%
600 - 699	5	4.9%	95.1%	3,250	14.3%	82.7%
700 - 799	3	2.9%	98.0%	2,250	9.9%	92.5%
800 - 899	0	0.0%	98.0%			92.5%
900 - 999	2	2.0%	100.0%	1,700	7.5%	100.0%
1000 - 1099						
1100 - 1199						
1200 - 1299						
1300 - 1399						
1400 - 1499						
TOTALS	102			22,800		

Tables 4 and 5 present the red porgy 1992 catches per trip for the Florida Atlantic coast (equivalent to the east coast) and for Monroe County. Six percent of the trips for Florida Atlantic coast had catches over 300 pounds per trip. If there is a 300 pound trip limit, the annual landings would decrease by 18, 438

pounds during the first year. For Monroe County, three percent of the trips had catches over 300 pounds per trip. With a 300 pound trip limit, the annual landings would decrease by 1, 663 pounds during the first year.

Table 4. Florida Atlantic Coast (East Coast excluding Monroe County) red porgy 1992 catch by trip. (Source: Joe O'Hop, Florida Marine Research Institute.)

FLORIDA ATLANTIC COAST						
			Cumulative			Cumulative
Pounds	No. Trips	% Trips	% Trips	Pounds	% Pounds	% Pounds
<100	1,244	74.8%	74.8%	34,733	25.3%	25.3%
100 - 199	232	14.0%	88.8%	33,248	24.2%	49.4%
200 - 299	87	5.2%	94.0%	21,133	15.4%	64.8%
300 - 399	42	2.5%	96.5%	14,610	10.6%	75.4%
400 - 499	27	1.6%	98.1%	12,070	8.8%	84.2%
500 - 599	13	0.8%	98.9%	7,106	5.2%	89.3%
600 - 699	6	0.4%	99.3%	3,801	2.8%	92.1%
700 - 799	6	0.4%	99.6%	4,463	3.2%	95.4%
800 - 899	1	0.1%	99.7%	884	0.6%	96.0%
900 - 999	2	0.1%	99.8%	1,860	1.4%	97.4%
1000 - 1099	1	0.1%	99.9%	1,000	0.7%	98.1%
1100 - 1199		0.0%	99.9%		0.0%	98.1%
1200 - 1299	1	0.1%	99.9%	1,228	0.9%	99.0%
1300 - 1399		0.0%	99.9%		0.0%	99.0%
1400 - 1499	1	0.1%	100.0%	1,416	1.0%	100.0%
TOTALS	1,663	100.0%		137,552	100.0%	

Table 5. Florida Monroe County red porgy 1992 catch by trip. (Source: Joe O'Hop, Florida Marine Research Institute.)

FLORIDA MONROE COUNTY 1992 RED PORGY CATCHES						
			Cumulative			Cumulative
Pounds	No. Trips	% Trips	% Trips	Pounds	% Pounds	% Pounds
<100	351	92.4%	92.4%	5,431	40.8%	40.8%
100 - 199	13	3.4%	95.8%	1,821	13.7%	54.4%
200 - 299	7	1.8%	97.6%	1,712	12.8%	67.3%
300 - 399	4	1.1%	98.7%	1,370	10.3%	77.5%
400 - 499	3	0.8%	99.5%	1,259	9.4%	87.0%
500 - 599	1	0.3%	99.7%	534	4.0%	91.0%
600 - 699			99.7%			91.0%
700 - 799			99.7%			91.0%
800 - 899			99.7%			91.0%
900 - 999			99.7%			91.0%
1000 - 1099			99.7%			91.0%
1100 - 1199			99.7%			91.0%
1200 - 1299	1	0.3%	100.0%	1,200	9.0%	100.0%
1300 - 1399						
1400 - 1499						
TOTALS	380	100.0%		13,327	100.0%	

If a 300 pound trip limit is enforced, annual landings of red porgy in the South Atlantic would decrease by 38,451 pounds during the first year. This is approximately six percent of the 1992 logbook total catch for red porgy. Using the NMFS 1992 total landings and value for red porgy, with an average price per pound of $1.28, the predicted annual decrease in revenue as a result of a 300 pound trip limit would be $49,217 during the first year. It is not possible to predict whether the long term benefits from stock recovery would exceed the short term loss to fishermen because there is no information on the expected recovery rate. The biological factors aside, the outcome would partly depend on measures taken to control access to the fishery in the long term.

These tables indicate that approximately 50% of the North Carolina red porgy catch in 1992 was from trips of less than 100 pounds. Trips less than 100 pounds represented 67% of the 1992 catch in South Carolina. For Georgia, 39% of the trips resulted in catches less than 100 pounds while the percentage increased to 60% for trips less than 200 pounds. Trips less than 100 pounds represented 75% of the 1992 catch on the Florida East Coast and 92% in Monroe County. This indicates that for areas other than Georgia the bulk of the red porgy catch comes from multi-species trips where red porgy makes up a relatively small portion of the total catch.

The information presented on red porgy catch per trip does not include data on all landings. The total landings represented by the catch per trip data was 271,379 which compares favorably with the total shown in Appendix F (299,659 pounds). The total 1992 catch from the logbook report was 831,991.

The Council's intent in considering a trip/bycatch limit is to allow the multi-species fishery to continue but to preclude any fishermen attempting to target red porgy given that the quotas are expected to limit catches. Fishermen are encouraged to comment on how representative the catch per trip data are and what trip level would accomplish the Council's goal of preventing targeting of red porgy.

Conclusions

The Council rejected this option as being unnecessary at this time given the stock status.

Rejected Option 2. Establish an endorsement system, similar to red snapper in the Gulf of Mexico, based on catches during 1990-1992.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council rejected this option as being unnecessary at this time given the stock status.

Rejected Option 3. Establish variable trip limits by state.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council rejected this option as being unnecessary at this time given the stock status.

Rejected Option 4. Set a trip/bycatch limit equivalent to _____ boxes of red porgy.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council rejected this option as being unnecessary at this time given the stock status.

Rejected Option 5. Set a trip/bycatch limit to correspond to the snowy grouper/golden tilefish bycatch limit of 300 pounds.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council rejected this option as being unnecessary at this time given the stock status.

D. Size/Bag Limits

ACTION 3. RED PORGY

Defer action on red porgy bag/size limit until a new assessment becomes available.

Biological Impacts

This option would continue the 12" TL size limit from Amendment 4. The 1992 assessment indicated that the present minimum size of 12" will, after the fishery achieves equilibrium, produce a SSR of only 12%.

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" 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 SSR for red porgy is estimated to be 8% (Table 2). The 1992 assessment (Huntsman et al., 1992) provided the following:

> "..Vaughan et al. reported SSR values (based on the equilibrium assumption) of about 0.75 through 1979. SSR declined to about 0.24 by 1986. The SSR is now so small that the red porgy appears to be one of the most stressed species in the snapper grouper complex. Both the SSR model based on data from 1988 and that from 1990 agree that F of about 0.25 on full recruited

ages is required to achieve SSR = 0.30 and that F must be reduced by over half (0.51 reduction based on 1988 data, 0.58 reduction - 1990 data)."

More recent analyses examining response of SSR to maturity schedule provided a SSR estimate of 0.22 (G. Huntsman, personal communication). The snapper grouper plan development team discussed the estimate of 0.08 versus 0.22 and members familiar with the red porgy analysis indicated that the value of 0.08 more accurately represented the current status of the red porgy resource.

Enforcement Impacts

The red porgy minimum size limit will be 12" TL in the State of Florida effective March 1, 1994.

Socioeconomic Impacts

Conclusion

The Council approved this option because it will provide sufficient protection for red porgy at this time. The Council will monitor the red porgy resource, and if action becomes necessary, regulations will be implemented under the framework provision.

Rejected Options for Action 3

Rejected Option 1. Bag limit of 5 red porgy (evaluate 5, 4, 3, 2 and 1).

Biological Impacts

Members of the advisory panel suggested that a bag limit of around 5 fish would have been acceptable. They preferred a bag limit to any increase in the size limit because they were having high discard rates with the 12" limit, and discards would have been greater with an increase in size limit. The problem is that fishermen are catching around 3-5 fish per day, and a bag limit of 5 may not reduce mortality.

Enforcement Impacts

Socioeconomic Impacts

Appendix H contains SAFMC staff and NMFS analyses done for red porgy (pages 27-29). A bag limit of 3 would reduce the MRFSS catch by 47% thereby achieving a SSR above 0.30 for the recreational sector. Alternatively, a bag limit of 5 would reduce the MRFSS catch by 18% and would not achieve a SSR above 0.30. Impacts to headboat catches are shown on pages 28 and 29.

Conclusions

The Council rejected this option as being unnecessary at this time given the stock status.

Rejected Option 2. Examine a pairing of a special management zone with and without a bag limit.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

This option was suggested by the plan development team and supported by some of the advisory panel members but was rejected by the Council as being too complicated given the difficulty in determining potential benefits from a special management zone and as being unnecessary at this time given the stock

status. An experimental closed area will be established off the Florida east coast and will allow evaluation of potential benefits from an area closure.

Rejected Option 3. Phase-in the recreational bag limit: five during 1994, four during 1995 and three thereafter.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council rejected this option as being unnecessary at this time given the stock status.

Rejected Option 4. Delay implementation of the 3-fish recreational bag limit until 1995.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council rejected this option as being unnecessary at this time given the stock status.

Rejected Option 5. Increase the minimum size limit from 12" TL to 16" TL.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusions

The Council rejected this option as being wasteful given that many fish would have been released (a portion of which would be dead) and given that some trips may not have been taken with such a large increase in the size limit and subsequent decreases in catches. Also, the Council concluded that this option was unnecessary at this time given the stock status.

ACTION 4. RED SNAPPER

No action.

Biological Impacts

This option would continue the 20" TL size limit and 2 fish bag limit. The 1992 assessment concluded that ... "Analyses based on 1990 data suggest that F on red snapper may have dropped about 17 percent from 0.42 to 0.35 and that, as a partial consequence, the equilibrium estimate of SSR improved somewhat (0.13 in 1990, 0.08 in 1988). Even if F has truly dropped on red snapper it is impossible that the population has come into equilibrium with the new F in only two years. It is possible that the apparent reduction in F results from sampling problems or violation of the equilibrium assumption, as discussed in the overview. Or it is possible that the imposition of a size limit (13 inches) by Florida in 1990 has reduced

the catch of two year old fish and caused a decrease in F. Regardless of any increase in SSR, it is crucial to note that in 1990 it was still below 0.30. A model of SSR based on the vector of age specific fishing mortality rates from 1990 implies that a minimum size of 19 inches (482 mm) would be sufficient to generate an SSR of 0.30, and that the 20 inch minimum size limit will, in equilibrium, produce an SSR of 0.35 and maintain an SSR of >0.30 for only a very small increase in F (to about F=0.40). The 20 inch limit will, even if the lower estimate of F is true, produce a substantial (56 percent) gain in Y/R."

The assessment further states that:... "The bulk of the recreational catch of red snapper is made in North Florida. Headboat data from there (6,762 angler trips) suggest the two fish bag limit will have almost no effect (<3 percent) on the catch while MRFSS data on 27 fishing trips off north Florida suggest a 45 percent reduction. At the best, the two fish bag limit in combination with the size limit might produce a crudely estimated reduction in F of 20 percent and an SSR of 0.42. At worst the bag limit will have no effect."

Enforcement Impacts

Socioeconomic Impacts

This action would continue the 20 inch size limit with the existing 2–fish bag limit. The 1993 Report of the Reef Fish Stock Assessment Panel estimated the commercial harvest of red snapper for 1992 at 3.1 million pounds and the recreational harvest at 2.7 million pounds. The 1992 allocations were 2.04 million pounds for the commercial sector and 1.96 million pounds for the recreational sector. Both sectors exceeded their allocations in 1992 by 52 percent and 39 percent respectively. Considering that the spawning stock ratio is much below the 30 percent level, continuation of the status quo will lead to further depletion instead of recovery of the stocks.

Conclusion

The Council approved this option because it will provide sufficient protection for red snapper (given existing management regulations) at this time. The Council will monitor the red snapper resource, and if action becomes necessary, regulations will be implemented under the framework provision.

Rejected Options for Action 4

Rejected Option 1. Manage the recreational fishery with only the 2 fish bag limit.

Biological Impacts

The advisory panel stated that with the 20" size limit, we are killing 300-500 red snappers per week that are around 18". A bag limit of 2 per person would be better and they we could move and target other fish. For every 100 caught, we are keeping 2-3. Survival in the deeper commercial areas appears to be very low while the survival from headboat-caught fish appears to be higher.

The 1991 assessment included a summary of survival rate results. Survival of red snapper ranged from 89-100% in water less than 30 m (90') to 64% in 37-40 m (111'-120') for surface released fish. For caged red snapper, survival was 79% at 22m (66'), 89% at 30 m(90") and 64% at 50 m (150').

The plan development team discussed survival of released fish and it was agreed that there are problems with survival but also that with a size limit your expect to throw back smaller fish that in the future will grow to become larger fish. There is some survival of the released red snapper and they will contribute to the spawning stock.

The 1992 assessment noted that the bag limit and the size limit may not produce any reductions in the recreational fishery. Therefore, going to only a bag limit may not reduce fishing mortality sufficiently in the recreational fishery.

Enforcement Impacts

Socioeconomic Impacts

As stated above, recreational catch in 1992 exceeded the recreational allocation for the same year. Thus, maintaining the recreational 2–bag limit will continue depletion of the stocks.

Conclusion

The Council rejected this option because the red snapper resource would not be rebuilt above the overfished level.

Rejected Option 2. Alternative size limits (evaluate 18" and 16").

Biological Impacts

The advisory panel would support a size limit around 18". However, the plan development team supports maintaining the current size limit and examine the catches next year when this size class should be over 20".

The Gulf Council is taking a step increase to their minimum size limit to public hearings: 14" in 1994, 15" in 1996 and 16" in 1998. If they adopt this measure, compatible regulations would be possible if we adopt the 16" size limit. However, the assessment indicates that this will result in an SSR less than 30%.

Enforcement Impacts

Socioeconomic Impacts

Appendix H contains SAFMC staff and NMFS analyses done for red snapper (pages 17-21). Across all commercial gears, the 20" size limit would reduce the catch by 49%. A size limit of 18" would reduce catch by 32% while a 16" limit would reduce catch by 22%. MRFSS catches would be reduced by 65% at 20", 60% at 18" and 45% at 16". Headboat catches would be reduced by 84% at 20", 71% at 18", and 49% at 16".

Conclusion

The Council rejected this option because the red snapper resource would not be rebuilt above the overfished level.

Rejected Option 3. Establish a minimum size slot limit of 16-20".

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

This option was suggested by the snapper grouper committee. Examining the data in Appendix H, for commercial catches across all gear types, 28% of the catch was between these two sizes. Therefore, catches would be reduced by approximately 72%. For headboat catches, 34% of the catch was between these two sizes. Therefore, catches would be reduced by approximately 66%.

Conclusion

The Council rejected this option because the red snapper resource would not be rebuilt above the overfished level.

Rejected Option 4. Establish a minimum size limit of 18" and the appropriate combination of a recreational bag limit and commercial quota to achieve a SSR of 30%.

Biological Impacts

There is some evidence that fish are being caught that are now larger than the 20" limit. If this option was to be implemented, the bag limit may have to be less than one fish per person and the quota would have to reduce catches by 20%.

Enforcement Impacts

Socioeconomic Impacts

Conclusion

This option was rejected by the Council in favor of maintaining the 20" TL size limit and 2 fish bag limit. The Council concluded that the negative impacts from implementation of this measure would outweigh any potential positive benefits.

Rejected Option 5. Establish a minimum size limit of 18" with the existing 2-fish bag limit.

Biological Impacts

The Advisory Panel felt that the effective fishing mortality rate would be less than that with the 20" size limit and 2-fish bag limit.

Enforcement Impacts

Socioeconomic Impacts

Conclusion

This option was rejected by the Council in favor of maintaining the 20" TL size limit and 2 fish bag limit. The Council concluded that the negative impacts from implementation of this measure would outweigh any potential positive benefits.

ACTION 5. WHITE GRUNT

No action.

Biological Impacts

The status of white grunt as indicated in the 1992 stock assessment (Huntsman et al., 1992) is as follows:

> The condition of the white grunt population, as reflected in data taken in 1990, is little changed from 1988 (1990 SSR = 0.19, 1988 SSR = 0.17; 1990 F = 0.34, 1988 F = 0.35). Catches of white grunt have increased 50% by number and 55% by weight from 1988 to 1990. Commercial catches of white grunt off the Carolinas increased steadily from naught in 1977 to about 110,000 kg in 1988. On Florida's east coast the commercial catch increased markedly from around 20,000 kg in the period 1972-1985 to over 80,000 in 1987. The commercial catch remained high in 1988 and 1989. Carolina headboat catches remained around 60,000 kg from 1972 to 1988, but Florida headboat catches steadily increased from 25,000 to 75,000 kg from 1983 to 1988. Raising the SSR to 0.30 will require reducing F by 32% or establishing a minimum size limit of 11". An 8" size limit at present F results in an SSR of 0.21 while a 12": limit provides an SSR of 0.44. Data from headboat catches and the MRFSS suggest a three grunt bag limit would reduce the recreational catch by about 40%. As noted last year, white grunt are extremely hard to release alive in the 75-150 foot depths where they are prevalent off the Carolinas. Thus a size limit may not be effective there. In south Florida where many small grunts are taken from relatively shallow water a size limit might be of value. Minimal gains in yield per recruit are available.

This option would continue with no regulations. The 1992 stock assessment report indicated a SSR of 19%, a slight increase from 17% in the 1991 assessment. The 1992 assessment stated that ... "Raising the SSR to 0.30 will require reducing F by 32 percent or establishing a minimum size limit of 11 inches. An eight inch size limit at present F results in an SSR of 0.21 while a 12 inch limit provides an SSR of 0.44. Data from headboat catches and the MRFSS suggest a three grunt bag limit would reduce the recreational catch by about 40 percent. As noted last year, white grunt are extremely hard to release alive in the 75 to 150 foot depths where they are prevalent off the Carolinas. Thus a size limit may not be effective there. In south Florida where many small grunts are taken from relatively shallow water a size limit might be of value. Minimal gains in yield per recruit are available."

NMFS analyzed 80 otoliths from the Keys and determined that there does appear to be differences in growth between the Keys and the Carolinas. In the Keys white grunt grow to about 12" and live approximately 8 years. In the Carolinas they grow to about 16" and live longer. In addition, incorporating the revised maturity schedule, resulted in a SSR=34% based on 1990 data (Dr. Gene Huntsman, NMFS Beaufort Lab, personal communication).

Enforcement Impacts

Socioeconomic Impacts

This action would allow the status quo to continue. The 1992 stock assessment report indicated that the spawning stock ratio (SSR) increased from 17 percent (1991 stock assessment) to 19 percent. Also, that raising the spawning stock ratio to 30 percent will require lowering fishing mortality to 32 percent or establishing a minimum size limit of 11– inch. Waters (1993) estimated that an 11 inch size limit will initially reduce commercial landings by approximately 22 percent and revenues by 12 percent (Appendix J). However, growth in weight of young fish would cause landings and revenues to increase in the long term.

Using a discount rate of 10 percent, Waters (1993) estimated that an 11 inch size limit with no release mortality would increase the net present value of commercial revenues by $57,100 (2.9 percent). and with 10 percent release mortality by $22,300 (1.1 percent) over a 20 year period. For release mortalities of 25 percent and above, the net present value would be negative. It should be noted that the model used to calculate the net present value assumed that recruitment, natural and fishing mortalities are all constant over time. Also, size does not affect the ex– vessel price of white grunt. Thus, the economic outcome for the net present value was determined largely by the natural rate of change in fish biomass over time due to a minimum size limit. If as expected, the minimum size limit results in an increase in the number of fish that live long enough to spawn, recruitment would increase over time and the constant recruitment model would have underestimated the economic benefits from minimum size limit.

Another factor of importance with the minimum size limit is that white grunt are extremely hard to release alive in the 75 to 150 feet depths where they are very prevalent off the Carolinas. Since the net present value with release mortality of 25 percent and above is negative, no economic benefit or biological gain would be achieved with an 11–inch minimum size limit for the Carolinas. The situation could be different for south Florida where many small white grunts are caught from relatively shallow water. The minimum size limit could provide some gains in recruitment.

The minimum size limit would also affect the recreational catch. Waters (1993) estimated that with an 11–inch minimum size limit, the recreational catch would initially decline by approximately 38 percent and 60 percent in terms of weight and numbers respectively. Over time, both measures of recreational catch would remain below levels predicted without the minimum size limit, regardless of the release mortality. Thus, smaller size limits would reduce but not eliminate the initial and long term losses in weight and number of fish kept by recreational fishermen. However, the release of undersized fish would likely increase the total number of fish caught, including fish that were released and caught more than once.

Conclusion

The Council approved this option because it will provide sufficient protection for white grunt at this time. The Council will monitor the white grunt resource, and if action becomes necessary, regulations will be implemented under the framework provision.

Rejected Options for Action 5

Rejected Option 1. Manage the recreational sector with a bag limit and the commercial with a 12" size limit.

Biological Impacts

From Huntsman et al. (1993):

"An alternative to size limits for increasing the SBR of white grunts is reduction in fishing mortality. Both the analysis based on data from 1988 and that on data from 1990 suggest that reducing F by about one third, to about 0.2, will increase the SBR to 0.3. Reducing F is often accomplished through bag limits in recreational fisheries and quotas in commercial fisheries. Analyses, based on data from 1988, of mean catch per angler by trip in the headboat fishery suggest that, over the entire region, a three fish bag limit will reduce the catch by 31 percent, and a 2 fish limit will reduce the catch by 44 percent. Data from 1991 suggest the headboat catch would be reduced 26 percent by a three fish limit and 39 percent

by a two fish limit. There is considerable variability in the distribution of catches by area and year. Data from 1988 suggests that in Florida a bag limit of four fish gives a 29 percent reduction in the headboat catch and a limit of three a 39 percent reduction. But in the Carolinas a two fish limit lowers the catch by 25 percent and a one fish limit by 47 percent. In 1991 in Florida a bag limit of two fish would have reduced the catch by 32 percent, and a bag limit of one fish by 56 percent; but in the Carolinas a bag limit of two would have lowered the headboat catch by 33 percent. The analysis of headboat data assumes that anglers on a headboat will share fish until everyone aboard has a limit. This assumption results in need for a smaller bag limit to achieve a given reduction in catch. An analysis of MRFSS data from 1990 which is based (mostly) on individual catches and does not assume sharing suggests that an 18 fish bag limit will reduce the white grunt catch by one third. One third of the estimated recreational catch in 1990 was made by anglers aboard headboats. Two thirds were taken by other recreational anglers."

White grunts (19% SSR) are an important species in the headboat catch; most are fairly large and a bag limit would work. Some advisory panel members suggested putting white grunt in the same size and bag limit as red porgy. One advisory panel member mentioned that the inshore grounds off South Carolina are loaded with grunts; the headboats fish offshore and are getting smaller grunts. An advisory panel member from the headboat industry felt that a 12" size limit would work for South Carolina and would not require a bag limit. The size limit may need to be smaller in Florida.

One plan development team members expressed concern that the 12" limit would have some impact in North Carolina and if there is a problem in Florida, address it in Florida. White grunts have a high release mortality which works against a size limit in deeper, northern waters; a size limit may work in the shallower areas in Florida.

Enforcement Impacts

Socioeconomic Impacts

Appendix H contains SAFMC staff and NMFS analyses of minimum size and bag limits. The impacts were further evaluated in terms of net present value and the effects on catches over time by Dr. James Waters, NMFS Beaufort Lab (Appendix J).

Conclusion

The Council rejected bag limits based on the fact that the most recent scientific information indicated that white grunt are not overfished and on the extensive public comments that management is not required at this time.

Rejected Option 2. Establish a 12" TL minimum size for white grunt in both the recreational and commercial fisheries.

Biological Impacts

An evaluation of size and bag limits for white grunt was conducted by Huntsman et al. (1993): "..Using data from 1990, the most recent year for which the catch is estimated in both numbers and weight, we estimate that in Florida 33 percent of the commercially caught fish (in numbers) were less than 11 inches long and 71 percent were less than 12 inches. Of headboat caught fish there, 68 percent were less than 11 inches and 87 percent were less than 12, and for other recreationally taken grunt 90 percent were less than 11 inches and 94 percent were less than 12. The reduction in the catch occasioned by size limits is substantially less in the Carolinas. There about 20 percent of recreationally taken white grunts were less than 11 inches, and 34 percent were less than 12. Of white grunts taken by commercial hook and line in the Carolinas only 9 percent were less than 11 inches, and 21 percent were shorter than

12 inches. But of white grunts taken in traps (probably mostly sea bass pots) 47 percent were less than 11 inch and 79 percent were less than 12 inches. Over all fisheries, an 11 inches size limit will reduce the south Florida catch by 75 percent and the Carolina catch by 20 percent. The 12 inch size limit reduces the Florida catch by 89 percent and the Carolina catch by 36 percent. Over all areas and fisheries the 11 inch size limit reduces the catch by 53 percent while the 12 inch limit engenders a 67 percent reduction (again in numbers of fish caught).

...The uncorrected estimate of the SBR created, in equilibrium, by an 11 inch size limit was 0.30. Applying the correction factor, 0.97, associated with mortality of 8 percent, suggests that SBR would be 0.29, nearly 0.3. Given the possibilities for underestimating SBR listed earlier it appears that an 11 inch size limit would just marginally miss providing the 0.30 SBR required. A 12 inch size limit with mortality at 14 percent would provide an SBR of at least 0.40 (correction factor of 0.91 applied)."

The following corrections were provided at the January 1993 Council meeting by Dr. Huntsman: 11 inch size limit results in a SBR of 27% and 12 inches results in 33% SBR.

Enforcement Impacts

Socioeconomic Impacts

Appendix H contains SAFMC staff and NMFS analyses done for white grunt (pages 11-16). Across all gears, the 12" limit would impact 35% of the commercially caught grunts based on 1991-1992 catches. About 74% of the commercial "rod & reel and other hand lines" catch is below 12 inches; 17% of the "electric & hydraulic reel" catch is below 12 inches; and none of the bottom longline catch is below 12 inches. Analyses from the MRFSS data indicate that 41% of the catch is below 12 inches. Approximately 51% of the headboat catch is below this size limit. Additional analyses done by SAFMC staff illustrate the differential impact by area with the 12" size limit based on MRFSS data: NC/SC approximately 17% below 12" and GA/FL east coast approximately 91% below 12".

Appendix J contains the impacts in terms of net present value and the effects on catches over time.

Conclusion

The Council rejected this option because the most recent data indicates that white grunt are not overfished.

Rejected Option 3. Establish a 12" TL minimum size for white grunt in the southern area (Florida) and a bag limit in the northern area; a bag limit of 3 would reduce fishing mortality 40%.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

This option would address some of the concerns expressed above.

Conclusion

The Council rejected use of bag limits in favor of a minimum size given the complexity of determining the reductions in fishing mortality with bag limits.

Rejected Option 4. Establish a 10" TL minimum size for white grunt.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

This option would not result in a SSR above 30% and was rejected by the Council. The impacts as shown in Appendix H (pages 11-16) are considerably less than those with a 12" limit. Additional analyses done by SAFMC staff illustrate the differential impact by area with the 10" size limit: NC/SC approximately 5% below 10" and GA/FL east coast approximately 31% below 10". The impacts in terms of net present value and the effects on catches over time are shown in Appendix J.

Conclusion

The Council rejected this option because the most recent data indicates that white grunt are not overfished.

Rejected Option 5. Establish a 8" TL minimum size for white grunt.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusion

This option was rejected because the most recent information indicated that white grunt are not overfished.

Rejected Option 6. Defer action at this time based on public input and instruct NMFS to evaluate stock structure and examine the option of managing Florida or south Florida as a separate management unit.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council rejected this option because the most recent data indicates that white grunt are not overfished.

Rejected Option 7. Establish a 12" TL minimum size for white grunt in North Carolina, South Carolina and Georgia.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council rejected this option because the most recent data indicates that white grunt are not overfished.

ACTION 6. GRAY TRIGGERFISH

No action.

Biological Impacts

Enforcement Impacts

The gray triggerfish minimum size limit will be 12" TL in the State of Florida effective January 1, 1995.

Socioeconomic Impacts

There are currently no regulations in place for triggerfish. Amendment 4 included an evaluation of management measures but due to the overwhelming public comment that no regulation was necessary, the Council took no action. A 12" FL size limit was included in Amendment 6 by the Council to track action by the Florida Marine Fisheries Commission thereby resulting in inconsistent state and federal regulations.

The Council approved taking no action based on overwhelming public comment and due to the fact that the most recent estimate of spawning stock ratio (27 percent) indicated minimal overfishing. There are some concerns that there could be a shift in effort from red snapper to gray triggerfish. This could negatively impact the gray triggerfish population. However, there is no evidence to indicate that the stocks could become overfished at this time This could be addressed in the framework provision if necessary

Conclusion

The Council approved taking no action based on overwhelming public comment and due to the fact that the most recent estimate of SSR (27%) indicated minimal overfishing. If action is necessary in the future, the framework provision will be used to implement regulations.

Rejected Options for Action 6

Rejected Option 1. Establish a minimum size limit of 12 inches for gray triggerfish off Florida and continue with no minimum size limit for North Carolina through Georgia.

Biological Impacts

The 1992 assessment concluded that ... "The SSR declined slightly (0.30 in 1988, 0.27 in 1990) and gray triggerfish now fall in the overfished category. There are no regulations on gray triggerfish, but a size limit of 12 inches (11.2 inches, 285 mm) fork length with complete survival should achieve the desired SSR of 0.30 as will a reduction in F of 12 percent to 0.59."... "Analysis of headboat data suggest a one fish bag limit would reduce the gray triggerfish catch by about 14 percent, but 20 observations in the MRFSS data set (1990) suggest a three fish bag limit would provide the same catch reduction. An 18 percent gain in yield per recruit (and a projected SSR of 0.45) could result from a 15 inch size limit but only a 12 percent gain results from 12 inch limit."

Enforcement Impacts

Socioeconomic Impacts

The impacts were further evaluated in terms of net present value and the effects on catches over time by Dr. James Waters, NMFS Beaufort Lab (Appendix J)

This option would track that proposed by the Florida Marine Fisheries Commission and provide protection for gray triggerfish in an area where the resource requires management without impacting fishing unnecessarily in the other states.

Waters (1993) predicted that commercial landings and revenues would decline for the first 3–4 years and then exceed levels predicted without the size limit. The magnitude of the long term increase would depend on the release mortality. With a 12–inch size limit and a 10 percent discount rate, the model predicted that the net present value of commercial revenues would increase for all release mortalities over a 20 year period. The increase in net present value would range from $74,200 (3.7 percent) for no release mortality, to $7,700 (0.4 percent) for 40 percent release mortality.

The model also predicted that the proposed minimum size limit would affect the catches of recreational fishermen more than commercial fishermen. This is because recreational fishermen catch relatively more fish at younger age and smaller size classes. The weight of gray triggerfish caught by recreational fishermen was predicted to decline initially by approximately 15 percent. It would increase marginally in the long term only with release mortalities of 10 percent or less. As a result, the proposed minimum size limit was predicted to redistribute catches from recreational to commercial fishermen.

The long term increase in revenues would likely attract new entrants to the fishery given its open access nature. Excess capacity will lead to stock depletion over time unless the open access nature of the fishery is addressed.

Conclusion

The Council rejected this option based on overwhelming public comment and due to the fact that the most recent estimate of SSR (27%) indicated minimal overfishing. If action is necessary in the future, the framework provision will be used to implement regulations.

Rejected Option 2. Establish a minimum size limit of 12 inches for gray triggerfish.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Appendix H contains SAFMC staff and NMFS analyses done for gray triggerfish (pages 6-10). Across all gears, the 12" limit would impact 3% of the commercially caught gray triggerfish based on 1991-1992 catches. About 4% of the commercial "electric & hydraulic reels" catch is below 12 inches and none of the "bottom longline" catch is below 12 inches. Analyses from the MRFSS data indicate that 23% of the catch is below 12 inches. Approximately 30% of the headboat catch is below this size limit. The impacts in terms of net present value and the effects on catches over time are shown in Appendix J.

Conclusion

The Council rejected this option because it is unnecessary at this time. If action becomes necessary in the future, the framework will be used to implement any changes.

Rejected Option 3. Evaluate a 12" FL minimum size limit and a 1-3 fish bag limit.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council rejected this option based on overwhelming public comment and due to the fact that the most recent estimate of SSR (27%) indicated minimal overfishing. If action is necessary in the future, the framework provision will be used to implement regulations.

ACTION 7. CUBERA SNAPPER

No action.

Biological Impacts

This option would continue the 12" minimum size limit that is currently in place for both recreational and commercial fishermen. In addition, cubera are included in the 10 snapper bag limit.

Enforcement Impacts

In the State of Florida, effective March 1, 1994, there will be a daily bag limit for cubera snapper of two per person or boat, whichever is less, for all fishermen for fish 30" in length or larger (smaller cubera snapper are included in the 10-snapper aggregate recreational bag limit).

Socioeconomic Impacts

Conclusion

The 1993 stock assessment did not include any new information on cubera snapper. Also, the Advisory Panel did not propose taking any action. The Council has deferred action until the State of Florida adopts new regulations.

Rejected Options for Action 7

Rejected Option 1. Establish a spawning area closure off north Key Largo, a 42" minimum size limit, and a bag limit of one fish per person per day including crew members in the case of a charter vessel.

Biological Impacts

Management of cubera was suggested by Capt. Larry Dukehart (letter of 27 November 1992). Capt. Dukehart suggested a spawning area closure, a 42" size limit and a bag limit of one fish.

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council rejected this option based on public comment and to let the State of Florida adopt regulations for state waters. If action is necessary in the future, the framework provision will be used to implement regulations.

Rejected Option 2. Establish a daily bag limit of two per person or boat, whichever is less, for all fishermen.

Biological Impacts

Management of cubera was suggested by Capt. Larry Dukehart (see Rejected Option 1 above).

Enforcement Impacts

Socioeconomic Impacts

Conclusion

This option would track that being proposed by the Florida Marine Fisheries Commission but was rejected by the Council until the Commission implements its regulations. If action is necessary in the future, changes will be implemented using the framework procedure.

Rejected Option 3. A daily bag limit of 2/boat and a minimum size limit of 42" TL.

Biological Impacts

Management of cubera was suggested by Capt. Larry Dukehart (see Rejected Option 1 above).

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council rejected this option based on public comment and to let the State of Florida adopt regulations for state waters. If action is necessary in the future, the framework provision will be used to implement regulations.

E. Spawning Season Regulations

ACTION 8. GREATER AMBERJACK

No action.

Biological Impacts

The 1992 assessment again indicated problems in the sampling data going into the assessment. The assessment indicates that current management measure appear adequate to maintain the stock. However, fishermen indicate that the resource has declined significantly. The plan development team noted that recent aging work using sectioned otoliths suggest they live 16-17 years rather than 10 years as suggested from whole otoliths. The new age/growth work should be completed by the end of 1992 and incorporated into the Beaufort Lab 1993 assessment. A decline has been noted in the South Atlantic and Gulf concomitant with the high catches in the Keys. The issue of artificial reefs attracting amberjacks off natural bottoms was raised. Several known harvesters are not being included in the data collection process and so the catch data is an underestimate of harvest.

Banded rudder fish should also be included given the apparent high numbers being caught. Also, their inclusion should be evaluated in the next assessment.

The Miami Lab completed a stock assessment for amberjack in March of 1993 (Cummings-Parrack, 1993). This analysis examined the exploitation status through 1991. Major results are summarized below (taken from Cummings-Parrack, 1993):

1. Total estimated catches ranged from about 114,000 fish (1986) to 223,000 fish (1987). Estimated yield of the three fisheries (commercial, headboat and recreational) ranged from 1,201 mt (1986) to 1,837 mt (1990). Sample average weight ranged from 12.98 pounds (1987) to 28.27 pounds (1989) across all fisheries). The trend in sample average weight (across all three fisheries) reflects a slight increase since 1987 across all fisheries.
2. The trend in stock size numbers estimated from this study suggest large variation in stock sizes.
3. The variance of stock size estimates is on the order of 100% annually, except for 1989 in which the coefficient of variation (CV) of stock size was 216%. The degree of uncertainty is too large for the estimates to be useful in measuring changes in abundance between years; only relative trends should be considered.
4. Large uncertainty in the estimates is a result of insufficient monitoring of the basic statistics required for analysis (reported yields, estimated catches, directed fishing time, and biometric (size/weight) samples).
5. The Atlantic greater amberjack stock is driven by recruitment which appears to be highly erratic in magnitude. Although stock size levels changed greatly over the six-year study period (1986-1991) the overall trend in stock size is up from the initial year of study (1986).
6. The dynamics are recruitment driven (new recruits compose the majority of numerical abundance) therefore, estimates will not be useful unless they are size specific. At present, the analysis method employed here indirectly estimates recruitment and does not separate recruitment into various components (i.e., new borns, juveniles, immigration of adults, etc.). Such analysis must be based on size data and these data are not currently being collected. The use of size-based procedures must ensue this investigation in order to comment definitively on the exact magnitude of recruitment.
7. Total catches exceeded stock production and stock growth in 1986, 1988, and in 1991. Because stock production was low in these years, most likely from low year classes, it seems likely that the 1985, 1987, and the 1990 year classes were low. Good recruitment apparently occurred in 1987 and 1990. Of particular concern is the low recruitment of 1986, 1988, and 1991 concomitant with stable or increasing fishing effort.
8. Fishing mortality approximately doubled from 0.12 in 1986 to 0.22 in 1987, and declined by 23% in 1988. fishing mortality averaged 0.18 from 1988 through 1990 and declined to 0.13 in 1991. This also coincided with the year of significant declines in directed effort in the commercial and the headboat fisheries. This rate of mortality represents the percentage of the stock, averaged over the year, that was removed from fishing alone.
9. It seems likely that the decline in stock size was due to low year classes (i.e., a reduction in recruitment) combined with persistent fishing. The index of fishing time ("effort") is generally stable over the six-year period but catches increased every year. Catches increased steadily and indexed fishing time was stable while average weight declined in the last year.
10. Based on preliminary data from the NMFS, SEFSC, RMD and from the MRFSS, projected yield in 1992 is 2.1 million pounds (commercial) and 1.2 million pounds (recreational) for about 3.3 million pounds for the 1992 calendar year. Neither average weight samples nor indices of time fished are yet available for any of these fisheries at this time and the estimates of projected yield are uncertain so reliable indices of 1992 stock sizes are not possible.
11. Currently, the 1990 and earlier year classes are being fished given the probable size when recruits become available to the different gears of the recreational and commercial fisheries. Given that good to moderate recruitment occurred in 1987 and in 1990, and if the 1992 projected yield is about 3.2 million pounds or less, then the stock can be expected to not decline in 1992.
12. Over the last six years the Atlantic greater amberjack stock size trend was characterized by two high years (1987, 1990), 1 year of medium (1989) and 3 years of low (1986, 1988, 1991) abundance. these results show a trend in the fishery of decreasing average weight since 1990 and that of increasing yield (and catch)in a stable or declining effort situation. Projected stock sizes for 1992 suggest a year of low

to moderate stock size and with a yield of about the 1991 amount or larger if the current observed trend in effort remains stable.
13. If the 1992 observed yield remains about the same or lower than that observed in 1991, estimated production of the 1992 stock may be positive because two "good" years of recruitment occurred in the six-year period and two moderate sized year classes.
14. The basic fisheries data will have to be dramatically improved in scope and quality before accurate assessment of stock condition and sound management advice is possible for the Atlantic greater amberjack stock.

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. The minimum size limits and 3-fish recreational bag limit are not altered by this action.

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council concluded that the status quo provides sufficient biological protection at this time. The Council has requested the Florida Marine Fisheries Commission address the sale of amberjack during April using its authority to regulate the sale of fish.

Rejected Options for Action 8

Rejected Option 1. Prohibit sale of bag limit caught fish during April south of Cape Canaveral Florida. As all fishermen are limited to the bag limit during April, this option would have the effect of prohibiting sale of greater amberjack during the month of April south of Cape Canaveral, Florida.

Biological Impacts

This option would address the large number of complaints concerning recreational fishermen targeting and selling amberjack during April when all fishermen are limited to the bag limit. This option continues 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.

Enforcement Impacts

Socioeconomic Impacts

The 1993 Reef Fish Stock Assessment Panel report indicated that the current minimum size limits (36–inch FT and 28–inch FT for commercial and recreational fishermen respectively) appear to have resulted in an increase in the average weight and length of greater amberjack. The proposed action would further aid this recovery process since it will remove any incentive for recreational fishermen to target greater amberjack during this period. No data is available to evaluate the impact of the proposed action. However, it is not expected to have any negative impact on recreational fishermen and can only help to improve the status of the greater amberjack stocks.

Conclusion

The Council rejected this option because the status quo provides sufficient biological protection at this time. The Council has requested the Florida Marine Fisheries Commission address the sale of amberjack during April using its authority to regulate the sale of fish.

Rejected Option 2. Prohibit any retention during April and May (a spawning closure).

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Some advisory panel members felt that all fishing should be "catch and release" during April and May. It was pointed out that artificial reefs appear to attract amberjacks away from natural reef/areas; amberjacks are not present on traditional grounds anymore. One AP member felt that the 36" size limit will protect the resource; the closure in April is good but if you also close May it would really impact the fishermen. The AP did not know of any directed fishing for amberjacks in North Carolina except one dive boat; several dive boats operate in South Carolina. Around the Naval Towers off Savannah and wrecks in 50', the harvest by divers has impacted the fish in the area.

Conclusion

The Council rejected this option as being too restrictive. Expanding the months during which fishermen are limited to the bag limit provides additional protection without the negative impacts of going to no retention.

Rejected Option 3. The plan development team suggested that the following alternatives be evaluated:

A. Reversion of the bag limit to 3 for both April and May .
B. No retention during April and May.
C. Prohibit coring (removal of head & tail) due to the problems in obtaining biological samples.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusion

Portions of this option are included as other options considered and either accepted or rejected. If in the future, data collection becomes a significant problem the Council will evaluate prohibiting coring.

Rejected Option 4. Close the fishery (both recreational and commercial) until an adequate data collection program can be established.

Biological Impacts

This would be the most biologically conservative option and would limit mortality until the necessary data collection program could be established. Recognizing the uncertainty about the status of greater amberjack, the council is taking some risk by allowing harvest.

Enforcement Impacts

Socioeconomic Impacts

Given some level of risk by allowing harvest, limiting recreational and commercial fishermen may not be necessary.

Conclusion

While remaining concerned about the inadequate data available for an assessment to determine the status of the greater amberjack resource, the Council rejected this option because they did not feel that it would be fair to negatively impact fishermen because of the serious lack of data. If only we had the necessary data or at least the necessary programs established to collect such data, consideration of such an option would not be necessary.

Rejected Option 5. Establish a quota for amberjack:

A. Set the quota equal to _____ pounds based on landings from 1986-91.
B. Set the quota equal to _____ pounds based on landings from 1990-91.
C. Set the quota equal to _____ pounds based on landings from 1991.
D. Set the quota based on one of the above less some percentage to be more conservative.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Establishment of a quota would at least set an upper limit on catch thereby limiting fishing mortality from the commercial sector until such time as more information became available.

Conclusion

The Council rejected this option as being unnecessary at this time. Existing regulations appear to offer adequate protection.

Rejected Option 6. Recommend that the controlled access committee evaluate ITQ management.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Based on the quota established above, ITQ management might be appropriate.

Conclusion

The Council will continue to evaluate the appropriateness of ITQ management in this fishery but has rejected moving forward at this time. Existing regulations appear to offer adequate protection.

Rejected Option 7. Reduce the bag limit from 3 to 2 or 1.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

This option would reduce fishing mortality from the recreational sector and reduce overall mortality during the spawning season closure.

Conclusion

The Council rejected this option as being unnecessary at this time. Existing regulations appear to offer adequate protection.

Rejected Option 8. Increase the minimum size limit.

Biological Impacts

This option would reduce the fishing mortality rate from both recreational and commercial sectors.

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council rejected this option as being unnecessary at this time. Existing regulations appear to offer adequate protection.

Rejected Option 9. Management of other *Seriola* species.

A. Bag limits.
B. Size limits.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council rejected this option as being unnecessary at this time. Existing regulations appear to offer adequate protection. If additional management becomes necessary, the framework (regulatory amendment) process will be used.

Rejected Option 10. Prohibit all harvest above the bag limit during April and May in the EEZ off Florida.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

This option would result in compatible state/federal regulations by tracking the Florida Marine Fisheries Commission and would provide greater protection for greater amberjack. The minimum size limits and 3 fish recreational bag limit would also be maintained.

Conclusion

The Council rejected this option as being unnecessary at this time. Existing regulations appear to offer adequate protection. If additional management becomes necessary, the framework (regulatory amendment) process will be used.

Rejected Option 11. Commercial trip limit of 10, 20 or 25 amberjack during spawning restriction (April) or year-round.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

This option was suggested at public hearings for Amendment 6.

Conclusion

The Council rejected this option as being unnecessary at this time. Existing regulations appear to offer adequate protection. If additional management becomes necessary, the framework (regulatory amendment) process will be used.

ACTION 9. YELLOWTAIL SNAPPER

No action.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

The 12–inch minimum size limit for both commercial and recreational fishermen will continue to be enforced. Huntsman et al (1993) indicated that the estimated spawning stock ratio obtained using 1991 data increased to 24 percent from the previous 19 percent obtained with 1990 data. Estimated fishing mortality for 1991 was 0.44. This was slightly lower than the estimated fishing mortality of 0.48 for 1990. They further indicated that the existing 12–inch size limit should produce a spawning stock ratio of 30 percent if most of the released fish survive. This is possible since yellowtail snapper are usually taken from shallow water. The signs so far suggest that recruitment is trending upward and the advisory panel does not have any evidence to support modifying the present regulations.

Conclusion

This option would continue the 12" minimum size limit that is currently in place for both recreational and commercial fishermen. In addition, yellowtails are included in the 10 snapper bag limit. The Council concluded that there was no compelling information available to suggest that these regulations should be modified.

Rejected Option for Action 9

Rejected Option 1. Establish a spawning season closure during the months of May, June and July.

Biological Impacts

This option would address concerns raised by Capt. Carl Rees (letter of 19 November 1992).

Enforcement Impacts

Socioeconomic Impacts

There is no evidence to indicate that the spawning stock is particularly vulnerable. Although catches remain very high, fishermen have not reported any problems with the fishery. In the absence of a more detailed analysis, such as a virtual population analysis to determine if there is any trend in recruitment, a spawning season closure might not serve any useful purpose and could cause hardship to fishermen.

Conclusion

The Council rejected this option because they concluded that there was no compelling information available to suggest that these regulations should be modified.

ACTION 10. GAG SPAWNING CLOSURE

No additional regulations at this time.

Biological Impacts

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.

The 1992 assessment results (Table 2) indicate that the gag SSR is 35% and with the minimum size limit of 20" TL, the SSR is expected to increase to 39%. Average monthly gag catch by state is shown in Figure 1 and annual catch by state for 1990-92 is shown in Table 6.

Figure 1. Gag average 1990-92 monthly commercial catch by state (SOURCE: NMFS general canvass data).

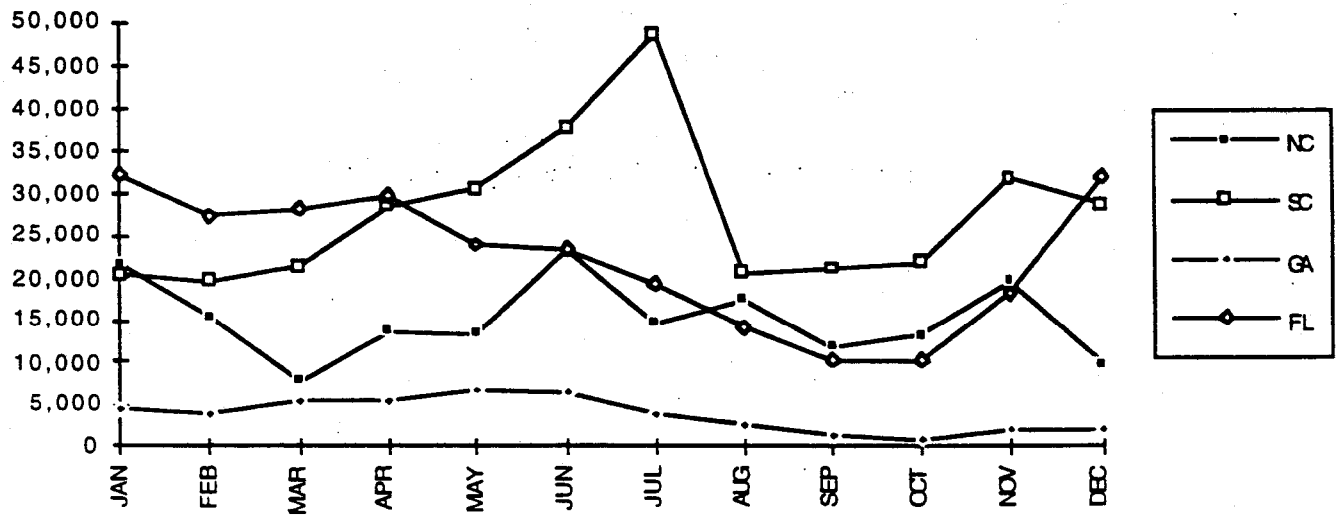

Table 15. Gag commercial landings by state for 1990-92 (SOURCE: NMFS general canvass data).

Year	North Carolina	South Carolina	Georgia	Florida East Coast	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	880,276

Enforcement Impacts

None.

Socioeconomic Impacts

Presently, there is a 20" TL size limit in place. However, no information is available to evaluate the impact of this size limit. 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 the gag would be out of their range by the time they are allowed to fish them. This would mean significant loss in revenues to them. Another issue that was mentioned is that the 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 will not have to incur any loss in revenues. However, if overfishing is taking place, the no action option would cause further declines in the stock and fishermen will incur revenue losses in the long-term.

Conclusion

Amendment 4 included a 20" gag size limit, eliminated longlines within 50 fathoms, prohibited use of fish traps, and implemented a 5-fish aggregate grouper bag limit. There was some concern that taking no additional action might result in overfishing. The present estimated spawning stock ratios, however, do not include data during the period that the 20" TL size limit and other management measures were in place, so it is not known whether overfishing according to the Council's definition is occurring or whether the size limit and other measures have reduced fishing mortality.

Data presented to the Council from North Carolina (Dennis Spitsbergen, personal communication) indicate that there were high gag catches by bottom longline vessels off North Carolina during the late 1980s. These large trips declined after 1990 and future trips are unlikely given the prohibition on bottom longlines within 50 fathoms implemented in 1992.

The Council accepted this action because they concluded that existing regulations provide sufficient protection for gag at this time. In Amendment 4 the Council prohibited use of fish traps, use of bottom longlines within 50 fathoms, established a 5-grouper aggregate bag limit, and established a gag minimum size limit of 20" TL. In addition, the experimental closed area proposed in Amendment 6 will offer some additional protection. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

Rejected Options for Action 10

Rejected Option 1. Prohibit all harvest of gag grouper January through March each year (spawning season closure) from the entire EEZ (North Carolina through Florida). See Figure 2 for monthly catch distribution.

Biological Impacts

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 that forms spawning aggregations:

> "...Polovina and Ralston (1987, pg 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 the 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 being proposed as a 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).

NMFS landings data were analyzed by Ben Hartig (member Snapper Grouper Advisory Panel; personal communication, January 1993) and indicated that the January through March time period accounted for 32% of the 238,509 pounds of gag landed commercially on the Florida east coast in 1990 and 30% of the 244,161 pounds landed in 1989. Total commercial gag landings were 768,077 pounds in 1990 and 939,823 in 1989 (Ben Hartig, personnel communication). The January through March closure on the Florida east coast will reduce the total gag catch in the south Atlantic by 10% based on 1990 landings and by 8% based on 1989 landings.

Catches from the NMFS general canvas data base were used to generate Figure 2 and indicate that over the 1990-92 fishing years approximately 25% of the catch from the entire south Atlantic was landed

during the January through March time period. On the Florida east coast, these three months account for about 33% of the annual Florida east coast catch.

Enforcement Impacts

Enforcement costs will increase and action will be necessary by each of the states for this to be effective.

Socioeconomic Impacts

Prohibiting the harvest of gag grouper during the spawning season will protect the spawning stock, particularly the males which are more aggressive during this period and are more susceptible to be caught. However, this action may cause fishermen to direct fishing effort at other species in order to avoid disruption of their fishing activities. Testimonies at public hearings indicate that 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 that the closure will impose more hardship on them since they already have a short fishing season.

Based on General Canvass data, the 1990–92 average monthly landing for January – March for North Carolina was 44,948 pounds valued at $89,373. The 1990–92 average yearly landing was 182,016 pounds valued at $352,561. If fishing is prohibited during January – March, fishermen would likely forego approximately 25% (also in value) of their harvest assuming that they cannot not make up for it before or after the closure.

In South Carolina, the average yearly landing for 1990–92 was 310,169 pounds valued at $707,241. The average landing for January – March was 61,288 pounds valued at $141,962. Fishermen would have to forego approximately 20% (also in value) of their harvest if fishing is prohibited during January–March assuming they cannot make up for it before or after the closure.

The 1990–92 average yearly landing for Georgia was 35,179 pounds valued at $67,201. Average landing and value for January – March for the same period were 13,549 pounds and $25,926 respectively. Fishermen would lose 39% of their harvest (also in value) if there is a season closure and they cannot make up for it otherwise.

Average yearly landing of gag grouper in Florida for 1990–92 was 262,934 pounds valued at $588,648. The average landing for January – March for the same period was 87,801 pounds valued at $214,780. The season closure would cause fishermen to lose approximately 33% of their harvest (37 percent in value) if they cannot make up for it before or after the closure.

At the regional level (all four states), the average yearly landing for 1990–92 was 790,298 pounds valued at $1,715,651. If the closure is imposed, fishermen in the region would lose 26% of their harvest (207,586 pounds). This represents a reduction in revenue of approximately 28% ($472,041). This would be quite significant for fishermen to forego and they would likely switch to other fisheries to make up for the loss.

However, the prohibition would protect 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 information available to predict whether the long term benefits would exceed the short term costs that would have to be foregone by fishermen. But we can expect that the open access nature of the fishery will attract new entrants in the long term as long as "pure profits" prevail. This will continue until all "pure profits" are dissipated unless the open access nature of the fishery is addressed.

Although spawning closures may allow spawning fish to spawn more effectively because they are undisturbed by fishing activities, the use of spawning closures to limit removals from the stock is not always successful. It is conceivable that fishing effort could increase before and after the spawning closure so as to keep harvest at the same level. Whether this occurs or not depends on the costs of fishing when fish are not as aggregated as they are during the spawning period or pre-spawning period. If prices are high enough and additional fishing costs are not high enough to make fishing unprofitable, then commercial catch could be nearly the same as without the closure. Should this occur, then the biological goal may not be met while net producer benefits are reduced because the efficiency of harvest is reduced due to fishermen having to fish when fish are less concentrated. If this results, then it would probably have been preferable to allow fishing during the spawning aggregations while controlling total harvest by a TAC restriction.

On the other hand, if fishing costs are far greater because fishing cannot take place when fish are 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 might have been better to limit catch to the same level by a TAC, 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 lower exvessel prices 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. However, spawning closures probably promote more inefficiency than TACs.

Conclusion.

The Council rejected this option because of the large socioeconomic impacts and because they concluded that existing regulations provide sufficient protection at this time. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

Rejected Option 2. The harvest and/or landing of gag in excess of the grouper aggregate bag limit of five (excluding Nassau grouper, jewfish, speckled hind and warsaw grouper) in or from the entire EEZ or south of Cape Canaveral, Florida (Vehicle Assembly Building, 28° 35.1' N Latitude) is prohibited during December, January and February.

Biological Impacts

Limiting catches to the bag limit during December, January, and February 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. It is the Council's intent that gag caught legally under the bag limit during the spawning closure could be sold in conformance with state law and the commercial size limit. Since the area north of Cape Canaveral would be open to both commercial and recreational fishing, a prohibition on sale of fish south of Cape Canaveral would be confusing and difficult to enforce.

Enforcement Impacts

Enforcement costs would increase.

Socioeconomic Impacts

This measure does not preclude commercial fishing during this time as long as the harvest does not exceed the bag limit. The spawning closure provides additional biological protection above that provided by the approved bag limit and size limits.

Harvest up to the recreational bag limit would promote public understanding of and compliance with the bag limit regulations. There is equity in leaving the recreational fishery open during the spawning closure in that the commercial fishery is not limited by a quota while the recreational fishery operates under a 5-fish bag limit.

In this approach, 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. This may actually increase recreational catches because anglers will not be competing with commercial fishermen during the spawning period when fishing is usually good. Allowing commercial fishermen to harvest the bag limit of 5 decreases impacts on the very small scale commercial fishermen but this also shifts a greater percentage of the conservation sacrifices to large scale fishermen who cannot fish profitably under a five fish bag limit. This proposal also could lead to significant highgrading by commercial fishermen.

This measure would discriminate against the large scale commercial fishermen since they would not find it cost effective to operate under a 5–bag limit. It would have little or no effect on small scale commercial, and recreational fishermen. If the large scale commercial fishermen cannot participate in the fishery during those months, it is possible that the other groups would be able to increase their harvests because of less competition. There is also the possibility of highgrading which would not be accounted for in the landings. Thus, this action is not likely to reduce fishing mortality and would also create equity problems among fishermen.

Conclusion

The Council rejected this option because of the large socioeconomic impacts and because they concluded that existing regulations provide sufficient protection at this time. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

Rejected Option 3. The harvest and/or landing of gag is prohibited during (other times will be added as appropriate) in the entire South Atlantic EEZ (appropriate area will be added).

Biological Impacts

See discussion under Rejected Option 2.

Enforcement Impacts

Enforcement costs would increase.

Socioeconomic Impacts

This measure will create undue hardship to fishermen. It will also necessitate significant enforcement cost because at–sea enforcement would have to be done to ensure that fishermen are not catching gag grouper from prohibited areas at certain times. The cost to fishermen would vary according to the areas and times of closure.

Conclusion

The Council rejected this option because of the likely large socioeconomic impacts and because they concluded that existing regulations provide sufficient protection at this time. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

Rejected Option 4. Prohibit all harvest of gag grouper January through March each year (spawning season closure) from the EEZ off Florida.

Biological Impacts

See discussion under Rejected Option 2. Although this would only affect the fishery off of Florida, it would also include recreational harvest which would benefit the resource.

Enforcement Impacts

Enforcement costs would increase.

Socioeconomic Impacts

Average yearly landing of gag grouper for 1990–92 in Florida represented 32% of the average yearly landing for the region. Although this is quite a significant percentage of the regional figure, there is no evidence to indicate that overfishing of gag grouper is more of a serious problem for Florida than for the other states. Based on the data, South Carolina accounted for a higher percentage (39%) of the region's average yearly landing for the period. Imposing a harvest prohibition for Florida alone would not address the problem in a timely manner and those fishermen would be the only one to bear the burden of this conservation measure.

Conclusion

The Council rejected this option because of the large socioeconomic impacts and because they concluded that existing regulations provide sufficient protection at this time. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

Rejected Option 5. Establish a recreational and commercial possession limit of 1 gag per person during January, February, and March. Prohibit sale during this time period.

Biological Impacts

See portions of discussion under Rejected Option 2.

Enforcement Impacts

This option would increase enforcement costs and require action by each of the states in order to be effective.

Socioeconomic Impacts

This option would essentially impose a harvest prohibition on commercial fishermen during this period. They would have to forego 26% (207,586 pounds) in harvest and lose $472,041 in revenue. This would create hardship for the commercial fishermen.

Conclusion

The Council rejected this option because of the large socioeconomic impacts and because they concluded that existing regulations provide sufficient protection at this time. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

Rejected Option 6. Establish a trip limit of ___ during January through March:

Biological Impacts

See discussion under Rejected Option 2.

Enforcement Impacts

Enforcement costs will increase and action will be necessary by each of the states for this to be effective.

Socioeconomic Impacts

Impacts would be proportional to the trip limit established. Lower trip limits will have greater impacts. See Rejected Option 5.

Fishermen might 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 their number of trips, their operating cost would increase significantly and they would be operating inefficiently. Enforcing the trip limit could also be problematic and costly because of the nature of the fishery.

Conclusion

The Council rejected this option because of the likely large socioeconomic impacts and because they concluded that existing regulations provide sufficient protection at this time. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

Rejected Option 7. Establish a recreational bag limit of ___ during January through March.

Biological Impacts

See discussion under Rejected Option 2.

Enforcement Impacts

Enforcement costs will increase and action will be necessary by each of the states for this to be effective.

Socioeconomic Impacts

Currently, there is a recreational bag limit of five, but no information is available to evaluate its impact so far on the fishery. However, the consensus is that fishing mortality should be reduced to increase recruitment, and particularly to prevent the male population from declining further. Imposing

another bag limit during this period would likely not have much impact in terms of decreasing fishing mortality.

Conclusion

The Council rejected this option because of the likely socioeconomic impacts and because they concluded that existing regulations provide sufficient protection at this time. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

Rejected Option 8. Prohibit retention of copper bellies (color pattern shown by males) and/or prohibit possession of gag greater than 35" TL year-round.

Biological Impacts

See discussion under Rejected Option 2. Release mortality will likely negate any potential benefits from releasing males and from releasing fish greater than 35" TL.

Enforcement Impacts

Enforcement costs will increase and action will be necessary by each of the states for this provision to be effective.

Socioeconomic Impacts

There is no information on release mortality for gag or for the percentage of copper bellies in the harvest.. Thus, it is impossible to predict the impact that this option would have. If a high percentage of the males do not survive after release, there would be significant wastage and this option would encourage inefficient fishing practices.

Conclusion

The Council rejected this option because of the likely socioeconomic impacts and because they concluded that existing regulations provide sufficient protection at this time. The Council will monitor the status of gag closely and propose any necessary changes through the framework procedure.

F. Gear Regulations

ACTION 11. REQUIRE BLACK SEA BASS POTS BE TENDED

No action.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

This option would continue to allow individuals to use any number of traps. Some fishermen are concerned that as the number of pots fished per firm increases, so will pot losses.

A requirement that black sea bass pots are brought in at the end of a trip may impact the present practices of some fishermen. To estimate what percentage of fishermen using black sea bass pots currently leave pots in the water rather than returning with some or all of their pots, permit files were sorted by fishermen's reported home port state. The reported number of pots listed by permit holder is useful to gauge the likely number of fishermen who own quantities of pots that can be stored on deck so

that all pots could be brought back at the end of a trip. It is, of course, possible that fishermen could own many pots and simply fish a quantity that can be hauled back to the dock at the end of a trip. The remaining traps could conceivably be stored on shore and used as replacements if pots are lost. This appears unlikely, however, because public testimony has indicated that pot losses are minimal when pots are brought in at the end of a trip. Incurring the inventory cost of holding a large number of pots as backups would not make good business sense.

High numbers of pots possessed by permit holders probably means that the permit holder has a very large vessel that can stack a large number of pots, or that some or all pots are left in the water between trips. Even the largest snapper grouper vessels probably could not stack over 60 pots and for smaller boats or boats without a canopy, only about 25 pots can be stacked on deck.

Tables 7 – 10 present the reported numbers of pots by permit holder and by state in frequency groups. If the number of pots that a boat can haul is limited to 30 per trip, 38 percent, 13 percent and 22 percent of the fishing units in North Carolina, South Carolina and Florida would be impacted respectively. In terms of the number of pots that will be impacted, 69 percent, 36 percent and 56 percent of the pots would be impacted in North Carolina, South Carolina and Florida respectively. When the number of pots that a boat can haul per trip is increased to 60, the number of fishing units that would be impacted are 11 percent, 2 percent and 11 percent in North Carolina, South Carolina and Florida respectively. This means that 31 percent, 8 percent and 37 percent of the pots in North Carolina, South Carolina and Florida respectively, would be impacted.

One way to view these impacts is that they are costs on fishermen amounting to the difference between what fishermen paid for pots exceeding the number they can carry safely on their vessels and what they can sell them for. Another impact is the loss of efficiency if using more pots than can be carried afforded gains in efficiency. Another way to characterize these impacts is that if fishermen do attain efficiency gains from using large numbers of pots, then the impacts may be the cost of adding carrying capacity to their vessels so that they can carry the number of the pots they feel maximizes efficiency. One way to accomplish this might be to increase storage through adding a canopy or a larger canopy where pots could be stacked.

This option will allow unlimited use of pots by fishermen. As the number of pots fished per firm increases, there is the possibility of potential conflicts between fishermen due to crowding effects. Some fishermen might think that they have traditionally fished in some areas with their pots and should continue to do so. Others might want to utilize the same space since there are no property rights to anyone. There is also the possibility that an increasing number of fish pots would increase fishing mortality depending on the efficiency of the pots.

Conclusion

The Council concluded that the existing regulations for black sea bass pots are sufficient at this time. If changes become necessary in the future, the framework procedure will be used to implement the necessary regulations.

Table 7. Number of black sea bass pots per permit holder in North Carolina. (Source: NMFS SERO.)

NORTH CAROLINA				
Class	Frequency	% Permits	#Pots/Class	% by # Pots
< 10	11	7.7%	56	1.1%
10-19	31	29.6%	359	8.3%
20-29	34	53.5%	775	23.9%
30-39	12	62.0%	373	31.4%
40-49	9	68.3%	360	38.6%
50-59	26	86.6%	1,301	64.7%
60-69	3	88.7%	185	68.5%
70-79	2	90.1%	150	71.5%
> 80	14	100.0%	1,421	100.0%
Totals	142		4,980	

Table 8. Number of black sea bass pots per permit holder in South Carolina. (Source: NMFS SERO.)

SOUTH CAROLINA				
Class	Frequency	% Permits	#Pots/Class	% by # Pots
< 10	16	26.2%	94	8.0%
10-19	19	57.4%	222	26.8%
20-29	13	78.7%	285	50.9%
30-39	5	86.9%	150	63.6%
40-49	3	91.8%	120	73.8%
50-59	3	96.7%	150	86.5%
60-69	1	98.4%	60	91.5%
70-79	0	98.4%	0	91.5%
> 80	1	100.0%	100	100.0%
Totals	61		1,181	

Table 9. Number of black sea bass pots per permit holder in Florida. (Source: NMFS SERO.)

FLORIDA				
Class	Frequency	% Permits	#Pots/Class	% by # Pots
< 10	5	13.5%	17	1.6%
10-19	11	43.2%	135	14.2%
20-29	9	67.6%	195	32.3%
30-39	4	78.4%	126	44.1%
40-49	0	78.4%	0	44.1%
50-59	4	89.2%	200	62.7%
60-69	0	89.2%	0	62.7%
70-79	1	91.9%	75	69.7%
> 80	3	100.0%	325	100.0%
Totals	37		1,073	

Table 10. Number of black sea bass pots per permit holder in the South Atlantic. (Source: NMFS SERO.)

SOUTH ATLANTIC				
Class	Frequency	% Permits	#Pots/Class	% by # Pots
< 10	37	13.8%	196	2.4%
10-19	68	39.0%	795	12.2%
20-29	64	62.8%	1,440	29.9%
30-39	22	71.0%	679	38.3%
40-49	12	75.5%	480	44.2%
50-59	36	88.8%	1,801	66.3%
60-69	6	91.1%	365	70.8%
>70<200	24	100.0%	2,371	100.0%
Totals	269		8,127	

Rejected Options for Action 11

Rejected Option 1. Require that black sea bass pots be tended, that is, taken out on a vessel and brought back at the end of a trip.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Requiring that pots be tended will limit the number of pots that are lost and limit the number of pots used. Pots are not required to be attached to the vessel at all times. This issue surfaced during the public hearings held on black sea bass pots and is supported by some fishermen in North and South Carolina. Others object because it would limit the number of pots that can be fished.

Pots must be baited to fish effectively which limits the number of traps that can be fished. Some fishermen fish more pots than they can carry on their boat and it is almost a storage method. Fishermen make a trip and fish three to five days, leave the pots out and when they come back out they pull the pots, bait them and stay out three or four days and fish them. Some of the North Carolina fishermen will have as many as 150 sea bass pots.

There is also the problem of non-tended pots preventing other boats from fishing some areas. This has been reported by headboats (Stuart Reeves, personal communication). This individual explained that it was not possible to go into an area that had been set with pots and left untended because the other vessels could not drag 400 feet of anchor line and 40 monafilament lines or bandit reels through 25 or 30 feet of black sea bass pots. Entanglement of the anchor line with pot buoy lines or lines connecting traps prevents use of a "float ball" to retrieve anchors on boats without anchor winches. In addition, the hard bottom areas in South Carolina are limited and may run for a distance along the coast but not in a wide band. If there are a series of pots with buoys it could prevent use of these hard bottom areas by other fishing vessels.

The "traditional" black sea bass pot fishery involved taking a relatively small number of traps out and bringing them back to shore at the end of a trip. This traditional fishery is the type of fishery provided for when the Council exempted the black sea bass pots north of Cape Canaveral in Amendment 4. The expansion of number of pots is a recent development.

If fishermen are used to leaving their pots in the water after retrieving their catches, the requirement to tend and bring back their pots at the end of each trip could reduce the length of time the pots are left in the water and whence the likelihood of increasing their total catch. This requirement would impose a burden on fishermen if they have to take and bring back their pots each time. Also, if the number of pots allowed is less than the number that would enable fishermen to operate efficiently, there would be some efficiency loss leading to loss in revenues to fishermen.

Conclusion

The Council concluded that the existing regulations for black sea bass pots are sufficient at this time and rejected this option. If changes become necessary in the future, the framework procedure will be used to implement the necessary regulations.

Rejected Option 2. Limit the number of pots to 25 per vessel.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council concluded that the existing regulations for black sea bass pots are sufficient at this time and rejected this option. If changes become necessary in the future, the framework procedure will be used to implement the necessary regulations.

Rejected Option 3. Require tending within ___ miles of shore (and limit to 25 per vessel?) but no tending (or number limitation?) if farther offshore.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

Conclusion

The Council concluded that the existing regulations for black sea bass pots are sufficient at this time and rejected this option. If changes become necessary in the future, the framework procedure will be used to implement the necessary regulations.

Rejected Option 4. Require tending and limit to 25 pots per vessel.

Biological Impacts

Enforcement Impacts

Socioeconomic Impacts

This option has been suggested by some fishermen and would be supported by fishermen that fish multiple gear types. However, it would impact fishermen that fish exclusively for black sea bass with pots either year round or seasonally.

This option is more restrictive than the 30 pots per trip limit discussed under the action. The percentages of fishing units and pots that would be affected would be higher than those already mentioned under Action 8. Fishing units that presently carry more than 25 pots per vessel will be affected and some might not find it cost effective to continue fishing. At the minimum, it will make them operate inefficiently. Tending of the pots would also create more burden on them because they will have to stick around the vicinity of their pots until they retrieve them. Weather conditions may not permit them to tend their pots at times

Conclusion

The Council concluded that the existing regulations for black sea bass pots are sufficient at this time and rejected this option. If changes become necessary in the future, the framework procedure will be used to implement the necessary regulations.

Rejected Option 5. Require that black sea bass pots be tended, that is, taken out on a vessel and brought back at the end of a trip. Also require that the vessel remain in the general proximity of their pots.

Biological Impacts

Enforcement Impacts

This option would have high enforcement costs or would be nearly impossible to enforce.

Socioeconomic Impacts

This will create considerable burden on the fishermen. Their pots would be in the water for shorter periods and this would reduce their fishing efficiency. Weather conditions may not make it feasible for them to be in the general proximity of their pots at all times.

Conclusion

The Council rejected this option because of the difficulty in enforcing the requirement that the vessel remain in the general proximity and because they concluded that the existing regulations for black sea bass pots are sufficient at this time. If changes become necessary in the future, the framework procedure will be used to implement the necessary regulations.

Appendix D. Habitat Concerns

The habitat section for the Snapper Grouper Fishery Management Plan was updated as part of Amendment 1. The following information replaces Section 8.2.5 in Snapper Grouper Amendment #1 and Adds Section 8.3.

A. Replace Section 8.2.5 in Amendment #1 With the Following Wording

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:

North Carolina•
- 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. hurricane Hugo impacts on fisheries habitat
15. anchoring on reefs and groundings
16. habitat utilization documentation
17. impacts of fishing techniques
18. sea level rise
19. impacts of jetties and groins
20. mandatory boat access

8.2.5.3 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 (Table 1).

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).

8.2.5.4 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. Local production could be adversely affected by dredging and pipe laying activities. Increased industrial activities could also affect adult and juvenile species 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.

8.2.5.5 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) and a policy statement concerning dredging and dredge disposal activities (Section 8.3.3).

8.2.5.6 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.

8.2.5.7 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. 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.

8.2.5.8 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.

8.2.5.9 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 nonpoint 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. Table 2 describes the pollutants included in the NCPDI, their definition and effects on the environment, marine organisms, and humans.

8.2.5.10 Agricultural Pesticide use in Coastal Areas

Pesticides including herbicides, insecticides, fungicides, nematicides, algicides, wood preservatives, and fumigants have been used extensively in the southeast coastal zone. 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 has undertaken a comprehensive review of pesticide use in coastal areas. 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 will be available in 1993 and will be included in a subsequent amendment to this plan.

B. Add Section 8.3 to Amendment #1 Wording

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 on Ocean Dumping

The SAFMC is opposed to ocean dumping of industrial waste, sewage sludge, and other harmful materials. Until ocean dumping of these materials ceases, the SAFMC strongly urges state and Federal agencies to control the amount of industrial waste, sludge, and other harmful materials discharged into rivers and the marine environment , and these agencies should increase their monitoring and research of

waste discharge. The SAFMC requests that the Environmental Protection Agency continue to implement and enforce all legislation, rules, and regulations with increased emphasis on the best available technology requirements and pretreatment standards. The SAFMC requests that EPA require each permitted ocean dumping vessel (carrying the above described material) to furnish detailed information concerning each trip to the dump site. This might be monitored with transponders, locked Loran C recorder plots of trips to and from dump sites, phone calls to the EPA when a vessel leaves and returns to port, or other appropriate methods. Also the EPA should take legal action to enforce illegal (short or improper) dumping. The SAFMC requests that fishermen and other members of the public report to the EPA, Coast Guard, and the Councils any vessels dumping other than in approved dump sites. The SAFMC supported the phase out of ocean dumping of the above described materials.

8.3.3 SAFMC Policy Statement Concerning Dredging and Dredge Material Disposal Activities

Ocean Dredged Material Disposal Sites (ODMDS)

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 concerning its role in the designation, operation, maintenance, and enforcement of activities in the ODMDSs:

Policies

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.

Offshore and Nearshore 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 nearshore underwater berm creation activities should be reviewed under the most rigorous criteria, on a case-by-case basis.

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.

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.

8.3.4 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 nearshore 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.

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 on the following pages along with the Atlantic States Marine Fisheries Commission policy on marine, estuarine and riverine habitat.

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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. Summary of Public Hearings & Written Comments

Public hearings on Amendment 6 (which included a number of the items that are now in Amendment 7) were held at the following locations:

August 26, 1993	Charleston, South Carolina
June 21, 1993	Marathon, Florida
June 16, 1993	West Palm Beach, Florida
June 15, 1993	Jacksonville Beach, Florida
June 14, 1993	Savannah, Georgia
June 10, 1993	Charleston, South Carolina
June 9, 1993	North Myrtle Beach, South Carolina
June 8, 1993	Wrightsville Beach, North Carolina
June 7, 1993	Morehead City, North Carolina

A briefing package containing copies of all letters received and minutes from all public hearings was distributed to all Council members prior to final deliberations on Amendment 6 (which included a number of the items that are now in Amendment 7). Summaries of the public hearing comments and letter received follow. Additional public input was received during the Council meeting on August 26, 1993 in Charleston, South Carolina and the minutes are a part of the administrative record.

Public hearings on Amendment 7 (which included a number of the items that were in Amendment 6) were held at the following locations:

October 19, 1993	Jacksonville Beach, Florida
October 20, 1993	Savannah, Georgia
October 25, 1993	Charleston, South Carolina
November 1, 1993	Atlantic Beach, North Carolina

A briefing package containing copies of all letters received and minutes from all public hearings was distributed to all Council members prior to final deliberations on Amendment 7 (which included a number of the items that were in Amendment 6). Additional public input was received during the Council meeting on February 10, 1994 in St. Augustine, Florida and the minutes are a part of the administrative record.

Due to the presentation of new information at the February 1994 Council meeting concerning seafood safety, it was decided to hold an additional public hearing in conjunction with the April 1994 Council meeting. A public hearing addressing the issue of seafood safety as it relates to the sale of bag limit caught fish in the snapper grouper fishery was held:

April 21, 1994	Brunswick, Georgia

Minutes of and material received during this additional public hearing were included in the package containing all public input received during the Amendment 7 public hearing process.

SUMMARY OF AMENDMENT 6 PUBLIC HEARING COMMENTS

	MOREHEAD CITY, NC (10)	WRIGHTSVILLE BEACH, NC (17)
ACTION ITEM		
1. Problem		
2. Objective		
3. Quota system		Snowy bandit N of Cape Canav/LL S = 1
4. Base year		
5. Phase-in		
6. Fishing year		
7. Minor sp. & effort shift		
8. Speckled hind & warsaw	Incl in 5 aggreg = 2	Yes = 0; No = 2
9. Oculina HAPC		
Sanctuaries for gag off S. FL = 1		
10. Snowy trip limit		
11. Golden tilefish trip limit		
12. Commercial bycatch		
13. Recreational bag limit	No = 1; Incl in 5 aggreg = 1	
14. Dealer permit		
15. Charter & Headboat permit		
16. Commercial permit to sell	Yes = 1; No = 2	Yes = 0; No = 5; Use 10% = 1
17. Tracking quota		
18. Red porgy quota & bag limit	Bag of 3 too low = 2; Eval 12" = 1	Quota hard/low = 3
	Phase-in bag = 1	Bag tough/low = 2
19. Gag spawning closure	Yes = 0; No = 5	Yes = 0; No = 6; 26" better = 1
Prefer a bag/trip limit	1-2 fish rec/com trip limit = 1	
		OK for Florida = 1; More research = 3
20. Red snapper		
21. Greater amberjack		
22. White grunt	No = 2; Maybe 10" = 1	No = 3
23. Hogfish		
24. Gray triggerfish		
25. Mutton snapper		
26. Cubera snapper		
Minimum size = 42"		
27. Yellowtail snapper		
28. Multi-day bag limit		
29. Crew specification		
30. Scup mgmt. unit		
31. Framework		
32. Allowable gear		
No powerheads off SC		
Longline north of Cape Canaveral		
Prohibit longlines		
33. Experimental gear		
34. Sink net fishery		
35. Tend black sea bass pots	Yes = 1; No = 2; Limit number = 1	Yes = 1; No = 4
Limit number of traps	Vessel safety problem = 1	Yes = 0; No = 1 Limit # tags = 1
OTHER COMMENTS		**OTHER COMMENTS**
You do not listen		
Support Limited Entry		
RIR/Economic Impacts Not Sufficient	Yes = 1	
Regs will destroy tourism	Yes = 1	
Undersized fish used for bait		
Bag/size limits	BSB larger than 8" = 1	
Allow shrimpers to exceed bag limits		
Shrimp bycatch is problem		Yes = 1
Data is lacking/poor/inaccurate	Yes = 2	Yes = 2; Need observers = 1
Need faster stock assessments		
Logbooks not accurate		Yes = 1
Separate mgmt by zones	Yes = 1	
Oppose Amendment 6	Yes = 1	
Fish are hook-smart & more abundant		
Leave current regs in place for 5 years		
No more regs until eval current regs	Yes = 3	Yes = 5
No more regs until get enforcement		Yes = 1
Law enforcement lacking; no response		
SAFMC should not track FL MFC		
Inshore pollution & beach renours		
Commercial effort has declined		Yes = 1
Tax imports/$ to fishermen		

SUMMARY OF AMENDMENT 6 PUBLIC HEARING COMMENTS

	NORTH MYRTLE BEACH, SC (12)	CHARLESTON, SC (4)
ACTION ITEM		
1. Problem	BSB pots = 2; inshore grounds = 3	
2. Objective		
3. Quota system		
4. Base year		
5. Phase-in		
6. Fishing year		Tile start Jan 1 = 1
7. Minor sp. & effort shift		
8. Speckled hind & warsaw	No = 1; Prohibit sale = 1	
9. Oculina HAPC	Yes = 0; No = 1	Yes = 1
Sanctuaries for gag off S. FL = 1		
10. Snowy trip limit		Yes = 1
11. Golden tilefish trip limit		Yes = 1; 5,000 lb = 2
12. Commercial bycatch		If catch more snowy, keep = 1
13. Recreational bag limit	Phase-in = 1	No = 1
14. Dealer permit	Yes = 1	
15. Charter & Headboat permit		
16. Commercial permit to sell	Yes = 3	Yes = 1; Boat either rec or com = 1
17. Tracking quota		
18. Red porgy quota & bag limit		Bag low = 1; Phase-in bag (10) = 1
	Phase-in bag = 1	
19. Gag spawning closure	Yes = 0; No = 1; Leave rec open = 1	Yes = 1
Prefer a bag/trip limit	90 fish or 15 boxes = 1	
20. Red snapper		
21. Greater amberjack		
22. White grunt		
23. Hogfish		
24. Gray triggerfish		
25. Mutton snapper		
26. Cubera snapper		
Minimum size = 42"		
27. Yellowtail snapper		
28. Multi-day bag limit		
29. Crew specification		
30. Scup mgmt. unit		
31. Framework		
32. Allowable gear	No cable = 2	Hook & line only = 1
No powerheads off SC	Agree = 0; Disagree = 1	
Longline north of Cape Canaveral		
Prohibit longlines		
33. Experimental gear		
34. Sink net fishery		
35. Tend black sea bass pots	Yes = 3; No = 1	Yes = 1
Limit number of traps	Limit effort=1; BSB pots damage habitat=3	Limit effort = 1
OTHER COMMENTS	OTHER COMMENTS	OTHER COMMENTS
You do not listen	Same size limit rec & com = 1	Habitat damage rec & com = 1
Support Limited Entry		Severe lack of enforcement = 1
RIR/Economic Impacts Not Sufficient		
Regs will destroy tourism		
Undersized fish used for bait		
Bag/size limits		
Allow shrimpers to exceed bag limits		
Shrimp bycatch is problem		
Data is lacking/poor/inaccurate	Yes = 2	
Need faster stock assessments	Yes = 1	
Logbooks not accurate		
Separate mgmt by zones	Yes = 1	
Oppose Amendment 6		
Fish are hook-smart & more abundant		
Leave current regs in place for 5 years		
No more regs until eval current regs		
No more regs until get enforcement		
Law enforcement lacking; no response	Yes = 1	
SAFMC should not track FL MFC		
Inshore pollution & beach renours		
Commercial effort has declined		
Tax imports/$ to fishermen	Yes = 1	

SUMMARY OF AMENDMENT 6 PUBLIC HEARING COMMENTS

	SAVANNAH, GA (5)	JACKSONVILLE BEACH, FL (18)
ACTION ITEM		
1. Problem		
2. Objective		
3. Quota system		Two 6-month quotas = 1
4. Base year		
5. Phase-in		
6. Fishing year		Jan 1 = 1
7. Minor sp. & effort shift		
8. Speckled hind & warsaw		No = 1
9. Oculina HAPC	No = 1	
Sanctuaries for gag off S. FL = 1		
10. Snowy trip limit		
11. Golden tilefish trip limit		5,000 or 6,000 aggregate = 2
12. Commercial bycatch		
13. Recreational bag limit		
14. Dealer permit	Yes = 2	
15. Charter & Headboat permit		
16. Commercial permit to sell	Yes = 2; No = 1	No = 2; Exceptions for part-time = 1
17. Tracking quota		
18. Red porgy quota & bag limit	No phase-in of quota = 1	Yes = 1; Quota steep = 1; Bag tough = 1; More info=1
		Bag ok = 1; Higher bag (5-6) = 2; Bag of 10=1
19. Gag spawning closure	No = 1; Maybe off FL = 1; Not rec = 1	Yes = 1; No = 11
Prefer a bag/trip limit		2-3/person, even 1 = 2; Lower bag = 5
		Prefer a larger size (30") = 3; Max size = 1
20. Red snapper	Slot limit = 2 (14-24")	High mortality = 1
21. Greater amberjack	Do something, no sale = 3; Reduce rec ok=1	No = 4; Lower bag if necessary = 1; Humps spawn=1
22. White grunt	No = 1	
23. Hogfish		
24. Gray triggerfish		Yes = 2
25. Mutton snapper		
26. Cubera snapper		No bag = 1
Minimum size = 42"		
27. Yellowtail snapper		
28. Multi-day bag limit	Want for rec if policed = 1	
29. Crew specification		
30. Scup mgmt. unit		
31. Framework		
32. Allowable gear		No cable on live bottom = 1; Powerheads OK=4
No powerheads off SC	No powerheads for AJ = 1	Unconstitutional = 2; Pass >100'=4
		Depth dangerous=1; Edorsement on permit = 1
Longline north of Cape Canaveral		No = 1
Prohibit longlines		
33. Experimental gear		
34. Sink net fishery		
35. Tend black sea bass pots		
Limit number of traps		
OTHER COMMENTS	OTHER COMMENTS	OTHER COMMENTS
You do not listen	Ban all commercial fishing = 1	Against ITQs = 1
Support Limited Entry		Enforcement lacking in HAPC = 1
RIR/Economic Impacts Not Sufficient		African pompano needs action = 1
Regs will destroy tourism		
Undersized fish used for bait		
Bag/size limits	Size limits kill brood stock = 2	Grouper bag of 2 all year = 1
		Vermilion size of 9" = 1
		Rec should be able to land smaller fish = 1
Allow shrimpers to exceed bag limits		
Shrimp bycatch is problem		
Data is lacking/poor/inaccurate	YES = 1	Yes = 6
Need faster stock assessments		
Logbooks not accurate		
Separate mgmt by zones		
Oppose Amendment 6		Yes = 1
Fish are hook-smart & more abundant		Yes = 1
Leave current regs in place for 5 years		Yes = 1
No more regs until eval current regs		Evaluate effects of current regs = 1
No more regs until get enforcement		
Law enforcement lacking; no response		Yes = 1
SAFMC should not track FL MFC		
Inshore pollution & beach renours		
Commercial effort has declined		
Tax imports/$ to fishermen		

SUMMARY OF AMENDMENT 6 PUBLIC HEARING COMMENTS

	WEST PALM BEACH, FL
ACTION ITEM	
1. Problem	
2. Objective	
3. Quota system	Yes = 1
4. Base year	
5. Phase-in	
6. Fishing year	
7. Minor sp. & effort shift	
8. Speckled hind & warsaw	Yes = 1; No = 1; Bag of 1 = 4
9. Oculina HAPC	Yes = 1; No = 5; Limit to hook & line = 1
Sanctuaries for gag off S. FL = 1	No only off FL = 1
10. Snowy trip limit	
11. Golden tilefish trip limit	
12. Commercial bycatch	
13. Recreational bag limit	3 tile = 1
14. Dealer permit	Yes = 1; Stricter rules, reporting, etc. = 1
15. Charter & Headboat permit	
16. Commercial permit to sell	Yes = 8; Yes but not charter = 1
	Stop handing out permits = 2
17. Tracking quota	
18. Red porgy quota & bag limit	
19. Gag spawning closure	Yes=1; No = 12; Gag Jan-Mar cos Kings closed=1
Prefer a bag/trip limit	10 fish/vessel/trip = 10; 12/vessel/trip =1
	1/person rec = 3; 1-2 rec/com=1; 1/person/5/boat=1
20. Red snapper	
21. Greater amberjack	Yes = 2; No = 6; Com quota?=1; Bag of 1=2
	10/1=1; 20/trip all year = 4; 25/trip Apr&May=7
22. White grunt	
23. Hogfish	Yes = 1
24. Gray triggerfish	Yes = 1; No = 4
25. Mutton snapper	Lower size=3; 16"=1; 15-16-17"=4;No = 1
	No closure, 20" all year = 1
26. Cubera snapper	Yes = 1
Minimum size = 42"	
27. Yellowtail snapper	
28. Multi-day bag limit	Yes = 1
29. Crew specification	
30. Scup mgmt. unit	
31. Framework	
32. Allowable gear	Yes w/powerheads =1
No powerheads off SC	No powerheads or sleds = 1
Longline north of Cape Canaveral	Yes Canaveral or Jupiter = 2; No = 1
Prohibit longlines	
33. Experimental gear	
34. Sink net fishery	
35. Tend black sea bass pots	
Limit number of traps	
OTHER COMMENTS	OTHER COMMENTS
You do not listen	SSR>30% more restrictive than <30% = 2
Support Limited Entry	AJ good candidate = 1; Support LE not sure ITQ=1
RIR/Economic Impacts Not Sufficient	Gag, AJ, mutton & Oculina in next Am=1
Regs will destroy tourism	Negotiate treaties with Mexico/Bahamas = 1
Undersized fish used for bait	
Bag/size limits	Rec & com same size limit = 4
	Rec bag limit should be per boat = 1
	Grouper bag limit of 1 all year = 1
	AJ trip limit/permit holder = 1
Allow shrimpers to exceed bag limits	
Shrimp bycatch is problem	Rock shrimp/calico bycatch is problem = 2
Data is lacking/poor/inaccurate	Yes = 2
Need faster stock assessments	
Logbooks not accurate	
Separate mgmt by zones	Line between Canaveral/Jupiter = 1
Oppose Amendment 6	
Fish are hook-smart & more abundant	
Leave current regs in place for 5 years	
No more regs until eval current regs	
No more regs until get enforcement	
Law enforcement lacking; no response	Yes = 3; Dealers don't check = 2
SAFMC should not track FL MFC	Uniformity w/AJ regs not suff = 1
Inshore pollution & beach renours	Estuaries important=1; Trawl habitat damage=1
Commercial effort has declined	Yes = 2; Effort by opportunists up =1
Tax imports/$ to fishermen	

SUMMARY OF AMENDMENT 6 PUBLIC HEARING COMMENTS

	MARATHON, FL
ACTION ITEM	
1. Problem	Yes, inshore NC & SC = 2; No, do not address=1
2. Objective	Localized depletion not unique to Monroe; Monroe is unique=1
3. Quota system	No in S.FL =3
4. Base year	
5. Phase-in	
6. Fishing year	Nov when $ up =1
7. Minor sp. & effort shift	
8. Speckled hind & warsaw	Dead when caught=1
9. Oculina HAPC	
Sanctuaries for gag off S. FL = 1	
10. Snowy trip limit	
11. Golden tilefish trip limit	
12. Commercial bycatch	
13. Recreational bag limit	Phase-in but at least >1=1
14. Dealer permit	
15. Charter & Headboat permit	Yes & report=1; OK but have so many permits now=1
16. Commercial permit to sell	No cos eliminate small boat fishermen=1
	Caused me to fish harder = 1; Can be used to stop com=1
17. Tracking quota	
18. Red porgy quota & bag limit	No com phase-in=1
	Phase-in bag limit=1
19. Gag spawning closure	Yes = 1; No=4; Keep 20"=3
Prefer a bag/trip limit	No closure & no trip limit, SSR high=1
	Rec bag of 1=1; Coordinate with other species=1
20. Red snapper	
21. Greater amberjack	No=1; No April or May =8; No size limit cos SSR high=1
	3 fish during closure allows black mkt=1; Rec bag of 1=1
22. White grunt	No = 18; Bag limit = 1; Separate stocks =1
23. Hogfish	Yes = 1; No = 2
24. Gray triggerfish	No = 3
25. Mutton snapper	12" OK=3; Lower size=3; 14"=1; 15"=2; 16"=5
	If raise, 2"/year & check=1; No closure = 3; Rec bag of 1=1
26. Cubera snapper	
Minimum size = 42"	
27. Yellowtail snapper	Keep 12"=2
28. Multi-day bag limit	Yes = 1; No, keep 3-day = 1
29. Crew specification	
30. Scup mgmt. unit	
31. Framework	
32. Allowable gear	Will prevent updating equipment=1
No powerheads off SC	
Longline north of Cape Canaveral	
Prohibit longlines	
33. Experimental gear	
34. Sink net fishery	
35. Tend black sea bass pots	Yes=1
Limit number of traps	Need to protect inshore NC & SC =2
OTHER COMMENTS	**OTHER COMMENTS**
You do not listen	SSR>30% more restrictive than <30% = 1
Support Limited Entry	No ITQs=2
RIR/Economic Impacts Not Sufficient	Not allow sale during spawning = 1
Regs will destroy tourism	Negotiate w/Bahamas = 1
Undersized fish used for bait	Charter/headboats, enforcement on passenger=1
Bag/size limits	Keep 12" on gray snapper=1
	Spawning closures instead of size limits =1
Allow shrimpers to exceed bag limits	Allow lobster/crab fishermen exceed bag=1; Shrimpers=1
Shrimp bycatch is problem	Shrimp bycatch is problem =1
Data is lacking/poor/inaccurate	Yes = 4
	Use of size & maturity for calculating SSR incorrect=1
Need faster stock assessments	
Logbooks not accurate	Logbook zones overlap, multiple books, language =2
Separate mgmt by zones	Yes = 1
Oppose Amendment 6	
Fish are hook-smart & more abundant	Council is biased against comercial fishermen=1
Leave current regs in place for 5 years	
No more regs until eval current regs	Yes =3; Yes except gags & hogfish = 1; Regulatory frenzy=1
No more regs until get enforcement	
Law enforcement lacking; no response	Yes, intact fish traps = 1
SAFMC should not track FL MFC	Yes = 1
Inshore pollution & beach renours	Estuaries & habitat degradation=1; Water quality poor=1
Commercial effort has declined	
Tax imports/$ to fishermen	

SUMMARY OF AMENDMENT 6 PUBLIC HEARING COMMENTS

	LETTERS @ MARATHON	
ACTION ITEM		
1. Problem	Major problem in NC & SC=1	
2. Objective		
3. Quota system	Unfair to phase-in quotas while bag immediate=1	
	Not is S. FL = 1	
4. Base year		
5. Phase-in	Can they stant the phase-in=1	
6. Fishing year		
7. Minor sp. & effort shift		
8. Speckled hind & warsaw		
9. Oculina HAPC	Yes=1	
Sanctuaries for gag off S. FL = 1		
10. Snowy trip limit		
11. Golden tilefish trip limit		
12. Commercial bycatch		
13. Recreational bag limit	Too restrictive = 1	
14. Dealer permit	Yes=1	
15. Charter & Headboat permit	No due to increased cost=1	
16. Commercial permit to sell	Yes=1	
17. Tracking quota		
18. Red porgy quota & bag limit	Yes but limit everyone=1	
19. Gag spawning closure	Yes=2	
Prefer a bag/trip limit		
20. Red snapper		
21. Greater amberjack		
22. White grunt		
23. Hogfish		
24. Gray triggerfish		
25. Mutton snapper		
26. Cubera snapper		
Minimum size = 42"		
27. Yellowtail snapper		
28. Multi-day bag limit	Allow 3 day limit=1	
29. Crew specification	Yes=1	
30. Scup mgmt. unit		
31. Framework		
32. Allowable gear	Do not allow traps=3; Only hook & line=3	
No powerheads off SC	Allow powerheads=1; Prohibit off SC=2	
	Do not allow BSB pots = 12; No powerheads=7	
Longline north of Cape Canaveral	No trawling for black sea bass	
Prohibit longlines		
33. Experimental gear		
34. Sink net fishery		
35. Tend black sea bass pots	Prefer no pots but if allow, then require tending=1	
Limit number of traps		
OTHER COMMENTS	OTHER COMMENTS	
You do not listen	Prevent overfishing & inappropriate gear=1	
Support Limited Entry		
RIR/Economic Impacts Not Sufficient		
Regs will destroy tourism		
Undersized fish used for bait		
Bag/size limits	Support bag/size limits proposed=1	
	Quotas & bag limits should be same rec & com =1	
Allow shrimpers to exceed bag limits		
Shrimp bycatch is problem		
Data is lacking/poor/inaccurate		
Need faster stock assessments		
Logbooks not accurate		
Separate mgmt by zones		
Oppose Amendment 6		
Fish are hook-smart & more abundant		
Leave current regs in place for 5 years		
No more regs until eval current regs		
No more regs until get enforcement		
Law enforcement lacking; no response		
SAFMC should not track FL MFC		
Inshore pollution & beach renours	Coral is damaged from traps=1	
Commercial effort has declined		
Tax imports/$ to fishermen		

SUMMARY OF AMENDMENT 6 WRITTEN COMMENTS AND PHONE CALLS

	LETTERS FROM INDIVIDUALS (43)	LETTERS FROM ORGANIZATIONS
ACTION ITEM		(Received 10 letters)
1. Problem	Info lacking on localized depletion = 1	Localized depletion inshore BSB NC = 1
2. Objective		
3. Quota system	No closure, prefer lower trip limits = 2	Yes = 1
4. Base year	Data 90-92 inaccurate = 1	
5. Phase-in		
6. Fishing year	Not April 16 = 1	Calendar year w/two 6-month quotas = 1
	Prefer Nov 1 but no later than Jan 1 = 1	
7. Minor sp. & effort shift		
8. Speckled hind & warsaw	Yes = 0; No = 5, incl w/ 5 grouper = 2;	No = 2; Bag of 1 W & 1 SpH = 1
Size limits or quotas = 1		Very low possession limit & no sale = 1
9. Oculina HAPC	Yes = 1	Yes = 1
Sanctuaries for gag off S. FL = 1		
10. Snowy trip limit	Yes = 1; No=1; No closure & 1500-2000 lb/trip=1	
11. Golden tilefish trip limit	Yes = 1; No = 1	
12. Commercial bycatch		
13. Recreational bag limit	No=1; snowy/tile of 1 No=1; incl w/5 grouper=1	Snowy bag of 3-5 = 1; No incl w/i 5 agg = 1
14. Dealer permit		
15. Charter & headboat permit	No = 1	
16. Commercial permit to sell	Yes = 1; No = 6; OK for rec to sell, not com quota	No = 2
	Permit for part-time = 1	
17. Tracking quota		
18. Red porgy quota & bag limit	Quota too severe = 3; Let min size work=2	Phase-in bag limit = 2; Yes = 1
Logbook catch est more accurate = 1	Bag of 3 too severe = 3;	
19. Gag spawning closure	Yes = 2; No = 8; 20° working = 3	No = 1; No particularly off NC = 1
Prefer a bag/trip limit	10 gag/trip = 1;	5 fish/trip = 1
Concerned about release mort; perhaps prohibiting diving sufficient = 1		
20. Red snapper	Support 18" = 1; Mortality high, lower limit = 1	Yes 18" w/2-bag = 1
21. Greater amberjack	No spawning closure = 2	
22. White grunt	No = 5; 11" in NC = 1	Yes = 1; No, consider 10" = 1
23. Hogfish	OK south but mortality north = 1	
24. Gray triggerfish	No = 4	
25. Mutton snapper	20" No = 3; Bag of 2 No = 1; keep 12" = 1	Yes 20" = 2; Yes bag = 1
Support smaller size limit; diff bag	17" = 1; 18" = 1; incl in 10 snapper = 1	Gradual increase 1-2"/yr to 16-18" = 1
Prohibit trapping spawning fish=1	No spawning closure = 2	Need to sell bag limit during closure = 1
26. Cubera snapper	2 fish/person Yes=1	Yes bag limit = 2
Minimum size = 42"	Yes = 1	Yes min size 36-42" = 1; Yes larger min=1
27. Yellowtail snapper	12"->14" Yes = 1	
28. Multi-day bag limit	Yes 3 day limit = 1;Yes 2 day limit = 1	
3-day limit of snappers inconsistent with FL law of 20 in possession = 1		
29. Crew specification		
30. Scup mgmt. unit		
31. Framework		
32. Allowable gear	Restrict powerheads = 1	Exclude BSB pots = 1
No powerheads off SC		
Longline north of Cape Canaveral	No = 2	
Prohibit longlines	Yes = 1	
33. Experimental gear		
34. Sink net fishery	Yes = 1	Yes but prefer Rej Opt 2 = 1
35. Tend black sea bass pots	Yes = 2; No = 2; Limit number of pots = 1	Yes = 1; Little support in NC = 1
	not necessary w/escape panels=2	Limit number of pots = 1
OTHER COMMENTS		OTHER COMMENTS
You do not listen	Yes = 3	RIR should address loss of employment,
Support Limited Entry	Yes = 2	income and tax impacts = 1
Snowy/yellowedge assessment off	Yes = 1	
Undersized fish used for bait	Is this allowed?= 1	
Bag/size limits	More time before additional regs = 1	
	Same for rec & com = 1; Scamp lower size = 1	
	Beeliners at 10" & support others = 1	
	24" for gag = 2; 24" black grouper = 1	
Permit to sell in addition to com permit	No = 1	
Permit holders sell bycatch of other sp.	Yes = 1	
Require all who sell to keep records	Yes = 1	
Allow shrimpers to exceed bag limits	Yes = 1	
Data is lacking/poor/inaccurate	Yes = 5	
Data is ignored/misinterpreted	Yes = 1	
Charter & headboat logs not accurate	Yes = 1	
Separate mgmt by zones	Yes = 2	
Reduce grouper & red snapper size limit	Yes = 1	
Support Amendment 6	Yes = 1; No = 1	
No problem in NC	Yes = 2	
Partyboat Grounds off N Florida - 1	no com harvest of SG w/i 32 mi or <108'	
	grouper bag=2; red snapper=2; A-J=1	
	penalty = loss of RS license	
Fish are hook-smart & more abundant	Yes = 1	
Leave current regs in place for 5 years	Yes = 1	
No more regs until eval current regs	Yes = 3	
Unfair time/questions of some persons	Yes = 1	
Law enforcement lacking; no response	Yes = 1	
SAFMC should not track FL MFC = 1	Regulations put us out of business = 1	
Inshore pollution & beach renours = 1		

SUMMARY OF AMENDMENT 6 WRITTEN COMMENTS AND PHONE CALLS

ACTION ITEM	PHONE CALLS TO OFFICE (6)
1. Problem	
2. Objective	
3. Quota system	Snowy quota hurts bandit gear because
	longliners will fill quota quickly.
4. Base year	
5. Phase-in	
6. Fishing year	April 16 OK snow=1; Nov 1 golden tile=1
7. Minor sp. & effort shift	
8. Speckled hind & warsaw	
Size limits or quotas = 1	
9. Oculina HAPC	Unenforceable = 1
Sanctuaries for gag off S. FL = 1	
10. Snowy trip limit	Aggregate limit of 5,000 = 1
11. Golden tilefish trip limit	
12. Commercial bycatch	
13. Recreational bag limit	
14. Dealer permit	
15. Charter & Headboat permit	
16. Commercial permit to sell	Yes but do not include Ch & HB income = 1
	Ch & HB should not fish commercially = 1
17. Tracking quota	
18. Red porgy quota & bag limit	
Logbook catch est more accurate = 1	
19. Gag spawning closure	No = 1; fish houses incl black,
Prefer a bag/trip limit	yellowedge, etc
Concerned about release mort; perhaps prohibiting diving sufficient = 1	
20. Red snapper	
21. Greater amberjack	
22. White grunt	
23. Hogfish	
24. Gray triggerfish	
25. Mutton snapper	
Support smaller size limit; diff bag	
Prohibit trapping spawning fish=1	
26. Cubera snapper	
Minimum size = 42"	
27. Yellowtail snapper	
28. Multi-day bag limit	
3-day limit of snappers inconsistent with FL law of 20 in possession = 1	
29. Crew specification	
30. Scup mgmt. unit	
31. Framework	
32. Allowable gear	
No powerheads off SC	
Longline north of Cape Canaveral	No = 2
Prohibit longlines	
33. Experimental gear	
34. Sink net fishery	
35. Tend black sea bass pots	
OTHER COMMENTS	OTHER COMMENTS
You do not listen	
Support Limited Entry	Need limited entry (BSB fisherman) = 1
Snowy/yellowedge assessment off	
Undersized fish used for bait	
Bag/size limits	
Permit to sell in addition to com permit	
Permit holders sell bycatch of other sp.	
Require all who sell to keep records	
Allow shrimpers to exceed bag limits	
Data is lacking/poor/inaccurate	
Data is ignored/misinterpreted	
Charter & headboat logs not accurate	
Separate mgmt by zones	
Reduce grouper & red snapper size limit	
Support Amendment 6	
No problem in NC	
Partyboat Grounds off N Florida - 1	
Fish are hook-smart & more abundant	
Leave current regs in place for 5 years	
No more regs until eval current regs	
Unfair time/questions of some persons	
Law enforcement lacking; no response	
SAFMC should not track FL MFC = 1	
Inshore pollution & beach renours = 1	Anchor damage from Ch & HB = 1

Appendix F. Landings and Value Information for the Commercial Fishery

Table A-1. Total South Atlantic commercial landings in pounds for 1978-92.

SPECIES	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Lane	24,875	34,720	9,596	24,098	5,825	3,824	4,248	5,522	9,348	10,575	6,192	4,664	18,147	26,616	29,296
Gray	77,774	127,171	79,423	82,647	64,397	82,156	66,143	88,329	93,664	102,287	94,580	96,156	210,713	200,849	217,012
Mutton	234,171	124,000	139,074	116,371	74,406	52,054	74,913	63,401	167,661	188,456	172,073	168,242	264,062	212,964	208,115
Red	605,716	418,194	374,403	371,068	302,231	313,836	251,132	248,528	220,323	186,368	171,516	266,105	223,109	133,826	100,803
Vermilion	550,400	373,106	398,715	519,898	611,854	554,008	690,136	869,430	811,623	674,833	910,476	1,149,000	1,329,520	1,026,016	791,189
Yellowtail	40,172	48,260	45,177	37,434	37,242	67,364	35,857	41,135	92,348	88,863	111,953	137,021	916,511	842,484	985,069
Schoolmaster															
Queen															
Blackfin					777	538	159	132	337	512	116	351	10	15	
Cubera			188	1,016	1,193	1,066	2,998	5,016	3,436	2,864	8,995	10,842	9,032	6,056	3,614
Dog			467												
Mahogany															
Silk			257	15,213	20,139	17,207	4,058	12,366	13,404	13,246	10,198	11,008	33,269	15,250	19,334
Snapper uncl.	124,259	123,338	150,746	260,549	332,787	295,334	186,462	101,870	239,521	232,067	183,821	125,026	110,383	92,438	106,833
Total Snappers	1,657,367	1,248,789	1,196,046	1,428,514	1,450,851	1,387,387	1,336,106	1,435,729	1,651,685	1,602,071	1,669,720	1,966,615	3,114,753	2,556,493	2,481,265
Gag			123,090	336,895	434,914	441,876	381,713	508,113	626,169	687,401	605,884	993,956	800,195	698,552	832,974
Scamp			33,009	112,461	197,602	183,287	250,888	220,950	326,957	431,103	431,160	375,946	491,184	399,892	291,460
Red				8,076	12,867	7,927	12,296	35,725	321,050	268,236	289,989	248,220	177,599	175,611	152,619
Black				131,811	122,593	114,929	233,307	62,225	435,174	493,226	333,299	332,885	240,934	156,386	198,701
Yellowfin				6,291	5,419	144	753	5,308	26,124	4,126	1,366	680	3,457	6,005	26,721
Yellowmouth															
Nassau									10,909		1,013	1,669	3,977	2,511	3,827
Speckled Hind			1,628	11,123	13,455	27,597	32,620	32,193	35,890	25,674	20,342	22,430	21,861	16,631	21,023
Snowy			6,788	222,596	203,942	416,966	319,390	155,621	441,531	367,669	295,473	486,425	586,145	449,064	561,086
Misty															
Yellowedge			527	343	10,254	20,525	2,152	578	32,310	28,660	18,439	16,063	15,599	24,002	29,898
Rock Hind				50	6		324	289	32	302	657	20	426	675	4,517
Red Hind					110	86	638	7,769	3,321	10,983	4,570	11,875	29,396	15,366	17,044
Grouper & Scamp	2,713,152	2,505,027	2,024,585	2,009,527	1,845,469	2,055,669	1,744,077	1,328,827	393,096	433,552	551,500	348,869	308,307	159,377	
Warsaw	16,601	17,257	5,907	17,506	16,803	16,103	12,529	9,901	25,050	33,225	25,045	17,739	18,524	12,163	22,880
Jewfish	33,508	26,524	26,103	24,907	15,634	22,013	17,764	19,505	21,881	31,034	25,130	21,043	2,471	0	0
Grouper uncl.															
Marbled													43	24	9
Total Groupers	2,763,261	2,548,808	2,221,637	2,881,586	2,879,069	3,307,122	3,008,471	2,387,031	2,902,509	3,018,190	2,603,878	2,877,718	2,899,115	2,118,180	2,152,740
Amberjack	42,009	50,211	69,394	97,344	145,125	97,332	155,408	144,853	426,070	1,170,223	1,013,998	1,005,261	1,398,118	1,674,170	1,832,326
Grunts	55,183	124,961	94,015	121,954	144,223	132,118	110,211	106,080	183,875	303,015	308,298	337,970	425,027	377,869	273,370
Hogfish	19,972	20,637	35,898	48,877	31,489	26,939	22,127	28,383	40,024	49,015	52,398	66,176	77,585	68,395	89,470
Porgy or Scup	201,377	202,137	231,320	265,972	229,241	169,884	175,240	116,437	186,310	164,324	186,250	288,169	489,852	256,738	505,635
Red porgy								453,069	682,851	578,192	632,604	670,081	760,150	570,092	299,659
Whitebone porgy								2,524	89	215	9,170	272	666	665	38
Knobbed porgy								15,521	32,439	51,060	75,008	34,288	47,149	46,293	43,361
Black Seabass	99,159	540,973	510,864	664,445	555,232	357,523	344,226	298,434	393,770	418,952	632,312	691,106	754,940	455,722	429,536
Seabass uncl.	1,191,975	1,124,520	1,299,478	1,222,788	845,577	464,795	895,249	1,119,009	992,584	389,414	689,345	590,001	717,575	821,498	646,032
Sheepshead	183,182	231,674	182,371	276,439	378,337	266,427	270,707	266,760	385,389	401,639	357,049	312,258	425,230	481,909	435,205
Blueline tilefish								46,578	40,820	82,431	27,898	55,598	105,842	142,400	269,183
Tilefish	138,891	150,166	248,386	998,285	3,340,928	1,551,956	923,986	1,052,398	970,742	253,609	561,201	870,102	986,098	1,051,017	1,114,366
Tilefish, goldface									77,194	5,291				40	
Tilefish, sand									66	254		3	68	1,156	451
Tilefish uncl.							104,659	41,272	94,526	81,032	50,261	25,702	17,822	25,059	13,934
Triggerfish	44,636	46,485	58,249	95,014	103,172	73,426	79,408	73,833	74,117	78,659	88,339	106,737	211,530	285,870	312,209
Total Others	1,976,383	2,492,013	2,727,773	3,781,113	5,773,323	3,140,399	3,081,228	3,764,125	4,580,884	3,999,064	4,884,141	5,154,328	6,416,956	6,039,084	6,253,778
Wreckfish										28,490	307,202	2,153,091	3,783,261	1,595,122	1,204,704
GRAND TOTAL	6,397,011	6,289,610	6,145,456	8,091,213	10,103,242	7,834,908	7,427,805	7,586,885	9,136,058	8,544,815	9,464,940	12,153,751	16,013,085	12,308,858	12,072,486

Table A-2. Total South Atlantic commercial landings in dollars for 1978-92.

SPECIES	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Lane	$18,969	$41,005	$9,697	$23,295	$6,032	$4,885	$5,757	$8,092	$12,749	$15,390	$10,195	$7,010	$22,075	$37,409	$39,220
Gray	$72,793	$148,665	$94,276	$98,860	$80,889	$105,280	$124,910	$133,436	$130,617	$155,007	$155,377	$148,536	$327,244	$204,418	$361,202
Mutton	$363,235	$174,378	$202,966	$189,503	$106,389	$88,654	$116,725	$112,027	$310,361	$382,471	$342,898	$316,657	$478,994	$390,577	$371,674
Red	$1,111,880	$703,491	$760,835	$824,008	$671,720	$719,542	$599,669	$600,183	$592,004	$506,327	$473,213	$735,531	$932,802	$382,605	$262,593
Vermilion	$333,860	$526,237	$586,107	$715,138	$876,022	$815,367	$1,078,129	$1,429,508	$1,470,889	$1,242,674	$1,607,173	$2,210,795	$2,612,910	$2,709,680	$1,527,001
Yellowtail	$49,654	$81,573	$66,533	$59,634	$56,051	$84,843	$63,396	$75,660	$176,432	$183,777	$244,198	$298,282	$1,952,025	$1,858,680	$2,070,070
Schoolmaster															
Queen															
Blackfin					$843	$1,001	$201	$204	$553	$930	$210	$502	$15	$33	
Cubera			$158	$4,513	$1,741	$1,250	$3,962	$3,578	$3,242	$3,160	$12,255	$14,324	$10,556	$8,727	$11,603
Dog			$528												
Mahogany															
Silk			$479	$20,920	$24,606	$32,118	$7,621	$23,547	$23,771	$25,003	$138,363	$24,184	$55,340	$29,200	$37,500
Snapper uncl.	$165,460	$180,057	$247,585	$440,385	$572,521	$530,899	$350,111	$210,866	$302,432	$241,040	$350,603	$219,310	$104,141	$100,042	$190,030
Total Snappers	$2,115,851	$1,844,320	$1,969,144	$2,388,344	$2,397,814	$2,383,820	$2,352,597	$2,603,099	$3,023,460	$2,757,700	$3,340,075	$3,073,120	$6,286,100	$5,887,507	$4,908,500
Gag			$100,570	$314,833	$417,148	$493,745	$519,572	$761,232	$1,482,140	$1,600,107	$1,262,137	$1,001,624	$1,683,434	$1,570,733	$1,013,220
Scamp			$32,877	$106,747	$183,471	$170,012	$300,526	$280,738	$470,281	$583,200	$601,327	$723,744	$1,000,408	$850,030	$635,240
Red				$7,167	$10,051	$7,070	$15,502	$40,114	$403,300	$413,304	$480,730	$402,010	$200,445	$301,477	$280,010
Black				$129,634	$102,031	$99,000	$310,000	$107,413	$824,803	$837,045	$750,200	$700,595	$511,718	$334,053	$305,740
Yellowfin				$5,931	$4,475	$163	$704	$9,164	$50,462	$7,103	$2,520	$1,355	$6,385	$14,094	$54,070
Yellowmouth															$1,820
Nassau									$10,415		$1,714	$3,157	$7,042	$4,254	$8,020
Speckled Hind			$1,518	$10,550	$12,470	$28,203	$39,310	$44,129	$52,144	$38,402	$33,123	$36,000	$30,767	$30,408	$38,000
Snowy			$4,085	$191,087	$177,019	$369,097	$390,051	$220,851	$730,040	$574,032	$400,030	$700,730	$874,843	$758,270	$900,020
Misty	$318,806	$318,806	$318,806	$318,000	$318,000	$318,000	$318,000	$318,000	$318,000	$318,000	$318,000			$67	$4
Yellowedge			$395	$324	$9,546	$18,605	$2,554	$674	$53,120	$51,965	$33,110	$32,206	$20,377	$40,330	$56,073
Rock Hind				$34	$7		$63		$25	$192	$600	$32	$707	$1,160	$7,005
Red Hind					$101	$76	$685	$10,110	$4,007	$15,600	$7,012	$17,602	$40,332	$27,077	$33,003
Grouper & Scamp	$1,841,040	$1,959,220	$1,769,250	$2,115,087	$1,775,994	$2,232,000	$2,243,642	$1,027,027	$810,332	$712,310	$657,109	$580,004	$940,282	$203,404	$120,000
Warsaw	$8,452	$11,074	$4,544	$13,938	$13,380	$13,062	$12,457	$12,027	$33,028	$43,303	$35,704	$20,100	$26,002	$21,361	$36,100
Jewfish	$13,091	$13,015	$13,943	$14,994	$9,000	$12,070	$13,240	$17,511	$22,990	$30,207	$26,050	$22,511	$2,644		
Grouper uncl.				$109,131	$54,699	$103,639	$135,349	$70,850	$142,213	$182,000	$106,470		$92	$90,301	$203,434
Total Groupers	$2,161,369	$2,302,923	$2,255,804	$3,339,171	$3,088,200	$3,895,722	$4,319,534	$3,834,852	$5,320,500	$5,677,002	$6,010,000	$5,207,071	$5,170,100	$4,325,503	$4,811,445
Amberjack	$4,813	$7,682	$15,430	$23,766	$29,372	$24,388	$64,487	$50,400	$149,000	$510,511	$350,385	$415,082	$861,007	$850,357	$703,174
Grunts	$8,402	$19,169	$37,905	$35,219	$43,417	$45,842	$37,649	$35,003	$60,754	$150,760	$150,090	$152,704	$208,304	$102,239	$120,051
Hogfish	$11,447	$14,724	$38,835	$47,703	$20,140	$28,571	$20,339	$25,905	$51,400	$73,508	$82,250	$101,230	$110,242	$105,022	$127,042
Porgy or Scup	$91,682	$118,030	$160,950	$186,597	$144,067	$130,077	$144,502	$106,714	$164,400	$157,225	$184,400	$280,130	$544,127	$207,000	$315,090
Red porgy								$414,320	$702,054	$501,030	$604,235	$720,720	$900,081	$803,407	$302,050
Whitebone porgy								$2,520	$60	$107	$3,905	$201	$440	$571	$30
Knobbed porgy								$6,773	$14,217	$20,301	$40,205	$13,865	$10,019	$10,230	$20,000
Black Seabass	$63,151	$282,860	$316,960	$405,476	$419,032	$289,081	$256,519	$243,240	$345,930	$401,143	$710,110	$655,703	$831,020	$567,137	$461,637
Seabass uncl.	$550,000	$674,806	$819,070	$918,623	$597,392	$386,160	$699,750	$820,230	$609,625	$403,540	$540,105	$641,070	$1,090,757	$1,050,224	$927,040
Sheepshead	$33,904	$50,857	$40,281	$73,777	$116,552	$80,400	$82,173	$81,053	$114,403	$132,100	$140,351	$117,451	$174,537	$210,174	$201,040
Blueline tilefish								$30,405	$31,533	$40,160	$20,741	$52,350	$95,317	$121,100	$172,049
Tilefish	$76,805	$107,191	$237,087	$998,244	$3,269,326	$2,012,322	$1,422,760	$1,474,720	$1,761,735	$400,000	$650,213	$1,588,333	$1,670,510	$1,030,534	$1,600,750
Tilefish, goldface								$16,665	$170,051	$41,704	$21,000			$54	$142
Tilefish, sand									$9	$63		$1	$43	$204	$201
Tilefish uncl.								$101,010	$30,055	$41,705	$19,000	$20,553	$14,735	$10,101	$10,417
Triggerfish	$10,283	$13,342	$15,790	$24,730	$35,732	$28,560	$31,324	$35,478	$34,097	$40,000	$54,034	$76,428	$157,223	$199,018	$220,359
Total Others	$851,294	$1,288,669	$1,680,247	$2,804,137	$4,875,039	$3,017,087	$2,750,574	$3,563,270	$4,600,000	$3,084,700	$4,181,574	$5,037,400	$6,380,020	$6,020,288	$5,497,294
Wreckfish										$52,790	$407,083	$2,080,433	$4,701,601	$9,124,309	$1,812,934
GRAND TOTAL	$5,148,534	$5,435,918	$5,905,194	$8,511,851	$10,160,059	$9,298,637	$9,431,705	$10,002,130	$12,953,620	$11,472,897	$13,000,321	$16,986,722	$22,540,701	$18,367,785	$16,070,242

Appendix G. Information on Powerheads

MEMORANDUM

To: David Cupka

From: Mel Bell MB

Date: September 8, 1993

Subject: Bangsticking Observations

Since my April 2, 1993 memo to you concerning bangsticking activity on artificial reefs and wrecks we have observed very limited evidence of this practice (only a few shell casings) on any of our artificial reefs. We have received reports from some divers and sportfishermen over the summer indicating that large-scale bangsticking is still occurring on reefs and wrecks off South Carolina, but none of these reports have been verifiable.

My general impression is that the few divers that are using bangsticks to harvest fish off South Carolina are doing most of their shooting on naturally occurring hard bottom areas or on a few of the deeper ship wrecks or artificial reefs. Evidence of their activity is extremely difficult to detect and date.

Commercial-scale bangsticking is probably still occurring off the state, primarily on less well known deeper wrecks and some deeper hard bottom ledges, however the fish are more than likely being landed in North Carolina. We know of at least one boat (Cheers) that has done this in the past, and is probably continuing to work off South Carolina well outside state waters.

Shell casings recovered during our reef monitoring trips have been limited to the following:

Reef Name	Casings Found	Date	SMZ Status
Ten Mile	2	16 June	Yes
Y-73	2	17 June	No
Hilton Head	1	13 July	Yes
Comanche	2	15 July	No

I am still waiting to hear back from one individual who was going to question several fishing club members who claim to have witnessed commercial and recreational bangsticking off the northern part of the state. I will let you know if this information seems to be of any use.

If I can provide you any additional information or assistance regarding this matter please let me know.

cc: C. Moore

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MEMORANDUM

To: David Cupka

From: Mel Bell MB

Date: April 2, 1993

Subject: Bangsticking on Artificial Reefs and Wrecks

As per your request I have compiled the following information concerning the use of bangsticks on artificial reefs and wrecks off South Carolina.

The attached memo dated 24 Oct 89 describes our first realization that commercial-scale bangsticking could become a potentially problematic area in the near future. Since our inspection of the BP-25 Artificial Reef on 13 Sep 89, during which we saw direct evidence of the impact of this type operation (described in memo), we have encountered only limited evidence of possible large-scale bangsticking activity. The following is a summary of our field observations:

4 Feb 91	Vermillion Reef	Found numerous 357 shell casings on main deck. Due to number of casings as well as location, suspect commercial amberjack fishermen.
12 May 92	Governor Wreck	Found numerous spent shell casings in and around wreck. Found one 36 inch freshly killed grouper under wreckage.
22 Sep 92	Betsy Ross Reef	Found several spent 357 casings on the deck of the vessel. Due to location of casings suspect amberjack fishermen.

In addition to the above observations, we have occasionally located one or two shell casings on other reefs or wrecks which would indicate the occurrence of bangsticking on a much more limited basis. Evidence of bangstick utilization is usually on sites in deeper water (60 feet or greater) where grouper or other larger fish are targeted.

The only other data we have regarding the use of bangsticks off South Carolina is what can be derived from our 1991 survey of recreational divers. One of the purposes of the survey was to determine the amount of spearfishing activity that occurred off the state in 1990, including the use of powerheads (bangsticks).

The following facts are derived from this survey:

- From the boat intercept portion of the survey, 5 of 40 divers encountered had reported diving on artificial reefs. Three of these reported having speared fish (may or may not have included use of bangsticks). A total of 7 fish were reported taken.

- Table 1 describes the results of phone interviews after 103 charter dive trips in 1990 (1,159 actual diver trips). Again fish taken could have included use of bangsticks as well as spears.

- Of the 107 responses received in a post card drop-off survey 14 of the respondents indicated having speared fish in 1990 while diving on artificial reef sites. A total of 41 fish were taken. Bangsticking could have been included.

- In the mail survey conducted of diving activities in 1990 the distinction was made between spearing fish and bangsticking fish. Of the 505 divers that reported having made dives on artificial reefs, use of spears was reported by 139 and use of powerheads by 22. A summary of this aspect of the survey along with pertinent tables is enclosed.

Based on the survey activities conducted for diving in 1990, it is apparent that a limited amount of recreational bangsticking of fish takes place on artificial reefs, wrecks and hard bottom areas off South Carolina. Only 4 percent of the artificial reef divers responding reported using bangsticks during 1990 (comprising only 1 percent of the total respondents to the survey). Since we have no idea how many individuals make up the entire population of sport divers in South Carolina it is difficult to expand these survey figures into a broader estimate to gauge total participation in bangsticking activities.

From talking to numerous divers across the state, my personal impression is that very few divers use bangsticks and very few dive stores even sell them any more. Potential problems we have identified are not likely due to recreational divers taking a few fish, but commercial diver/fishermen taking too many fish off the artificial reefs. I still fully support the concept of restricting the use of bangsticks on artificial reefs if this is the only way to restrict the large-scale removal of fish (as in the case of amberjack).

If you have any additional questions please let me know.

MEMORANDUM

TO: Charles Bearden and David Cupka

FROM: [redacted] MB

DATE: October 24, 1989

SUBJECT: Commercial Bang-Sticking on Artificial Reefs

I wanted to make you aware of what will probably become the next potentially heated area of user conflict between recreational and commercial fishermen in association with the State's offshore artificial reefs.

Since earlier this year, I have received a number of calls from recreational anglers, primarily from Georgetown and north, who are concerned with the practice of SCUBA divers bang-sticking commercial quantities of amberjack on well known artificial reefs and shipwrecks.

This practice involves several divers working together to shoot and land as many fish as possible in the bottom time available over a given piece of structure around which the fish are easily accessible. Bang-sticking is much more effective than the use of conventional spearguns in this type of activity due to the fact that immediate death of the fish and rapid reloading of the pole spear allow large numbers of big fish to be harvested in a short period of time. Amberjack are particularly vulnerable to this type of operation due to their tendency to swim in large but loosely organized schools close to structure, as well as their habit of approaching divers to within a very close range.

The recreational fishermen who called had all observed the actual fishing activity taking place or had been at the dock or boat landing when the fish were being off-loaded. All of them were disturbed by the large number of amberjack that were removed from artificial reefs in this manner. Direct communication with the commercial fishermen themselves has confirmed that during 1988 and 1989 there were at least four boats fishing in this manner along the northern coast of the state.

One commercial fisherman reported that during one four day trip he was able to land 4,000 pounds of amberjack by bang-sticking. Another had indicated that in one visit to a wreck off Georgetown he was able to shoot 5 boxes of amberjack. As other popular established fisheries such as snapper, grouper and mackerel decline from increasing commercial and recreational pressure, and as the price of amberjack and demand for it increase, it is very likely that other fishermen who are able may move into this type of commercial endeavor.

On September 13th, during a routine examination of several offshore artificial reefs and wrecks, Division divers collected direct evidence and witnessed the immediate impact of this type of fishing activity on the BP-25 Artificial Reef off Little River Inlet. This reef, which has been closely monitored during summer months for the past three years, has always had large numbers of amberjack around it. On the initial dive during this trip only one amberjack was observed over the entire reef, and divers recovered a number of spent 38 special shell casings. During a second 30 minute dive, divers counted only four amberjack and were able to collect about 50 spent casings (many more were seen on all parts of the reef). The lack of amberjack in combination with the extraordinary number of relatively fresh casings would indicate that a large scale bang-sticking effort had recently taken place.

A visit to a near-by wreck which has also been monitored for three years revealed normal quantities (hundreds) of amberjack and no direct evidence of any bang-sticking. The observations at both of these sites would seem to indicate that this type of fishing activity can have a rather dramatic effect on resident amberjack populations on artificial reefs. The duration of this impact can only be speculated on at the moment, but it is very likely that since amberjack appear to be long-term seasonal residents of the reefs the impact could last for at least as long as it takes for next years seasonal recruitment to take place (until next April or May).

At this point it would be very hard to imagine that this activity is having a detrimental effect on the amberjack stocks off the State (as a whole amerjack are probably relatively under-utilized). The main concern we should have for now is: "are the amberjack found on the artificial reefs being most effectively exploited by allowing a few individuals to harvest large quantities of them for commercial purposes (at $.85/lb.), or would they be better utilized by allowing recreational fishermen the opportunity to catch them over the coarse of an entire fishing season?" Also, since the State's 23 artificial reefs were clearly built with the intention of enhancing recreational fishing activities and not larger scale commercial efforts, it is very hard to justify to the citizens of this State the use of these reefs for the direct commercial benefit of a few individuals (several of which are from out-of-state).

Since most of the reefs in question are outside State waters, our only method of regulating the type of fishing that takes place on the reefs is probably through modification of existing special management zone (SMZ) regulations such as those that apply to fish traps, long-lines and trawling on certain permitted reefs. A ban on the use of bang-sticks on these sites

would be one logical method of addressing the problem. Initial contact with segments of the recreational diving community. suggest that this would not receive a tremendous amount of opposition. since bang-sticking is not wide-spread among this group off South Carolina.

I will continue to gather as much information on this subject as I can through various sources. At this point I do not feel the activity has received enough attention to make it a burning issue among recreational fishermen, but as word spreads and as the activity becomes more extensive I am sure that it will generate the same type of user conflict as we saw over the issue of fish traps on reefs. We will address this and other management related issues in our State Artificial Reef Plan in the near future, but it might be an area of interest now to bring before the Fisheries Management Council for some consideration and to see if it appears to be a regional problem.

cc: P. Sandifer
E. Joseph
C. Moore
G. Ulrich
D. Theiling
W. Hall
D. Stubbs
E. Low

Table 1. Distribution of reported sport diving trips and spearfishing activities based upon weekly dive shop telephone interviews for trips between July 8, 1990 and October 10, 1990.

		Percent[1]
Total Artificial Reef Trips:	28	27%
Total "Diver-Trips":	336	29%
Total "Non-Artificial Reef" Trips:	75	73%
Total "Diver-Trips":	823	71%
Total Trips to All Sites:	103	100%
Total Diver-Trips to All Sites:	1,159	100%

SPEARFISHING ACTIVITIES

Total Trips Involving Spearfishing Harvest:	24 Trips(23%)[1]
Total Number of Fish Speared:	105 Fish
Average Number of Fish Per Spearing Trip:	4.4 Fish/Trip
Total Number of Fish Speared at Artificial Reef Sites:	41 Fish
Total Number of Trips to Artificial Reef Sites Involving Spearfishing Harvest:	9 Trips(9%)[1]
Average Number of Fish Per Spearing trip at Artificial Reef Sites:	4.6 Fish/Trip

[1]Percent of trips or diver-trips to all sites. A "trip" occurred when one or more dives were reported for a given site during the day. Diver-trips were the total number of divers participating in the trip.

Annual Mail Survey

Diving Activities (Effort)

Based upon usable questionnaires, 28% (505) of the annual survey respondents reported diving at artificial reef sites during 1990 (Table 6). The percentage of trips by artificial reef zones for the North, Central, and South Zones where 42%, 37%, and 21%, respectively (Table 7). Dive trips to specific artificial reef sites during 1990 are summarized in (Table 8). The median number of trips per respondent was 2 dive trips per year to artificial reef sites during 1990 (Table 7). The most frequently reported underwater activity (395 respondents) when diving at artificial reef sites was "sightseeing" (Table 9). Spearfishing and spearfishing with power heads was reported by 139 and 22 respondents, respectively (Table 9).

Spearfishing vs. Non-spearfishing Activities

Based upon responses to the annual mail survey, 45% (1,134) of the trips to artificial reef sites were by divers that reported some spearfishing activities when diving at artificial reef sites during 1990 (Table 10). This was a higher aggregate trip percentage by spearfishing divers than reported by post card respondents, 15% (See Table 4).

Fish Species Speared

Seventeen different fish species were reported speared by South Carolina divers. Grouper species were the most frequently reported speared, followed by spadefish (Table 11).

Reported Spearfishing Harvest by Divers

The aggregate harvest of individual fish for all respondents diving at South Carolina "Saltwater" locations was 3,611 fish or 1.3 fish per dive day (Table 12).

For respondents reporting trips to artificial reef sites, the aggregate harvest was 1,888 fish and 1.8 fish per trips (Table 13). Divers using spears with powerheads at all South Carolina "Saltwater" locations reported a harvest of 635 fish and an aggregate average of 0.8 fish per dive day (Table 14).

The median number of artificial reef trips completed by respondents reporting a harvest of fish was 4 and 8 trips, for all spearfishing and powerhead users, respectively (Table 13). The median harvest for the above respondents was 2 and 1.25 fish per trip, for all spearfishers and powerhead users, respectively (Table 13).

Table 6. Number of respondents diving at South Carolina artificial reef sites by South Carolina (SC) vs. non-South Carolina (Non-SC) addresses (Source: 1990 Annual Mail Survey).

	SC	Non-SC	Total
Sport diving at artificial reef	452	53	505
Did not sport dive at artificial reefs	939	334	1,276
Total diver respondents	1,392	387	1,781

Table 9. Diver activities while at artificial reef sites by South Carolina (SC) vs. non-South Carolina (Non-SC) divers[1], (Source: 1990 Annual Mail Survey).

Activity	Average Percentage of Total "Bottom Time" Diver's Address SC	Non-SC	All Divers
Checkout/training	37%(110)	46% (5)	37%(115)
Sightseeing	58%(363)	63% (32)	58%(395)
Photograph	27%(123)	30% (17)	27%(140)
Used spear[2]	33%(130)	37% (9)	33%(139)
Used power head	23% (19)	17% (3)	22% (22)
Catching lobsters	20% (36)	5% (2)	19% (38)
Catching stone crabs	12% (12)	7% (4)	11% (16)
Shell collecting	20%(123)	20% (8)	20%(131)
Taking live animals	19% (24)	1% (1)	18% (25)
Collecting artifacts	30%(134)	48% (13)	31%(147)
Other	34% (18)	40% (2)	35% (20)

[1]Number in parentheses indicate the number of respondent for each activity and group.

[2]This includes spear guns and pole spears.

Table 10. Distribution of reported South Carolina artificial reef trips and dive days by spearfishing[1] vs. non-spearfishing divers (Source: 1990 Annual Mail Survey).

NON-SPEARFISHING DIVERS			
	SC	Non-SC	All
Total Artificial Reef Trips:	1,203	183	1,386
Total Artificial Reef Days[2]:	1,203	177	1,380
Number of Charter Days[3]:	450	130	580
Number of Other Days:	753	47	801

SPEARFISHING DIVERS			
	SC	Non-SC	All
Total Artificial Reef Trips:	1,027	107	1,134
Estimated Artificial Reef Days:	1,027	107	1,134
Estimated Charter Days:	175	34	209
Number of Other Days:	852	73	925

All Artificial Reef Divers			
	SC	Non-SC	All
Total Artificial Reef Trips:	2,230	290	2,520
Estimated Artificial Reef Days:	2,230	284	2,514
Estimated Charter Days:	625	164	789
Number of Other Days:	1,605	120	1,725

[1]All respondents reporting any spearfishing activities and diving at artificial reef sites. The respondent may not have been involved in spearfishing activities at an artificial reef site in 1990.

[2]For a given respondent, the number of days with at least one trip to an artificial reef site.

[3]Estimated number of dive trips to artificial reef sites involving a chartered vessel vs. "other" vessels.

Table 11. The number of responses for eight most common fish species speared by responding divers (Source: 1990 Annual Mail Survey).

Species Common Name	DIVING LOCATION: Artificial Reef Divers[1]	Artificial Reef Sites	All Saltwater Sites	All Saltwater Sites
Grouper	94	29%	104	29%
Spadefish	80	25%	87	24%
Flounder	43	13%	45	13%
Sheepshead	42	13%	46	13%
Blackfish	21	6%	22	6%
Snapper	20	6%	22	6%
Barracuda	14	4%	16	4%
Amberjack	11	3%	15	4%
Total Responses:	325		357	

NOTE: There were often multiple responses by a respondent.

[1]These are divers reporting one or more dive trips to an artificial reef site. Some of these divers may not have speared the above species at an artificial reef site during 1990.

Table 12. Reported aggregate spearfishing harvest (number of fish) for all diver respondents reporting a catch of one or more fish (Source: 1990 Annual Mail Survey).

	Diver's Address		All Divers
	SC	Non-SC	
Locations		All Saltwater	
Respondents, n	153	14	167
Total Dive "Days"[1]	2,718	168	2,886
Total Harvest	2,869	742	3,611
Aggregate Average Per Day	1.1	4.4	1.3

[1]A "dive day" may include dives at two or more different locations on a given day.

[2]A "dive trip" is one or more dives at a given location.

Table 13. Trips and harvest per trip for respondents reporting a harvest of one or more fish at artificial reef sites, 1990 (Source: 1990 Annual Mail Survey).

	All Spearfishing	Powerheads Only
n	124	16
Total	1,028 trips	162 trips
Mean	8.29 trips	10.13 trips
Median	4 trips	8 trips
Skewness	3.779	1.859
C.V.	1.51	0.97

Harvest:
(Number of fish)

n	124	16
Total	1,888 fish	197 fish
Mean /trip	3.97 fish	2.88 fish
Median/trip	2.0 fish	1.25 fish
Skewness	2.291	1.500
C.V.	1.23	1.35

C.V. = Coefficient of Variation.

n = Number of respondents reporting a harvest of one or more fish.

Table 14. Reported aggregate harvest number of fish for all diver respondents using spears with powerheads, 1990 (Source: 1990 Annual Mail Survey).

Divers	Diver's Address		All
	SC	Non-SC	
	All Saltwater Locations		
Total Dive "Days"[1]	729	29	758
Total Harvest	626 (27)	9 (2)	635 (29)
Aggregate Average Per Day	0.9	0.3	0.8

The numbers in parenthesis are the number of respondents reporting a harvest of one or more fish.

[1]A dive day may include dives at two or more different locations on a given day.

Appendix H. Size Limit and Bag Limit Analyses

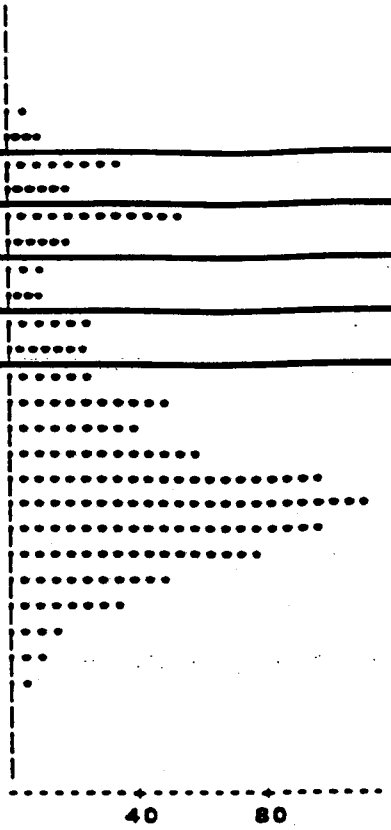
SAS 5:15 Tuesday, March 16, 1993 155

MUTTON SNAPPER- ALL GEARS

1981-1982

FREQUENCY OF INCHES

INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	3	3	0.33	0.33
12.0	13	16	1.42	1.75
13.0	34	50	3.72	5.46
14.0	26	76	2.84	8.31
15.0	53	129	5.79	14.10
16.0	26	155	2.84	16.94
17.0	11	166	1.20	18.14
18.0	16	182	1.75	19.89
19.0	25	207	2.73	22.62
20.0	30	237	3.28	25.90
21.0	24	261	2.62	28.52
22.0	50	311	5.46	33.99
23.0	40	351	4.37	38.36
24.0	60	411	6.56	44.92
25.0	102	513	11.15	56.07
26.0	114	627	12.46	68.52
27.0	98	725	10.71	79.23
28.0	79	804	8.63	87.87
29.0	49	853	5.36	93.22
30.0	33	886	3.61	96.83
31.0	13	899	1.42	98.25
32.0	10	909	1.09	99.34
33.0	5	914	0.55	99.89
34.0	1	915	0.11	100.00
35.0	0	915	0.00	100.00
36.0	0	915	0.00	100.00



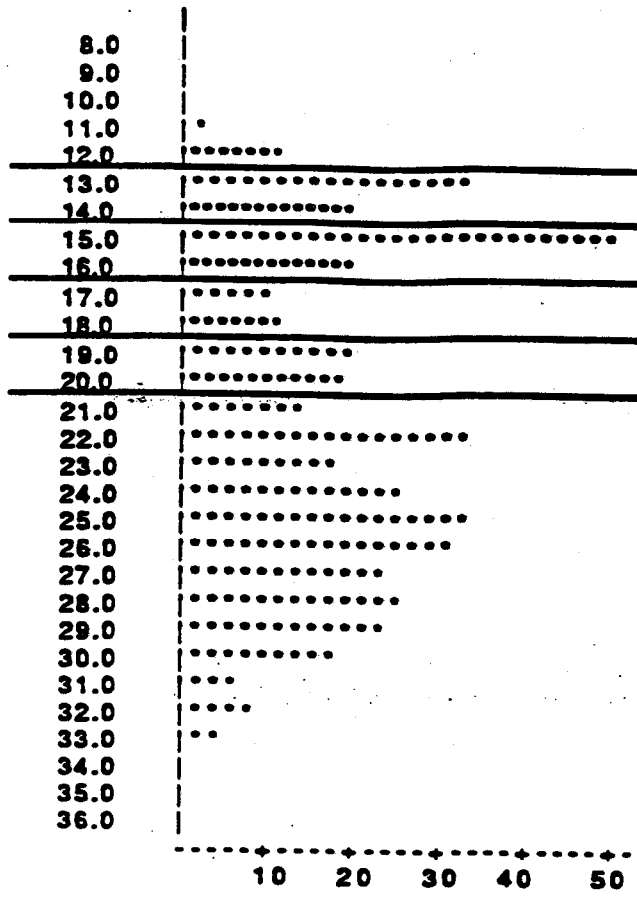
GEARS-
610 Other Hand Lines
611 Rod & Reel
676 Bottom Longline
355 Spiny Lobster Traps

SAS 5:15 Tuesday, March 16, 1993

MUTTON SNAPPER- HOOK & LINE

1991-1992

FREQUENCY OF INCHES



INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	2	2	0.42	0.42
12.0	13	15	2.73	3.15
13.0	34	49	7.14	10.29
14.0	26	75	5.46	15.76
15.0	52	127	10.92	26.68
16.0	25	152	5.25	31.93
17.0	9	161	1.89	33.82
18.0	13	174	2.73	36.55
19.0	20	194	4.20	40.76
20.0	21	215	4.41	45.17
21.0	14	229	2.94	48.11
22.0	33	262	6.93	55.04
23.0	17	279	3.57	58.61
24.0	25	304	5.25	63.87
25.0	33	337	6.93	70.80
26.0	32	369	6.72	77.52
27.0	23	392	4.83	82.35
28.0	26	418	5.46	87.82
29.0	24	442	5.04	92.86
30.0	18	460	3.78	96.64
31.0	5	465	1.05	97.69
32.0	8	473	1.68	99.37
33.0	3	476	0.63	100.00
34.0	0	476	0.00	100.00
35.0	0	476	0.00	100.00
36.0	0	476	0.00	100.00

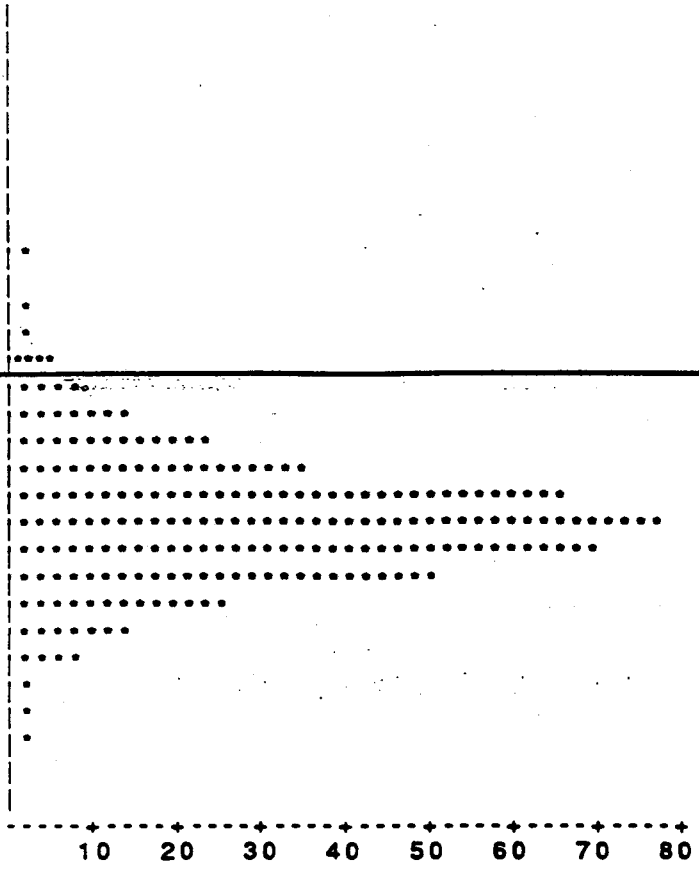
GEARS-
610 Other Hand Lines
611 Rod & Reel

MUTTON SNAPPER-LONGLINES

1991-1992

FREQUENCY OF INCHES

INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	0	0	0.00	0.00
12.0	0	0	0.00	0.00
13.0	0	0	0.00	0.00
14.0	0	0	0.00	0.00
15.0	0	0	0.00	0.00
16.0	1	1	0.24	0.24
17.0	0	1	0.00	0.24
18.0	2	3	0.48	0.72
19.0	2	5	0.48	1.21
20.0	8	13	1.93	3.14
21.0	8	21	1.93	5.07
22.0	14	35	3.38	8.45
23.0	23	58	5.56	14.01
24.0	35	93	8.45	22.46
25.0	68	161	16.43	38.89
26.0	79	240	19.08	57.97
27.0	72	312	17.39	75.36
28.0	51	363	12.32	87.68
29.0	25	388	6.04	93.72
30.0	14	402	3.38	97.10
31.0	8	410	1.93	99.03
32.0	1	411	0.24	99.28
33.0	2	413	0.48	99.76
34.0	1	414	0.24	100.00
35.0	0	414	0.00	100.00
36.0	0	414	0.00	100.00



GEARS-
676 Bottom Longline

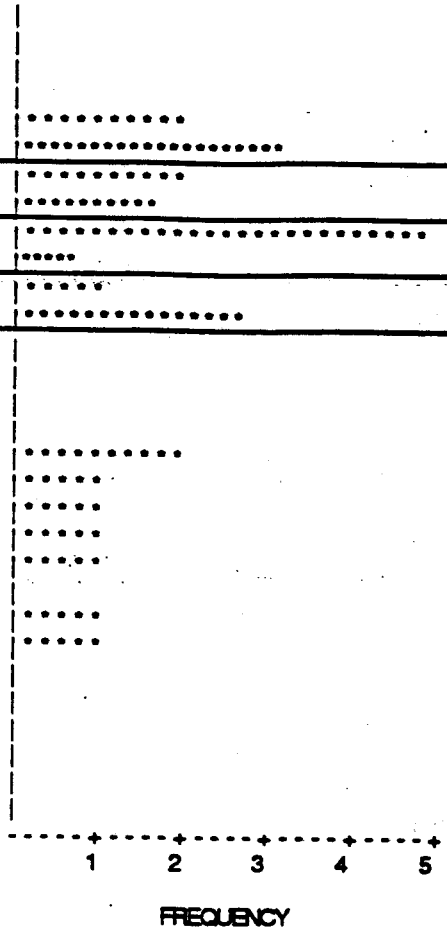
Marine Recreational Fisheries Statistics Survey
1991-1992
MUTTON SNAPPER

South Atlantic States

Size Limit Analysis

FREQUENCY OF INCHES

Size Limit (TL- inches)	FREQ	CUM FREQ	% BELOW LIMIT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	2	2	7.14	7.14
12.0	4	6	14.29	21.43
13.0	2	8	7.14	28.57
14.0	2	10	7.14	35.71
15.0	5	15	17.86	53.57
16.0	1	16	3.57	57.14
17.0	1	17	3.57	60.71
18.0	3	20	10.71	71.43
19.0	0	20	0.00	71.43
20.0	0	20	0.00	71.43
21.0	0	20	0.00	71.43
22.0	0	20	0.00	71.43
23.0	2	22	7.14	78.57
24.0	1	23	3.57	82.14
25.0	1	24	3.57	85.71
26.0	1	25	3.57	89.29
27.0	1	26	3.57	92.86
28.0	0	26	0.00	92.86
29.0	1	27	3.57	96.43
30.0	1	28	3.57	100.00
31.0	0	28	0.00	100.00
32.0	0	28	0.00	100.00
33.0	0	28	0.00	100.00
34.0	0	28	0.00	100.00
35.0	0	28	0.00	100.00
36.0	0	28	0.00	100.00



FISHERY=HEADBOAT YEAR=92 SPECIES=19 SP=MUTTON SNAPPER

FREQUENCY OF LCLASS

SIZE LIMIT		FREQ	CUM FREQ	PERCENT	PERCENT OF CATCH EXCLUDED
11	**	2	2	0.96	0.96
12	*	1	3	0.48	1.44
13	***	3	6	1.44	2.88
14	********	8	14	3.85	6.73
15	**********	22	36	10.58	17.31
16	**********	27	63	12.98	30.29
17	**********	13	76	6.25	36.54
18	**********	16	92	7.69	44.23
19	**********	12	104	5.77	50.00
20	**********	13	117	6.25	56.25
21	**********	14	131	6.73	62.98
22	**********	14	145	6.73	69.71
23	*******	7	152	3.37	73.08
24	**	2	154	0.96	74.04
25	*******	7	161	3.37	77.40
26	*******	7	168	3.37	80.77
27	**********	11	179	5.29	86.06
28	*******	7	186	3.37	89.42
29	*****	5	191	2.40	91.83
30	******	6	197	2.88	94.71
31	***	3	200	1.44	96.15
32	*******	7	207	3.37	99.52
34	*	1	208	0.48	100.00

5 10 15 20 25

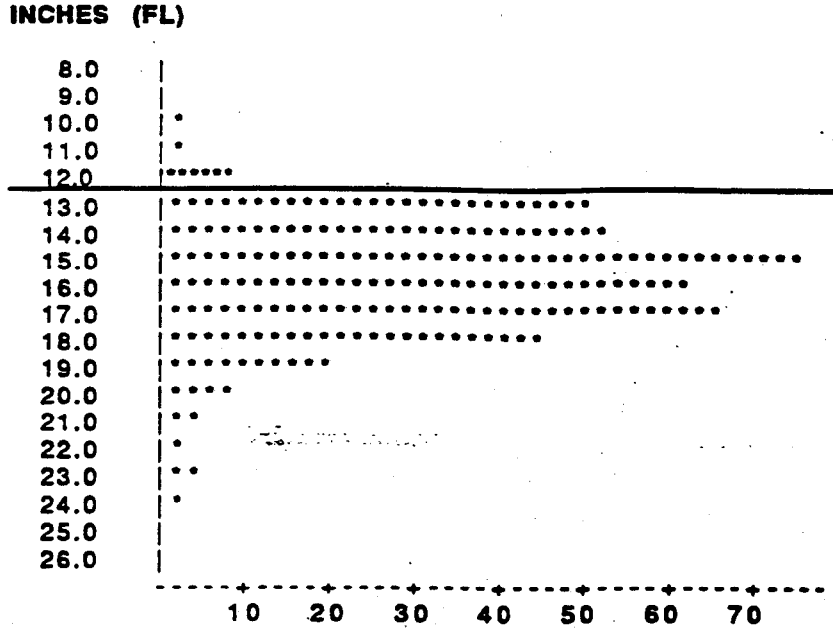
FREQUENCY

SAS 3:49 Wednesday, March 17, 1993

GRAY TRIGGERFISH-ALL GEARS

1991-1992

FREQUENCY OF INCHES



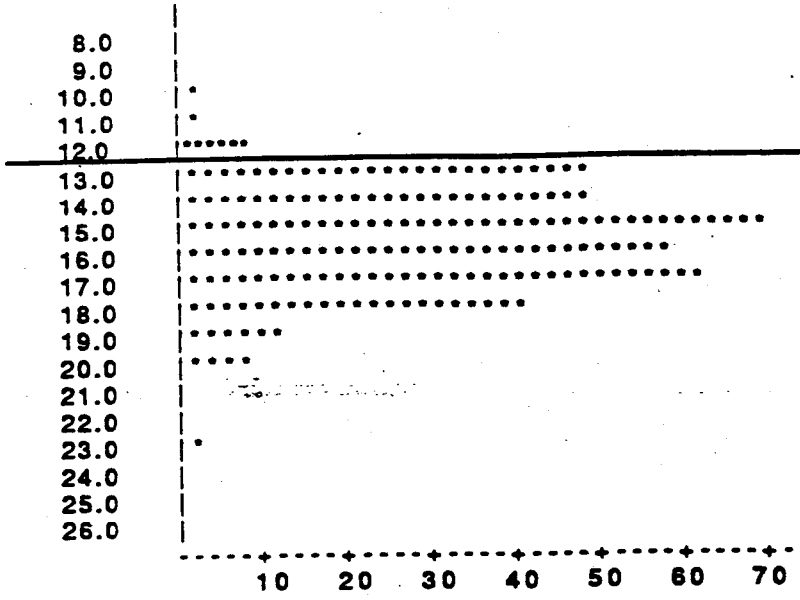
INCHES (FL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	1	1	0.24	0.24
11.0	1	2	0.24	0.49
12.0	12	14	2.93	3.41
13.0	52	66	12.68	16.10
14.0	53	119	12.93	29.02
15.0	77	196	18.78	47.80
16.0	64	260	15.61	63.41
17.0	67	327	16.34	79.76
18.0	45	372	10.98	90.73
19.0	19	391	4.63	95.37
20.0	8	399	1.95	97.32
21.0	4	403	0.98	98.29
22.0	2	405	0.49	98.78
23.0	4	409	0.98	99.76
24.0	1	410	0.24	100.00
25.0	0	410	0.00	100.00
26.0	0	410	0.00	100.00

GEAR-
611 Rod & Reel
613 Electric & Hydraulic Reels
660 Trolling
676 Bottom Longline

GRAY TRIGGERFISH- SNAPPER REELS

1991-1992

FREQUENCY OF INCHES



INCHES (FL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	1	1	0.27	0.27
11.0	1	2	0.27	0.54
12.0	12	14	3.24	3.78
13.0	50	64	13.51	17.30
14.0	50	114	13.51	30.81
15.0	71	185	19.19	50.00
16.0	59	244	15.95	65.95
17.0	64	308	17.30	83.24
18.0	42	350	11.35	94.59
19.0	12	362	3.24	97.84
20.0	7	369	1.89	99.73
21.0	0	369	0.00	99.73
22.0	0	369	0.00	99.73
23.0	1	370	0.27	100.00
24.0	0	370	0.00	100.00
25.0	0	370	0.00	100.00
26.0	0	370	0.00	100.00

GEAR-
613 Electric & Hydraulic Reels

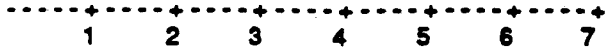
SAS 3:49 Wednesday, March 17, 1993

GRAY TRIGGERFISH- LONGLINES

1991-1992

FREQUENCY OF INCHES

INCHES (FL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	0	0	0.00	0.00
12.0	0	0	0.00	0.00
13.0	2	2	5.00	5.00
14.0	3	5	7.50	12.50
15.0	6	11	15.00	27.50
16.0	5	16	12.50	40.00
17.0	3	19	7.50	47.50
18.0	3	22	7.50	55.00
19.0	7	29	17.50	72.50
20.0	1	30	2.50	75.00
21.0	4	34	10.00	85.00
22.0	2	36	5.00	90.00
23.0	3	39	7.50	97.50
24.0	1	40	2.50	100.00
25.0	0	40	0.00	100.00
26.0	0	40	0.00	100.00



FREQUENCY

GEAR-
676 Bottom Longline

3:20 Thursday, March 25, 1993 5

Marine Recreational Fisheries Statistics Survey
1991-1992

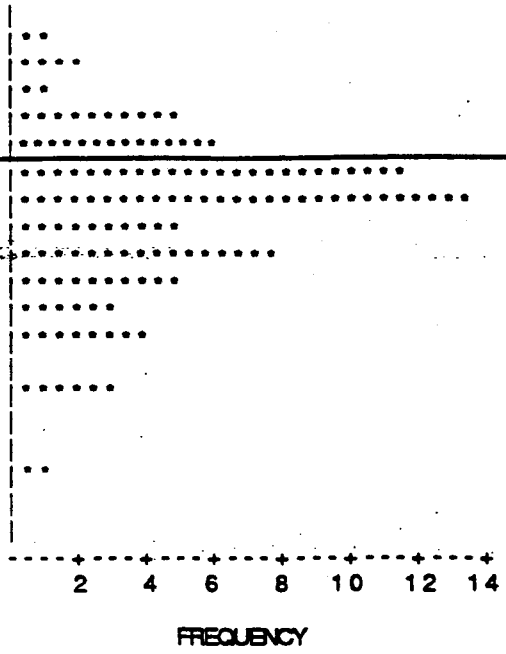
GRAY TRIGGERFISH

South Atlantic States

Size Limit Analysis

FREQUENCY OF INCHES

Size Limit (FL- inches)	FREQ	CUM FREQ	% BELOW LIMIT	CUM PERCENT
8.0	1	1	1.41	1.41
9.0	2	3	2.82	4.23
10.0	1	4	1.41	5.63
11.0	5	9	7.04	12.68
12.0	7	16	9.86	22.54
13.0	12	28	16.90	39.44
14.0	14	42	19.72	59.15
15.0	5	47	7.04	66.20
16.0	8	55	11.27	77.46
17.0	5	60	7.04	84.51
18.0	3	63	4.23	88.73
19.0	4	67	5.63	94.37
20.0	0	67	0.00	94.37
21.0	3	70	4.23	98.59
22.0	0	70	0.00	98.59
23.0	0	70	0.00	98.59
24.0	1	71	1.41	100.00
25.0	0	71	0.00	100.00
26.0	0	71	0.00	100.00



FISHERY=HEADBOAT YEAR=92 SPECIES=77 SP=GRAY TRIGGERFISH

FREQUENCY OF LCLASS

SIZE LIMIT		FREQ	CUM FREQ	PERCENT	PERCENT OF CATCH EXCLUDED
8		1	1	0.14	0.14
9	*	6	7	0.83	0.96
10	*******	33	40	4.54	5.50
11	**********	73	113	10.04	15.54
12	**********	105	218	14.44	29.99
13	**********	170	388	23.38	53.37
14	**********	125	513	17.19	70.56
15	**********	108	621	14.86	85.42
16	********	42	663	5.78	91.20
17	*******	33	696	4.54	95.74
18	**	12	708	1.65	97.39
19	**	12	720	1.65	99.04
20	*	5	725	0.69	99.72
21		2	727	0.28	100.00

40 80 120 160

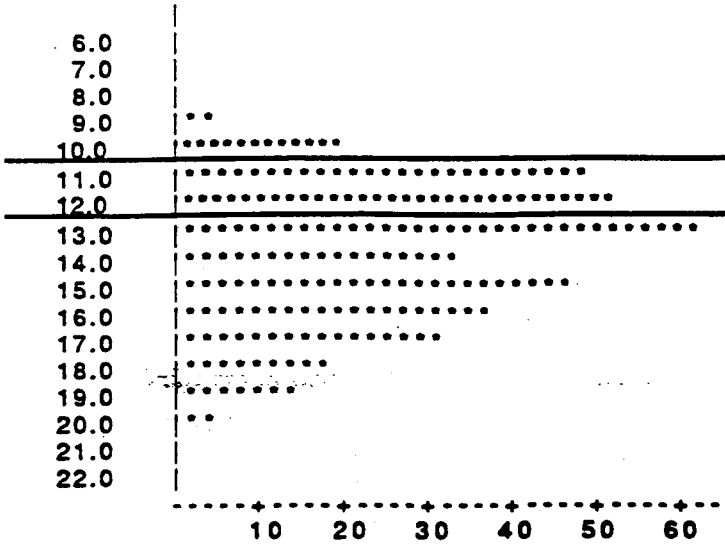
FREQUENCY

SAS 5:15 Tuesday, March 16, 1993

WHITE GRUNT- ALL GEARS

1991-1992

FREQUENCY OF INCHES



INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
6.0	0	0	0.00	0.00
7.0	0	0	0.00	0.00
8.0	0	0	0.00	0.00
9.0	3	3	0.78	0.78
10.0	24	27	6.27	7.05
11.0	49	76	12.79	19.84
12.0	59	135	15.40	35.25
13.0	63	198	16.45	51.70
14.0	34	232	8.88	60.57
15.0	48	280	12.53	73.11
16.0	38	318	9.92	83.03
17.0	31	349	8.09	91.12
18.0	18	367	4.70	95.82
19.0	13	380	3.39	99.22
20.0	3	383	0.78	100.00
21.0	0	383	0.00	100.00
22.0	0	383	0.00	100.00

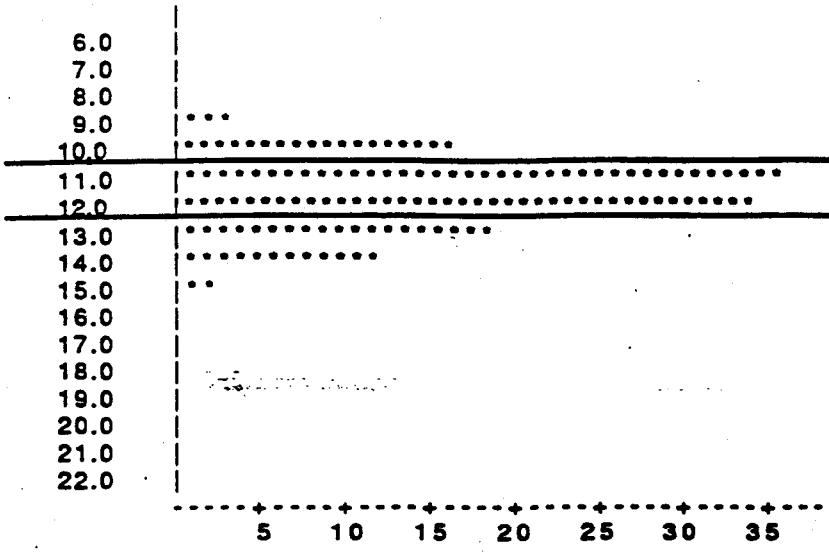
GEARS-
610 Other Hand Lines
611 Rod & Reel
613 Electric & Hydraulic Reels
676 Bottom Longline

SAS 5:15 Tuesday, March 16, 1993

WHITE GRUNT- HOOK & LINE

1991-1992

FREQUENCY OF INCHES



INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
6.0	0	0	0.00	0.00
7.0	0	0	0.00	0.00
8.0	0	0	0.00	0.00
9.0	3	3	2.33	2.33
10.0	18	21	13.95	16.28
11.0	37	58	28.68	44.96
12.0	38	96	29.46	74.42
13.0	19	115	14.73	89.15
14.0	12	127	9.30	98.45
15.0	2	129	1.55	100.00
16.0	0	129	0.00	100.00
17.0	0	129	0.00	100.00
18.0	0	129	0.00	100.00
19.0	0	129	0.00	100.00
20.0	0	129	0.00	100.00
21.0	0	129	0.00	100.00
22.0	0	129	0.00	100.00

GEARS-
610 Other Hand Lines
611 Rod & Reel

SAS 5:15 Tuesday, March 16, 1993

WHITE GRUNT- SNAPPER REELS

1991-1992

FREQUENCY OF INCHES

INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
6.0	0	0	0.00	0.00
7.0	0	0	0.00	0.00
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0 ***	6	6	2.64	2.64
11.0 ******	12	18	5.29	7.93
12.0 **********	21	39	9.25	17.18
13.0 **********	44	83	19.38	36.56
14.0 **********	22	105	9.69	46.26
15.0 **********	43	148	18.94	65.20
16.0 **********	32	180	14.10	79.30
17.0 **********	27	207	11.89	91.19
18.0 ******	11	218	4.85	96.04
19.0 *****	9	227	3.96	100.00
20.0	0	227	0.00	100.00
21.0	0	227	0.00	100.00
22.0	0	227	0.00	100.00

10 20 30 40

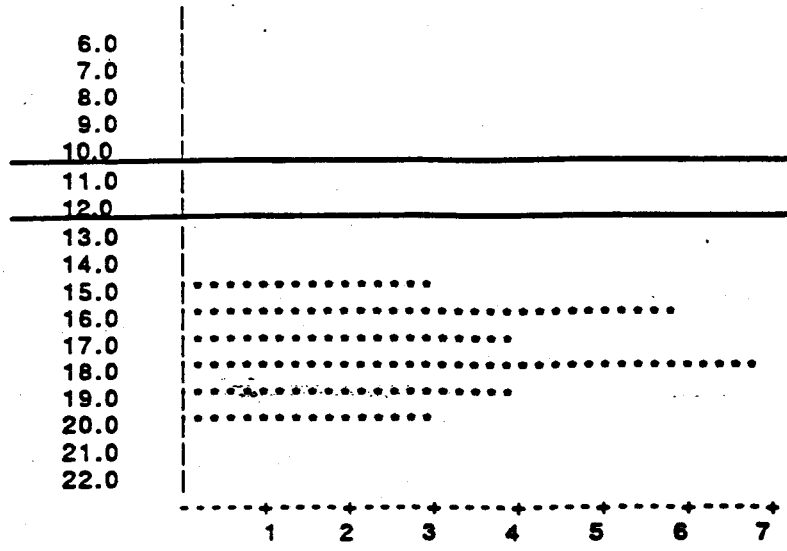
FREQUENCY

GEARS-
613 Electric & Hydraulic Reels

WHITE GRUNT- LONGLINES

1991

FREQUENCY OF INCHES



INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
6.0	0	0	0.00	0.00
7.0	0	0	0.00	0.00
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	0	0	0.00	0.00
12.0	0	0	0.00	0.00
13.0	0	0	0.00	0.00
14.0	0	0	0.00	0.00
15.0	3	3	11.11	11.11
16.0	6	9	22.22	33.33
17.0	4	13	14.81	48.15
18.0	7	20	25.93	74.07
19.0	4	24	14.81	88.89
20.0	3	27	11.11	100.00
21.0	0	27	0.00	100.00
22.0	0	27	0.00	100.00

GEARS-
676 Bottom Longline

Marine Recreational Fisheries Statistics Survey
1991-1992

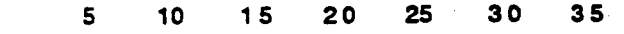
WHITE GRUNT

South Atlantic States

Size Limit Analysis

FREQUENCY OF INCHES

Size Limit (TL- inches)	FREQ	CUM FREQ	% BELOW LIMIT	CUM PERCENT
8.0	2	2	0.84	0.84
9.0	7	9	2.95	3.80
10.0	23	32	9.70	13.50
11.0	30	62	12.66	26.16
12.0	35	97	14.77	40.93
13.0	23	120	9.70	50.63
14.0	30	150	12.66	63.29
15.0	36	186	15.19	78.48
16.0	16	202	6.75	85.23
17.0	18	220	7.59	92.83
18.0	4	224	1.69	94.51
19.0	9	233	3.80	98.31
20.0	4	237	1.69	100.00
21.0	0	237	0.00	100.00
22.0	0	237	0.00	100.00
23.0	0	237	0.00	100.00
24.0	0	237	0.00	100.00
25.0	0	237	0.00	100.00
26.0	0	237	0.00	100.00



FREQUENCY

FISHERY=HEADBOAT YEAR=92 SPECIES=50 SP=WHITE GRUNT

FREQUENCY OF LCLASS

SIZE LIMIT		FREQ	CUM FREQ	PERCENT	PERCENT OF CATCH EXCLUDED
7		1	1	0.05	0.05
8		6	7	0.27	0.32
9	**	36	43	1.65	1.97
10	**********	208	251	9.53	11.50
11	**********	410	661	18.79	30.29
12	**********	446	1107	20.44	50.73
13	**********	411	1518	18.84	69.57
14	**********	271	1789	12.42	81.99
15	**********	207	1996	9.49	91.48
16	******	121	2117	5.55	97.02
17	**	42	2159	1.92	98.95
18	*	17	2176	0.78	99.73
19		3	2179	0.14	99.86
20		1	2180	0.05	99.91
33		1	2181	0.05	99.95
113		1	2182	0.05	100.00

100 200 300 400

FREQUENCY

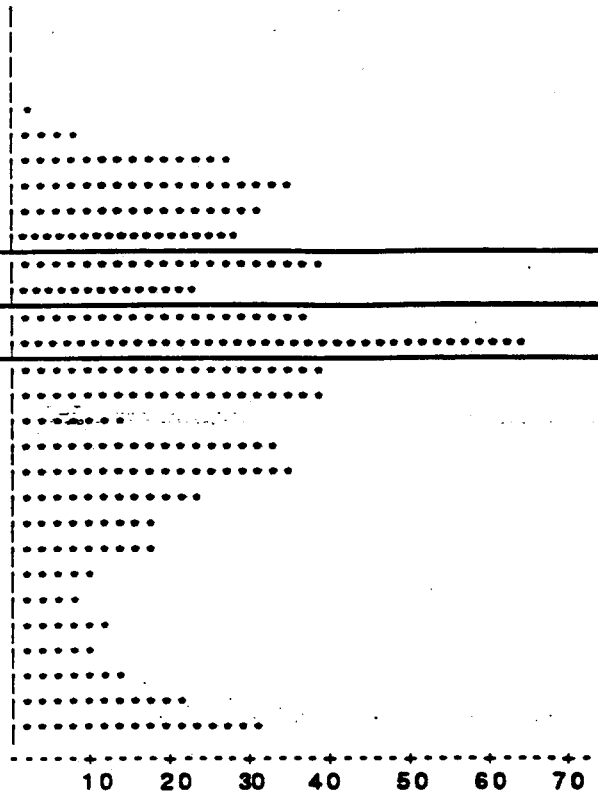
SAS 5:07 Saturday, March 13, 1993

RED SNAPPER- ALL GEARS

1991

FREQUENCY OF INCHES

INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	1	1	0.16	0.16
12.0	7	8	1.09	1.25
13.0	27	35	4.22	5.47
14.0	36	71	5.62	11.09
15.0	32	103	5.00	16.09
16.0	35	138	5.47	21.56
17.0	39	177	6.09	27.66
18.0	28	205	4.37	32.03
19.0	38	243	5.94	37.97
20.0	72	315	11.25	49.22
21.0	39	354	6.09	55.31
22.0	40	394	6.25	61.56
23.0	13	407	2.03	63.59
24.0	34	441	5.31	68.91
25.0	35	476	5.47	74.37
26.0	23	499	3.59	77.97
27.0	17	516	2.66	80.62
28.0	18	534	2.81	83.44
29.0	9	543	1.41	84.84
30.0	7	550	1.09	85.94
31.0	12	562	1.87	87.81
32.0	10	572	1.56	89.37
33.0	14	586	2.19	91.56
34.0	22	608	3.44	95.00
35.0	32	640	5.00	100.00



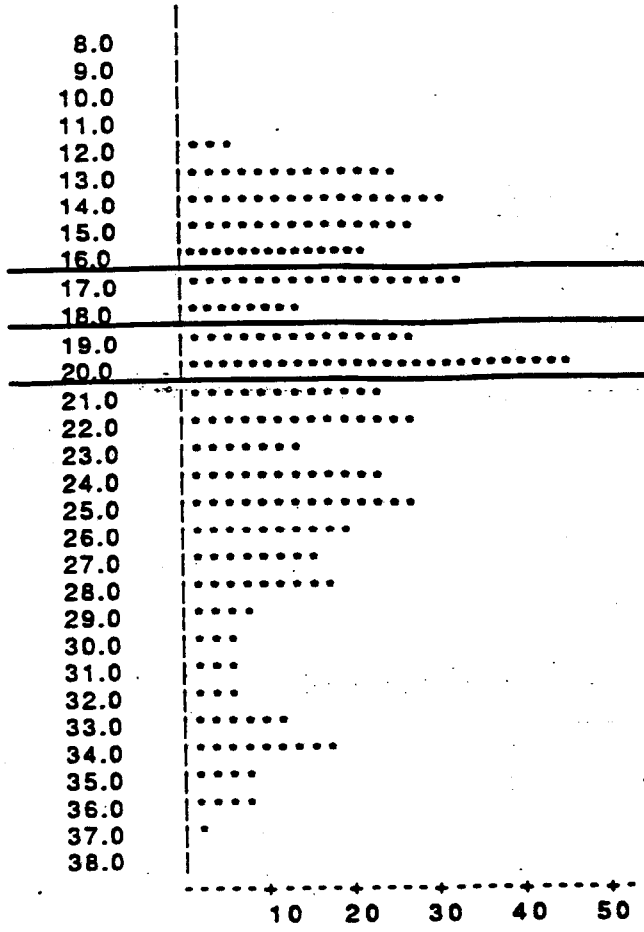
GEAR-
610 Other Hand Lines
611 Rod & Reel
613 Electric & Hydraulic Reels
660 Trolling
665 Mackerel Trolling
676 Bottom Longline
943 Diving
530 Trammel Net
355 Spiny Lobster Traps

SAS 5:07 Saturday, March 13, 1993

RED SNAPPER- SNAPPER REELS

1991

FREQUENCY OF INCHES



INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	0	0	0.00	0.00
12.0	5	5	1.04	1.04
13.0	26	31	5.38	6.42
14.0	31	62	6.42	12.84
15.0	27	89	5.59	18.43
16.0	28	117	5.80	24.22
17.0	34	151	7.04	31.26
18.0	16	167	3.31	34.58
19.0	28	195	5.80	40.37
20.0	52	247	10.77	51.14
21.0	23	270	4.76	55.90
22.0	27	297	5.59	61.49
23.0	13	310	2.69	64.18
24.0	24	334	4.97	69.15
25.0	28	362	5.80	74.95
26.0	19	381	3.93	78.88
27.0	15	396	3.11	81.99
28.0	17	413	3.52	85.51
29.0	8	421	1.66	87.16
30.0	5	426	1.04	88.20
31.0	6	432	1.24	89.44
32.0	6	438	1.24	90.68
33.0	12	450	2.48	93.17
34.0	17	467	3.52	96.69
35.0	7	474	1.45	98.14
36.0	8	482	1.66	99.79
37.0	1	483	0.21	100.00
38.0	0	483	0.00	100.00

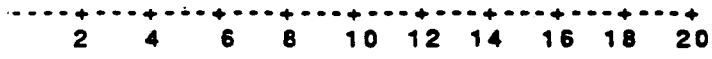
GEARS-
613 Electric & Hydraulic Reels

RED SNAPPER- HOOK & LINE

1991

FREQUENCY OF INCHES

INCHES (TL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	0	0	0.00	0.00
11.0	1	1	0.78	0.78
12.0	2	3	1.56	2.34
13.0	1	4	0.78	3.12
14.0	5	9	3.91	7.03
15.0	4	13	3.12	10.16
16.0	7	20	5.47	15.63
17.0	5	25	3.91	19.53
18.0	12	37	9.38	28.91
19.0	9	46	7.03	35.94
20.0	20	66	15.63	51.56
21.0	13	79	10.16	61.72
22.0	11	90	8.59	70.31
23.0	0	90	0.00	70.31
24.0	5	95	3.91	74.22
25.0	4	99	3.12	77.34
26.0	2	101	1.56	78.91
27.0	2	103	1.56	80.47
28.0	1	104	0.78	81.25
29.0	0	104	0.00	81.25
30.0	1	105	0.78	82.03
31.0	6	111	4.69	86.72
32.0	4	115	3.12	89.84
33.0	2	117	1.56	91.41
34.0	2	119	1.56	92.97
35.0	9	128	7.03	100.00



FREQUENCY

GEAR-
610 Other Hand Lines
611 Rod & Reel

7:56 Thursday, March 25, 1993

Marine Recreational Fisheries Statistics Survey
1991
RED SNAPPER

South Atlantic States
Size Limit Analysis

FREQUENCY OF INCHES

Size Limit (TL-inches)		FREQ	CUM FREQ	% BELOW LIMIT	CUM PERCENT
8.0		0	0	0.00	0.00
9.0		0	0	0.00	0.00
10.0		0	0	0.00	0.00
11.0		0	0	0.00	0.00
12.0	•••••••••••••••••••••••••••••	3	3	15.00	15.00
13.0	••••••••••	1	4	5.00	20.00
14.0	•••	4	8	20.00	40.00
15.0	••••••••••	1	9	5.00	45.00
16.0		0	9	0.00	45.00
17.0	••••••••••••••••••••	2	11	10.00	55.00
18.0	••••••••••	1	12	5.00	60.00
19.0		0	12	0.00	60.00
20.0	••••••••••	1	13	5.00	65.00
21.0		0	13	0.00	65.00
22.0	••••••••••••••••••••	2	15	10.00	75.00
23.0		0	15	0.00	75.00
24.0	••••••••••	1	16	5.00	80.00
25.0	••••••••••	1	17	5.00	85.00
26.0		0	17	0.00	85.00
27.0		0	17	0.00	85.00
28.0		0	17	0.00	85.00
29.0	••••••••••	1	18	5.00	90.00
30.0	••••••••••••••••••••	2	20	10.00	100.00
31.0		0	20	0.00	100.00
32.0		0	20	0.00	100.00
33.0		0	20	0.00	100.00
34.0		0	20	0.00	100.00
35.0		0	20	0.00	100.00
36.0		0	20	0.00	100.00

1 2 3 4

FREQUENCY

FISHERY=HEADBOAT YEAR=91 SPECIES=11 SP=RED SNAPPER

FREQUENCY OF LCLASS

SIZE LIMIT		FREQ	CUM FREQ	PERCENT	PERCENT OF CATCH EXCLUDED
8	*	1	1	0.66	0.66
10	*	1	2	0.66	1.32
11	****	4	6	2.63	3.95
12	*******	7	13	4.61	8.55
13	**********	11	24	7.24	15.79
14	**********	22	46	14.47	30.26
15	**********	16	62	10.53	40.79
16	**********	13	75	8.55	49.34
17	**********	17	92	11.18	60.53
18	**********	16	108	10.53	71.05
19	**********	11	119	7.24	78.29
20	********	8	127	5.26	83.55
21	**	2	129	1.32	84.87
22	******	6	135	3.95	88.82
23	*	1	136	0.66	89.47
24	****	4	140	2.63	92.11
25	*	1	141	0.66	92.76
26	**	2	143	1.32	94.08
27	**	2	145	1.32	95.39
28	**	2	147	1.32	96.71
30	*	1	148	0.66	97.37
32	*	1	149	0.66	98.03
35	**	2	151	1.32	99.34
36	*	1	152	0.66	100.00

5 10 15 20

FREQUENCY

HOGFISH- ALL GEARS

1991-1992

FREQUENCY OF INCHES

INCHES (FL)

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0		0	0	0.00	0.00
9.0		0	0	0.00	0.00
10.0	*	1	1	0.65	0.65
11.0	********	8	9	5.19	5.84
12.0	**********	22	31	14.29	20.13
13.0	**********	36	67	23.38	43.51
14.0	**********	21	88	13.64	57.14
15.0	**********	25	113	16.23	73.38
16.0	**********	15	128	9.74	83.12
17.0	*****	5	133	3.25	86.36
18.0	*******	7	140	4.55	90.91
19.0	********	8	148	5.19	96.10
20.0	***	3	151	1.95	98.05
21.0	*	1	152	0.65	98.70
22.0	*	1	153	0.65	99.35
23.0	*	1	154	0.65	100.00
24.0		0	154	0.00	100.00
25.0		0	154	0.00	100.00
26.0		0	154	0.00	100.00

5 10 15 20 25 30 35

FREQUENCY

GEARS-
610 Other Hand Lines
355 Spiny Lobster Traps
943 Diving

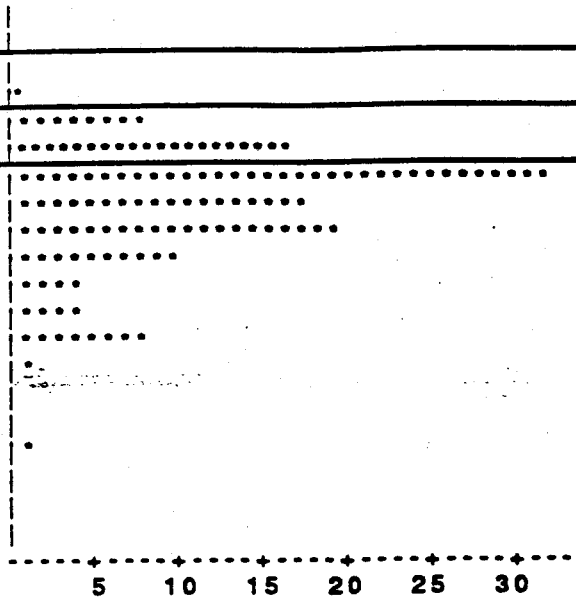
SAS 3:49 Wednesday, March 17, 1993

HOGFISH- DIVING

1991-1992

FREQUENCY OF INCHES

INCHES (FL)	FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	0	0	0.00	0.00
10.0	1	1	0.78	0.78
11.0	8	9	6.25	7.03
12.0	20	29	15.63	22.66
13.0	33	62	25.78	48.44
14.0	18	80	14.06	62.50
15.0	20	100	15.63	78.12
16.0	10	110	7.81	85.94
17.0	4	114	3.12	89.06
18.0	4	118	3.12	92.19
19.0	8	126	6.25	98.44
20.0	1	127	0.78	99.22
21.0	0	127	0.00	99.22
22.0	0	127	0.00	99.22
23.0	1	128	0.78	100.00
24.0	0	128	0.00	100.00
25.0	0	128	0.00	100.00
26.0	0	128	0.00	100.00



GEARS-
943 Diving

SAS 3:49 Wednesday, March 17, 1993

HOGFISH- OTHER GEAR

1991-1992

FREQUENCY OF INCHES

INCHES (FL)		FREQ	CUM FREQ	PERCENT	CUM PERCENT
8.0		0	0	0.00	0.00
9.0		0	0	0.00	0.00
10.0		0	0	0.00	0.00
11.0		0	0	0.00	0.00
12.0	**********	2	2	7.69	7.69
13.0	**********	3	5	11.54	19.23
14.0	**********	3	8	11.54	30.77
15.0	**********	5	13	19.23	50.00
16.0	**********	5	18	19.23	69.23
17.0	*****	1	19	3.85	73.08
18.0	**********	3	22	11.54	84.62
19.0		0	22	0.00	84.62
20.0	**********	2	24	7.69	92.31
21.0	*****	1	25	3.85	96.15
22.0	*****	1	26	3.85	100.00
23.0		0	26	0.00	100.00
24.0		0	26	0.00	100.00
25.0		0	26	0.00	100.00
26.0		0	26	0.00	100.00

1 2 3 4 5

FREQUENCY

GEARS-
610 Other Hand Lines
355 Spiny Lobster Traps

Marine Recreational Fisheries Statistics Survey
1991-1992

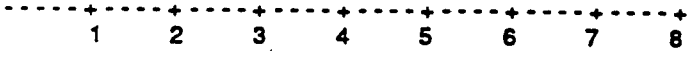
HOGFISH

South Atlantic States

Size Limit Analysis

FREQUENCY OF INCHES

Size Limit (FL- inches)	FREQ	CUM FREQ	% BELOW LIMIT	CUM PERCENT
8.0	0	0	0.00	0.00
9.0	3	3	7.50	7.50
10.0	0	3	0.00	7.50
11.0	8	11	20.00	27.50
12.0	7	18	17.50	45.00
13.0	6	24	15.00	60.00
14.0	3	27	7.50	67.50
15.0	3	30	7.50	75.00
16.0	2	32	5.00	80.00
17.0	0	32	0.00	80.00
18.0	0	32	0.00	80.00
19.0	0	32	0.00	80.00
20.0	2	34	5.00	85.00
21.0	1	35	2.50	87.50
22.0	1	36	2.50	90.00
23.0	0	36	0.00	90.00
24.0	2	38	5.00	95.00
25.0	1	39	2.50	97.50
26.0	0	39	0.00	97.50
27.0	0	39	0.00	97.50
28.0	0	39	0.00	97.50
29.0	0	39	0.00	97.50
30.0	1	40	2.50	100.00
31.0	0	40	0.00	100.00
32.0	0	40	0.00	100.00



FREQUENCY

FISHERY=HEADBOAT YEAR=92 SPECIES=80 SP=HOGFISH

FREQUENCY OF LCLASS

PERCENT OF CATCH EXCLUDED		FREQ	CUM FREQ	PERCENT	SIZE LIMIT
11	**********	1	1	7.14	7.14
16	**********	1	2	7.14	14.29
19	**********	1	3	7.14	21.43
20	**********	2	5	14.29	35.71
21	**********	1	6	7.14	42.86
22	**********	1	7	7.14	50.00
24	**********	1	8	7.14	57.14
25	**********	1	9	7.14	64.29
27	**********	1	10	7.14	71.43
28	**********	1	11	7.14	78.57
31	**********	1	12	7.14	85.71
32	**********	1	13	7.14	92.86
34	**********	1	14	7.14	100.00

1 2

FREQUENCY

7:56 Thursday, March 25, 1993

RED PORGY
Marine Recreational Fisheries Statistics Survey
Catch per Trip- South Atlantic States
Waves 1-4 1992 (Type A fish)

C_PER_T	Frequency	Cumulative Percent	Cumulative Frequency	Cumulative Percent
0	7	5.6	7	5.6
1	28	22.6	35	28.2
2	21	16.9	56	45.2
3	0	8.1	66	53.2
4	24	19.4	90	72.6
5	11	8.9	101	81.5
7	1	0.8	102	82.3
8	10	8.1	112	90.3
9	1	0.8	113	91.1
15	1	0.8	114	91.9
20	10	8.1	124	100.0

BAG=1

NB	NCALL	SBAG
25711	67224	0.61753

BAG=2

NB	NCALL	SBAG
40735	67224	0.39404

BAG=3

NB	NCALL	SBAG
50066	67224	0.25524

BAG=4

NB	NCALL	SBAG
56044	67224	0.16631

BAG=5

NB	NCALL	SBAG
59939	67224	0.10837

BAG=6

NB	NCALL	SBAG
62642	67224	0.068160

BAG=7

NB	NCALL	SBAG
64381	67224	0.042291

BAG=8

NB	NCALL	SBAG
65394	67224	0.027222

RED PORGY BAG LIMITS - 1991 - HEADBOAT FISHERY - ALL REGIONS - SOUTH ATLANTIC (cont.)

BAG=9

NB	NCALL	SBAG
66009	67224	0.018074

BAG=10

NB	NCALL	SBAG
66364	67224	0.012793

BAG=11

NB	NCALL	SBAG
66548	67224	0.010056

BAG=12

NB	NCALL	SBAG
66666	67224	.0083006

BAG=14

NB	NCALL	SBAG
66876	67224	.0051767

BAG=16

NB	NCALL	SBAG
67062	67224	.0024099

BAG=18

NB	NCALL	SBAG
67186	67224	.00056527

BAG=20

NB	NCALL	SBAG
67224	67224	0

Appendix I. Reef Fish Size at Age

REEF FISH SIZE AT AGE (INCHES)

Provided by Gene Huntsman, NMFS, Beaufort.
March 1993

	GOLDEN TILEFISH	SCAMP		YELLOWTAIL	
AGE	TL	TL	FL	FL	TL
1	6.9	11.1	10.6	5.6	6.3
2	9.8	13.9	13.0	8.6	10.0
3	12.6	16.5	15.3	10.8	13.0
4	15.0	18.9	17.4	12.5	15.0
5	17.3	21.1	19.3	13.8	16.7
6	19.6	23.0	20.9	14.6	17.9
7	21.4	24.8	22.5	15.4	18.9
8	23.3	26.4	23.9	16.0	19.6
9	24.8	28.0	25.3	16.5	20.1
10	26.3	29.3	26.5	16.7	20.6

	LANE	GRAY	MUTTON	RED PORGY	RED SNAPPER	VERMILION
AGE	TL	TL	TL	TL	TL	TL
1	5.6	4.4	7.3	7.2	5.7	3.9
2	7.4	7.3	11.1	9.3	10.5	7.6
3	8.9	10.0	14.3	11.2	14.6	10.7
4	10.3	12.4	17.1	13.0	18.1	13.2
5	11.5	14.6	19.5	14.5	21.1	15.0
6	12.5	16.5	21.5	15.9	23.7	17.0
7	13.4	18.3	23.3	17.2	25.9	18.3
8	14.2	19.9	24.8	18.4	27.9	19.5
9	14.9	21.4	26.1	19.5	29.3	20.4
10	15.5	22.7	27.2	20.4	30.6	21.2

NOTE: TL = Total Length
FL = Fork Length

REEF FISH SIZE AT AGE (INCHES)

Provided by Gene Huntsman, NMFS, Beaufort.
March 1993

	SPECKLED HIND	SNOWY GROUPER	RED GROUPER	WARSAW GROUPER	BLACK GROUPER
AGE	TL	TL	TL	TL	TL
1	8.7	9.6	4.0	20.8	10.7
2	12.3	12.4	9.0	24.6	15.3
3	15.5	15.1	13.2	28.3	19.5
4	18.2	17.5	16.7	31.8	23.2
5	20.6	19.8	19.8	35.1	26.5
6	22.8	21.9	22.3	38.2	29.4
7	24.6	23.9	24.4	41.1	32.0
8	26.3	25.7	26.3	43.9	34.3
9	27.7	27.4	27.8	46.6	36.4
10	29.0	29.0	29.1	49.1	38.2

	GAG GROUPER	BLACK SEA BASS	WHITE GRUNT	GREATER AMBERJACK	GRAY TRIGGERFISH
AGE	TL	TL	TL	TL	FL
1	11.6	3.5	4.9	14.8	6.7
2	16.1	5.6	7.0	22.8	10.4
3	20.1	7.2	8.9	29.4	12.9
4	23.6	8.5	10.5	35.1	14.6
5	26.7	9.5	12.0	39.8	15.8
6	29.5	10.3	13.4	43.8	16.6
7	32.0	10.9	14.6	47.1	17.2
8	34.1	11.5	15.7	49.9	17.6
9	36.0	11.9	16.7	52.3	17.8
10	37.7	12.2	17.5	54.3	18.0

NOTE: TL = Total Length
FL = Fork Length

REEF FISH SIZE AT AGE (MILLIMETERS)

Provided by Gene Huntsman, NMFS, Beaufort.
March 1993

	GOLDEN TILEFISH	SCAMP		YELLOWTAIL	
AGE	TL	TL	FL	FL	TL
1	175	281	268	142	159
2	249	353	331	218	255
3	319	418	388	274	329
4	382	479	441	318	382
5	440	535	489	350	425
6	498	584	532	372	455
7	543	630	572	392	481
8	593	671	608	407	499
9	630	710	642	418	511
10	668	745	672	425	523

	LANE	GRAY	MUTTON	RED PORGY	RED SNAPPER	VERMILION
AGE	TL	TL	TL	TL	TL	TL
1	142	111	185	184	144	99
2	187	186	281	237	267	194
3	227	253	364	285	372	272
4	261	315	434	329	461	336
5	291	370	495	369	537	380
6	317	420	547	405	602	431
7	340	465	592	438	657	466
8	361	506	630	468	708	495
9	378	543	663	495	744	519
10	394	576	691	519	778	538

NOTE: TL = Total Length
FL = Fork Length

REEF FISH SIZE AT AGE (MILLIMETERS)

Provided by Gene Huntsman, NMFS, Beaufort.
March 1993

	SPECKLED HIND	SNOWY GROUPER	RED GROUPER	WARSAW GROUPER	BLACK GROUPER
AGE	TL	TL	TL	TL	TL
1	222	244	102	528	271
2	313	316	228	626	389
3	393	383	335	719	495
4	463	445	425	807	589
5	524	503	502	891	672
6	578	557	566	970	747
7	626	606	621	1045	813
8	667	653	667	1116	872
9	704	696	706	1183	925
10	736	736	740	1246	971

	GAG GROUPER	BLACK SEA BASS	WHITE GRUNT	GREATER AMBERJACK	GRAY TRIGGERFISH
AGE	TL	TL	TL	TL	FL
1	295	89	125	375	170
2	410	141	178	578	264
3	511	182	225	748	328
4	600	215	267	891	372
5	679	241	306	1011	402
6	750	262	340	1112	422
7	812	278	371	1197	436
8	867	291	398	1268	446
9	915	301	423	1328	452
10	958	309	445	1378	457

NOTE: TL = Total Length
FL = Fork Length

Appendix J. Economic Analyses of Minimum Size Limits for Selected Reef Fishes along the U.S. South Atlantic Coast

ECONOMIC ANALYSES OF MINIMUM SIZE LIMITS FOR SELECTED REEF FISHES ALONG THE U.S. SOUTH ATLANTIC COAST

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ECONOMIC ANALYSES OF MINIMUM SIZE LIMITS FOR SELECTED REEF FISHES ALONG THE U.S. SOUTH ATLANTIC COAST

Economic analysis of minimum size limits is one of tradeoffs in the value of catch rates over time. Biological conservation and recovery of fish populations with a minimum size limit would require reductions in current harvest rates as fishermen would have to either avoid concentrations of the now-undersized fish or release any undersized fish caught. Over time, fish left unharvested would enhance society's ability to harvest more fish in the future, both recreationally and commercially, via growth in weight and reproduction net of natural mortality. The economic problem is to value and compare the short-term losses with the long-term gains in catch rates due to implementation of minimum size limits.

This paper investigates the economic effects of alternative minimum size limits for white grunt, Haemulon plumieri, gray triggerfish, Balistes capriscus, and mutton snapper, Lutjanus analis. A bioeconomic simulation model was used to predict changes in commercial and recreational landings over time. The economic concept of net present value was used as the criterion for evaluation of the tradeoffs between short-term losses and long-term gains in commercial revenues, but the utility (benefits) that fishermen receive from recreational fishing could not be evaluated due to a lack of data. The effects of minimum size limits on recreational fishermen were indirectly examined through predicted changes in pounds and numbers of fish caught.

Bioeconomic Simulation Model

The effects of implementing a minimum size limit were studied with a bioeconomic simulation model to evaluate changes in net benefits over a twenty year time period. Aggregate catches for commercial and recreational fishermen were simulated annually both with and without the proposed minimum size limits. The difference in yields was then expressed as changes in net benefits to the commercial sector via information on ex-vessel prices. The results simulate the differences between the levels of net benefits or losses for commercial fishermen under the no action alternative as compared to net benefits with the proposed minimum size limits. The effects of minimum size limits on net benefits to recreational fishermen were not calculated due to a lack of appropriate information about the marginal utility (value) of fish caught.

The biological portion of the simulation analysis is a standard age-structured population model that may be characterized by a matrix with numbers of fish at age as rows and time in years as columns (see Appendix). During each year, the simulated fish population consisted of up to 20 age classes, with the initial numbers of fish in each age class specified as data. The numbers of fish caught by age for the commercial and recreational fisheries combined were used in the biological stock assessments to determine initial population numbers for each age class. The initial population numbers were calculated by Huntsman et al. (1992) with 1990 data for white grunt and gray triggerfish and by Huntsman et al. (1993) with 1991 data for mutton snapper.

After specification of initial population numbers, the simulated population of fish available for capture in future years was determined by the number of new fish entering the population each year (recruitment) and by natural and fishing mortality coefficients. Recruitment was assumed to be a constant number of fish over time and was obtained from the stock assessment analyses. An important objective of a minimum size limit is to increase the number of fish that live long enough to spawn and increase recruitment. The benefits from an increased spawning stock are not incorporated into the simulation model due to the absence of an empirical relationship between the size of the spawning stock and recruitment and should not be interpreted to imply that recruitment is not increased or not of value. Natural and fishing mortality coefficients were obtained from Huntsman et al. (1992) using data from 1990 for white grunt and gray triggerfish and from Huntsman et al. (1993) with 1991 data for mutton snapper. Fishing mortality coefficients for each age class were split into commercial and recreational components according to the proportions of the numbers of fish landed in each age class (with 1990 data for white grunt and gray triggerfish and 1991 data for mutton snapper) by the commercial and recreational sectors. Growth equations (Johnson and Saloman (1984) for gray triggerfish; Manooch (1978) for white grunt; Mason and Manooch (1985) for mutton snapper) were used to convert predicted numbers of fish landed to predicted weights of fish landed.

Catch-and-release mortality for fish smaller than the minimum size limit was incorporated into the model through appropriate adjustments to the natural mortality coefficient (Waters and Huntsman 1986).

$$M_u = M + F P_r P_d$$

Natural mortality for undersized fish, M_u, was the sum of mortality from natural causes, M, plus catch-and-release mortality, defined as the product of fishing mortality, F, the probability that undersized fish are released, P_r, and the probability that released fish die, P_d. Because fish usually cannot be identified as legal or sublegal until they have been caught, undersized fish were assumed to be caught at the same rate as without a size limit, but that they would be released ($P_r = 1$) and survive with a probability ($1-P_d$) less than or equal to 1. This procedure overestimates catch-and-release mortality if fishermen minimize the catch of undersized fish by using larger hooks when feasible and by avoiding areas known to have large concentrations of small fish.

Economic Submodel of the Commercial Fishery

The effects of minimum size limits on commercial fishermen were defined as changes in producers' surplus, approximately measured as changes in total revenues. The immediate effect of minimum size limits on commercial fishermen would be to reduce landings and, probably, revenues and profits. Total revenues would decline because ex-vessel demand is probably price elastic. Production costs are assumed to remain unchanged after

implementation of minimum size limits because, in the multispecies reef fishery, fishermen would probably continue to fish for other species despite the effects of the size limits on their catches of white grunt, gray triggerfish, or mutton snapper. Over time, the populations of reef fish are expected to increase, which would increase domestic landings, revenues, and profits. In each simulated year, the difference between revenues under the size limit and revenues without the size limit were discounted and then summed to calculate net present value of the change in benefits to the commercial sector from the hypothesized minimum size limit.

Quantification of the effects of minimum size limits on industry revenues requires predictions of future commercial landings and the corresponding ex-vessel prices. The biological simulation model predicts landings given constant recruitment and constant natural and fishing mortality coefficients. Current ex-vessel prices for each species were obtained by telephone from several commercial fish houses in different geographic regions. Prices were approximately $0.50 per pound for white grunt, $0.80 per pound for gray triggerfish, and $1.70 per pound for mutton snapper. All prices refer to dollars per pound of fish before evisceration because the simulation model calculates landings on a whole weight basis.

Although ex-vessel demand curves have not been estimated for white grunt, mutton snapper, or gray triggerfish, it is expected that in the short-term, revenues would decline even though prices would increase in response to a decline in landings. Conversely,

revenues would be expected to increase in the long-term when landings increase, despite a decline in prices. These expectations are based on estimated demand curves for snappers and groupers (Keithly and Prochaska 1985) in which a 10% decline in landings of snappers (including mutton snapper) was associated with an increase of approximately 3.7% in average annual ex-vessel prices. Similarly, a 10% decline in landings of groupers was associated with an increase of approximately 4.6% in grouper prices. The economic submodel for the commercial fishery assumes that prices would change over time by -3.7% for every 10% change in landings of mutton snapper due to implementation of a minimum size limit and by -4.6% for every 10% change in landings of white grunt or gray triggerfish. Additional analyses are needed to better quantify the response of ex-vessel prices to changes in quantities of mutton snapper, white grunt and gray triggerfish landed due to regulation.

The method of approximating changes in producers' surplus by changes in total revenues tends to overestimate both the short-term costs and long-term benefits of regulation. The method assumes that fishermen would not alter their general fishing practices or strategies in response to minimum size limits. This assumption is consistent with the biological simulation model where fishing mortality is held constant over time. The assumption is probably reasonable for fishermen who land white grunt and gray triggerfish because these species are often caught incidentally when fishing for other more valuable species. Fishermen probably would continue to fish for the more valuable species regardless of the effect of

minimum size limits on their ability to keep incidental catches of white grunt and gray triggerfish. However, fishermen for whom mutton snapper is a primary species could alter their fishing behavior in response to regulated changes in catch rates. For example, fishermen probably would redirect their fishing effort to other fishing grounds or other species to offset major reductions in landings and revenues due to a minimum size limit. Ideally, the simulation model should account for changes in fishing patterns to calculate changes in producers' surplus in a more realistic fashion. Changes in producers' surplus would be calculated as the lesser of (1) the change in net operating revenues, including any changes in harvesting costs due to changes in fishing patterns, or (2) the reduction in profits between reef fishing and the next-best alternative fishery. Data are not currently available with which to predict how fishermen alter their harvesting practices in response to regulation.

The hypothesized minimum size limits also could affect retail buyers of commercial reef fish products, especially in south Florida where mutton snapper represents a non-trivial fraction of total reef fish landings. In the short-term with minimum size limits, buyers could be worse off as supplies available for consumption decline and retail prices increase. In the long-term, buyers could be better off as supplies and consumption increase and market prices fall. On the other hand, minimum size limits probably would have little effect on consumers of white grunt and gray triggerfish because these species represent relatively small

fractions of total reef fish supplies. For example, although minimum size limits for white grunt and gray triggerfish are expected to reduce landings in the short-term, consumers probably would purchase other species with little loss of utility rather than pay significantly higher prices for the more limited supplies available for consumption. The effects of minimum size limits on consumers are not included in the simulation model because consumer demand curves for white grunt, mutton snapper and gray triggerfish are not available. Additional analyses are needed to quantify the effects of minimum size limits on consumers of mutton snapper, white grunt and gray triggerfish.

Economic Submodel of the Recreational Fishery

Recreational fishermen derive utility from their fishing experiences, and that utility accrues from both the number of trips and the quality of each trip. The net economic benefit (termed consumers' surplus) for recreational fishermen is the difference between what they would have been willing to pay to take a fishing trip minus the actual cost of the trip. The net economic benefit accruing to vendors of recreational fishing inputs is defined as the difference between their revenues and their costs of production. Expenditures for recreational fishing supplies, such as guide or charter fees, fuel, bait, tackle, etc., cannot be counted as benefits to the recreational sector because they are costs to fishermen as well as benefits to vendors of recreational

fishing inputs. Expenditures represent a transfer from fishermen to vendors with no net gain to society.

Minimum size limits potentially affect the net benefits of recreational fishermen through changes in the quality of their fishing trips. Quality is hypothesized to be a function of species caught, the number of fish caught per trip, and the size distribution of the catch. Recreational fishermen would not be affected by minimum size limits if they did not receive utility from their catches. Other characteristics of a fishing trip which may enhance its quality, such as seascapes and fellowship, are assumed to be unaffected by minimum size limits.

At the present time, no model of recreational demand exists for reef fishing. Models have been estimated for other species (e.g., Agnello (1988) for bluefish, Pomatomus saltatrix, summer flounder, Paralichthys dentatus, and weakfish, Cynoscion regalis, along the U.S. Atlantic coast; Milon (1988, 1991) for king mackerel, Scomberomorus cavalla, in the Gulf of Mexico), but they do not appear applicable to analyses of minimum size limits for white grunt, gray triggerfish or mutton snapper. One problem is that studies of recreational demand often focus on fishermen who target certain species, a practice that probably yields marginal values per fish that are higher than would apply to less venerable species such as white grunt and gray triggerfish. Some studies, such as Milon (1991), included catch rates of non-targeted species in their estimated recreational demand models, but these variables usually are not found to be statistically significant determinants

of recreational value. In addition, the effect of catch rates for targeted species on the estimated values of recreational fishing appears sensitive to species sought, even in the same study where the researcher used a common set of data and estimation techniques. For example, Agnello (1988) found that the effect of catch rates on recreational value differed for summer flounder compared with bluefish and weakfish. Therefore, published estimates of the value of recreational fishing probably are not relevant for analyses of white grunt, gray triggerfish or mutton snapper.

The economic submodel of the recreational fishery calculates changes in recreational catches of each species, but does not value these changes due to a lack of appropriate information about the recreational demands for white grunt, gray triggerfish and mutton snapper. The lack of a complete evaluation of the recreational sector should not be interpreted to imply that minimum size limits would not affect recreational fishermen. In the short-term, a minimum size limit would reduce the number of small fish that could be kept, although it may not reduce the number of fish actually caught. Recreational fishermen are expected to suffer losses during the short-term if they are required to release fish that they otherwise would have kept. In the long-term, a minimum size limit, if biologically effective, would increase the number of fish that survive to and are caught at older ages and larger sizes. The value of recreational fishing is expected to increase in the long-term if fishermen realize higher catch rates of larger fish. In general, fishermen would be more likely to favor a minimum size

limit if they valued heavier fish more highly than numbers of fish caught per trip.

Results

The simulation model was used to evaluate alternative minimum size limits for white grunt, mutton snapper and gray triggerfish in the south Atlantic snapper-grouper fishery.

Species	Minimum Size Limits	Units of Measurement
White grunt	10, 11, 12, 13, 14	Inches, total length
Mutton snapper	12, 14, 16, 18, 20	Inches, total length
Gray triggerfish	12, 13, 14	Inches, fork length

Each minimum size limit was assumed to apply to both commercial and recreational fishermen, and was evaluated at four hypothesized values for the probability that undersized fish die when released: P_d=0.0 (100% survival), P_d=0.10 (90% survival), P_d=0.25 (75% survival) and P_d=0.40 (60% survival). Minimum size limits were assumed to be implemented in one step; policies which would gradually increase the legal minimum sizes to their final levels were not evaluated, although they may be considered in future analyses. Evaluation of the alternative minimum size limits focused on the net present value of changes in commercial revenues. Federal regulations required the use of a 10% discount rate. The analyses also assume discount rates of 4% and 0% for purposes of comparison with the mandated 10% rate. Recall that potential effects of minimum size limits on the value of recreational benefits were not accounted for in the model due to a lack of data, although changes in recreational catches were predicted.

The results of the simulation analyses are summarized in Tables 1-3 and the accompanying figures. Column 1 in each table identifies the minimum size limit being evaluated. Column 2 identifies the length of time period (20 years) which corresponds to the results given in the remaining columns. Column 3 shows the present value of commercial revenues accumulated over the 20 year study period without the hypothesized minimum size limit. Column 4 lists the net present value (NPV) of changes in commercial revenues accumulated over 20 years when evaluated with no release mortality for undersized fish. When NPV > 0 the commercial sector is expected to realize a net gain in revenues from the minimum size limit. However, when NPV < 0 the commercial sector is expected to suffer a net loss in revenues. Column 5 expresses the estimated net gains or losses as a percentage of the present value of revenues under the status quo (without the minimum size limit) as a means of assessing relative change over the full 20 year study period. Column 5 is calculated as the ratio of columns 3 and 4. Columns 6-11 present results for release mortalities of 10%, 25% and 40%.

Figures 1-15 illustrate the predicted changes in commercial revenues and commercial and recreational landings for each species as a percentage of each year's situation without the minimum size limit. These figures present percentage changes for each year whereas tables 1-3 give results accumulated over all 20 years. Each figure illustrates predicted changes for the proposed minimum size limits in the upper center or upper left hand corner. Other

graphs on the same page illustrate the effects of alternative size limits for purposes of comparison with the proposed size limit.

White Grunt

Given the model's assumptions, the current proposal for a 12 inch minimum size limit for white grunt would initially reduce commercial landings by approximately 40% (Fig. 1) and revenues by 25% (Fig. 2). Over time, growth in weight of young fish would cause landings and revenues to increase, although in some cases neither were predicted to recover to their expected levels without a minimum size limit (Fig. 1-2). The expected change in the net present value of commercial revenues was positive for only the most favorable of situations--a 100% survival rate for released fish and low discount rates (Table 1).

The simulated outcomes for white grunt become more favorable with smaller hypothesized minimum size limits, primarily because of the correspondingly smaller initial losses in landings and revenues and because of the shorter time during which fish are subjected to catch-and-release mortality. Given the model's assumptions, the 11 inch size limit would increase the net present value of commercial revenues for release mortalities of 10% or less with all discount rates considered (Table 1). Only the 10 inch size limit would increase net present value for nearly all situations evaluated here (Table 1). Net present value ranged from a 5.3% increase over a 20 year period, assuming a 10 inch size limit, 100% survival rate for

released fish and no discounting, to -34.2% with a 14 inch size limit, 60% survival rate and a 10% discount rate (Table 1).

Changes in recreational catches were also predicted, although changes in recreational benefits could not be calculated. Given the assumptions of the model, recreational catches in terms of pounds landed and numbers of fish kept would be smaller with the proposed 12 inch minimum size limit than without it for all simulated years. Pounds of recreationally caught fish would initially decline by approximately 50% (Fig. 3) while numbers of fish kept would decline by 75% (Fig. 4). Over time, both measures of recreational catches would remain (sometimes substantially) below levels predicted without the minimum size limit, regardless of the survival rate for released fish (Fig. 3-4). Smaller size limits would reduce but not eliminate both the initial and long-term losses in pounds and numbers of fish kept by recreational fishermen (Fig. 3-4). However, because minimum size limits would require fishermen to release undersized fish, it is likely that the total number of fish caught would increase, including fish that were released and caught more than once (Fig. 5). Smaller size limits are associated with smaller potential increases in numbers of fish caught recreationally (Fig. 5) because fewer fish would be released and available for recapture.

Mutton Snapper

Despite the large potential sizes of mutton snapper, the simulation model suggested that the proposed 20 inch minimum size limit would not be beneficial to commercial fishermen regardless of the release mortalities or discount rates considered (Table 2). Given the model's assumptions, a 20 inch size limit would initially reduce commercial landings by over 30% (Fig. 6) and revenues by over 20% (Fig. 7). In the long-term, commercial landings and revenues would increase only in cases with release mortalities of 10% or less (Fig. 6-7). The net present value of commercial revenues over 20 years would decline by from 3.2% with no release mortality or discount rate to 13.8% with 40% release mortality and 10% discount rate (Table 2). Pounds and numbers of mutton snapper kept by recreational fishermen would also decline substantially and permanently (Fig. 8-9), although numbers of fish caught would increase, including fish that might be caught more than once (Fig. 10).

As was the case with white grunt, the simulated outcomes for mutton snapper become more favorable with smaller hypothesized minimum size limits. Given the model's assumptions, an 18 inch size limit would increase the net present value of commercial revenues only in the most favorable circumstances--no release mortality and no discount rate (Table 2). Conversely, a 14 inch size limit would increase the present value of commercial revenues in all but the most unfavorable circumstances considered here--40% release mortality and 10% discount rate (Table 2). The outcomes

for a 16 inch size limit depended on the particular release mortality and discount rate assumed in each simulation, with one-half of the simulations yielding overall increases in the net present value of commercial revenues and one-half yielding decreases (Table 2). Better enforcement of the current 12 inch minimum size limit would yield only small increases in the net present value of commercial revenues, apparently because fishermen catch few mutton snapper smaller than 12 inches (Table 2).

Smaller minimum size limits would reduce short-term losses in pounds and numbers of mutton snapper kept by recreational fishermen (Fig. 8-9) because fewer fish would be protected by the size limit. And in some cases, smaller size limits would lead to long-term increases in pounds kept, in contrast to the situation with the proposed 20 inch size limit (Fig. 8).

Gray Triggerfish

The predicted effects of the proposed (12 inch) minimum size limit for gray triggerfish were more favorable than they were for white grunt and mutton snapper. Commercial landings and revenues for gray triggerfish were predicted to decline only for the first 3-4 years with the proposed minimum size limit, and then were predicted to exceed levels expected without the size limit, with the magnitude of the long-term increases dependent on the survival rates for released fish (Fig. 11-12). Given the model's assumptions, the net present value of commercial revenues with a 12 inch size limit was predicted to increase for all release

mortalities and discount rates considered, with the increase ranging from 4.8% over a 20 year time period with 100% survival of released fish and no discounting to 0.4% with a 60% survival rate and a 10% discount rate (Table 3). Larger 13 and 14 inch minimum size limits were predicted to yield both larger initial losses and long-term gains in commercial landings and revenues when compared with the proposed 12 inch size limit (Fig. 11-12). The present value of commercial revenues was predicted to increase for nearly all size limits and discount rates considered with release mortalities of 25% or less (Table 3).

The proposed minimum size limit would affect the catches of recreational fishermen relatively more than it would commercial fishermen because recreational fishermen catch relatively more fish at younger ages and smaller sizes. Pounds of gray triggerfish caught and kept by recreational fishermen were predicted to decline initially by approximately 15% and to increase marginally in the long-term only with release mortalities of 10% or less (Fig. 13), whereas commercial landings were predicted to eventually increase with all release mortalities considered (Fig. 11). The larger 13 and 14 inch size limits were predicted to generate larger short-term losses and smaller long-term gains in pounds kept by recreational fishermen when compared with the proposed 12 inch size limit (Fig. 11, 13). However, larger size limits were predicted to increase both short-term losses and long-term gains in commercial landings (Fig. 11). Hence, the proposed minimum size limit was predicted to redistribute catches from recreational to commercial

fishermen. Similar redistributive effects of the proposed size limit for white grunt and mutton snapper were also evident. As was the case with the other species, the numbers of gray triggerfish kept by recreational fishermen were predicted to decline permanently over time (Fig. 14), although the numbers of fish caught recreationally, including released fish that could be caught more than once, were predicted to increase over time (Fig. 15).

Summary and Discussion

The finding that the proposed minimum size limit for gray triggerfish generated more favorable outcomes than did the proposed size limits for white grunt and mutton snapper was a consequence of the growth and mortality rates for each species. First, gray triggerfish are shorter lived and faster growing than white grunt and mutton snapper. Hence, the percentage rate of growth in weight at the proposed minimum size limit was greater for gray triggerfish than for the other species. In addition, gray triggerfish also experience lower natural mortality rates than white grunt (Huntsman et al. 1992) and approximately the same natural mortality rate as mutton snapper (Huntsman et al. 1993). Therefore, minimum size limits for gray triggerfish are more likely to generate increases in overall yield than the other species because growth in weight would accumulate quickly and before significant losses in population numbers due to natural mortality. Second, Huntsman et al. (1992) found higher fishing mortality rates for adult gray triggerfish than for adult white grunt (Huntsman et al. 1992) and

adult mutton snapper (Huntsman et al. 1993). Therefore, the potential gains in fishery yield from postponing the harvest of young fish are more likely to be realized for gray triggerfish than for the other species.

In general, smaller minimum size limits yielded more favorable changes in the net present values of commercial revenues than did larger size limits (Tables 1-3). In the cases evaluated here where recruitment was assumed constant and ex-vessel prices did not vary by size of fish, the economic outcome for net present value was determined largely by the natural rate of change over time in fish biomass due to a minimum size limit. For a given survival rate for released fish, the magnitude of a minimum size limit and the resultant net present value of changes in commercial revenues were inversely related because the proportional rate of growth in weight per fish declines as fish mature. Consequently, small size limits, which protect only smaller, faster growing fish, usually produce relatively high net present values, whereas larger size limits protect additional older fish with lower growth rates. Hence, the average growth rate of all protected fish and the resultant net present value were smaller with larger minimum size limits.

Tables 1-3 also illustrate that for a given species net present value is always greater when a minimum size limit is evaluated with higher rather than lower survival rates for undersized fish that are released. Minimum size limits require fishermen to release undersized fish that are caught. The higher the survival rate for these fish, the greater will be the expected

long-term gains in both landings and revenues. Undersized fish that die when released do not contribute economically to revenues in either the short-term or long-term. In addition, they do not contribute to the biological goal of a larger spawning population.

Since larger size limits also tend to yield larger spawning potential ratios, it appears that the economic and biological criteria for the success or failure of a size limit policy conflict, at least for commercial fishermen. That is, larger minimum size limits offer greater levels of biological protection at the cost of lower, and perhaps negative, net present values of changes in commercial revenues. The direction of change in recreational benefits is unknown. On the one hand, it is assumed that fishermen would be worse off with a minimum size limit when they release fish that they otherwise would have kept. On the other hand, catch-and-release fishing would add to the total number of fish caught and would increase catches of larger fish. Recreational benefits could increase if the value of extra and heavier fish caught exceeded the loss in value of fish kept, but recreational demand functions have not been estimated with which to evaluate this hypothesis. Additional information about the demand for recreational fishing trips needs to be developed before the effects of minimum size limits on both the recreational and commercial fisheries can be evaluated.

Finally, the need to compare short-term losses with potential long-term gains in the value of catches creates a problem because the future is difficult to predict. Biological and environmental

conditions, fishery regulations, and local and national economic conditions all change over time and if there is no precise way to predict such changes the forecasts of future regulatory effects will be less reliable as the time frame of analysis is extended. Although the net present value criterion is not intended to account for uncertainty, the process of discounting tends to give the least weight to the more distant future when predictions are most uncertain. Nevertheless, the reader is cautioned that the analyses presented here represent outcomes given specific assumptions about the future--constant recruitment, constant fishing and natural mortality coefficients, and constant real prices (i.e., prices adjusted to eliminate the effects of inflation). Therefore, the analyses are illustrative rather than definitive because the future is difficult to predict accurately.

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Appendix. Notes on Simulation Model

1. The bioeconomic simulation model accounts for changes over time in the numbers of fish in each age class. Let the elements, $N_{i,t}$, of the following matrix represent numbers of fish in each of i=0,1,2,..,I age classes at the beginning of years t=1,2,...,20. Rows denote age classes while columns denote years.

$$\begin{bmatrix} N_{0,1} & N_{0,2} & N_{0,3} & - & N_{0,20} \\ N_{1,1} & N_{1,2} & N_{1,3} & - & N_{1,20} \\ N_{2,1} & N_{2,2} & N_{2,3} & - & N_{2,20} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ N_{I,1} & N_{I,2} & N_{I,3} & - & N_{I,20} \end{bmatrix}$$

2. The initial numbers of fish in age class (i.e., elements in the first column of the matrix) were obtained from biological stock assessments (Huntsman et al. 1992, Huntsman et al. 1993).

3. Recruitment to the youngest age class (i.e., the elements of the first row of the matrix) is assumed constant over time.

$$N_{0,t+1} = N_{0,t}$$

4. For fish older than the age corresponding to the minimum size limit, A_{msl}, the number of survivors to age class i+1 at the beginning of year t+1 was defined as

$$N_{i+1,t+1} = N_{i,t} \exp[-(M+F_i)(A_{i+1,t+1}-A_{i,t})]$$

where $N_{i,t}$ denotes population numbers of fish in age class i at the beginning of year t, $N_{i+1,t+1}$ denotes the number of survivors to age class i+1 at the beginning of year t+1, $A_{i,t}$ and $A_{i+1,t+1}$ represent their chronological ages, and M and F_i denote natural and fishing mortality coefficients.

5. For fish younger than the age corresponding to the minimum size limit, the number of survivors to age class i+1 at the beginning of year t+1 was defined as

$$N_{i+1,t+1} = N_{i,t} \exp[-(M + F_i P_r P_d)(A_{i+1,t+1}-A_{i,t})]$$

where P_r denotes the probability that undersized fish are released and P_d denotes the probability that fish die when released.

6. An additional adjustment was made whenever A_{ms} fell between birthdays $A_{i,t}$ and $A_{i+1,t+1}$.

$$N_{i+1,t+1} = N_{i,t} \exp[-(M + F_i P_r P_d)(A_{ms}-A_{i,t}) - (M + F_i)(A_{i+1,t+1}-A_{ms})]$$

7. Three measures of catch were calculated: numbers of fish caught (including fish caught and released), YC_t, numbers of fish caught and kept, YK_t, and weight of fish kept, Q_t. Numbers of fish caught differed from numbers of fish kept because fishermen were assumed to fully comply with the minimum size limit by releasing all undersized fish that were

caught (P_r=1). Hence, there would be no illegal fishing mortality.

$$YC_t = \sum_{\text{sublegal ages}} N_{i,t} \frac{F_i}{(M + F_i P_r P_d)} (1-\exp[-(M+F_i P_r P_d)(A_{i+1,t}-A_{i,t})]) + \sum_{\text{legal ages}} N_{i,t} \frac{F_i}{(M + F_i)} (1-\exp[-(M+F_i)(A_{i+1,t}-A_{i,t})])$$

$$YK_t = \sum_{\text{legal ages}} N_{i,t} \frac{F_i}{(M + F_i)} (1-\exp[-(M+F_i)(A_{i+1,t}-A_{i,t})])$$

$$Q_t = \sum_{\text{legal ages}} F_i W_\infty N_{i,t} \sum_{j=0}^{3} \frac{G(j) \exp[-jK(A_{i,t}-t_o)]}{(M + F_i + jK)} (1-\exp[-(M+F_i+jK)(A_{i+1,t}-A_{i,t})])$$

where G(0)=1, G(1)=-3, G(2)=3, G(3)=-1, and W_∞, K and t_o are parameters from the von Bertalanffy growth-in-weight equation.

$$W_i = W_\infty (1-\exp[-K(i-t_o)])^b$$

This method of calculating weight landed was based on the Beverton and Holt yield-per-recruit equation so as to simplify the process of verifying the computational accuracy of the simulation model.

8. Net present value, NPV, was calculated as the difference between present values to be received with and without the minimum size limit to be evaluated.

$$NPV = \sum_{t=1}^{T} \Delta B_t (1+d)^{-t}$$

The notation, ΔB_t, refers to the difference between the commercial revenues that are expected to be received in year t with and without the minimum size limit. Time t=0 refers to the year in which the regulatory decision is to be made. Times t=1,2, ... T refer to the number of years in the future when revenues would be either lost or gained as a result of the size limit. Variable d denotes the discount rate.

Table 1. White Grunt

Net Present Value (NPV) of Changes in Commercial Revenues Associated with Alternative Minimum Size Limits (MSL)

10 Percent Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
10" TL	20 yrs	$1961.3	$74.3	3.8%	$55.1	2.8%	$26.9	1.4%	$-0.8	-0.04%
11"	20	1961.3	57.1	2.9	22.3	1.1	-28.4	-1.4	-77.4	-3.9
12"	20	1961.3	-48.3	-2.5	-99.8	-5.1	-173.6	-8.9	-243.5	-12.4
13"	20	1961.3	-187.1	-9.5	-294.0	-13.0	-340.5	-17.0	-436.2	-22.2
14"	20	1961.3	-387.7	-19.8	-465.2	-23.7	-572.7	-29.2	-670.5	-34.2

4 Percent Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
10" TL	20 yrs	$3141.7	$148.9	4.7%	$115.1	3.7%	$65.3	2.1%	$16.8	0.5%
11"	20	3141.7	143.1	4.6	81.0	2.6	-7.5	-0.2	-93.0	-3.0
12"	20	3141.7	4.3	0.1	-97.3	-2.8	-210.8	-7.0	-343.4	-10.9
13"	20	3141.7	-192.8	-6.1	-313.0	-10.0	-483.4	-15.4	-639.8	-20.4
14"	20	3141.7	-491.1	-15.6	-632.1	-20.1	-827.4	-26.3	-1004.9	-32.0

No Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
10" TL	20 yrs	$4633.4	$247.4	5.3%	$194.8	4.2%	$117.1	2.5%	$41.0	0.9%
11"	20	4633.4	259.0	5.6	163.6	3.5	24.4	0.5	-110.0	-2.4
12"	20	4633.4	82.7	1.8	-61.1	-1.3	-267.3	-5.8	-462.8	-10.0
13"	20	4633.4	-183.9	-4.0	-373.2	-8.1	-640.2	-13.8	-888.1	-19.2
14"	20	4633.4	-600.9	-13.0	-824.9	-17.8	-1134.8	-24.5	-1416.4	-30.6

Table 2. Mutton Snapper

Net Present Value (NPV) of Changes in Commercial Revenues Associated with Alternative Minimum Size Limits (MSL)

10 Percent Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
12" TL	20 yrs	$5473.4	$34.7	0.6%	$27.6	0.5%	$16.0	0.3%	$ 6.1	0.1%
14"	20	5473.4	91.7	1.7	67.5	1.2	31.6	0.6	-3.0	-0.1
16"	20	5473.4	35.2	0.6	-10.5	-0.2	-77.7	-1.4	-143.6	-2.6
18"	20	5473.4	-128.7	-2.4	-196.0	-3.6	-296.4	-5.4	-392.9	-7.2
20"	20	5473.4	-409.1	-7.5	-499.1	-9.1	-629.5	-11.5	-756.6	-13.8

4 Percent Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
12" TL	20 yrs	$8740.2	$ 73.0	0.8%	$ 59.8	0.7%	$40.0	0.5%	$20.3	0.2%
14"	20	8740.2	207.0	2.4	162.1	1.9	95.8	1.1	29.8	0.3
16"	20	8740.2	166.1	1.9	81.7	0.9	-42.8	-0.5	-166.8	-1.9
18"	20	8740.2	-39.5	-0.5	-166.3	-1.9	-351.8	-4.0	-531.3	-6.1
20"	20	8740.2	-427.4	-4.9	-596.3	-6.8	-841.1	-9.6	-1079.7	-12.3

No Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
12" TL	20 yrs	$12862.4	$124.9	1.0%	$103.7	0.8%	$ 71.9	0.6%	$40.1	0.3%
14"	20	12862.4	364.6	2.8	292.5	2.3	189.3	1.4	79.4	0.6
16"	20	12862.4	353.2	2.7	217.4	1.7	17.2	0.1	-178.9	-1.4
18"	20	12862.4	105.4	0.8	-90.9	-0.8	-397.7	-3.1	-687.4	-5.3
20"	20	12862.4	-406.3	-3.2	-679.9	-5.3	-1076.3	-8.4	-1456.3	-11.3

Table 3. Gray Triggerfish
Net Present Value (NPV) of Changes in Commercial Revenues Associated with Alternative Minimum Size Limits (MSL)

10 Percent Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
12" FL	20	$2030.9	$74.2	3.7%	$57.3	2.8%	$32.3	1.6%	$7.7	0.4%
13"	20	2030.9	104.3	5.1	69.0	3.4	17.3	0.9	-32.8	-1.6
14"	20	2030.9	115.7	5.7	57.6	2.8	-25.9	-1.3	-105.3	-5.2

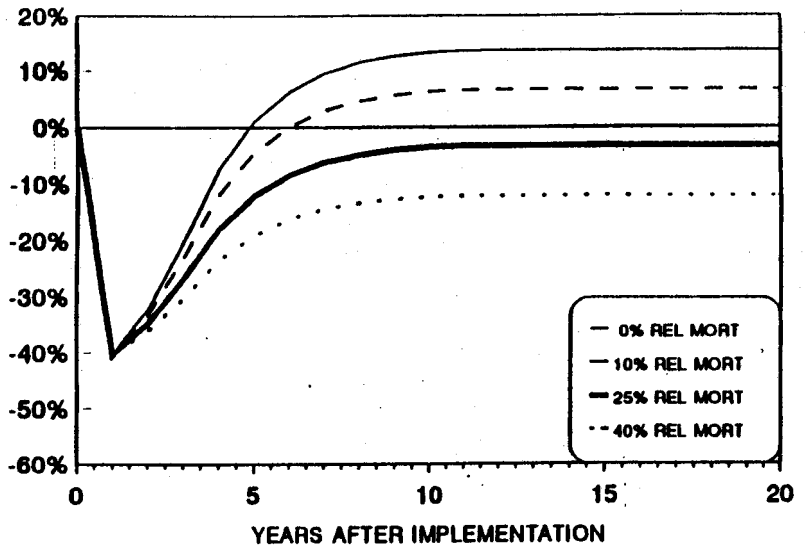
4 Percent Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
12" FL	20	$3241.7	$141.4	4.4%	$112.0	3.5%	$68.5	2.1%	$25.8	0.8%
13"	20	3241.7	206.3	6.4	145.5	4.5	56.6	1.7	-29.6	-0.9
14"	20	3241.7	250.5	7.7	150.2	4.6	5.9	0.2	-131.2	-4.0

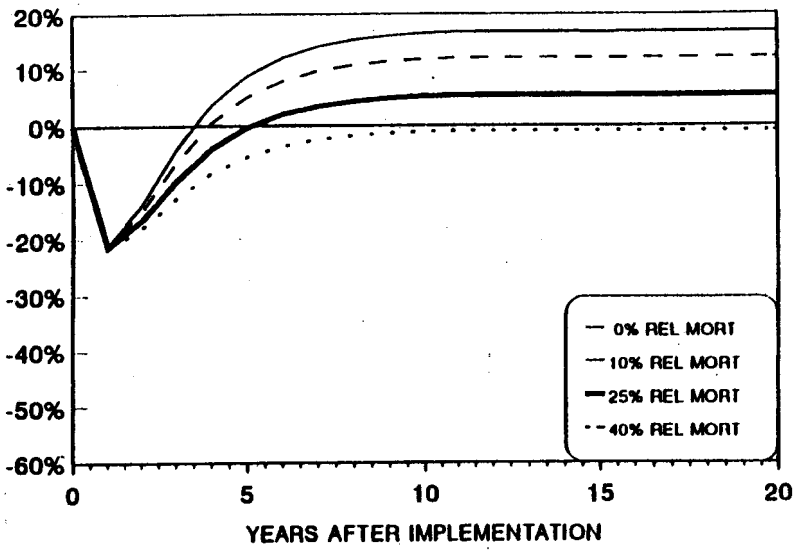
No Discount Rate

Minimum Size Limit	Study Period	Present Value of Revenues without MSL ($1000)	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL	NPV of Change in Revenues with MSL ($1000)	Percentage of Revenues without MSL
			(No Release Mortality)		(10% Release Mortality)		(25% Release Mortality)		(40% Release Mortality)	
12" FL	20	$4770.3	$228.8	4.8%	$183.4	3.8%	$116.2	2.4%	$50.1	1.1%
13"	20	4770.3	339.3	7.1	245.9	5.2	109.4	2.3	-22.9	-0.5
14"	20	4770.3	427.8	9.0	273.3	5.7	51.2	1.1	-159.9	-3.4

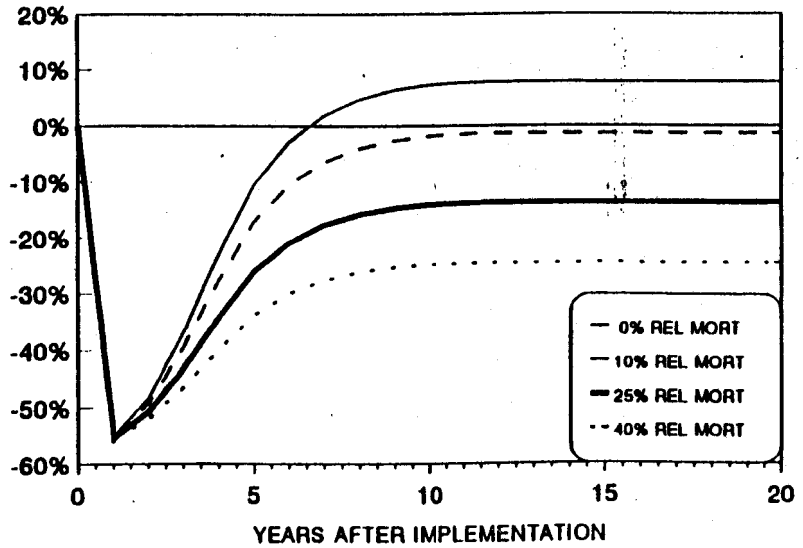
FIG. 1. EXPECTED PERCENTAGE CHANGES IN COMMERCIAL LANDINGS OF WHITE GRUNT WITH A 12 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL LANDINGS OF WHITE GRUNT WITH AN 11 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL LANDINGS OF WHITE GRUNT WITH A 13 INCH TL MINIMUM SIZE LIMIT



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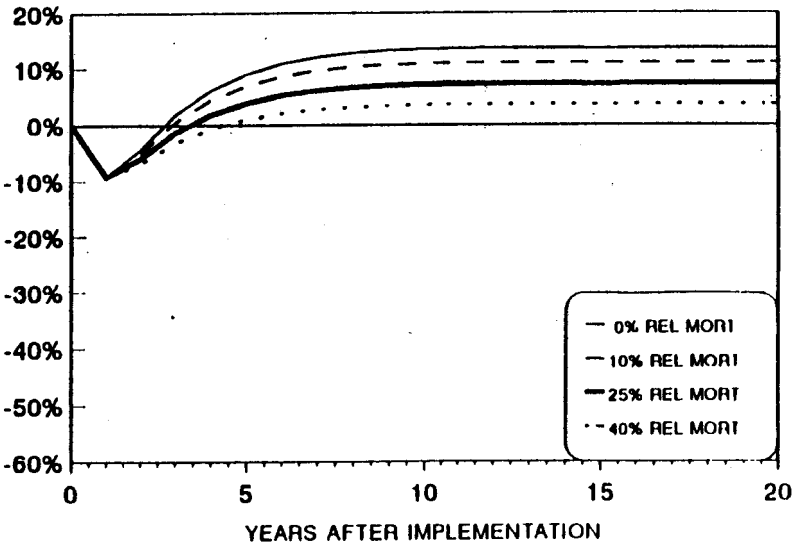
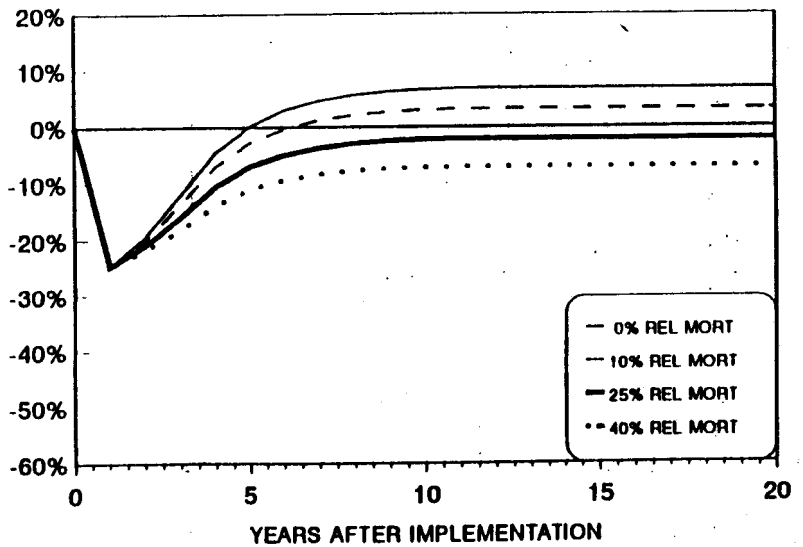
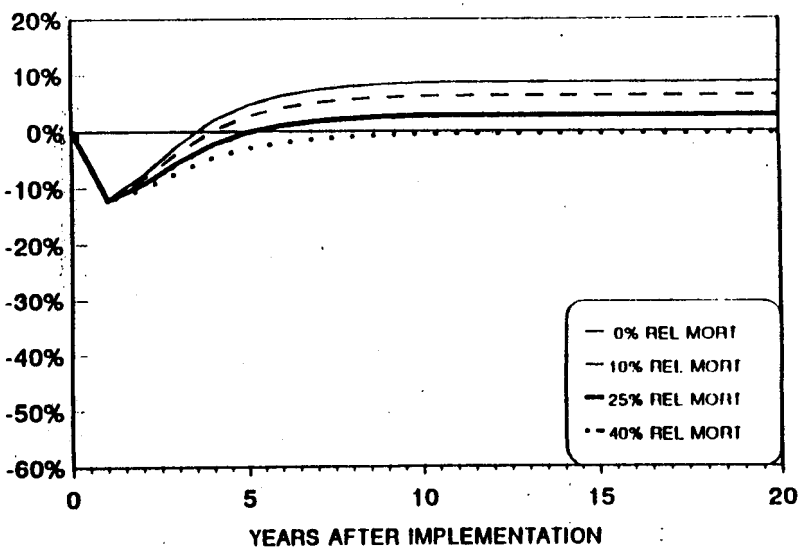


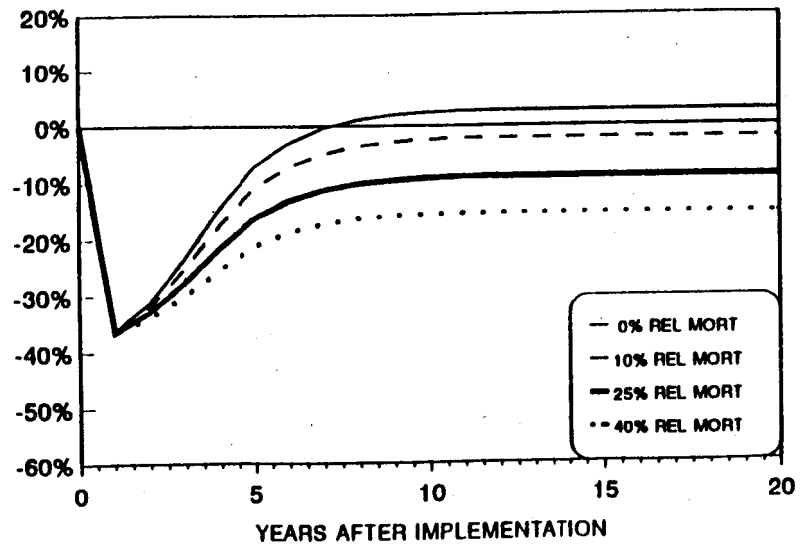
FIG. 2. EXPECTED PERCENTAGE CHANGES IN COMMERCIAL REVENUES FROM WHITE GRUNT WITH A 12 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL REVENUES FROM WHITE GRUNT WITH AN 11 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL REVENUES FROM WHITE GRUNT WITH A 13 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL REVENUES FROM WHITE GRUNT WITH A 10 INCH TL MINIMUM SIZE LIMIT

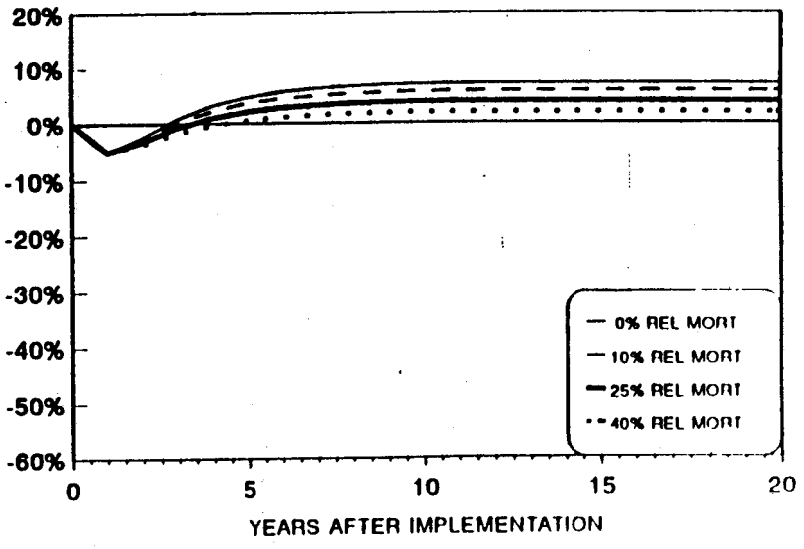
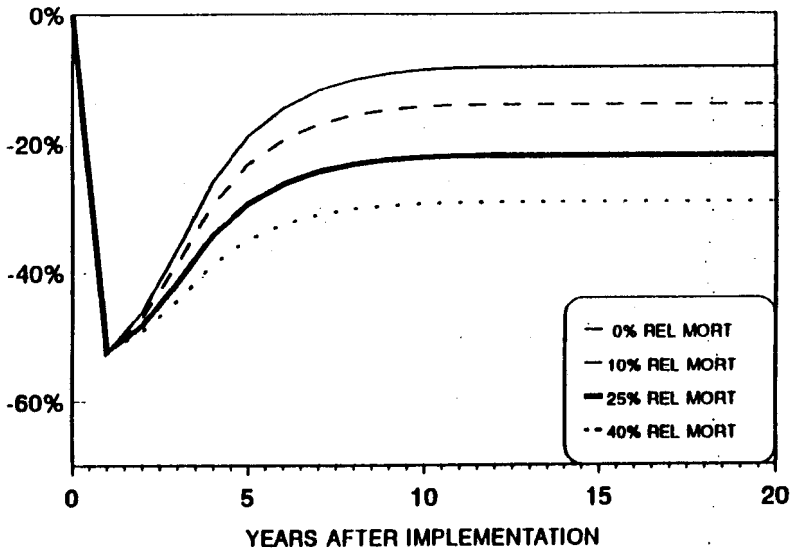
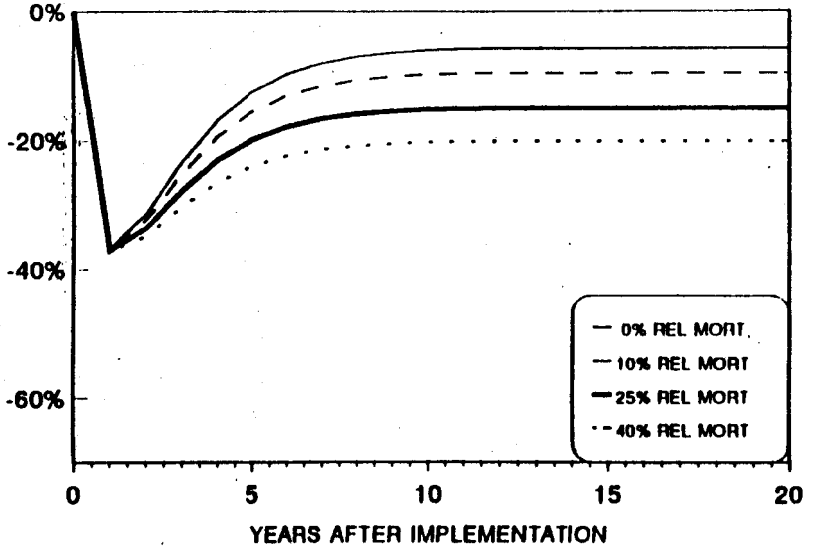


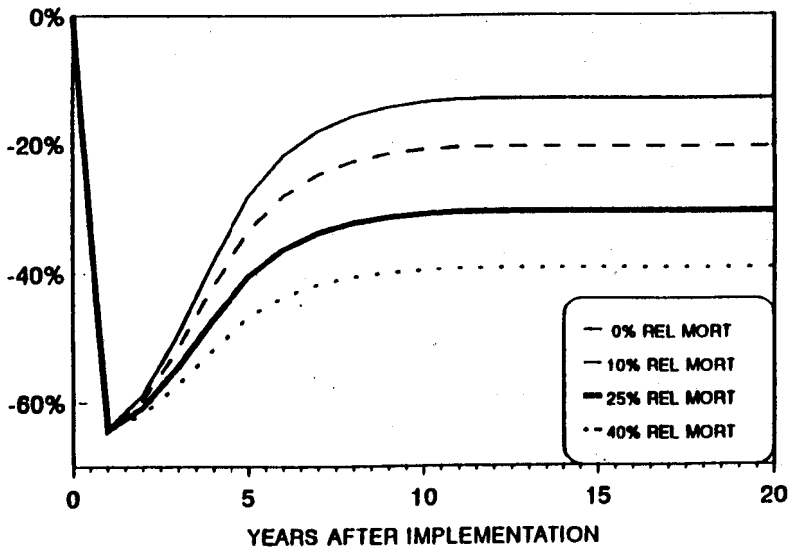
FIG. 3. PERCENTAGE CHANGES IN POUNDS OF RECREATIONALLY CAUGHT WHITE GRUNT WITH A 12 INCH MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN POUNDS OF RECREATIONALLY CAUGHT WHITE GRUNT WITH AN 11 INCH MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN POUNDS OF RECREATIONALLY CAUGHT WHITE GRUNT WITH A 13 INCH MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN POUNDS OF RECREATIONALLY CAUGHT WHITE GRUNT WITH A 10 INCH MINIMUM SIZE LIMIT

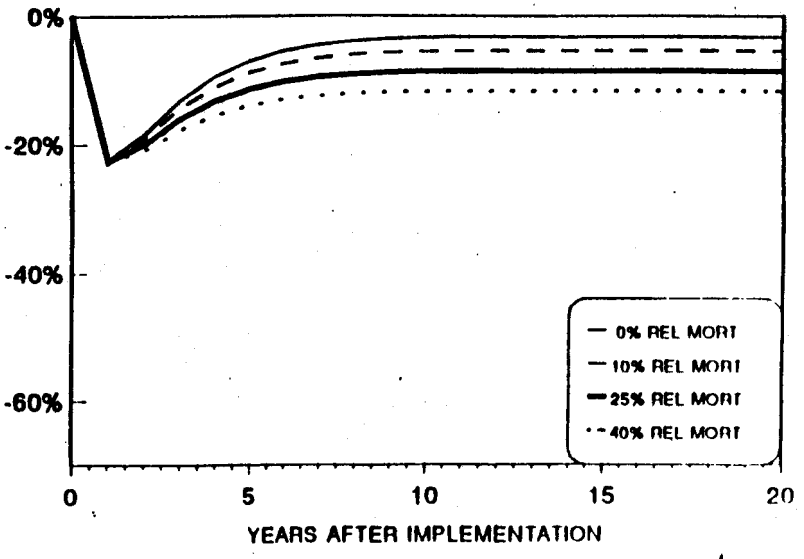
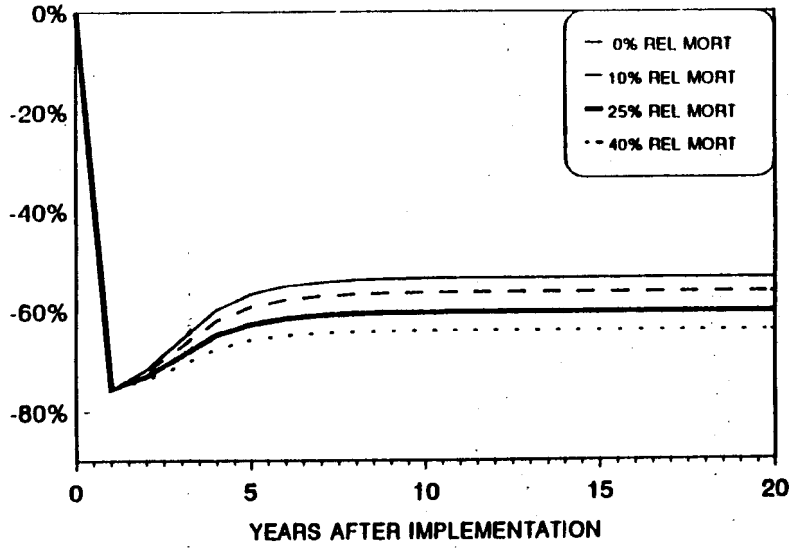
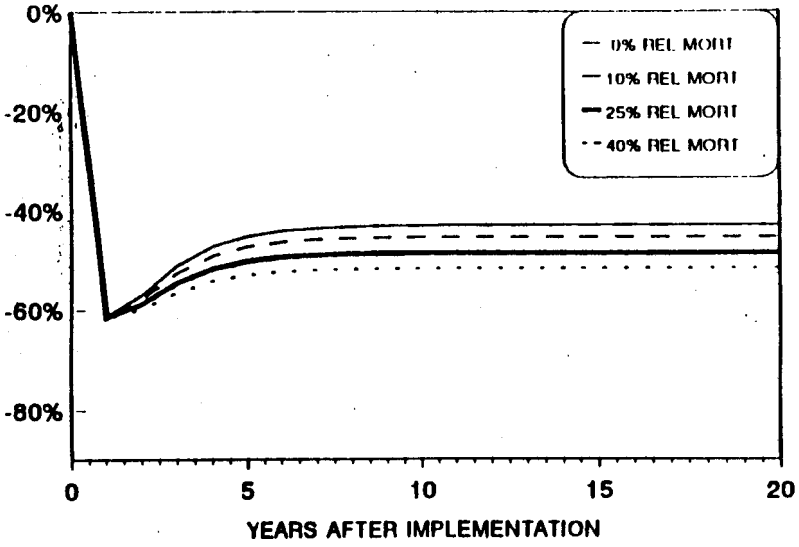


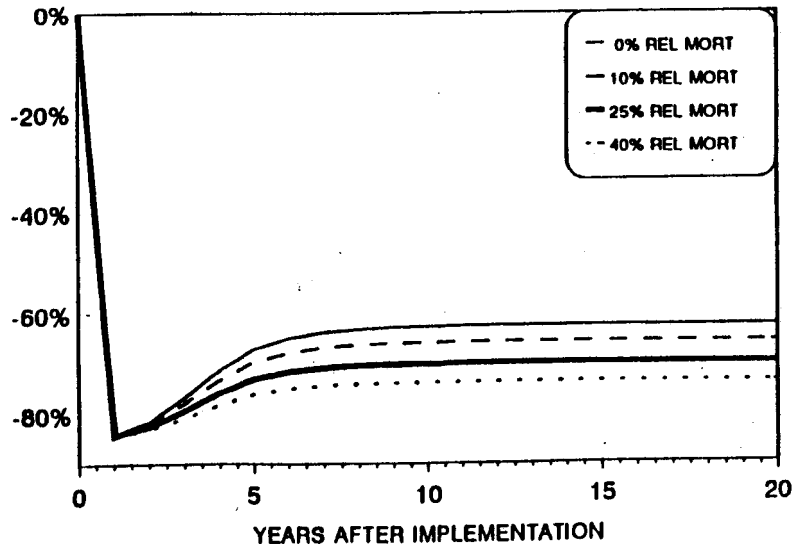
FIG. 4. PERCENTAGE CHANGES IN NUMBERS OF WHITE GRUNT KEPT BY RECREATIONAL FISHERMEN WITH A 12 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF WHITE GRUNT KEPT BY RECREATIONAL FISHERMEN WITH AN 11 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF WHITE GRUNT KEPT BY RECREATIONAL FISHERMEN WITH A 13 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF WHITE GRUNT KEPT BY RECREATIONAL FISHERMEN WITH A 10 INCH TL MINIMUM SIZE LIMIT

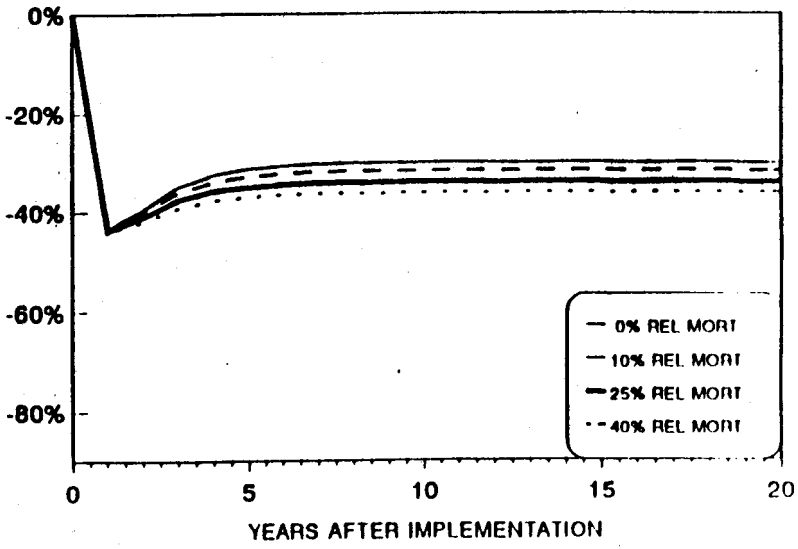
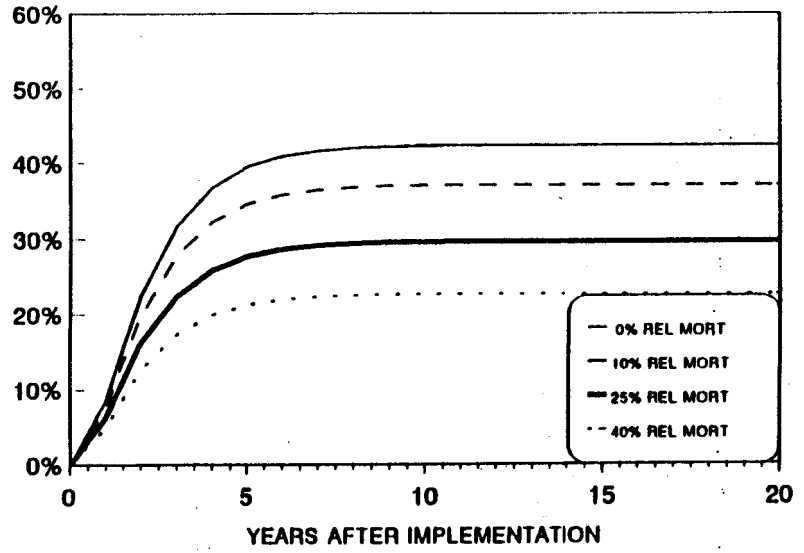
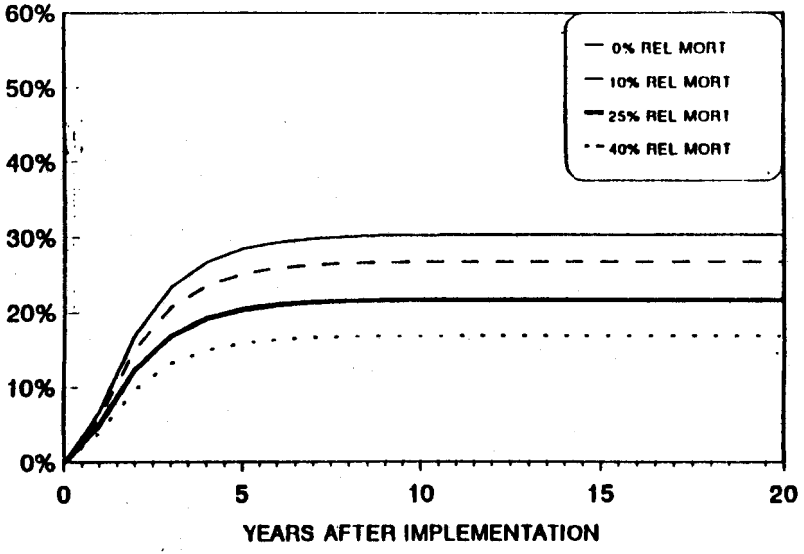


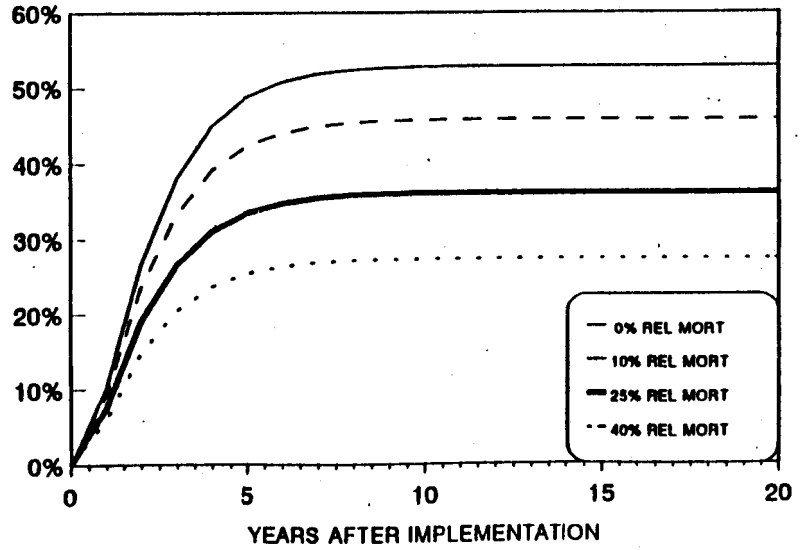
FIG. 5. PERCENTAGE CHANGES IN NUMBERS OF WHITE GRUNT CAUGHT BY RECREATIONAL FISHERMEN WITH A 12 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF WHITE GRUNT CAUGHT BY RECREATIONAL FISHERMEN WITH AN 11 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF WHITE GRUNT CAUGHT BY RECREATIONAL FISHERMEN WITH A 13 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF WHITE GRUNT CAUGHT BY RECREATIONAL FISHERMEN WITH A 10 INCH TL MINIMUM SIZE LIMIT

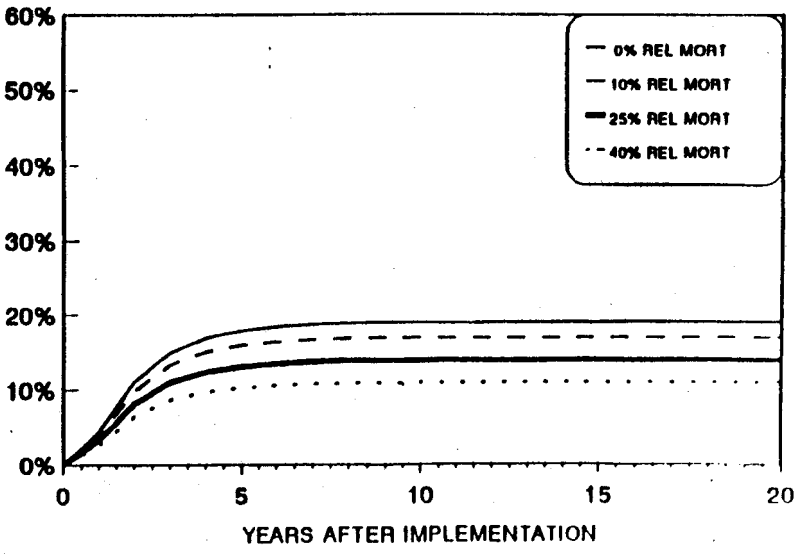
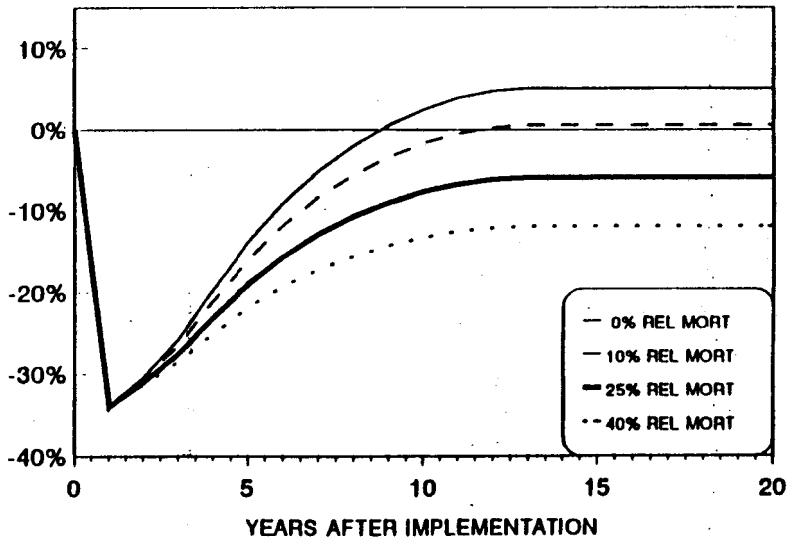
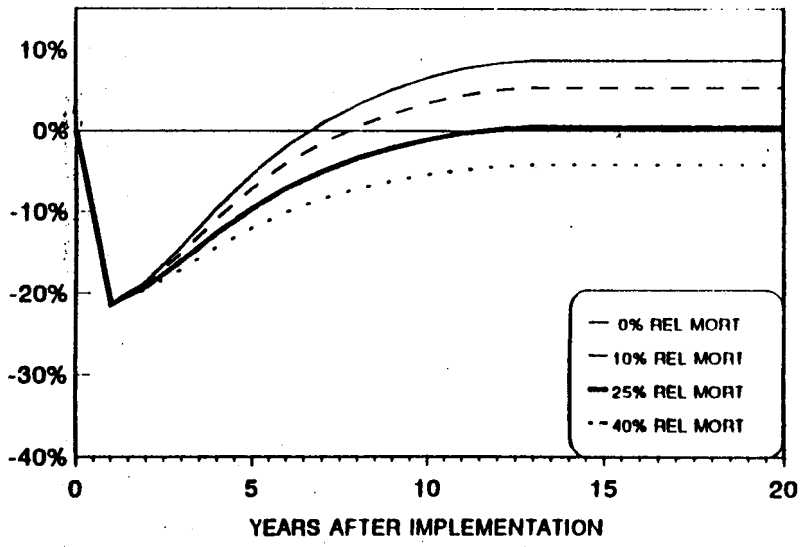


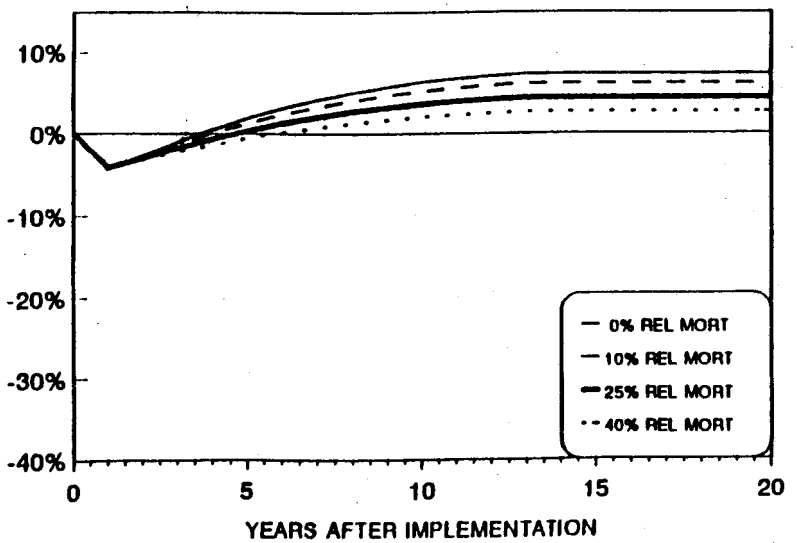
FIG. 6. EXPECTED PERCENTAGE CHANGES IN COMMERCIAL LANDINGS OF MUTTON SNAPPER WITH A 20 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL LANDINGS OF MUTTON SNAPPER WITH AN 18 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL LANDINGS OF MUTTON SNAPPER WITH A 14 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL LANDINGS OF MUTTON SNAPPER WITH A 16 INCH TL MINIMUM SIZE LIMIT

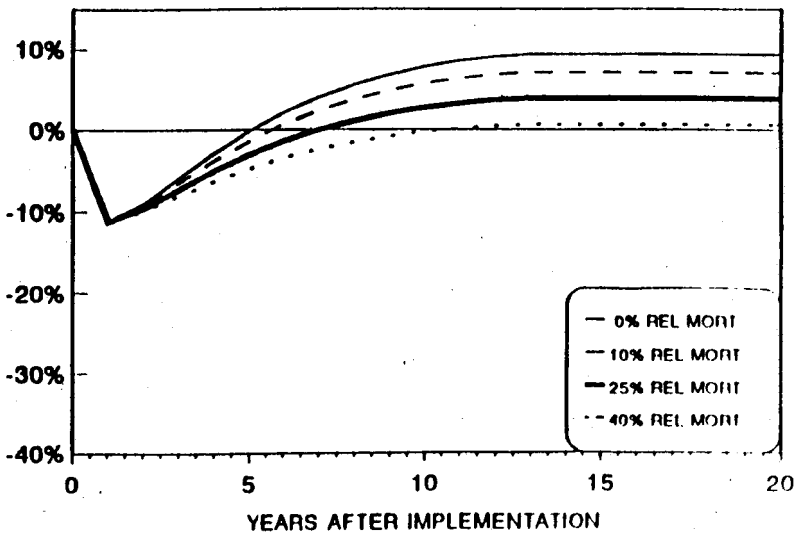
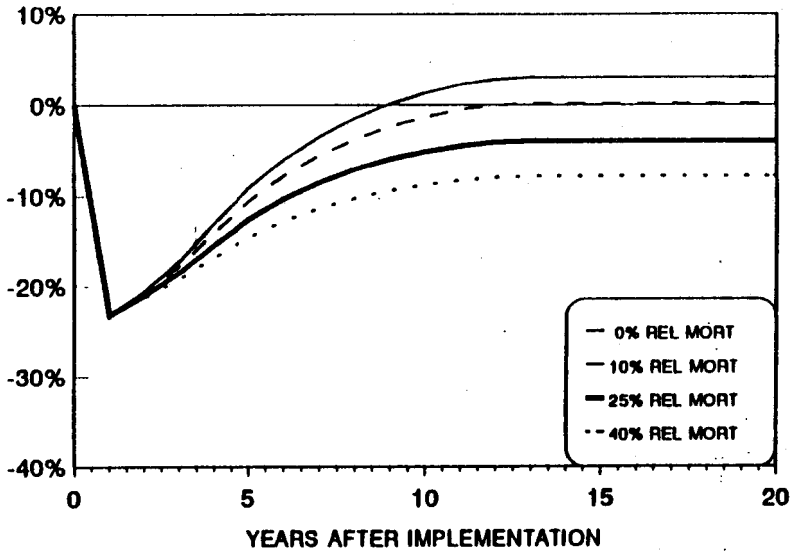
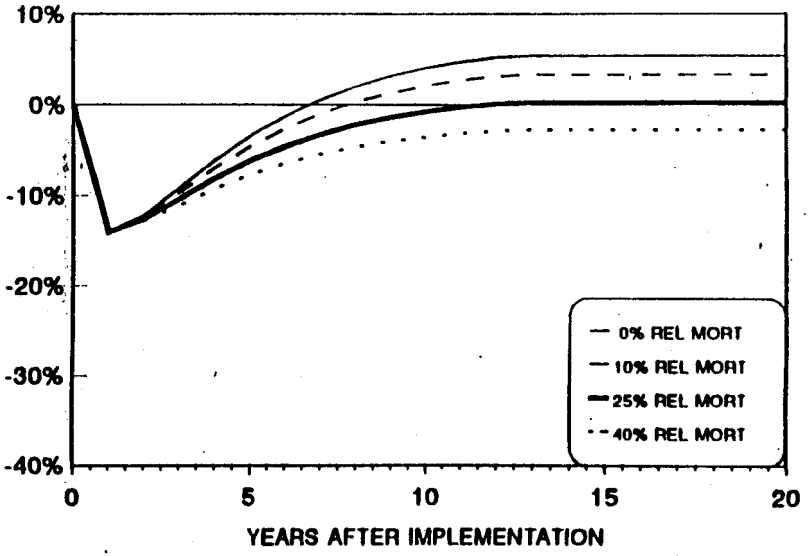


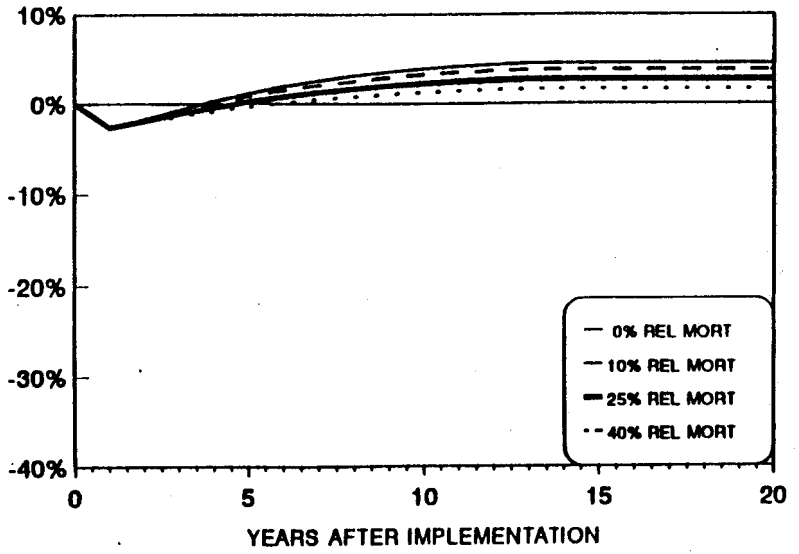
FIG. 7. EXPECTED PERCENTAGE CHANGES IN COMMERCIAL REVENUES FROM MUTTON SNAPPER WITH A 20 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL REVENUES FROM MUTTON SNAPPER WITH AN 18 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL REVENUES FROM MUTTON SNAPPER WITH A 14 INCH TL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES IN COMMERCIAL REVENUES FROM MUTTON SNAPPER WITH A 16 INCH TL MINIMUM SIZE LIMIT

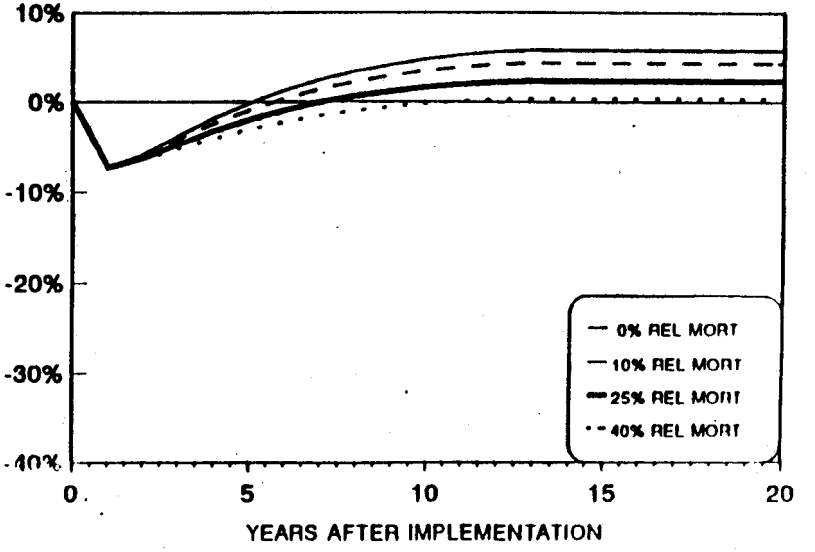
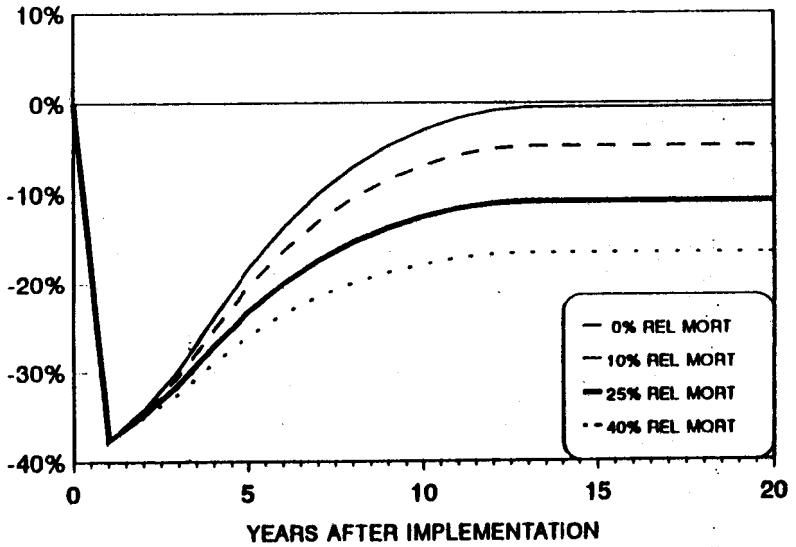
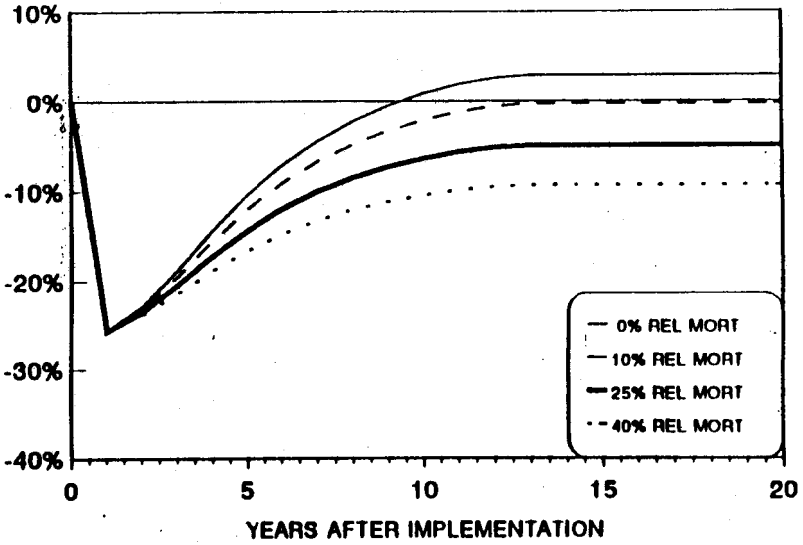


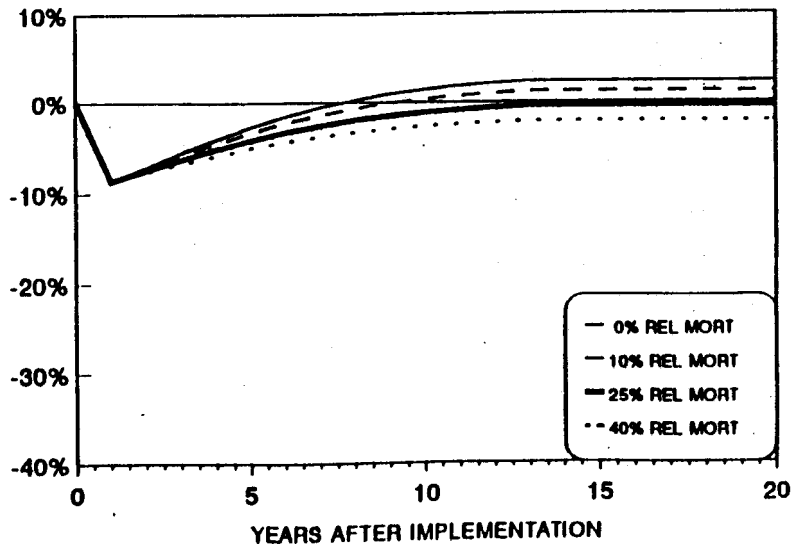
FIG. 8. PERCENTAGE CHANGES IN POUNDS OF RECREATIONALLY CAUGHT MUTTON SNAPPER WITH A 20 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN POUNDS OF RECREATIONALLY CAUGHT MUTTON SNAPPER WITH AN 18 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN POUNDS OF RECREATIONALLY CAUGHT MUTTON SNAPPER WITH A 14 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN POUNDS OF RECREATIONALLY CAUGHT MUTTON SNAPPER WITH A 16 INCH TL MINIMUM SIZE LIMIT

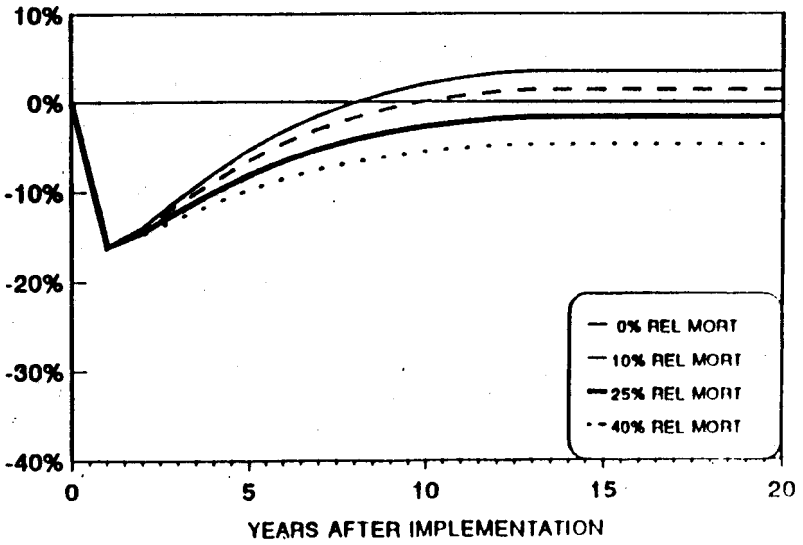
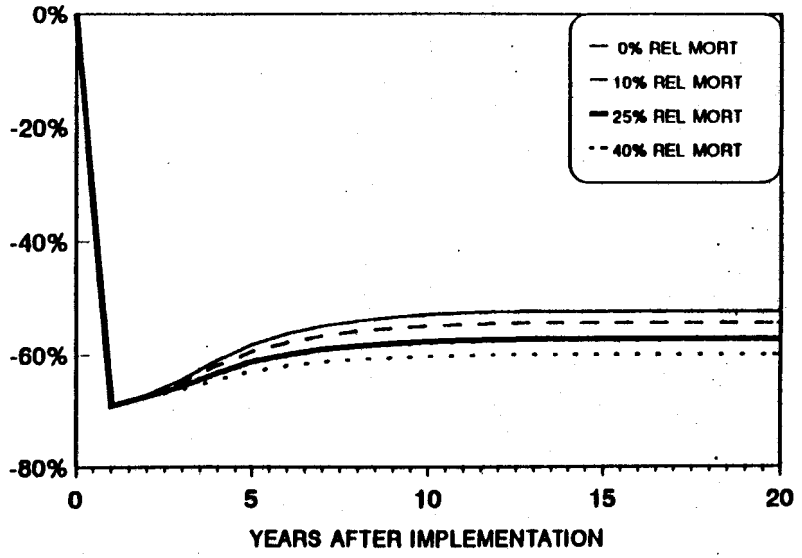
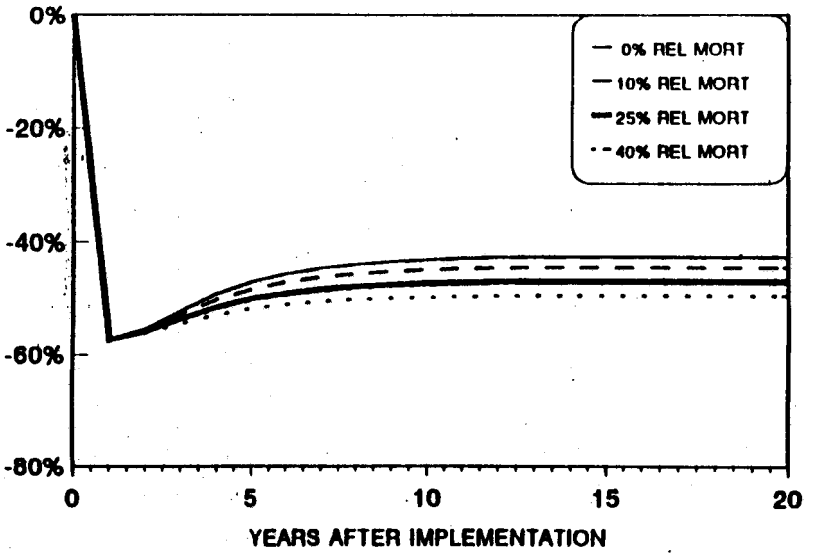


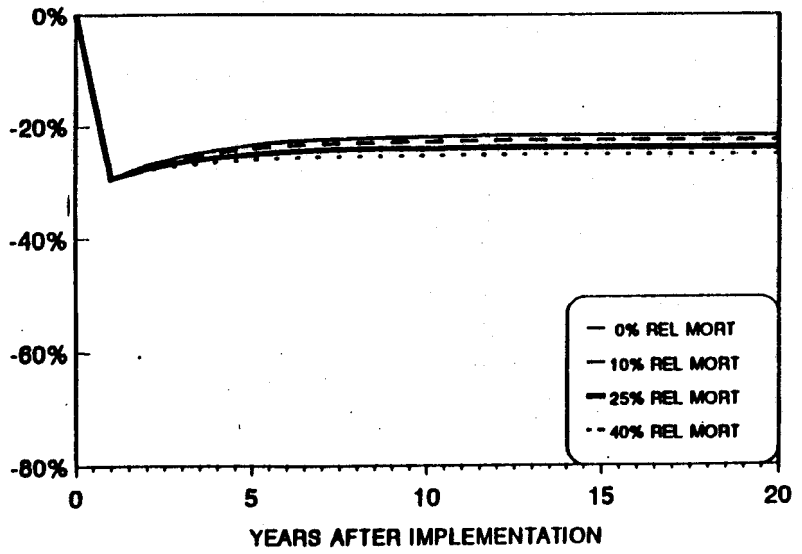
FIG. 9. PERCENTAGE CHANGES IN NUMBERS OF MUTTON SNAPPER KEPT RECREATIONALLY WITH A 20 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF MUTTON SNAPPER KEPT RECREATIONALLY WITH AN 18 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF MUTTON SNAPPER KEPT RECREATIONALLY WITH A 14 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF MUTTON SNAPPER KEPT RECREATIONALLY WITH A 16 INCH TL MINIMUM SIZE LIMIT

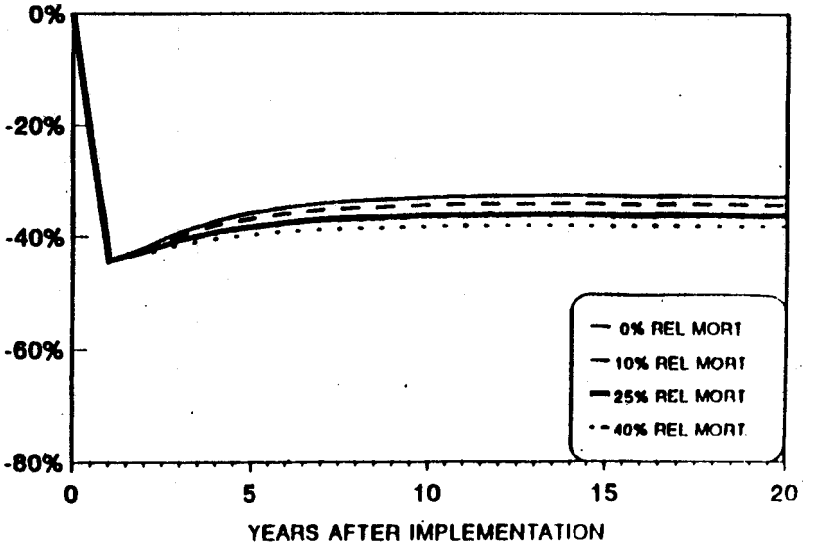
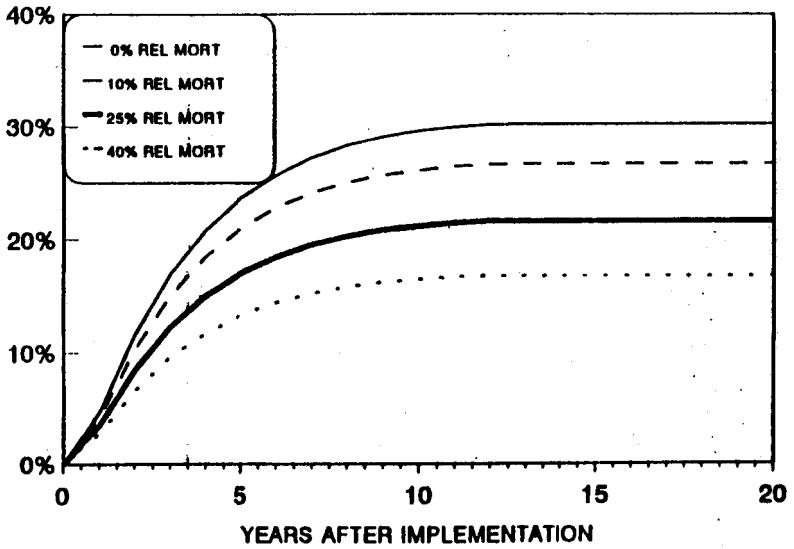
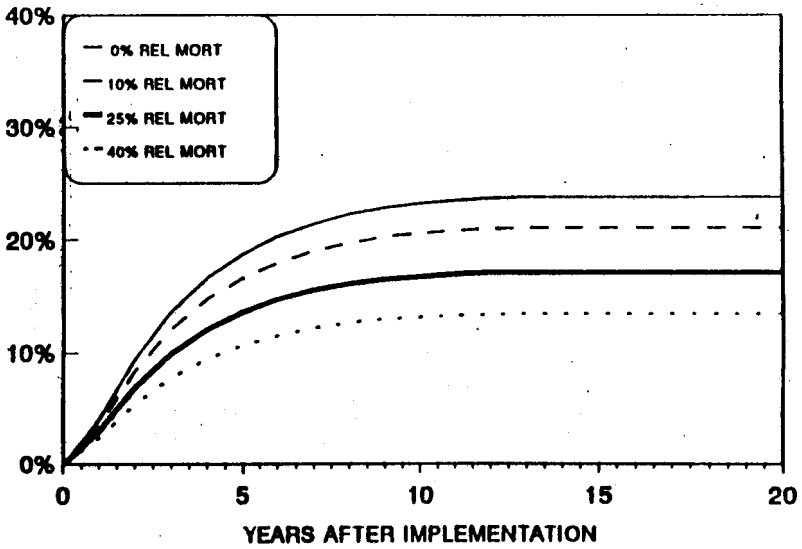


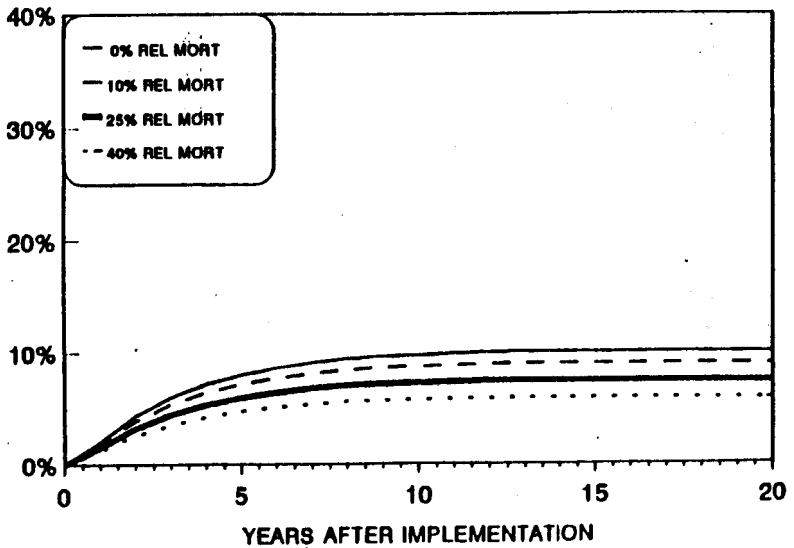
FIG. 10. PERCENTAGE CHANGES IN NUMBERS OF MUTTON SNAPPER CAUGHT RECREATIONALLY WITH A 20 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF MUTTON SNAPPER CAUGHT RECREATIONALLY WITH AN 18 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF MUTTON SNAPPER CAUGHT RECREATIONALLY WITH A 14 INCH TL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF MUTTON SNAPPER CAUGHT RECREATIONALLY WITH A 16 INCH TL MINIMUM SIZE LIMIT

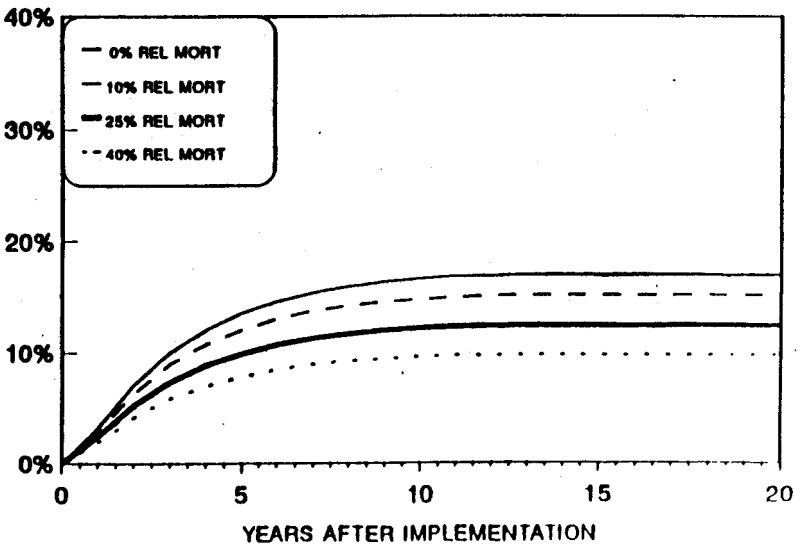
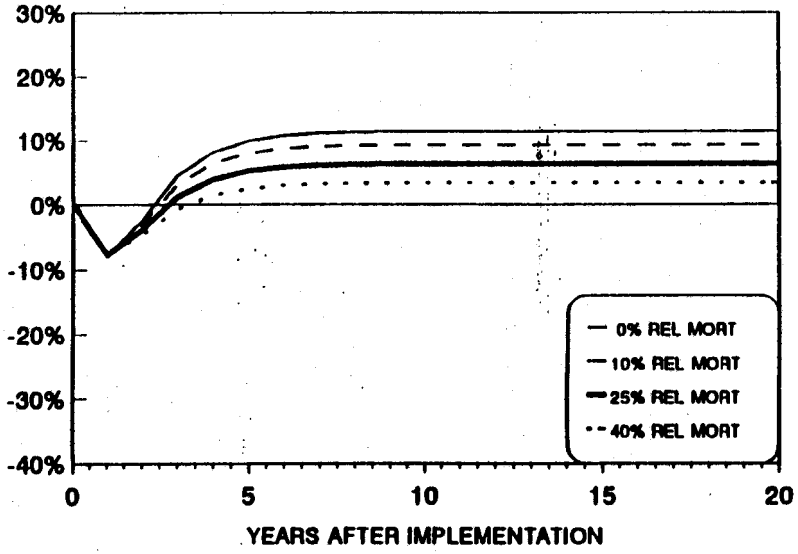
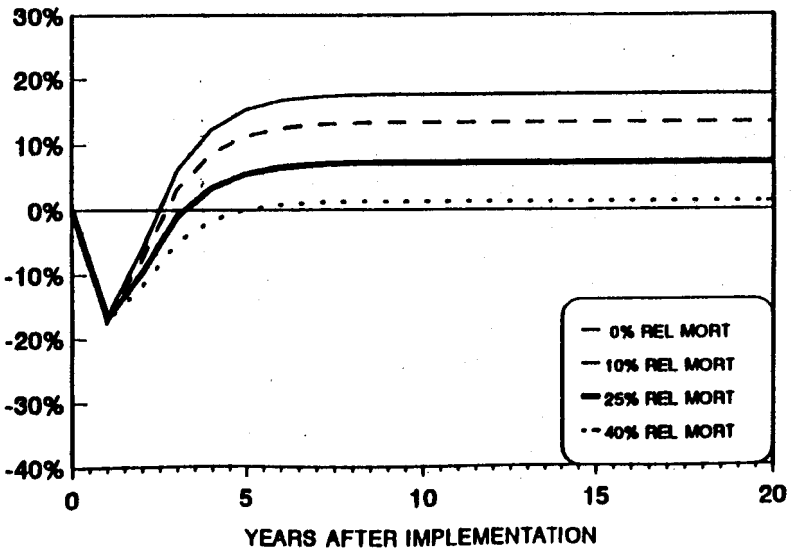


FIG. 11. EXPECTED PERCENTAGE CHANGES
IN COMMERCIAL LANDINGS OF GRAY TRIGGERFISH
WITH A 12 INCH FL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES
IN COMMERCIAL LANDINGS OF GRAY TRIGGERFISH
WITH A 13 INCH FL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES
IN COMMERCIAL LANDINGS OF GRAY TRIGGERFISH
WITH A 14 INCH FL MINIMUM SIZE LIMIT

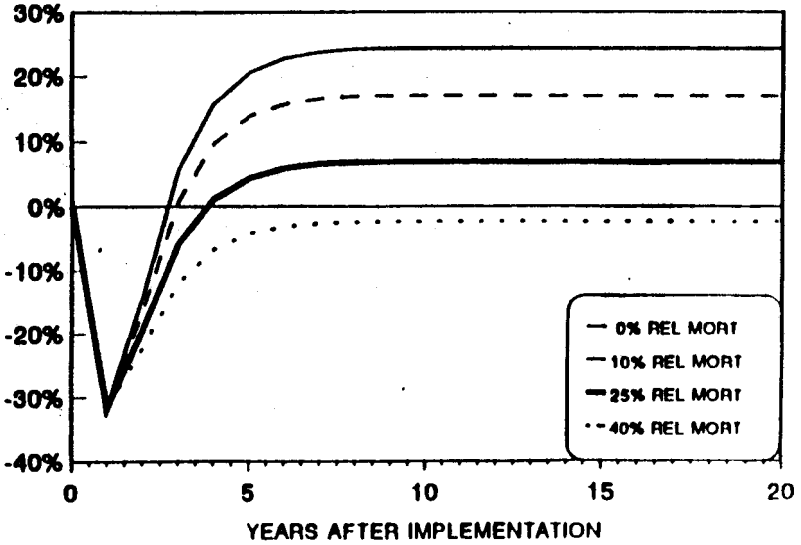
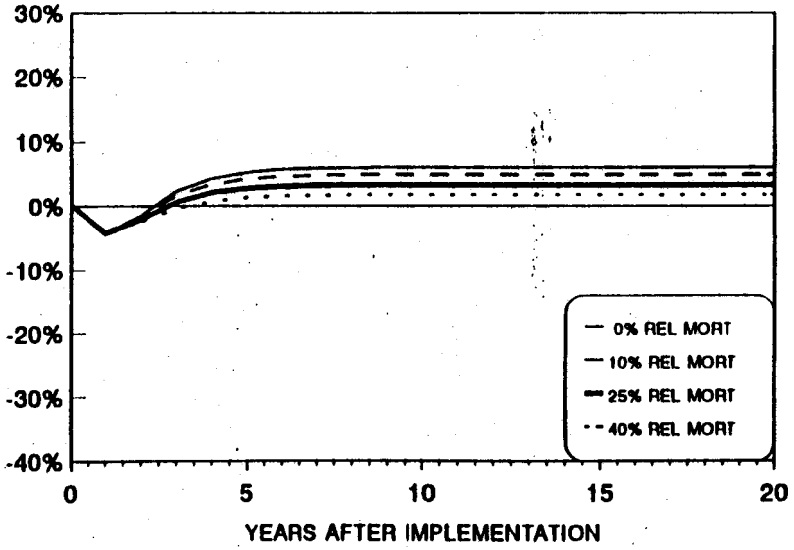
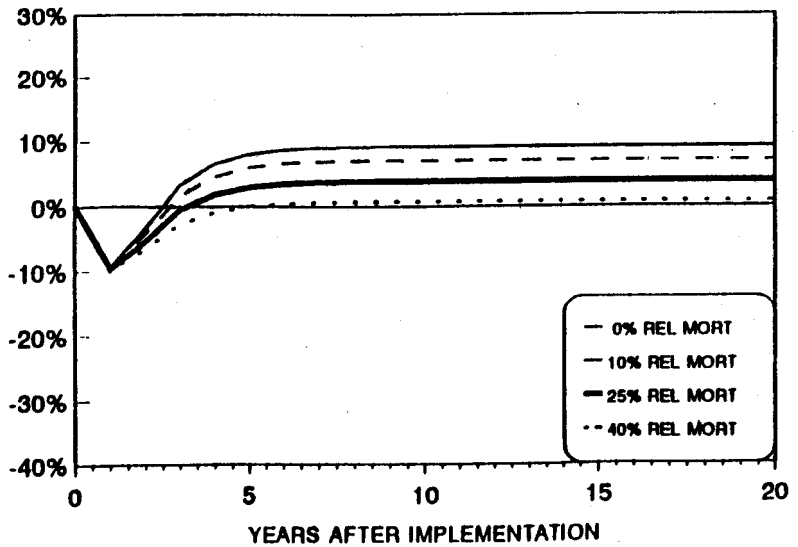


FIG. 12. EXPECTED PERCENTAGE CHANGES
IN COMMERCIAL REVENUES FROM GRAY TRIGGERFISH
WITH A 12 INCH FL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES
IN COMMERCIAL REVENUES FROM GRAY TRIGGERFISH
WITH A 13 INCH FL MINIMUM SIZE LIMIT



EXPECTED PERCENTAGE CHANGES
IN COMMERCIAL REVENUES FROM GRAY TRIGGERFISH
WITH A 14 INCH FL MINIMUM SIZE LIMIT

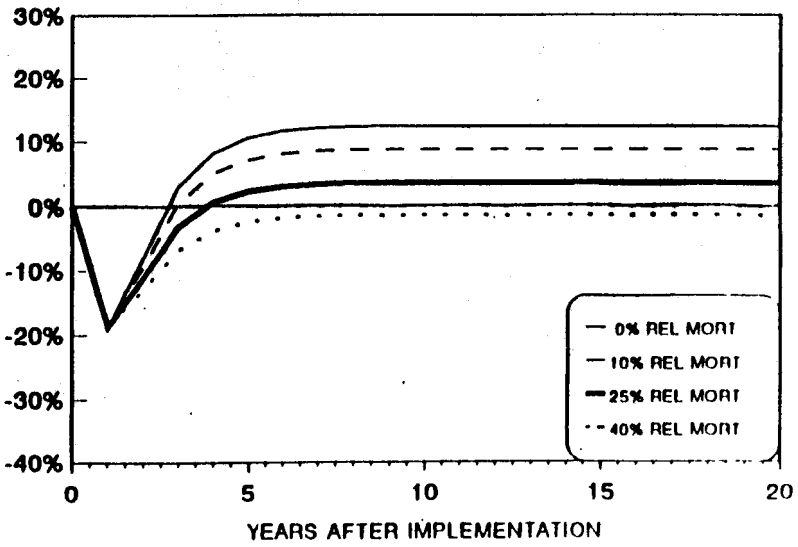
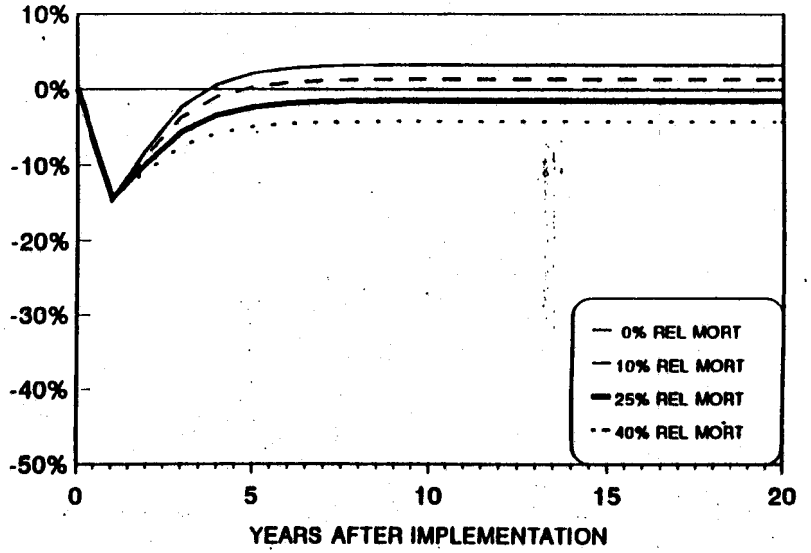
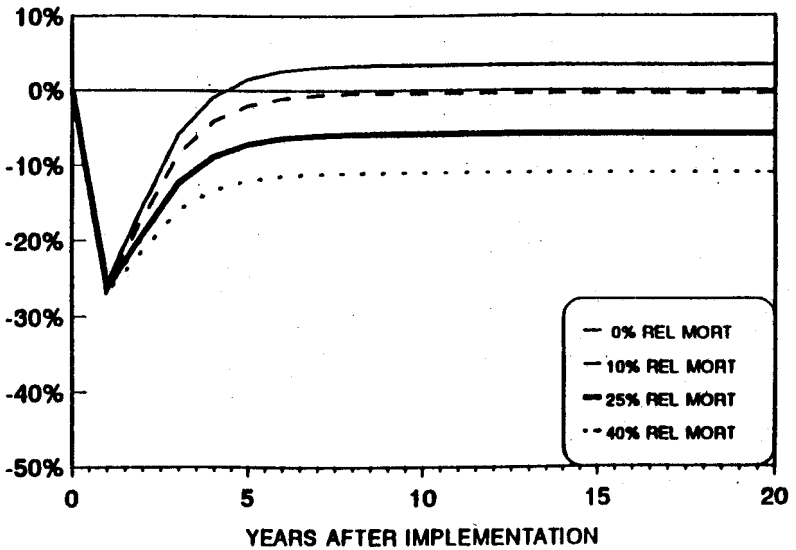


FIG. 13. PERCENTAGE CHANGES IN POUNDS
OF RECREATIONALLY CAUGHT GRAY TRIGGERFISH
WITH A 12 INCH FL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN POUNDS
OF RECREATIONALLY CAUGHT GRAY TRIGGERFISH
WITH A 13 INCH FL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN POUNDS
OF RECREATIONALLY CAUGHT GRAY TRIGGERFISH
WITH A 14 INCH FL MINIMUM SIZE LIMIT

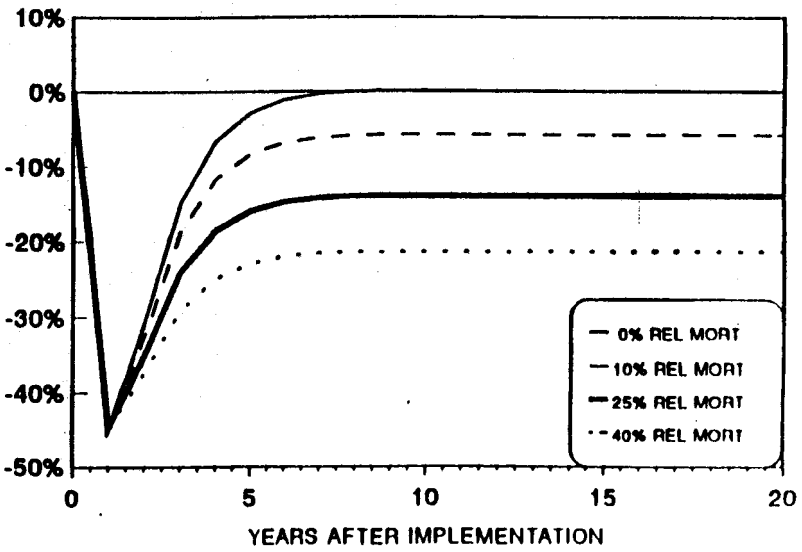
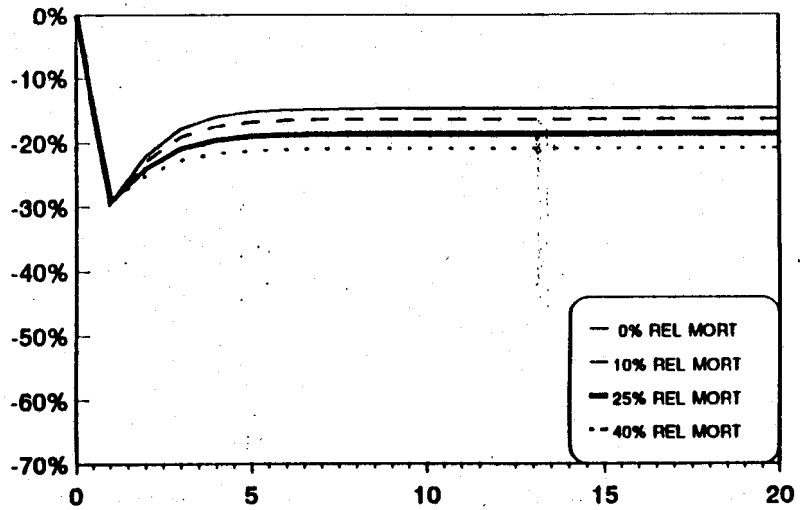
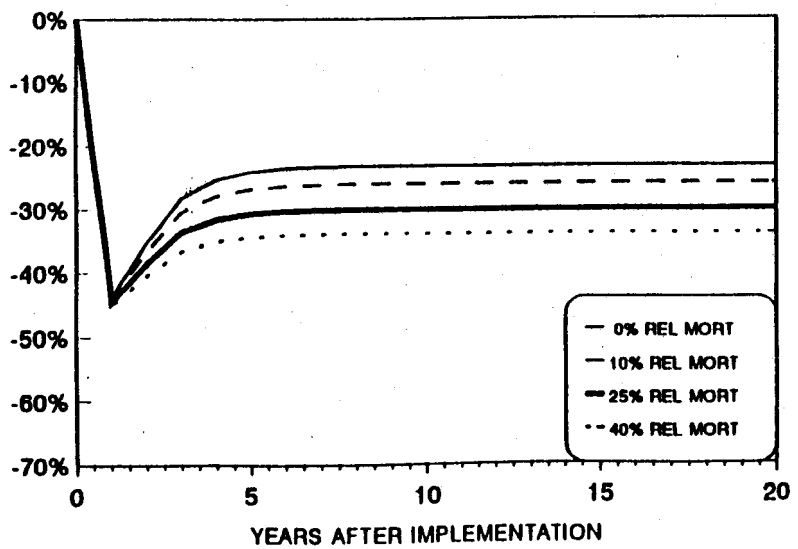


FIG. 14. PERCENTAGE CHANGES IN NUMBERS OF GRAY TRIGGERFISH KEPT RECREATIONALLY WITH A 12 INCH FL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF GRAY TRIGGERFISH KEPT RECREATIONALLY WITH A 13 INCH FL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF GRAY TRIGGERFISH KEPT RECREATIONALLY WITH A 14 INCH FL MINIMUM SIZE LIMIT

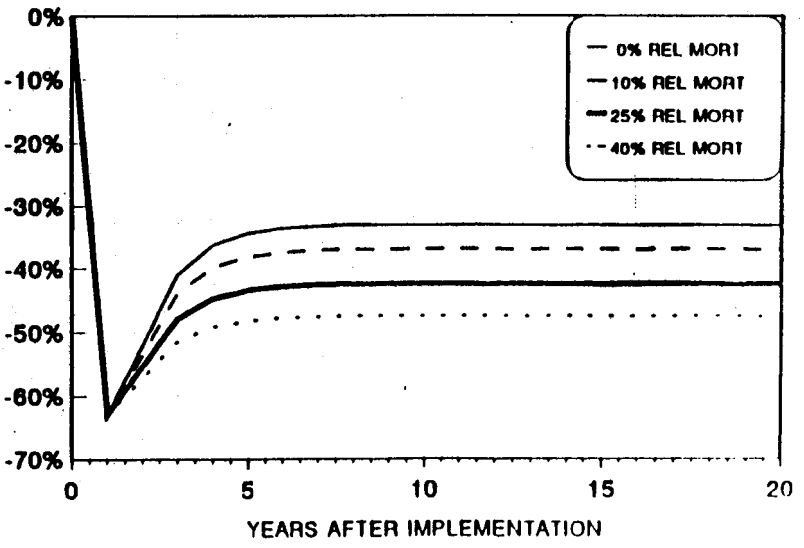
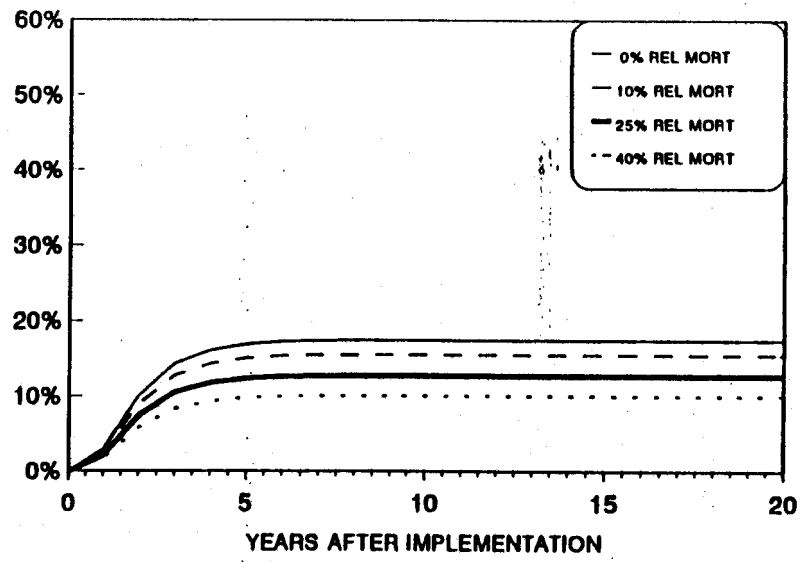
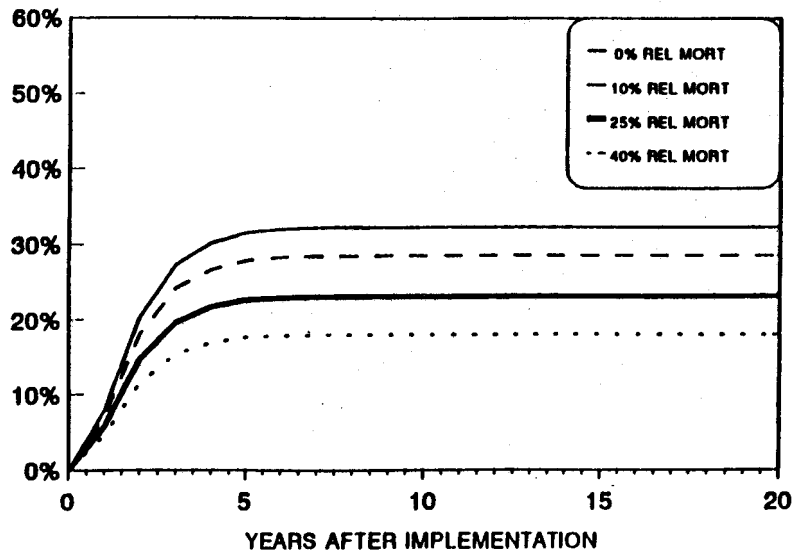


FIG. 15. PERCENTAGE CHANGES IN NUMBERS OF GRAY TRIGGERFISH CAUGHT RECREATIONALLY WITH A 12 INCH FL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF GRAY TRIGGERFISH CAUGHT RECREATIONALLY WITH A 13 INCH FL MINIMUM SIZE LIMIT



PERCENTAGE CHANGES IN NUMBERS OF GRAY TRIGGERFISH CAUGHT RECREATIONALLY WITH A 14 INCH FL MINIMUM SIZE LIMIT