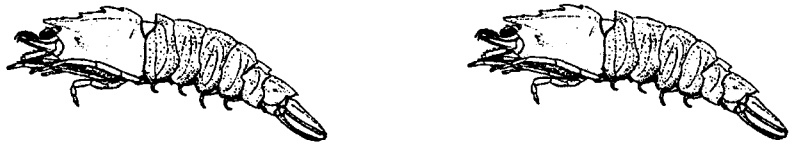
FINAL
AMENDMENT 1
TO THE
FISHERY MANAGEMENT PLAN
FOR THE
SHRIMP FISHERY
OF THE
SOUTH ATLANTIC REGION
(ROCK SHRIMP)

INCLUDING AN ENVIRONMENTAL ASSESSMENT, INITIAL REGULATORY FLEXIBILITY ANALYSIS, REGULATORY IMPACT REVIEW, AND SOCIAL IMPACT ASSESSMENT



JANUARY 1996

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South Atlantic Fishery Management Council

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ACTIONS IN AMENDMENT 1

SOUTH ATLANTIC SHRIMP AMENDMENT 1 (COVER SHEET)

This integrated document contains all elements of the Plan Amendment, Environmental Assessment (EA), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA). Separate table of contents are provided to assist readers and the NMFS/NOAA/DOC reviewers in referencing corresponding sections of the Amendment. Introductory information and/or background for the EA, RIR, and SIA are included with separate table of contents for each of these sections.

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SUMMARY

The proposed management program for rock shrimp in the south Atlantic region involves the following actions: (1) Add rock shrimp to the management unit of the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region; (2) Prohibit trawling for rock shrimp east of 80° W. longitude in-between 28° 30' N. latitude and 27° 30' N. latitude in depths less than 100 fathoms; (3) Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to have a permit issued by the NMFS Regional Director; (4) Parties shall be required to obtain a vessel permit from the National Marine Fisheries Service to harvest or possess rock shrimp in or from the south Atlantic EEZ; (5) Require captains operating permitted vessels fishing for rock shrimp in the south Atlantic EEZ to have a vessel operators permit issued by NMFS to participate in the fishery; and (6) Any dealer defined as the person who first transfers or receives rock shrimp by way of purchase, barter, or trade and holds a valid permit issued by the NMFS Regional Director, would be required to report data needed to monitor the rock shrimp fishery to NMFS. Public scoping meetings were held on September 23, 1992 in Cocoa Beach, Florida, on September 24, 1992 in Jacksonville Beach, Florida, on February 9, 1994 in St. Augustine, Florida, on April 20, 1994 in Brunswick, GA and on June 23, 1994 in Marathon, FL. A control date for the rock shrimp fishery was established on the publication date in the Federal Register, April 4, 1994 (FR Doc.94-8005) (Appendix H). The notice of public hearings and request for comments on draft Amendment 1, which included an Environmental Assessment and Regulatory Impact Review, was published on September 8, 1994 in the Federal Register (FR Doc.94-22060). Public hearings (Section 9) were held on September 20, 1994 in St. Augustine, Florida, on September 21, 1994 in Cocoa Beach, Florida, and on February 7, 1995 in St. Augustine, Florida. An additional set of public hearings were held on May 22, 1995 in Wilmington, NC, on May 23, 1995 in Charleston, SC, on May 24, 1995 in Cocoa Beach, FL, on May 25, 1995 in Mobile, AL, and on June 19, 1995 in Palm Beach Gardens, FL.

ENVIRONMENTAL ASSESSMENT

This integrated document contains all elements of the Plan Amendment, Environmental Assessment (EA), Initial Regulatory Flexibility Analysis, Regulatory Impact Review (RIR), and Social Impact Assessment (SIA). The table of contents for the EA is provided separately to aid the reviewer in referencing corresponding sections of the Amendment.

TABLE OF CONTENTS

SUMMARY

The National Environmental Policy Act (NEPA) requires Federal agencies to consider the interactions of natural and human environments. Issues and concerns to be addressed in the Environmental Assessment (EA) are: What is the management unit for rock shrimp? What are the benefits to the industry, the resource, essential habitat and the nation by bringing rock shrimp under federal management? (Management Unit); What should be done to enhance protection of essential habitat including the Oculina Bank Habitat Area of Particular Concern? (Habitat Damage); and What should be done to ensure the council has adequate information on the rock shrimp fishery to manage the resource? (Data).

REGULATORY IMPACT REVIEW

This integrated document contains all elements of the Plan Amendment, Environmental Assessment (EA), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA). The table of contents for the RIR is provided separately to aid the reviewer in referencing corresponding sections of the Amendment.

INTRODUCTION

The Regulatory Impact Review (RIR) is part of the process of developing and reviewing fishery management plans, amendments and seasonal adjustments, and is prepared by the regional fishery management councils with assistance from the National Marine Fisheries Service, as necessary. The regulatory impact review provides a comprehensive review of the level and incidence of economic impact associated with the proposed regulatory actions.

Executive Order 12866 requires that a Regulatory Impact Analysis be prepared for all regulatory actions that are of public interest. To meet this mandate NMFS requires that the council prepares a Regulatory Impact Review (RIR) for proposed actions. 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).

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

PROBLEMS AND OBJECTIVES

The general problems and objectives in the FMP are found in Appendix A. Problems and objectives addressed by this amendment and the purpose and need for the present amendment are found in Section 1.0 of this document. Essentially the plan amendment addresses the issues of (1) including rock shrimp in the management unit; (2) minimizing the impact of the rock shrimp fishery on coral, coral reefs, and live/hard bottom habitat in the EEZ within the South Atlantic Council's jurisdiction; and (3) implementing permit and reporting requirements for the rock shrimp industry.

METHODOLOGY AND FRAMEWORK FOR ANALYSIS

The fundamental issue in this plan amendment is management of rock shrimp as part of the fishery management plan (FMP). The discussions for the proposed actions are incorporated in the text under economic impacts in Section 4. This RIR assesses management measures from the standpoint of determining the changes in costs and benefits to society. The net effects should be stated in terms of changes in producer surplus or net profits to the harvest sector, and consumer surplus to the final users of the resource.

The harvest sector refers to harvesters, processors and dealers of rock shrimp. Final users of the resource are taken to refer to the individuals that derive benefits from consuming rock shrimp. Ideally, all these changes in costs and benefits need to be accounted for in assessing the net economic benefit to society from the management of the rock shrimp fishery. However, lack of data (particularly on standardized effort units, count sizes and associated dockside prices) 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.

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

Table 1. Summary of expected changes in net benefits.

PROPOSED ACTION/ REJECTED OPTIONS	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Proposed Action 1: Add rock shrimp to the management unit of the Fishery Management Plan For the Shrimp Fishery of the south Atlantic region.	Allows the council to manage rock shrimp and to take timely actions when necessary.	None.	Positive.
Rejected Option 1 The management unit includes the population of rock shrimp from Duval through St. Lucie Counties, FL.	Allows the council to manage rock shrimp and to take timely actions when necessary.	Does not cover the range of the rock shrimp fishery in the region. Could prevent the council from taking timely action if problems should arise in areas not covered by this option.	Positive.
Rejected Option 2 No Action.	None.	Prevents the council from managing the fishery. This would result in continued habitat damage.	Likely negative.
Proposed Action 2. Prohibit trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms.	Likely increase in economic benefits in the long-term. Protection of essential habitat.	Likely decrease in revenues in the short-term. [Potential loss between $0 and $1.41 million in industry revenue 1st year of implementation.]	Unknown, but likely positive.
Rejected Option 1 Prohibit trawling for rock shrimp east of 80° w. longitude in– between 27° 30' N. latitude and 28° N. and west of 80° W. longitude south of 27° 30' N. latitude	Likely increase in economic benefits in the long-term.	Likely decrease in revenues in the short-term. [potential loss ≈ between $0 and $1.17 million 1st year of implementation depending on how much effort could be redirected to other areas.]	Unknown, but likely positive.
Rejected Option 2 Establish a four mile prohibition on trawling east and west of the 80° W. longitude south of 28° 30' N. latitude.	Likely increase in economic benefits in the long-term.	Likely decrease in revenues in the short-term. [Potential loss between $0 and $127,000 reduction in industry revenue during first year of implementation depending on how much effort could be redirected to other areas.]	Unknown, but likely positive.

Table 1. Summary of expected changes in net benefits (cont.).

PROPOSED ACTION/ REJECTED OPTIONS	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Rejected Option 3 Limit trawling to depths greater than 120 ft. (20 fathoms).	Likely increase in economic benefits.	Minimal decrease in revenues.	Likely positive.
Rejected Option 4 Limit harvest area to Duval through St. Lucie Counties, Florida.	Likely increase in economic benefits in the long-term.	May affect harvest outside defined area.	Unknown.
Rejected Option 5 Establish a no transit zone in the Oculina Bank HAPC for all vessels possessing trawls rigged to fish.	Likely increase in economic benefits in the long-term. Would aid enforcement.	Possible increase in operating costs to fishermen.	Likely positive.
Rejected Option 6 Use of Transponders Trawling allowed south of 28° 30' N. latitude, south of Cape Canaveral, from Duval through St. Lucie Counties , and in the south Atlantic EEZ only with transponders.	Provides protection for Oculina HAPC and safety insurance for vessels and fishermen.	Likely increase in operating costs. [Lease and report cost between $450 and $2,520 annually per vessel.]	Likely positive.
Rejected Option 7 No trawling south of Bethal Shoals.	Protects juvenile shrimp and essential habitat south of Bethal Shoals.	Reduced area of trawling for some rock shrimp vessels. [Harvest could be reduced between 0 and 32 percent in 1st year depending on how much effort could be redirected to other areas.]	Likely positive.
Rejected Option 8 No trawling west of the Oculina Bank HAPC.	Protects essential habitat west of the Oculina Bank.	Reduced area of trawling for some vessels. [Harvest could be reduced between 0 and 18 percent in 1st year depending on how much effort could be redirected to other areas.]	Likely positive.
Rejected Option 9 No action.	Increased short-term benefits to highliner rock shrimp fishermen.	Habitat damage and possibly high bycatch rate.	Likely negative.

Table 1. Summary of expected changes in net benefits (cont.).

PROPOSED ACTION/ REJECTED OPTIONS	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Action 3. Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to have a permit issued by the Regional Director.	Likely increase in economic benefits in the long-term gained through successful management of the fishery.	Minimal increase in operating costs. [Estimated annual cost to industry: $520]	Likely positive.
Rejected Option 1 No action	None.	Likely decrease in economic benefits in the long-term.	Likely negative.
Action 4. Parties shall be required to obtain a vessel permit from the National Marine Fisheries Service to harvest or possess rock shrimp in or from the south Atlantic EEZ.	Identify universe of harvesters, aid data collection, and improve management.	Minimal increase in operating costs. [Estimated annual cost to industry: $5,600]	Likely positive.
Rejected Option 1 No action.	None.	Likely decrease in economic benefits in the long-term.	Likely negative.
Action 5. Require captains operating permitted vessels fishing for rock shrimp in the south Atlantic EEZ to have a vessel operators permit issued by NMFS to participate in the fishery.	Should aid enforcement and data collection.	Minimal increase in operating costs. [Estimated annual cost to industry: $5,600]	Likely positive.
Rejected Option 1 No action.	None.	Could hinder enforcement.	Likely negative.

Table 1. Summary of expected changes in net benefits (cont.).

PROPOSED ACTION/ REJECTED OPTIONS	POSITIVE IMPACTS	NEGATIVE IMPACTS	NET IMPACTS
Action 6. Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to report data needed to monitor the rock shrimp fishery to NMFS.	Should aid enforcement, data collection and could increase economic benefits from the fishery in the long-term resulting from improved management. Insures rock shrimp landed and trucked to another state are accounted for in State/Federal commercial landings statistics.	[Estimated annual cost to industry: $2,000]	Likely positive.
Rejected Options 1-3 1. Any dealer defined as a person who first receives rock shrimp by way of purchase, barter or trade and holds a valid permit issued by the NMFS Regional Director, would be required to report data needed to monitor the rock shrimp fishery. 2. Dealers handling rock shrimp harvested anywhere in the south Atlantic EEZ shall be required to report to the Permit Division, Southeast Regional Office, NMFS. The reports shall be made on hard copy or electronic logbook forms, which will be provided to the permitted dealer by the NMFS. 3. Dealers handling rock shrimp harvested anywhere in the south Atlantic EEZ shall be required to report to the fisheries statistics section of the Florida Bureau of Marine Research. Dealers will need to obtain a Florida Saltwater Products License.	Should aid enforcement, data collection and could increase economic benefits from the fishery in the long-term.	[Estimated annual cost to industry: $2,000]	Likely positive.
Rejected Option 4 No action.	None.	Could hinder enforcement.	Likely negative.

SOCIAL IMPACT ASSESSMENT

This integrated document contains all elements of the Plan Amendment, Environmental Assessment (EA), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA). The table of contents for the SIA is provided separately to aid the reviewer in referencing corresponding sections of the Amendment.

INTRODUCTION

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

Under the MFCMA, fishery management plans (FMPs) must "...achieve and maintain, on a continuing basis, the optimum yield from each fishery" [MFCMA Section 301 (a) (1)]. More recent amendments to the MFCMA require that FMPs address the impacts of any management measures on the participants in the affected fishery and those participants in other fisheries that may be affected directly or indirectly [MFCMA Section 303 (1) (9)]. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. With an increasing need for management action, the consequences of such changes need to be examined in order to mitigate the negative impacts experienced by the populations concerned.

PROBLEMS AND METHODS

Social impacts are generally the consequences to human populations that follow from some type of public or private action. Those consequences may include alterations to "the ways in which people live, work or play, relate to one another, organize to meet their needs and generally cope as members of a

society...." (Interorganizational Committee on Guidelines and Principles for Social Impact Assessment, 1994:1). In addition, cultural impacts which may involve changes in values and beliefs which affect people's way of identifying themselves within their occupation, communities, and society in general are included under this interpretation. Social impact analyses determine consequences of policy action in advance by comparing the status quo with the projected impacts. Therefore, it is extremely important that as much information as possible concerning a fishery and its participants be gathered for an assessment. Although public hearings and scoping meetings do provide input from those concerned with a particular action, they do not constitute a full overview of the fishery.

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

Summary of the Social Impact Statement

ACTION 1. Add rock shrimp to the management unit of the fishery management plan for the shrimp fishery of the south Atlantic region.

The rock shrimp industry has been divided with regard to including rock shrimp in the management unit. Original consideration for including rock shrimp in a management plan was initiated by industry concerns, but subsequent public hearings indicated that many involved in the fishery felt that management was unnecessary. When the council's concerns over the effect of trawling upon live/hard bottom and *Oculina* coral became clear, the rock shrimp industry began to work with council staff in order to provide a more comprehensive overview of the fishery. The information provided by the industry indicated more of an impact than had been previously assumed under some of the actions. Subsequently, after two Ad Hoc advisory panel meetings and several additional public hearings, most of the proposals submitted by industry through the Ad Hoc Rock Shrimp Advisory Panel were adopted by the council. Although they were very explicit about their overall desire for no management and considered the rock shrimp fishery in good shape, the advisory panel proposed several measures which would bring rock shrimp under management and at the same time address the council's concern over habitat damage from rock shrimp trawling.

ACTION 2. Prohibit trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms.

This action was proposed by the Ad Hoc Rock Shrimp Advisory Panel as a solution to the council's concern over damage to *Oculina* coral, an important habitat for snapper/grouper and other species of finfish and shellfish, including rock shrimp. The panel considered this proposal an effort in good faith and a considerable sacrifice, given that almost twenty-five percent of the 1994 harvest reported by industry to the council took place within the proposed closed area. In all likelihood, if harvesting effort shifts to other areas the impacts of this closure may be lessened. However, with such an effort shift the possibility of overcrowding and conflict between users becomes an important consideration. The recent increase in the number of participants within the fishery and the distinct geographic division (south Atlantic/Gulf of Mexico) between harvesters may further increase the potential for conflict.

ACTION 3. Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to have a permit Issued by the Regional Director.

This option was proposed by the Ad Hoc Rock Shrimp Advisory Panel and has support within the industry as a means of improving landings data. Discussions during Ad Hoc Panel meetings and testimony at public hearings indicate that most rock shrimp dealers have few objections to this requirement. However, dealers are quick to point out that many of them are already permitted within the State of Florida and that reporting requirements are already in place in other states. If such a permitting system were to be selected, dealers have suggested that it be incorporated into the present system so as to reduce the burden of duplicate reporting. Permitting of dealers allows for identification of those involved in the fishery in a timely manner if the need for information concerning landings, price structure, or general questions about the marketing channels for rock shrimp is needed.

By not requiring dealer permits the council will lose the ability to quickly identify those participating in the intermediate sector of the rock shrimp fishery. Unable to completely identify that sector may prevent important information form being considered in a timely manner when implementing FMP amendments.

ACTION 4. Parties shall be required to obtain a vessel permit from the National Marine Fisheries Service to harvest or possess rock shrimp in or from the south Atlantic EEZ.

This action was part of the proposal package from the first Ad Hoc Panel meeting. It has the support of the Ad Hoc Panel and the industry at large. Permitting vessels will allow for easy identification of those individuals involved in the harvesting of rock shrimp in the south Atlantic EEZ. Discussions with the Ad Hoc Panel and testimony during public hearings indicate industry has few if any objections to this kind of action. This action was pursued to address the lack of satisfactory information concerning the number of participants within the rock shrimp fishery.

ACTION 5. Require captains operating permitted vessels fishing for rock shrimp in the south Atlantic EEZ to have a vessel operators permit issued by NMFS to participate in the fishery.

This option was proposed by the Ad Hoc Rock Shrimp Advisory Panel and has support within the industry according to information provided through the public hearing process. This option is part of the combined proposal by industry to include strict penalties to ensure compliance with existing regulations.

Penalties suggested by industry include the revoking of licenses or permits for violators. This action will allow vessel owners to shoulder less of the burden for captains who may fish in closed areas. The Ad Hoc Panel emphasized that this action, if implemented in conjunction with penalties for violations that are tied to the permitting system, can help ensure compliance. Without this action, the panel suggested that captains who might fish inside protected areas would have little incentive to ensure compliance with any closure.

ACTION 6. Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to report data needed to monitor the rock shrimp fishery to NMFS.

Dealers have indicated they are already mandated to report through the Florida trip ticket system when handling shrimp in that state. Although this is true, it is possible for dealers in another state that does not have the strict reporting requirements of the State of Florida to file landings information at a much later date and in a much different form. Therefore, detailed information included on the Florida trip ticket system may not be included in these reports. This breakdown in the system of reporting has accounted for late reporting and the inability to assess impacts in a timely manner. It has been suggested by industry that any other reporting requirement be incorporated into the present system of reporting so as to reduce the burden of duplicate reporting.

Social Impact Assessment Data Needs

Given the lack of sufficient data to conduct a complete social impact assessment, the following data needs are suggested to help improve analysis of future actions addressing rock shrimp. The following categories include the types of data that need to be collected on the commercial harvesting sector.

Demographic information on commercial harvesters may include but not necessarily be limited to: Population, age, gender, ethnic/race, education, language, marital status, children (age & gender), residence, household size, household income (harvester/non harvester), occupational skills, and association with vessels and firms (role & status).

Social structure information on commercial harvesters may include but not necessarily be limited to: Historical participation, description of work patterns, description of gear and materials needed for harvesting and their use, organization and affiliation, patterns of communication and cooperation, competition and conflict, and communication and integration.

Emic culture information may include but not necessarily be limited to: Occupational motivation and satisfaction, attitudes and perceptions concerning management, constituent views of their personal future of harvesting, and psycho-social well-being.

A general description of the rock shrimp trade would aid in determining social impacts beyond the harvesting sector. Such a description might include the support industry associated with harvesting rock shrimp, costs associated with handling and marketing, channels for selling rock shrimp products that have developed, and finally, social and economic information on the areas, regions, or communities where rock shrimp is harvested and marketed.

1.0 PURPOSE AND NEED

A. Introduction

The Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region (SAFMC 1993) was prepared by the South Atlantic Fishery Management Council primarily to provide south Atlantic states with the ability to request concurrent closure of the EEZ adjacent to their closed state waters following severe winter cold weather and to eliminate fishing mortality on overwintering white shrimp following severe winter cold kills. The plan does provide an exemption for the royal red and rock shrimp fisheries in the event of a closure of the EEZ to the harvest of white shrimp. In addition it also establishes a buffer zone extending seaward from shore 25 nautical miles, inside of which no trawling would be allowed with a net having less than 4 inch stretch mesh during an EEZ closure. Vessels trawling inside this buffer zone could not have a shrimp net aboard (i.e., a net with less than 4 inch stretch mesh) in the closed portion of the EEZ. Transit of the closed EEZ with less than 4 inch stretch mesh aboard while in possession of *Penaeus* species will be allowed provided that the nets are in an unfishable condition which is defined as stowed below deck. The exemption, the provision for transit through the EEZ and limiting the buffer zone to 25 miles were all measures implemented to allow the rock shrimp fishery to be prosecuted with minimal disruption during a closure of federal waters for protection of white shrimp. Rock shrimp, although acknowledged as being part of the south Atlantic shrimp fishery, were not included in the management unit because no regulations were being proposed for the species at that time. The Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region (SAFMC 1993) was approved in December 1993.

The primary measure discussed in previous deliberations on rock shrimp involved delaying harvest to increase yield and possibly market price by landing larger rock shrimp (Appendix B). Shrimp Advisory Panel members also reviewed the issue (September 28, 1992) and recommended the council consider implementation of a delayed harvest if economic benefits to the rock shrimp fishery could be documented.

The council, in response to industry comments, held scoping meetings in 1992 to solicit input from the public on the management of rock shrimp. Rock shrimp fishermen and the council had become concerned over the decline in rock shrimp landings. With the use and modification of peeling technology to economically process smaller rock shrimp, the industry proceeded to harvest larger amounts of previously unmarketable rock shrimp.

A preliminary analysis, conducted by council staff in 1993, looked at the possibility of increasing total value of landed rock shrimp if they were allowed to attain a larger and possibly more valuable market size. No information was available at the time on the potential increase in value from landing larger shrimp. A preliminary analysis of what determines dockside prices in the rock shrimp fishery (Adams 1993) was initiated at the request of the council and our Scientific and Statistical Committee.

The council reinitiated discussions on rock shrimp in 1994 and held public scoping meetings in St. Augustine, Florida on February 9, 1994 and in Brunswick, Georgia on April 20, 1994 to solicit input on development of regulations for the rock shrimp fishery. The council, pursuant to action taken at the St. Augustine meeting, approved a control date of April 4, 1994 for the rock shrimp fishery prosecuted in federal waters off Florida from Duval County through St. Lucie County (Appendix H).

The preliminary analysis of what determines dockside prices in the fishery was reviewed by the council along with an update to the original yield per recruit analysis. The updated yield per recruit analysis and newly available price information were used to further explore changes in yield and exvessel prices of landed rock shrimp for various seasonal closures (Appendix B). The results indicated there would be a marginal gain in yield and value by delaying the opening of the season. Part of the reason for this is due to the probable density dependency of growth and mortality. Also, the fishery likely exhibits a cyclical pattern in abundance and little may be gained by restricting harvest during a good year through delaying the opening of the season.

The council on June 23, 1994 held an additional public scoping meeting in Marathon, Florida prior to reviewing a decision document for rock shrimp. The council subsequently voted to develop an amendment to the shrimp fishery management plan to manage the rock shrimp fishery off Cape Canaveral, Florida through area and possibly gear restrictions, license limitation, and co-management of the fishery with the industry.

In 1994, increased demand and unusually high market prices for many shrimp products, resulting from reduced rate of increase in imports of maricultured shrimp, provided fishermen with an incentive to harvest all marketable sizes of rock shrimp, expanding fishing areas even further south. The season started much earlier in 1994, lasted much longer, and allowed fishermen to increase their overall harvest and hence total revenue.

Subsequently, the increased effort and extension of the fishery offshore and significantly farther south of Cape Canaveral, increased the probability of the fishery impacting protected hard/live bottom habitat. This included *Oculina* coral and the Oculina Bank Habitat Area of Particular Concern (HAPC). The area encompassed by the Oculina Bank HAPC was designated an experimental closed area under the snapper grouper fishery management plan (SAFMC 1994) in which fishing or anchoring to fish for species in the snapper grouper management unit was prohibited. There was concern the trawls used in the rock shrimp fishery would cause significant damage to these fragile habitats. Therefore, the council proposed to implement regulations to manage the fishery by requiring appropriate measures to monitor the fishery and prevent gear damage to habitat. Measures addressing area closures, gear restrictions, license limitation, and co-management of the fishery with the industry were taken to public hearing in St. Augustine and Cocoa Beach, Florida in September 1994.

At its October 1994 meeting, the council voted to defer license limitation, co-management, and development of a framework procedure to allow introduction of gear regulations to a separate amendment; take no action on mesh size regulations contingent on the development of this framework procedure; and include no trawling for rock shrimp south of 28° 30' N. latitude as the preferred option for an area closure. Prohibiting trawling for rock shrimp south of 28° 30' N. latitude would have enhanced existing federal regulations for coral and snapper grouper by protecting *Oculina* coral and the Oculina Bank HAPC from trawl-related habitat damage. The area that would have been protected south of the line contains the majority of the known distribution of *Oculina* coral.

The council was scheduled to review Amendment 1 at the February 1995 council meeting and hold a final public hearing. Prior to the hearing held in St. Augustine, Florida fishermen commented that the information on the fishery was incorrect and incomplete. Council staff attended an informal meeting with rock shrimp fishermen, dealers, and processors to explain data sources, council rationale, etc. The meeting was held on Monday, February 6, 1995. At that meeting staff listened to the concerns of the industry and requested help from the newly formed Rock Shrimp Producers Association to improve our understanding of the industry with specific focus on landings and harvest areas. The two items presented in the draft Amendment, were challenged by industry as not truly representatives of the fishery. At both the informal meeting on February 6, 1995 and the public hearing held on Tuesday, February 7, 1995 industry representatives suggested that landings information was incomplete due to late

data or non-reporting. Industry representatives indicated that some landings were reaching the processors before being documented, and that may have explained some of the inconsistencies.

Landings from certain harvest areas were also challenged by representatives of the Rock Shrimp Producers Association. This indicated that harvesting of rock shrimp had moved further south than official statistics indicated. Generally, the industry suggested that overall landings were larger and more pounds had been harvested in certain harvest areas. This new information showed the closure proposed by the council would have a greater impact upon the rock shrimp fishery than had been previously assumed.

Given the concerns expressed by industry, the council deferred final action to provide an additional opportunity for industry to supply information on total harvest and areas fished. At the same time council asked that industry consider the issues of under-reporting and habitat protection, and work closely with staff to bring new options to the next council meeting.

With new information provided by the industry through the public hearing process and with updated information from the State of Florida, a more accurate picture of total landings and area of harvest was achieved. The presentation of known distribution of live/hard bottom habitat associated with the rock shrimp fishing area was also refined.

An Ad Hoc Rock Shrimp Advisory Panel was established by the council and convened to discuss and propose options to address the two primary issues of reporting and habitat protection. The Ad Hoc Advisory Panel presented the following measures for consideration by the South Atlantic Council:

1. Create a no transit zone for all vessels around the Oculina Bank HAPC that is strictly enforced.
2. Build an education program for the protection of the *Oculina* coral.
   A. Clearly highlight the zone on charts.
   B. Create leaflets to be distributed by docks and the rock shrimp network to all fisherman.
   C. Work together with state and local agencies like the Alabama Extension and Research Center, to disseminate information.
3. Keep logbooks on all vessels as a requirement. Reporting of landings would be made by receiving docks.

A. Use a more extensive reporting classification to fully understand the fisheries instead of the current system which divides the area into only three areas. Example 10 areas.

4. Mandatory permitting for captains.
   A. First offense would result in six months suspension.
   B. Second offense would result in permanent suspension.
5. Locate a buoy system on the west side of the Oculina Bank HAPC.

The council, at the April 1995 meeting in Savannah, Georgia, reviewed the Advisory Panel's proposal and adopted, the use of vessel and dealer permitting, reporting requirements, captain permits, and prohibiting rock shrimp trawling east of 80° W longitude between 28° N latitude and 27° 30' N latitude and west of 80° W longitude south of 27° 30' N latitude for additional public hearings. The options for buoying the HAPC, creating a modified no transit zone, and prohibiting rock shrimp trawling east and west of the 80° W. longitude south of 28° 30' latitude were included as options considered and rejected. Proposals from the Ad Hoc panel were incorporated into the range of options included in the document brought to an additional set of public hearings held during May 1995. The Ad Hoc Rock Shrimp Advisory Panel met after public hearings were completed and presented the council with a revised list of recommendations for management of the fishery (Appendix L). The council, after reviewing the Advisory Panel's recommendations adopted the following management measures for the fishery.

The council, in adding rock shrimp to the shrimp management unit, will provide a mechanism to manage rock shrimp and the rock shrimp fishery under the Fishery Management Plan for the Shrimp Fishery in the south Atlantic region.

The council is proposing to minimize impacts of the rock shrimp fishery on essential bottom habitat, including the fragile coral species existing in the Oculina Bank Habitat Area of Particular Concern, by prohibiting trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms. Prohibiting trawling for rock shrimp in this area will enhance existing federal regulations for coral and snapper grouper by protecting essential live/hard bottom habitat including *Oculina* coral and the Oculina Bank HAPC from trawl related damage. In order to address the need for better data, permits will be required for captains, vessels, and dealers in the rock shrimp fishery. In addition, NMFS will require dealers to submit reports to accurately account for harvest of rock shrimp in the south Atlantic. The council

will also develop an enhanced education program on *Oculina* coral and the Oculina Bank Habitat Area of Particular Concern.

B. Issues/Problems Considered in This Amendment

Problems, management objectives, and management measures contained in the original Fishery Management Plan are contained in Appendix A. Problems and management objectives addressed in Amendment 1 are as follows:

Management Unit for Rock Shrimp

The problem addressed by this action acknowledges that rock shrimp although identified in the existing shrimp management plan as part of the southeast shrimp fishery, were not included in the management unit because no management measures was being proposed at the time the plan was implemented. The first step the council must take in addressing management of this public resource is to include it in the management unit under an existing federal management plan. The following issues are considered in the biological, economic, and social analyses included to address directives mandated under the Magnuson and the National Environmental Protection Acts, and other applicable law:

- What is the management unit for rock shrimp?
- What are the benefits to the industry, the resource, essential habitat, and the nation by bringing rock shrimp under federal management?

Habitat Damage

The problem addressed by this action involves the mandate that the council, pursuant to the Magnuson Act, the National Environmental Policy Act, and adopted council habitat policy, must minimize the impact of fisheries on essential habitat. The rock shrimp fishery as presently prosecuted is closely associated with major concentrations of live/hard bottom, *Oculina* coral, and the Habitat Area of Particular Concern (HAPC) designated in the south Atlantic region under the Coral Fishery Management Plan. The only known distribution of massive *Oculina* pinnacle structures which sometimes extend 25 meters from the ocean bottom, is concentrated primarily from 28° 30' N. latitude through 27° N. latitude, with the major concentration in the Oculina Bank HAPC.

Testimony received at scoping meetings and public hearings indicated some rock shrimp vessels fish close to the shelf-edge, in association with the open

sand/shell bottom between known hard bottom areas, or even into the protected Oculina Bank HAPC. Despite the HAPC being designated in 1982, two violations of rock shrimp vessels trawling in the HAPC occurred immediately after public hearings held in September 1994. The council is proposing regulations to minimize impact of the rock shrimp fishery on fishery habitat including bottom habitat necessary for continued survival of managed snapper grouper species. The following issue is considered in the biological, economic and social analyses included to address directives mandated under the Magnuson and the National Environmental Protection Acts, and other applicable law:

- What should be done to enhance protection of essential habitat including the Oculina Bank Habitat Area of Particular Concern?

Data

The proposed action addresses incomplete and inadequate data for the south Atlantic rock shrimp fishery. Testimony received from industry at previous public hearings, informal meetings, and through the Rock Shrimp Producers Association identified problems with the monitoring and reporting system. In addition, the Ad Hoc Rock Shrimp Advisory Panel supports mandatory permitting of dealers and institution of a mandatory system which enhances information used for management of the rock shrimp resource. This Amendment proposes to require NMFS to enhance data collection necessary for management. NMFS is encouraged to facilitate data collection through coordination under existing state/Federal cooperative statistics programs. However, if necessary NMFS may implement additional reporting requirements where states do not have cooperative statistics programs. Participation in the data collection program would be mandatory for all vessels fishing for or landing rock shrimp and all dealers handling rock shrimp. The following issue is considered in the biological, economic, and social analyses included to address directives mandated under the Magnuson and the National Environmental Protection Acts, and other applicable law:

- What should be done to ensure the council has adequate information to manage the rock shrimp resource?

C. Management Objectives in This Amendment

1. Provide a mechanism to manage rock shrimp under the fishery management plan for the shrimp fishery in the south Atlantic region.

2. Minimize impacts of the rock shrimp fishery on coral, coral reefs and live/hard bottom habitat in the south Atlantic region.

3. Implement permit and reporting requirements needed to ensure necessary data are provided by the rock shrimp industry.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

National Environmental Policy Act (NEPA) regulations require that Section 2.0 present the environmental impacts of the proposed actions and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public. The council's documents must also conform to Magnuson Act and "Other Applicable Law" requirements. National Environmental Policy Act regulations are one of the "other applicable laws" referenced. The South Atlantic Council decided to blend Magnuson Act and "other applicable law" (including NEPA) requirements in one consolidated, non-duplicative and non-repetitive document. The detailed evaluation of alternatives and discussion about the effects on the environment are in Section 4.0 Environmental Consequences. In Section 2.0, the council summarizes the impacts of the proposed actions and range of alternatives and uses matrices to provide the reader with an overview of the environmental impacts of the proposed actions as they relate to the range of alternatives considered.

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 discussion summarizes the environmental impacts of the proposed actions and consolidates the discussion of the range of alternatives considered. For detailed analysis of impacts for each alternative see Section 4.0 Environmental Consequences.

ACTION 1. Add rock shrimp to the management unit of the fishery management plan for the shrimp fishery of the south Atlantic region.

The council, in adding rock shrimp to the shrimp management unit is providing a mechanism to manage rock shrimp under the Fishery Management Plan for the Shrimp Fishery in the south Atlantic region. The shrimp management unit already consists of white shrimp. In order to manage rock shrimp in south Atlantic federal waters the species must be included in the shrimp management unit. The inclusion of rock shrimp in the management unit is a necessary first step to create the regulatory structure to manage the fishery. Including rock shrimp in the management unit throughout the South Atlantic Council's jurisdiction will also allow the council to address other areas where rock shrimp may occur in significant concentrations in the future.

Action 1 provides the basis for implementing management measures necessary to minimize the impact of the fishery on bottom habitat. It also provides for the establishment of permit and reporting requirements to enhance management of the fishery and to determine the impacts on the rock shrimp resource. This action will facilitate the implementation of other proposed actions that will enhance existing federal regulations for coral and snapper grouper species by protecting essential live/hard bottom habitat, *Oculina* coral, and the Oculina Bank HAPC from trawl related habitat damage.

ACTION 2. Prohibit trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms.

The council is taking this action to minimize impacts of the rock shrimp fishery on essential bottom habitat including the fragile *Oculina* coral species. Trawl damage occurs from direct contact with live/hard bottom, and specifically the fragile slow growing *Oculina* coral. *Oculina* is only known to be distributed in bank formations south of 29° N. latitude. Action 2 would close an area where 25% of the rock shrimp were harvested during 1994, would protect the significant *Oculina* pinnacle distribution between 27° 30' N. latitude and 28° 30' N. latitude. *Oculina* is distributed mainly in deepwater along the south Atlantic coast with the largest known concentrations occurring off Cape Canaveral, south through the Oculina Bank HAPC. Effective June 27, 1994 as part of Amendment 6 to the snapper grouper plan, the Oculina HAPC was also designated an experimental closed area in which fishing or anchoring to fish for species in the snapper grouper management unit is prohibited. Therefore, the additional protection afforded by this action extends the protection for the biological integrity of the HAPC and the possible effectiveness of the closed area. In addition, the closed area may protect a portion of the rock shrimp spawning stock. This will help the fishery in years when recruitment is low due to poor environmental conditions. The closed area will protect juvenile rock shrimp in their nursery grounds.

The council rejected other options to prohibit rock shrimp trawling because they would either not protect the significant *Oculina* pinnacle distribution and other live/hard bottom habitats or they would unnecessarily eliminate a large productive area of trawlable sand and shell bottom.

The council also rejected taking no action, limiting trawling to depths greater than 120 ft, limiting harvest areas to Duval through St. Lucie Counties, Florida, establishing a no transit zone in the Oculina HAPC, prohibiting trawling south of Bethal Shoals, or prohibiting trawling west of the Oculina Bank HAPC

because these restrictions would not eliminate the negative impact of the fishery on essential bottom habitat and would be difficult to enforce.

The council rejected only allowing trawling with transponders, south of 28° 30' N. latitude, from Duval through St. Lucie Counties, south of Cape Canaveral, or throughout the south Atlantic EEZ, because use of a transponder system in the rock shrimp fishery while providing an enforcement tool to protect the Oculina Bank HAPC, would do nothing to protect bottom habitat including *Oculina* coral and the shelf edge prominences outside of the HAPC. Other area closure options eliminated from further detailed consideration are included in Appendix C.

ACTIONS 3-6 Permits and Reporting Requirements.

ACTION 3. Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to have a permit issued by the Regional Director.

ACTION 4. Parties shall be required to obtain a vessel permit from the National Marine Fisheries Service to harvest or possess rock shrimp in or from the south Atlantic EEZ.

ACTION 5. Require captains operating permitted vessels fishing for rock shrimp in the south Atlantic EEZ to have a vessel operators permit issued by NMFS to participate in the fishery.

ACTION 6. Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to report data needed to monitor the rock shrimp fishery to NMFS.

In order to provide the necessary data and to enhance accountability in the fishery, permits will be required for captains, vessels, and dealers participating in the rock shrimp fishery. This amendment also directs NMFS to require dealers to submit reports to accurately account for harvest of rock shrimp in the south Atlantic.

The council is proposing requiring mandatory dealer permits in part at the request of industry and in order to establish a more structured information flow between NMFS, dealers, and harvesters. Permitting harvesters will provide the necessary information to assess impacts of fishing on the resource and associated habitats. The Ad Hoc Rock Shrimp Advisory Panel proposal submitted to the council, requested implementation of a permitting system for captains operating rock shrimp vessels in the south Atlantic. The council adopted this measure as an additional incentive to fish legally and in a manner in which habitat damage is

avoided in order to insure their continued participation in the fishery as a vessel operator.

The council is proposing a measure under this amendment that directs NMFS to collect landings and value information as well as clearly identify all participants in the rock shrimp fishery. The council is recommending NMFS use existing systems to obtain this information thereby reducing duplication with existing programs. All south Atlantic states collect commercial statistics through existing state/Federal cooperative agreements with the States of Florida and North Carolina recording rock shrimp landings under their existing trip ticket systems. If NMFS uses these existing systems for data collection, then the only increased paperwork consideration would arise from the implementation of dealer, vessel and operator permits which are being proposed and continue to be strongly supported by industry. Therefore a dealer reporting system built on existing systems and/or integrating new reporting, which may be needed for vessels landing in states in the Gulf of Mexico, will enable the collection of more accurate and complete data for the rock shrimp fishery. It will also increase the incentive for regulatory compliance and aid enforcement.

The following tables summarize the proposed action and the range of 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. For detailed analysis of impacts for each alternative see Section 4.0 Environmental Consequences.

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

ISSUES/PROBLEMS

Alternatives	**Management Unit**
Proposed Action 1: Add Rock Shrimp to the Management Unit of the Fishery Management Plan For the Shrimp Fishery of the south Atlantic region.	Provides the regulatory mechanism to manage the rock shrimp fishery throughout the range and reduce the impact of the fishery on essential bottom habitat. Covers range of fishery if future management is needed to protect the rock shrimp stock or other essential habitat.
Rejected Options. Management unit is Duval Through St. Lucie Counties or no action.	Would not provide the mechanism to reduce the impact of the fishery on essential bottom habitat.

ISSUES/PROBLEMS

Alternatives	Habitat Damage
Proposed ACTION 2. Prohibit trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms.	Minimizes habitat and coral damage. Provides protection to most of the known *Oculina* coral and pinnacle distribution off Florida east coast. Provides a buffer area north and west of the HAPC. Possibly provides a refuge for juvenile rock shrimp and may protect spawning stock.
Rejected Vessel Monitoring Options. Rock shrimp trawling allowed only with transponders; south of Cape Canaveral, from Duval through St. Lucie Counties, or throughout the south Atlantic EEZ.	Would provide a system for enforcement agents to monitor the Oculina Bank HAPC or other closed areas that rock shrimp vessels may enter.
Rejected Area Closure Options. Prohibit rock shrimp trawling west of the Oculina Bank, south of Bethal shoals, in depths <120 ft, or outside Duval through St. Lucie counties.	Minimizes habitat and coral damage either west of the Oculina Bank HAPC where limited *Oculina* exists, south of Bethal shoals which would protect southern distribution but not the Bank area north of the HAPC, inshore in depths less than 120 ft where a limited amount of individual coral colonies have been identified, or outside of Duval and St. Lucie counties. All options had limited scope and would not enhance protection of the HAPC or protect the extensive bank system north of the HAPC.
Rejected Options. Limit rock shrimp trawling to Duval through St. Lucie Counties or no action.	Habitat and coral damage will continue in the Oculina HAPC and in the extensive bank area north of the HAPC.

ISSUES/PROBLEMS

Alternatives	Data
Proposed Actions 3-6: **ACTION 3.** Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to have a permit Issued by the Regional Director. **ACTION 4.** Parties shall be required to obtain a vessel permit from the National Marine Fisheries Service to harvest or possess rock shrimp in or from the south Atlantic EEZ. **ACTION 5.** Require captains operating permitted vessels fishing for rock shrimp in the south Atlantic EEZ to have a vessel operators permit issued by NMFS to participate in the fishery. **ACTION 6.** Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to report data needed to monitor the rock shrimp fishery to NMFS.	Provides greater and more accurate information on amount of removal of rock shrimp from south Atlantic stock and area harvested. In addition, captains would be more accountable and this action will act as a deterrent for violating fishing regulations including harvesting in the HAPC or the area proposed for closure. NMFS could minimize cost and duplication by using existing reporting systems where available.
Rejected Option. No Action.	Uncertainty would continue regarding industry operations, harvest, and the potential impact the fleet may be having on the rock shrimp resource or closely associated live/hard bottom and coral habitat.

Additional management measures that were eliminated from further detailed consideration prior to the last set of public hearings are included in Appendix C.

3.0 AFFECTED ENVIRONMENT

The affected environment, including a description of the shrimp fisheries in the south Atlantic region, is presented in detail in the original shrimp plan (SAFMC 1993) and the profile of the shrimp fishery in the south Atlantic (SAFMC 1981). A description of council concerns and recommendations on protecting shrimp habitat is also included in the original FMP.

Keiser (1976) described the distribution of rock shrimp in coastal waters of the southeastern United States. Whitaker (1982) presented a summary of information on rock shrimp off South Carolina. The only comprehensive research to date on rock shrimp off the east coast of Florida was by Kennedy et al. (1977). The following section incorporates some of the more significant findings presented by Kennedy et al. (1977) regarding the biology of rock shrimp on the east coast of Florida.

A. Description of the Species and Distribution

Rock shrimp are distributed worldwide in tropical and temperate waters. In the southeastern United States, the rock shrimp fishery is based entirely on the rock shrimp (*Sicyonia brevirostris*) which occur in deeper waters than the three species of *Penaeus* and constitutes a small part of the southeast shrimp fishery.

Morphology

Rock shrimp (Figure 1) are very different in appearance from the three species of *Penaeus*. Rock shrimp can be easily separated from *Penaeus* species by their thick, rigid, stony exoskeleton.

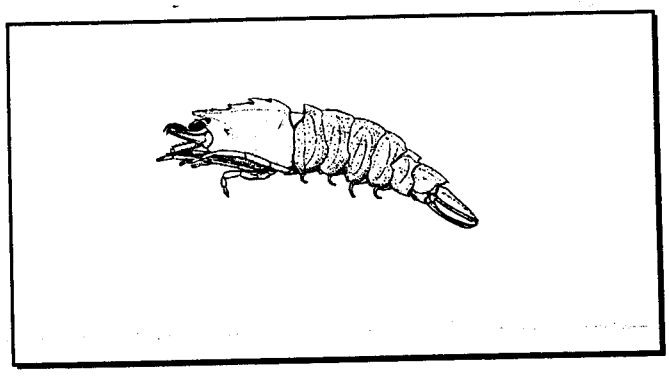


Figure 1. Rock shrimp *Sicyonia brevirostris*.

Distribution

Rock shrimp are found in the Gulf of Mexico, Cuba, the Bahamas, and the Atlantic Coast of the U.S. up to Virginia (SAFMC 1993) (Figure 2). The center of abundance and the concentrated commercial fishery for rock shrimp in the south Atlantic region occurs off northeast Florida south to Jupiter Inlet (Figure 3 & Appendix K). Although rock shrimp are also found off North Carolina, South Carolina, and Georgia and are occasionally landed in these states (Appendix D), no sustainable commercially harvestable quantities of rock shrimp comparable to the fishery prosecuted in the EEZ off Florida are being exploited.

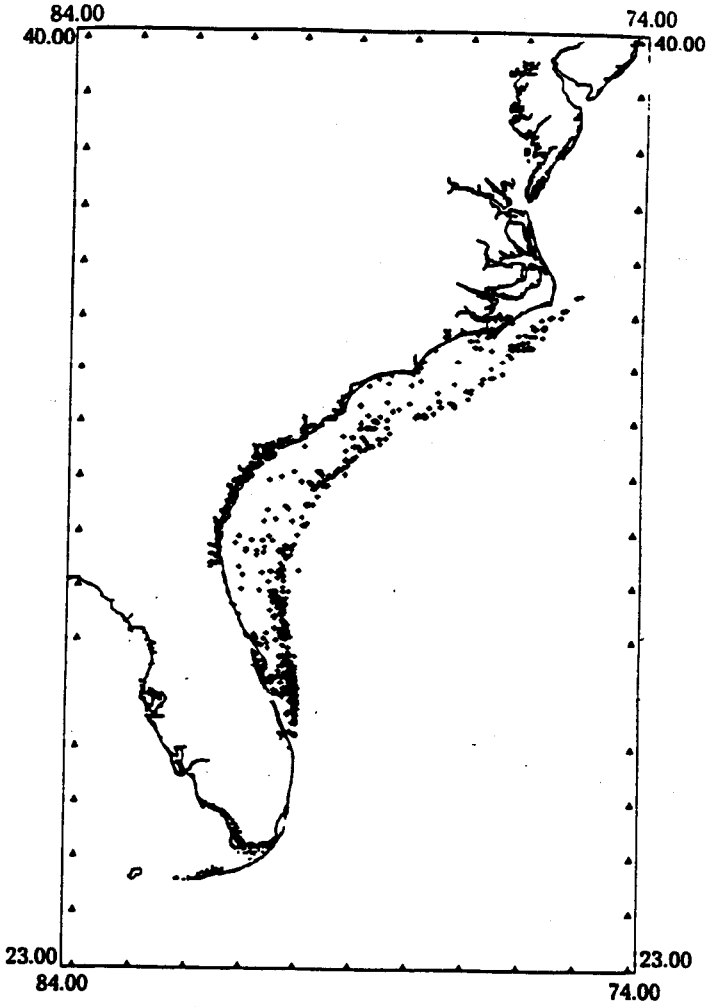


Figure 2. Rock shrimp distribution in the south Atlantic region as indicated from historical research efforts (1956-1991) using finfish and shrimp trawls (Source: NMFS 1994).

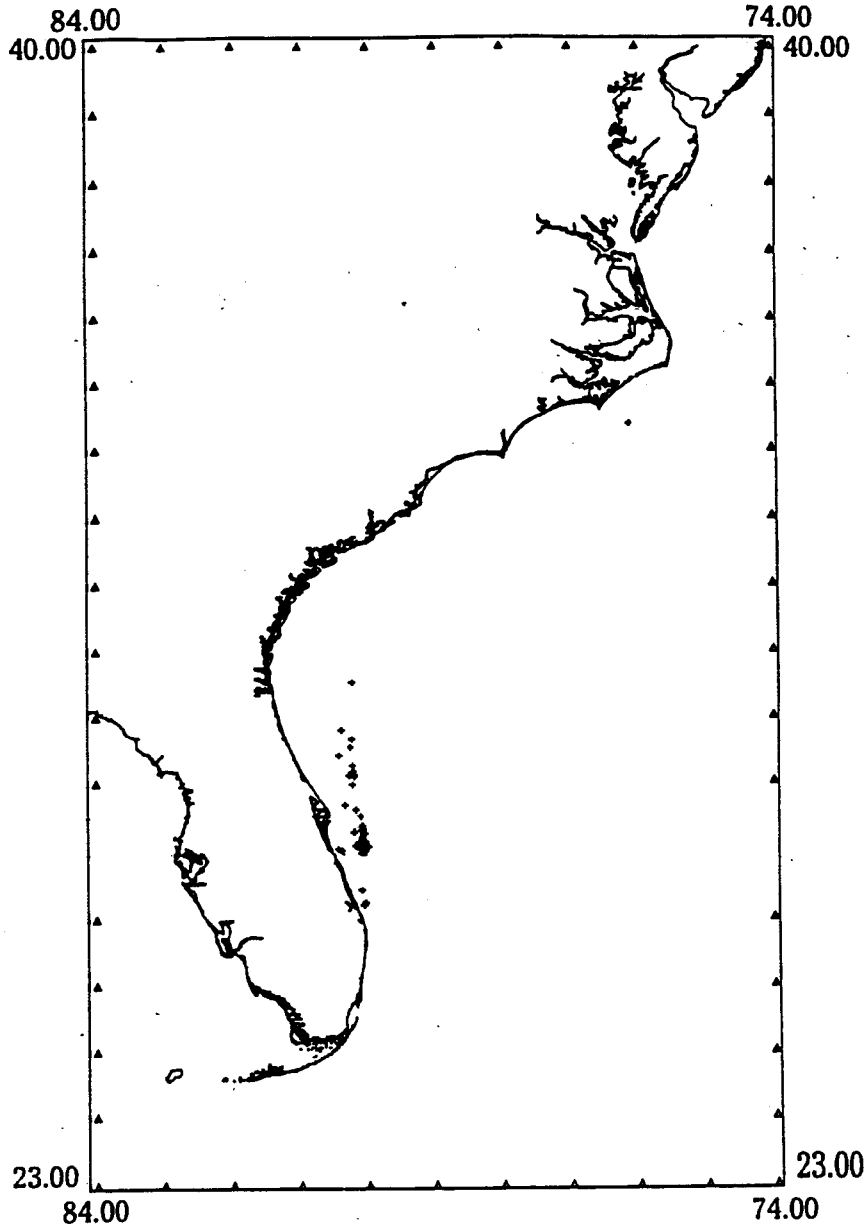
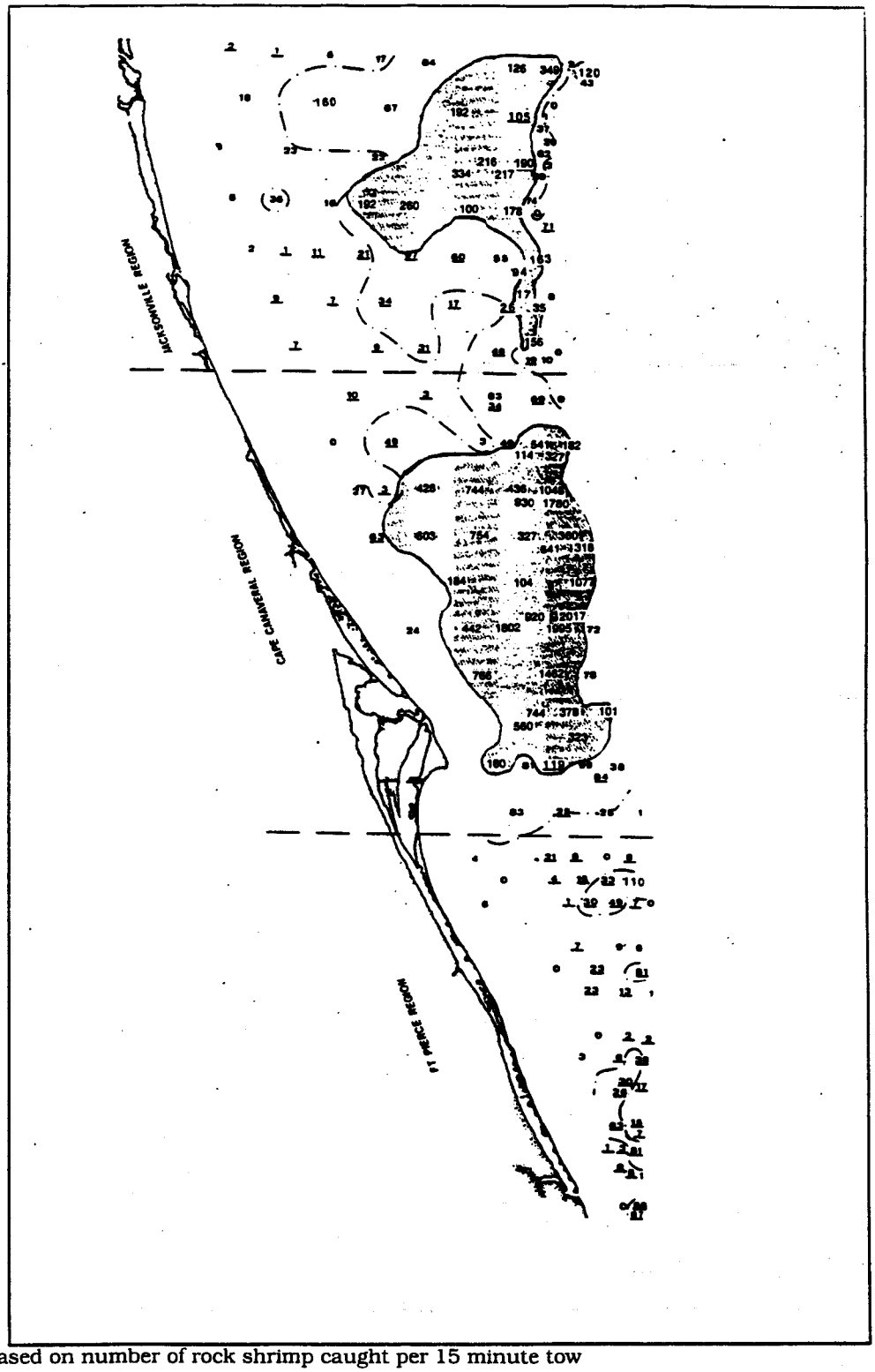


Figure 3. Harvestable rock shrimp distribution in the south Atlantic region as indicated from historic research efforts (1956-1991) using finfish and shrimp trawls (Source: NMFS 1994).

Rock shrimp live mainly on sand bottom from a few meters to 183 m (600 ft), occasionally deeper (SAFMC 1993). The largest concentrations are found between 25 and 65 m (82 and 213 ft) (Figure 4).



* based on number of rock shrimp caught per 15 minute tow

Figure 4. Variability in rock shrimp distribution (shaded area) off the Florida Atlantic shelf as indicated in research trawling efforts (Kennedy et al. 1977).

Biological Characteristics

Maturation

Rock shrimp are dioecious (separate sexes). Female rock shrimp attain sexual maturity at about 17 mm carapace length (CL), and all males are mature by 24 mm CL. Seasonal temperature initiates maturation.

Fecundity and Total Reproductive Capacity

Rock shrimp have ovaries that extend from the anterior end of the cephalothorax to the posterior end of the abdomen. Rock shrimp, as with most shrimp species, are highly fecund. Fecundity most probably, as with penaeids, increases with size.

Kennedy et al. (1977) approximated the contribution of mature female rock shrimp by size class to total reproduction (Figure 5).

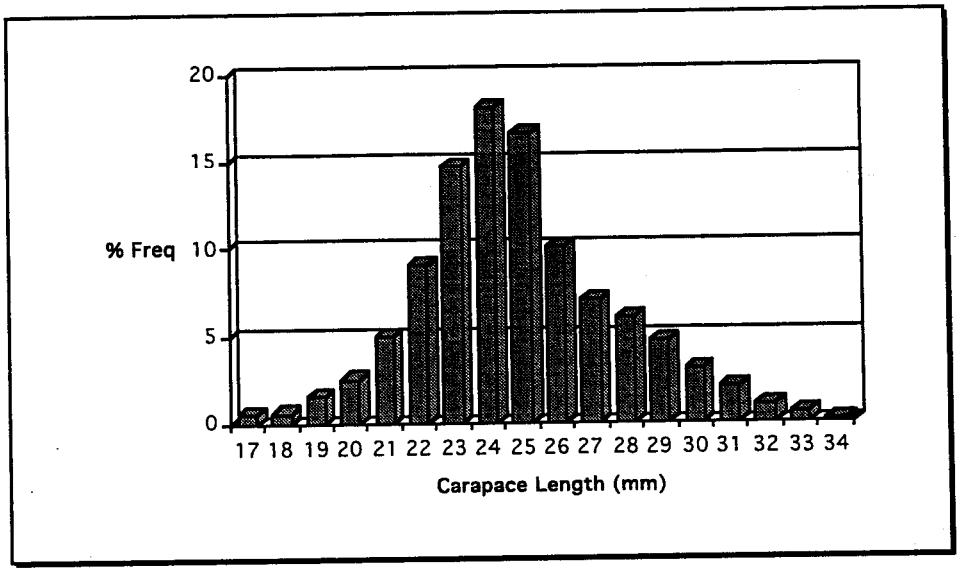


Figure 5. Contribution of mature female rock shrimp by size class to total reproduction (Source: Kennedy et al. 1977).

Mating

In rock shrimp, copulation is believed to take place between hard shelled individuals. During copulation the male anchors the spermatophore to the female's thelycum by the petasma and other structures and a glutinous material. Fertilization is believed to take place as ova and spermatozoa are simultaneously expulsed from the female.

Spawning

Spawning season for rock shrimp is variable with peak spawning beginning between November and January and lasting 3 months. Individual females may spawn three or more times in one season. Peak spawning activity seems to occur monthly and coincides with the full moon (Kennedy et al. 1977).

Ovarian Development

Five ovarian stages, one more than found in penaeid shrimp, have been identified for rock shrimp (Kennedy et al. 1977): 1) Undeveloped; 2) Developing; 3) Nearly Ripe; 4) Ripe; and 5) Advanced Ripe.

Larval and Postlarval Phases

Kennedy et al. (1977) found rock shrimp larvae to be present year round with no trend relative to depth, temperature, salinity, and length or moon phase. The development from egg to postlarvae takes approximately one month. Subsequently the development from postlarvae to the smallest mode of recruits takes two to three months. The major transport mechanism affecting planktonic larval rock shrimp is the shelf current systems near Cape Canaveral, Florida (Bumpus 1973). These currents keep larvae on the Florida Shelf and may transport them inshore in spring.

Length-Weight Relationships

Length-weight relationships for female rock shrimp are as follows:

$W = 1.818\ CL - 30.475$ above 23 mm CL

$W = 3.398 \times 10^{-4}\ CL^{3.364}$ below 23 mm CL

Length-weight relationships for male rock shrimp are as follows:

$W = 1.886\ CL - 30.922$ above 23 mm CL

$W = 4.104 \times 10^{-4}\ CL^{3.303}$ below 23 mm CL

Total length of males and females increases at the same rate until 20 mm CL. The rate of increase in total length for females after reaching 20 mm CL slows down most likely in response to maturity and spawning (Kennedy et al. 1977).

Length-count (count= number of shrimp per pound) relationships have been developed for rock shrimp and are presented in Figure 6.

Growth Patterns, Mortality, and Recruitment

Rates of growth in rock shrimp are variable and depend on factors such as season, water temperature, shrimp density, size, and sex. Rock shrimp grow

about a count a month. Growth is 2 - 3 mm CL per month in juveniles and 0.5 - 0.6 mm CL per month in adults (Kennedy et al. 1977).

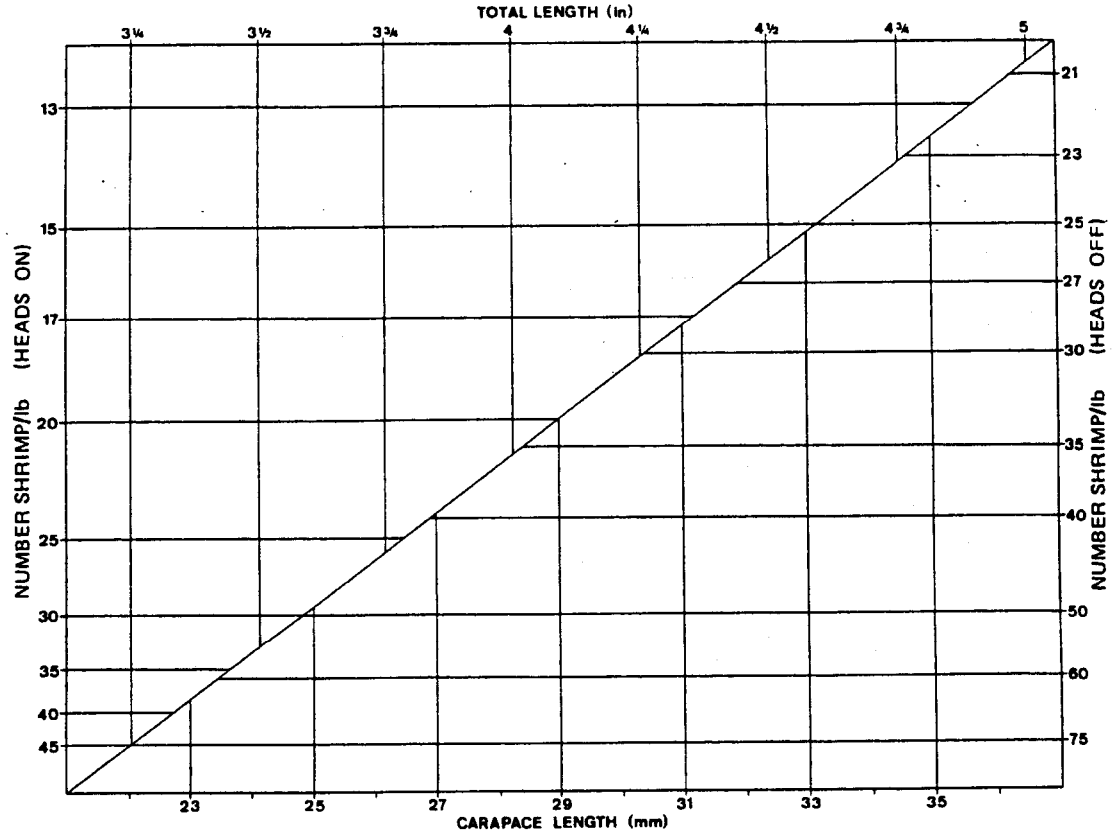


Figure 6. Relationship of rock shrimp length to count size, heads on and heads off (Kennedy et al. 1977).

Density is thought to also affect growth of rock shrimp. In 1993, the industry indicated that rock shrimp were abundant but never grew significantly over 36/40 count which was the predominant size class harvested during July and August of that year. During years of low densities, the average size appears to be generally larger.

Since rock shrimp live between 20 and 22 months, natural mortality rates are very high, and with fishing, virtually the entire year class will be dead at the end of the season. The intense fishing effort which exists in today's fishery, harvests exclusively the incoming year class. Three year classes were present in sampling conducted between 1973 and 1974 by Kennedy et al. (1977). Fishing mortality in combination with high natural mortality and possibly poor

environmental conditions, may be high enough to prevent any significant escapement of adults to constitute a harvestable segment of the population. The better than average rock shrimp production in the 1994 season possibly resulted from better environmental conditions more conducive to rock shrimp reproduction and spawning.

Recruitment to the area offshore of Cape Canaveral occurs between April and August with two or more influxes of recruits entering within one season (Kennedy et al. 1977).

Estimation of Survival Rates Used in Rock Shrimp Analysis (Appendix B)

A yield per recruit analysis was conducted by SAFMC staff based on estimated survival rates developed from growth information contained in Kennedy et al. (1977). Researchers observed three generations of shrimp during part or all of their life cycle: G1 (January 1973 through November 1973), G2 (April 1973 through November 1974), and G3 (April 1974 through December 1974). Survival rates were estimated for two of the three generations. The observed change in carapace length (CL) was used as an estimate of growth rate and was rapid from May through August 1973 and May through September 1974. Mean carapace lengths (measured to nearest 0.5 mm) for G2 males and females beginning in May 1973 and G3 males and females beginning in May 1974 were approximated from Figure 20, page 30 of Kennedy et al. (1977). Growth was estimated directly from mean carapace length for each month from May to October. Mean carapace length was converted to mean weight in grams from length-weight equations for males and females presented in Kennedy et al. (1977).

B. Abundance and Present Condition

Population size is thought to be regulated by environmental conditions and available bottom habitat. While fishing certainly reduces the population size over the course of the season, it is unknown what impact fishing has on subsequent year class strength. Year class and adult abundance follows a yearly cycle, peaking in the fall and exponentially declining until a new year class appears in the spring. Estimates of population size are not available but since effort in the fishery is high, the fishery may be considered to be fished at near maximum levels. Annual landings are probably a good indication of relative abundance. Annual variation in catch is presumed to be due to a combination of prevailing environmental conditions, fishing effort, price, and relative abundance of shrimp. When looking at a landings comparison of rock shrimp and calico scallops,

another species whose catch is thought to be dependent on environmental conditions and availability, relative increases and decreases between 1989 and 1994 tend to track each other (Figure 7).

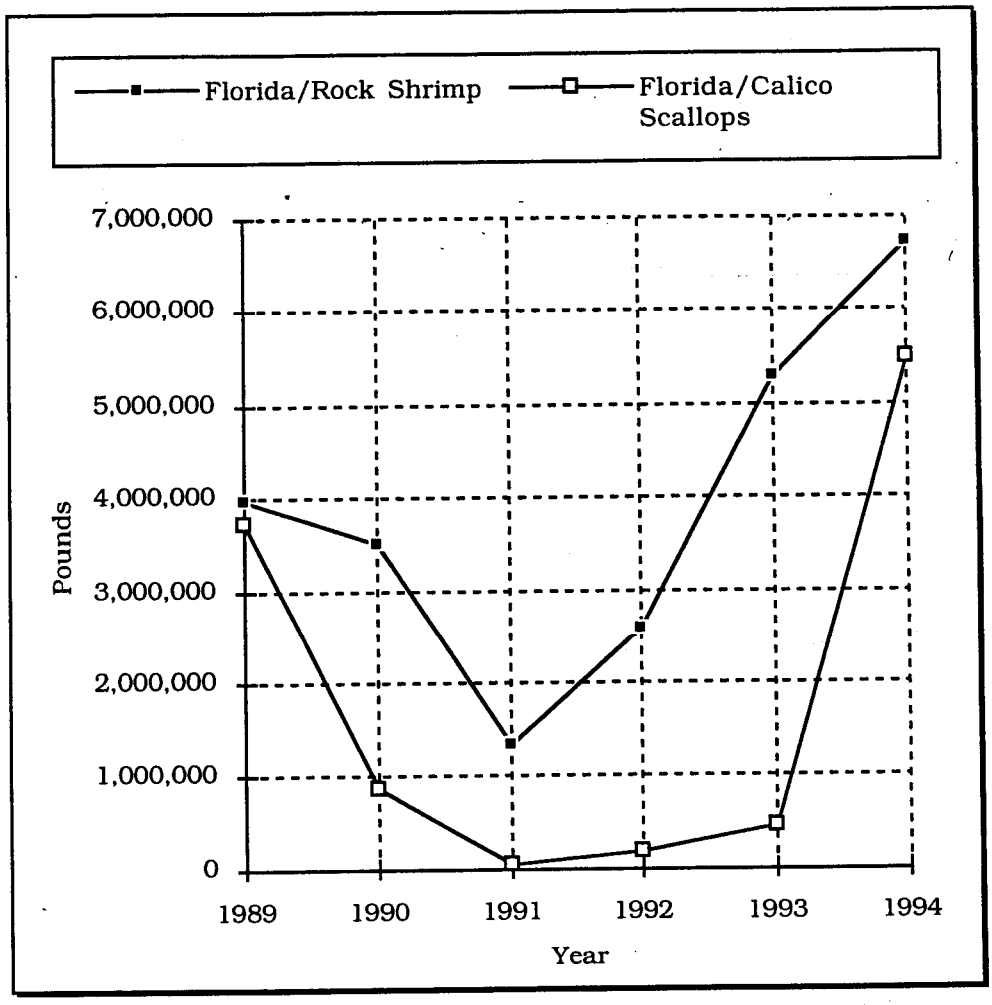


Figure 7. Commercial landings comparison of rock shrimp (heads on) and calico scallops (meats) harvested off the east coast of Florida in the south Atlantic EEZ between 1989 and 1994 (Source: FDEP 1995).

Annual landings of rock shrimp vary considerably from year to year (Figure 8). When looking at the entire south Atlantic shrimp fishery by state, the general patterns identified in the original management plan continue to hold, with rock shrimp playing a greater role in terms of weight in the Florida east coast fishery.

The contribution of each species to total shrimp landings in the south Atlantic varies in a relatively consistent pattern among the four southeastern states. In North Carolina, brown shrimp is the principal species while white shrimp are a minor component of the overall catch, with pink shrimp sometime being an important component of the catch and rock shrimp constituting a minor

component of any year's catch. In South Carolina and Georgia, there are virtually no pink shrimp in the landings which are dominated by white shrimp. The relative contribution of brown shrimp to the catch varies yearly, but rarely exceeds the catch of white shrimp. Rock shrimp landings in recent years have been either nonexistent or minimal for South Carolina and constitute a low percentage of total shrimp catch for Georgia vessels. In northeast Florida, some pink shrimp enter the catch, primarily as a bycatch of the rock shrimp fishery, but as in Georgia and South Carolina, white shrimp predominate in terms of value. In recent years, landings of rock shrimp have become an increasing component of shrimp landings in Florida.

The rock shrimp fishery has changed over the last few years from the historic fishery that was prosecuted almost exclusively north of Cape Canaveral, Florida, to a fishery where new vessels have been harvesting as far south as St. Lucie, Florida. With the recent increases in availability of rock shrimp in the last two years and the higher price paid, especially in 1994, large freezer boats (>70 ft) dominate the present day fishery. State of Florida records indicated that vessels landing rock shrimp in Florida in 1994 were from Florida, Texas, Georgia, Alabama, North Carolina, and South Carolina. Rock shrimp production in the south Atlantic region for 1994 by year is shown in Appendix D. State data indicate that rock shrimp landings have averaged 3,451,132 pounds (heads on) between 1986-94 with the lowest catch occurring in 1991 and the highest recorded catch occurring in 1994 (Figure 8).

C. Ecological Relationships

Food, Substrate, and Predation

Along the Florida Atlantic coast, the predominant substrate inside of 200 m depth is fine to medium sand with small patches of silt and clay (Milliman 1972). Juvenile and adult rock shrimp are bottom feeders. Stomach contents analyses indicated that rock shrimp primarily feed on small bivalve mollusks and decapod crustaceans (Cobb et al. 1973). Based on stomach contents of rock shrimp analyzed, Kennedy et al. (1977) found the relative abundance of particular crustaceans and mollusks corresponding to their availability in the surrounding benthic habitat (Appendix E).

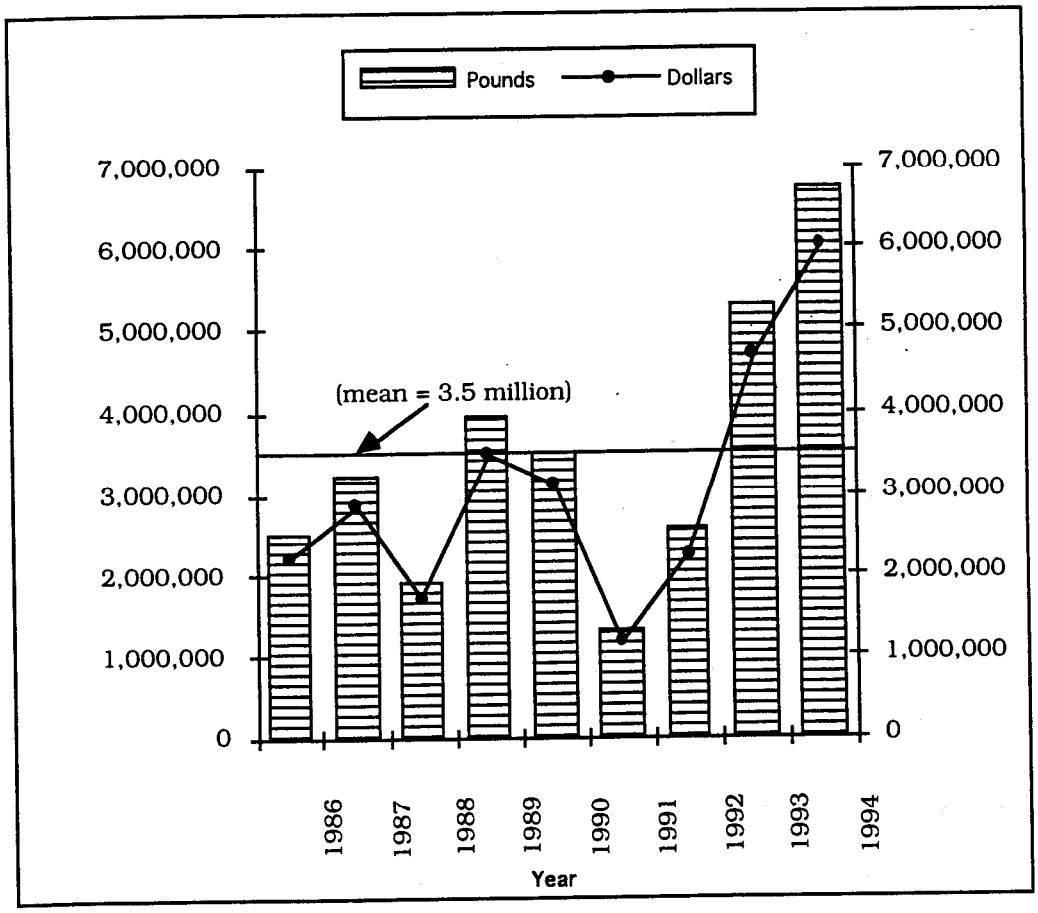


Figure 8. Commercial landings of rock shrimp (heads on) harvested in the south Atlantic region 1986-1994 (Source: SCDNR, GDNR, FDEP, and NCDMF 1995).

Description of Rock Shrimp Habitat

A description of shrimp habitat and recommendations to protect habitat were contained in the shrimp management plan (SAFMC 1993). The bottom habitat on which rock shrimp thrive is thought to be limited. Kennedy et al. (1977) determined that the deepwater limit of rock shrimp was most likely due to the decrease of suitable bottom habitat rather than to other physical parameters including salinity and temperature. Cobb et al. (1973) found the inshore distribution of rock shrimp to be associated with terrigenous and biogenic sand substrates and only sporadically on mud. Rock shrimp also utilize hard bottom and coral or more specifically *Oculina* coral habitat areas. This was confirmed with research trawls capturing large amounts of rock shrimp in and around the Oculina Bank HAPC prior to its designation (Appendix I). Also, a common technique used by fisherman searching for rock shrimp was described during public hearings. This technique involves first locating coral or hard bottom and then trawling around it on the associated sand/shell bottom.

Other than Kennedy et al. (1977), no characterization of rock shrimp habitat or bycatch in the rock shrimp fishery has been conducted. In order to address issues raised by NMFS during informal review, a list of species associated with the benthic habitat inhabited by rock shrimp was compiled from research trawling efforts (1955-1991) that captured harvestable levels of rock shrimp. This list of species caught in association with rock shrimp discussed under the Section on bycatch in the fishery is included in Appendix I. In addition, Kennedy et al. (1977), during research efforts sampling the major distribution area of rock shrimp off the east coast of Florida, compiled a list of crustacean and molluscan taxa associated with rock shrimp benthic habitat (Appendix E).

Description of *Oculina* Coral Habitat

Oculina coral (*Oculina varicosa*) is distributed along the south Atlantic shelf with concentrations occurring off the central east coast of Florida (Figure 9). According to Reed (1980) the majority of massive *Oculina* growth occurs between 27° 30' N. latitude and 28° 30' N. latitude which is encompassed by the proposed management measures. *Oculina*, a slow growing coral species, constitutes essential habitat to a complex of species, including those managed under the snapper grouper fishery management plan (SAFMC 1983) . The average growth rate for *Oculina varicosa* at a depth of 80 m was estimated to be very slow, 16 mm/year (Reed 1981). Bullis and Rathjen (1959) identified rugged coral formations in depths from 27 to 180 m between St. Augustine and Cape Canaveral, Florida. The highest growth rate for *Oculina* is on the top or on the current facing mound. Oculina Banks thrive in areas of strong currents (up to 60 cm/second) which are thought to contribute to the growth of the coral (Reed 1992). Reed also described *Oculina varicosa* as follows:

> *Oculina varicosa* forms spherical, dendroid, bushy colonies that are 10 cm to 1.5 m in diameter and height. Individual corals may coalesce forming linear colonies 3-4 m in length or massive thickets of contiguous colonies on the slopes and tops of the banks (Reed 1980). The deep-water form lacks zooxanthellae, whereas in shallow water *Oculina varicosa* is usually golden brown with the algal symbiont and colonies average <30 cm in diameter with thicker branches. Deep-water banks of the coral, however, are only known from 27°32' N and 79°59' W to 28°59' N and 80°07'W....

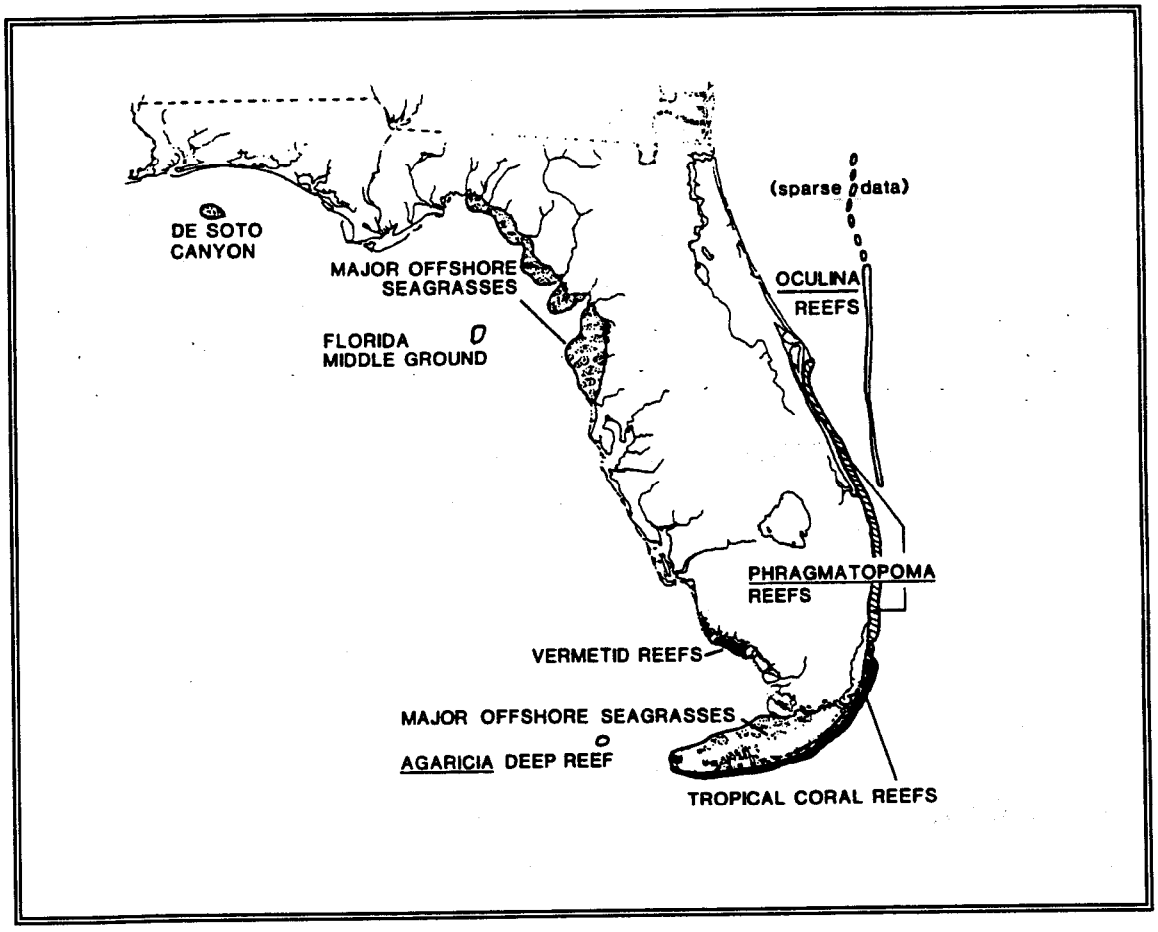


Figure 9. General distribution of *Oculina* coral (*Oculina varicosa*) (Source: AFS 1985).

Deepwater coral communities support a very rich and diverse community composed of large numbers of species of mollusks, amphipods, and echinoderms with *Oculina* constituting the dominant species. The diversity of this system is equivalent to that of many tropical reef systems (Reed 1992). The geomorphological nature of the deepwater Oculina Banks is characterized by high current regimes which trap fine sand, mud, and coral debris forming the basis for the diverse invertebrate community (Reed 1992). Other species associated with *Oculina* banks are presented in Table 2.

To protect this fragile limited coral habitat, a 92 square mile Oculina Bank Habitat Area of Particular Concern (HAPC) was established under the Federal Fishery Management Plan for Coral and Coral Reefs (GMFMC and SAFMC 1982) (Figure 10). Existing regulations protecting the Oculina HAPC are as follows:

Regulations in the Coral Fishery Management Plan

§638.23 Habitat areas of particular concern.

(c) The Oculina Bank. The Oculina Bank is located approximately 15 nautical miles east of Fort Pierce, Florida, at its nearest point to shore and is bounded on the north by 27° 53' N. latitude, on the south by 27° 30' N. latitude, on the east by 79° 56' W. longitude, and on the west by 80° 00'W. longitude In the HAPC, fishing with bottom longlines, traps, pots, dredges, or bottom trawls is prohibited. See §646.26 (d) of this chapter for prohibitions on fishing for snapper-grouper in the Oculina Bank HAPC.

Regulations in the Snapper Grouper Fishery Management Plan

§ 646.26 Area limitations

(d) *Habitat area of particular concern* (HAPC). (1) The Oculina Bank, which is a coral HAPC under § 638.23(c) of this chapter, is bounded on the north by 27° 53' N. latitude, on the south by 27° 30' N. latitude, on the east by 79° 56' W. longitude, and on the west by 80° 00' W. longitude.

(2) No fishing for fish in the snapper-grouper fishery may be conducted in the Oculina Bank HAPC; such fish may not be retained in or from the Oculina Bank HAPC. Fish in the snapper-grouper fishery taken incidentally in the Oculina HAPC by hook-and-line must be released immediately by cutting the line without removing the fish from the water. It is a rebuttable presumption that fishing aboard a vessel that is anchored in the HAPC constitutes fishing for fish in the snapper-grouper fishery.

(3) See §638.23(c) of this chapter for prohibitions on fishing with bottom longlines, traps, pots, dredges, and bottom trawls in the Oculina HAPC.

In addition, *Oculina* coral serve as an important habitat to many species of finfish. A list of finfish species collected in and around *Oculina* reef habitats, is presented in Table 2 (Reed 1982). Some species may be possible bycatch if trawling occurs on or around the *Oculina* banks.

Table 2. Species list of fish observed or collected on *Oculina* reefs off central eastern Florida (Source: Reed 1982).

Species	Common Name
MURAENIDE	Morays
Gynothorax nigromarginatus	
Muraena milaris	
CLUPEIDAE	Herrings
Sardinella anchovia	Spanish sardine
BATRACHOIDIDAE	Toadfishes
Opsanus pardus	
HOLOCENTRIDAE	Squirrelfishes
Corniger spinousu	
Holcentrus ascensionis	
SERRANIDAE	Seabasses
Centropristis ocyurus	Bank seabass
Centropristis philadelphia	Rock seabass
Centropristis striata	Black seabass
Epinephelus adscensionis	Rock hind
Epinephelus drummondhayi	Speckled hind
Epinephelus itajara	Jewfish
Epinephelus morio	Red grouper
Epinephelus nigritus	Warsaw grouper
Epinephelus niveatus	Snowy grouper
Hemanthias vivanus	Red barber
Holoanthias martinicensis	
Liopropoma eukrines	Wrasse basslet
Mycteroperca bonaci	Black grouper
Mycteroperca nicrolepis	Gag grouper
Mycteroperca phenax	Scamp grouper
Plectranthis garrupellus	
Serranus phoebe	Tattler
Serranus sublingarius	Belted sandfish
GRAMMISRIDAE	Soapfishes
Rypticus maculatus	
Rypictus saponaceus	
PRIANCANTHIDAE	Bigeyes
Priacanthus arenatus	
Priacantus alta	
APOGONIAE	Cardinalfishes
Apogon pseudomaculatus	
CARANGIDAE	Jacks
Caranx hippos	Jack crevalle
Decapterus dumerili	Round scad
Seriola dumerili	Greater amberjack
Seriola rivoliana	Almaco jack
Caranx crysos	Blue runner
LUTJANIDAE	Snappers
Lutjanus campechanus	Red snapper
Lutjanus griseus	Gray snapper
Lutjanus synagris	Lane snapper
Rhomboplites aurorubens	Vermilion snapper
POMADASYIDAE	Grunts
Haemulon aurolineatum	Tomtate
SPARIDAE	
Archosargus probatocephalus	Sheephead
Pagrus pagrus	Red porgy

Table 2. Species list of fish observed or collected on *Oculina* reefs off central eastern Florida (cont.).

Species	Common Name
SCIAENIDAE	Drums
Equetus acuminatus	
Equetus lanceolatus	
Equetus umbrosus	
Equetus n. sp.	
CHAETODONTIDAE	Butterflyfishers
Chaetodon aya	
Chaetodon ocellatus	
Chaetodon sedentarius	
POMACANTHIDAE	Angelfishes
Chromis bermudensis	
Chromis scotti	
Eupomacentrus variabilis	
LABRIDAE	Wrasses
Bodianus pulchellus	
Halichoeres bivittatus	
Halichoeres caudalis	
Halichoeres bathyphilus	
GOBIIDAE	Gobies
Lythrypnus nesiotes	
Lythrypnus spilus	
SCOMBRIDAE	Mackerals and Tunas
Acanthocymbium solandri	Wahoo
Euthynnus alletteratus	Little tunny
Scomberomorus cavalla	King mackeral
Scomberomorus maculatus	Spanish mackeral
SCORPAENIDAE	Scorionfishes
Neomerinthe hemingwayi	
Scorpaena brasiliensis	
Scorpaena dispar	
MOLIIDAE	Molas
Mola mola	Ocean sunfish
MOBULIDAE	Mantas
Manta birostris	Atlantic manta
CARCHARINIDAE	Requiem sharks
Galeocerdo cuvieri	Tiger shark
SPHYRNIDAE	Hammerhead sharks
Sphyrna lewini	Scalloped hammerhead

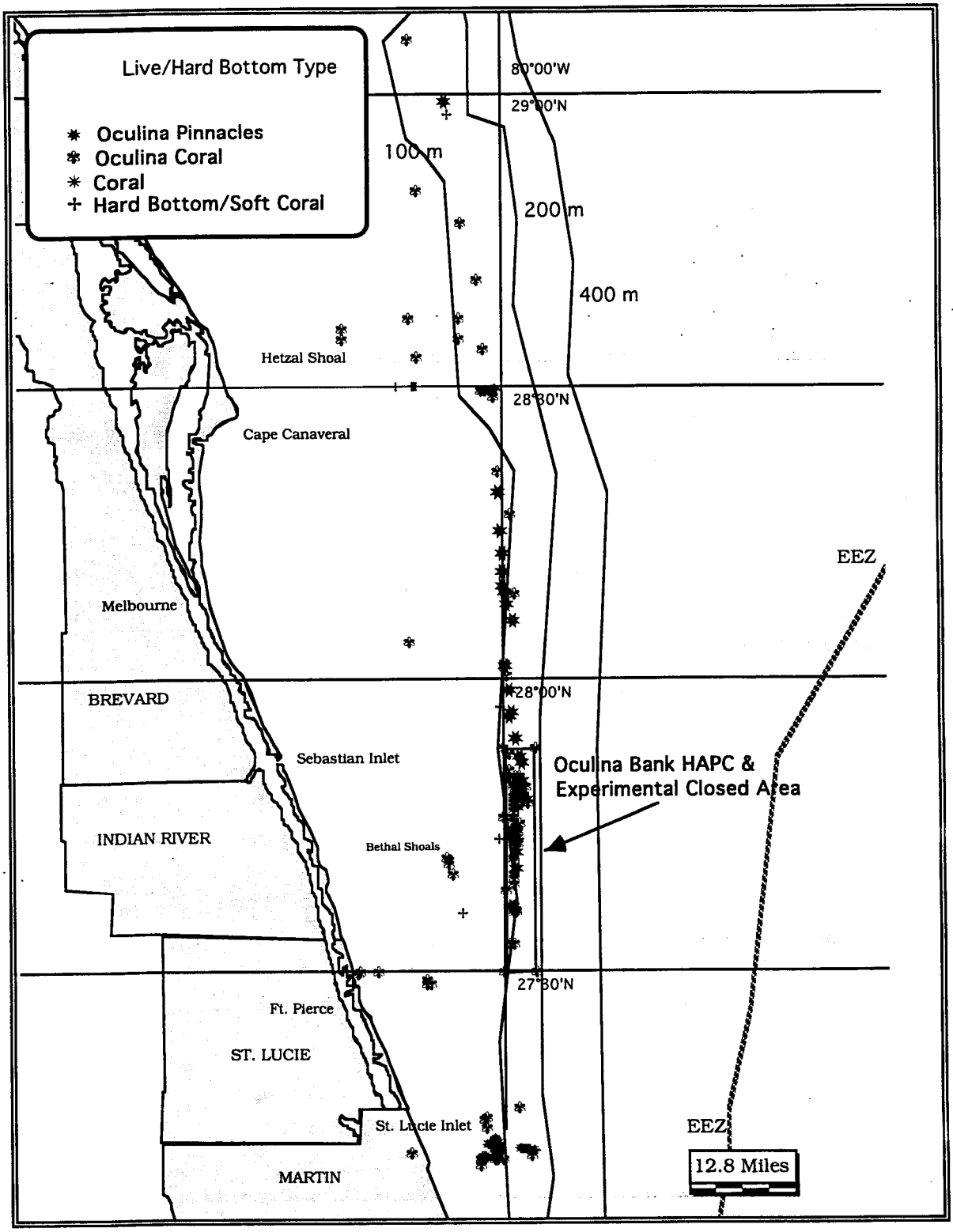


Figure 10. Map of coral (*Oculina varicosa*), coral reef and live/hard bottom habitat distributed along the south Atlantic shelf off the central east coast of Florida (Source: SAFMC 1995).

D. Maximum Sustainable Yield

Because rock shrimp live only 20-22 months landings fluctuate considerably from year to year depending primarily on environmental factors. Maximum sustainable yield (MSY) is not a particularly useful concept. Although there is a good historical time series of catch data, the associated effort data are not considered adequate to calculate MSY. Nevertheless, mean total landings may be considered to be a reasonable proxy for MSY. The harvest of rock shrimp in the region has fluctuated (Figure 8) while fleet size and fishing power have increased tremendously. In the last three years catch has increased and possibly fishing effort. If the increase in rock shrimp landings is due to increased effort, market development and product acceptance, and the expansion of the fishery south of Cape Canaveral, the rock shrimp resource may be fully exploited.

E. Probable Future Condition

The status of rock shrimp stocks in the south Atlantic at is unknown. However, because of high fecundity rock shrimp are capable of rebounding from a very low population size in one year to a high population size in the next. Fluctuations in abundance resulting from changes in environmental conditions will continue to occur.

F. Optimum Yield

Optimum yield is MSY which for the rock shrimp fishery in the south Atlantic EEZ is defined as the amount of harvest that can be taken by U.S. fisherman without reducing the spawning stock below the level necessary to ensure adequate reproduction.

G. Definition of Overfishing

At present calculation of maximum sustainable yield (MSY) is not possible for the rock shrimp fishery along the east coast of the United States (NMFS 1993). Although there is a good relationship between monthly catch and effort, there is a poor relationship between monthly CPUE and effort data, therefore MSY cannot effectively be calculated (NMFS 1993). This is because different vessel size categories participate in the fishery and the effort unit is not standardized. Since MSY cannot now be calculated, another index level was selected as a basis for a definition of recruitment overfishing for rock shrimp. The council considered options for a definition of overfishing for rock shrimp based on the 1993 NMFS

SAFE report to the SAFMC. NMFS Southeast Fisheries Science Center comments supplied to the council during the informal review process indicate an overfishing definition based on CPUE would be inappropriate because there was no relationship between CPUE and effort data. In addition, NMFS SEFSC indicated an appropriate definition for overfishing should be based on annual catch and be two standard deviations above the mean annual landings over a set time period. The council selected the following definition based on NMFS comments.

The south Atlantic rock shrimp resource is overfished when the annual landings exceed the value which is two standard deviations above mean landings 1986-1994. This level, based on the more accurate state data, is 6,829,449 pounds heads on.

H. Description of Fishing Activities

Given the distance from shore, depth of water, and gear necessary to harvest rock shrimp there is no recreational fishery. The rock shrimp commercial fishery has existed off the east coast of Florida for approximately twenty-five years. The relatively late beginning for this shrimp fishery, compared to other southeast shrimp fisheries can be attributed to the lack of a viable market for the crustacean once considered "trash." Rock shrimp found a niche in the local fresh market and restaurant trade during the early 1970's, and became a regional delicacy. During those early years rock shrimping was primarily a local fishery with boats principally from the east coast of Florida, Georgia, North Carolina, and South Carolina. Today the fishery has grown and rock shrimp are now being marketed world wide. Expanding markets created growth within the industry which in turn has changed the composition of the rock shrimp fishery including the harvesting and the intermediate sector.

In the south Atlantic region there is essentially one user group exploiting the rock shrimp resource, commercial trawlers. Rock shrimp (*Sicyonia brevirostris*) harvested by commercial vessels is the only one of six species of *Sicyonia* reported for the south Atlantic coast which attains a commercial size (Keiser 1976). When the rock shrimp industry began, few vessels participated on a full time basis with some vessels making a few trips a year when the white and brown shrimping ended, or as a bycatch of the penaeid shrimp fishery (Dennis 1992). Over the past five years there has been an increase in effort in terms of the number of vessels participating.

The south Atlantic rock shrimp fishery may have as many as 108 active vessels according to State of Florida landings data, although industry

representatives propose the number of vessels actively participating throughout the season may be closer to 65 (SAFMC 1995). Nevertheless, all sources indicate there has been an increase in the number of participants with more boats from the Gulf of Mexico region entering the fishery recently. This increase in participants and the new markets for rock shrimp mentioned earlier are reflected in the increased landings in Figure 8.

The increase in participants and market opportunities for smaller rock shrimp has brought about a subsequent change in harvesting patterns. The rock shrimp fishery historically was prosecuted along Florida's east coast from Cape Canaveral to as far north as Jacksonville. Recently, vessels have been reported fishing as far south as St. Lucie County. This recent shift in effort to the south reflects new participation in the fishery as the majority of those harvesting these new areas are from the Gulf region.

As shown in Figure 8 landings of rock shrimp have increased substantially over the past few years. Much of this increase may be attributed to increased effort within the fishery. However, there does seem to be a cyclical pattern to the abundance of rock shrimp that is driven primarily by environmental factors. The recent trend in landings may begin to decrease if the pattern continues as suggested by past trends. The recent increase in landings has generated concern within some sectors of the industry and with the council. In order to clarify for the council the impacts of this shift in effort, industry representatives provided information concerning socio-demographic characteristics, landings data, and harvest areas. Tables 3-5 and figures 11-12 provide a profile of the rock shrimp harvesting and intermediate sectors based upon information provided by the industry.

The following description is the result of information provided by fifty individuals in the rock shrimp industry during the public hearing process. Of those fifty individuals, 44 were harvesters and 6 were dealers or processors. While this does not represent a random sample of the rock shrimp fishery, this data does represent the best information available for harvesters in this fishery. If industry estimates are correct then this sample represents over 65% of the harvesters within the rock shrimp fishery. The landings of 5,171,699 pounds reported by the 44 harvesters represents 77% of the total landings in 1994 for the south Atlantic region reported by FDEP.

Socio-demographic profile

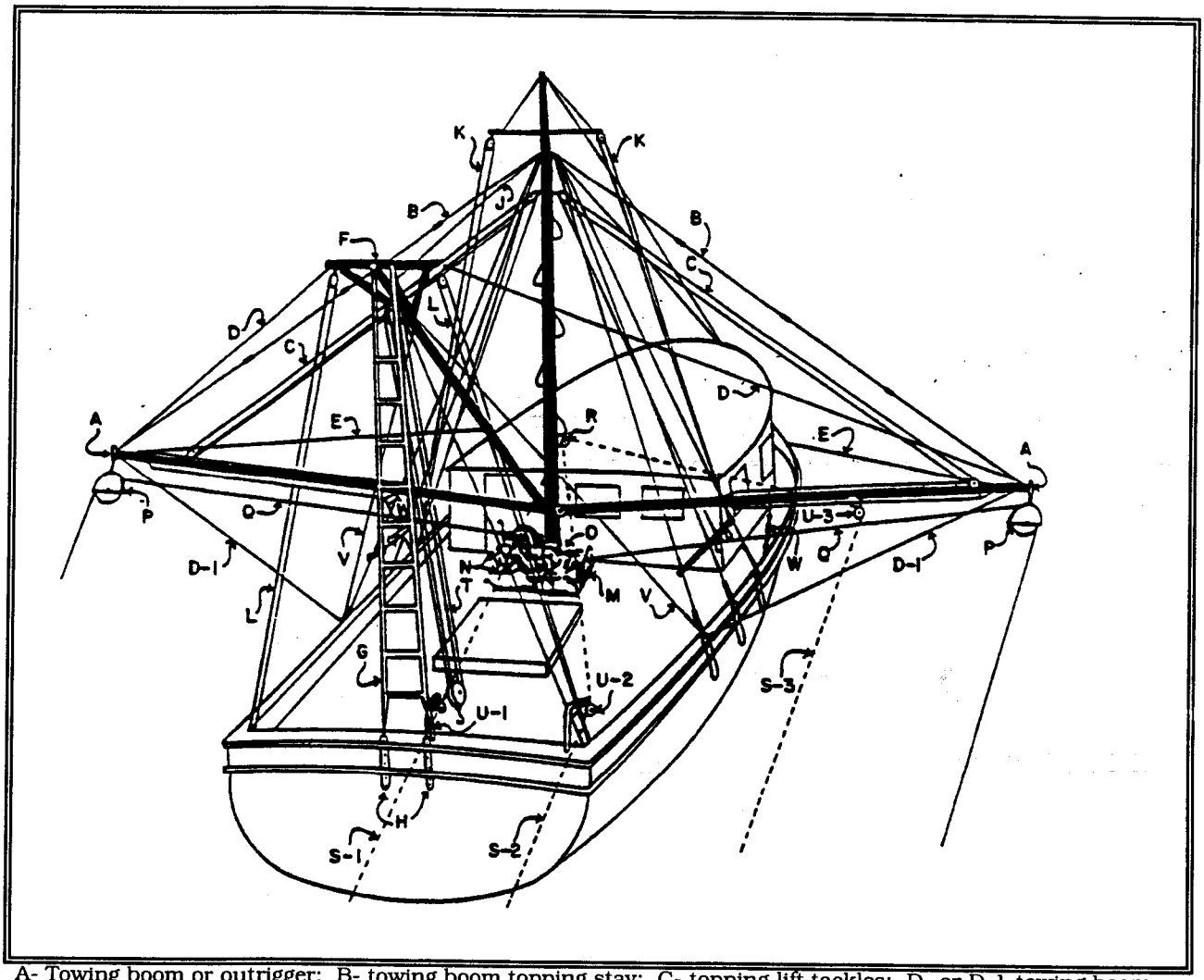
As shown in Table 3, of those harvesters indicating marital status all but three were married and all but three had children. Well over half were high school graduates, and 19% had continued their education beyond high school. Of those harvesters included in this report, thirty (73%) were captain owners, ten were captains, and one was a crew member.

Table 3. Demographic characteristics of a comparative subsample of rock shrimp harvesters for 1994.

Variable	Frequency	Percent	N
Marital status			n=40
Married	37	93%	
Not married	3	7%	
Dependents			n=40
Has children	37	93%	
Does not have children	3	7%	
Education			n=40
Grade school	2	5%	
Some high school	9	23%	
High school graduate	21	53%	
Vocational/tech school graduate	1	2%	
Some college	6	15%	
College graduate and more	1	2%	
Status			n=41
Captain/owner	30	73%	
Captain	10	24%	
Crew	1	2%	

Trawl Vessels

There are two types of vessels in the rock shrimp fishery: ice or fresh boats and freezer boats. Most newer rock shrimp trawlers are 75-80 feet in length and are rigged to tow two to four nets simultaneously. The double-rigged shrimp trawler has two outrigger booms from whose ends, the cable from the winch drum is run through a block to the two nets (Figure 11). Testimony at hearings indicated that a standard freezer trawler was around 73 feet and would pull four forty-foot nets.



A- Towing boom or outrigger; B- towing boom topping stay; C- topping lift tackles; D- or D-1-towing boom outrigger back stay; E- towing boom outrigger bow stay; F- modified boom; G- boom back stays- ratline structure; H- boom back stay plate on transom; J- boom topping lift stay; K- single block tackle; L- single block tackle; M- trawl winch; N- heads, two on trawl winch; O- center drum for trynet warp; R- leading block for try net; S-1, S-2, S-3- trynet lead block; T- main fish tackle tail block; U-1, U-2, U-3- trynet lead block; any one may be used to accord with selection of S-1, S-2, or S-3; V- boom shrouds; W- chain stoppers for outriggers.

Figure 11. Rigged shrimp vessel similar to ones used in rock shrimp fishery (SAFMC 1993).

Essentially the only gear used in the rock shrimp fishery is the trawl (Figure 12) which consists of: (1) a cone-shaped bag in which the shrimp catch are gathered into the tail or cod end; (2) wings on each side of the net for herding shrimp into the bag; (3) trawl doors at the extreme end of each wing for holding the wings apart and holding the mouth of the net open; and (4) two lines attached to the trawl doors and fastened to the vessel. A ground line extends from door to door on the bottom of the wings and mouth of the net while a float line is similarly

extended at the top of the wings and mouth of the net. A flat net is more often used when fishing for rock shrimp since they burrow into the bottom to escape the trawl. This net has a wider horizontal spread than other designs and is believed more effective.

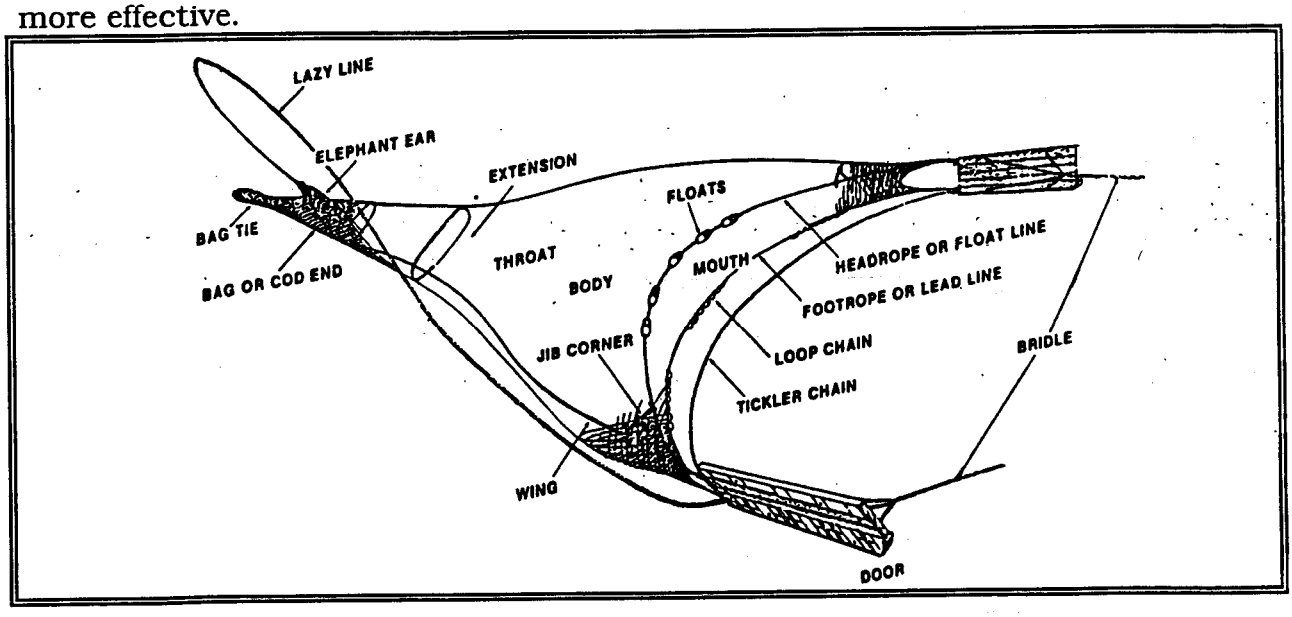


Figure 12. General shrimp trawl configuration (NMFS 1992b).

Some vessels use twin trawls, which are essentially two trawls on a single set of doors, joined together at the head and foot ropes to a neutral door connected to a third bridle leg. Thus, instead of towing two seventy-foot nets the vessel tows four forty-foot nets. This rig has some advantages in ease of handling and increased efficiency.

The length of tows varies depending on many factors including the concentration of shrimp. Large boats fishing offshore waters make much longer drags lasting several hours. Testimony at public hearings indicated that vessels may drag up to 30 to 35 miles over a number of tows in one night fishing for rock shrimp.

Fleet Characteristics

Fleet characteristics for the south Atlantic rock shrimp fishery have most likely changed over the years with entry of new participants from the Gulf states. As shown in Table 4, the majority of vessels were from south Atlantic states, with most of those from Florida. However, 40 percent of the vessels included in this profile reported they were from Gulf states. There was no information provided by vessels from North Carolina.

Anecdotal information suggests in the past the majority of boats in the rock shrimp fishery were wooden ice boats. Almost half of the harvesters providing information for this report had steel hulled vessels and 84% were freezer boats. There were only seven ice boats (see Table 4). Of the vessels included in this report, over 75% were at least ten years old; over half were 15 years or older.

Table 4. Fleet characteristics for a comparative subsample of the 1994 rock shrimp fishery.

Variable	Frequency	Percent	N
State which vessel was registered			n=43
Florida	19	44%	
Alabama	14	33%	
South Carolina	3	7%	
Georgia	4	9%	
Texas	3	7%	
Vessel construction type			n=43
Steel	21	49%	
Wood	13	30%	
Fiberglass	9	21%	
Type of vessel			n=43
Freezer	36	84%	
Ice	7	16%	
Year vessel built			n=43
1975 & before	8	19%	
1976 - 1980	22	51%	
1981- 1985	7	16%	
1986 - 1990	1	2%	
1991 -1994	5	12%	

One of the primary distinctions within the rock shrimp fishery as mentioned before is that between vessels from the south Atlantic and vessels from the Gulf of Mexico. Table 5 outlines some of those differences with regard to harvesters and their vessels.

Harvesters from the south Atlantic on average were older and have been rock shrimping much longer than harvesters from the Gulf states. Harvesters from both regions have long tenures as fishermen with each average close to the overall mean of twenty-five years. Gulf vessels tended to be longer, had more

crew, and pulled larger nets on average. Moreover, these vessels made fewer and longer trips than those from the south Atlantic. Average catch was higher for Gulf vessels, as was the dollar amount needed to break even per/day while fishing.

Table 5. A comparative subsample of rock shrimp harvester characteristics by region (ice boats and freezer boats combined).

Variable	Average for Gulf Region	n	Average for South Atlantic Region	n	Average Combined Gulf/SA*	n
Age	43	14	47	26	46	40
Years as a fisherman	24	14	26	26	25	40
Years as a rock shrimper	5	14	15	26	11	40
Boat Length (ft)	81	17	75	26	78	43
Number of crew (ft)	5	17	3	26	4	43
Size nets (ft)	55	17	45	26	50	43
Net mesh size (in)	1 7/8	17	1 7/8	26	1 7/8	43
Bag mesh size (in)(mode)	1 3/4	17	1 3/4	24	1 3/4	41
Trip length (days)	21	16	14	22	17	38
Number of trips	5	16	9	21	7	37
Amount to break even/day	$1050/day	7	$922/day	13	$967/day	20
Average catch (lb)	46,633	14	20,892	20	31,491	34
Exvessel Price	$1.20	14	$1.22	17	$1.21	31

Combined Gulf/SA is the total for both regions divided by the number for both regions.

Rock Shrimp Vessel Economics

During the 1994 season, two types of vessels trawled for rock shrimp. The predominant vessel type was the freezer boat that ranged from 56 to 75 feet in length. A few ice boats (up to 56 feet in length) also participated in the fishery. The freezer boats made trips that lasted up to 20 days and the ice boats operated on 5-7 day trips.

Approximately 65 vessels were reported to have actively participated in the fishery throughout the season, seven of them were ice boats. Anecdotal data indicated that the larger freezer boats needed to make a minimum gross revenue of $1,200 a day in order to break even. Ice boats required a gross revenue of $800 a day to break even. Forty percent of the gross revenue goes to the crew. The remaining 60 percent goes to the boat owner to cover fixed costs, operating costs,

etc. Average total catch per trip were around 36,000 pounds for freezer boats and 15,000 pounds for ice boats (heads-on). Freezer boats received an average of $1.25 per pound as exvessel price, while ice boats received an average of $1.00 per pound. No information was available on fixed and operating costs. Based on total revenue and minimum revenue needed to operate, fixed and operating costs per trip were estimated at $12,000 to $14,400 and $3,360 for freezer and ice boats respectively.

Harvest Area Information

The commercial rock shrimp fishery historically occurred from St. Augustine, Florida to Cape Canaveral, Florida (Hetzal Shoals). Today the directed fishery prosecuted in northeastern Florida is concentrated between Fernandina Beach and south of Cape Canaveral to Melbourne.

The Rock Shrimp Producers Association, a newly formed industry organization, submitted information to the council indicating that the harvest area extends between just north of New Smyrna Beach to Stuart between 120 ft (20 fathoms) and 156 feet (26 fathoms) and between 200 and 240 feet (33.3 and 40 fathoms)(Appendix K). The fishable grounds are hard sand to shell hash bottoms which run north and south with a width as narrow as one mile. Only in recent years has the effort shifted south of Cape Canaveral which exposes the known concentrations of *Oculina* coral and the Oculina Bank HAPC to bottom trawls. Trawling was prohibited in the HAPC in 1982. In addition, Amendment 1 (SAFMC 1988) to the Snapper Grouper fishery management plan prohibited the retention of snapper grouper species caught by roller rig trawls and their use on live/hard bottom habitat north of 28° 35' N. latitude.

One of the immediate data concerns within the rock shrimp fishery regarding this amendment has been the areas of harvest. Specific information regarding harvest areas was not detailed enough and did not reflect the present patterns of harvest described by industry. Because industry representatives suggested that harvest of rock shrimp was much greater than the council had anticipated earlier, they provided the council with the amount of rock shrimp harvested from specific areas. The following represents information provided by thirty-four harvesters on area of harvest and pounds harvested within each area. Figure 13 presents 1994 reported harvest of rock shrimp by subdivided NMFS statistical harvest areas in the south Atlantic region. As shown in Figure 13 slightly over half of the harvest reported by these individuals comes from the areas 732 & 733. These areas of harvest represent the historic fishery for rock shrimp

just off Cape Canaveral. Information from public scoping and public hearings indicate those areas furthest south represent expansion of the fishery due to increased participation and the demand for smaller rock shrimp which are often harvested in these areas.

As mentioned earlier, expansion of the fishery has resulted in harvesting patterns which separate harvesters within the rock shrimp fishery by area of harvest and home port geographical region. Figure 14 shows the distribution of harvest patterns by home port region. The larger harvest area numbers (741 vs. 728) represent a more southern locale. As shown in Figure 14, Gulf vessels harvested more rock shrimp in the southern areas, while vessels from the south Atlantic harvested more in the northern areas.

This difference in harvesting patterns is important when considering any management action that would reduce harvesting in areas that may be utilized by one sector but not the other.

Seasons

Rock shrimp landings vary seasonally, governed primarily by the life cycle of the species. The peak rock shrimping season generally runs from July through October. Historically, the fishery did not begin until August or September but testimony at public hearings indicated that some vessels now begin harvesting in June or July with very high discards of undersized rock shrimp.

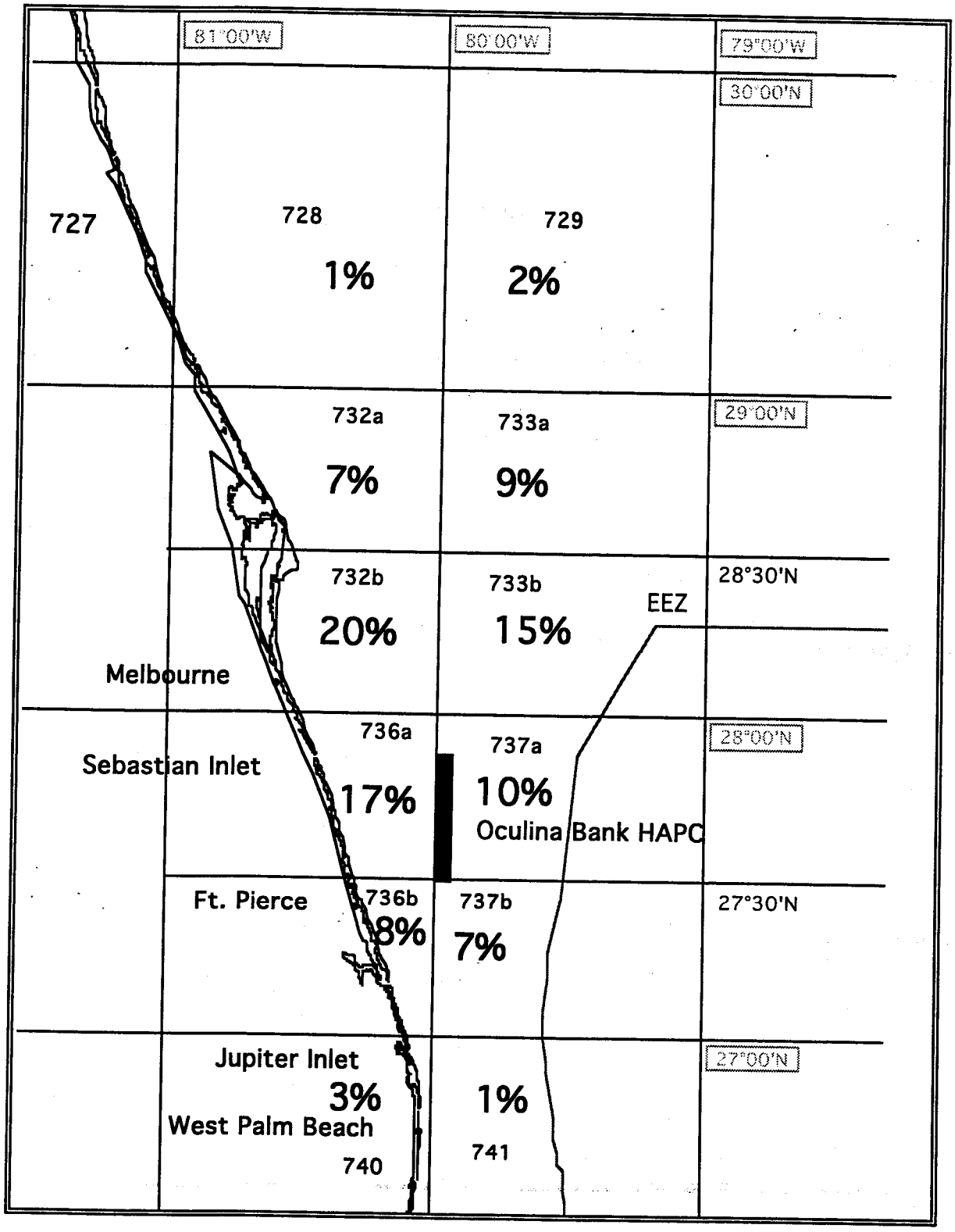


Figure 13. Estimated percent of total rock shrimp harvested in the south Atlantic EEZ off Florida east coast in 1994 by area of harvest based on a comparative sub-sample provided by rock shrimp industry(Source: SAFMC 1994/Rock Shrimp Industry).

Rock shrimping has been a fall back or a filler to the white and brown shrimp fisheries. To a degree, the amount of effort and the period vessels fish is dependent on the success of the white and brown shrimp fisheries. Many vessels participate at varying levels in those fisheries although a number of the big freezer trawlers are full time rock shrimpers. Public hearing testimony indicated that on average by September 1, the majority of rock shrimp catch is of marketable size.

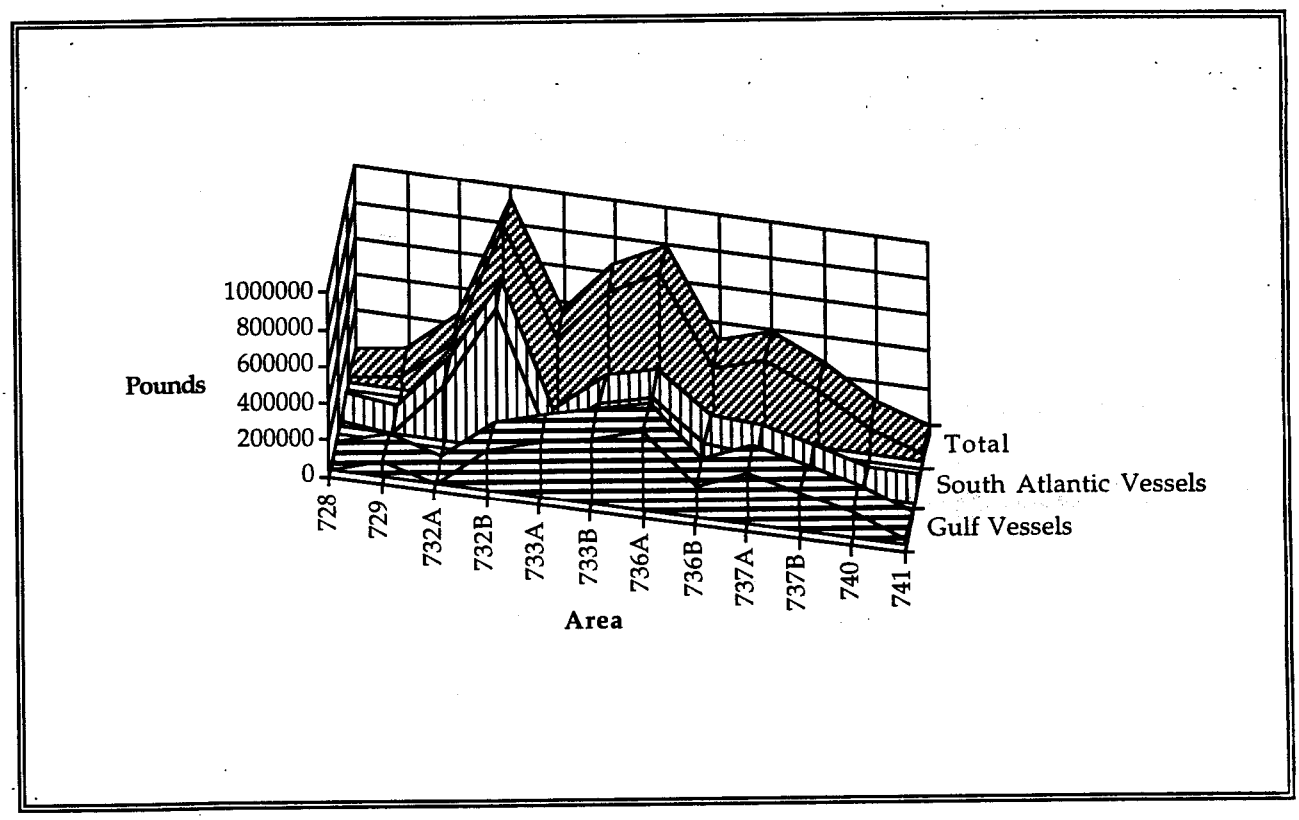


Figure 14. Comparative sub-sample showing pounds of rock shrimp landed in 1994 by area of harvest and home port region (Source: Rock Shrimp Industry).

Figure 15 represents harvesting effort information from 40 harvesters by month and by species fished. As mentioned earlier the principal rock shrimping season is from July through October. More than 30 out of 40 harvesters indicated they were fishing for rock shrimp off Florida's east coast during those months for the 1994 rock shrimp season. From January to March there were approximately twelve vessels fishing for rock shrimp. Moreover, it is only during the month of April that the number of vessels which reported fishing for rock shrimp dropped below 10. This most likely represents a year-round fishery that supplies the local fresh and restaurant market.

Other species that are targeted throughout the year are also indicated. Whether these species are targeted during the same time as rock shrimp is not clear. Industry sources suggested that there are times when other species may be present and they become the targeted species. Royal red shrimp are harvested and some harvesters indicated during public hearing that these shrimp are at much greater depths than rock shrimp, but may be close to rock shrimping grounds.

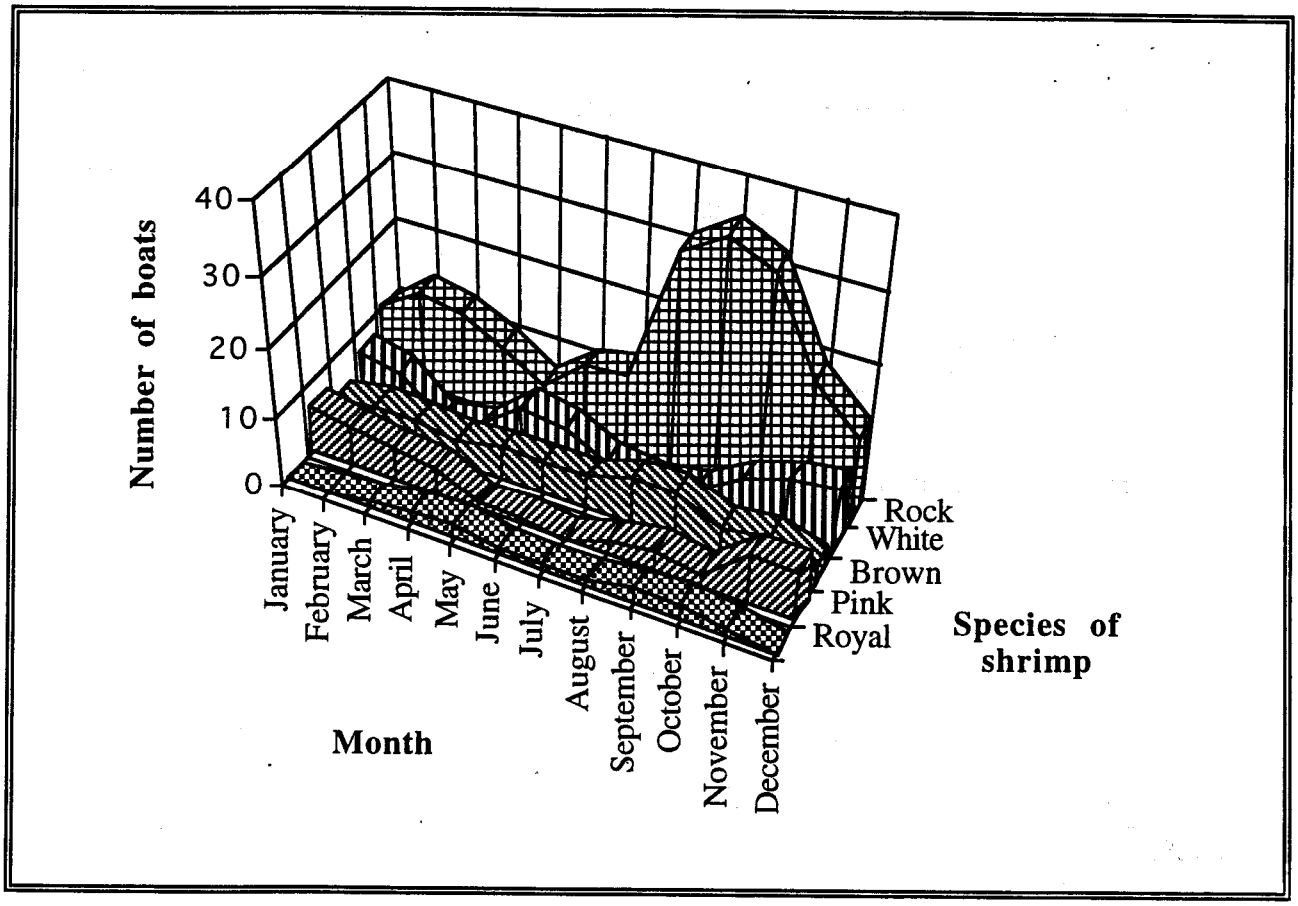


Figure 15. Comparative subsample showing number of boats fishing by month and species as reported for the 1994 rock shrimp season (Source: Rock Shrimp Industry).

Participation in Other Fisheries

Participants in the commercial rock shrimp fishery are involved in a wide variety of other fisheries. Larger vessels often participate in other trawl fisheries mainly for white, brown, and pink shrimp. In addition to participating in fisheries for other species, many of the larger shrimp vessels in the region are very mobile within the shrimp fishery and may move anywhere throughout the south Atlantic states and the Gulf of Mexico. Testimony during the scoping meeting in

Marathon, Florida indicated that a small bycatch of rock shrimp occurs in the Florida Keys mainly in the Tortugas pink shrimp fishery.

Those individuals who provided information on harvest areas during the public hearing process also indicated their harvesting effort by state for the 1994 shrimping season. As shown in Figure 16, many rock shrimp vessels do fish other regions throughout the year. Many vessels fish during the open Gulf shrimp season during the summer months just prior to the rock shrimp season. It is also interesting to note the peak in the pink shrimp fishing on Florida's west coast just after the rock shrimp season. These vessels represent a very mobile and diverse fleet, primarily made up of harvesters from the Gulf states, but do include some harvesters from the south Atlantic.

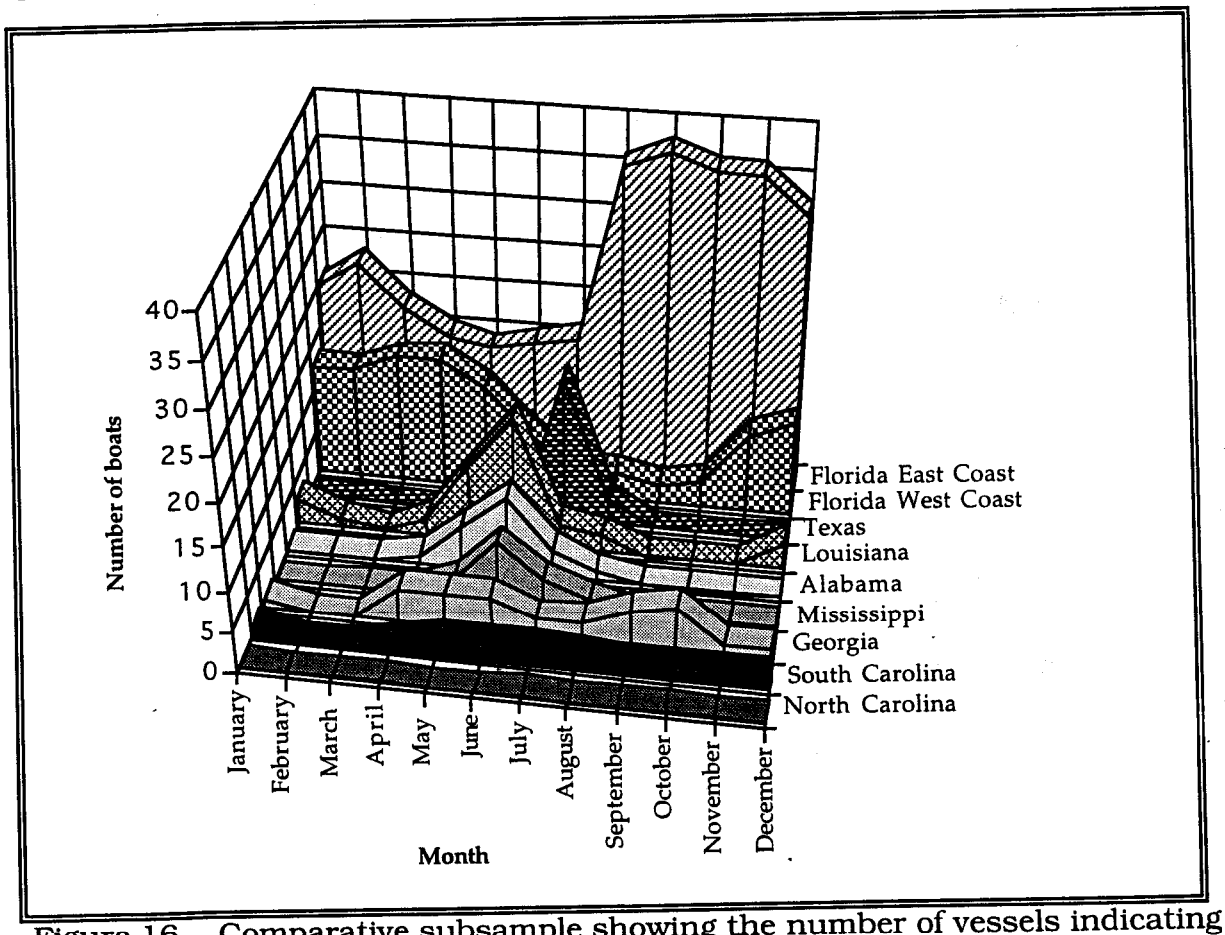


Figure 16. Comparative subsample showing the number of vessels indicating some type of effort by month and state fished (Source: Rock Shrimp Industry 1995).

The rock shrimp fishery has changed slowly over time as market development and technology have been pursued in this fishery. It is important to understand how this fishery has changed when considering management measures. The information provided by industry indicate a very diverse fishery

with harvesters from as far away as Texas who participate in a fishery prosecuted principally off Florida's east coast. Differences that become expressed through harvesting patterns at different locations and different harvest times are valuable data for fishery management. Cooperation among the various sectors within a fishery and management is becoming an important aspect of successful fisheries management. The cooperation of the rock shrimp industry was critical to the assessment of impacts within the rock shrimp fishery. This type of participation and volunteerism will hopefully continue within the rock shrimp fishery and others.

Discards and Bycatch

The discarded bycatch of fish and crustaceans in the rock shrimp trawl fishery is highly variable by season and area. Until recently, no directed research has been conducted to document bycatch in the rock shrimp fishery. Comments received at scoping meetings and public hearings from industry representatives have indicated that the catches have very little bycatch north of Cape Canaveral and in deeper water. In addition, as vessels began fishing earlier in the year, in June and July versus August or September, discards of unmarketable juvenile rock shrimp increased dramatically. Industry representatives also indicated that beyond 20 fathoms (120 ft) 90% of the catch is rock shrimp; therefore, it can be assumed that the remaining is unwanted bycatch.

In order to document species associated with rock shrimp benthic habitats, NMFS SEFSC Pascagoula Laboratory compiled lists of species associated with rock shrimp catches in research trawling efforts for finfish and shrimp conducted between 1956 and 1991 (Appendix I). At a minimum, these lists will provide potential bycatch associated with rock shrimp trawling. In order to identify possible key species caught in association with harvestable levels of rock shrimp, only trawl records when rock shrimp catch met or exceeded 40 lb. per hour per 40 foot of head rope were used based on input from public hearings and discussions with people in the industry.

One rock shrimp bycatch characterization observer trip was completed between January 26 and February 4, 1995. The results are detailed in the Table 6. Further characterization trips are being coordinated through the Gulf and South Atlantic Fisheries Development Foundation.

Table 6. Results of initial rock shrimp bycatch characterization trip (Source: GSAFDF 1995).

	Number of individuals/per hour/per net	kilograms/per hour/per net
Biomass	NA	38.2
Total finfish	1,164	33.6
Shrimp		
Rock Shrimp	283	5.0
Penaeids	49	1.8
Other Invertebrates		
Swimming crabs	20.6	1.0
Mantis shrimp	56	1.5
Squid	1.2	0.2
Drums		
croaker	2.4	0.3
spot	23.5	2.3
weakfish	not taken	
sea trout	not taken	
whiting	not taken	
Mackerels	not taken	
Other Fishes		
Lizardfish (*Synodus sp.*)		
Eel (*Lepophidium sp.*	25.0	3.3
Jenny (*Eucinostomus sp.*)	3.0	0.2
Goatfish (*Mullus sp.*)	6.3	0.5
Sea Bass (*Diplectrum sp.*)	7.5	0.6
Sea Bass (*Centropristis sp.*)	11.3	0.7
Grunt (*Haemulon sp.*)	1.2	0.1
Pinfish (*Lagodon sp.*)	4.0	0.4
Searobin (*P. ophryas*)	0.7	0.03
Searobin (*P. longirostris*)	43.0	0.8
Searobin (*Bellator sp.*)	87.0	1.0
Scorpionfish (*S. calcaratta*)	30.0	0.7
Flatfishes		
P. lethostigma	0.7	0.2
A. quadrocellata	0.5	0.1
S. gunteri	44.6	1.1
B. robinsi	11.3	0.3
Etropus sp.	33.0	0.4
E. crossotus	17.3	0.4
Cyclopsetta sp.	3.1	0.4
Citharichthys macrops	5.2	0.2
Symphurus plagiusa	3.6	0.1
Filefish (*Monocanthus sp.*)	3.1	0.1
Puffer (*Sphoeroides sp.*)	2.4	0.2

(estimates based on 53.1 tow hours with a mean tow time of 3.8 hours)

The council will revisit bycatch in the rock shrimp fishery once adequate characterization is completed and further analysis is accomplished by NMFS to determine the extent of the problem, if any, in the rock shrimp fishery.

Turtle Interactions and TEDS

While the proposed regulations for the rock shrimp fishery contained in this amendment will not have any impact on threatened or endangered species, the southeastern shrimp fishery itself does have a significant interaction with sea turtles, all species of which are listed as either threatened or endangered under the ESA of 1973, 16 U.S.C., 1531 et seq. (Appendix F). Incidental capture by trawlers fishing for white, brown, and pink shrimp has been documented for loggerhead, Kemp's ridley, green, leatherback, and hawksbill turtles in coastal waters of the southeastern United States and Gulf of Mexico. No capture of sea turtles have been documented for the rock shrimp fishery and NMFS SERO (Dr. Andrew Kemmerer pers. comm. 1994) has indicated that no action was necessary addressing threatened or endangered species in the rock shrimp fishery under this amendment. Some rock shrimpers testifying at public hearing indicated that the mandatory turtle excluder devices being pulled are helpful in eliminating unwanted bycatch other than turtles.

Regulations promulgated by NMFS under the Endangered Species Act, required shrimp trawlers in Federal or state waters off the southeastern Atlantic coastal states to comply with Federal sea turtle conservation requirements. The final rule as published in the Federal Register is presented in Appendix VIII of the original FMP (SAFMC 1993).

NMFS estimated that prior to 1987, commercial shrimp trawlers killed more than 11,000 sea turtles annually in waters off the south Atlantic and Gulf of Mexico states. A more recent review and analysis of existing information by the National Academy of Sciences in 1990, found that the NMFS estimates were conservative, and that the number of turtles killed by shrimp trawlers could be as high as 44,000 each year which makes if the largest human-caused source of turtle mortality in U.S. waters.

A biological opinion on implementation of the 1987 Sea Turtle Conservation Regulations (52 FR 24244, June 29, 1987) was submitted on September 30, 1987. The 1987 opinion addressed the potential adverse effects to listed species of implementation of the rule, and concluded that the regulations would have a positive impact on sea turtles by substantially reducing mortalities.

NMFS issued regulations under the ESA on June 29, 1987 [52 FR 24244] to reduce the incidental capture of sea turtles by shrimp trawlers. Trawlers 25 feet or longer were required to use TEDs in offshore waters, and were required to limit tow times to 90 minutes or use TEDs in inshore waters (landward of the COLREGS line). Trawlers less than 25 feet in length were required to use 90 minute tow times or TEDs in inshore and offshore waters. These conservation measures were required in the waters off the southeastern Atlantic United States (North Carolina through Florida) from May 1 through August 31, except for the Canaveral area where the regulations were in place year round.

Because of extensive strandings of turtles during periods when TEDs were not required, NMFS issued regulations on September 4, 1991 [56 FR 43713], extending the sea turtle conservation regulations from September 1, 1991, through April 30, 1992 in the Atlantic area.

On April 9, 1992, Endangered Species Act (ESA) Section 7 consultation was initiated by the South Atlantic Fishery Management Council. This consultation was to address the potential adverse effects to listed species of both the proposed management action (adoption of a shrimp fishery management plan for the south Atlantic) and the shrimp fishery itself.

A biological opinion regarding implementation of the Shrimp Fishery Management Plan for the South Atlantic region and Amendment 6 to the Gulf of Mexico Shrimp Fishery Management Plan was issued on August 19, 1992 which is contained in Appendix IX of the original FMP (SAFMC 1993). NMFS concluded that shrimp trawling in the southeastern United States was in compliance with the 1992 Revised Sea Turtle Conservation Regulations and the proposed management actions under the south Atlantic shrimp FMP were not likely to jeopardize the continued existence of threatened or endangered species under NMFS jurisdiction.

On September 8, 1992 (57 FR 40861) NMFS issued a final rule effective September 1, 1992 that extended the sea turtle regulations in the Atlantic area to year-round rather than May 1 through August 31. Effective November 1, 1992 in all areas where tow times were used in place of TEDs, tow times were reduced from 90 to 75 minutes. The interim rules also eliminated the exemption for the rock shrimp fishery in the Atlantic and provided for exemptions for vertical barred beam trawls, roller trawls, wing nets, skimmer trawls, pusher-head trawls, and bait shrimpers.

As of December 1, 1992 shrimp trawlers were required to comply with sea turtle conservation measures throughout the year in all areas. Effective January

1, 1993 shrimp trawlers under 25 feet in offshore waters could no longer use limited tow times as an alternative to using TEDs. Also effective January 1, 1993, was the requirement that shrimp trawlers in inshore waters must use TEDs unless they are equipped with a single net with a headrope length less than 35 feet and a footrope length less than 44 feet. In that case, then they can use limited tow times until December 1, 1994. Final ESA regulations for the shrimp fishery were published on December 4, 1992 (FR Doc. 92-29370)

A Section 7 consultation was reinitiated on November 14, 1994 and a Biological Opinion regarding the present prosecution of the southeast shrimp trawl fishery was issued on November 14, 1994 (Appendix F). This Opinion found the fishery as presently prosecuted is likely to jeopardize the continued existence of threatened or endangered species under NMFS jurisdiction. Subsequently, the opinion directed NMFS to implement permits in the entire shrimp fishery within four months and detailed specific tasks to increase enforcement of existing regulations, and to accomplish research needed to identify and implement management measures to eliminate the jeopardy situation. An Emergency Response Plan developed in response to the biological opinion was issued by NMFS and specifies monitoring and regulatory action required if allowable take levels of threatened and endangered sea turtles are exceeded.

4.0 ENVIRONMENTAL CONSEQUENCES

A. Introduction

This section presents management measures and alternatives considered by the council and the environmental consequences of management. The Environmental Assessment (EA), the Regulatory Impact Review (RIR), the Initial Regulatory Flexibility Analysis (IRFA), and Social Impact Assessment (SIA) are incorporated into the discussion under each of the proposed action items.

Each action is followed by five sub-headings: Biological Impacts, Economic Impacts, Social Impacts, Enforcement Impacts, and Conclusion. These are self explanatory with the first four 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 1.

B. Proposed Actions

ACTION 1. Add rock shrimp to the management unit of the fishery management plan for the shrimp fishery of the south Atlantic region.

The description of the management unit contained in the existing management plan will be modified to read as follows:

Management Unit. The management unit includes the populations of white and rock shrimp along the U.S. Atlantic coast from the east coast of Florida to the North Carolina/Virginia border. Brown, pink, and royal red shrimp are included in the fishery but not in the management unit because regulations in this plan only address white and rock shrimp at this time. Although three species of penaeid shrimp and rock shrimp are also harvested in the Gulf of Mexico, it is believed that the Atlantic and Gulf populations are essentially isolated from one another.

Biological Impacts

None, however, including rock shrimp in the management unit will provide the regulatory framework to implement management measures for the rock shrimp fishery.

Economic Impacts

No economic impact is expected to individual vessels or to the industry by adding rock shrimp to the management unit of the FMP. However, it allows the council to manage the fishery and to take timely action when necessary. Implementation of management measures would likely result in increased net benefit in the long-term.

Social Impacts

Including rock shrimp in the management unit will provide the rock shrimp industry and other interested parties with the necessary means to address concerns that have developed or may develop regarding the fishery. Society may benefit through the council's ability to address problems within the fishery that have a direct or indirect effect upon other fisheries or other physical and social environments.

The rock shrimp industry has been divided with regard to including rock shrimp in the management unit. Original consideration for including rock shrimp in a management plan was initiated by industry concern over undersized rock shrimp and increasing effort, but, subsequent public hearings indicated that many involved in the fishery felt that management was unnecessary. However, concern over *Oculina* coral, which is often closely associated with the harvesting of rock shrimp in the south Atlantic, was raised during the initial scoping meetings and the focus of Amendment 1 was redirected toward habitat protection and data collection. *Oculina* coral is important habitat for many species in the snapper grouper complex, many other finfish, and shellfish including rock shrimp. Because rock shrimping takes place in such close association with *Oculina* coral, damage has occurred to the coral banks over the years. By addressing the effects of habitat damage through Amendment 1, the council has worked closely with the industry to negotiate a proposal which encompasses the problems of not only habitat damage, but reporting of landings and harvest areas.

Proposals from the Ad Hoc Panel were incorporated into the range of options taken to public hearing. These proposals along with evidence from earlier public hearing documentation suggest that industry supports more stringent reporting requirements. However, the industry remained divided on the issue of habitat protection. At the time, some within the industry were unsure as to the need for extending protection to hard/live bottom habitats and more specifically *Oculina* coral beyond the present HAPC. The issue becomes complicated when increased protection for coral habitat means giving up harvest area for rock shrimping,

especially when certain areas are primarily fished by different factions within the industry.

There is little distinction between gear types and sizes but, there is considerable division along other characteristics. Although the primary fishing grounds are on the east coast of Florida, harvesters come from as far away as Texas. In fact, of the forty-four individuals who provided landings and harvest area information, seventeen were from the Gulf region. Thirty-six of those vessels included were freezer boats and seven were ice boats. Certain harvest areas are utilized by most rock shrimpers, but areas to the extreme north and south end of the harvesting grounds off southeast Florida are essentially utilized by different factions within the harvesting sector. Dealers, buyers, and processors are also located in both the south Atlantic and Gulf regions. The channels through which rock shrimp must travel for final processing can vary a great deal.

It is this combination of diverse characteristics which have made it difficult to determine the impacts of certain actions. Recent information provided by the industry during public hearings has helped clarify some of these differences. These types of divisions will certainly affect the manner in which a particular group or sector within the industry views a specific action.

Enforcement Impacts

Inclusion of rock shrimp in the management unit will create the regulatory framework to enforce proposed regulations.

Conclusion

The shrimp management unit already consists of white shrimp in the Exclusive Economic Zone. The council concluded that in order to manage rock shrimp in south Atlantic federal waters, the species must be included in the shrimp management unit. Inclusion of rock shrimp in the management unit is a necessary first step to create the regulatory structure to manage the fishery. Including rock shrimp in the management unit will also allow the council to address other areas where rock shrimp may occur in significant concentrations in the future and to address the other issues deferred from this amendment. Action 1 will therefore provide the basis for implementing management measures.

Rejected Options for Action 1

Rejected Option 1. The management unit includes the population of rock shrimp from Duval through St. Lucie Counties, Florida.

Biological Impacts

None. Including rock shrimp in the management unit will provide the regulatory framework to implement management measures.

Economic Impacts

No economic impact is expected to individual vessels or to the industry by adding rock shrimp to the management unit of the FMP. However, it allows the council to manage the fishery and to take timely action when necessary. Implementation of management measures would likely result in increased net benefit in the long-term. This option however, does not cover the entire range of the fishery in the region. This could prevent the council from acting if problems arise in areas that are not covered by this option.

Social Impacts

Harvest area information outside of Duval through St. Lucie County provided during the public hearings is limited. Other sources do indicate that harvesting occurs in the EEZ off North Carolina, South Carolina, and Georgia. Therefore, excluding these areas from the management unit would prevent the council from taking timely action if problems developed outside the management unit being proposed.

Enforcement Impacts

Testimony at public scoping meetings indicated that some vessels have fished in the HAPC and continue to do so until recently. In addition, testimony at public hearing indicated that the fishery has recently extended south to Jupiter inlet out of the range of this option therefore enforcement of other regulations proposed under this amendment may be compromised if the management unit is restricted.

Conclusion

The council concluded that including rock shrimp in the management unit in this limited area would not provide the basis for implementing additional management measures for the rock shrimp fishery throughout its range in the

south Atlantic region. Vessels could subsequently fish for rock shrimp south of St. Lucie unregulated, or vessels could claim shrimp were caught outside of the management unit.

The council rejected this option because not including rock shrimp in the management unit throughout the council's jurisdiction would not allow the council to address other areas with rock shrimp distributions in future actions, or encourage monitoring of stock status and research and data collection throughout the range of the resource.

Rejected Option 2. No Action.

Biological Impacts

None.

Economic Impacts

No economic impact is expected to individual vessels or to the industry by adding rock shrimp to the management unit of the FMP. However, it prevents the council from managing the rock shrimp fishery. Lack of management could lead to market disruption and habitat damage. These could result in reduced net benefit from the fishery in the long-term.

Social Impacts

During earlier public hearings it became evident that there might be a consensus toward favoring addition of rock shrimp to the management plan within the industry, but the extent of that consensus was not known. Initial management options to be considered were brought forth by industry. However, as noted above, since that time there has been little initiative from industry to pursue further regulation of the fishery. In some public hearings there seemed to be the perception within the industry that adding rock shrimp to the management unit was over regulation. Since that time, increased fishing effort and other concerns have convinced many within the industry that there is a need for management; limited entry has even been mentioned by some harvesters.

During the second round of public hearings there was still some animosity toward the management process and the addition of rock shrimp to the management unit. However, at the second Ad Hoc Rock Shrimp Advisory Panel meeting a proposal to address critical issues of habitat damage was negotiated and added to the previous options which focused upon permits and reporting. Although the panel was explicit that they preferred no action with regard to

management, they acknowledged the council's concern over habitat damage from rock shrimping and other fishing activities. The proposed closure and reporting requirements (included as Appendix L) were presented to the council as a means to not only address the concerns over habitat and reporting, but to also ensure compliance.

It is reasonable to assume that future issues within the fishery will need to be resolved given the division within the industry and possible future expansion both in numbers of participants and areas fished. The council will need a regulatory framework if it is to respond to those concerns in a timely fashion. That alternative is precluded by taking no action.

Enforcement Impacts

Testimony at public scoping meetings indicated that some vessels have fished in the HAPC and continue to do so until recently. In addition, testimony at hearings and from the Ad Hoc Rock Shrimp Advisory Panel indicate the fishery has recently extended even further south to Jupiter Inlet. Therefore, enforcement of other regulations implemented to protect bottom habitat including the prohibition of trawling in the Oculina Bank HAPC, may continue to be compromised if rock shrimp are not included in the shrimp management unit.

Conclusion

The council rejected this option because taking no action will preclude addressing management needs for the rock shrimp fishery.

ACTION 2. Prohibit trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms.

The council is proposing to prohibit trawling for rock shrimp to protect live/hard bottom habitat, *Oculina* coral and the Oculina Bank HAPC (Figure 17). However, some rock shrimp fishermen do fish for royal red shrimp outside of that depth during the peak rock shrimp season, therefore the depth limitation was included to allow for that fishery to continue.

Biological Impacts

Action 2 reduces the impact of the fishery on live/hard bottom and coral habitat by eliminating trawl gear from being used in the closed area. The rock shrimp industry proposed this option as the result of discussions between the

council and the industry to resolve the issue of habitat protection within the rock shrimping grounds.

The fishery historically occurred in the EEZ off St. Augustine to Cape Canaveral, Florida (Hetzal Shoals). Today the fishery operates north of Cape Canaveral through Jupiter Inlet, Florida (Figure 17). The fishable grounds are hard sand to shell hash bottoms which run north and south with a width as narrow as one mile. It is only in recent years (after 1991) that the effort shifted south of Cape Canaveral exposing the known concentrations of *Oculina* coral, live/hard bottom, and the Oculina Bank HAPC to bottom trawl damage. More recently the fishery has also shifted offshore and south of the Oculina Bank HAPC

Trawl damage occurs from direct contact with live/hard bottom, including *Oculina* coral. *Oculina* is only known to be distributed in bank formation south of 29° N. latitude. Amendment 1 to the snapper grouper fishery management plan prohibited use of bottom tending roller rig trawls on live/hard bottom habitat north of Cape Canaveral, Florida. Habitat damage occurs from the use of bottom tending trawl gear. The effects of research trawls on hard bottom sponge and coral (including *Oculina*) assemblages has been well documented. Therefore, implementation of this measure will prevent the loss of this essential snapper grouper habitat.

The most extensive *Oculina* coral concentration exists in the Oculina Bank Habitat Area of Particular Concern (HAPC) which was established under the Coral Fishery Management Plan. *Oculina varicosa*, a slow growing delicate stony coral, is easily damaged by bottom tending trawl gear, anchoring, fishing leads, etc. *Oculina* is distributed mainly in deepwater along the south Atlantic coast with the largest known concentrations occurring off Cape Canaveral, south through the Oculina Bank HAPC. Effective June 27, 1994 as part of Amendment 6 to the snapper grouper plan, the Oculina HAPC was also designated an experimental closed area in which fishing or anchoring to fish for species in the snapper grouper management unit is prohibited. Therefore, the additional protection afforded by this action extends the protection from trawl gear north through 28° 30' N. latitude and east out to 100 fathoms, enhancing the biological integrity of the HAPC and the possible effectiveness of the closed area.

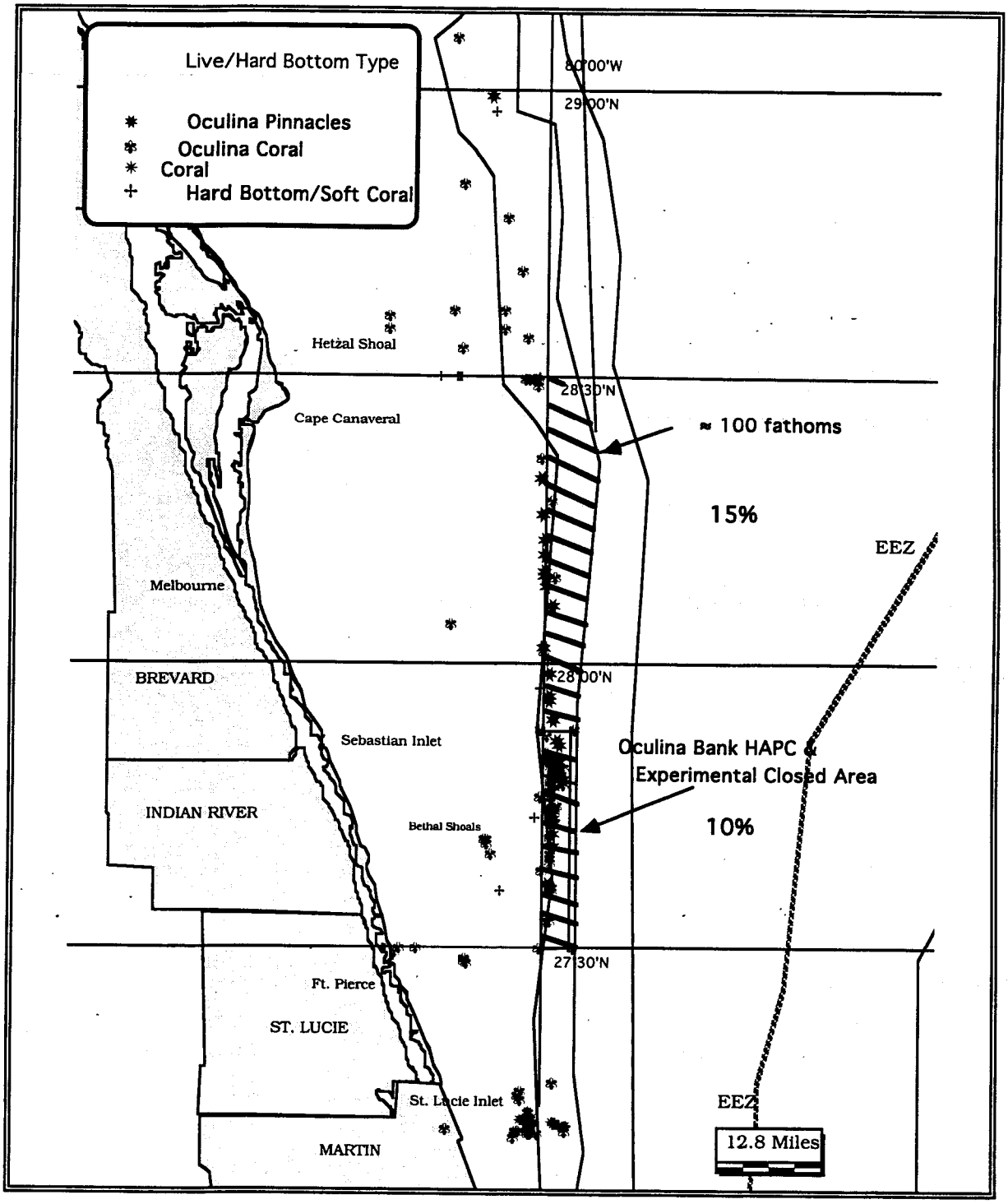


Figure 17. Map of hashed areas prohibited under Management Action 2 and coral, coral reef and live/hard bottom habitat associated with rock shrimp harvest areas (Source: SAFMC 1995).

Another habitat concern which has been raised is the repetitive trawling of the limited fishable bottom over the years which may impact the benthic habitat

and the shrimp resource it sustains. In addition, the council's Scientific and Statistical Committee reiterated that although limited, the information provided from research efforts has indicated that large spawning rock shrimp tend to be associated with the *Oculina* live/hard bottom habitat. Therefore, an additional benefit which may come with protecting these habitats is protection of a portion of the rock shrimp spawning stock. This would help the fishery in years where recruitment is poor due to poor environmental conditions.

The area closure may also protect juvenile rock shrimp in their nursery grounds. Public testimony at scoping meetings and public hearings indicated that nursery grounds may be southeast of Cape Canaveral in depths greater than 180 feet. The rock shrimp fishery during the 1993/94 season, occurred at depths of 180 feet and deeper. In earlier years the fishery took place at depths around 120 feet. Some fishermen feel the fishery prevents rock shrimp from moving up and on the shelf and distributing over the grounds since rock shrimp are being caught as they move up onto the slope.

Economic Impacts

Rock shrimp landings data were obtained from the Florida Department of Environment Protection for the period 1986 to 1994. The Georgia Department of Natural Resources provided data for the period 1989 to 1994. South Carolina Department of Natural Resources provided data for the period 1981 to 1994 with the exception of 1991 and 1993 when no data were available. North Carolina Department of Health, and Natural Resources provided data for the period 1983 to 1994 (Table 7). Information on landings, areas harvested, etc., during the 1994 season were also obtained from industry participants through the public hearing process.

Data on landings and value were obtained from the National Marine Fisheries Service for the period 1981 to 1992. However, for some years the NMFS data were significantly different from the data from the four states in terms of areas of harvest. Discussions with various state officials indicated that data for recent years have been revised and such revisions are yet to be incorporated into the NMFS database. In addition, detailed shrimp data for 1992-1994 is only available through state reporting systems because NMFS stopped maintaining detailed shrimp data through the Southeast Fisheries Science Center. As such, the data used throughout this document and in the analysis was provided by the states and industry participants.

Table 7. Annual rock shrimp landings and value (heads on) for south Atlantic region as reported by south Atlantic states (Source: Florida, Georgia, South Carolina, and North Carolina state commercial data reports, 1995).

Year	Weight (lb- head on)	Value ($)
1986	2,514,895	2,225,319
1987	3,223,692	2,869,086
1988	1,933,097	1,716,405
1989	3,964,942	3,499,260
1990	3,507,955	3,115,050
1991	1,330,919	1,184,325
1992	2,572,727	2,250,169
1993	5,297,197	4,680,916
1994	6,714,761	6,037,093

The proposed area for the rock shrimp trawling prohibition encompasses the areas shown in Figure 17. Total harvest of rock shrimp reported by the State of Florida Department of Environmental Protection (FDEP) for the south Atlantic region in 1994 was 6.7 million pounds (heads on). Thirty-four harvesters provided information on harvest by statistical area during the public hearing process. These fishermen reported harvesting 4.6 million pounds (heads on) of rock shrimp in the south Atlantic region during 1994. This represents 69 percent of the total harvest of rock shrimp reported by the State of Florida for the south Atlantic region. It should be noted that a total of 44 rock shrimp harvesters provided harvest data during the public hearing process for 1994. Their total harvest was 5,171,699 pounds (heads on). This represents 77 percent of the total 1994 landings for the south Atlantic region reported by FDEP. However, only 34 of these provided data by area harvested.

The 34 harvesters reported harvests of 689,836 pounds and 438,788 pounds (heads on) from subdivided statistical areas 733b and 737a respectively in 1994. Both figures represent 25 percent of the harvest reported by the 34 harvesters, 22 percent of the harvest reported by 44 harvesters, and 17 percent of the total harvest from the south Atlantic region. Based on harvest information provided by industry for the 1994 season, 25 percent of the annual harvest by the 34 harvesters, 22 percent of the harvest reported by the 44 harvesters, or 17 percent of the total harvest in the region would be affected by the proposed action. Using an average exvessel price of $1.25 per pound, this would result in a loss of

approximately $1.41 million in the first year assuming that the same amount of rock shrimp would be harvested from both areas.

This analysis shows that a trawling prohibition under this proposed action would result in lost harvest to fishermen. However, it should be noted that such a prohibition could also result in a shift of effort to other areas. This would depend on a number of factors: namely the availability of rock shrimp in other areas throughout the season, the ability of rock shrimp vessels to trawl at depths where rock shrimp occur outside the area of prohibition, whether other areas are congested, the ability of rock shrimp vessels to participate in other fisheries, and other exogenous factors influencing the exvessel price of rock shrimp. If significant effort shift occurs to other areas not previously trawled, the impact of the prohibition could be reduced. There could also be overcrowding during the peak season. This could lead to gear conflict. The Ad Hoc Rock Shrimp Advisory Panel proposed this option to the council as the one that will be most acceptable to industry while at the same time protecting over 90 percent of essential habitat in the area. The members also indicated their willingness to engage in self-policing to insure that there would be no violation of the regulation.

Hardly any information is available to assess the benefits in dollar terms from protecting the habitat, thus it cannot be determined quantitatively whether the benefits from this prohibition would outweigh the costs, particularly in lost income to rock shrimp fishermen and dealers/processors. However, it should be noted that coral reef communities are characterized by biological complexity (the biological components are highly diverse, exhibit many forms of symbiosis, display a high level of species diversity, and provide shelter or refugia for breeding and for recycling essential chemicals (Jaap 1993).

The economic value of coral reef habitats could range from hundreds to thousands of dollars per square meter. Valuation methods include: existence value, market value, and lost use value. However, most of the valuation work done to date are based on tourism. The cost for restoring reef habitat on a square meter basis is not available, but the time scale for recovery for such habitats is often measured in decades. Jaap (1993) estimated the cost to range from $50 to $500 per square meter. It is difficult to generalize because habitat composition varies significantly. For example, a damaged area that is 50 square meters might be valued at $250,000.

Social Impacts

Although the rock shrimp industry does not favor closing any harvesting area, this action was the result of discussions between the council and the industry to resolve the issue of habitat protection for the *Oculina* coral and hard/live bottom habitat that exists within the primary rock shrimping grounds. This action was proposed by the Ad Hoc Rock Shrimp Advisory Panel as a solution to the problem of long-term damage to *Oculina* coral by rock shrimpers. The panel considered this proposal an effort in good faith and a considerable sacrifice, given that almost twenty-five percent of the 1994 harvest reported by a comparative subsample to the council took place within the proposed closed area. In all likelihood, if harvesting effort shifts to other areas the impacts of this closure may be lessened. However, with such an effort shift the possibility of overcrowding and conflict between users becomes an important consideration. The recent increase in the number of participants within the fishery and the distinct geographic division (south Atlantic/Gulf of Mexico) between harvesters may further increase the potential for conflict. Although twenty-five percent of the harvest reported to the council by industry participants came from this area, it does not necessarily represent the same percentage of the fishing fleet. The number of vessels reportedly fishing from those areas during 1994 ranged from ten to twenty-three. Moreover, it is unlikely that the twenty-three vessels reporting harvesting from a specific area were fishing at the same time. Still, during the peak season from July through October, many of the vessels could be forced into the same fishing areas. The Ad Hoc Panel indicated that although there is a depth limitation on the eastern border of the proposed closed area, this action would represent a prohibition on all rock shrimping in the entire area of 733b and 737a because there is no rock shrimping outside of that depth.

Enforcement Impacts

Prohibiting trawling for rock shrimp in the closed area is proposed to create enforceable regulations protecting essential habitat. Prohibiting trawling for rock shrimp in the specified area is supported by the Ad Hoc Rock Shrimp Advisory Panel representing the rock shrimp industry and will increase enforceability of existing federal regulations. Enforcement of coral regulations, which protect stony *Oculina* coral and specifically prohibit bottom trawling in the Oculina Bank HAPC, would be enhanced. The Oculina Bank was also designated an experimental closed area under the snapper grouper fishery management plan in which fishing or anchoring to fish for species in the snapper grouper management unit is

prohibited. Prohibiting trawling will increase enforcement and assist in preventing the continued degradation of essential coral resources and live bottom habitat which would compromise the effectiveness of the area and research being conducted to document the benefits of area closures.

Conclusion

The council is taking this action to reduce the impact of the fishery on live/hard bottom and coral habitat in the specified area. This action would close areas in which 25 percent of rock shrimp were harvested from in 1994 but would protect approximately 90% of the *Oculina* pinnacle distribution between 29° N. latitude and 27° N. latitude while at the same time allowing the fishery to continue. The proposed action addresses the management objective to minimize the impact of the rock shrimp fishery on coral, coral reefs, and live/hard bottom habitat in the south Atlantic region.

Rejected Options for Action 2

Rejected Option 1. Prohibit trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° N. latitude and west of 80° W. longitude south of 27° 30' N. latitude.

Biological Impacts

This option would reduce the impact of the fishery on habitat by eliminating damaging trawl gear from being used in the specified areas.

However, while providing some additional buffer area to the east of the HAPC, this option would not have protected the significant distribution of *Oculina* pinnacles and bank structure that exists north of 28° N. latitude. This option would have protected some of the inshore bottom habitat west of 80° W. longitude. It would not have protected the majority of the deepwater bottom habitat that exists west of that line.

Economic Impacts

The proposed area for the rock shrimp trawling prohibition encompasses the areas shown in Figure 17. Based on harvest information provided by the industry for the 1994 season, these areas accounted for ten percent, eight percent, and three percent respectively, of the harvest reported by the 34 rock shrimp harvesters for the 1994 season. In terms of the total harvest in the south Atlantic region, they accounted for seven percent, five percent, and three percent respectively. This means that 21 percent of the 34 rock shrimp harvester's

harvest or 15 percent of the entire harvest from the south Atlantic region in 1994 would be affected by this alternative. Using an average exvessel price of $1.25 per pound, this would result in a loss of approximately $1.17 million in the first year assuming that the same amount of rock shrimp would be harvested from these areas.

This analysis showed that a trawling prohibition under this alternative would result in lost harvest to rock shrimpers. However, it should be noted that such a prohibition could also result in a shift of effort to other areas. This would depend on a number of factors: namely the availability of rock shrimp in other areas throughout the season, the ability of rock shrimp vessels to trawl at depths where rock shrimp occur outside this area, whether other areas are not congested, the ability of rock shrimp vessels to participate in other fisheries, and other exogenous factors influencing the exvessel price of rock shrimp. If significant effort shift occurs to other areas not previously trawled, the impact of the prohibition could be reduced. The council rejected this option in favor of the one proposed by the Ad Hoc Rock Shrimp Advisory Panel (Action 2) because the latter will protect more essential habitat and is more acceptable to industry.

Social Impacts

Information provided by industry through the public hearing process suggests shifting effort to other areas may minimize the loss of these harvest areas. However, such an effort shift may also create overcrowding in other harvest areas during the peak rock shrimp season from July to October when most harvesters are fishing the south Atlantic waters. In that case, there may be incentives for some to enter prohibited areas in search of more accessible shrimp. This may cause conflict among harvesters and would require increased law enforcement.

This option may impact a greater number of boats from the Gulf region according to the harvest area information provided by industry. In addition, through conversations with harvesters and information provided during the public hearings it is clear that some Gulf shrimpers may also target royal red shrimp during the peak rock shrimp season. Royal red shrimp are fished at greater depths than rock shrimp and would most likely be harvested east of the 80° W. longitude. This option may prevent some individuals from fishing royal reds in the harvest areas to the east of the HAPC. There is no information regarding harvest areas for royal red shrimp at this time.

Enforcement Impacts

The area closure proposed by Rejected Option 1 was opposed by the Ad Hoc Rock Shrimp Advisory Panel and the rock shrimp industry. Voluntary compliance would therefore not be expected. In addition, due to the subdivided nature of the proposed closed area, enforcement would be more costly and problematic.

Conclusion

The council rejected this option even though it would reduce the impact of the fishery on habitat in the specified areas east and west of 80° W. longitude because it would close greater than 21% of areas which rock shrimp were harvested from in 1994 while not protecting the significant *Oculina* pinnacle distribution north of 28° N. latitude.

Rejected Option 2. Establish a four mile prohibition on trawling east and west of the 80° W. longitude south of 28° 30' latitude.

Biological Impacts

Establishing a four mile prohibition on trawling east and west of 80° W. longitude south of 28° 30' latitude would protect the majority of known distribution of *Oculina* coral and the deepwater Oculina Bank system (Figures 9 & 10). Protection of the Oculina Bank HAPC is also enhanced by creating a buffer north at 28° 30' N. latitude, west at 80°04' W longitude, and with the southern boundary being the limit of the EEZ. There is significant distribution of known *Oculina* coral shelf edge prominences or peaks and hard bottom and coral north of the presently designated HAPC mainly through 28° 30' N. latitude. Presently vessels are allowed to fish in the northern region in close association with the shelf edge system. From testimony at public hearings and from comments presented by the Ad Hoc Rock Shrimp Advisory Panel this activity is mainly conducted by Gulf vessels in areas not previously fished by vessels with south Atlantic home ports.

This option would provide a western buffer for the HAPC of four miles. Testimony at hearings and maps supplied by industry indicate a significant amounts of hard bottom closely associated with the western edge of the Oculina Bank HAPC. This option would eliminate the major impacts the rock shrimp fishery has on essential bottom habitat.

An additional benefit that may be forthcoming would be protection of larger spawning shrimp. The council's Scientific and Statistical Committee indicated

that the large spawning shrimp occur in the deeper *Oculina* habitat protected under this option. Some benefit in terms of spawning stock protection may be gained by protecting the stock from the impact of environmental fluctuations coupled with high fishing mortality.

Economic Impacts

This prohibition would affect a number of statistical areas. Four subdivided statistical areas would be affected east of 80° W. longitude and south of 28° 30' N. latitude. These include subdivided statistical areas 733b, 737a, 737b, and 741 (Figure 13). In area 737a which encompasses the Oculina Bank HAPC, it is estimated that only 1.6 percent of the trawl grounds would be affected. For the other three areas, 6.7 percent would be affected in each area. If harvest is distributed evenly in these statistical areas, the prohibition east of the 80° W. longitude and south of 28° 30' N. latitude could result in lost harvest of 101,700 pounds ($127,125) during the first year (heads–on). Hardly any precise estimates could be made for the area west of the 80° W. longitude and south of 28° 30' N. latitude because the fishable areas do not encompass the entire statistical grids. Also, some of the proposed area for prohibition consists of unfishable hard bottoms. Thus the impact west of the line would be much less than east of the line.

Social Impacts

This option would reduce the harvesting area as reported for the 1994 season, the extent of which is unknown. There has been some support for a modified and less restrictive version of this option within certain sectors of the industry. However, personal communication with other industry personnel suggests resistance to this option due to the extent of landings that would be affected.

Because rock shrimp harvesting has been closely associated with *Oculina* coral, a substantial amount of landings from the harvest areas included may be affected. However, there is insufficient information regarding harvest within the proposed buffer zone to determine the extent of impacts on landings at this time. Some harvesters have indicated that there are a number of preferred fishing areas within the proposed buffer zone that could encompass as much as 80 percent of harvest. Therefore, there may be resistance to this option from some within the industry.

Enforcement Impacts

Establishing a closed area around the 80° W. longitude south of 28° 30' N. latitude will enhance enforcement of existing regulations protecting coral and snapper grouper in and around the Oculina Bank HAPC. This option would provide a buffer around existing HAPC. Enforcement of this option may only be feasible with implementation of a vessel tracking system to insure vessels do not cross in and fish the closed area.

Conclusion

The council rejected this option because, while preventing habitat loss by protecting *Oculina* coral and the Oculina Bank HAPC from trawl related habitat damage, industry representatives indicated up to 80 percent of the harvest in 1994 could be attributed to this area. While covering a large area, the actual fishery is mainly prosecuted fairly close to the 80° W. longitude line. The industry's greatest concern was the loss of the area west of the 80° W. longitude line where a large productive area of trawlable sand and shell bottom exists.

Rejected Option 3. Limit trawling to depths greater than 120 ft (20 fathoms).

Biological Impacts

Recent information provided by the rock shrimp industry at public hearing and through representatives on the Ad Hoc Rock Shrimp Advisory Panel indicate that the primary harvest area does not begin until 20 fathoms or 120 ft and extends outward. Therefore, most habitat identified offshore would not be protected and the action would have little benefit in protecting bottom habitats of major concern including *Oculina* coral.

Economic Impacts

Some industry participants previously indicated that trawling for rock shrimp mainly occurs at depths of 80 to 210 feet depending on the area. More recent information provided by industry participants at public hearings and by representatives on the Ad Hoc Rock Shrimp Advisory Panel indicate the primary harvest area starts at the 20 fathoms or 120-foot contour and extends outward. This option would prohibit trawling for rock shrimp at depths less than 120 feet, thus some loss in harvest could result. However, no information is available on harvest by depth, thus the impact on lost income to fishermen of this alternative could not be determined. If it turns out that no trawling for rock shrimp occurs

inside the 20-fathom contour, there will hardly be any impact on rock shrimp fishermen.

One industry participant suggested that depth limitation could be effective if the extent of the coral outcrops is accurately known, but the cost of enforcement could be substantial unless rock shrimp vessels are fitted with transponders. Costs to rock shrimp fishermen would include initial installation and maintenance of the transponder system. (See Rejected Option 6 for a discussion on the cost of a transponder system.)

Social Impacts

With little information on harvest area by depth it is difficult to assess the impacts of this option. Harvest area would be reduced, but the extent of that reduction is unknown at this time. Industry personnel have indicated that little harvest takes place in depths less than 120 ft. If this is true then the impact on landings would be minimal.

Enforcement Impacts

This measure would be more difficult to enforce at sea unless a transponder monitoring system is also implemented in conjunction with the depth limitation.

Conclusion

The council rejected this option because the restriction would not eliminate the negative impact of the fishery on live/hard bottom habitat or protect most *Oculina* coral and coral habitat existing in and around the Oculina Bank HAPC. The council also rejected this option because of the possible unenforceable nature of the option and the uncertainty regarding catch as it relates to depth.

Rejected Option 4. Limit harvest area to Duval through St. Lucie Counties, Florida.

Biological Impacts

This option does nothing to protect *Oculina* coral which is easily damaged by bottom trawling and the HAPC which is designated as an experimental closed area in the harvest area. Testimony at public scoping meetings indicated that some vessels have fished in the HAPC or are fishing in the HAPC. Without additional regulations this activity will probably continue and the biological integrity of the HAPC and experimental closed area will be compromised. Further, the limited

distribution of *Oculina* would be reduced. A limited amount of protection would be afforded habitat north of Duval County and south of St. Lucie County, but the majority of bottom habitat of concern would not be protected. Considering the fishery is not prosecuted to any significant degree outside of the area, the protection of coral resources and live bottom habitat would be minimal.

Economic Impacts

The combined data from the states showed that less than one to two percent of the harvest occurred outside this area from 1986 to 1994. Thus, 98 percent of the harvest occurred within Duval and St. Lucie Counties, Florida from 1986 to 1994. Assuming that this alternative does not prohibit harvest of rock shrimp outside this area, there will be no impact on rock shrimp trawling activities outside this area if past harvesting trends continue. However, this option presupposes that the management area accounts for virtually all rock shrimp harvest. Recent information points to increasing trawling for rock shrimp as far south as Jupiter, Florida particularly by vessels from the Gulf coast states, mainly Alabama and Texas. Information received from industry participants indicated that between four and 17 percent of the harvest by the 34 harvesters during the 1994 season were from this area. This option would not address increased trawling activities outside of the specified area.

Social Impacts

This option would reduce area of harvest according to information provided by the rock shrimp industry. Between four and seventeen percent of the 1994 harvest could be affected. It is likely that at least four percent of the total harvest would be affected since that is the estimate being harvested below the 27° N. latitude line. Again, this option would affect boats from the Gulf region more than those from the south Atlantic since all reports of harvest in the area south of St. Lucie were by Gulf boats.

Boats from the south Atlantic region would be affected with this option by the loss of harvest areas in Nassau County, Florida, Georgia, South Carolina, and North Carolina. While the amount of harvest in these states is minimal, it has been suggested that rock shrimping in these states is undertaken during slack times and/or provides supplemental income when shrimping in other areas is not feasible.

Enforcement Impacts

Enforcement of coral regulations protecting bottom habitat including *Oculina* coral and prohibiting bottom trawling in the Oculina Bank HAPC would not be enhanced. The Oculina Bank was also designated an experimental closed area under the snapper grouper fishery management plan. This option would allow continued degradation of essential coral resources and live bottom habitat compromising the effectiveness of the area and research to be done documenting the benefits.

Conclusion

The council rejected this option because it did not minimize impacts of the fishery on essential habitat. In addition, this option would not protect the significant *Oculina* coral distribution in the area the fishery operates in the south Atlantic region. This option would allow continued degradation of protected coral resources and live bottom habitat as well as compromise the effectiveness of the Oculina Bank HAPC and experimental closed area and research being conducted documenting the benefits of the area.

Rejected Option 5. Establish a no transit zone in the Oculina Bank HAPC for all vessels possessing trawls rigged to fish.

Biological Impacts

Establishing a no transit zone in the Oculina Bank HAPC may discourage vessels previously harvesting in the HAPC from continuing to target the area. This option minimizes the likelihood of vessels impacting the bottom habitat in the HAPC by not allowing vessels rigged to fish to transit the HAPC. Theoretically, permitted vessels would be prevented from straying into the Bank area. If vessels would comply with this regulation most effort would be eliminated from the HAPC. This specifically addresses impacts to the HAPC and does nothing to prevent damage to the *Oculina* coral and hard bottom outside of the HAPC. This option, in addition to designating an area closed to rock shrimp trawling, could enhance protection of habitat in the HAPC, *Oculina* coral, and hard bottom habitat outside the HAPC.

Economic Impacts

The thrust of this action is to aid enforcement and further protect coral, coral reef habitats, and hard bottom. The taking of coral, hard bottom, etc. is

already prohibited. This alternative could increase traveling costs for those fishing vessels that have been transiting this area. It is not known whether any significant number of vessels use this area for transit at the present time.

Social Impacts

This option was offered by the Ad Hoc Rock Shrimp Advisory Panel and has support within the industry. Combined with licensing requirements and stiff penalties, the panel and others within the industry considered this option a means to ensure compliance with existing regulation. This option would not address the damage to *Oculina* coral outside the HAPC.

Enforcement Impacts

Enforcement of a no transit zone for vessels rigged to fish in and of itself may do little to enhance existing regulations if not done in conjunction with closed areas and/or a vessel monitoring system.

Conclusion

The council rejected this option because, although proposed by the Ad Hoc Rock Shrimp Advisory Panel, it would not address habitat protection outside the HAPC. The HAPC was designated in 1982 and it is likely this measure alone would do little to minimize impacts of the fishery on bottom habitat.

Rejected Option 6. Trawling for rock shrimp allowed only with transponders.

The council considered and rejected options requiring use of transponders to fish for rock shrimp in the following areas of the south Atlantic EEZ: (1) south of 28° 30' N. latitude, (2) south of Cape Canaveral, (3) from Duval through St. Lucie Counties, and (4) throughout the south Atlantic EEZ.

The transponder is an electronic, satellite positioning and communication system consisting of four elements: (1) the shipboard transponder, (2) a satellite system, (3) a shore-based central computer system, and (4) a base station. Communications are transmitted between the vessel and a base station, or other vessels, through the central computer and relayed by the satellites. The central computer is linked to base stations by conventional land lines. The base station can be any personal computer or a dedicated piece of hardware which is pre-programmed to perform specific functions such as location mapping. Position information is obtained when the transponder emits a signal which is received by

the satellite system and then relayed to the shore-side computer. The computer calculates vessel position based on information sent by the satellites. The shore-side computer sends the position information to the base station which can plot the position on a map or transmit it back to the vessel. Enforcement of regulations prohibiting rock shrimp trawling in designated areas including the Oculina HAPC may require monitoring vessels by periodic transmission of a vessel's position.

Biological Impacts

Requiring transponders would significantly enhance enforcement in areas closed to rock shrimp trawling, thus providing greater biological protection to coral and live/hard bottom habitats. Monitoring vessels fishing would provide enforcement agents the ability to rapidly identify vessels violating the HAPC or other closed areas and prevent possible damage to bottom habitat which may be caused by unintentionally or intentionally trawling and straying into the areas closed to trawling.

Economic Impacts

Use of transponders will increase operating costs, but could also be considered as safety insurance, since the Coast Guard could accurately locate vessel position in case of an emergency. The cost of leasing the unit that could transmit information on the location of a vessel varies significantly. An Argos system could be leased for about $210 a month, while Mobile Data Comm. system could be leased for about $45 a month. This would translate to an annual cost of between $2,500 and $540, assuming the system is utilized 12 months a year (Allen Mager, NMFS Special Agent presentation to SAFMC at the February 1995 meeting). Industry participants indicated small vessels rarely trawl for rock shrimp south of Cape Canaveral. During the 1994 season, up to 17 large vessels, mainly coming from outside the south Atlantic region, fished south of Cape Canaveral and as far south as Jupiter, Florida. These are the vessels likely to be most affected if use of transponders by rock shrimp vessels was adopted. The increase in operating costs would likely be felt more by those trawling for rock shrimp between Duval and Volusia Counties, Florida since their total landings are significantly lower and hence their total revenue relative to their investment (that is, including the cost of carrying transponders) would be lower.

Social Impacts

Use of transponders has received mixed reviews within the industry. Overall there tends to be dissatisfaction with this type of monitoring system among commercial fishermen. Commercial fishermen tend to see monitoring of this type as an invasion of privacy and an impingement on their rights as individuals. Their concerns stem from a strong sense of independence that most strive for in their daily lives, but most of all in their work. That independence is viewed as being severely compromised by the use of transponders as they see "Big Brother" looking over their shoulder.

Rock shrimp fishermen are no exception. Sentiments expressed by industry through the public hearing process suggest some aversion to use of this type of system. Some resistance is due to unfamiliarity with use and implementation of transponder systems. The expense of installing transponders is often mentioned as a major detractor. However, expense is relative to the type of system that might be required and transponder used. In addition, transponders do reduce some risks associated with fishing by providing a measure of safety in the event of an emergency. As commercial fishermen become more acquainted with these systems and realize some of the benefits to be gained from using such monitoring devices, levels of acceptance may change.

Enforcement Impacts

Use of a transponder system in the rock shrimp fishery would provide NMFS and the Coast Guard with the ability to limit or reduce at sea enforcement of existing coral and snapper grouper regulations protecting the Oculina Bank HAPC and any other areas where rock shrimp trawling is prohibited.

Conclusion

This option would have decreased the need for at-sea monitoring and enforcement and increased vessel safety for vessels covered by the system. However, the council considered the industries resistance to transponders and decided they were not necessary at this time.

Rejected Option 7. No trawling south of Bethal Shoals.

Biological Impacts

Prohibiting trawling south of Bethal Shoals (approximately 27° 40' N. latitude) would only protect part of the Oculina Bank HAPC by eliminating the

possible damage which may be caused by unintentionally or intentionally trawling along the HAPC south of approximately 27° 40' N. latitude. In addition, no protection would be afforded bottom habitat including *Oculina* coral and the shelf edge prominences or peaks north of Bethal Shoals. This measure would not increase protection of stony *Oculina* coral and the Oculina Bank HAPC north of the line. In addition, the measure would only partially enhance protection of the newly designated experimental closed area because the prohibition line falls in the middle of the Oculina Bank HAPC.

Economic Impacts

Industry participants provided information on harvest areas in 1994 indicating that 32 percent of the harvest for the entire region was from the area south of Bethal shoals. Comments from fishermen at scoping meetings indicate only a small number of vessels fished in this area. Subsequent public hearings and input supplied by the industry indicate that harvest extended as far south as Jupiter Inlet. Expansion of harvest south is by freezer boats, mainly coming from outside the south Atlantic region. The prohibition would affect these vessels, but they could likely redirect effort to other areas. It is likely that harvest during the first year could be reduced anywhere from 19 percent to 32 percent. The most important outcome would be the prevention of damage to bottom habitat including the Oculina Bank and coral outcrops.

Social Impacts

This option would reduce the available fishing grounds and likely affect vessels from the Gulf area more. Harvesting information provided by the industry indicated that of the 1994 harvest at least 19% or as much as 32% would be affected. Impacts could be lessened by an effort shift, but this could also lead to overcrowding during the peak season from July through October.

Again this option would impact vessels from the Gulf region more in that they have reported a greater harvest from areas south of Bethal Shoals than did boats from the south Atlantic. Thirty-five reports of harvest were from Gulf vessels in the areas south of Bethal Shoals, while 26 harvest reports in those areas were from south Atlantic vessels.

Enforcement Impacts

Enforcement of existing coral regulations which protect stony *Oculina* coral, prohibit bottom trawling in the Oculina Bank HAPC, and prohibit snapper grouper

fishing in the newly designated experimental closed area would only partially be enhanced because the prohibition line falls in the middle of the Oculina Bank HAPC. Some fishermen fish on the western edge of the Oculina Bank moving north and south along the HAPC.

Conclusion

The council rejected this option because the restriction would not eliminate the negative impact of the fishery on live/hard bottom habitat and coral existing in and around the Oculina Bank HAPC and north of Bethal shoals. Enforcement of regulations protecting essential habitat including *Oculina* coral in areas of known and significant distribution including the Oculina Bank HAPC would only be partially enhanced because the prohibition line falls in the middle of the Oculina Bank HAPC.

Rejected Option 8. No trawling west of the Oculina Bank HAPC.

Biological Impacts

Prohibiting trawling west of the Oculina Bank HAPC would eliminate the removal of smaller shrimp from shallower water closely associated with the area. In addition, this option would provide a western buffer eliminating possible damage which may be caused by unintentionally or intentionally trawling on the western side and straying into the HAPC. Some fishermen shrimp on the western edge of the Oculina Bank moving north and south along the HAPC. Testimony at public scoping meetings indicated some vessels have fished in the HAPC and continued to do so until recently. This option may reduce the likelihood of a vessel fishing inside the HAPC on the western side.

Economic Impacts

NMFS and States' data indicate less than one percent of the harvest for the entire region was from this area from 1981 to 1994 . These are large vessels which fish toward the end of the season. These boats could redirect effort to other areas. Thus, the impact of this action could be minimized. However, harvest data for 1994 provided by rock shrimp fishermen indicate that 829,012 pounds of rock shrimp were harvested by 24 vessels from area 736a which is west of the Oculina Bank HAPC. Thus, it appears that harvest in this area increased in the past year. This option will reduce harvest by 12 percent relative to the total harvest in the

south Atlantic region for 1994 or by 18 percent relative to the total harvest of those who reported harvest by area if effort cannot be redirected.

Social Impacts

This option would reduce the available fishing grounds. According to information provided by industry, approximately 18 percent of the 1994 harvest would have been affected if harvesting was spread evenly throughout the area of 736a. With an effort shift to other areas, impacts could be less than anticipated, but could lead to overcrowding during the peak rock shrimp season from July through October. This area is one of the more productive areas and is fished regularly by boats from both the Gulf and south Atlantic regions.

Enforcement Impacts

Enhances enforceability of the trawl prohibition which already exists in the Oculina HAPC. Probable resistance by industry due to the number of vessels harvesting rock shrimp south of Cape Canaveral, west of the Oculina HAPC.

Conclusion

The council rejected this option because prohibiting trawling west of the Oculina Bank HAPC would not significantly enhance protection of the HAPC and would not protect *Oculina* coral and bank structure distributed mainly north of the HAPC.

Rejected Option 9. No action.

Biological Impacts

This option would not protect *Oculina* coral which is easily damaged by bottom trawling and the HAPC which is designated as an experimental closed area. Testimony at public scoping meetings indicated that some vessels have fished in the HAPC or are fishing in the HAPC. Without additional regulations, this activity would probably continue and the biological integrity of the HAPC and experimental closed area will be compromised and the limited distribution of *Oculina* would be reduced.

The council rejected taking no action in order to protect essential bottom habitat in the EEZ by minimizing the impacts of the rock shrimp fishery on non-renewable, protected resources, including live/hard bottom, *Oculina* coral, and the Oculina Bank system. Also, in looking at this issue, the council discovered the

coral distribution is more extensive than just the HAPC. Taking no action would allow the fishery to continue to degrade essential habitat when options redirecting effort can reduce the direct or possible impacts the fishery could have on this habitat. Short-term losses in catch or redirection of effort away from bottom habitat will enhance the protection of these essential habitat types while maintaining the majority of historical fishing grounds open for unlimited harvest of rock shrimp. In addition, minimizing impacts of the fishery on these and other essential bottom habitats is mandated under existing south Atlantic Council habitat policies and the Magnuson Act. No action is not a viable alternative considering these mandates and the council's commitment to protect essential habitats in the south Atlantic region.

Economic Impacts

Taking no action would forgo any benefits that would result from the protection of essential habitat. Other impacts could include significant harvest of rock shrimp of smaller size classes and high bycatch. Presently, there is limited information on bycatch in the rock shrimp fishery.

Social Impacts

This option has support within the industry as there are some that share the view that expanding protection of *Oculina* coral beyond the present HAPC is unnecessary. Others within the industry recognize the council's concerns for habitat protection and support some action to address further protection of the *Oculina* coral habitat and hard bottom areas beyond the present closed area. Support for any action will likely depend, however, upon the amount of harvest that will be affected for each individual or faction within the industry.

By taking no action the council would have to address the effects of rock shrimp trawling on *Oculina* through the coral plan. In doing so, the other issues of landings and reporting within the rock shrimp fishery would not be addressed. In addition, the council would not have had the opportunity to work as closely with the rock shrimp industry to develop a proposal, because it would have been one of many fisheries to be considered. Detailed information provided by industry may not have been available to understand all impacts of a proposed closure.

Enforcement Impacts

No action would neither enhance enforceability of the trawl prohibition which already exists in the Oculina HAPC nor protect the limited distribution of fragile *Oculina* coral.

Conclusion

The council rejected the no action option because continued degradation and loss of live/hard bottom habitat including *Oculina* coral and damage to the bank system associated with trawling would continue. Degradation or loss of live/hard bottom and coral habitat may reduce the ability of this habitat to provide shelter and food sources for species including snapper grouper that are associated with these habitats and also managed under federal law.

ACTION 3. Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to have a permit issued by the Regional Director.

Dealers who want to handle rock shrimp must obtain a federal dealer permit. Dealers who handle rock shrimp must fill out monthly rock shrimp reports listing their total rock shrimp purchases. Requirements for a federal rock shrimp dealer permit are that the applicant possesses 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 license. A fee will be charged to cover the administrative costs of issuing federal rock shrimp dealer permit. In addition, transactions of rock shrimp would be limited to permitted harvesters selling to permitted dealers.

Dealers would be required to submit an application supplied by the Regional Director for a dealer permit. The permit would not be transferable and would expire upon change in ownership of the business.

Biological Impacts

Mandatory dealer permits will provide a complete list of dealers handling south Atlantic rock shrimp. When coupled with mandatory reporting the system will provide accurate catch data. While having no direct biological impacts, future estimates of fishing mortality and sustainable optimum yield for the south Atlantic rock shrimp resource would be more reliable.

Economic Impacts

Dealer permits will increase the incentive for dealers to accurately report rock shrimp landings. In fact, industry requested that the council implement a dealer permit system. The cost of dealer permits to the industry is estimated at $520 annually. This estimate represents an application fee of $40 per application for 12 dealers, and the opportunity cost (time spent filling the application form) estimated at 15 minutes per application at $12.50 per hour.

The public costs of dealer permitting is estimated to be $150 annually. This represents labor cost at $12.50 per hour for processing permit applications for an estimated 12 dealers. Requiring that dealers have physical facilities at fixed locations should not impose any cost on legitimate dealers because, from a practical standpoint, physical facilities are required to off-load rock shrimp.

For those with Federal dealer permits, rock shrimp would be added to the list of species they can handle. They will not be required to obtain separate dealer permits.

Although it imposes minimal cost on dealers, this measure will likely increase long-term economic benefits from the fishery by identifying the universe of dealers and providing information to monitor other management measures and make them more effective.

Social Impacts

This option was proposed by the Ad Hoc Rock Shrimp Advisory Panel and has support within the industry as a means of improving landings data. Discussions during Ad Hoc Panel meetings and testimony at public hearings indicate that most rock shrimp dealers have few objections to this requirement, although they rarely seek additional reporting requirements. Dealers are quick to point out that many of them are already permitted within the State of Florida and that reporting requirements are already in place in other states. If such a permitting system were to be selected, dealers have suggested that it be incorporated into the present system so as to reduce the burden of duplicate reporting. Permitting of dealers allows for identification of those involved in the fishery in a timely manner if the need for information concerning landings, price structure, or general questions about the marketing channels for rock shrimp becomes evident.

Enforcement Impacts

Requiring dealers handling south Atlantic rock shrimp to obtain a rock shrimp dealer permit will provide an enforceable mechanism to insure all rock shrimp harvested are reported. The council determined that harvest data could be best collected through the dealer channels. Also, this would be less burden on the industry than requiring individual fishermen to report their harvest through a log book or some other system.

Conclusion

The council is requiring mandatory dealer permits to identify the universe and ensure that data necessary for management is collected. This action is also supported by industry.

The primary purpose of a dealer permit would be to ensure accurate reporting and improve enforcement of the regulations through dealer accountability. In addition, permitting of dealers would identify participants in the processing side of the fishery and identify principle business locations. A secondary benefit in defining the universe of dealers, processors, and brokers handling south Atlantic rock shrimp is that it provides an additional information route to the council for all vessels fishing for rock shrimp, and a better understanding of the economic characteristics of the fishery.

The exact number of dealers (processors, buyers, and brokers) that would be required to report is unknown. However, approximately 8 major processors, brokers, and dealers accounted for roughly 90% of the reported landings of rock shrimp harvested in the south Atlantic in 1994.

Rejected Option for Action 3

Rejected Option 1. No Action.

Biological Impacts

There are no direct biological impacts from not requiring dealers to be permitted. However, information received from a permitted dealer including but not limited to, catch rates, count size, and harvest location, it will allow a more accurate evaluation of the biological impacts of management measures.

Economic Impacts

If dealer permit is not required, the universe of rock shrimp dealers may not be known with any certainty. This could affect the collection of statistics for the

fishery because there would be no incentive on the part of dealers to report in a timely and accurate manner. In the long-term there will likely be some reduction in net benefits because of the lack of accurate information to manage the fishery optimally. No information is available to assess the magnitude of any likely reduction in net benefits from taking no action.

Social Impacts

No action with regard to dealer permits also has support within the industry as some see federal permits as an unnecessary burden and duplication of the present state system in Florida. By not requiring dealer permits the council will lose the ability to quickly identify those participating in the intermediate sector of the rock shrimp fishery. Inability to completely identify that sector may prevent important information from being considered and the council's need for accurate and timely data to assess the impact of specific actions when implementing FMP amendments would be hindered.

Enforcement Impacts

By not permitting dealers, the council will loose a check in the system. In addition, the accountability in the industry gained by require permitted harvesters to sell to permitted dealers, would be lost.

Conclusion

The council rejected no action because without accurate data good management would not be possible. In addition, the Ad Hoc Rock Shrimp Advisory Panel supports mandatory permitting of dealers and the institution of a mandatory system which enhances the data collection necessary for management of the resource. Also, this action enhances the accountability of the rock shrimp industry. The council determined that requiring dealers to report was less burdensome than requiring individual fishermen to report landings data.

ACTION 4. Parties shall be required to obtain a vessel permit from the National Marine Fisheries Service to harvest or possess rock shrimp in or from the south Atlantic EEZ.

Permits can be obtained from the Permit Division, Southeast Regional Office, National Marine Fisheries Service, 9721 Executive Center Drive North, St. Petersburg, Florida 33702 (telephone (813) 570-5326).

To receive a federal rock shrimp permit, a permit application would have to be completed and submitted to NMFS SERO preceding the fishing year. A fee will be charged to cover the administrative costs of issuing federal rock shrimp vessel permit. In addition, transactions of rock shrimp would be limited to permitted harvesters selling to permitted dealers.

Permit holders would be required to carry their permit aboard during fishing and off-loading operations and for it to be available upon request by an authorized officer.

Biological Impacts

No direct biological impacts can be attributed to requiring a vessel permit however, knowing the entire universe of rock shrimp vessels will aid future management.

Economic Impacts

Vessel permits will enable the universe of participants in the harvesting sector to be known. If an electronic reporting system is developed through the use of transponders by vessels, such data could be transmitted at regular intervals. This could improve the timeliness of obtaining information on the fishery. Industry requested that the council institute a vessel permit system.

A fee will be charged to cover the administrative costs of issuing federal rock shrimp vessel permits. The cost of vessel permits to the industry is estimated at $5,600 annually. This represents the application fee for an estimated 130 vessel permits at $40 per application and the opportunity cost (time spent filling the application) of $400. Vessel permits are already required in other fisheries in the region. It will aid in the collection of accurate data for the fishery and hence in managing the fishery optimally to increase net benefits in the long-term.

Social Impacts

This action was part of the set of proposals from the first Ad Hoc Panel meeting. It has the support of the Ad Hoc Advisory Panel and the industry at large. Permitting vessels will allow for easy identification of those individuals involved in the harvesting of rock shrimp in the south Atlantic EEZ. Discussions with the Ad Hoc Advisory Panel and testimony during public hearings indicate industry has few if any objections to this kind of action. This action was pursued to address the lack of satisfactory information concerning the number of participants within the rock shrimp fishery.

The added benefit of timely and accurate information concerning the rock shrimp industry would improve the council's ability to assess impacts of future actions.

Enforcement Impacts

Requiring vessel permits will improve accountability and give enforcement agents the ability to determine if a vessel is fishing legally under the existing federal regulations.

Conclusion

Requiring vessel permits would insure the universe of participants in the south Atlantic rock shrimp fishery are identified. Permitting vessels will provide the necessary information to assess impacts of fishing on the resource and associated habitats. In addition, permitted harvesters would be required to sell to permitted dealers affording greater accountability to both parties and insuring dealer harvest reports reflect all rock shrimp landings.

Rejected Option for Action 4

Rejected Option 1. No Action.

Biological Impacts

None.

Economic Impacts

If vessel permits are not required, it would be difficult to identify the universe of participants in the harvesting sector. In addition, industry informally agreed to bear the additional cost associated with a vessel permit by requesting the council institute a permit system. The industry also acknowledges that timely and accurate information concerning the rock shrimp industry will enhance the council's ability to accurately assess the economic impacts of actions.

Social Impacts

Because there is support for permitting, the option of no action would likely have few social impacts upon the industry. This option would hamper efforts by the council to gather timely and accurate information on the rock shrimp industry.

Enforcement Impacts

Not having vessel permits would limit the ability of enforcement officers to rapidly identify vessels which may be violating closed areas. Also, the incentive for compliance among harvesters (fishermen) would decrease and a weak link in the compliance chain could result.

Conclusion

The council rejected taking no action in order to implement a vessel permit system to enhance data collection, monitoring of the fishery, and provide another enforcement tool. Industry supports this requirement. This action also address the objective of enhancing data collection.

ACTION 5. Require captains operating permitted vessels fishing for rock shrimp in the south Atlantic EEZ to have a vessel operators permit issued by NMFS to participate in the fishery.

Operators of rock shrimp vessels will be required to have a vessel operators permit. No performance or competency testing will be required to obtain a permit. However, the permit may be revoked for violation of Federal rock shrimp regulations as authorized by 15 C.F.R. 904. A fee will be charged to cover the administrative costs of issuing a federal rock shrimp vessel operators permit.

The Ad Hoc Rock Shrimp Advisory Panel presented this option to the council for consideration noting it would afford a greater responsibility to the vessel operator to comply with existing and proposed federal regulations.

The council proposes to require that vessel operators be permitted as follows:

(1) Any operator of a rock shrimp vessel fishing in the south Atlantic EEZ must have a permit issued by the NMFS Regional Director;

(2) An operator is defined as the master or other individual on board a vessel who is in charge of the vessel;

(3) The operator will be required to submit an application, supplied by the Regional Director for an operator's permit. The permit will be issued for up to three years; and

(4) Permit holders will be required to carry their permits onboard fishing vessels during fishing and off-loading operations and must be available for inspection upon request by an authorized official.

Biological Impacts

None.

Economic Impacts

The proposed action would make vessel captains more responsible in terms of their actions in complying with regulations. Oftentimes vessel owners who are not captains are penalized when their vessels are in violation of regulations, while the captains of those vessels walk away and continue business as usual. Vessel operators permitting would also provide for penalties to be imposed on operators who are found to be in violation of regulations. A fee will be charged to cover the administrative costs of issuing a federal rock shrimp vessel operator's permit.

Industry requested that the council institute a vessel operator's permit system. Assuming that there are approximately 130 captains manning the estimated 130 vessels active in the rock shrimp fishery during the 1994 season, the estimated cost of permits is $5,600 annually. Increased compliance of regulations through vessel operators' permits could make regulations more effective and likely increase net benefits in the long-term.

Social Impacts

This option was proposed by the Ad Hoc Advisory Panel and has support within the industry according to information provided through the public hearing process. This option is part of the combined proposal by industry to include strict penalties to ensure compliance with existing regulations. Penalties suggested by industry include the revoking of licenses or permits for violators. This action will allow vessel owners to shoulder less of the burden for operators who may fish in closed areas. The Ad Hoc Advisory Panel emphasized that this action, if implemented in conjunction with penalties for violations that are tied to the permitting system, can help ensure compliance. Without this action, the panel suggested that operators who might fish inside protected areas would have little incentive to ensure compliance with any area closure.

Enforcement Impacts

Requiring a vessel operators permit will provide accountability of operators in complying with proposed regulations and provide a mechanism to remove violators from the fishery.

Conclusion

The Ad Hoc Rock Shrimp Advisory Panel proposal submitted to the council requested implementation of a permitting system for operators of rock shrimp vessels in the south Atlantic. The council adopted this measure as an additional incentive for vessel captains to fish legally and in a manner in which habitat damage is avoided, if they wish to insure their continued participation in the fishery.

Rejected Option for Action 5

Rejected Option 1. No Action.

Biological Impacts

None.

Economic Impacts

If a vessel operators' permit is not required, the incentive for compliance among rock shrimp vessel operators would decrease and a weak link in the compliance chain could result. This could cause net benefits to decrease in the long-term because of lower compliance in the fishery.

Social Impacts

Because vessel operators permits were recommended by the industry and there is support for permitting, the option of no action would likely have some social impacts. The no action option would continue to place the responsibility for compliance with federal regulations on the vessel owners.

Enforcement Impacts

Taking no action will impede facilitating self compliance in the industry. Without the threat of sanctions including the loss of fishing time or ability to participate in the fishery, some captains will not comply with federal fishing regulations.

Conclusion

The council rejected taking no action in order to facilitate self compliance and give enforcement the ability to prevent a small number of violators from reflecting negatively on the industry as a whole. The council supported the rock shrimp industry proposal to require vessel operators permits.

ACTION 6. Any dealer defined as the person who first receives rock shrimp harvested in the EEZ by way of purchase, barter, trade, or transfer would be required to report data needed to monitor the rock shrimp fishery to NMFS.

Implementing a dealer reporting system will improve the collection of data for the rock shrimp fishery. The council is recommending NMFS use existing systems to attain this information thereby reducing duplication with existing programs. If the NMFS uses these existing systems for data collection, then the only increased paperwork consideration would arise from the implementation of permits which are proposed and continue to be strongly supported by industry.

Biological Impacts

Requiring dealer reporting, through existing systems where possible and through new systems where needed, will provide a system of checks and balances needed to insure accurate reporting of total harvest as well as the location of harvest. Having a better indication of location of harvest provided by to dealers by harvesters will provide the council with information on harvest in relationship to essential bottom habitat and closed areas. Long-term sustainable yields for the fishery may also be calculated once accurate harvest information is available and the biology of the species is better understood through subsequent research efforts.

Economic Impacts

Since dealer reporting is being required instead of individual fishermen reporting, there is less burden placed on the industry. A dealer reporting system will enable collection of accurate and complete data for the rock shrimp fishery. It will also increase the incentive for regulatory compliance and aid enforcement. The estimated cost of dealer reporting to the industry is approximately $2,000 annually. The public burden cost of dealer reporting is estimated at $650 annually. Although somewhat restrictive, this measure will likely increase long-term economic benefits from the fishery by providing information to monitor other management measures and make them more effective.

Social Impacts

Many dealers have indicated they are already mandated to report through the Florida trip ticket system. Although this is true, other states do not have the strict reporting requirements as does Florida. In addition, detailed information included on the Florida trip ticket system may not be included in these reports.

This breakdown in the system of reporting has accounted for late reporting and the inability to assess impacts in a timely manner. It has been suggested by industry that any additional reporting requirement be incorporated into the present system so as to reduce the burden of duplicate reporting. Although some dealers resist additional reporting requirements, they have expressed a willingness to improve the current reporting systems in existence.

Enforcement Impacts

This option may be more enforceable considering dealers have indicated they are already mandated to report through the Florida trip ticket system. However, catch may be forwarded to dealers or processors in other states and not enter the existing system or be recorded in states where it is not mandatory to report landings and/or dealer transactions.

Conclusion

A dealer reporting system will enable the collection of more accurate and complete data for the rock shrimp fishery. It will also increase the incentive for regulatory compliance and aid enforcement. Obtaining the data necessary for management through a dealer reporting system is less burdensome on the industry than requiring that individual fishermen provide the data through mandatory log books.

Rejected Options for Action 6.

Other Dealer Reporting Requirements Considered:

Rejected Option 1. Any dealer defined as a person who first receives rock shrimp by way of purchase, barter or trade and holds a valid permit issued by the NMFS Regional Director, would be required to report data needed to monitor the rock shrimp fishery.

Rejected Option 2. Dealers handling rock shrimp harvested anywhere in the south Atlantic EEZ shall be required to report to the Permit Division, Southeast Regional Office, National Marine Fisheries Service, 9721 Executive Center Drive North, St. Petersburg, Florida 33702. The reports shall be made on hard copy or electronic logbook forms, which will be provided to the permitted dealer by the NMFS.

Rejected Option 3. Dealers handling rock shrimp harvested anywhere in the south Atlantic EEZ and landed: 1. in Florida shall be required to report to the Fisheries Statistics Section of the Florida Bureau of Marine Research Florida Department of Environmental Protection. Dealers will submit hard copy or electronic reports which incorporates Form #33-610 (Florida Trip Ticket). Dealers will need to obtain a Florida Saltwater Products License.: and 2. outside of Florida shall be required to report to the National Marine Fisheries Service. The

reports shall be made on hard copy or electronic forms, which will be provided to the permittee by the NMFS.

Biological Impacts

Requiring dealer reporting, through existing systems where possible and through new systems where needed, will provide a system of checks and balances needed to insure accurate reporting of total harvest as well as the location of harvest. Having a better indication of location of harvest provided by to dealers by harvesters will provide the council with information on harvest in relationship to essential bottom habitat and closed areas. Long-term sustainable yields for the fishery may also be calculated once accurate harvest information is available and the biology of the species is better understood through subsequent research efforts.

Economic Impacts

A dealer reporting system will aid in the collection of accurate and complete data for the rock shrimp fishery. It will also increase the incentive for regulatory compliance and aid enforcement. Increased economic benefits could result in the long-term as a result of the reporting system making other management measures effective.

Social Impacts

Many dealers have indicated they are already mandated to report through the Florida trip ticket system. It has been suggested by industry that any additional reporting requirement be incorporated into the present system so as to reduce the burden of duplicate reporting. Dealers have indicated a willingness to improve the current reporting systems in existence rather than requiring a new or duplicative system. Implementing a dealer reporting system, through existing systems where possible and through new systems where needed, is viewed by the council and industry as the least burdensome method of collection .

Conclusion

The council rejected these options because implementing a dealer reporting system, through existing systems where possible and through new systems where needed, as proposed in Action 6, is the least burdensome method of collection of accurate and complete data for the rock shrimp fishery.

No Action Option.

Biological Impacts

Taking no action would not provide the system of checks and balances needed to insure accurate reporting so that the best information on the total rock shrimp resource harvest can be collected and verified. The calculation of long-term sustainable yields for the fishery could not be done without accurate landings information in combination with needed research on the biology of the species.

Economic Impacts

If dealer reporting is not required, it could hinder the collection of accurate and complete data from the fishery. Industry requested the council institute a dealer reporting system because it would provide data for managing the fishery efficiently.

Social Impacts

With no action there remains the problems encountered with the recent attempts to assess the impacts of various actions on the rock shrimp industry. Without timely, accurate, and detailed information it is difficult to assess the impacts upon the industry and especially certain sectors of the industry which may be impacted more than others.

Enforcement Impacts

Taking no action may continue to allow rock shrimp to be shipped to dealers or processors in other states without going through the existing data systems or be recorded in states where it is not mandatory to report landings and/or dealer transactions. Consequently reported harvest from the south Atlantic stock may continue to be underestimated. If dealer reporting is not required, the incentive for compliance among rock shrimp vessel captains, owners, and dealers would decrease and a weak link in the compliance chain could result. In the long-term net benefits would likely decline because the fishery would not be managed at an optimal level due to lack of adequate and accurate information.

Conclusion

The council rejected this option because without implementing a dealer reporting system, the least burdensome collection of accurate and complete data for the rock shrimp fishery will be unlikely. The incentive for regulatory compliance without a mandatory system would be lost. If a dealer reporting

system is not implemented, it would be necessary to require an individual fisherman log book system to acquire management data.

C. Unavoidable Adverse Effects

Prohibiting trawling in the specified area will result in a loss of fishing area but, harvest could remain the same if effort shifts and shrimp are harvested in other open areas. Fishing could increase during a season as fishermen rush to harvest as much as they can, given their harvesting capacity, before the season ends. This could result in habitat loss. Implementation of a trawl prohibition for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms results in loss of fishing areas but would protect juvenile rock shrimp and prevent habitat damage. The area prohibition would have some impact on fisherman trawling for rock shrimp. However, this will be minimized to the extent that fishermen can successfully shift effort to other areas without any significant reduction in their catches.

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

The proposed measures would likely impose some short-term losses on fishermen. This level of reduction or losses is necessary to ensure the long-term productivity of essential habitat. Without such regulations the long-term yield of fish species and rock shrimp dependent on this habitat would be jeopardized.

The council weighed the likely short-term losses to fishermen against the long-term yield and damage to *Oculina* coral and the bottom habitat east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms encompassing the Oculina Bank HAPC, and concluded that the proposed actions would likely result in net benefits to society.

E. 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 regulate the rock shrimp fishery, damage to essential habitat would continue.

F. Effects of the Fishery on the Environment

Damage to Ocean and Coastal Habitats

The proposed actions are expected to have a positive effect on ocean and coastal habitats. Implementing a trawl prohibition to prevent damage to the fragile *Oculina* coral around and in the designated HAPC will limit trawl damage to

live bottom habitat and possibly reduce bycatch in the prohibited area. Additional habitat concerns are included in the original management plan (SAFMC 1993).

The fishery, as presently prosecuted, does on occasion substantially impact the live bottom habitat including coral and live bottom habitat essential to the snapper grouper species under council management. The Oculina Bank HAPC is discussed in Action 2. The council is proposing the trawl prohibition to minimize damage to coral and habitat around and in the Oculina Bank HAPC.

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 rejected options that would have required use of transponders would have increased vessel safety.

Endangered Species and Marine Mammals

The proposed actions, and their alternatives, are not expected to adversely affect any endangered or threatened species or marine mammal populations. A Section 7 consultation was reinitiated for the southeastern shrimp fishery and the updated Endangered Species Act Biological Opinion is included in Appendix F. Additional information on endangered and threaten species is contained in Section 3.0 subsection H under Turtle Interactions and TEDs and in Section 7.0, Subsection C.

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 rock shrimp resource or any related stocks, including sea turtles. In fact, the proposed measures may improve status of stocks and will minimize fishery related habitat damage.

G. Public and Private Costs

Preparation, implementation, enforcement, and monitoring of this and any Federal action involves expenditure of public and private resources which can be expressed as costs associated with the regulation.

Costs associated with this specific action include:

Council costs of document preparation, meetings, public hearings and information dissemination		$112,000
NMFS administrative costs of document preparation, meetings and review		$5,000
NMFS law enforcement costs		$25,000
Permit Costs	Industry: (Dealer, Vessel, and Operator Permits and Dealer Reporting)	$13,720
	Public: (Dealer Permit and Dealer Reporting)	$800
TOTAL		$156,520

H. Effects on Small Businesses: Initial Regulatory Flexibility Analysis

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 rock shrimp fishermen, processors, and businesses having a high dependence on rock shrimp. The impacts of the proposed action on these entities have been discussed in this Section. 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 the 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 1992a). For the 1994 fishing season, the most recent year for which data on numbers of participants are

available, there were 60 freezer boats ranging in size from 56 feet to 75 feet and 5 ice boats that participated full time during the rock shrimp season (Rodney Thompson, pers. comm.). 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. Most holders of Florida Saltwater Products License that have reported rock shrimp landings 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 percent; b) increase in total costs of production by more than 5 percent as a result of an increase in compliance costs; c) compliance costs as a percent of sales for small entities are at least 10 percent higher than compliance costs as a percent of sales for large entities; 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 percent of small business entities being forced to cease business operations (NMFS 1992a).

Based on the "threshold–type analysis" of the proposed measures in this amendment, the council determined that the likely impacts will have a significant economic impact on a substantial number of small entities in that annual gross revenue for affected vessels could be reduced by more than five percent. Therefore, an Initial Regulatory Flexibility analysis (IRFA) was conducted and the results are summarized below. For more detail, please refer to the discussions under Economic Impacts in Section 4.0.

Action 1. Add rock shrimp to the management unit of the fishery management plan for the shrimp fishery of the south Atlantic region.

No economic loss is expected to individual vessels by adding rock shrimp to the management unit of the Fishery Management Plan for the Shrimp Fishery of the South Atlantic region (SAFMC EEZ). Over 95 percent of rock shrimp harvested in the south Atlantic region occur in the EEZ off the east coast of Florida. There is also some harvest in the EEZ off the coasts of North Carolina, South Carolina, and Georgia. However, this has not been consistent throughout the time period. One of the alternatives considered and rejected would have had less of an impact on fishermen but would not have enabled the council to act

expeditiously if trawling for rock shrimp extends significantly beyond the traditional fishing grounds.

Rejected Option 1. The management unit includes the population of rock shrimp from Duval through St. Lucie Counties, Florida.

This area encompasses over 90 percent of the historical harvest of rock shrimp in the south Atlantic region. The measure is not expected to cause any economic loss to individual vessels because there would be no disruption of their trawling activities. However, it will not allow the council to implement measures that will apply to rock shrimpers fishing outside this management unit. This could lead to dissipation of rents from the fishery which could affect the revenue of individual vessels in the long-term.

Rejected Option 2. No Action.

The last two fishing seasons have been very productive for rock shrimping. The 1994 season has been particularly successful and profitable because catches have been higher than usual, the season has extended beyond the end of October, and exvessel prices have stayed relatively high even for small count sizes, due partly to some exogenous factors. As a result, some representatives from the industry indicated at the public hearing in Cocoa Beach, Florida in September 1994 that the council should not take any action at this time although they had come to the council in 1992 when landings were falling and smaller count sizes were predominant in the catches. If no action is taken, it is possible that the long-term damage to essential habitat could exceed the short-term benefits that rock shrimp fishermen are presently enjoying.

Action 2. Prohibit trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms.

Information from industry participants (rock shrimp harvesters) indicate that during the 1994 season about 23 freezer vessels reported having trawled for rock shrimp in statistical area 733b (Figure 13, page 42). An average of 22 percent of the harvest of these vessels was taken in this area. These vessels harvested 3,472,867 pounds of rock shrimp in the south Atlantic region. Assuming that the same harvest rate continues and these vessels cannot successfully redirect effort to other areas, they will experience a reduction of 764,031 pounds ($955,039) annually with the trawling prohibition. If this reduction in harvest is distributed equally among the 23 vessels, each vessel will experience a reduction in harvest of 33,219 pounds ($41,523) in the first year.

A total of 14 freezer vessels reported having harvested rock shrimp from area 737a (Figure 13, page 42) during 1994. (These 14 vessels are part of the 23 that reported harvest from area 733b.) An average of 19.5 percent of their harvest was taken from this area. These vessels harvested 2,359,045 pounds of rock shrimp in the south Atlantic region in 1994. Assuming that the same harvest rate continues and that these vessels cannot successfully redirect effort to other areas, they will experience a reduction of 460,014 pounds ($575,018) in the first year with the trawling prohibition. If this reduction in harvest is distributed equally among the 14 vessels, each vessel will experience a reduction in harvest of 32,858 pounds ($41,073) in the first year.

Combining areas 733b and 737a, the trawl prohibition will result in a reduction in harvest of 1,224,045 pounds ($1,530,057) in the first year. However, these vessels would likely be able to shift effort somewhat to other areas. The extent to which they can successfully shift effort to other areas will determine how well they can minimize the impact. If these vessels have to travel extra distances to reach other areas, there could be some increase in operating costs. This may not result in a reduction in net revenue to the vessel if, by switching, they can harvest larger size shrimp which could be marketed at higher exvessel prices. One other factor to consider is that these vessels participate in other fisheries when they are not fishing for rock shrimp. It is likely that they could also switch effort to other fisheries during the time they would have been trawling in the prohibited area.

Some of the options considered and rejected would have had less of a short–term impact on rock shrimp fishermen but their long–term damage to essential habitat, and effect on biological productivity would have been greater. Also, industry proposed this option to the council as the one that will be acceptable and enforceable given the council's mandate to protect essential habitat.

Rejected Option 1. Prohibit trawling for rock shrimp east of 80° W. longitude between 27° 30' N. latitude and 28° N. latitude and west of 80° W. longitude south of 27° 30' N. latitude.

Information from industry participants (rock shrimp harvesters) indicate that during the 1994 season about 13 freezer and one ice vessels reported having trawled for rock shrimp in statistical area 736b. An average of 17.5 percent of the harvest of these vessels was taken in this area. These vessels harvested 2,082,453 pounds of rock shrimp in the south Atlantic region. Assuming that the same harvest rate continues and these vessels cannot successfully redirect effort to

other areas, they will experience a reduction of approximately 364,429 pounds ($455,536) in the first year with the trawling prohibition. If this reduction in harvest is distributed equally among the 14 vessels, each vessel will experience a reduction in harvest of 26,031 pounds ($32,538) in the first year.

A total of 14 freezer vessels reported having harvested rock shrimp from area 737a during 1994. An average of 19.5 percent of their harvest was taken from this area. These vessels harvested 2,359,045 pounds of rock shrimp in the south Atlantic region in 1994. Assuming that the same harvest rate continues and that these vessels cannot successfully redirect effort to other areas, they will experience a reduction of 460,014 pounds ($575,018) in the first year with the trawling prohibition. If this reduction in harvest is distributed equally among the 14 vessels, each vessel will experience a reduction in harvest of 32,858 pounds ($41,073) in the first year.

A total of 3 freezer vessels reported having harvested rock shrimp from area 740 during 1994. An average of 30 percent of their harvest was taken from this area. These vessels harvested 468,411 pounds of rock shrimp in the south Atlantic region in 1994. Assuming that the same harvest rate continues and that these vessels cannot successfully redirect effort to other areas, they will experience a reduction of 140,523 pounds ($175,654) in the first year with the trawling prohibition. If this reduction in harvest is distributed equally among the three vessels, each vessel will experience a reduction in harvest of 46,841 pounds ($58,551) in the first year.

Combining areas 736b, 737a, and 740 the trawl prohibition will result in a reduction in harvest of 964,966 pounds ($1,206,208) in the first year. However, these vessels would likely be able to shift effort somewhat to other areas. The extent to which they can successfully shift effort to other areas will determine how well they can minimize the impact. If these vessels have to travel extra distances to reach other areas, there could be some increase in operating costs. This may not result in a reduction in net revenue to the vessel if by switching they can harvest larger size shrimp which could be marketed at higher exvessel prices. One other factor to consider is that these vessels participate in other fisheries when they are not fishing for rock shrimp. It is likely that they could also switch effort to other fisheries during the time they would have been trawling in the prohibited area.

Rejected Option 2. Establish a four mile prohibition on trawling east and west of 80° W. longitude south of 28° 30' N. latitude.

As indicated in the RIR, four statistical areas would be affected east of the 80° W. longitude and south of 28° 30' N. latitude. It is estimated that an average of 4.2 percent of the harvest in these areas will be affected. This could result in a reduction in harvest of 101,700 pounds (heads–on) if harvesters cannot redirect effort to other areas. It is difficult to come up with precise estimates for the area west of the bank and south of 28° 30' N. latitude because the fishable areas do not encompass the entire statistical grids. The impact on fishing units of this option is impossible to assess given the nature of the data available. However, it could be stated that between one and 23 vessels could be affected depending on the area, and each vessel will likely experience less than five percent reduction in harvest.

Rejected Option 3. Limit trawling to depths greater than 120 ft (20 fathoms).

There is no information on rock shrimp harvest by depth. The majority of the vessels trawl for rock shrimp at depths greater than 120 feet. However, during certain times in the season, some vessels (particularly the ice boats) trawl within the 120-foot contour. There were only about 7 ice boats in the rock shrimp fishery during the 1994 season, so these are the vessels likely to be impacted. No determination could be made on the magnitude of the reduction in harvest and hence reduction in total revenue per vessel.

Rejected Option 4. Limit harvest area to Duval through St. Lucie Counties, Florida.

Less than 2 percent of the harvest occurred outside this area during the period 1981 to 1994 except for 1984 when it was reported that 13 percent occurred outside this area. If the option does not prohibit harvesting of rock shrimp outside the proposed area, there would be no impact on vessels trawling for rock shrimp outside the area. On the other hand, if this option does prohibit trawling for rock shrimp outside this area, a reduction of approximately 6,000 pounds (heads–off) per season should be expected based on 1993 landings. Based on an average exvessel price of $1.25, the reduction in total revenue for the entire fishery would be $17,500. The reduction in total revenue per vessel per season (if divided equally among an average of 65 vessels) would be $115. However, it should be noted that most of the vessels do not trawl for rock shrimp outside this proposed area, thus only a small percentage of the vessels would be affected. The revenues of individual vessels that are operating within the proposed management unit would likely not be affected.

Rejected Option 5. Establish a no transit zone in the Oculina Bank HAPC for all vessels possessing trawls rigged to fish.

It is not known how many fishing vessels transit this area. This option is to aid enforcement in the Oculina Bank HAPC. Fishing vessels could store their trawl rigs below deck to transit this area, or they could use an alternate route. The former would involve some inconvenience but no additional cost. The latter would involve some additional cost if extra distance is involved using an alternate route. No assessment of the impact could be made for individual vessels.

Rejected Option 6. Trawling for rock shrimp allowed only with transponders.

Almost all vessels trawling for rock shrimp operate south of 28° 30' N. latitude at certain times during the season. The extent these vessels operate south varies by vessel port of origin. Thus, the requirement to use transponders south of 28° 30' N. latitude would likely affect most of the rock shrimp vessels. The base unit costs around $1,200. Transmission cost per day for the base unit is $15 when transmitting. The units utilized by sea scallop vessels cost between $5,000 and $6,000. Transmission cost includes a $70 per month fee, plus $0.08 per message, plus one-half cent per character per message (Commercial Fisheries News, October 1992). Also, the basic unit that could transmit information on the location of a vessel could be leased for between $540 and $2,520 annually (Allen Mager, NMFS Special Agent presentation to SAFMC at the February 1995 meeting). The increase in operating costs for rock shrimp vessels would depend on the type of system installed and the extent of use. In addition, the costs may or may not change depending on whether the industry is required to purchase the equipment, as was done in the sea scallop fishery, or NMFS purchases the equipment as was done in the Pacific longline fishery.

Trawling only from Duval through St. Lucie Counties, Florida encompasses over 90 percent of the fishery and accounts for over 90 percent of the harvest as well. Also, almost all the vessels would be impacted. The extent of the impact in terms of increase in operating costs would depend on the type of unit and the frequency of transmission by each vessel.

If trawling was allowed in the EEZ only with transponders all the vessels would be impacted. The extent of the impact in terms of increase in operating costs would depend on the type of unit and the frequency of transmission by each vessel.

Rejected Option 7. No trawling south of Bethal Shoals.

The analysis for Rejected Option 11 applies. The expected reduction in revenue per vessel per season, based on 1994 figures would be less than 2 percent. Effective implementation of this option would involve increased enforcement costs.

Rejected Option 8. No trawling west of the Oculina Bank HAPC.

Information provided by industry participants indicated that up to 18 percent of the harvest reported by area came from this area. Also, 24 vessels reported harvest came from this area. Their total harvest in 1994 was 829,012 pounds. Assuming that harvest was distributed evenly each vessel would have harvested 34,542 pounds. Thus, reduction per vessel in the first year could be $43,178 if effort cannot be successfully redirected elsewhere.

Rejected Option 9. No action.

There would be no impact on rock shrimp vessels in the short–term. However, if trawling activities cause damage to essential habitat, recruitment of rock shrimp could be affected in the long-term. This could affect economic benefits to individual vessels if the rock shrimp population declines significantly in the long-term.

Explanation of Why the Action is Being Considered

Refer to Section 1.0, Purpose and Need. This amendment provides a mechanism for including rock shrimp in the FMP for the Shrimp Fishery in the south Atlantic region to reduce fishery related habitat damage and possibly decrease bycatch and discards in the rock shrimp fishery prosecuted in the south Atlantic region. Biological productivity, particularly in the snapper grouper complex would decline in the long-term specifically in the Oculina Bank HAPC area, if the council did not implement the measures in this amendment. Intense fishing for rock shrimp in nursery areas during years of poor recruitment could also lead to a decrease in net benefit from the fishery in the short-term.

Objectives and Legal Basis for the Rule

Refer to Section 1.0 and Appendix A for the Management Objectives. Objectives addressed in this amendment are to:

1. Provide a mechanism to manage rock shrimp under the Fishery Management Plan for the Shrimp Fishery in the South Atlantic Region.

2. Minimize impacts of the rock shrimp fishery on essential habitat including the fragile coral species existing in the Oculina Bank Habitat Area of Particular Concern.

The Magnuson Fishery Conservation and Management Act of 1976 as amended provides the legal basis for the rule.

Demographic Analysis

Refer to the original FMP (SAFMC 1993) and Section 3.0 of this amendment. Data on fishermen are very limited. Some information on costs and earnings for the 1994 season are provided.

Cost Analysis

Refer to the summary of the impacts (RIR page xi, and Section 4.0 Subsection G) and the summary of public and private costs (Section 4.0 Subsection H). 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 for rock shrimp will have a significant effect on small businesses.

I. Research Needs

The following research needs are listed in no particular priority order:

1. Recruitment processes and life history strategy.

2. What are the settlement patterns of juveniles with respect to depth? What are the subsequent development and mortality rates, and how do they vary across depths?

3. Growth rates. Accurate, detailed laboratory experiments to test effects of ecological variables are particularly desirable.

4. Reproductive cycle.

5. Seasonal movements.

6. Habitat preferences. Basic ecological questions concerning physiological ecology, refuges and foraging habits, trophic dynamics, and community relationships remain largely unanswered.

7. Basis physiology of rock shrimp, biogeography, and systematics.

Additional fishery management related items include:

8. Estimate potential yield.

9. Document economic and social information of fishermen and dealers.

10. Identification of the extent of existing bottom habitat suitable for rock shrimp in the South Atlantic Council's area.

11. Bycatch characterization of the rock shrimp fishery.

5.0 LIST OF PREPARERS

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6.0 LIST OF AGENCIES AND ORGANIZATIONS

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List of Agencies, Organizations, and Persons Consulted:

SAFMC Law Enforcement Advisory Panel
SAFMC Shrimp Advisory
SAFMC Habitat Advisory Panel
SAFMC Scientific and Statistical Committee
North Carolina Coastal Zone Management Program
South Carolina Coastal Zone Management Program
Florida Coastal Zone Management Program
Florida Department of Environmental Protection
Florida Marine Fisheries Commission
Georgia Department of Natural Resources
South Carolina Department of Natural Resources
North Carolina Department of Environment, Health, and Natural Resources
National Marine Fisheries Service
- Washington Office
- Office of Ecology and Conservation
- Southeast Region
- Southeast Fisheries Science Center

United States Coast Guard
United States Environmental Protection Agency, Region IV
Center for Marine Conservation
Rock Shrimp Producers Association
National Fisheries Institute
Florida Sea Grant

7.0 APPLICABLE LAW

A. Vessel Safety

PL. 99-659 amended the Magnuson Act to require that a fishery management plan or amendment must consider, and may provide for, temporary adjustments (after consultation with the U.S. Coast Guard and persons utilizing the fishery) regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safety of the vessels.

No vessel will be forced to participate in the fishery under adverse weather or ocean conditions as a result of the imposition of management regulations set forth in this amendment to the Shrimp 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.

Implementation of management measures which incorporate use of vessel transponders would enhance vessel safety in the fishery. The Coast Guard would have almost immediate information on exact location of a vessel in distress, thereby reducing search and rescue time.

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 concluded this amendment is an improvement to the federal management for rock shrimp.

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 (Appendix G).

C. Endangered Species and Marine Mammal Acts

The proposed actions are not expected to have any anticipated adverse impact on any endangered or threatened species or marine mammal population. A Section 7 consultation was conducted for the original fishery management plan and it was determined the fishery management plan was not likely to jeopardize the continued existence of threatened or endangered animals or result in the destruction or adverse modification of habitat that may be critical to those species. A Section 7 consultation for the shrimp fishery was reinitiated on November 15 by the NMFS Southeast Regional Office. An updated biological assessment which determines if the southeastern shrimp fishery is having a negative impact on threatened or endangered species or marine mammals, was prepared and is included in Appendix F. A prohibition of rock shrimp trawling east of 80° W. longitude between 28° 30' N. latitude and 27° 30' N. latitude in depths less than 100 fathoms will eliminate even the chance rock shrimp trawlers will encounter or impact endangered or threatened species or marine mammals in the closed area.

Listed and protected species under the Endangered Species Act (ESA) and Marine Mammals Protection Act (MMPA) and governed by the jurisdiction of NMFS include:

Whales:
(1) The northern right whale- *Eubalaena glacialis*(ENDANGERED)
(2) The humpback whale- *Magaptera novaeangliae* (ENDANGERED)
(3) The fin whale- *Balaenoptera physalus* (ENDANGERED)
(4) The sei whale- *Balaenoptera borealis* (ENDANGERED)
(5) The sperm whale- *Physeter macrocephalus* (ENDANGERED)
(6) The blue whale- *Balaenoptera musculus* (ENDANGERED)

Sea Turtles:
(1) The Kemp's ridley turtle- *Lepidochelys kempii* (ENDANGERED)
(2) The leatherback turtle- *Dermochelys coriacea*(ENDANGERED)
(3) The hawksbill turtle- *Eretmochelys imbricata*(ENDANGERED)

(4) The green turtle- *Chelonia mydas* (THREATENED/ENDANGERED)
(5) The loggerhead turtle- *Caretta caretta* (THREATENED)

Other:

(1) The manatee- *Trichechus manatus* (ENDANGERED)

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 is proposing measures under this amendment that will direct NMFS to collect landings and value information as well as clearly identify all participants in the rock shrimp fishery. The council is recommending NMFS use existing systems to attain this information thereby reducing duplication with existing programs. If the NMFS uses these existing systems for data collection, then the only increased paperwork consideration under this Amendment would arise from the implementation of dealer, vessel and operator permits which were proposed and continue to be strongly supported by industry.

Permit Costs	Industry: (Dealer, Vessel, and Operator Permits and Dealer Reporting)	$13,720
	Public: (Dealer Permit and Dealer Reporting)	$800

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

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 actions will have positive impacts by bringing rock shrimp under federal management, and enhancing protection of coral resources and essential bottom habitat. The proposed actions should not result in impacts significantly different in context or intensity from those described in the Environmental Assessment. A formal Environmental Impact Statement (EIS) was prepared for the shrimp fishery for the original Fishery Management Plan (SAFMC 1993).

Mitigating measures related to proposed actions are unnecessary. No unavoidable adverse impacts on protected species, wetlands, or the marine environment are expected to result from the proposed management measures in this amendment.

The proposed regulations will further protect the limited deepwater *Oculina* coral resources by eliminating the impact of potentially damaging bottom tending trawl gear used by the fishery. Implementation of these regulations will better achieve the objectives of this amendment, the fisheries management plan for Coral, and the fishery management plan for Snapper Grouper, by lessening the negative environmental impacts from the rock shrimp fishery on protected and essential bottom habitat. 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 establish a management program for rock shrimp. The main action in this amendment is to prohibit rock shrimp trawling east of 80° W. longitude between 28° 30' N. latitude and 27° 30' N. latitude in depths less than 100 fathoms. Section 4.0 describes the council's management measures in detail.

Section 1508.27 of the CEQ Regulations list 10 points to be considered in determining whether or not impacts are significant. The analyses presented below are based on the detailed information contained in Section 4.0 Environmental Consequences including the Regulatory Impact Review 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 and summarized in Section 2.0.

A trawling prohibition east of 80° W. longitude between 28° 30' N. latitude and 27° 30' N. latitude in depths less than 100 fathoms would result in loss in harvest to rock shrimp fishermen in the short-term. However, it should be noted that such a prohibition could also result in a shift of effort. This would depend on a number of factors: namely the availability of rock shrimp throughout the season, the ability of rock shrimp vessels to trawl at depths where rock shrimp occur, extent of trawling grounds, the ability of rock shrimp vessels to participate in other fisheries, and exogenous factors influencing the exvessel price of rock shrimp. If a significant shift of effort occurs to the north, south or west of the closed area, the impact of the trawl prohibition on the fishery could be much reduced.

No information is available to assess the benefits in dollar terms from protecting the habitat, thus it cannot be quantitatively determined whether the benefits from this prohibition would outweigh the costs, particularly in lost income to rock shrimp fishermen and processors. It should be noted that this habitat provides essential ecological environment for snapper grouper species. The survival of the snapper grouper species depend on the condition and availability of such habitat to the species. Thus, the snapper grouper fishery could be adversely affected if their habitat is not protected. In addition, there are other economic benefits from preserving this habitat in terms of its existence and bequeath values.

Prohibiting trawling for rock shrimp east of 80° W. longitude between 28° 30' N. latitude and 27° 30' N. latitude in depths less than 100 fathoms will enhance existing federal regulations for Coral and Snapper Grouper species, protecting *Oculina* coral and the Oculina Bank HAPC from trawl related habitat damage. The area that will be protected contains the majority of the known distribution of *Oculina* coral.

Impacts associated with enhancing protection of the Oculina Bank HAPC are unquantifiable but are expected to be positive. Beneficial impacts are unquantifiable but bringing the fishery under management will enhance data collection efforts to monitor the fishery, encourage needed biological research, and minimize gear related habitat damage.

The benefits and adverse impacts discussed 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 expected to have a positive impact on unique characteristics of the area such as proximity to historic or cultural resources, park lands, wetlands or ecologically critical areas. The fishery, as presently prosecuted, does occasionally significantly impact the live bottom habitat that is essential to the reef species under council management. Regulations within the existing Oculina Bank HAPC will be strengthened with the area restriction limiting the possible interaction of the bottom tending gear and the fragile *Oculina* coral resource.

Controversial Effects

The proposed actions are not expected to have significant controversial effects. The council has provided for extensive input by the public through committee and council meetings, by holding scoping meetings and conducting public hearings, and by providing the opportunity for interested persons to provide written comments. During development of this amendment the council has incorporated suggestions from the public, and the final document will address 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 negative impacts that could have a substantial effect on the rock shrimp resource or any related stocks, including sea turtles. In fact, the proposed measures will improve status of impacted deepwater coral resources and eliminate future habitat damage inflicted by bottom tending trawls east of 80° W. longitude between 28° 30' N. latitude and 27° 30' N. latitude in depths less than 100 fathoms. See Section 4.0, Items G and H, Summary of Impacts and Effects on Small Businesses for additional information.

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 have any significant effects on any endangered or threatened species or marine mammal population. A Section 7 consultation for the shrimp fishery was reinitiated on November 15, 1994 by the NMFS Southeast Regional Office. An updated biological assessment which determines if the southeastern shrimp fishery is having a negative impact on threatened or endangered species or marine mammals, was prepared and is included in Appendix F. A prohibition of rock shrimp trawling east of 80° W. longitude between 28° 30' N. latitude and 27° 30' N. latitude in depths less than 100 fathoms will eliminate even the chance rock shrimp trawlers will encounter or impact endangered or threatened species or marine mammals.

Interaction With Existing Laws for Habitat Protection

The proposed actions are expected to have a positive interaction with existing Federal requirements imposed for the protection of the environment. The management action will enhance existing federal regulations protecting all stony corals, including *Oculina*, and live/hard bottom habitat, and will reiterate the existing trawl prohibition for the Oculina Bank HAPC (GMFMC & SAFMC 1982). In addition, the trawl prohibition will enhance the protection of all habitat in the Oculina Bank HAPC which was designated an experimental closed area under the Snapper Grouper FMP (SAFMC 1994) and is essentially the first marine fishery reserve designated on the Atlantic coast.

The council has also adopted a number of positions that protect the habitat supporting managed shrimp resources. These positions are contained in the south Atlantic Coral Amendment 2 (SAFMC 1994) . The proposed measures will minimize habitat damage east of 80° W. longitude between 28° 30' N. latitude and 27° 30' N. latitude in depths less than 100 fathoms. Additional habitat protection will be provided in the existing *Oculina* HAPC and experimental closed area.

Effects of the Fishery on the Environment

Section 3.0 Affected Environment discusses rock shrimp habitat and coral habitat impacted by bottom tending trawls used in the rock shrimp fishery. Section 4.0 Environmental Consequences, subsection F presents the detailed information on the impacts of the proposed action and alternatives on the environment. The council evaluated the effects of the fishery on the environment and concluded that the fishery, as prosecuted does impact *Oculina* coral and live/hard bottom habitat including the Oculina Bank HAPC. The implementation of the management measures proposed under this amendment will reduce to the maximum extent practicable the impact of the fishery on the protected coral and live bottom resources.

Bycatch

Section 3.0 Affected Environment, subsection C, discusses species associated with rock shrimp habitat as well as *Oculina* coral habitat. Table 2 in Section 3.0, presents a list of finfish species associated with *Oculina* coral habitat and more specifically with the Oculina Bank HAPC.

No directed research has been conducted to quantify bycatch associated with the Atlantic coast rock shrimp fishery. As a proxy for such information data on catch associated with high concentrations of rock shrimp caught in historic finfish and shrimp research trawling conducted between 1956 and 1991 in the south Atlantic bight was observed. Appendix I identifies catch associated with high or harvestable catches of rock shrimp.

The council has requested NMFS conduct a characterization of bycatch in the rock shrimp fishery. In addition, the council deferred action on establishing a minimum mesh size contingent on the completion of mesh selectivity studies allowing a framework provision to be developed in a subsequent amendment to implement mesh or other regulations in the fishery to address bycatch. The council also initiated the NEPA and MFCMA scoping process in February 1995 on bycatch in all south Atlantic shrimp fisheries.

Under the proposed trawl prohibition the likelihood of catching species associated with *Oculina* coral and the Oculina Bank HAPC or experimental closed area would be eliminated or greatly reduced. This includes protected live/hard bottom and coral species, as well as snapper grouper species which are protected by the bottom trawl prohibition already existing north of Cape Canaveral.

Conclusion

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

8.0 REFERENCES

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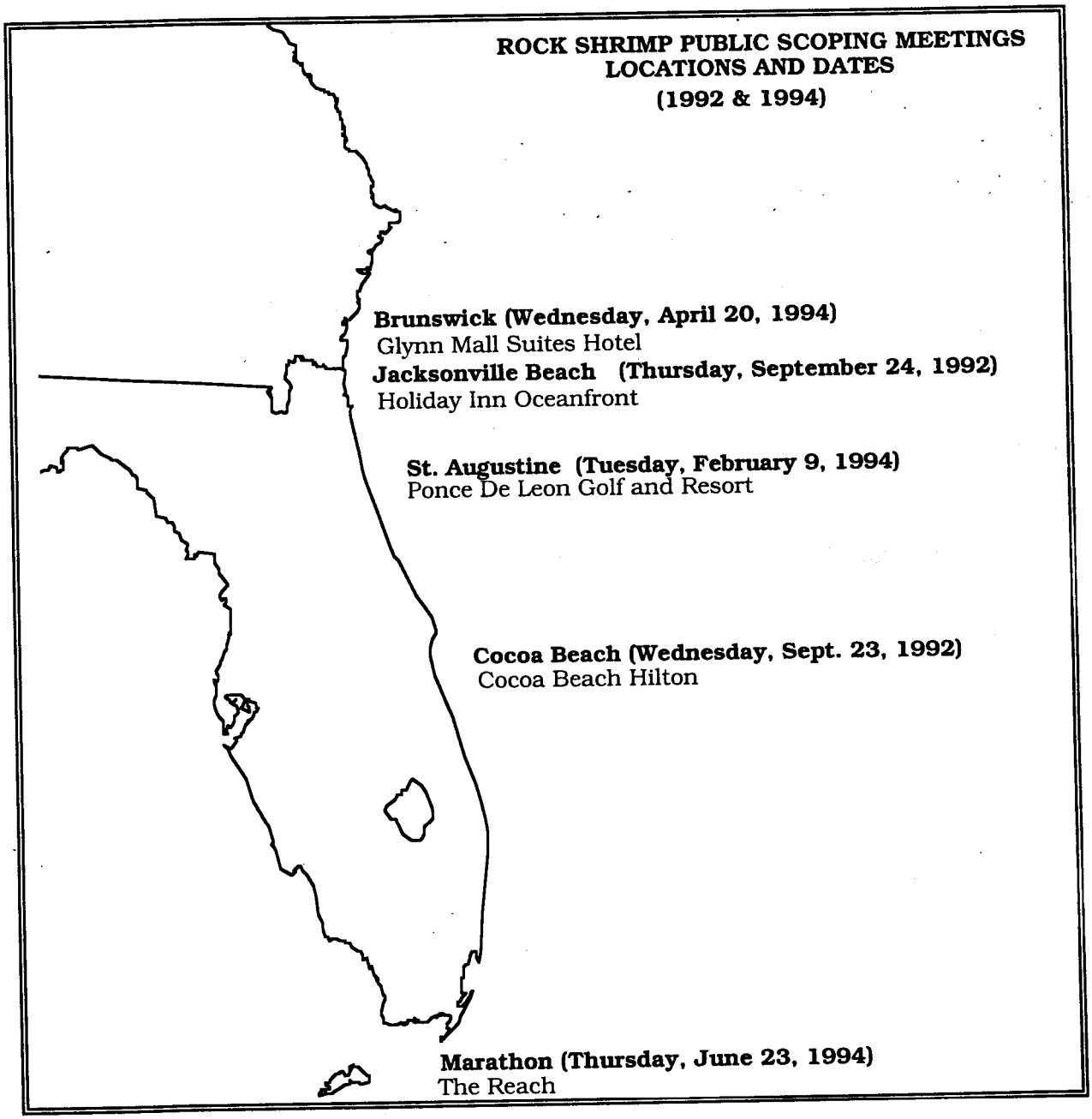
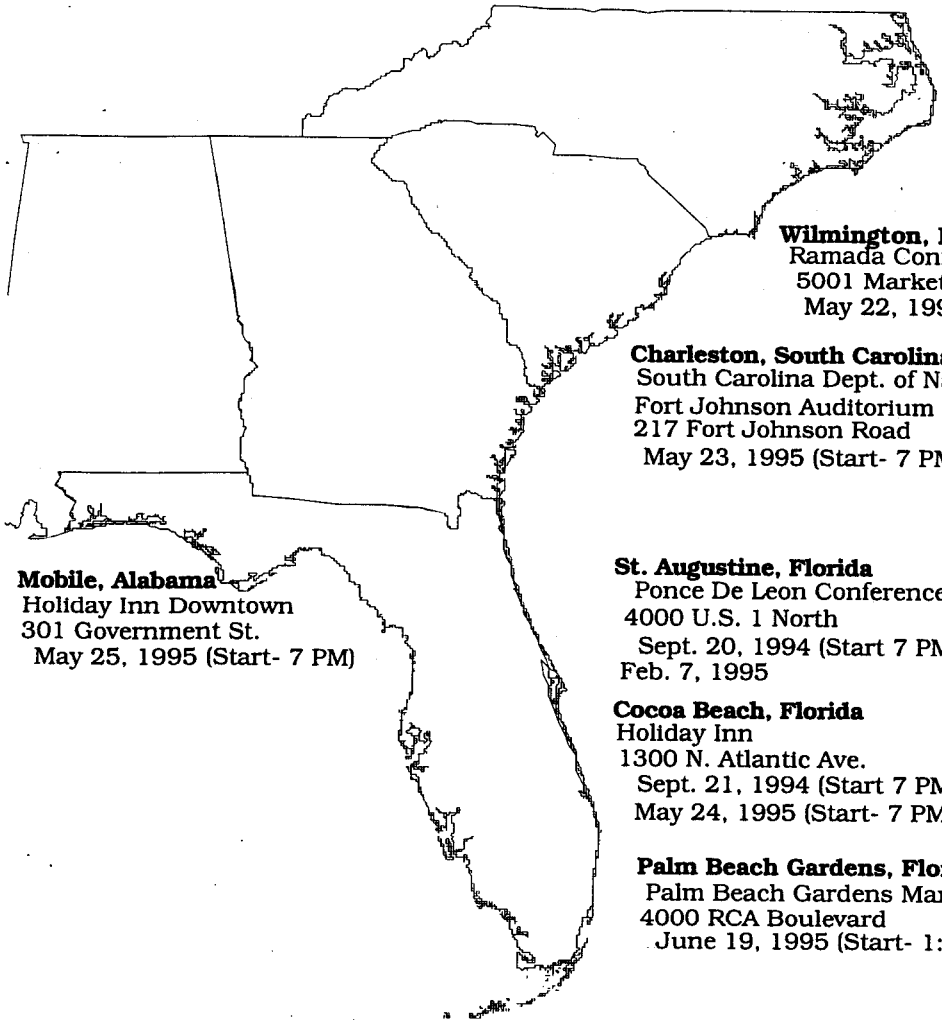
9.0 PUBLIC HEARINGS AND SCOPING MEETINGS - LOCATIONS AND DATES



PUBLIC HEARING LOCATIONS AND DATES
AMENDMENT #1 (ROCK SHRIMP) 1994 & 1995



Wilmington, NC
Ramada Conference Center
5001 Market Street
May 22, 1995 (Start- 7 PM)

Charleston, South Carolina
South Carolina Dept. of Natural Resources
Fort Johnson Auditorium
217 Fort Johnson Road
May 23, 1995 (Start- 7 PM)

Mobile, Alabama
Holiday Inn Downtown
301 Government St.
May 25, 1995 (Start- 7 PM)

St. Augustine, Florida
Ponce De Leon Conference Resort
4000 U.S. 1 North
Sept. 20, 1994 (Start 7 PM) and
Feb. 7, 1995

Cocoa Beach, Florida
Holiday Inn
1300 N. Atlantic Ave.
Sept. 21, 1994 (Start 7 PM) and
May 24, 1995 (Start- 7 PM)

Palm Beach Gardens, Florida
Palm Beach Gardens Marriott
4000 RCA Boulevard
June 19, 1995 (Start- 1:45 PM)

Appendix A. Problems, management objectives, and management measures contained in the fishery management plan For the shrimp fishery of the south Atlantic region.

(Sections relevant to the rock shrimp fishery are underlined)

Management Unit. The management unit is the population of white shrimp occurring along the U.S. Atlantic coast from the east coast of Florida to the North Carolina/Virginia border. Brown, pink, rock, and royal red shrimp are included in the fishery but not in the management unit because regulations in this plan only address white shrimp at this time. Although all three species of penaeid shrimp are also harvested in the Gulf of Mexico, it is believed that the Atlantic and Gulf populations are essentially isolated from one another.

Optimum Yield. Optimum yield for the white shrimp fishery is defined as the amount of harvest that can be taken by U.S. fishermen without reducing the spawning stock below the level necessary to ensure adequate reproduction.

Definition of Overfishing. Overfishing is indicated when the overwintering white shrimp population within a state's waters declines by 80 percent or more following severe winter weather resulting in prolonged cold water temperatures. Continued fishing following such a decline may reduce the reproductive capacity of the stock affecting subsequent recruitment and would be considered overfishing. Relative population abundance will be determined by catch per unit effort (CPUE) during standardized assessment sampling.

Problems in the Fishery:

1. Unregulated commercial fishing in the EEZ on overwintering white shrimp following severe winter cold kills may reduce subsequent recruitment and fall shrimp production.

2. Shrimp trawls have a significant bycatch of nontarget finfish and invertebrates, most of which are discarded dead. This is wasteful and may significantly reduce yield in other fisheries directed at these discard species. In addition, shrimp trawls have a bycatch of endangered, threatened, and/or protected species (e.g., leatherback turtles) that are too large to be excluded by TEDs.

3. Shrimp mariculture operations may inadvertently release exotic species and/or diseases or parasites into local waters. The impact of such releases on domestic shrimp stocks is unknown, but potentially serious.

4. Habitat alteration (including beach renourishment and dredge and fill projects) and pollution in coastal areas may reduce shrimp production.

Management Objectives:

1. Eliminate fishing mortality on overwintering white shrimp following severe winter cold kills.

2. Reduce the bycatch of non-target finfish, invertebrates and threatened, protected and endangered species.

3. Encourage states with mariculture facilities to carefully monitor these operations, and require safeguards to prevent exotic species from escaping and/or diseases from entering the environment.

4. Reduce or eliminate loss and/or alteration of the habitat on which shrimp depend or degradation of water quality through pollution that would reduce shrimp production.

Management Measures:

1. States may request concurrent closure of the EEZ adjacent to their closed state waters following severe winter cold weather that results in an 80 percent or greater reduction in the population of overwintering white shrimp.
a. Exempt royal red and rock shrimp fisheries from any closures of the EEZ for the harvest of white shrimp.
b. Exempt the whiting fishery (*Menticirrhus sp.*) from a closure for white shrimp.

2. Establish a buffer zone extending seaward from shore 25 nautical miles, inside of which no trawling would be allowed with a net having less than 4 inch stretch mesh during an EEZ closure. Vessels trawling inside this buffer zone could not have a shrimp net aboard (i.e., a net with less than 4 inch stretch mesh) in the closed portion of the EEZ. Transit of the closed EEZ with less than 4 inch stretch mesh aboard while in possession of Penaeus species will be allowed provided that the nets are in an unfishable condition which is defined as stowed below deck.

Recommendations to the States:

The council requests that the states in the south Atlantic region adopt the following recommendations:

1. The council requests that states having shrimp mariculture facilities, either research or commercial, institute strict controls and guidelines to minimize the possibility of inadvertently introducing either exotic shrimp species or diseases into the environment. The council further recommends that states comply with Amendment 1 to the Atlantic States Marine Fisheries Commission's (ASMFC) Procedural Plan to Control Interjurisdictional Transfers and Introductions of Shellfish.

2. The council recommends that states minimize or eliminate alteration of shrimp habitat, especially the fragile and highly productive salt marsh and estuarine areas. These areas are considered critical habitat for all species of penaeid shrimp addressed by this FMP.

Research Recommendations:

1. Determine the possible impacts on indigenous shrimp species of inadvertent introductions of exotic shrimp species and diseases from mariculture operations, and develop methods and protocol to prevent such introductions.
2. Assess the potential utility of releasing maricultured white shrimp into the environment to supplement natural reproduction, especially following cold kills.
3. Assess the potential of controlled closures and other measures to enhance the production and economics of the south Atlantic shrimp fishery.
4. Determine the effects of beach renourishment projects on subsequent shrimp production.
5. Evaluate the impacts of habitat and water quality alteration on shrimp growth, survival, and productivity.
6. Investigate the costs, benefits, and utility of limited entry programs in the shrimp fishery of the south Atlantic.
7. Determine the impact of shrimp trawl bycatch on the habitat and all nontarget species of fish and invertebrates (i.e., expand the congressionally mandated study to include impacts on habitat and all incidental species, not just the impact on other "fishery resources").
8. Determine the relationship between absolute number of adults (or adult biomass) and subsequent recruitment to allow development of a threshold level of population size to serve as a trigger to request a closure of the EEZ.
9. Determine the biological, economic, and sociological status of the rock shrimp fishery

Appendix B. Rock shrimp yield per recruit analysis.

Potential change in landings and value by seasons/using revised YPR analysis.

In order to determine what changes in landings may occur if various seasonal closures were implemented, the preliminary yield per recruit analysis was updated using 1993 landings data. Subsequently once yield streams were generated from this analysis, specific information on price as it relates to count was applied to develop estimates of changes in exvessel landed value of rock shrimp. Price per pound by count size generated from the preliminary dockside price determinants study (Adams 1993) was used in combination with 1993 price information provided by the industry and FMRI to estimate values presented in the following charts. Appendix 1 contains details about the rock shrimp yield per recruit analysis and various scenarios. The base year is 1993 and changes in yield and values are compared to the base value. One of the more significant assumptions is that all shrimp that survive (natural mortality) to recruit to the fishery are available immediately and are harvested. Such an assumption would make the projected yields an upper bound of potential benefits. On the other hand, data is not available on how much the shrimp which would have been discarded as undersized bycatch would increase projected yields if allowed to survive and grow.

Projected changes in landings and values by delaying opening of season under three scenarios using revised YPR analysis

The assumptions used in the analysis to compute projected changes in landings and values are in Appendix 1. Under scenario 1, (Figures 1 & 2), a May to July closure would yield 6.0% and 2.2% increase in landings respectively for year class one and two. Total value would increase by 5.3% and 1.5% respectively for year class one and two. The landings and values for 1993 were used as the base. A closure from May to August would yield a decrease of 4.1% and an increase of 1.4% in landings respectively for year class one and two. Total value would decrease by 3.3% and increase by 2.3% respectively for year class one and two. Lastly, a May to September closure would yield decreases of 18.8% and 23. 9% in landings respectively. Total value would decrease by 18.0% and 5.0 % respectively.

Scenario 2 offers the best possibility in terms of increasing the yield and value to the fishery from delaying the opening of the season. A May to July

closure would yield 9.8% and 2.0% increase in landings respectively for year class one and two. Total value would increase by 9.0% and 9.4% respectively. Closing the fishery from May to August would yield an increase of 2.6% in landings for year class one and two. Total value would increase by 5.6% and 3.6% respectively. However, closing the fishery from May to September would yield a decrease of 14.8% and 19.4% in landings respectively for year class one and two. Total landings would decrease by 14.0% and increase by 0.7% respectively for year class one and two.

Scenario 3 offers the least possibility for increasing the yield and value to the fishery by delaying the opening of the season. A May to July closure would yield an increase of 5.4% and a decrease of 1.3% in landings respectively for year class one and two. Total value would increase by 4.8% and decrease by 1.8% respectively. Closing the fishery from May to August would yield a decrease of 5.7% and 12.3% in landings respectively for year class one and two. Total value would decrease by 4.8% and 11.6% respectively. The worst case scenario is delaying the opening of the season from May to September. The yield from the fishery would decrease by 40.2% and 58.6% in landings respectively for year class one and two. Total value would decrease by 39.6% and 48.3% respectively for year class one and two.

These results indicate that there would only be a marginal gain in yield and value from scenario 2 by delaying the opening of the season. Part of the reason for this is due to the density dependency of growth and natural mortality. Also, the fishery seems to exhibit a cyclical pattern and nothing could be gained by restricting harvest during a good year through delaying the opening of the season.

PROJECTED CHANGES IN LANDINGS AND VALUES BY DELAYING OPENING OF SEASON UNDER THREE SCENARIOS USING REVISED YPR ANALYSIS

SEASONAL CLOSURE	BASE YEAR	SCENARIO 1	SCENARIO 2	SCENARIO 3
	WT: 3,901,319 LB. VALUE: $3,437,877	PERCENTAGE CHANGE	PERCENTAGE CHANGE	PERCENTAGE CHANGE
MAY - JULY				
YEAR CLASS 1	WT	5.95	9.75	5.38
	VALUE	5.33	9.04	4.77
YEAR CLASS 2				
	WT:	2.07	1.95	(1.32)
	VALUE:	1.54	1.42	(1.76)
MAY - AUG.				
YEAR CLASS 1	WT:	(4.12)	2.64	(5.69)
	VALUE:	(3.26)	5.59	(4.84)
YEAR CLASS 2	WT:	1.37	2.64	(12.33)
	VALUE:	2.29	3.57	(11.55)
MAY - SEPT.				
YEAR CLASS 1	WT:	(18.80)	(14.80)	(40.22)
	VALUE:	(17.99)	(14.01)	(39.63)
YEAR CLASS 2	WT:	(23.89)	(19.36)	(58.59)
	VALUE:	(5.00)	0.66	(48.30)

Figures in parenthesis indicate decrease.

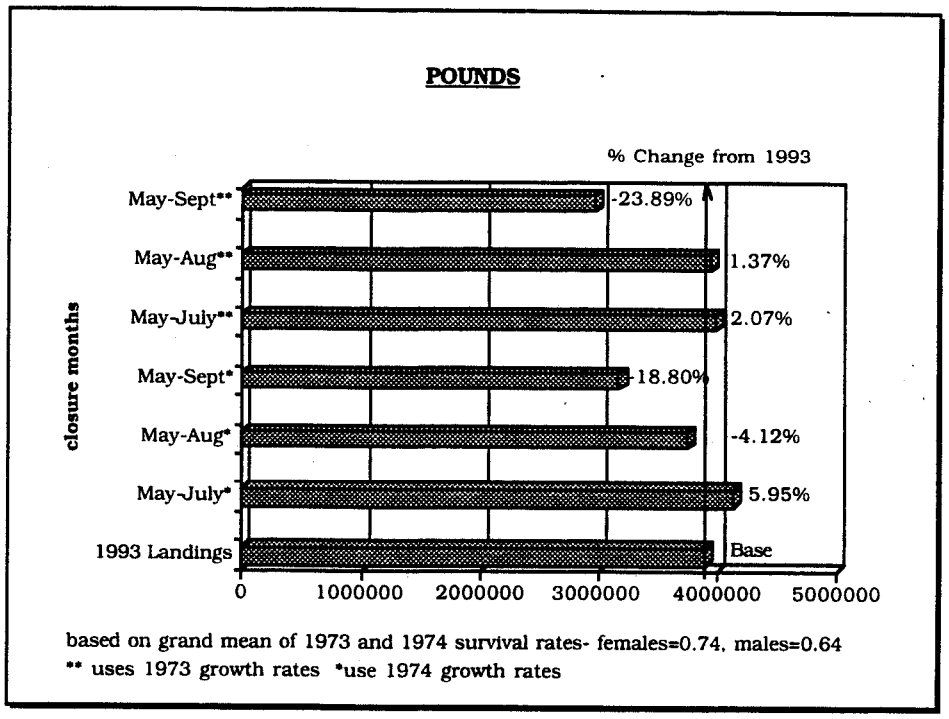


Figure 1. Estimated change in yield from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 1).

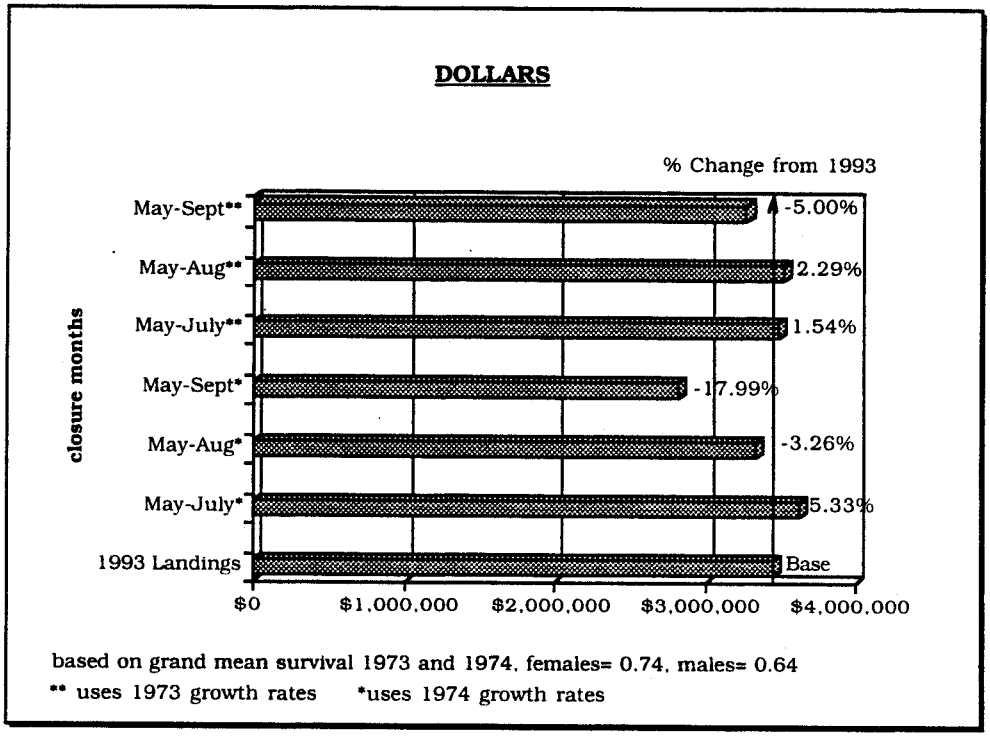


Figure 2. Estimated change in exvessel landed value from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 1).

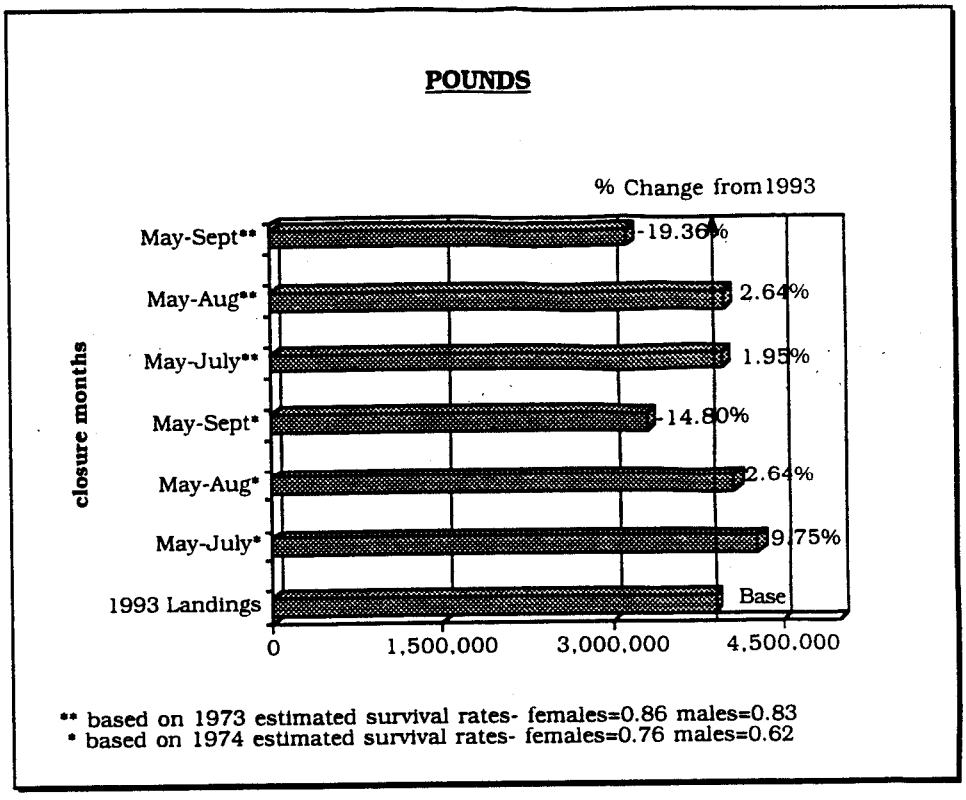


Figure 3. Estimated change in yield from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 2).

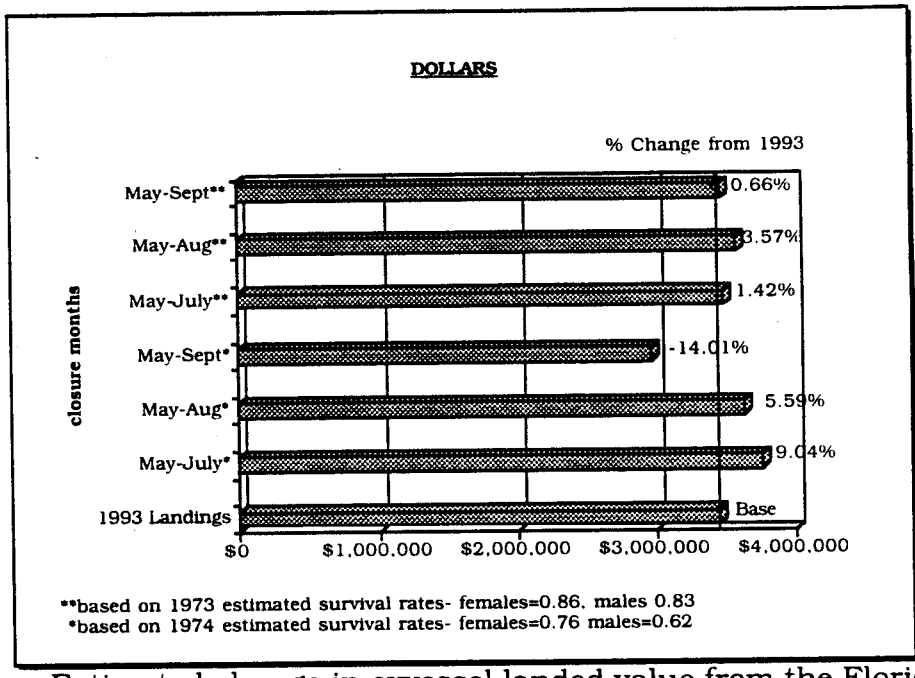


Figure 4. Estimated change in exvessel landed value from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 2).

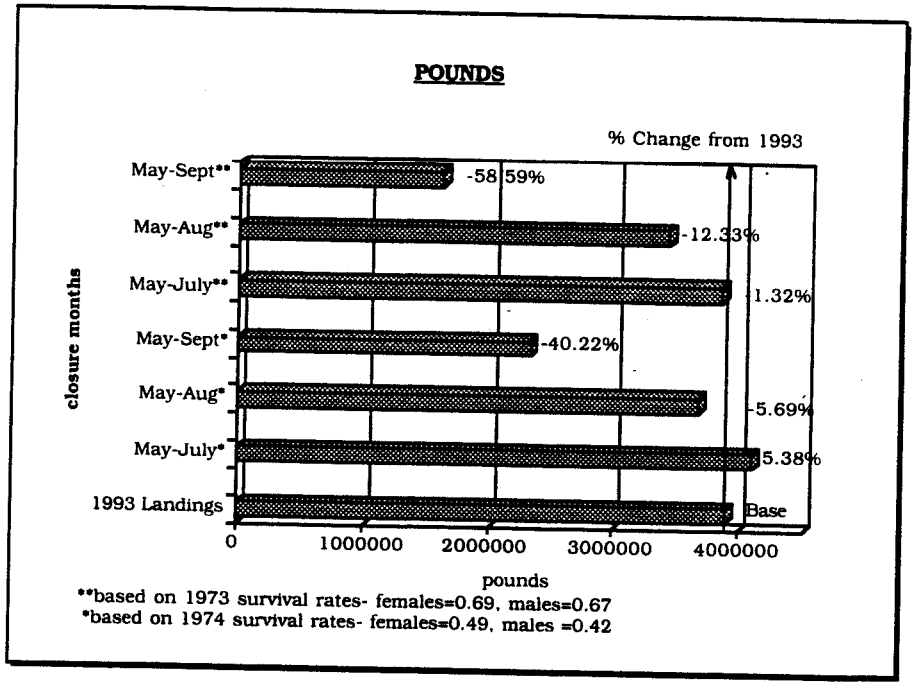


Figure 5. Estimated change in yield from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 3).

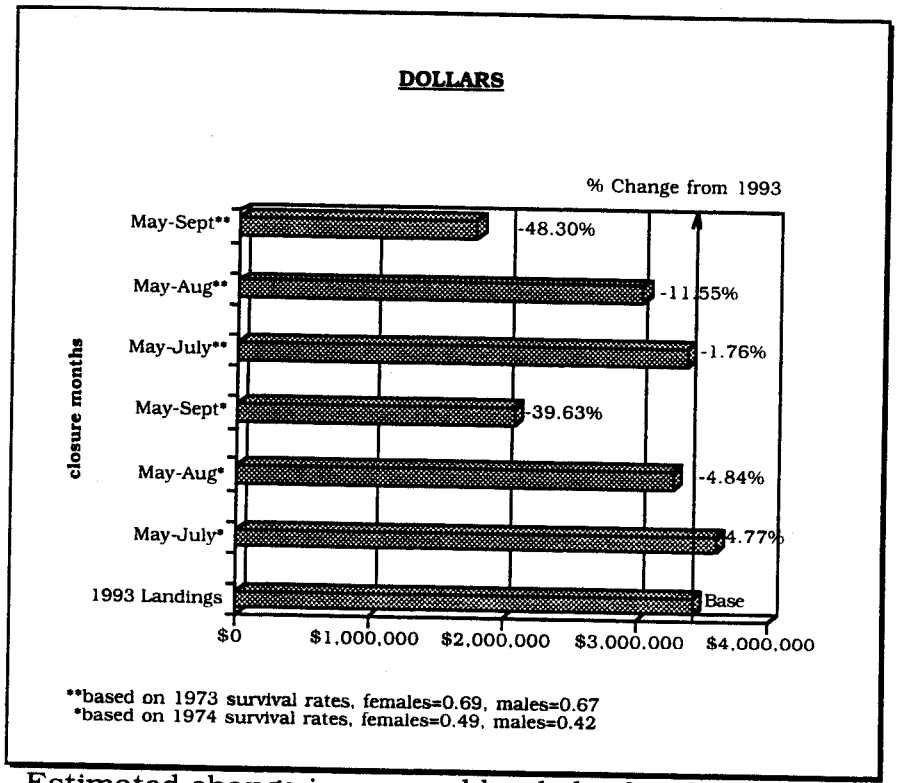


Figure 6. Estimated change in exvessel landed value from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 3).

The rock shrimp analysis was accomplished to show the potential benefit in increased yield per recruit by delaying harvest. This analysis only shows the possibility of increasing total weight landed of rock shrimp cohorts if allowed to attain a larger possibly more valuable size. When combined with estimated price by count information, changes in total exvessel value of rock shrimp resulting from the implementation of various seasonal closures as compared to a base year (1993) were estimated. This analysis is an update of the preliminary analysis prepared by council staff in 1993 and incorporates 1993 preliminary rock shrimp landings supplied by Florida Marine Research Institute. Landings for the months May through October were used as a base from which to apply three esparto estimates of rock shrimp survival (a proxy for natural mortality). The analysis uses growth information presented in Kennedy et al. (1977) to determine the tradeoffs of a delayed season opening for the rock shrimp fishery prosecuted off Cape Canaveral Florida.

Documentation of Rock Shrimp Analysis:

Estimation of Survival Rates:

Kennedy et al (1977) observed three generations of shrimp during part or all their life cycle, G1 (January 1973 through November 1973), G2 (April 1973 through November 1974), and G3 (April 1974 through December 1974). Survival rates were estimated for two of the three generations. The observed change in carapace length was used as an estimate of growth rate and was rapid from May through August 1973 and May through September 1974. Mean carapace lengths (CL)(to nearest 0.5 mm) for G2 males and females beginning in May 1973 and G3 males and females beginning in May 1974 were approximated from Figure 20, page 30 (Kennedy et al, 1977). Growth was estimated directly from mean carapace length for each month from May to October. Mean carapace length was converted to mean weight in grams from length-weight equations for males and females separately from the following length weight conversions presented in Kennedy et al. (1977).

Appendix B

Length-weight relationships

Males:	
$W = 1.886\ CL - 30.922$	for shrimp above 23 mm CL
$W = 4.10 \times 10^{-4} CL^{3.303}$	for shrimp below 23 mm CL
Females:	
$W = 1.818\ CL - 30.475$	for shrimp above 23 mm CL
$W = 3.398 \times 10^{-4} CL^{3.364}$	for shrimp below 23 mm CL

In order to determine the composition of the theoretical cohort on which the survival rates would be applied an assumption regarding the sex ratio had to be made. For both years the ratio, based on information contained in Kennedy's research, is assumed to be 1:1 in May.

The theoretical year class or cohort was composed of 1000 males and 1000 females in May. Subsequently, the cohort was subjected to three scenarios of estimated survival. Three Scenarios were developed which applied low (1), medium (2), and high (3) estimates of natural mortality to a theoretical cohort or year class of rock shrimp. Survival rates were estimated in three ways.

Scenario 1.

The first Scenario (1) uses a grand mean of all 21 months by sex presented in Kennedy et al. (1977) Since survival was not estimated for every month but in the period (e.g. April through July) each month included in the time period was assigned the survival rate for the period (e.g. April, 1973, S=0.984; May, S=0.984, June, S=0.984; July, S=0.766). Separate rates were calculated for males and females but the same value was used for 1973 and 1974 year classes. Since survival rate estimates were not available for every month (e.g. survival rate is given for the period April through July, but not for April, May, June and July individually)

Scenario 2.

A mean survival rate for the period February - August was calculated separately by sex and year. In this case, the values were not weighted by the length of the time period from which they were derived (i.e. the value for February - April was added to the value for April - July and the value for July - August and the sum divided by three). In other words, the August - October value was not

used because it appears that this is when the year class disappears and mortality increases dramatically.

the months of February through April were included to help smooth out estimates of survival since we are assuming, in this scenario, that survival rate is not a function of month, but rather that all estimates in the time period are estimates of the same quantity. The analysis for this scenario was done separately for males and females, using 1973 and 1974 growth and mortality estimates.

In both Scenario 1 and 2, the analysis is done separately for males and females and then the numbers and weights are added together to get total cohort weight remaining at the beginning of the month. The "count" is simply the total number divided by the total weight (in lb) of the cohort remaining at the start of the month (sexes combined).

Scenario 3

The third scenario (3) of the rock shrimp analysis uses high values of natural mortality. The results are more uncertain using these values than for the other scenarios possibly because the low survival values may not be appropriate because recent high fishing levels has reduced the standing stock below the levels that you saw in the 1970s. Since growth and mortality seem to be density dependent, survival and growth rates are probably biased low in the analyses using the 1970s data. This analysis utilizes the same growth data as the other scenarios, only the survival rates are different. The survival rates are the mean of the survival rates for July, August and September for each year (1973 and 1974) for males and females separately. The remainder of the analysis is the same as in the other scenarios. This scenario uses the months of highest natural mortality under the assumption that the mortality for the young of the year shrimp would be higher than for the older year class. Survival rates were not estimated for the incoming year class, so we have to use the mortality rates for the older shrimp as a proxy. During the period July-September, both year classes are on the same grounds (hence the bi-modal size frequency distribution). If the increased density resulting from the influx of new shrimp on the grounds lowers the survival rate of the older shrimp, then this survival rate might better reflect the survival rate of the incoming year class during the period of proposed closure, before their density is reduced from fishing and natural mortality.

Calculation of projected landings by month

Preliminary 1993 landings of rock shrimp harvested on Florida's east coast were supplied by FDEP/FMRI. The following is an example of how projected landings were calculated in this case using Scenario 1 which applies monthly mean grand survival and 1973 growth rates.

Example-

Scenario 1 Monthly Grand Mean Survival
Sexes Combined 1973 (females, S=0.74; males, S=0.64)

(May landings x 1.72)

((May landings x 1.72) + June landings) x 2.22

((((May landings x 1.72) + June landings) x 2.22) + July landings) x 1.48

(((((((May landings x 1.72) + June landings) x 2.22) + July landings) x 1.48) + August landings) x 0.74

(((((((((May landings x 1.72) + June landings) x 2.22) + July landings) x 1.48) + August landings) x 0.74) + September landings) x 0.81

1.72 is derived from-
Total weight in pounds of remaining cohort for June divided by total weight in pounds of remaining cohort for May.

1.72 = 4.48 lb / 2.6 lb

Calculation of remaining cohort sum of remaining males and females (uses tables 1-3)
Example-

	Number	
May	2000	
June	1380	= sum of (1000 * 0.740 + (1000 * 0.64)
July	958	= sum of (740 * * 0.74) + (640 * 0.64)

This analysis was accomplished to show the potential benefit in increasing yield per recruit by delaying harvest of rock shrimp. Tables 1, 3, and 5 present projected yields and tables 2, 4, and 6 present projected exvessel revenues. This analysis was developed to shows the possibility of increasing total weight of landed rock shrimp cohorts and exvessel value if allowed to attain a larger potentially more valuable market size.

Assumptions made in yield and value analyisis:

1. Estimates of potential yield give some indication of changes in annual exvessel revenues for the fishery based on 1993 landings and value data.

2. Estimated survival rates act as a proxy for natural mortality.

3. All shrimp not caught in closure months were assumed caught during the first month of opening of the fishery (adjusted for growth and mortality).

4. Monthly average prices were calculated from the monthly landings and values data. This included all rock shrimp in the count range: 31-55.

5. Average price for 21-30 count per pound was 31.2¢ higher than the average price for count range 31-55.

6. Two average prices were used to complete values of shrimp in the 21-30 count range:
   a) 31.2¢ higher obtained from Adams 1993.
   b) 21¢ higher obtained from Rodney Thompson's data.

7. Other factors such as income, landings of pink shrimp, etc., were held constant.

8. No change in demand for rock shrimp between year one and year 2.

9. Increased landings after delayed opening of fishery did not affect the price of rock shrimp (there was no significant decrease in the price per pound of rock shrimp)

Table 1. Estimated change in yield from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 1).

	May	June	July	August	September	October	Total	Change
Actual Landings (pounds/1993)	2,680	62,902	158,157	1,055,392	1,894,812	727,376	3,901,319	
Scenario 1, 1973	0	0	0	1,511,280	1,894,812	727,376	4,133,468	232,149
Scenario 1, 1973	0	0	0	0	3,013,160	727,376	3,740,536	-160,783
Scenario 1, 1973						3,168,035	3,168,035	-733,284
Scenario 1, 1974	0	0	0	1,359,783	1,894,812	727,376	3,981,971	80,652
Scenario 1, 1974	0	0	0	0	3,227,400	727,376	3,954,776	53,457
Scenario 1, 1974	0	0	0			2,969,208	2,969,208	-932,111

Scenario 1. Survival, S=0.74 Females; S=0.64 Males
All shrimp not caught in closure months are assumed caught in first open fishing month (adjusted for growth and mortality).

Table 2. Estimated change in exvessel landed value from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 1).

	May	June	July	August	September	October	Total	Change
Average price/lb $	$0.89	$0.95	$0.91	$0.86	$0.89	$0.89		()=decrease
1993 Value $	$2,391	$59,539	$143,189	$911,384	$1,677,320	$644,054	$3,437,877	
Scenario 1, 1973	$0	$0	$0	$1,299,700	$1,677,320	$644,054	$3,621,074	$183,197
Scenario 1, 1973	$0	$0	$0	$0	$2,681,712	$644,054	$3,325,766	($112,111)
Scenario 1, 1973						$2,819,551	$2,819,551	($618,326)
Scenario 1, 1974	$0	$0	$0	$1,169,413	$1,677,320	$644,054	$3,490,787	$52,910
Scenario 1, 1974	$0	$0	$0	$0	$2,872,386	$644,054	$3,516,440	$78,563
Scenario 1, 1974	$0	$0	$0			($1.10) $3,266,129 ($1.20) $3,563,050	$3,266,129 $3,563,050	($171,748) $125,173

Scenario 1 Survival, S=0.74 Females; S=0.64 Males
All shrimp not caught in closure months are assumed caught in first open fishing month (adjusted for growth and mortality).

Table 3. Estimated change in yield from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 2).

	May	June	July	August	September	October	Total	Change
Actual Landings (pounds/1993)	2,680	62,902	158,157	1,055,392	1,894,812	727,376	3,901,319	
Scenario 2, 1973	0	0	0	1,659,568	1,894,812	727,376	4,281,756	380,437
Scenario 2, 1973	0	0	0	0	3,355,232	727,376	4,082,608	181,289
Scenario 2, 1973						3,321,679	3,321,679	-579,640
Scenario 2, 1974	0	0	0	1,355,027	1,894,812	727,376	3,977,215	75,896
Scenario 2, 1974	0	0	0	0	3,276,939	727,376	4,004,315	102,996
Scenario 2, 1974	0	0	0			3,145,861	3,145,861	-755,458

Scenario 2 survival rates: 1973, Females, S=0.86; Males=0.83; 1974 Females, S=0.76; Males, S=0.62
All shrimp not caught in closure months are assumed caught in first open fishing month (adjusted for growth and mortality).

Table 4. Estimated change in exvessel landed value from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 2).

	May	June	July	August	September	October	Total	Change ()=decrease
Average price/lb $	$0.89	$0.95	$0.91	$0.86	$0.89	$0.89		
1993 Value $	$2,391	$59,539	$143,189	$911,384	$1,677,320	$644,054	$3,437,877	
Scenario 2, 1973	$0	$0	$0	$1,427,229	$1,677,320	$644,054	$3,748,603	$310,726
Scenario 2, 1973	$0	$0	$0	$0	$2,986,159	$644,054	$3,630,213	$192,336
Scenario 2, 1973						$2,956,294	$2,956,294	($481,583)
Scenario 2, 1974	$0	$0	$0	$1,165,323	$1,677,320	$644,054	$3,486,697	($48,820)
Scenario 2, 1974	$0	$0	$0	$0	$2,916,476	$644,054	$3,560,530	$122,653
Scenario 2, 1974	$0	$0	$0			$1.10 $3,460,447	$3,460,447	$22,570
						$1.20 $3,775,033	$3,775,033	$337,156

Scenario 2 survival rates: 1973, Females, S=0.86; Males=0.83; 1974 Females, S=0.76; Males, S=0.62
All shrimp not caught in closure months are assumed caught in first open fishing month (adjusted for growth and mortality).

Table 5. Estimated change in yield from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 3).

	May	June	July	August	September	October	Total	Change
Actual Landings (pounds/1993)	2,680	62,902	158,157	1,055,392	1,894,812	727,376	3,901,319	
Scenario 3, 1973	0	0	0	1,489,074	1,894,812	727,376	4,111,262	209,943
Scenario 3, 1973	0	0	0	0	2,952,054	727,376	3,679,430	-221,889
Scenario 3, 1973						2,332,123	2,332,123	-1,569,196
Scenario 3, 1974	0	0	0	1,227,754	1,894,812	727,376	3,849,942	-51,377
Scenario 3, 1974	0	0	0	0	2,692,852	727,376	3,420,228	-481,091
Scenario 3, 1974	0	0	0			1,615,711	1,615,711	-2,285,608

Scenario 3, Survival rates: 1973 Females, S=0.69; Males S=0.67. 1974 Females, S=0.49; Males, S=0.42
All shrimp not caught in closure months are assumed caught in first open fishing month (adjusted for growth and mortality).

Table 6. Estimated change in exvessel landed value from the Florida East coast rock shrimp fishery when seasonal closures are implemented (Scenario 3).

	May	June	July	August	September	October	Total	Change ()=decrease
Average price/lb $	$0.89	$0.95	$0.91	$0.86	$0.89	$0.89		
1993 Value $	$2,391	$59,539	$143,189	$911,384	$1,677,320	$644,054	$3,437,877	
Scenario 3, 1973	$0	$0	$0	$1,280,604	$1,677,320	$644,054	$3,601,978	$164,101
Scenario 3, 1973	$0	$0	$0	$0	$2,627,328	$644,054	$3,271,382	($166,495)
Scenario 3, 1973						$2,075,590	$2,075,590	($1,362,287)
Scenario 3, 1974	$0	$0	$0	$1,055,868	$1,677,320	$644,054	$3,377,242	($60,635)
Scenario 3, 1974	$0	$0	$0	$0	$2,396,638	$644,054	$3,040,692	($397,185)
Scenario 3, 1974	$0	$0	$0			$1.10 $1,777,282	$1,777,282	($1,660,595)
						$1.20 $1,938,853	$1,938,853	($1,499,024)

Scenario 3, Survival rates: 1973 Females, S=0.69; Males S=0.67. 1974 Females, S=0.49; Males, S=0.42
All shrimp not caught in closure months are assumed caught in first open fishing month (adjusted for growth and mortality).

Appendix C. Alternatives eliminated from detailed consideration.

The council reviewed a wide range of management options during the development of Amendment 1. Detailed discussions of these options are included in previous drafts of this Amendment and in the administrative record. Abbreviated discussions of additional options that were considered but not brought to the final set of public hearings follow:

Options Eliminated from Additional Detailed Consideration

a. Minimum Count Size
b. Seasonal Closures
c. Mandatory Vessel Logbooks
d. Minimum Mesh Size
e. Effort Unit Limitations/Days at Sea
f. License Limitation
g. Co-management
h. Other Area Closures Options

a. Minimum Count Size

Testimony at scoping meetings and by members of the council's Scientific and Statistical Committee indicated that the majority of the time rock shrimp occur in mixed size distributions (especially in the spring) and establishing a minimum size may result in excessive culling and loss of undersized rock shrimp. Implementing a minimum count size may add to the already substantial discards that occur in at least two months (June & July) of the year. In addition, this option would ensure that discards increase during the season. Vessels may fish harder and discard (essentially with 100% mortality) more in order to make a trip profitable. If a minimum count was established, industry has indicated that problems may arise in fishermen culling large volumes of rock shrimp at sea in uncertain sea conditions. The variability in growth of rock shrimp between years may be a problem. For example, fisherman have indicated that 1993 was a good year with good landings and even increased catch per trip. What was reiterated by almost all fisherman who testified at scoping meetings was that after the first month the count size remained fairly constant throughout the year. A number of questions can be raised with this being a good year class, rock shrimp growth possibly being density dependent, and suitable habitat being a limiting factor? Could these factors in combination produce less yield per recruit? Another factor

may be that fishing effort is high and so concentrated that the year class is being cropped off as it enters the fishery. Assuming a 30 count minimum was set before harvest was allowed the shrimp may not grow to that size until late in the season and potential increased yield may be lost to natural mortality.

Implementation of a minimum count size may not be effective, undersized shrimp could continue to be caught and discarded, and increased culling could occur to compensate for the limit. Subsequently, the council rejected this option for further consideration under this Amendment.

b. Seasonal Closures

The council considered implementing seasonal closures at the request of industry to increase yield and revenue to the industry. The Florida east coast rock shrimp fishery historically started after Labor day. The Gulf based vessels first fish in the Gulf of Mexico during spring and early summer and then begin fishing on the east coast after Labor day. Typically shrimp vessels trawl for brown shrimp from May through August and begin shrimping for rock shrimp normally in August. However, since 1992, vessels are landing larger catches in July than in previous years.

Rock shrimp have an 18-20 month life cycle which has year class and adult abundance peaking in the fall and exponentially declining until the new year class appears in the spring. A closure could have been implemented to protect juveniles. Rock shrimp have a three month peak spawning which starts between November and January. This would be a logical time to implement a closure to reduce mortality on the spawning stock at a time when minimal harvest is occurring in the fishery. However, there has been no established spawner recruit relationship established for rock shrimp. Some industry representatives supported a seasonal closure and indicated a closed season may allow shrimp to move up from the shelf and distribute over the fishing grounds to be harvested later at a larger size. Previous industry testimony and landings information indicated little harvest was associated with the winter months. However, recent comments and landings information indicate that a greater amount of harvest is occurring in the winter months mainly by the smaller ice boats which depend heavily on these catches.

The council supported the SSC recommendation that a preliminary price determinants study for rock shrimp be accomplished by NMFS or other appropriate body. A limited study was conducted but due to the limited data the results were not viewed to represent real trends in price. The council staff

prepared a yield per recruit analysis and coupled it with available price information. The results indicated there would only be a marginal gain in yield and value by delaying the opening of the season. Part of the reason for this is may be due to the density dependency of growth and mortality. Also, the fishery likely exhibits a cyclical pattern and nothing would be gained by restricting harvest during a good year through delaying the opening of the season. The council subsequently removed seasonal closures from the list of options to be considered.

c. Vessel Logbooks

The use of mandatory logbooks was proposed to enhance data collection and provide better landings, price and area harvested estimates for the south Atlantic rock shrimp fishery. In addition, information on areas fished relative to essential bottom habitat could be attained.

The council, determined that NMFS in most cases will be able to, under existing State/Federal cooperative agreements and data collection programs, acquire appropriate data to determine the impacts of management and of the fishery on the resource and associated habitat. Industry and the council agree that the problems with data and monitoring must be resolved. The council decided thta requiring dealers to report would be less costly and less burdensome to the industry tha requiring vessel logbooks. However, the council recommended that NMFS should to the greatest extent possible use existing data gathering systems to minimize duplication and unnecessary reporting requirements.

d. Minimum Mesh Size

The council considered implementing a minimum mesh size in rock shrimp fishery to reduce bycatch of undersized shrimp, standardize the gear used in the fishery, and increase yield. The council did not select a preferred alternative mesh size but included the option to receive public comment for further consideration after the initial public hearings. The rock shrimp fishery utilizes between 1 and 7/8" and 2" mesh nets; they fish uo to four forty foot shrimp trawl nets. There was some support for imposing a 1 and 7/8", 2", or 2 and 1/4" mesh size at least in the tail bag.

One major problem was the lack of information on net selectivity for rock shrimp. In addition, no studies are available on the mortality associated with capture and passing through the net. This may be of some concern because of the intense fishing effort concentrated on what industry indicates is a narrow band of suitable rock shrimp habitat and trawling grounds. With the imposition of a

minimum mesh size, shrimpers could still cull small shrimp during the spring to get a minimum count. Testimony at public scoping meetings indicated that at certain times of the year the inshore water temperature shifts and spot and croaker move offshore and are caught by trawlers in depths beyond 120 feet. There is no minimum size mesh that would retain rock shrimp and release these finfish.

Currently, the industry uses between 1 and 7/8" and 2" mesh net. Any minimum mesh size measure that is within this range may have minimal impact on fishermen's activities. If a mesh size greater than 2" was implemented, it is likely that an unquantified amount of small undersized as well as marketable rock shrimp will escape through the mesh.

The council eliminated this option from further detailed consideration because no study had been conducted to determine the retention rates of different mesh sizes, thus it is not possible to assess the benefits or costs of implementing any mesh regulation.

e. License Limitation

The council considered implementing a license limitation program for the rock shrimp fishery to promote orderly utilization of the rock shrimp resource. The council established a control date in the fishery to put fishermen on notice that limited entry was a possible management tool being considered and anyone entering the fishery after the control date would not be guaranteed access to the fishery if a limited entry system is adopted. Licenses could have been limited to vessels with documented commercial rock shrimp landings within the area prior to the control date. The basic advantage for requiring licensing of participants in the fishery is in the identification of fishery participants and the subsequent effective monitoring and enforcement of rules governing rock shrimp harvest.

The council concluded that license limitation could identify the universe of fishermen that will participate in the fishery and thus be included in the co-management program, limit the number of participants in the fishery thereby limiting effort and preventing overcapitalization, and make enforcement more effective and improve compliance.

f. Effort Unit Limitations/Days at Sea

The council considered effort unit limitation as one of a number of controlled access options for the initial set of public hearings. Even when the number of participants in the fishery is effectively controlled by license limitation,

it is possible for those with licenses to increase individual effort so they can take advantage of the entry restriction and increase their catch rates. This rapid rate of harvest could lead to flooding of the market with the product. Fishermen behave this way because there is no incentive for them to harvest optimally from an economic standpoint.

Presently, total effort in terms of number of trips made by vessels in the rock shrimp fishery is the only available information on effort. Effort unit limitations would require standardizing effort for the different categories of vessels according to size, fishing power, etc. One important point worth noting is that the number of days at sea or absent from port should not be taken as a measure of fishing effort. The larger freezer vessels that spend up to 30 days at sea per trip do not effectively expend the same level of fishing effort on a daily basis throughout those trips.

Effort unit limitations usually take the form of limits on the number of days at sea for each vessel, limits on the months or seasons when fishing can take place, or even the number of gear sets allowed per boat. In theory, effort unit limitations can accomplish the same efficiency and demand side benefits as individual transferable quotas. However, efficiency can only be attained if effort units are tradable just like individual transferable quotas. The council eliminated this option from further consideration after receiving little industry support for any type of limited entry system in the rock shrimp fishery.

g. Co-Management

The council considered the establishment of a co–management program that would enable rock shrimp fishermen to form a board with the responsibility of making recommendations to the council on: 1) allocation of effort units, 2) season closure/opening, 3) access to the fishery by area, 4) research and data needs, and 5) licensing issues, among others. This would enable management measures to be enforced at minimum cost, thus increasing the net benefits that could be obtained from the fishery. Recommendations approved by the council could have been implemented through plan amendment or any future framework procedures in the FMP. The details concerning the size of fishermen's groups, movement of fishermen between groups, etc. would be worked out with the fishermen.

Under a co–management system, fishermen are more likely to share information, which would reduce conflict between government and fishermen. Fishermen are treated as responsible co–participants and as a result, their behavior and attitudes should change. Governmental responsibility for monitoring

and enforcing regulations can be reduced through higher compliance and better flow of information from fishermen. In general, the government should: 1) provide overall planning, 2) define the level of overfishing or optimum yield for the fishery, 3) solve conflicts between fishermen's groups, 4) provide legal support for fishermen's groups, and 5) enforce regulatory decisions. Fishermen's groups are better suited for making decisions on access control, allocative issues, and fishing practices.

The general proposal was brought to public hearing and did not receive support from the industry. The council concluded that co–management was not supported by industry at this time and would not be pursued under this Amendment.

h. Other area closures considered.

No trawling for rock shrimp south of 28° N. latitude.

This option is more restrictive and would require increased at–sea monitoring and enforcement. The council included this option in the initial document to receive comment for further consideration after public hearings. The council eliminated this option from further consideration because it would provide less protection for live/hard bottom, *Oculina* coral, and the massive Oculina banks which extend further north. In addition, the option would eliminate 46 percent of harvest based on a comparative subsample of the rock shrimp harvest information provided by industry during the public hearing process.

Prohibit trawling for rock shrimp south of 28° 30' N. latitude.

This option was presented at public hearings in September 1994. The council selected this option as the preferred action based on NMFS SEFSC informal review comments that the area south of the line contains the majority of known distribution of *Oculina* coral and Oculina Bank system. The option was considered to reduce the impact of the bottom tending trawls used in the fishery, on essential habitat including live/hard bottom, *Oculina* coral, and the Oculina Bank HAPC. Therefore, the action was selected because it would also enhance existing federal regulations for coral and snapper grouper species, by protecting *Oculina* coral and the Oculina Bank HAPC from trawl related habitat damage.

Available information on harvest by area was limited to voluntary reporting in the Florida trip ticket system. However, this information when combined with public testimony indicated the majority of the fishery was

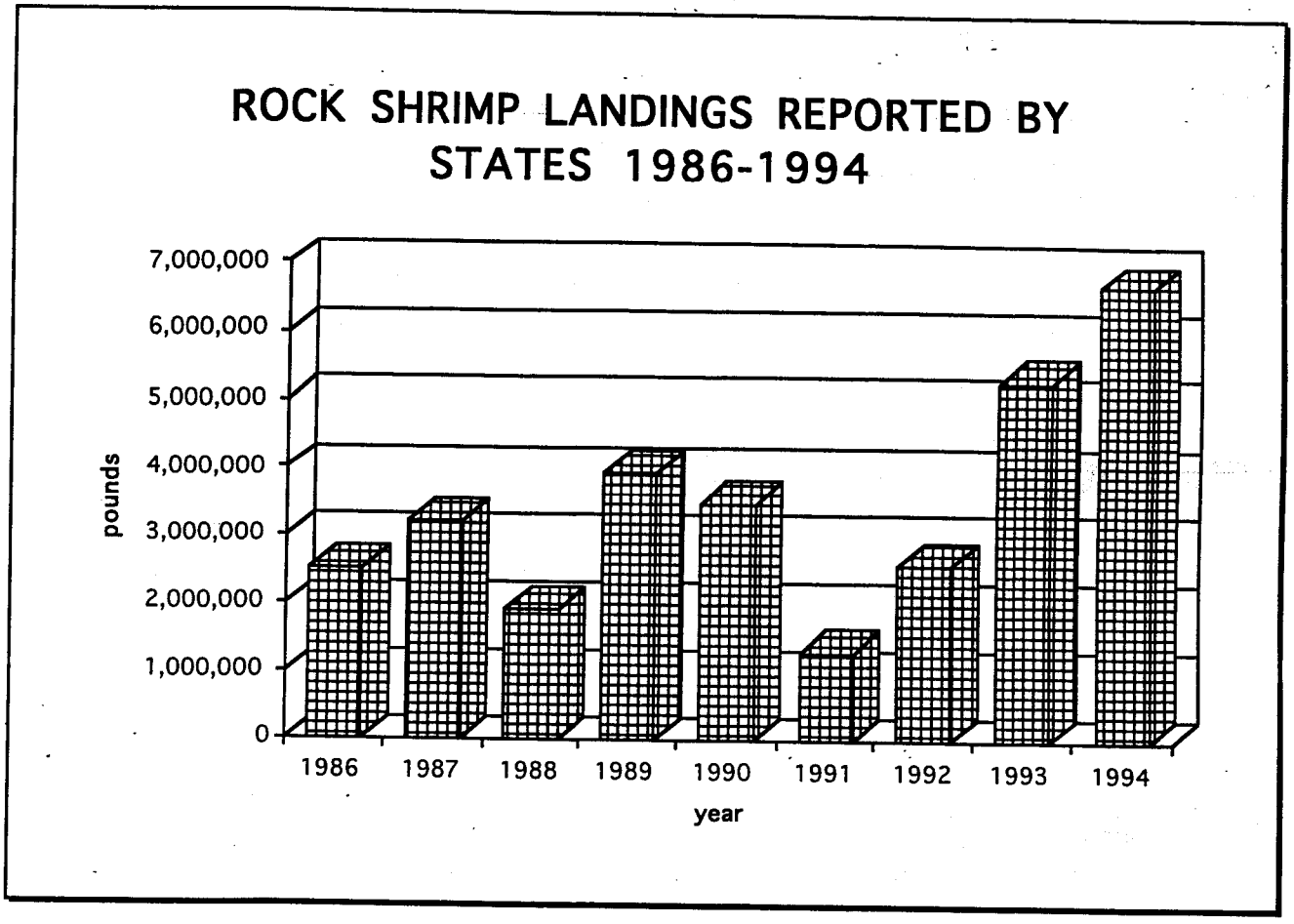
prosecuted north of Cape Canaveral. Therefore, the impact of the action on the rock shrimp industry, based on best available data, was minimal. However, after going to public hearing and proposing the area closure, the council received input that the fishery had significantly moved south.

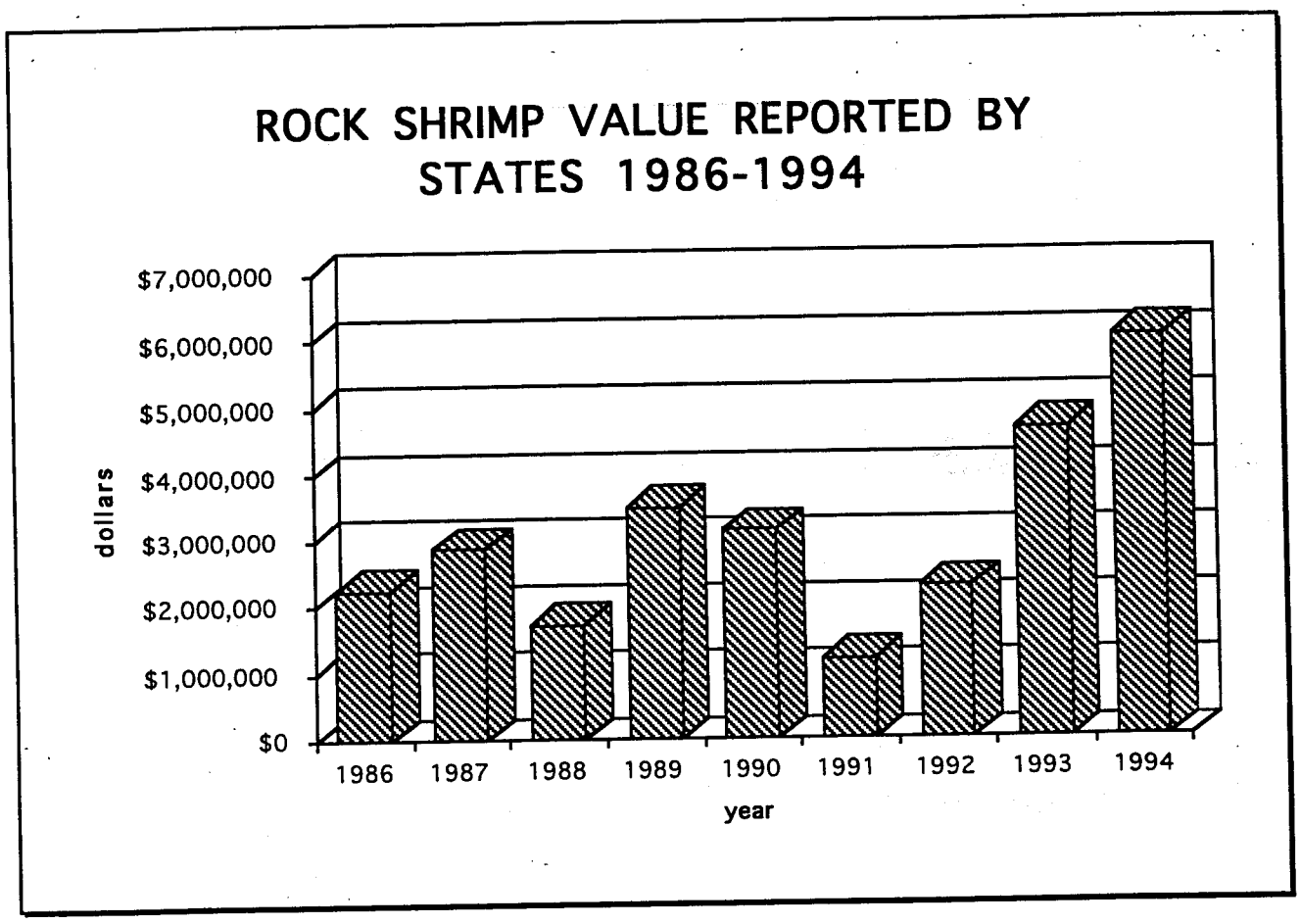
Based on a comparative subsample of landings by area information provided by industry, 80 percent of the 1994 harvest is estimated to have come from areas south of 28° 30' N. latitude. Therefore if present harvest patterns continue, the majority of the fishery would be eliminated. The council subsequently eliminated this option from further consideration and from the second public hearing document.

Limit harvest area to Duval through St. Lucie Counties Florida.

The council rejected this option because it did not address the impact of bottom trawls used in the rock shrimp fishery on essential habitat. In addition, this option was proposed when the council was considering working with industry to provide a limited entry system. After public hearing the intent of the action was clarified to be to consider an area closure to reduce the impact of the fishery on essential habitat. The council dropped the option from further consideration because it would allow continued degradation of coral resources and live/hard bottom habitat.

Appendix D. South Atlantic commercial rock shrimp fishery statistics (Source: SCDNR, NCDMF, FDEP, AND GDNR 1995).




ROCK SHRIMP VALUE REPORTED BY STATES 1986-1994
$7,000,000
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$0
dollars
1986
1987
1988
1989
1990
1991
1992
1993
1994
year

Appendix E. Crustacean and Molluscan taxa identified in benthic sampling for rock shrimp (Source: Kennedy et al. 1977).

Class Crustacea
- Order Isopoda
  - *Apanthura* sp.
  - *Astacilla* sp.
  - *Cyanthura burbancki*
  - *Colanthura tenuis*
  - *Eurydice littoralis*
  - *Ptilanthura tricarina*
  - *Xenanthura* sp.
- Tanaidacea
  - *Apseudes* sp.
  - *Leptochelia* sp.
- Cumaceana
  - *Cyclaspis varians*
  - *Oxyurostylis smithi*
- Mysidacea
  - 1 Phenotype
- Decapoda
  - Alpheidae sp.
  - *Carpoporus papulosus*
  - *Euceramus praelongus*
  - *Hypoconcha arcuata*
  - *Hypoconcha* sp.
  - *Leptochela* sp.
  - *Micropanope* sp.
  - Paguroidea sp.
  - *Parthenope fraterculus*
  - *Pilumnus* sp.
  - *Pinnixa floridana*
  - *Pinnixa* sp.
  - *Portunus gibbesii*
  - *Processa* sp.
  - *Ranilia muricata*
  - Solenocerinae sp.
  - *Synalpheus* sp.
  - Xanthidae sp.
- Amphipoda
  - 22 Phenotypes

Class Pelecypoda
- Family Solemyidae
  - *Solemya* sp.
- Nuculidae
  - *Nucula proxima*
- Nuculanidae
  - *Nuculana* sp.
- Arcidae
  - *Anadara transversa*
  - *Barbatia* sp.
  - *Noetia ponderosa*
- Glycymeridiidae
  - *Glycymeris pectinata*
  - *Glycymeris spectralis*
- Mytilidae
  - *Amygdalum sagittatum*
  - *Crenella divaricata*
  - *Musculus lateralis*
- Pectinidae
  - *Argopecten gibbus*
  - *Chlamys benedicti*
  - *Cyclopecten* sp.
- Limidae
  - *Limaria* sp.
- Anomiidae
  - *Anomia simplex*
- Crassatellidae
  - *Crassinella dupliniana*
  - *Crassinella lunulata*
  - *Crassinella* sp.
- Carditidae
  - *Pleuromeris tridentata*
- Astartidae
  - *Astarte nana*
- Condylocardidae
  - *Carditopsis smithi*
- Lucinidae
  - *Lucina blanda*
  - *Lucina multilineata*
  - *Lucina* sp.
- Leptonidae
  - *Montacuta* sp.
- Chamidae
  - *Arcinella* sp.
  - *Chama* sp.
- Cardiidae
  - *Trachycardium egmontianum*
  - *Trachycardium muricatum*
  - *Laevicardium* sp.
- Veneridae
  - *Chione grus*
  - *Chione intapurpurea*
  - *Chione latilirata*
  - *Gouldia cerina*
  - *Dosinia* sp.
  - *Pitar fulminata*
  - *Pitar* sp.
- Mesodesmatidae
  - *Ervilia concentrica*
- Tellinidae
  - *Macoma* spp.
  - *Tellina cristata*
  - *Tellina* spp.
- Semelidae
  - *Abra* spp.
  - *Semele bellastriata*
  - *Semele nuculoides*
  - *Semele* spp.

Class Pelecypoda (Cont.)
- Family Corbulidae
  - *Corbula barrattiana*
  - *Corbula* sp.
  - *Varicorbula operculata*
- Hiatellidae
  - *Hiatella* sp.
- Pandoridae
  - *Pandora* sp.
- Lyonsiidae
  - *Lyonsia hyalina*
- Verticordiidae
  - *Verticordia ornata*

Class Gastropoda
- Family Trochidae
  - *Calliostoma yucatecanum*
  - *Calliostoma* spp.
  - *Solariella lacunella*
- Skeneidae
  - *Skenea* sp.
- Liotiidae
  - *Arene tricarinata*
  - *Arene variabilis*
- Turbinidae
  - *Turbo castanea*
- Phasianellidae
  - *Tricolia affinis*
- Rissoidae
  - *Alvania auberiana*
  - *Alvania* sp.
  - *Zebina browniana*
- Rissoinidae
  - *Rissoina* sp.
- Vitrinellidae
  - *Anticlimax* sp.
  - *Aorotrema* sp.
  - *Circulus* sp.
  - *Cyclostremiscus* spp.
  - *Episcynia inornata*
  - *Parviturboides interruptus*
  - *Teinostoma goniogyrus*
  - *Teinostoma* spp.
  - *Vitrinella* spp.
- Architectonicidae
  - *Architectonica* sp.
  - *Heliacus bisulcatus*
- Turritellidae
  - *Turritella acropora*
  - *Turritella exoleta*
  - *Vermicularia* sp.
- Caecidae
  - *Caecum cooperi*
  - *Caecum pulchellum*
  - *Caecum* spp.
- Cerithiidae
  - *Alaba incerta*
  - *Cerithiopsis taeniolata*
  - *Cerithiopsis* spp.
  - *Cerithium* sp.
  - *Diastoma varium*
  - *Finella* spp.
  - *Seila adamsi*
  - *Triphora* spp.
- Epitoniidae
  - *Amaea retifera*
  - *Depressicala nautlae*
  - *Epitonium* spp.
  - *Opalia* sp.

Class Gastropoda (Cont.)
- Family Eulimidae
  - *Balcis* spp.
  - *Niso aeglees*
  - *Niso* sp.
- Aclididae
  - *Henrya* sp.
- Fossaridae
  - *Fossarus* spp.
  - *Macromphalina floridana*
  - *Macromphalina palmalitoris*
- Calyptraeidae
  - *Calyptraea centralis*
  - *Crepidula fornicata*
- Naticidae
  - *Natica pusilla*
  - *Natica* sp.
  - *Polinices duplicatus*
  - *Polinices lacteus*
  - *Sigatica carolinensis*
- Cassidae
  - *Phalium* sp. (juv.)
- Eratoidae
  - *Erato maugeriae*
- Tonnidae
  - *Tonna* sp.
- Cymatiidae
  - *Distortio* sp.
- Muricidae
  - *Eupleura caudata*
  - *Murex* sp. (juv.)
- Columbellidae
  - *Aesopus stearnsi*
  - *Anachis lafresnayi*
  - *Anachis iontha*
  - *Anachis obesa*
  - *Mitrella lunata*
  - *Nassarina glypta*
  - *Nassarina* sp.
- Melongenidae
  - *Busycon contrarium*
- Nassariidae
  - *Nassarius* spp.
- Olividae
  - *Oliva* sp.
  - *Olivella* spp.
- Mitridae
  - *Costellaria wandoensis*
  - *Vexillum* sp.
- Cancellariidae
  - *Agatrix smithii*
- Marginellidae
  - *Granulina ovuliformis*
  - *Marginella eburneola*
  - *Prunum roscidum*
  - *Prunum* sp.
  - *Volvarina* sp.
- Terebridae
  - *Terebra concava*
  - *Terebra protexta*
- Turridae
  - *Bellaspira pentagonalis*
  - *Brachycythara barbarae*
  - *Cerodrillia* sp.
  - *Cerodrillia* sp.
  - *Cochlespira radiata*
  - *Crassispira* sp.
  - *Ithycythara* sp.
  - *Kurtziella* spp.

Class Gastropoda (Cont.)
Family Turridae (Cont.)
Nannodiella spp.
Pyrgocythara coxi
Rubellatoma rubella
Rubellatoma sp.
Vitricythara sp.
Pyramidellidae
Cingulina babylonia
Eulimastoma spp.
Odostomia dianthophila
Odostomia dux
Odostomia gibbosa
Odostomia seminuda
Odostomia spp.
Turbonilla spp.
Acteonidae
Acteon spp.
Ringiculidae
Ringicula semistriata
Acteocinidae
Acteocina candei
Acteocina sp.

Class Gastropoda (Cont.)
Family Cylichnidae
Cylichna verrillii
Cylichnella bidentata
Philinidae
Philine sagra
Haminoeidae
Atys riiseana
Retusidae
Pyrunculus caelatus
Retusa sulcata
Volvulella spp.

Class Polyplacophora
Family Ischnochitonidae
Chaetopleura apiculata

Class Scaphopoda
Family Dentaliidae
Cadulus spp.
Dentalium americanum
Dentalium spp.

Appendix F. Section 7 Consultation- Updated Biological Opinion

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1335 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

NOV 14 1994

MEMORANDUM FOR: The Record

FROM: Rolland A. Schmitten

SUBJECT: Reinitiation of Endangered Species Act Section 7 Consultation on the Impacts of Shrimp Trawling in the Southeastern United States

Based on the attached biological opinion, we conclude that the continued long term operation of the shrimp fishery in the nearshore waters of the southeastern United States is likely to jeopardize the continued existence of the highly endangered Kemp's ridley sea turtle. This Endangered Species Act (ESA) Section 7 consultation on the shrimp fishery was based on a reinitiation of the consultation that resulted in the August 19, 1992 biological opinion on shrimp fishing in the Southeastern U.S. Consultation was reinitiated in response to the unusually high numbers of sea turtle strandings in Texas during the spring and summer of 1994.

Beginning in April, 1994, coinciding with heavy nearshore shrimp trawling activity, unprecedented numbers of dead sea turtles stranded along the coast of Texas. The strandings continued through May and occurred in highest numbers where nearshore shrimping activity was heaviest. Texas waters were closed to shrimping from May 13 through July 7, 1994. During that time, strandings decreased, but resumed when Texas waters reopened. In response, NMFS increased enforcement efforts and technical assistance. Subsequently, strandings again decreased. Finally, when NMFS resumed typical enforcement efforts, high numbers of dead turtles stranded on northern Texas beaches. A total of 366 turtles stranded between January and August, 1994, on Texas offshore beaches, including almost 200 Kemp's ridley turtles. An additional 164 turtles, including 122 Kemp's ridleys, stranded in Louisiana during the period of January through September, 1994. Because the very high level of mortality of an endangered species like the Kemp's ridley threatens its continued existence, NMFS has determined that shrimping in the nearshore waters of Texas is likely to jeopardize the Kemp's ridley sea turtle.

The major apparent cause of the strandings is the incorrect installation and improper use of TEDs by shrimpers in the Gulf of Mexico. Other causes include: 1) Certification of TEDs which

THE ASSISTANT ADMINISTRATOR FOR FISHERIES

are ineffective due to their complexity or incompatibility with net types; and 2) intensive "pulse" fishing in areas of high sea turtle abundance during spring and summer 1994. The simultaneous occurrence of intensive fishing effort and Kemp's ridley turtles may have led to the repeated submergence of individual sea turtles in short time periods, which could have contributed to the high levels of mortalities.

An attached biological opinion was issued on August 19, 1992, regarding the shrimp fishery and requiring the use of TEDs. It concluded that the shrimp fishery, when conducted in compliance with 1992 Revised Sea Turtle Conservation Regulations and with the Gulf of Mexico and South Atlantic Shrimp Fishery Management Plans, was not likely to jeopardize the continued existence of threatened or endangered species under National Marine Fisheries Service (NMFS) jurisdiction.

This biological opinion identifies a reasonable and prudent alternative to ensure that shrimping does not jeopardize the continued existence of listed species. This alternative requires NMFS to maintain current levels of enforcement for the remainder of the 1994 season and to formulate an emergency response plan detailing NMFS actions to insure shrimper compliance with sea turtle conservation measures. NMFS is additionally required to: (1) Require fishing permits for shrimp trawl vessels operating in the Gulf of Mexico, (2) develop a training program for U.S. Coast Guard boarding parties, (3) amplify domestic TED technology transfer programs, (4) reexamine soft TEDs and the TED approval process, (5) identify special sea turtle management areas and implement appropriate conservation measures, (6) increase beach monitoring for strandings and coordinate activities with the USFWS and Sea Turtle Stranding and Salvage Network, (7) increase observer coverage in the shrimp fishery, (8) form a TED enforcement team to respond to reports of stranding pulses or TED noncompliance, and (9) select a team of experts and population biologists to estimate the current population of Kemp's ridleys and determine the maximum number of individuals that can be taken incidental to commercial fishing. This opinion was formulated using the best available information.

The biological opinion includes an incidental take statement, with reasonable and prudent measures, and terms and conditions. All reasonable and prudent measures in the August 19, 1992 incidental take statement are incorporated into this opinion. The incidental take level identified in this opinion is the documented take (lethal or nonlethal) of eight Kemp's ridley, four green, four hawksbill, four leatherback, or twenty loggerhead turtles for all shrimp trawling activities in the Atlantic and Gulf areas. The incidental take statement also identifies an indicated incidental take level based on weekly stranding rates in each NMFS statistical zone.

Reinitiation of formal consultation is required if: (1) The amount or extent of taking specified in the incidental take statement is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat (when designated) in a manner or to an extent not previously considered, e.g., evidence of sea turtle strandings or other observed sea turtle mortality, (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed, or critical habitat is designated that may be affected by the identified action. Reinitiation is required within two years of issuance of this opinion in order to reevaluate the opinion and incidental take statement for the shrimp fishery.

Endangered Species Act - Section 7 Consultation

Biological Opinion

Agencies: National Marine Fisheries Service

Activity: Shrimp Trawling in the Southeastern United States Under the Sea Turtle Conservation Regulations

Consultation Conducted By: National Marine Fisheries Service

Date Issued: NOV 14 1994

A. Background information

The incidental capture and mortality of sea turtles in shrimp trawls has been the foremost endangered species conflict in the southeastern United States for well over a decade. NMFS has devoted years of effort to resolving this conflict through gear development and regulations. NMFS' efforts culminated in the amendments to the TED regulations (57 FR 57348, December 4, 1992) which require most shrimp trawlers to install an approved TED in each net rigged for fishing year-round in all U.S. waters of the Gulf of Mexico and southern North Atlantic. NMFS believed that these regulations would result in up to a 97 percent reduction in shrimp trawler related mortality to four species of sea turtles. The Endangered Species Act (ESA) Section 7 biological opinion (August 19, 1992) on shrimp fishing pursuant to the final 1992 regulations and the South Atlantic and Gulf of Mexico Shrimp Fishery Management Plans (FMPs) determined that a 97 percent reduction in the mortality of sea turtles due to shrimp trawling would allow the shrimp fishery to continue without jeopardizing the continued existence of listed species of sea turtles.

Sea turtle stranding rates higher than those observed historically have been reported in the northern Gulf of Mexico in 1994. The best available information suggests that many of the observed mortalities have been caused by incidental capture in the shrimp fishery at rates above those considered in previous consultations. Consultation has therefore been reinitiated on the effects of the southeastern shrimp fishery on listed species of sea turtles.

1. 1993 Mass Stranding of Kemp's ridleys in Louisiana

During Memorial Day weekend of 1993 over 100 small Kemp's ridley turtles stranded along the shore of Grand Isle, Louisiana. The strandings were coincidental with high shrimping effort (over 150 trawlers) off of Grand Isle but enforcement efforts suggested

that TED compliance in the area was good. NMFS received reports from shrimpers that small turtles passed through the bars of the grid TEDs. In November 1993, NMFS tested a variety of TEDs to determine what types and configurations were most likely to retain small turtles. Bottom-opening grid TEDs with floats excluded 7 of 7 turtles introduced into the trawl. Bottom-opening grid TEDs without floats excluded 0 of 7 turtles. Five of the turtles caught passed through the grid bars and the other 2 were unable to escape out the bottom opening.

Single grid TEDs, such as the Georgia and Matagorda, were originally tested for their ability to exclude turtles in the waters off Cape Canaveral, Florida. This area was selected because of the fairly predictable abundance of loggerhead turtles. All single grid TEDs with bottom escape openings were tested with floats. All TEDs are required to meet a release standard statistically comparable to the NMFS TED for each certification test. The NMFS TED has been found to have a 97 percent exclusion rate. The 1987 TED regulations did not dictate that flotation be used, but allowed for floats on all devices. The 1992 revised TED regulations also provided for, but did not require, the use of floats on hard TEDs. During testing it was not anticipated that most grid TEDs would be used without floats, in part because net chaffing would occur from contact with the bottom. In addition, during all certification trials prior to 1993, gear experts did not predict the possibility that the lack of flotation would hinder turtle release.

2. **Spring 1994 Sea Turtle Strandings in Texas**

Beginning in April 1994, and coinciding with heavy nearshore shrimp trawling activity, unusually high numbers of sea turtles stranded along the coast of Texas (Figure 1). The strandings continued through May and occurred in highest numbers where shrimping activity was the heaviest. Two hundred and sixteen dead turtles, 131 of which were Kemp's ridleys, were found stranded on offshore Texas beaches from April through May 13. An additional 17 turtles were reported from May 13 to May 31 after the Texas closure was implemented. The five-year average (1989-1993) for sea turtle strandings in Texas during April and May was 49.

The Texas strandings were associated with strandings of fish, consisting mostly of sea catfish. The State of Texas documented the presence of toxic dinoflagellates (red tide) in association with the fish and turtle strandings; however, no indication of poisoning was identified in the turtle necropsies or after analyses of collected tissues. Also, there were several menhaden purse seine vessels operating off the Texas coast at the time of the strandings. NMFS observers on the menhaden vessels monitored 29 sets. Observers did not document any sea turtles takes, which

is consistent with historical observations of menhaden purse seine vessels.

Increased dolphin strandings occurred prior to and during the initial period of turtle strandings and fish kills. Ultimately, the cause of the dolphin strandings was determined to be a viral pathogen, morbillivirus, related to canine distemper and measles. While related viruses affect the health of numerous mammal species, there is no information to suggest that turtles could be affected by this mammalian virus. The simultaneous red tide bloom, fish kill, dolphin die-off, and apparent compliance with TED regulations confounded the attempts of NMFS scientists to determine the cause of sea turtle strandings in Texas.

Gulf shrimpers suggested that oil and gas development activities, including explosive platform removals and seismic exploration in the Gulf, may have contributed to the observed strandings. The Corps of Engineers (COE) and Minerals Management Services (MMS) have incorporated conservation measures, including pre- and post-detonation surveys, for their rig removal procedures to minimize the possibility of takes of sea turtles and marine mammals. In over five years of observations, no lethal takes have been documented. Research conducted on air guns, the primary instrument used in seismic surveys, has indicated that while they may be a nuisance to some species, there is no information to suggest that they harm listed species of sea turtles. While conducting aerial surveys to monitor populations of marine mammals in the Gulf of Mexico, NMFS staff have observed seismic vessels operating in the Gulf and have never observed carcasses in the vicinity of the vessels. These activities are being reconsidered, and will be analyzed for any geographic coincidence with strandings, in ongoing consultations with MMS and COE.

In May, gear experts joined law enforcement agents boarding shrimp vessels in Texas and the northern Gulf to determine whether gear problems were contributing to the increased number of strandings. They determined that, while almost all shrimp trawlers were equipped with TEDs, many were installed improperly. For example, several TEDs contained deflector bars that were installed at nearly vertical angles, which could reduce the ability of turtles to exit the net. Current TED regulations require single-grid style TEDs to be installed in the trawl at a 30 to 50 degree angle when the trawl is in a normal horizontal fishing position. An angle greater than 50 degrees will cause clogging of the TED and hinder turtle release. In addition, these and other gear problems with TEDs might not have been apparent to enforcement officers.

Additionally, many of the vessels were using bottom-opening, hard-grid TEDs with insufficient or no flotation attached to the grid. The gear specialists believe that hard-grid TEDs with no, or improper, flotation would cause the grid to drag along the sea

floor pinning the flap covering the escape opening against the net. This situation could severely impair the ability of sea turtles, especially smaller ones, from escaping the trawl net. The unprecedented stranding levels strongly suggested that the shrimp fishery was adversely impacting turtles to an extent not previously considered, therefore consultation on the fishery was reinitiated. The resulting Biological Opinion (June 28, 1994) concluded that proper flotation must be used on single-grid bottom-shooting TEDs to allow the shrimp fishery to continue operating without jeopardizing the continued existence of listed species of sea turtles.

NMFS requested voluntary use of flotation on bottom opening single grid TEDs and requested shrimpers to ensure that their TEDs were installed at proper angles through a press release on June 14, 1994 in anticipation of the flotation rule. NMFS conducted workshops through the Texas Shrimpers Association, and met with shrimpers to discuss the development of rules to reduce the impacts of the fishery on sea turtles. NMFS published an interim rule that requires the use of specified flotation devices on bottom shooting hard-grid TEDs (59 FR 33447, June 29, 1994) to improve their ability to safely exclude sea turtles. At that time, NMFS issued a news release and informed Texas shrimp industry leaders that the float requirement was forthcoming. The rule became effective two days after the Texas closure period ended.

3. Summer 1994 Closure of Texas Waters to Shrimping

As determined under State regulations and the Gulf of Mexico Shrimp Fishery Management Plan, State and Federal waters off Texas, out to 200 miles, are closed to shrimp fishing for 45 to 90 days each year between mid-May and mid-July. In 1994, the Texas closure period extended between May 13 and July 7. Sea turtle strandings on offshore beaches, which had been documented at unprecedented levels of up to 47 turtles each week, declined to levels of one to 16 turtles each week during the closure period. Despite the decrease in strandings, however, approximately four times as many strandings occurred on offshore Texas beaches during the closure period in 1994 as compared to the previous five-year average. Forty-eight sea turtles stranded on offshore beaches during the 1994 closure period. An average of approximately 12 sea turtles stranded during closed periods of similar lengths between 1989 and 1993. No new natural or anthropogenic sources of mortality have been identified to explain the increase in strandings during the Texas closure.

4. Strandings Decreased During Times of Increased Enforcement Efforts

Fifty-six sea turtles strandings were documented between July 10 and July 16, 1994 the week following the July 7, 1994 opening of

Texas waters to shrimping. Enforcement efforts in Texas were intensified in response to the high stranding levels that followed the Texas closure (See Figure 1). From July 18 to July 27, 1994, personnel from the U.S. Coast Guard, Texas Parks and Wildlife combined efforts with NMFS enforcement and gear specialists. Together, they conducted 188 boardings, both at sea and at the dock. Gear problems were observed and corrected by gear specialists on approximately 50 percent of all vessels they boarded. Most of these problems were minor. However, a total of 24 violations were documented, resulting in the issuance of 10 written warnings and 14 referrals to NOAA General Counsel for prosecution. Cases were referred to NOAA General Counsel where gear problems appreciably increased the risk of taking a sea turtle, such as vertical grid angles and inadequate flotation. Stranding levels decreased, and in the two weeks following the initiation of enforcement efforts only 9 and 12 strandings were documented, respectively. Thus, NMFS reduced enforcement efforts.

After high strandings resumed again in the first week of August, a second enforcement operation occurred between August 8 and August 17, 1994. Subsequently, strandings in Texas decreased to one per day or less. Enforcement actions, therefore, appeared to be effective at reducing sea turtle mortalities to background levels. However, it is not clear whether the reduced strandings, after increased enforcement, were due directly to increased compliance and/or due indirectly to dispersal of effort in areas of turtle abundance. Enforcement efforts during this time are described in detail in subsequent sections of this biological opinion.

Coast Guard and enforcement presence in Texas was reduced after the second enforcement action. During the week of August 21 - 27, strandings resumed, as 17 sea turtles stranded in two days between Freeport and Sabine, Texas, for a weekly state total of 23 strandings on offshore beaches. Increased nearshore shrimping effort was observed by sea turtle stranding network personnel during their stranding surveys. Within the cluster of 17 turtles (including at least 7 ridleys) at least four sea turtles were observed with missing appendages that stranding network personnel suggested may have been removed by knife, ax or other cutting or chopping tool. Inspections of two of these turtles by a local veterinarian were inconclusive. In response, NMFS again increased enforcement efforts.

In total, over 366 sea turtle strandings have been reported on offshore Texas beaches between January 1 and August 31, 1994. An average of approximately 109 sea turtle strandings were reported on offshore beaches between January and August over the previous five years (1989-1993). This represents a greater than threefold increase in sea turtle strandings. Most importantly, the number of Kemp's ridleys strandings this year (198) is nine times higher

than the average number of Kemp's ridley strandings on offshore Texas beaches for that period during the previous five years (22). Loggerhead strandings rates of almost three times the five-year average of 57 have been reported, with 168 offshore loggerhead strandings reported through August 31, 1994.

5. **Sea Turtle Strandings in Louisiana**

Turtle strandings in Louisiana were also unusually high during the period of January 1 through September 30, 1994. During this eight month period, a total of 122 Kemp's ridleys were reported dead on offshore Louisiana beaches. Recognizing the variability in stranding reporting in Louisiana, this represents a greater than four-fold increase over the five-year average (1989-1993) for the same season. This is the second consecutive year that sea turtle strandings have well exceeded the average level. Additionally, the actual stranding levels in Louisiana are assumed to be higher than reported due to the nature of Louisiana's coastline and the limited and variable scope of systematic stranding surveys in Louisiana.

Data on shrimp fishing effort in nearshore Louisiana waters are not available at this time. Additionally, information regarding coastal gillnet effort, which reportedly occurs in western Louisiana waters, is not available at this time. The population of Kemp's ridleys in the Gulf of Mexico is not limited to Texas waters, and high numbers of Kemp's ridleys occur in Louisiana. Therefore, in considering the impact of the shrimp fishery on the Kemp's ridley population, Louisiana strandings must be considered in conjunction with the Texas strandings.

B. **Proposed Activities**

This consultation considers the continued operation of the shrimp fishery in the southeastern United States pursuant to the 1992 Revised Sea Turtle Conservation Regulations, and the South Atlantic and Gulf of Mexico FMPs. Shrimp fishery operations were considered in the August 19, 1992 biological opinion and modified by the rule requiring flotation on hard-grid TEDs with bottom escape openings, for which a biological opinion was issued on June 28, 1994.

C. **Listed Species and Critical Habitat**

The list of endangered and threatened species contained in the August 19, 1992 biological opinion remains unchanged and is incorporated by reference.

D. Assessment of Impacts

The following discussion addresses new information relating to the impacts of the shrimp fishery on primarily Kemp's ridley and loggerhead sea turtles. There is no new information to suggest that hawksbill, leatherback and green sea turtles are adversely affected by the shrimp fishery to an extent or in a manner not already considered in previous biological opinions, including the one of August 19, 1992.

1. Sea Turtle/Shrimp Trawl Interactions in Texas Waters

a. Catch Rates in Texas Waters

Henwood and Stuntz (1987) analyzed shrimp trawler observer data collected from 1974 through 1984 to identify catch rates and estimate total catch of sea turtles in the shrimp fishery. Almost 8,000 hours of shrimping effort were observed in the western Gulf, which corresponds to Texas waters. Sixteen loggerhead takes were observed, representing a catch rate of 0.0020 (+- 0.0010) loggerheads per net hour. Four Kemp's ridleys were taken, representing 0.0005 (+- 0.0005) ridleys per net hour. Mortality rates in this area were calculated to be about 38 percent due to the longer than average tow times observed. Mortalities may be higher in areas of densely distributed fishing effort due to the possibility of repeated captures of individual turtles, compounding submergence stresses. Catch rates observed by Henwood and Stuntz (1987) off Texas through 1984 suggest that overall, Kemp's ridleys would constitute approximately 25 percent of all sea turtles lethally taken in shrimp vessels and observed as strandings.

There is no information to determine what percentage of sea turtles lethally taken incidental to shrimp fishing will wash ashore. Takes closer to shore would have a greater chance of beaching prior to decomposition, or ingestion by scavengers.

b. Nearshore Shrimp Trawling Effort in 1994

The primary change in activities in early 1994 which likely contributed to the large number of sea turtle strandings was an increase in nearshore (i.e. within depths of 10 fathoms) shrimping effort before the Texas closure. Intensive nearshore shrimp trawling effort at almost four times the historical (1989-1993) rates were documented off Galveston, Texas in April (NMFS, unpublished data). This high effort increased slightly through May, which is historically a month of high nearshore effort, with effort about 25 percent higher than the 1989 through 1993 average. A strong positive correlation between nearshore shrimping effort and sea turtle strandings prior to the 1994 Texas closure was identified by biologists at the NMFS Galveston

lab, and is consistent with past observations. Caillouet et al. (1991) identified a significant correlation between increased strandings and shrimp trawling within 15 fathoms between 1986 and 1989.

Review of preliminary fishery effort data for 1994 suggests nearshore shrimping effort was high in northeastern Texas immediately after the closure ended. Nearly 12,000 hours of nearshore effort off Galveston, Texas was identified during the week following the opening of Texas waters, coinciding with a week of 53 sea turtle strandings on offshore Texas beaches. Continued analyses of fishery effort and distribution data are anticipated, but are not available for this consultation. Fluctuations in nearshore effort corresponding with shrimp distribution likely occurred throughout the remainder of the season, however. During 1994 these pulses of shrimping occurred in areas of high sea turtle concentration. Multiple takes and corresponding repeated forced submergence of individual turtles would likely result in increased mortalities in areas of densely distributed shrimp trawling.

Up to a 97 percent reduction in sea turtle captures, expected with the correct implementation of TEDs, would result in fewer mortalities and fewer shrimp fishery related strandings, but would continue to proportionally represent the resident turtle population unless TEDs were selective by species. During the five years between 1989 and 1993, an average of 22 Kemp's ridleys and 57 loggerheads were reported stranded in the first seven months (January through August) of each year on offshore Texas beaches. However, in 1994, through the end of July, Kemp's ridley strandings on offshore Texas beaches (over 200) outnumbered loggerhead strandings (over 150). Catch rates of Kemp's ridleys appear to be higher than previously observed, and are apparently above rates considered during previous Section 7 consultations conducted on the shrimp fishery.

c. Value of Nearshore Northern Gulf Waters to Kemp's ridleys and Loggerheads

Stomach content analyses on sea turtles stranded in Texas suggest that, in all years, most mortalities occur in nearshore waters. Studies conducted on loggerheads stranded on the lower Texas coast (south of Matagorda Island) have indicated that stranded individuals were feeding in nearshore waters shortly before their death (Plotkin et al. 1993). Stomach contents of Kemp's ridleys along the lower Texas coast also showed a predominance of nearshore crabs and mollusks, as well as fish, shrimp and other foods considered to be shrimp fishery discards (Shaver, 1991). Analyses of stomach contents from sea turtles stranded on north Texas beaches apparently suggest similar nearshore foraging behavior (Plotkin, pers comm). Over 100 Kemp's ridleys were intentionally live-captured by research gillnets in 1993 at

Sabine Pass by Texas A&M University scientist conducting research for the Corps of Engineers. This illustrates the availability of ridleys to incidental or targeted capture in nearshore north Texas waters.

Ongoing research conducted by NMFS scientists supports the likelihood that the nearshore waters of Texas and Louisiana provide important developmental habitat for young loggerheads and Kemp's ridley sea turtles. Ogren (1988) suggests that the Gulf Coast, from Port Aransas, Texas through Cedar Key, Florida, represents the primary habitat for subadult ridleys in the northern Gulf of Mexico. Preliminary analysis of satellite telemetry data suggests that subadult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida Coast (Renaud, pers comm). Tracked ridleys spent 75 percent of their time in waters less then 5 fathoms deep, and 15 percent in waters between 5 and 10 fathoms.

Satellite transmitters have been applied to approximately 50 adult female Kemp's ridleys over the last decade to identify the movements of the females after leaving the nesting beach in Rancho Nuevo, Mexico (Byles, unpublished data). While most female ridleys head south towards the Bay of Campeche after leaving the beach, 2 out of 8 turtles headed into nearshore Texas waters during one year's study.

Clearly, reproductively active Kemp's ridleys, which are directly required for the recovery of the population, and juveniles are vulnerable to incidental take in Gulf of Mexico shrimp fishery without effective TED use. As a term and condition of the incidental take statement for this biological opinion, NMFS must formulate a research and funding plan to identify high use areas for Kemp's ridleys in the northern Gulf that may require additional management considerations.

d. Results of Necropsies on Stranded Turtles

Seventy-three necropsies have been conducted by NMFS staff on sea turtles stranded on Texas beaches between January 1 and May 31, 1994. Necropsy results did not prove nor foreclose the likelihood that shrimp trawling caused death. Below is a brief summary of necropsy results (Andrea Cannon, NMFS unpublished data):

Sixty-five Kemp's ridleys, four loggerheads, three greens and one leatherback were necropsied. Fifty-three of the Kemp's ridleys had no external injuries. Six ridleys were missing appendages, including at least one shark injury, and one straight edged wound. Six ridleys had propeller cuts. One green turtle also had propeller cuts. There was no way to determine whether these injuries were incurred before or after death.

No material was observed in the gastrointestinal tracts of sixteen ridleys and the leatherback. Two fish hooks were observed in Kemp's ridleys, one of which may have contributed to the mortality. One green turtle contained balloons within its stomach contents. Sand was discovered impacted within the trachea of one ridley. Toxicology tests performed to date have not identified any pathogens. All other turtles examined had food in their digestive tract, indicating they were actively feeding within a few hours prior to death. Eleven ridleys and one loggerhead had been feeding on fish parts, and an additional 20 ridleys and loggerhead had been feeding on both fish and crabs. Fish is not considered to be a normal component of the diet of these benthic foraging species, and is considered to be an indicator of sea turtle foraging on fishery bycatch (Shoop and Ruckdeschel 1982, Plotkin 1993). Turtles may be attracted to areas of heavy shrimp trawling where large amounts of fishery bycatch are thrown overboard. While feeding on dead fish, they may be repeatedly captured by shrimp trawl nets.

e. TED Violations and Enforcement Efforts

Enforcement efforts prior to implementation of the float rule indicated that most shrimpers had TEDs installed in nets. Intensive scrutiny by NMFS gear experts, however, indicated that some of these TEDs were installed improperly in violation of TED requirements. Coast Guard enforcement personnel and NMFS gear specialists collected information during 26 at-sea boardings of shrimp trawlers between May 20, 1994 and June 19, 1994 off Louisiana. Trawlers observed included many of the same vessels that fish off Texas when Texas waters are open to shrimping. No floats were observed on bottom-shooting hard-grid TEDs, which were used on 24 of the vessels boarded. One soft TED and 8 hard TEDs were installed at improper angles.

The float rule was published June 29, 1994, and became effective July 9, 1994, two days after the re-opening of Texas waters to shrimping (July 7, 1994). Fifty-three strandings were reported on offshore Texas beaches during the week following the opening, resulting in an intensive enforcement effort combining NMFS enforcement agents, Coast Guard personnel, NMFS gear specialists and Texas Parks and Wildlife enforcement agents. Warnings about increased enforcement efforts and NMFS policy to include catch seizures for any violation which increased the possibility of a lethal take of sea turtles (eg. vertical angles, no floats) were broadcasted. One hundred and eighty-eight dockside and at-sea boardings were conducted between July 20 and July 26, 1994. A total of 24 violations (13%) were documented, resulting in the issuance of 10 written warnings and 14 referrals to NOAA General Counsel for prosecution. Violations included illegal soft TEDs, TEDs set at steep angles, lack of floats on bottom-grid TEDs, holes in soft TEDs, long flaps over exits, and other gear problems that could result in the incidental capture and

mortality of sea turtles. Additional TED irregularities that did not require enforcement action, and were not likely to lethally take sea turtles, were also observed and corrected. Gear specialists reported that, in 7 days of dockside boardings, approximately 50 percent of the vessels boarded had some type of gear irregularity (Seidel, pers comm). The percentage of violations documented represents the minimum level of violations with the potential to take turtles off Texas prior to intensive enforcement and education efforts in 1994.

Compliance with TED regulations appeared to increase and strandings were reduced immediately following increased enforcement efforts. During the second enforcement operation, between August 8 and August 17, 1994, 272 boardings (97 at sea, and 175 dockside) were conducted. Only 16 violations (6%) were documented, 4 resulting in issuance of written warnings and 12 resulting in referrals to NOAA General Counsel for prosecution. Gear specialists found few TED problems on the vessels that they boarded. Subsequently, strandings in Texas decreased to less than one per day.

Enforcement efforts were relaxed to background levels after August 17, 1994. Between Friday, August 16 and Sunday, August 28, 1994, 17 sea turtle strandings, including at least 7 ridleys, were observed on beaches between Freeport and Sabine, Texas. Five of these turtles had missing limbs, including at least 4 in which human interactions were suspected due to straight-edged wounds. Veterinarian inspection of turtles without limbs for confirmation of human interactions were inconclusive. Nine additional turtles were observed between Freeport and Sabine on Monday, August 29, 1994. NMFS employees observed shrimping effort nearshore of beaches on which strandings were observed during this period.

Increased enforcement appeared to effectively reduce sea turtle mortalities. Violation rates decreased and fishing effort may have been dispersed by enforcement effort. In addition, high stranding rates subsequent to enforcement efforts suggest that some participants in the nearshore component of the shrimp fleet off Texas may modify their fishing practices by altering TEDs or altering fishing areas in response to the level of enforcement presence. Regardless of whether the reduction in mortalities is due to deterrence of violations or dispersal of fishing effort, there is a clear relationship between increased enforcement efforts and reduced sea turtle mortalities.

f. Use of Soft TEDs May Cause Sea Turtle Mortalities

Evidence that the use of soft TEDs may be causing some sea turtle mortalities is accumulating. A study by Georgia Sea Grant and NMFS gear specialists indicates that some soft TEDs (specifically the Morrison) can bag or pouch in the net even when installed in

accordance with current regulations. This bagging or pouching can then result in the entanglement and mortality of turtles. Additionally, enforcement officers cannot always effectively evaluate soft TEDs. They are difficult to observe in the net due to the amount of webbing involved. Tears and holes can easily be overlooked. These problems have been recognized and reported by members of the shrimp industry. As a term and condition of the incidental take statement for this opinion, NMFS must reexamine soft TEDs to determine if they still warrant NMFS certification.

2. Impacts to the Kemp's ridley population

There have been documented takes of green, leatherback and hawksbill sea turtles in shrimp trawlers in the Gulf of Mexico, however, the primary species taken are loggerheads and Kemp's ridleys, due to their benthic feeding habits in areas of high shrimping effort. While shrimping is considered the primary cause of the continued threatened status of the loggerhead population, the industry's immediate potential to jeopardize the continued existence of the severely endangered Kemp's ridley population is of greater concern.

Precise data regarding the total number of Kemp's ridleys in the Gulf of Mexico population in 1994 are not available. Trends in turtle populations are identified through monitoring of their most accessible life stages on the nesting beaches, where hatchling production and the number of nesting females can be directly measured. Most Kemp's ridley nesting occurs in aggregations, called arribadas, on a single beach at Rancho Nuevo, Mexico. Film taken in 1947 documented over 40,000 nesting females in a single day during an arribada at Rancho Nuevo (Carr 1963). Bi-national protection and monitoring by Mexico and the United States has occurred on the nesting beach since 1978. Arribadas of up to 200 females have rarely been observed during that period (FWS and NMFS, 1992). Nest production plummeted to only 702 nests in 1985, but has been steadily increasing since that time (R. Byles 7/94). Over 1500 nests have been observed during the 1994 nesting season, representing the highest nesting year since monitoring was initiated. While these data need to be interpreted cautiously due to expanded monitoring efforts since 1990, up to 110,000 hatchlings may be released from Rancho Nuevo this year, compared to 50,000 to 80,000 over the last 5 - 6 years (Byles, pers comm).
All documented evidence suggests an upward trend in the ridley population. However, the Recovery Plan for the Kemp's ridley sea turtle (Lepidochelys kempii) (FWS and NMFS, 1992) has identified a recovery criteria of 10,000 nesting females in one season as a prerequisite for a determination that Kemp's ridleys can be downlisted to threatened status. Considering 58% of all adult females appear to nest in any one year, and each female lays an estimated 2.7 nests, 1500 nests documented in 1994 represents less then 1000 adult female Kemp's ridleys in the entire

population. This is less then 2.5% of nesting females observed in one day in 1947, and only 10% of the downlisting criterion identified in the Recovery Plan. Continued protection of all life stages of Kemp's ridleys is necessary to increase recruitment to the reproductive population and insure recovery of the species.

Since April, 1994, at least 27 of the stranded Kemp's ridleys observed may have been adults (defined as ridleys with curved carapace length greater than or equal to 60 cm). Sex could only be identified in 11 carcasses. Seven of these were females, including three with tags from Rancho Nuevo indicating they had nested at the main nesting beach. A fourth tagless female was gravid. Determination of the sex of sea turtles often depends upon internal examination of relatively fresh carcasses. Secondary sex characteristics, such as the longer tail in adult males, are only reliable in extreme cases or when verified through an internal examination. The total number of adult females ridleys stranded during 1994 could be anywhere from 7 to 30 turtles, representing up to 3.0 percent of the adult female population. The nesting season ended in August, therefore post-nesting females may be available to interactions with the fishery in the northern Gulf of Mexico.

While there has been some increase in the Kemp's ridley population over the past ten years, population growth at a rate that would solely explain the increase in strandings is not likely. Henwood and Stuntz (1987) suggested that, through 1984, 501 Kemp's ridleys (+/- 501) were killed annually in the Gulf of Mexico shrimp fishery prior to implementation of TED regulations. A reduction in incidental take by up to 97%, anticipated with full compliance with TED regulations, would result in only 15 lethal takes at the 1984 catch rates and population levels. Therefore, 300 ridley strandings (reported in 1994) would represent a twenty-fold increase in the Kemp's ridley population in the Gulf of Mexico if the increase in population alone accounted for the increase in strandings. Biologically, a twenty-fold increase in the size classes observed as strandings is not possible over a ten-year period. This implies that this year's turtle mortalities have far exceeded expectations based on assumptions regarding the use of TEDs and compliance with TED regulations. Furthermore, based on current population estimates, the population likely cannot sustain the current level of mortalities.

E. <u>Conclusion</u>

There is no information to determine precisely why catch rates of sea turtles, especially Kemp's ridleys, appeared to increase in the northern Gulf of Mexico during 1994. Mortalities caused by factors other than shrimp trawling can be attributed to only a small percentage of the total strandings. Intensive enforcement

efforts revealed non-approved TEDs and some non-compliance with TED requirements. Gear problems with legal soft TEDs and the lack of flotation on bottom opening hard-grid TEDs prior to implementation of the float rule, likely resulted in ineffective TED use. These elements, combined with the synchronous occurrence of dense fishing effort and sea turtle abundance in north Texas and Louisiana, likely caused the unprecedented number of Kemp's ridley and loggerhead strandings observed so far in 1994. Enforcement efforts appear to be effective in reducing nearshore mortalities as evidenced by strandings. Furthermore, removal of enforcement resources results in immediate resumption of high sea turtle mortality rates.

Strandings represent the minimum mortality of sea turtles. Therefore over 300 Kemp's ridleys, including adults, have been lost to the ridley population in the first 8 months of 1994 in Texas and Louisiana waters. While numbers of Kemp's ridley nests have slowly increased in recent years, the number of mature females remains below 1000. Although the ridley population has probably increased since nesting beach protection and TED regulations have been implemented, it is not likely that the population can sustain the level of mortality reflected by 1994 Texas and Louisiana strandings. Review of the best available information indicates that intensive nearshore shrimp trawling effort during periods of sea turtle abundance is the cause of the mortality of most of the sea turtles observed on Texas and Louisiana beaches.

Continued long-term operation of the shrimp fishery in the southeastern U.S., resulting in mortalities of Kemp's ridley turtles at levels observed in the Gulf of Mexico in 1994, is likely to jeopardize the continued existence of the Kemp's ridley population. Continued long-term operation of the shrimp fishery, resulting in loggerhead mortalities at levels observed to date are not likely to jeopardize the continued existence of loggerheads, but could prevent the recovery of this species. There is no new information to suggest that hawksbill, leatherback and green sea turtles are adversely affected by the shrimp fishery in any manner not already considered in previous consultations.

In summary, the major apparent cause of the strandings is the incorrect installation and improper use of TEDs by shrimpers in the Gulf of Mexico. Other causes include: 1) certification of TEDs which are ineffective due to their complexity or incompatibility with net types; and 2) intensive "pulse" fishing in areas of high sea turtle abundance during spring and summer 1994. The simultaneous occurrence of intensive pulse fishing and Kemp's ridley turtles may have led to the repeated submergence of individual sea turtles in short time periods, which could have contributed to the high levels of mortalities.

These factors are likely to be repeated in future years without modification to the management of the shrimp fishery. While levels of compliance may fluctuate, nearshore effort is likely to remain high in the future. Therefore, modifications to the management of the shrimp fishery are necessary to enable shrimp trawling to continue without jeopardizing the continued existence of the Kemp's ridley population or preventing the recovery of the loggerhead population. These modifications are specified in the reasonable and prudent alternative. These actions address the major apparent causes of the 1994 strandings.

F. Reinitiation of Consultation

Reinitiation of consultation is required if: (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals effects of this action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. Specifically, new information that may be used as a basis for reinitiation includes stranding data, enforcement reports, necropsies, studies of nearshore shrimping effort, or other new information that may indicate that shrimp fishing affects listed species or critical habitat to an extent or in a manner not previously considered. This includes new information acquired through the implementation of the reasonable and prudent alternative and reasonable and prudent measures.

Reinitiation is required within two years of issuance of this opinion in order to reevaluate the biological opinion and incidental take statement for the shrimp fishery, unless consultation is reinitiated sooner.

REASONABLE AND PRUDENT ALTERNATIVE

The regulations implementing Section 7 of the Endangered Species Act (50 CFR §402.14 (i)(h)(3)) specify that a "'jeopardy' biological opinion shall include reasonable and prudent alternatives, if any." The following reasonable and prudent alternative can be taken to avoid the likelihood of jeopardizing the continued existence of the Kemp's ridley sea turtle. It can be implemented in a manner consistent with the scope of NMFS' legal authority and jurisdiction, and it is economically and technologically feasible. NMFS concludes that by insuring adequate compliance with existing sea turtle conservation measures, continued long-term operation of the shrimp fishery is not likely to jeopardize the continued existence of the Kemp's ridley sea turtle, if the following reasonable and prudent alternative is implemented.

1. The following component of the reasonable and prudent alternative is necessary to ensure that short-term, immediate shrimp fishing operations are not likely to jeopardize the continued existence of Kemp's ridley sea turtles.

NMFS must insure that enforcement efforts, in cooperation with state and federal enforcement agencies, will remain at or near current effort levels, as of October 15, 1994, in the Gulf of Mexico and Atlantic through November 30, 1994.

2. The following components of the reasonable and prudent alternative are necessary to ensure that long-term, continued operation of the shrimp fishery is not likely to jeopardize the continued existence of any species of sea turtle in the future:

A. Improve TED Regulation Compliance

1) Within four months of the date of this opinion, NMFS must formulate an emergency response plan, approved by the Assistant Administrator, to respond to sea turtle stranding events and to insure compliance with sea turtle conservation measures. This plan must include a system to quickly increase enforcement efforts, in cooperation with state and Federal enforcement agencies, in response to:

a) increased strandings in areas of shrimping effort; or

b) reports of increased noncompliance with TED regulations.

In addition, the plan must include criteria that set forth specific guidelines for conservation measures that will be implemented as mortality levels approach the established incidental take levels. The plan must also provide that in the event that sea turtle takings reach or exceed 75% of

either the documented or indicated incidental take level established in the incidental take statement, NMFS must implement immediate conservation measures to reduce the impact of shrimping in affected areas. These measures include, but are not limited to, the implementation of the following: prohibitions on nighttime shrimping, restrictions on the number and size of trawl nets, restrictions on the size of trynets, authorization of only top-shooting, hard-grid TEDs, or area closures. NMFS must ensure that identified conservation measures can be implemented in a timely manner.

2) As part of the implementation of the emergency response plan, within four months of the date of this opinion, NMFS must form a TED enforcement team consisting of at least five enforcement agents specially trained in TED technology. This team will be deployed in response to:

a. reports of increased strandings in areas of shrimping effort;
b. reports of increased noncompliance with TED regulations; or
c. reports of intensive shrimping effort in areas of expected sea turtle abundance.

3) NMFS, in cooperation with the U.S. Coast Guard, must immediately develop and implement a training program designed for Coast Guard boarding parties, including introductory training, refresher and update programs. NMFS must request that the U.S. Coast Guard perform coastal aerial surveys to monitor nearshore shrimping effort.

4) Within one month of the date of this opinion, NMFS domestic TED technology transfer programs must be amplified to allow NMFS gear specialists to provide information to shrimpers and gear manufacturers through additional workshops and dockside TED inspections regarding installation and efficient use of TEDs. This effort should include the development of media aids (brochures, videos) that the shrimpers readily can obtain.

5) Within four months of the date of this opinion, in coordination with the states and fishery management councils, NMFS must propose a system under applicable authority establishing registration requirements for all shrimp trawlers fishing in waters seaward of the COLREGS line. In fulfilling this requirement, NMFS will consider implementing the registration system through existing or alternative state programs. Fishery permitting or registration will improve enforcement by providing a mechanism to sanction shrimpers, including but not limited to egregious or multiple violators, or shrimpers refusing to take observers. Permitting or registration would also allow

fishing authorization to be withheld pending payment of assessed fines. Additionally, the vessel registration data base would provide a mechanism to directly provide shrimpers with information on sea turtle conservation measures.

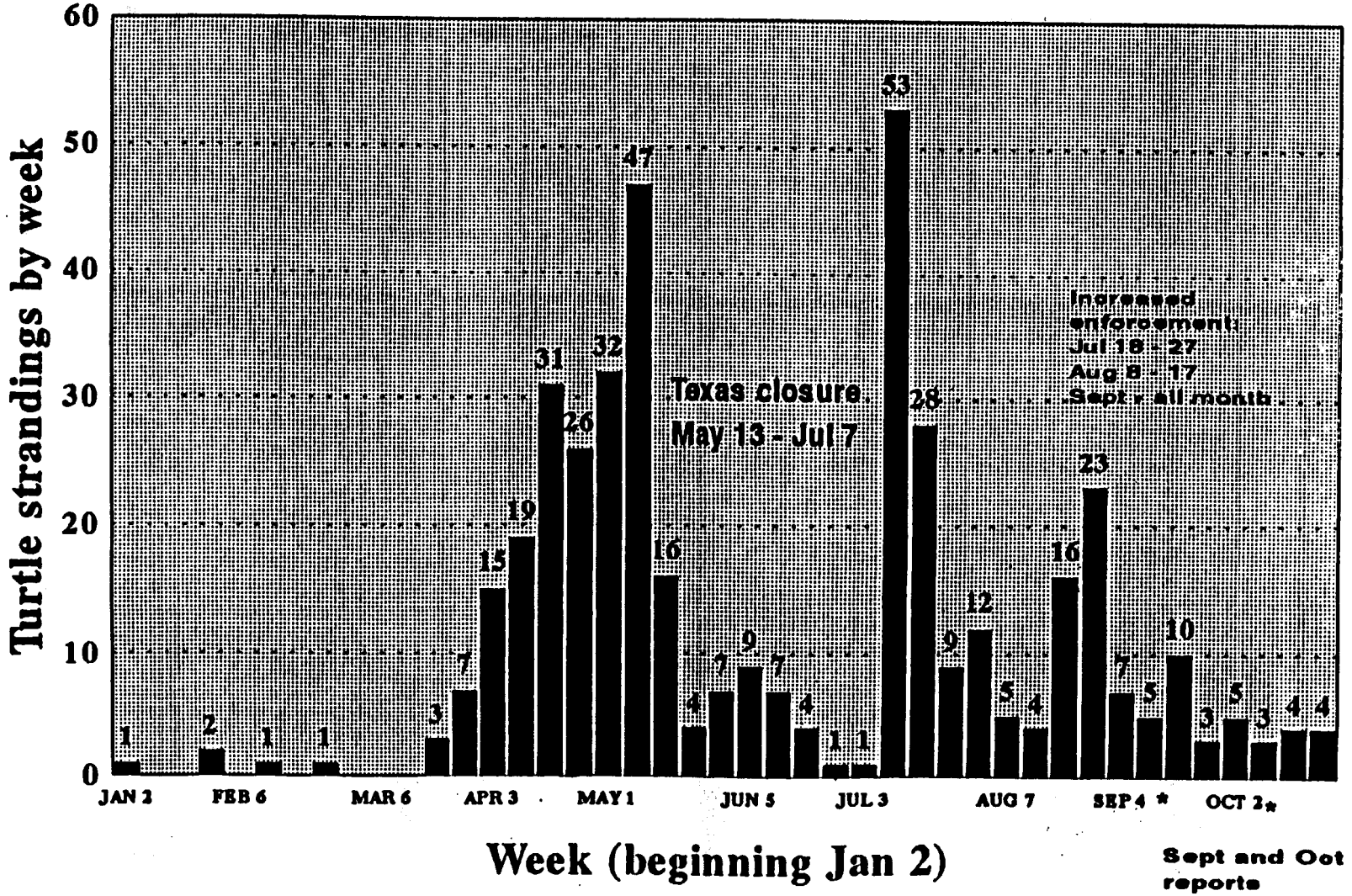
B. Reexamine Certain NMFS-Approved TEDs

Within three months of the date of this opinion, NMFS must reexamine NMFS-approved soft TEDs and bottom-shooting hard TEDs to reconsider whether they effectively reduce the incidental take of sea turtles by shrimp trawlers. As part of this reexamination, recall of soft TEDs or implementation of a program restricting the use of soft TEDs should be considered. Additionally, NMFS should review the TED approval process to insure that approved TEDs can be used effectively by shrimpers. NMFS will make public the results of the reexamination and review.

C. Mitigate Impacts of Intensive Nearshore Shrimping Effort

Within one year of the date of this opinion, NMFS shall identify areas requiring special sea turtle management considerations, due to high sea turtle abundance or important nesting or foraging habitats. NMFS shall propose management measures to mitigate the impacts of intensive nearshore shrimping pulses, and to prevent repeated captures of individual turtles. These measures include, but are not limited to, the following: prohibitions on nighttime shrimping, restrictions on the number and size of trawl nets, restrictions on the size of trynets, authorization of only top-shooting, hard-grid TEDs, reducing the density of shrimp vessels, and/or temporary area closures.

1994 TEXAS SEA TURTLE STRANDINGS
OFFSHORE BEACHES



Sept and Oct reports include inshore

n = 426

Date Travel Status	Sea Days	State Depth	TED/Opening	Turtle Species	Method Captured	Turtle Condition
April 14 - 30, 1992	15	TX/Nearshore	Morrison Soft/Top	Leatherback	Slid Out/TED	Fresh Dead
June 16 - July 7, 1992	10	SC/Nearshore	Morrison Soft/Top	Loggerhead	Try Net	Alive/Conscious
				Loggerhead	Slid Out/TED	Alive/Conscious
July 3 - 16, 1992	14	TX/LA/Nearshore	GA Jumper/Bottom	Loggerhead	Try Net	Alive/Conscious
July 5 - 24, 1992	18	TX/Nearshore	GA Jumper/Bottom	Unknown	Slid Out/TED	Alive/Conscious
July 16 - 24, 1992	5	SC/Nearshore	Morrison Soft/Top	Loggerhead	Try Net	Alive/Conscious
July 22 - August 1, 1992	11	GA/Nearshore	Burbank/Bottom	Loggerhead	Try Net	Alive/Conscious
				Loggerhead	Try Net	Fresh Dead
				Unknown	TED Net	Dead
Sept. 22 - Oct. 2, 1992	9	LA/Nearshore	None	Kemp's Ridley	Main Net	Decomposed
				Kemp's Ridley	Main Net	Fresh Dead
December 2 - 9, 1992	6	MS/Sound	None	Green	Try Net	Alive/Conscious
May 13 - 22, 1993	10	GA/Offshore	GA Jumper/Bottom	Loggerhead	*Try Net	Alive/Conscious
				Loggerhead	*Try Net	Alive/Conscious
				Loggerhead	*Try Net	Alive/Conscious
May 19 - June 15, 1993	27	W. FL/Near&Off	Anthony Weedless/Bottom	Loggerhead	Slid Out/TED	Fresh Dead
				Unknown	Slid Out/TED	Fresh Dead
May 31 - June 9, 1993	10	GA/SC/Nearshore	GA Jumper/Bottom	Loggerhead	Slid Out/TED	Alive/Conscious
				Loggerhead	Try Net	Alive/Conscious
June 22 - June 26, 1993	5	NC/Inshore	Anthony Weedless/Bottom	Loggerhead	TED Net	Alive/Conscious
				Loggerhead	TED Net	Alive/Conscious
July 5 - 9, 1993	5	GA/Offshore	Morrison Soft/Top	Loggerhead	Try Net	Alive/Conscious
				Loggerhead	Try Net	Alive/Conscious
July 21 - Aug. 9, 1993	20	LA/Near/Offshore	Supershooter/Bottom	Leatherback	Slid Out/TED Net	Fresh Dead
July 26 - 29, 1993	4	GA/Nearshore	Supershooter/NG	Loggerhead	Try Net	Alive/Conscious
October 12 - 25, 1993	14	LA/Near/Offshore	Supershooter/Bottom	Leatherback	Slid Out/TED	Alive/Conscious
April 7 - May 7, 1994	31	FL/In/Near/Off	Boston/Bottom	Kemp's Ridley	TED Net	Alive/Conscious
April 28 - May 21, 1994	20	FL/Offshore	Andrews 8"	Loggerhead	Slid Out/TED Net	Alive/Conscious
July 7 - July 22, 1994	16	TX/Offshore	Andrews 8"	Kemp's Ridley	TED Net	Alive/Conscious

NG - Data Not Given
* 22 foot

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Incidental Take Statement

Section 7(b)(4) of the Endangered Species Act (ESA) requires that when a proposed agency action is found to be consistent with action 7(a)(2) of the ESA and the proposed action may incidentally take individuals of listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. It also states that reasonable and prudent measures, and terms and conditions to implement the measures, be provided that are necessary to minimize such impacts. Only incidental taking resulting from the agency action, including incidental takings caused by activities approved by the agency, that are identified in this statement and that comply with the specified reasonable and prudent alternatives, and terms and conditions, are exempt from the takings prohibition of section 9(a), pursuant to section 7(o) of the ESA.

Observers have documented approximately 10,000 hours of trawling per year in the Gulf of Mexico since the observer program was initiated in 1992. Table 1 lists the results of these efforts in both the Atlantic and the Gulf of Mexico. Ten thousand hours represent only about 0.2% of all shrimping effort in the Gulf, and while the observer data provide insights into the fishery, the program cannot be used as the primary tool to monitor the level of incidental takes. Establishment of a statistically valid observer program is prohibitively expensive. Therefore, use of the stranding network for indirect monitoring of the effects of the shrimp fishery is required. Stranding data must be used cautiously due to other potential sources of mortality in coastal waters. For those areas with nearshore closures of the shrimp fishery, strandings during closures may provide background levels regarding local mortality levels in the absence of shrimp trawling.

The incidental take level for the Atlantic and Gulf of Mexico shrimp fishery of a documented lethal or non-lethal take of

four (4) Hawksbill,
four (4) leatherback,
four (4) green,
eight (8) Kemp's ridley, or
twenty (20) loggerhead turtles

is identified pursuant to Section 7(b)(4) of the ESA. This take level represents a total documented annual take for all shrimp trawling in the southeastern United States, based on the estimated number of takings that would be documented under the current level of observer coverage if the shrimp fishery was in full compliance with existing TED regulations. If this incidental take level is met or exceeded, NMFS must reinitiate consultation.

Further, an indicated take level is established. Because unusually high strandings during periods of intensive shrimping activities may indicate turtle mortality in the shrimp fishery, NMFS will use stranding data as an indicator of take levels. If during periods in which intensive shrimping effort occurs there are no significant or intervening natural or human sources of mortality other than shrimping conclusively identified as the cause of strandings, then strandings will be considered an indicator of lethal takes in the shrimp fishery if:

1) in areas of shrimping effort, weekly strandings in any NMFS statistical zone reach twice the previous three-year weekly average (taking into consideration anomalous years) for that zone; or

2) in areas of shrimping effort, weekly strandings in any NMFS statistical zone reach twice the highest weekly level during a shrimp fishery closure period (after the first seven days of closure) within the same season in that zone.

The terms and conditions and reasonable and prudent measures established in the incidental take statement accompanying the August 19, 1992 biological opinion on the shrimp fishery remain valid and are incorporated by reference into this incidental take statement.

In addition, the following reasonable and prudent measures are required:

A. If stranding levels indicate that either the documented or indicated incidental take level is being approached, then NMFS shall take the emergency actions identified in the emergency response plan required in the reasonable and prudent alternative of this biological opinion.

B. NMFS shall ensure that sea turtle incidental take levels and shrimp fishery effort levels are effectively monitored and accurately estimated. In order to implement this measure, the following terms and conditions are required:

1. Within thirty days of the date of this opinion, NMFS must identify areas within the Sea Turtle Stranding and Salvage Network (STSSN) to determine where increased effort is needed to adequately monitor sea turtle strandings. Accordingly, within four months of the date of this opinion, NMFS must ensure that intensive stranding monitoring be established in states with low stranding coverage such as Louisiana, Alabama and Mississippi. Increased sea turtle stranding reporting is necessary to identify trends in incidental takes during nearshore shrimping.

2. Within three months of the date of this opinion, NMFS must determine the previous three-year weekly averages of sea turtle strandings (taking into consideration anomalous years), by NMFS statistical zone, as identified in the indicated take level above. State coordinators must be advised of these threshold numbers, and must be requested by NMFS to provide timely notification if stranding rates exceed identified thresholds. In addition, NMFS should enter into a Memorandum of Understanding with the U.S. Fish and Wildlife Service to promote better beach monitoring for stranding reporting.

3. NMFS must continue to improve observer coverage in the shrimp fishery in both the Atlantic and Gulf of Mexico in order to better document the level of incidental take. In improving observer coverage, NMFS shall seek to achieve a level of 1% observer coverage on shrimp fishery vessels operating seaward of the COLREGS line, within two years of the date of this opinion. The documented take level may be revised accordingly.

4. Within three months of the date of this opinion, NMFS must select a team of population biologists, sea turtle scientists, and life history specialists to compile and examine information on the status of sea turtle species. The team should attempt to identify (a) the maximum number of individual sea turtles of each species that can be taken incidentally to commercial fishing activities without preventing the recovery of the species, (b) the maximum number of individuals that can be taken incidentally to commercial fishing activities without jeopardizing the continued existence of any listed sea turtle species, and (c) the number of stranded sea turtles occurring in each statistical zone that indicate incidental takes are occurring at levels beyond those authorized.

5. As part of ongoing and future research efforts, NMFS must evaluate other human-caused sources of sea turtle mortality, and identify measures to reduce those sources of mortality.

C. NMFS shall reinitiate consultation on this action within two years of the date of this opinion in order to reevaluate the biological opinion and incidental take statement for the shrimp fishery, unless consultation is reinitiated sooner.

Appendix G. Coastal Zone Consistency Letters.

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

ONE SOUTHPARK CIRCLE, SUITE 306
CHARLESTON, SOUTH CAROLINA 29407-4699
TEL 803/571-4366 FAX 803/769-4520

John D. Brownlee, Chairman
David M. Cupka, Vice-Chairman

Robert K. Mahood, Executive Director

September 14, 1994

Mr. Estus Whitfield
Executive Office of the Governor
The Capitol
Room 1501
Tallahassee, Florida 32399-0001

Dear Mr. Whitfield:

This is to advise the State of Florida of proposed federal action and the conclusion of the South Atlantic Council on the consistency of such action with the provisions of Florida's Coastal Management Program. This letter is submitted pursuant to provisions of 15 CFR §930 *et seq.* and §307 of the Coastal Zone Management Act of 1972, as amended.

The proposed federal action is to manage the rock shrimp fishery in the Cape Canaveral, Florida area through Amendment #1 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region. A copy of the amendment containing the proposed management actions is enclosed.

We have reviewed the proposed action with regard to the provisions of your State's Coastal Management Program and have concluded that it is consistent to the maximum extent practicable with the provisions thereof. In accordance with the provisions of 15 CFR §930.41 we are requesting that you advise us of your agreement or disagreement with our determination. In the event that there is no response from your agency within 45 days of receipt of this letter, we will presume your agency's concurrence with our determination of consistency.

If you have any questions, please do not hesitate to call me or Roger Pugliese at (803) 571-4366.

Sincerely,

Robert K. Mahood
Executive Director

RKM:rp

Enclosures

cc: Mr. Ralph Cantral, Director w/cpy encl.
DCA/FCMP
SAFMC Council Members

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

ONE SOUTHPARK CIRCLE, SUITE 306
CHARLESTON, SOUTH CAROLINA 29407-4699
TEL 803/571-4366 FAX 803/769-4520

John D. Brownlee, Chairman
David M. Cupka, Vice-Chairman

Robert K. Mahood, Executive Director

September14, 1994

Dr. H. Wayne Beam, Executive Director
South Carolina Coastal Council
AT&T Capitol Center
1201 Main Street, Suite 1520
Columbia, SC 29201

Dear Dr. Beam:

This is to advise the State of South Carolina of proposed federal action and the conclusion of the South Atlantic Council on the consistency of such action with the provisions of South Carolina's Coastal Management Program. This letter is submitted pursuant to provisions of 15 CFR §930 *et seq.* and §307 of the Coastal Zone Management Act of 1972, as amended.

The proposed federal action is to manage the rock shrimp fishery in the Cape Canaveral, Florida area through Amendment #1 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region. A copy of the amendment containing the proposed management actions is enclosed.

We have reviewed the proposed action with regard to the provisions of your State's Coastal Management Program and have concluded that it is consistent to the maximum extent practicable with the provisions thereof. In accordance with the provisions of 15 CFR §930.41 we are requesting that you advise us of your agreement or disagreement with our determination. In the event that there is no response from your agency within 45 days of receipt of this letter, we will presume your agency's concurrence with our determination of consistency.

If you have any questions, please do not hesitate to call me or Roger Pugliese at (803) 571-4366.

Sincerely,

Robert K. Mahood
Executive Director

RKM:rp

Enclosures

cc: Mr. Heyward Robinson, Staff Biologist w/copy encl.
Mr. Steve Snyder, Chief Planner w/copy encl.
South Carolina Coastal Council
4130 Faber Place North, Suite 300
N. Charleston, SC 29405
SAFMC Council Members

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

ONE SOUTHPARK CIRCLE, SUITE 306
CHARLESTON, SOUTH CAROLINA 29407-4699
TEL 803/571-4366 FAX 803/769-4520

John D. Brownlee, Chairman
David M. Cupka, Vice-Chairman

Robert K. Mahood, Executive Director

September 14, 1994

Mr. William W. Cobey, Jr., Secretary
N.C. Department of Environment, Health & Natural Resources
P.O. Box 27687
Raleigh, North Carolina 27611-7687

Dear Mr. Cobey:

This is to advise the State of North Carolina of proposed federal action and the conclusion of the South Atlantic Council on the consistency of such action with the provisions of North Carolina's Coastal Management Program. This letter is submitted pursuant to provisions of 15 CFR §930 *et seq.* and §307 of the Coastal Zone Management Act of 1972, as amended.

The proposed federal action is to manage the rock shrimp fishery in the Cape Canaveral, Florida area through Amendment #1 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region. A copy of the amendment containing the proposed management actions is enclosed.

We have reviewed the proposed action with regard to the provisions of your State's Coastal Management Program and have concluded that it is consistent to the maximum extent practicable with the provisions thereof. In accordance with the provisions of 15 CFR §930.41 we are requesting that you advise us of your agreement or disagreement with our determination. In the event that there is no response from your agency within 45 days of receipt of this letter, we will presume your agency's concurrence with our determination of consistency.

If you have any questions, please do not hesitate to call me or Roger Pugliese at (803) 571-4366.

Sincerely,

Robert K. Mahood

Robert K. Mahood
Executive Director

RKM:rp

Enclosures

cc: Mr. Roger N. Schecter, Director w/copy encl.
Division of Coastal Management
SAFMC Council Members

Department of Environmental Protection

Lawton Chiles
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Virginia B. Wetherell
Secretary

November 30, 1994

RECEIVED
DEC 1 1994
Florida Coastal
Management Program

Suzanne Traub-Metlay
State Clearinghouse
Office of Planning and Budgeting
Executive Office of the Governor
The Capitol
Tallahassee, FL 32399-0001

RE: NMFS/Public Hearing Draft Amendment 1 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region (Rock Shrimp)
SAI: FL9410241069C

Dear Ms. Traub-Metlay:

The Department has reviewed the above-referenced Fishery Management Plan (FMP) and based on the information provided, we find the proposed management actions consistent with our authorities in the Florida Coastal Management Program.

Staff of the Department's Florida Marine Research Institute (FMRI) have reviewed the amendment and provided comments per the attached memorandum. The reviewer suggests that the impacts of implementing Action 2 should be given further consideration and, in regards to Action 3, additional studies should be conducted regarding mesh size selectivity and bycatch reduction. Questions concerning these comments should be directed to Phil Steele, FMRI, at (813) 896-8628 or suncom 523-1011.

If I can be of further assistance, please feel free to contact me at 487-2231.

Sincerely,

Carliane D. Johnson
Environmental Specialist
Office of Intergovernmental Programs

/cdj
Attachment
cc: Ed Irby, Marine Resources
Phil Steele, FMRI

STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS

2740 CENTERVIEW DRIVE • TALLAHASSEE, FLORIDA 32399-2100

LAWTON CHILES
Governor

LINDA LOOMIS SHELLEY
Secretary

December 13, 1994

Mr. Robert Mahood
Executive Director
South Atlantic Fishery Management Council
One Southpark Circle, Suite 306
Charleston, South Carolina 29407-4699

RE: Regional Fishery Management Councils - Public Hearing Draft, Including Draft Supplementary Environmental Impact Statement and Regulatory Impact Review - Amendment Number One to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region (Rock Shrimp) - Florida
SAI: FL9410241069C

Dear Mr. Mahood:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Governor's Executive Order 93-194, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced project.

The Department of Environmental Protection's (DEP) Florida Marine Research Institute has provided comments regarding proposed Actions Two and Three for the above-referenced project. Please refer to the enclosed DEP comments.

Based on the enclosed comments provided by our reviewing agencies, the state has determined that the above-referenced project is consistent with the Florida Coastal Management Program.

Very truly yours,

Linda Loomis Shelley

Linda Loomis Shelley
Secretary

LLS/rk
Enclosures
cc: Carliane Johnson, Department of Environmental Protection

Florida Department of

Environmental Protection

Memorandum

To: George Henderson
Senior Research Scientist

From: Phil Steele
Associate Research Scientist

Subject: SAI #194-1069C - Rock Shrimp FMP

Date: November 14, 1994

I have reviewed the SAI for the South Atlantic Region Rock Shrimp FMP. In general, the Biological Impact Statement for each of the proposed Actions is adequate in supporting the Councils acceptance or rejection of the Action. I have included a few comments on some of the options for each Action for the Council's consideration.

ACTION 2. Limit harvest area to Duval (Jacksonville) through St. Lucie (Stuart) Counties Florida

The Council selected this option because it encompasses the majority of the harvest and landing areas for the Cape Canaveral rock shrimp fishery. Other options considered by the Council included those that would impose depth or area restrictions or allow trawling in these restricted areas only with the use of onboard transponders (to identify trawling activities in Habitat Areas of Particular Concern). These options, rejected by the Council, provide for protection of critical habitat such as the Oculina Bank HAPC and juvenile rock shrimp on their nursery grounds and should be given further consideration. Even though the economic benefit of capturing small rock shrimp during certain times of the year is substantial, the lack of information regarding a parent-progeny relationship and the possible biological and economic effects of growth and recruitment overfishing must be considered. Also, the impact on the benthic habitat by sustained trawling in those allowable fishing areas is unknown and may have a detrimental effect on future shrimp harvesting. Inadvertent damage to the Oculina Bank HAPC by shrimpers operating in or nearby this area must also be considered.

ACTION 3. Implement a minimum mesh size (1 7/8", 2", 2 1/4") for the rock shrimp fishery prosecuted off Cape Canaveral, Florida (Duval through St. Lucie Counties).

Mesh size selectivity studies are definitely needed to determine optimum size for release of juvenile shrimp. Bycatch characterization studies by season, area, and mesh size, as well as possible characterization studies of bycatch reduction devices, should also be conducted. Will the rock shrimp fishery be included in any bycatch reduction programs in the forthcoming Magnuson Act?

COUNTY: STATE

COMMENT DUE DATE: 11/08/94

SAI#: FL9410241069C

STATE AGENCIES		LOCAL/OTHER		OPB POLICY UNITS	
___	Agriculture	___	NWFWMD	___	Public Safety
___	Board of Regents	___	SFWMD	___	Education
___	Commerce	___	SWFWMD	_X_	Environment/C & ED
_X_	Community Affairs	___	SJRWMD	___	General Government
___	Education	___	SRWMD	___	Health & Human Srv
_X_	Environmental Protection	___		___	Revenue & Eco. Ans
___	Game & Fish Comm	___		___	SCH
___	Health & Rehab Srv			_X_	SCH/CON
___	Highway Safety				
___	Labor & Employmnt				
___	Law Enforcement				
_X_	Marine Fish Comm				
___	State Library				
___	State				
___	Transportation				
___	Trans Disad. Comm				
___	DEP District				
___					
___					

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Florida Coastal Management Program

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

___ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

_X_ Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

___ Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

___ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

FOR CONSISTENCY PROJECTS, SEE REVERSE SIDE FOR INSTRUCTIONS.

To: State Clearinghouse
Executive Office of the Governor -OPB
Room 1603, The Capitol
Tallahassee, FL. 32399-0001
(904) 488-8114 (SC 278-8114)

Florida Coastal Management Director
Department of Community Affairs
Suite 305, Rhyne Building
Tallahassee, FL. 32399-2100
(904) 922-5438 (SC 292-5438)

EO. 12372/NEPA

☐ No Comment
☐ Comments Attached
☐ Not Applicable

Federal Consistency

☑ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:
Division/Bureau: Marine Fisheries Comm
Reviewer: Roy Williams
Date: 10-31-94

Appendix H. Federal Register Notice- Control Date- Cape Canaveral Rock Shrimp Fishery

National Oceanic and Atmospheric Administration

[Docket No. 940390–4090 I.D. 030794B]

Shrimp Fishery Off the Southern Atlantic States

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of control date for entry into the rock shrimp component of the shrimp fishery off the southern Atlantic states.

SUMMARY: NMFS announces a control date of April 4, 1994, for the commercial fishery for rock shrimp in the exclusive economic zone (EEZ) off Florida from Duval through St. Lucie counties. Anyone entering the fishery after April 4, 1994, may not be assured of future participation in the fishery if a management regime is developed and implemented that limits the number of participants in the fishery. This notice is intended to discourage new entries into the fishery based on economic speculation while the South Atlantic Fishery Management Council (Council) considers whether and how participation or effort in the rock shrimp fishery off the Florida counties should be controlled.

FOR FURTHER INFORMATION CONTACT: Peter Eldridge, 813–893–3161.

SUPPLEMENTARY INFORMATION: The Council prepared a Fishery Management Plan for the Shrimp Fishery off the South Atlantic Region (FMP), which is implemented through regulations at 50 CFR part 659 under the authority of the Magnuson Fishery Conservation and Management Act (Magnuson Act). The FMP contains management measures applying to brown, pink, and white shrimp which are caught in the shrimp fishery off the southern Atlantic states. The shrimp fishery also includes royal red and rock shrimp. There currently are no regulations for rock shrimp and the Council is considering management measures for this component of the shrimp fishery. If the Council determines that management is necessary, an amendment to the FMP will be developed pursuant to the requirements of the Magnuson Act and other applicable law.

The rock shrimp fishery is prosecuted mainly in the EEZ off Florida from Duval through St. Lucie counties. Florida produces over 85 percent of U.S. landings of rock shrimp. Rock shrimp landings have varied from 1.8 to 5.4 million pounds (816.5 to 2,449.4 metric tons) in the past decade. The introduction of peeling machines resulted in the capture of much smaller shrimp and greatly increased landings in 1989 and 1990. However, in 1991, landings decreased about two-thirds from the level experienced in 1989 and 1990 even though fishing effort remained at a high level. The rapid decrease in landings raised concern by industry that overfishing may be occurring. There is also concern about the small size of shrimp that have been taken.

In February 1994, the Council held a scoping meeting to solicit input from the industry and public on the management of rock shrimp. Based on the results of that meeting, the Council began development of options for management of the rock shrimp fishery. The Council will consider a range of options including area restrictions, seasons, mesh sizes, count limits, and limited entry.

In establishing a control date, the Council intends to discourage speculative entry into the rock shrimp fishery while it discusses possible management regimes. As the Council considers a limited entry or access-controlled management regime, among other options, some fishermen who do not currently harvest rock shrimp, and never have done so, may decide to enter the fishery for the sole purpose of establishing a record of making commercial landings of rock shrimp. In the absence of a control date, such a record generally may be considered indicative of economic dependence on the fishery. On this basis, the fishermen may successfully lay claim to access to a fishery that is otherwise limited to traditional participants. When management authorities begin to consider use of a limited access management regime, this speculative entry often is responsible for a rapid increase in fishing effort in fisheries that are already fully or over-developed. The original problems become exacerbated by those who seek possible windfall gain from the solutions being discussed.

Establishment of a control date does not commit the Council or NMFS to any particular management regime or criterion for entry into the rock shrimp fishery. Fishermen are not guaranteed future participation in the rock shrimp fishery regardless of their date of entry or intensity of participation in the fishery before or after the control date. The Council may subsequently choose a different control date, or it may choose a management regime that does not make use of such a date. The Council may choose to give variably weighted consideration to fishermen in the fishery before and after the control date. Other qualifying criteria, such as documentation of commercial landings and sales, may be applied for entry. The Council may choose also to take no further action to control entry or access to the fishery.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: March 30, 1994.

Charles Karnella,

Acting Program Management Officer, National Marine Fisheries Service.

[FR Doc. 94–8005 Filed 4–1–94; 8:45 am]

BILLING CODE 3510–22–P

Appendix I. Species list and frequency of capture of bycatch associated with research trawls catching harvestable levels of rock shrimp (Source: Compiled from data summary supplied by NMFS SEFSC Pascagoula laboratory November 1994).

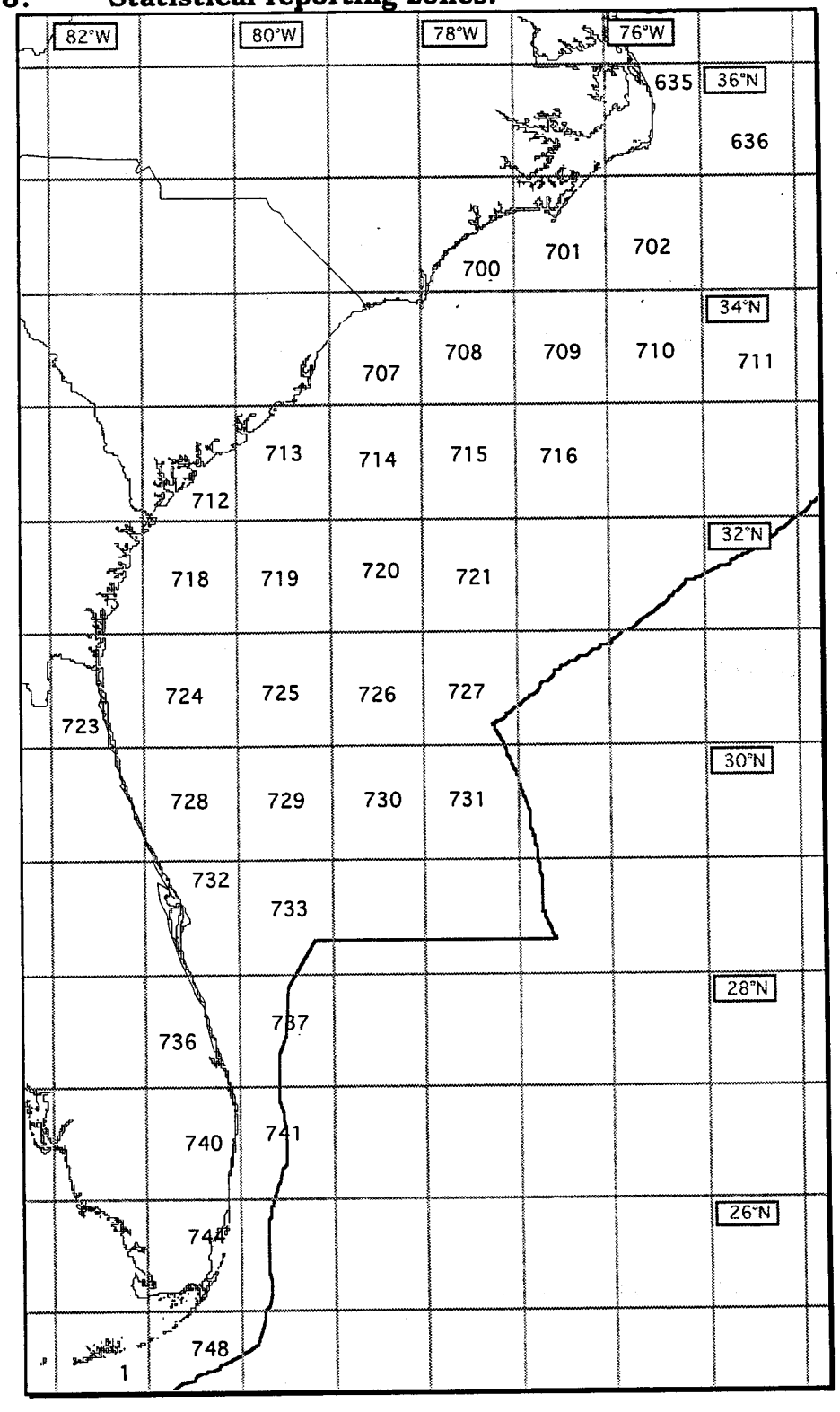
(Stations catching at least 20 pounds rock shrimp per hour)
(Total Stations = 57) (Reports for species caught in two or more stations)

NMFS Biocode	Freq	%Freq	Number	Weight	Av.Wt.
228011901	57	100.0	56796	33810	0.6
132010302	47	82.5	1825	7620	4.2
229080100	45	78.9	2261	13570	6.0
170024805	44	77.2	2516	6610	2.6
195050200	39	68.2	803	1170	1.5
330231102	36	63.2	3452	8380	2.4
228010703	34	59.6	1308	1590	1.2
170400000	34	59.6	1344	2680	2.0
183050700	32	56.1	2854	2140	0.7
228010701	30	52.6	1976	1600	0.8
225010103	30	52.6	681	680	1.0
170201902	29	50.9	2469	12940	5.2
189040204	28	49.1	3967	4940	1.2
170024806	28	49.1	686	1010	1.5
170570518	26	45.6	241	210	0.9
170570800	24	42.1	513	190	0.4
170201701	24	42.1	3437	17970	5.2
183011003	23	40.4	715	1550	2.2
183012203	22	38.6	286	570	2.0
229110809	22	38.6	1104	980	0.9
183040802	21	36.8	151	100	0.7
143060200	21	36.8	53	60	1.1
170560700	20	35.1	83	50	0.6
229110803	20	35.1	1309	870	0.7
229260100	19	33.3	141	290	2.1
347020200	19	33.3	196	120	0.6
170024804	18	31.6	278	410	1.5
229260201	18	31.6	125	250	2.0
183012403	17	29.8	67	650	9.7
148010105	17	29.8	930	740	0.8
229110602	16	28.1	826	520	0.6
229050000	15	26.3	154	60	0.4
170570503	15	26.3	132	130	1.0
183011000	14	24.6	444	590	1.3
170340501	14	24.6	24	10	0.4
170211601	14	24.6	562	840	1.5
170220203	14	24.6	164	170	1.0
229260102	14	24.6	47	100	2.1
170570525	13	22.8	124	120	1.0
110040205	13	22.8	39	230	5.9
183010605	12	21.1	310	120	0.4

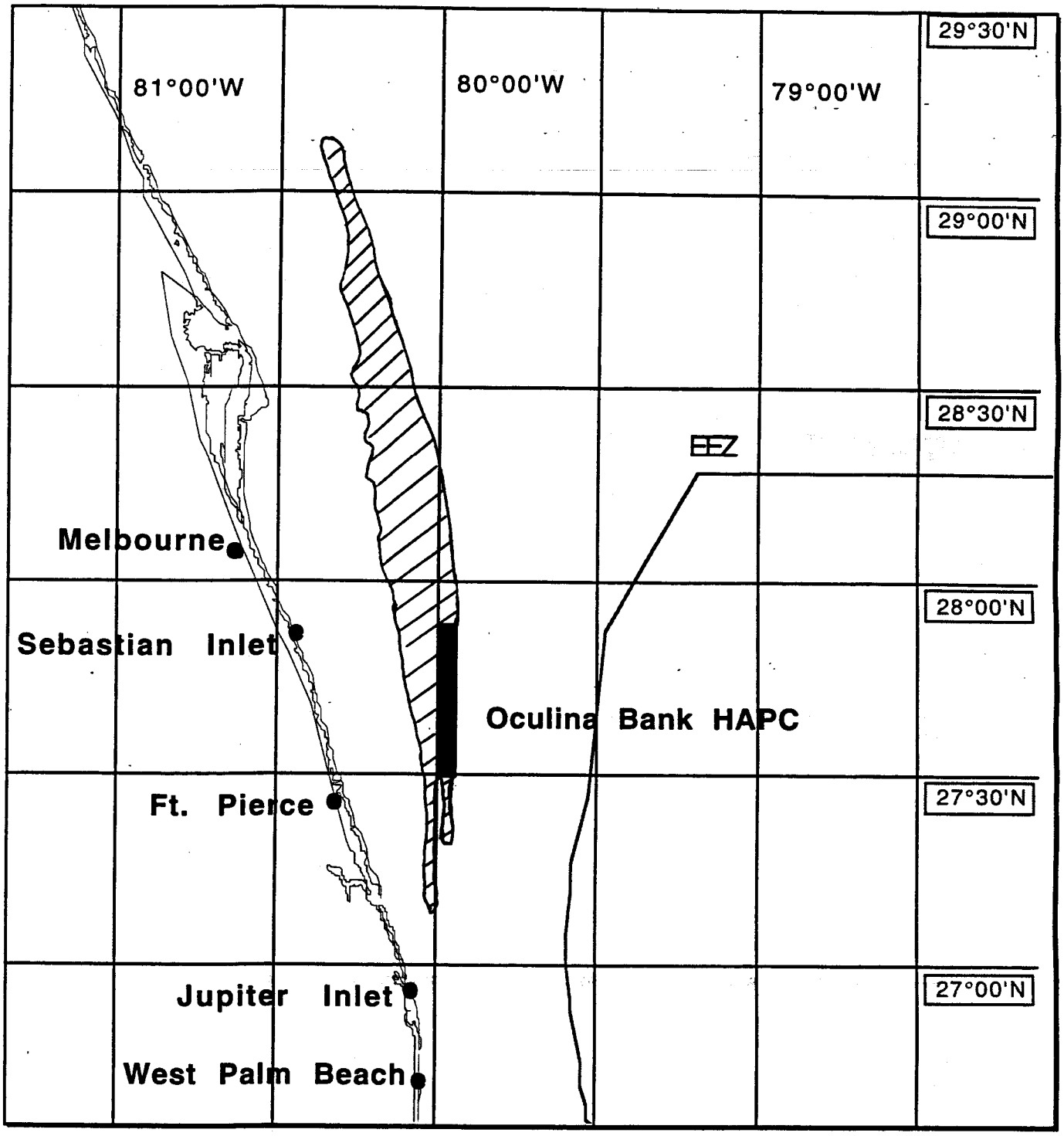
NMFS Biocode	Freq	%Freq	Number	Weight	Av.Wt.
183010403	12	21.1	36	210	5.8
170400303	12	21.1	164	580	3.5
170560703	11	19.3	42	70	1.7
170560704	11	19.3	151	160	1.1
183012105	11	19.3	57	260	4.6
183050702	11	19.3	95	50	0.5
170020903	10	17.5	66	460	7.0
183040800	9	15.8	77	50	0.6
193010801	9	15.8	25	20	0.8
229110000	8	14.0	761	360	0.5
183010606	8	14	161	129	0.7
132010101	8	14	62	120	1.9
170111202	8	14	101	100	1.0
613000000	8	14	0	2150	1.0
308100201	8	14	10	470	47.0
170201604	7	12.3	56	230	4.1
183010304	7	12.3	72	190	2.6
170570500	7	12.3	64	110	1.7
170511104	7	12.3	27	10	0.4
183012404	6	10.5	24	100	4.2
195050203	6	10.5	67	40	0.6
189080600	5	8.8	21	30	1.4
229110800	5	8.8	177	900	5.1
183040803	5	8.8	35	30	0.9
183012200	5	8.8	71	40.0	0.6
170570803	5	8.8	15	-	-
17091003	5	8.8	153	170	1.1
132010300	5	8.8	15	-	-
143060205	5	8.8	67	170	2.5
350020100	5	8.8	8	10	1.3
691000000	4	7.0	608	500	0.8
619000000	4	7.0	7	-	-
170024208	4	7.0	15	10	0.7
170152001	4	7.0	3	30	10
170201806	4	7.0	0	1600	10
170151107	4	7.0	4	300	75
183010300	4	7.0	63	40	0.6
183010600	4	7.0	147	120	0.8
170511101	4	7.0	18	20	1.1
229110810	4	7.0	123	100	0.8
189030502	4	7.0	4	-	-
225010100	4	7.0	23	10	0.4
195050401	3	5.3	40	30	0.8
195050400	3	5.3	16	-	-
189070102	3	5.3	7	-	-
229260000	3	5.3	19	40	2.1
229110203	3	5.3	22	30	1.4
229110201	3	5.3	4	-	-
170220605	3	5.3	3	-	-
170213404	3	5.3	16	10	0.6

NMFS Biocode	Freq	%Freq	Number	Weight	Av.Wt.
170210660	3	5.3	7	50	7.1
170570505	3	5.3	5	-	-
170570514	3	5.3	-	-	-
170110800	3	5.3	4	20	5.0
170080101	3	5.3	8	10	1.3
170201801	3	5.3	1	-	-
170200907	3	5.3	25	280	11.6
170020900	3	5.3	2	-	-
148010100	3	5.3	4	-	-
694000000	3	5.3	29	120	4.1
121052004	2	3.5	0	60	4.1
689000000	2	3.5	310	350	1.1
308070100	2	3.5	2	-	-
308010528	2	3.5	16	160	10
143150402	2	3.5	3	-	-
143150400	2	3.5	3	-	-
141020101	2	3.5	4	-	-
165030102	2	3.5	17	90	5.3
151061500	2	3.5	2	-	-
151060600	2	3.5	3	-	-
170201100	2	3.5	95	220	2.3
170200903	2	3.5	6	160	26.7
170113802	2	3.5	0	-	26.7
170111201	2	3.5	6	-	-
170570512	2	3.5	3	-	-
183050707	2	3.5	8	-	-
183040000	2	3.5	7	-	-
170282901	2	3.5	22	20	0.9
229110101	2	3.5	29	70	2.4
229110600	2	3.5	21	30	1.4
229010300	2	3.5	2	20	10
307800201	2	3.5	2	-	-
307780400	2	3.5	2	-	-
189070200	2	3.5	4	10	2.5
189090203	2	3.5	4	10	2.5
228010705	2	3.5	7	-	-
228011800	2	3.5	27	-	-

Appendix J. Statistical reporting zones.



Appendix K. Rock shrimp harvest area (Source: Adapted from map provided by rock shrimp industry Feb. 1995).



Appendix L. Rock Shrimp Ad Hoc Advisory Panel recommendations.

ROCK SHRIMP AD HOC ADVISORY PANEL RECOMMENDATIONS AMENDMENT 1 (ROCK SHRIMP)TO THE FISHERY MANAGEMENT PLAN FOR THE SHRIMP FISHERY OF THE SOUTH ATLANTIC REGION

(JUNE 1995)

AREA CLOSURES

The Ad Hoc Rock Shrimp Advisory Panel prefers to have no area closures in the rock shrimp fishery. However, if the council determines that area closures are the only way to effectively address the council's concern for the hard bottom and *Oculina* coral habitat, the least objectionable alternative is presented below. This proposal is viewed by the panel as a good faith gesture and is a considerable sacrifice for this industry. Although harvesters can shift effort within this fishery, it should be understood that the areas proposed for closure encompass some of the best rock shrimping grounds in recent years and represents 25% of the 1994 harvest based on information provided by the rock shrimp industry.

The advisory panel wishes to stress the need for the council to implement this option not only for the rock shrimp industry, but for other fisheries as soon as possible in the future. If the council wishes to protect this habitat, the rock shrimp fishery should not be singled out and impacts from other fisheries should also be eliminated. The panel therefore, feels that the council should prohibit all trawling as well as any other fishing practices that impact habitat in this area. The option was also selected because it minimizes the impact of the regulations on the hopper, royal red shrimp, and calico scallop fisheries.

AD HOC ADVISORY PANEL PROPOSED ACTION 2. PROHIBIT TRAWLING FOR ROCK SHRIMP EAST OF 80° W. LONGITUDE BETWEEN 27° 30' N. LATITUDE AND 28° 30' N. LATITUDE IN DEPTHS LESS THAN 100 FATHOMS.

The rock shrimp advisory panel is proposing this option as the least objectionable option for area closures that would minimize the impact of the rock shrimp fishery on the bottom habitat.

IMPACTS

This option will specifically protect *Oculina* coral and the pinnacle structures found in the Oculina Bank from 28° 30' N. latitude south to 27° 30' N. latitude while minimizing the impact of regulations on the industry. Prohibiting trawling for rock shrimp in the designated area effectively eliminates the total harvest from the area east of 80° W. longitude between 28° 30' N. latitude and 27° 30' N. latitude (Figure 1). Establishment of the 100 fathom depth contour as the eastern boundary of the closed area, will allow regulations to be written to prohibit ALL trawling in this area. This allows the fishery for royal red

shrimp, prosecuted seaward of this depth, to continue, and also addresses the calico scallop fishery which occurs shoreward of the proposed closed area (Figure 2).

Data on the location of rock shrimp harvest areas for 1994 was supplied by industry during the public hearing process. When applied to the updated official 1994 commercial landings of rock shrimp (Table 1), approximately 25% (1.7 million pounds) of the total harvest of rock shrimp from the south Atlantic during the 1994 season came from the area indicated in the Ad Hoc Rock Shrimp Advisory Panels' proposed action 2. Given the total exvessel revenue value of rock shrimp for 1994, the trawl prohibition would result in an annual reduction in total exvessel revenue of $2.1 million. However, it should be noted that trawling for rock shrimp extended to this area only in recent years. The traditional areas for rock shrimp trawling are west of 80° W. longitude. If this prohibition is implemented, there is likely to be an effort shift west of 80° W. longitude since it is believed that the juvenile rock shrimp move westward up and onto the shelf as they grow. Thus, the reduction in harvest could be minimized if effort is shifted. One consequence of this effort shift may be overcrowding during the peak season. It is likely that the harvest of large size class rock shrimp west of 80° W. longitude could result in higher exvessel prices.

Only the impact of the rock shrimp fishery on essential bottom habitat can be minimized through implementation of this closed area under this amendment. Approximately 90% of the *Oculina* coral and the Oculina bank structure between 29° N'. latitude and 27° N. latitude would be protected from rock shrimp fishery under the proposed closed area.

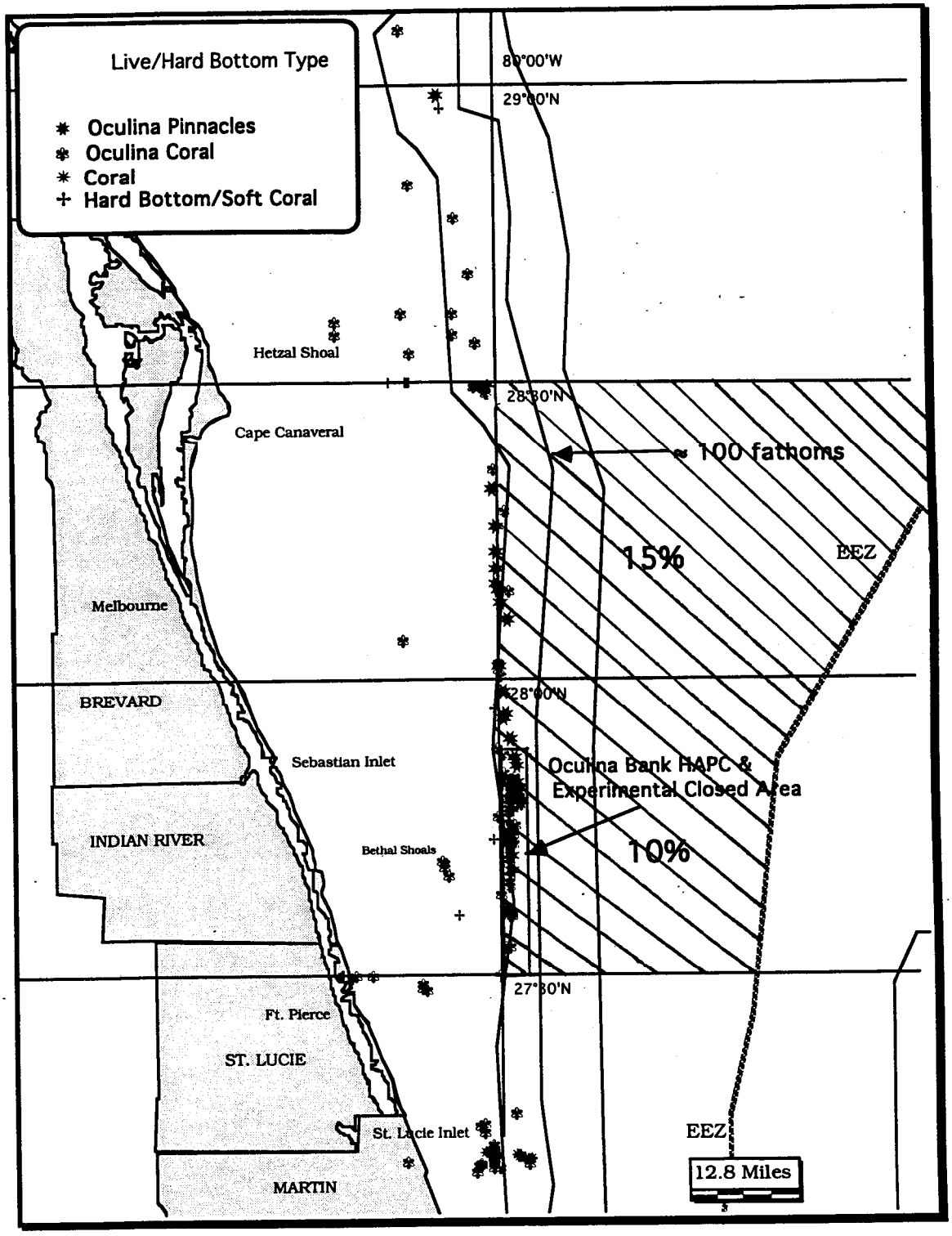


Figure 1. Map identifying bottom habitat distribution associated with the rock shrimp fishery in the EEZ off Florida, the effective closed area in the advisory panel option proposed to protect bottom habitat, and percent of 1994 rock shrimp harvest associated with the proposed closed area (Source: SAFMC).

Table 1. Annual rock shrimp landings (heads on) for Florida east coast (Source: Florida, Georgia, South Carolina, and North Carolina State Commercial Data Reports, 1995).

Year	Weight (lb- head on)*	Value ($)*
1986	2,514,895	2,225,319
1987	3,223,692	2,869,086
1988	1,933,097	1,716,405
1989	3,964,942	3,499,260
1990	3,507,955	3,115,050
1991	1,330,919	1,184,325
1992	2,572,727	2,250,169
1993	5,297,197	4,680,916
1994	6,714,761	6,037,093

*1993 & 1994 are preliminary and unedited data

ROCK SHRIMP ADVISORY PANEL RECOMMENDATIONS ON OTHER ACTIONS:

ACTION 5. REQUIRE CAPTAINS OPERATING PERMITTED VESSELS FISHING FOR ROCK SHRIMP IN THE SOUTH ATLANTIC EEZ TO HAVE A VESSEL OPERATORS LICENSE ISSUED BY NMFS TO PARTICIPATE IN THE FISHERY.

The advisory panel recommends that the council modify the wording of action 5 as follows:

Require captains operating vessels permitted to fish for rock shrimp in the south Atlantic EEZ to have a vessel operators permit issued by NMFS to participate in the fishery.

The advisory panel recommends the council use the term permit in place of license because it sounds less intimidating and is more appropriate if there is to be no performance or competency testing required to attain this permit. The main function of the permit should be to provide accountability of captains, through permit sanctions, which will serve as an incentive to comply with existing and proposed regulations protecting habitat, and requiring permitting and reporting.

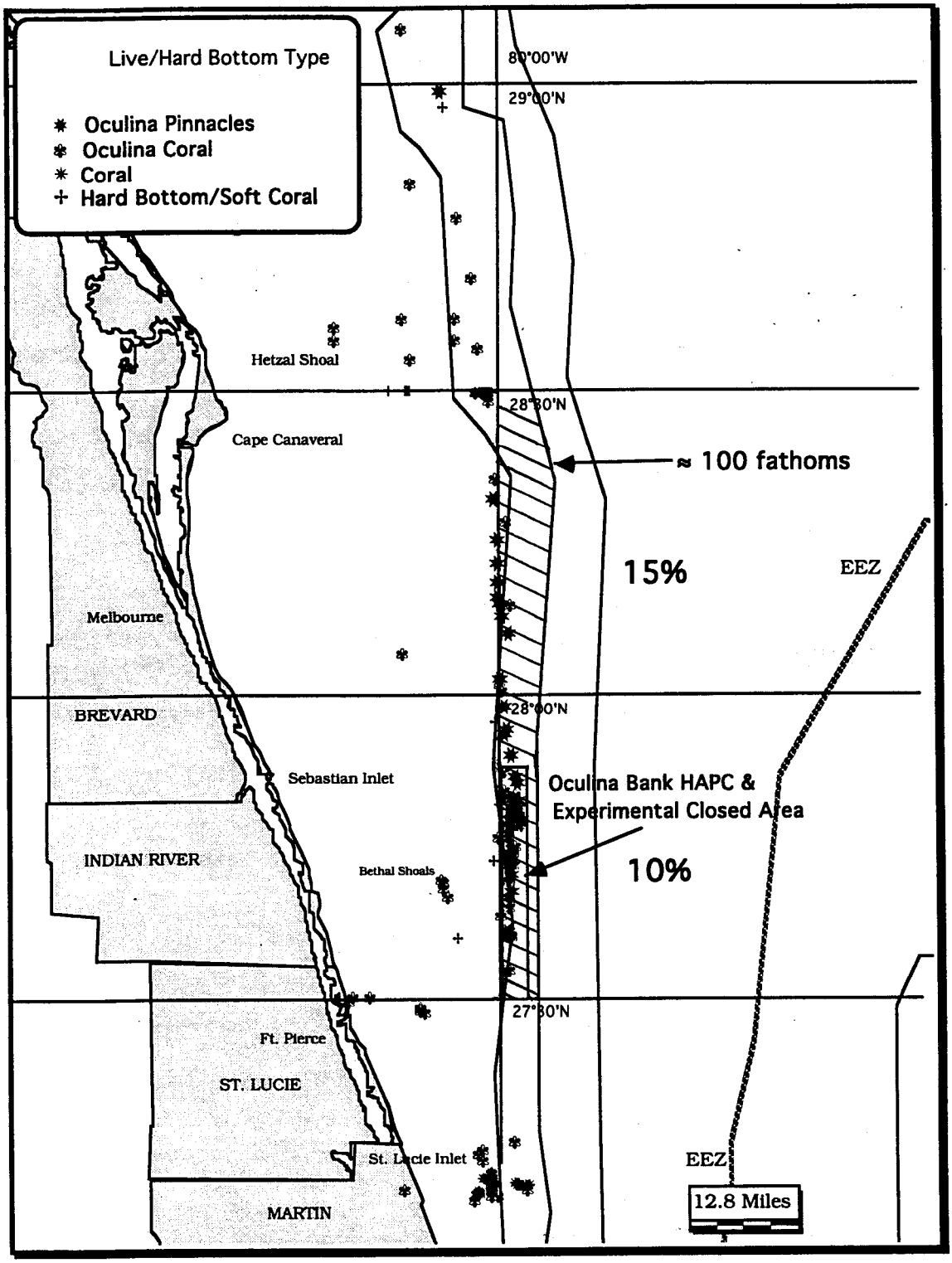


Figure 2. Map identifying bottom habitat distribution associated with the rock shrimp fishery in the EEZ off Florida, the designated closed area in the advisory panel option proposed to protect bottom habitat, and percent of 1994 rock shrimp harvest associated with the proposed closed area (Source: SAFMC).

ACTION 6. REQUIRE VESSELS PERMITTED IN THE SOUTH ATLANTIC ROCK SHRIMP FISHERY TO MAINTAIN A FISHING RECORD ON MANDATORY VESSEL LOGBOOKS

The rock shrimp advisory panel recommends that the council adopt a modified Option 2 for Action 6 which would require rock shrimp harvested from the EEZ off Florida and landed in Florida be reported on the Florida Trip Ticket to the Florida Department of Environmental Protection. All rock shrimp harvested from the south Atlantic EEZ and landed outside Florida should be reported to the NMFS on a logbook based on the format of the Florida Trip Ticket. Adopting this option will ensure adequate detailed data is collected while minimizing duplication, cost and impact to the fishery.

Modified Option 2. For rock shrimp landed in the State of Florida, the permittee shall be required to report to the Fisheries Statistics Section of the Florida Bureau of Marine Research (Florida Department of Environmental Protection), 100 Eighth Avenue SE., St. Petersburg, Florida 33701-5095. The reports shall be made on hard copy or electronic format which incorporates Form #33-610 (Florida Trip Ticket). Harvesters will need to obtain a Florida Saltwater Products License.

For rock shrimp landed outside of Florida, the permittee shall be required to report to the Science and Research Director, National Marine Fisheries Service. The reports shall be made on hard copy or electronic logbook forms, which will be provided to the permittee by the NMFS. (Intent that the format incorporate the Florida Trip Ticket.)

ACTION 7. ANY DEALER, DEFINED AS THE PERSON WHO FIRST RECEIVES ROCK SHRIMP BY WAY OF PURCHASE, BARTER, OR TRADE AND HOLDS A VALID PERMIT ISSUED BY THE NMFS REGIONAL DIRECTOR, WOULD BE REQUIRED TO REPORT DATA NEEDED TO MONITOR THE ROCK SHRIMP FISHERY.

The rock shrimp advisory panel recommends that the council adopt Option 2 for Action 7 which requires dealers handling rock shrimp harvested from the EEZ off Florida and landed in Florida be reported on the Florida dealer reports submitted to the Florida Department of Environmental Protection. Dealers handling rock shrimp harvested from the south Atlantic EEZ and landed outside Florida should submit reports to the NMFS based on the format of the dealer reports used in Florida. Adopting this option will ensure adequate detailed data is collected while minimizing duplication, cost and impact to the fishery.

Option 2. Dealers handling rock shrimp harvested anywhere in the south Atlantic EEZ and landed in Florida shall be required to report to the Fisheries Statistics Section of the Florida Bureau of Marine Research (Florida Department of Environmental Protection), 100 Eighth Avenue SE., St. Petersburg, Florida 33701-5095. Dealers will submit hard copy or electronic reports which incorporates Form #33-610 (Florida Trip Ticket). Dealers will need to obtain a Florida Saltwater Products License.

Dealers handling rock shrimp harvested anywhere in the south Atlantic EEZ rock and landed outside of Florida shall be required to report to the Science and Research Director, National Marine Fisheries Service. The reports shall be made on hard copy or electronic forms, which will be provided to the permittee by the NMFS. (Intent that the format incorporate the Florida Trip Ticket.)