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Amendment 5 to the Golden Crab Fishery Management Plan for the South Atlantic Region

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ABBREVIATIONS AND ACRONYMS

ABC	Acceptable Biological Catch
ACCSP	Atlantic Coastal Cooperative Statistics Program
APA	Administrative Procedures Act
AUV	Autonomous Underwater Vehicle
B	A measure of stock biomass either in weight or other appropriate unit
B_{MSY}	The stock biomass expected to exist under equilibrium conditions when fishing at F_{MSY}
B_{OY}	The stock biomass expected to exist under equilibrium conditions when fishing at F_{OY}
B_{CURR}	The current stock biomass
CEA	Cumulative Effects Analysis
CEQ	Council on Environmental Quality
CFMC	Caribbean Fishery Management Council
CPUE	Catch per unit effort
CRP	Cooperative Research Program
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EBM	Ecosystem-Based Management
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFH-HAPC	Essential Fish Habitat - Habitat Area of Particular Concern
EIS	Environmental Impact Statement
EPAP	Ecosystem Principles Advisory Panel
ESA	Endangered Species Act of 1973
F	A measure of the instantaneous rate of fishing mortality
$F_{30\%SPR}$	Fishing mortality that will produce a static SPR = 30%
$F_{45\%SPR}$	Fishing mortality that will produce a static SPR = 45%
F_{CURR}	The current instantaneous rate of fishing mortality
FMP	Fishery Management Plan
F_{MSY}	The rate of fishing mortality expected to achieve MSY under equilibrium conditions and a corresponding biomass of B_{MSY}
F_{OY}	The rate of fishing mortality expected to achieve OY under equilibrium conditions and a corresponding biomass of B_{OY}
FEIS	Final Environmental Impact Statement
FMU	Fishery Management Unit
FONSI	Finding Of No Significant Impact
GFMC	Gulf of Mexico Fishery Management Council
GIS	Geographic Information System
IFQ	Individual fishing quota
IMS	Internet Mapping Server
M	Natural mortality rate
MARMAP	Marine Resources Monitoring Assessment and Prediction Program
MARFIN	Marine Fisheries Initiative

MBTA	Migratory Bird Treaty Act
MFMT	Maximum Fishing Mortality Threshold
MMPA	Marine Mammal Protection Act of 1973
MRFSS	Marine Recreational Fisheries Statistics Survey
MSA	Magnuson-Stevens Act
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
NEPA	National Environmental Policy Act of 1969
NFMS	National Marine Fisheries Service
NMSA	National Marine Sanctuary Act
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
OY	Optimum Yield
POC	Pew Oceans Commission
R	Recruitment
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation Report
SAMFC	South Atlantic Fishery Management Council
SEDAR	Southeast Data, Assessment, and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SDDP	Supplementary Discard Data Program
SFA	Sustainable Fisheries Act
SIA	Social Impact Assessment
SSC	Scientific and Statistical Committee
TAC	Total allowable catch
T_{MIN}	The length of time in which a stock could rebuild to B_{MSY} in the absence of fishing mortality
USCG	U.S. Coast Guard
USCOP	U.S. Commission on Ocean Policy
VMS	Vessel Monitoring System

AMENDMENT 5 TO THE GOLDEN CRAB FISHERY MANAGEMENT PLAN OF THE SOUTH ATLANTIC REGION

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

Proposed actions:

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FMP Amendments – South Atlantic Fishery Management Council
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ABSTRACT

The need for action through Amendment 5 is to implement Catch Share or Limited Access Privilege (LAP) program for the South Atlantic golden crab fishery. More specifically, the actions proposed in Amendment 5 would:

- Implement a catch share program for golden crab. These management measures could include:
    - Identify eligibility requirements for initial allocation of privileges to fish a portion of the ACL;
    - Allocate privileges to fish a portion of the ACL to individual entities;
    - Establish a cap on ownership of privileges; and
    - Devise a method for recovery of the costs of administering, monitoring, and enforcing management of the golden crab fishery.

The Draft Environmental Impact Statement (DEIS) analyzes the effects of implementing the proposed actions listed above. Comments on the DEIS will be accepted for 45 days from publication of the Notice of Availability (NOA) in the Federal Register.

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1 Introduction

1.1 **Purpose and Need**

Amendment 5 to the Golden Crab Fishery Management Plan (Golden Crab FMP) consists of X regulatory actions that focus on …

Management actions proposed in this Amendment include:

[insert purpose and need]

1.2 **Management Objectives**

Management objectives of the Golden Crab FMP addressed by this amendment include the following:

1. Prevent overfishing of golden crab by preventing the fishing mortality rate from exceeding the fishing mortality rate that would produce maximum sustainable yield (Fmsy)
2. Promote orderly utilization of the resource.
3. Provide for a flexible management system that minimizes regulatory delays while retaining substantial Council and public involvement in management decisions, and rapidly adapts to changes in resource abundance, new scientific information, and changes in fishing patterns among user groups.
4. Develop a mechanism to vest fishermen in the golden crab fishery, and create incentives for conservation and regulatory compliance whereby fishermen can realize potential long-run benefits from efforts to conserva and manage the golden crab resource.
5. Provide a management regime that promotes stability and facilitates long-range planning and investment by harvesters and dealers while avoiding, where possible, the necessity for more stringent management measures and increasing management costs over time.
6. Develop a mechanism that allows the marketplace to drive harvest strategies and product forms in order to maintain product continuity and increase total producer and consumer benefits from the fishery.
7. Promote management regimes that minimize gear and area conflicts among fishermen.
8. Minimize tendency for over-capitalization in the harvesting and processing/distribution sectors.
9. Provide a reasonable opportunity for fishermen to make adequate returns from commercial fishing by controlling entry so that returns are not regularly dissipated by open access, while also providing avenues for fishermen not initially included in the controlled access program to enter the program.

1.3 History of Management

The following is a summary of management actions for the Golden Crab FMP. Other summaries of Council actions and history of management for other Fishery Management Plans are available online at www.safmc.net.

The Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region

The golden crab resource and fishery in the South Atlantic Region was unprotected prior to implementation of the FMP. The Council approved a control date that was published in the Federal Register on April 7, 1995. The Council completed the Golden Crab FMP (SAFMC 1995b) and submitted the plan for formal Secretarial Review on December 15, 1995. Regulations implementing the FMP were published in the Federal Register on August 27, 1996 [61 Federal Register 43952]; various regulations became effective August 27, September 26, and October 28, 1996 and September 7, 1997.

The Golden Crab FMP relies on a system of traditional fishery management plus controlled access. Traditional fisheries management includes measures to provide biological protection to the resource (escape gaps in traps and no retention of female crabs); gear regulation (define allowable gear, degradable panel, tending requirements, gear identification, and maximum trap size by zone); provide for law enforcement (depth limitations and prohibit possession of whole fish or fillets of snapper grouper species); determine the number of participants (vessel and dealer/processor permits); collect the necessary data (vessel/fishermen and dealer/processor reporting); and a framework procedure to adjust the management program (framework adjustments and adjustments to activities authorized by the Secretary of Commerce). Use of these traditional management techniques in other fishery management plans has not solved all fisheries management problems. At best, the fishery resource, in this case golden crab, is biologically protected. Ignored or even exacerbated are underlying social and economic problems resulting from gear conflicts, high regulatory costs, and low marketing incentives. To solve these social and economic problems, managers have increasingly turned to various forms of controlled access or effort limitation. The Council chose to limit the number of vessels in the golden crab fishery. Combining the more traditional fisheries management measures with controlled access best allowed the Council to solve problems in the golden crab fishery.

Framework Seasonal Adjustment #1 (SAFMC 1997) revised the vessel size limitations applicable when a vessel permit is transferred to another vessel and extended through December 31, 2000, the authorization to use wire cable for a mainline attached to a golden crab trap. The framework document was sent to NMFS on September 26, 1997 and the proposed rule was published on June 26, 1998. The final rule was published in the Federal Register on October 28, 1998 with regulations effective upon publication.

Amendment 1 (SAFMC 1998b) was a part of the Council's Comprehensive Amendment addressing Essential Fish Habitat in FMPs of the South Atlantic Region. Essential fish habitat for golden crab includes the U.S. Continental Shelf from Chesapeake Bay south through the Florida Straits (and into the Gulf of Mexico). In addition, the Gulf Stream,

which occurs within the EEZ, is an essential fish habitat because it provides a mechanism to disperse golden crab larvae. The detailed description of seven essential fish habitat types (a flat foraminferan ooze habitat; distinct mounds, primarily of dead coral; ripple habitat; dunes; black pebble habitat; low outcrop; and soft-bioturbated habitat) for golden crab is provided in Wenner *et al.* (1987). Refer to **Section 4.0** in this Amendment, Volume II of the FEP (SAFMC in prep.) and the Habitat Plan (SAFMC 1998a) for a more detailed description of habitat utilized by the managed species. There is insufficient knowledge of the biology of golden crabs to identify spawning and nursery areas and to identify HAPCs. As information becomes available, the Council would evaluate such data and identify HAPCs as appropriate through the framework. In addition, Amendment 1 established a framework procedure to address habitat issues; this framework was added to the framework of all approved FMPs including the Golden Crab FMP. Amendment 1 was submitted to the NMFS on October 9, 1998. The Notice of Availability was published in the Federal Register on March 5, 1999, and the Comprehensive Habitat Amendment was approved on June 3, 1999. The proposed rule was published on July 9, 1999 and a supplement to the proposed rule was published on November 2, 1999. The final rule was published in the Federal Register on June 14, 2000 with regulations becoming effective July 14, 2000.

Amendment 2 (SAFMC 1998c) was a part of the Council's Comprehensive Amendment addressing Sustainable Fishery Act definitions and other required provisions in FMPs of the South Atlantic Region. The amendment was partially approved on May 19, 1999. The final rule was published in the Federal Register on November 2, 1999 with regulations becoming effective December 2, 1999. The description of fisheries and communities was approved and bycatch reporting was approved. The remaining items for golden crab were disapproved because "the stock status determination criteria are incomplete and, thus, do not totally fulfill the new requirements of the Magnuson-Stevens Act and the national standard guidelines."

Amendment 3 (SAFMC 2000) extended the authorization to use wire cable for mainlines attached to golden crab traps to December, 31, 2002; modified escape panel sizes for traps; addressed permit renewal requirements including removal of the 5,000-pound harvest requirement for renewing biannual permits and addressed the minimum harvest requirement for permit holders in the Southern Zone; allowed up to a 20% increase in vessel size from the vessel size of the original permit; created a sub-zone within the Southern Zone with specified conditions; allowed two new vessels to be permitted to fish only in the Northern Zone using an earlier list of those wanting to enter the fishery; specified status determination criteria; and modified the FMP framework to allow modifications to the sub-zone.

Lastly, the current effort at managing the golden crab fishery is distinguished by the practice of co-management, which has been defined by McGoodwin (1990) as "a shift away from autocratic and paternalistic modes of management to modes that rely on the joint efforts of traditional fisheries specialists and fishing peoples." The options for managing the fishery that are put forth in this document have been developed by the golden crab fishermen and refined in consultation with the Council. It is hoped that such

efforts would increase the legitimacy of the future regulations and make the rationale for such regulations more understandable to all involved.

Amendment 4 , included in the Comrehensive Ecosystem-Based Amendment 1 (SAFMC 2009b), establishes Allowable Golden Crab Fishing Areas that allow fishermen to continue to harvest golden crab in two of the proposed deepwater Coral Habitat Areas of Particular Concern. One area is in the Northern Zone (north of 28 degrees N. latitude), three are in the Middle Zone (between 28 degrees N. latitude and 25 degrees N. latitude), where fishery activity is concentrated; and one area is in the Southern Zone (south of 25 degrees N. latitude).

2 Actions and Alternatives

This section outlines the proposed actions and alternatives considered by the Council. A complete analysis of these alternatives can be found in **Section 4.0.**

Alternatives the Council considered during the development of this amendment and/or presented at the first round of public hearings but eliminated from further detailed study are described in **Appendix x**.

2.1 **Action 1. Implement a catch share program for the golden crab fishery**

Alternative 1. No action. Do not implement a catch share program for the golden crab fishery.

Alternative 2. Implement a catch share program for the golden crab fishery.

Selection of Alternatives

2.1.1 Comparison of Alternatives

Table 2-1. Summarized comparison of the impacts among alternatives for Action 1.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.1.2 Conclusion

2.2 **Action 2. Define substantial participants in the golden crab fishery**

Alternative 1. No Action. Do not define substantial participants.

Alternative 2. Permit holders who have landed 1 pound or more of golden crab between 2001 and 2009 are considered substantial participants. (Council memers have suggested additional alternatives that require more than 1 pound.)

Alternative 3. Golden crab permit holders are considered substantial participants.

Alternative 4. Golden crab permit holders and golden crab captains and crew are considered substantial participants.

Alternative 5. Golden crab permit holders and federally permitted golden crab dealers are considered substantial participants.

Alternative 6. Golden crab permit holders, federally permitted golden crab dealers, and golden crab captains and crew are considered substantial participants.

Selection of Alternatives

2.2.1 Comparison of Alternatives

Table 2-2. Summarized comparison of the impacts among alternatives for Action 2.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.2.2 Conclusion

2.3 Action 3. Establish eligibility criteria for a golden crab catch share program

(NOTE: all alternatives under this action proposed by the Golden Crab AP)

Alternative 1. No Action. Donot establish eligibility criteria for a golden crab catch share program

Alternative 2. Restrict eligibility to current participants who have made landings of 1 pound or greater between 2001 and 2009.

Alternative 3. Restrict eligibility to current participants who have made landings of 1 pound or greater between 2005 and 2009.

Alternative 4. Restrict eligibility to valid commercial golden crab permit holders.

Alternative 5. Restrict eligibility to valid commercial golden crab permit holders and golden crab captains and crew.

Alternative 6. Restrict eligibility to valid commercial golden crab permit holders and federally permitted golden crab dealers.

Alternative 7. Restrict eligibility to valid commercial golden crab permit holders, federally permitted golden crab dealers, and golden crab captains and crew.

Selection of Alternatives

2.3.1 Comparison of Alternatives

Table 2-3. Summarized comparison of the impacts among alternatives for Action 3.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.3.2 Conclusion

2.4 Action 4. Establish vessel catch history initial allocation

Note: All alternatives under this action proposed by the Golden Crab AP.

Note: This action uses catch history associated with a vessel, not permit catch history. In this way, it incorporates people who have leased permits in the past.

Note: For each alternative, the individual's catch history is divided by all vessels' catch history to ascertain a percentage share of the quota. For example, under Alternative 2, the catch history associated with a particular vessel from 2002-08 aggregated is divided by all vessels' aggregated 2002-08 catch history to calculate quota share for that individual vessel owner.

Alternative 1. No action. Do not establish vessel catch history initial allocation.

Alternative 2. Use 2002-08 aggregate catch history for each vessel to allocate initial allocation to each vessel owner.

Alternative 3. Use 1995-2008 aggregate catch history for each vessel to allocate initial allocation to each vessel owner.

Alternative 4. Use 1998-2008 aggregate catch history for each vessel to allocate initial allocation to each vessel owner. Vessels with below 5% initial allocation receive an extra 2% per vessel excluding those receiving greater than 30% initial allocation on all vessels

owned combined. The extra 2% comes out of highest share holder portion. Must have 25,000 pounds aggregate catch history from 1998-2008 to receive bonus.

Alternative 5. Use 1998-2008 aggregate catch history for each vessel only if vessel has catch history in 1998. Vessels with below 5% initial allocation receive an extra 5% per vessel excluding those receiving greater than 30% initial allocation on vessels owned combined. The extra 5% comes out of highest share holder portion. Must have 25,000 pounds aggregate catch history from 1998-2008 to receive bonus.

Alternative 6. Use 2006-08 aggregate catch history for each vessel to allocate initial allocation to each vessel owner. Vessels fishing between 2007 and 2009 that get less than 10% initial allocation receive an additional 7% per vessel excluding those that receive greater than 20% initial allocation on vessels owned combined. The extra 7% comes out of highest share holder. Must have 50,000 pounds aggregate catch history from 2006-08 to receive bonus.

Alternative 7. Use 2006-08 aggregate catch history for each vessel to allocate initial allocation to each vessel owner. If vessels fished in the last 5 years and received less than 20% initial allocation, each vessel owner receives an additional 5% excluding those that receive greater than 20% initial allocation on vessels owned combined. The extra 5% comes out of highest share holder. Must have 50,000 pounds aggregate catch history from 2006-08 to receive bonus.

Alternative 8. Use the following formula to conduct initial allocation: 50% catch history + 50% equal allocation

Sub-alternative 8a. Vessel catch history for 1995-2008. Must have 25,000 pounds aggregate to receive equal allocation portion.

Sub-alternative 8b. Vessel catch history for 1995-2008. Must have 50,000 pounds aggregate to receive allocation portion.

Sub-alternative 8c. Vessel catch history for 2005-2008. Must have 25,000 pounds aggregate to receive allocation portion.

Sub-alternative 8d. Vessel catch history for 2005-2008. Must have 50,000 pounds aggregate to receive allocation portion.

Sub-alternative 8e. Vessel catch history for 2002-2008. Must have 25,000 pounds aggregate to receive allocation portion.

Sub-alternative 8f. Vessel catch history for 2002-2008. Must have 50,000 pounds aggregate to receive allocation portion.

Alternative 9. Use the following formula to conduct initial allocation: 75% catch history + 25% equal allocation

Sub-alternative 9a. Vessel catch history for 1995-2008. Must have 25,000 pounds aggregate to receive equal allocation portion.

Sub-alternative 9b. Vessel catch history for 1995-2008. Must have 50,000 pounds aggregate to receive allocation portion.

Sub-alternative 9c. Vessel catch history for 2005-2008. Must have 25,000 pounds aggregate to receive allocation portion.

Sub-alternative 9d. Vessel catch history for 2005-2008. Must have 50,000 pounds aggregate to receive allocation portion.
Sub-alternative 9e. Vessel catch history for 2002-2008. Must have 25,000 pounds aggregate to receive allocation portion.
Sub-alternative 9f. Vessel catch history for 2002-2008. Must have 50,000 pounds aggregate to receive allocation portion.

Alternative 10: Allocate through equal allocation of the total quota (ACL)
Sub-alternative 10a. 11 vessel owners
Sub-alternative 10b. 4 active vessels

Alternative 11. Allocate based on using the vessel's best 3 years averaged
Sub-alternative 11a. Vessel catch history for 1995-2008. Must have 25,000 pounds aggregate to receive equal allocation portion.
Sub-alternative 11b. Vessel catch history for 1995-2008. Must have 50,000 pounds aggregate to receive allocation portion.
Sub-alternative 11c. Vessel catch history for 2005-2008. Must have 25,000 pounds aggregate to receive allocation portion.
Sub-alternative 11d. Vessel catch history for 2005-2008. Must have 50,000 pounds aggregate to receive allocation portion.
Sub-alternative 11e. Vessel catch history for 2002-2008. Must have 25,000 pounds aggregate to receive allocation portion.
Sub-alternative 11f. Vessel catch history for 2002-2008. Must have 50,000 pounds aggregate to receive allocation portion.

Selection of Alternatives

2.4.1 Comparison of Alternatives

Table 2-4. Summarized comparison of the impacts among alternatives for Action 4.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.4.2 Conclusion

2.5 Action 5. Establish eligibility for harvest

Alternative 1. No Action. Do not establish eligibility for harvest.

Alternative 2. Any person holding a current (as in paid fees) permit in any zone is eligible to participate in the golden crab catch share program. New entrants to the fishery must purchase annual pounds and purchase or lease a permit (Golden Crab AP).

Selection of Alternatives

2.5.1 Comparison of Alternatives

Table 2-5. Summarized comparison of the impacts among alternatives for Action 5.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.5.2 Conclusion

2.6 Action 6. Establish criteria and structure of an appeals process

Alternative 1. No Action. Do not specify provisions for an appeals process.

Alternative 2. 1-2% of TAC will be set aside for the appeals process. If set aside is not used, it will be returned back to the overall quota pool and will be redistributed based on the original initial allocation to all share holders. The NMFS Regional Administrator would administer the appeals process. The process will be conducted 90 days after initial allocation and before the bonus is distributed. There will be no hardship clause and the appeals process will rely upon trip tickets to establish additional landings (Golden Crab AP)

Alternative 3. A special board composed of state directors/designees will review, evaluate, and make individual recommendations to RA on appeals. Filing of an appeal must be completed within 90 days of the effective date of the final regulations implementing the catch share program. Hardship arguments will not be considered.

Selection of Alternatives

2.6.1 Comparison of Alternatives

Table 2-6. Summarized comparison of the impacts among alternatives for Action 6.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.6.2 Conclusion

2.7 Action 7. Establish criteria for program duration

Alternative 1. No Action. Do not establish criteria for program duration.

Alternative 2. The program will exist in perpetuity unless modified by the SAFMC (Golden Crab AP).

Selection of Alternatives

2.7.1 Comparison of Alternatives

Table 2-7. Summarized comparison of the impacts among alternatives for Action 7.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.7.2 Conclusion

2.8 Action 8. Establish criteria for program review

Alternative 1. No Action. Do not establish criteria for program review

Alternative 2. Perform review every 5-7 years. The program reviews would coincide (one year post) with stock assessments, if possible, so that changes to the program in response to the stock assessment can occur (Golden Crab AP).

Selection of Alternatives

2.8.1 Comparison of Alternatives

Table 2-8. Summarized comparison of the impacts among alternatives for Action 8.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.8.2 Conclusion

2.9 Action 9. Establish criteria for transferability

Alternative 1. No Action. Do not establish criteria for transferability

Alternative 2. Program allows for all or a portion of permanent (quota share) and temporary (annual pounds) sale of quota among all permit holders and those leasing a permit (Golden Crab AP).

Alternative 3. Shares or annual pounds can be transferred to golden cab permit holders. Eligible individuals must be persons who are U.S. citizens or permanent resident aliens.

Alternative 4. Shares or annual pounds can only be transferred to golden crab permit holders during the first five years of the catch share program and all U.S. citizens and permanent resident aliens thereafter. Eligible individuals must be persons who are U.S. citizens or permanent resident aliens.

Selection of Alternatives

2.9.1 Comparison of Alternatives

Table 2-9. Summarized comparison of the impacts among alternatives for Action 9.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					

Social					
Administrative					

2.9.2 Conclusion

2.10 **Action 10. Define quota share ownership caps**

NOTE: Alternatives under this action proposed by Golden Crab AP

Alternative 1. No Action. Do not establish quota share ownership cap criteria
Alternative 2. Cap on ownership of quota share where the maximum percentage (quota share) initially allocated would serve as the ownership cap.
Alternative 3. A maximum of 55% of the quota can be owned as shares by any one entity
Alternative 4. A maximum of 65% of the quota can be owned as shares by any one entity
Alternative 5. A maximum of 75% of the quota can be owned as shares by any one entity

Selection of Alternatives

2.10.1 Comparison of Alternatives

Table 2-10. Summarized comparison of the impacts among alternatives for Action 9.

	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Biological					
Economic					
Social					
Administrative					

2.10.2 Conclusion

2.11 **Action 11. Define annual pounds ownership caps**

Alternative 1. No Action. Do not identify annual pound ownership caps

Alternative 2. Set the annual pounds cap equal to the corresponding share cap as defined in Action 10 times the annual quota. For any single fishing year, no person shall possess annual pounds in an amount that exceeds the annual pounds cap. Anyone receiving annual pounds in excess of the annual pounds ownership cap would not be able to purchase additional annual pounds. Anyone receiving annual pounds that were less than the annual pounds ownership cap could purchase additional annual pounds up to the amount of the annual pounds ownership cap.

Alternative 3. Set the annual pounds cap equal to:

Sub-alternative 3a. The share cap specified in Action 10 plus 1% times the annual quota.

Sub-alternative 3b. The share cap specified in Action 10 plus 5% times the annual quota.

Sub-alternative 3c. The share cap specified in Action 10 plus 10% times the annual quota.

For any single fishing year, no person shall possess annual pounds in an amount that exceeds the annual pounds cap.

Selection of Alternatives

2.11.1 Comparison of Alternatives

Table 2-11. Summarized comparison of the impacts among alternatives for Action 11.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

Conclusion

2.12 **Action 12. Use it or Lose it policy**

NOTE: Alternatives under this action proposed by Golden Crab AP

Alternative 1. No Action. Do not specify a minimum landings requirement for retaining shares.

Alternative 2. Permit owner or person leasing a permit must have used at least 10% of an individual's quota share for one year (fished, quota share sale, or sale of annual lbs) on a cumulative basis during a two year period using a running average (Golden Crab AP).

Alternative 3. Shares that remain inactive for 3 years will be revoked and redistributed proportionately among the remaining shareholders. "Inactive" is defined as using less than 30% of an individual's allotted shares over a 3-year moving average period.

Alternative 4. Shares that remain inactive for 3 years will be revoked and redistributed proportionately among the remaining shareholders. "Inactive" is defined as less than 50% of the allotted shares over a 3-year moving average period.

Selection of Alternatives

2.12.1 Comparison of Alternatives

Table 2-12. Summarized comparison of the impacts among alternatives for Action 12.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.12.2 Conclusion

2.13 Action 13. Cost recovery plan

Alternative 1. No Action. Do not implement a cost recovery plan.

Alternative 2. Implement a cost recovery plan. All cost recovery fees shall be the responsibility of the recognized shareholder. The cost recovery plan will have the following conditions:

Sub-alternative 2a. Cost recovery fees will be calculated at the time of sale of crabs to the registered dealer based on (i) the actual ex-vessel value of the landings or (ii) the standard ex-vessel price of the landings as calculated by NMFS.

Sub-alternative 2b. the fee collection and submission shall be the responsibility of (i) the shareholder or (ii) the dealer.

Sub-alternative 2c. The collected fees would be submitted to NMFS (i) quarterly or (ii) monthly.

Note: Collected fees shall not exceed 3% of the ex-vessel value of golden crab harvested (MSA Sec 304(d)(2)(B)).

Selection of Alternatives

2.13.1 Comparison of Alternatives

Table 2-13. Summarized comparison of the impacts among alternatives for Action 13.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.13.2 Conclusion

2.14 Action 14. Establish boat length limit rule

Alternative 1. No Action. Do not establish boat length limit rule

Alternative 2. Eliminate boat length limit rule in the middle and southern Zones (Golden Crab AP). *Rationale: Greater length is sometimes needed after implementation of the RSW system. A larger boat is more efficient. However, the vessel length is somewhat limited by the catch shares and the quota share ownership cap.*

Selection of Alternatives

2.14.1 Comparison of Alternatives

Table 2-14. Summarized comparison of the impacts among alternatives for Action 14.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.14.2 Conclusion

2.15 **Action 15. Address quota share allocation among golden crab fishing zones**

Alternative 1. No Action. Participants can use quota in any of the three golden crab fishing zones.

Alternative 2 (Preferred by Golden Crab AP). Participants can use quota in any zone for which they possess a permit.

Alternative 3 (Preferred by Golden Crab AP). Eliminate box in southern zone originally established to protect against very large vessels.

Note: The above alternatives are not mutually exclusive. The GC AP has an interest in both. Rationale: Eliminating the box would allow vessels over 65 feet to participate in that area. Very little fishing has occurred in the Southern Zone, perhaps because of the box, for some time and it is seen as no longer necessary in that the problem that created this solution (implementation of the box) no longer exists. If you are smaller than 65 feet and have a permit in the Southern Zone, you are restricted to fishing in the box and cannot fish outside the box.

Selection of Alternatives

2.15.1 Comparison of Alternatives

Table 2-15. Summarized comparison of the impacts among alternatives for Action 15.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.15.2 Conclusion

2.16 **Action 16. Establish criteria for permit stacking**

Alternative 1. No Action. Do not allow stacking of permits

Alternative 2 (Preferred by Golden Crab AP). Allow for stacking of up to three permits on one vessel so that any zones for which the vessel has a permit can be fished in one trip.

Selection of Alternatives

2.16.1 Comparison of Alternatives

Table 2-16. Summarized comparison of the impacts among alternatives for Action 16.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.16.2 Conclusion

2.17 Action 17. Monitoring and enforcement

Alternative 1. No Action. Do not require additional monitoring end enforcement.

Alternative 2. Phase in additional monitoring as necessary based on the economic capacity of the fishery. Explore real-time reporting via electronic monitoring (recording trip ticket and logbook data on a website upon landing) (Golden Crab AP).

Note: There may be a discrepancy between logbook landings and trip ticket if, during shipping, there is shrinkage (5-10%) and any such comparison between logbooks and trip tickets would need to account for this. This could happen given that there could be a time difference of 5-7 days between when a crab is caught and when it is sold due to the length of the trip.

Alternative 3. Require all fishing vessels engaged in the golden crab catch share program to be equipped with VMS. The purchase, installation, and maintenance of VMS equipment must conform to the protocol established by NMFS in the Federal Register.

Sub-alternative 3a. The purchase, installation, and maintenance of the VMS equipment and communications costs will be paid for or arranged by the shareholder.

Sub-alternative 3b. The purchase, installation, and maintenance of the VMS equipment and communications costs will be paid for or arranged by NMFS.

Sub-alternative 3c. The purchase, installation, and maintenance of the VMS equipment and communications costs will be paid for jointly by the shareholder and NMFS.

Sub-alternative 3d. The purchase, installation, and maintenance of the VMS equipment will be paid for by NMFS. Communications costs will be paid for or arranged by the shareholder.

Alternative 4. Implement hail-in requirement (at least 3 hrs ahead of time whereby a message could be left or texted in excess of 3 hours) when landing with location and time or other information deemed necessary by enforcement (Golden Crab AP).

Selection of Alternatives

2.17.1 Comparison of Alternatives

Table 2-17. Summarized comparison of the impacts among alternatives for Action 17.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.17.2 Conclusion

2.18 Action 18. Establish criteria for new entrants program

Alternative 1. No Action. Do not create provisions that assist new entrants in entering the fishery.

Alternative 2. Set aside some amount of annual pounds for new entrants when quota is: (i) released as a part of a violation, (ii) lost quota (use it or lose it provision); and (iii) when the TAC exceeds 3 million pounds (Golden Crab AP).

Alternative 3. Set aside 2% of the golden crab TAC each year to be auctioned off to permit holders that do not possess shares.

Alternative 4. Set aside 5% of the golden crab TAC each year to be auctioned off to permit holders that do not possess shares.

Alternative 5. Set aside 10% of the golden crab TAC each year to be auctioned off to permit holders that do not possess shares.

Selection of Alternatives

2.18.1 Comparison of Alternatives

Table 2-18. Summarized comparison of the impacts among alternatives for Action 18.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.18.2 Conclusion

2.19 Action 19. Establish provisions for banking and borrowing

Alternative 1. No Action. Do not create provisions for banking and borrowing as part of the golden crab catch share program.

Alternative 2 (Preferred by Golden Crab AP). Establish a 20,000 lbs borrowing allowance each year.

Selection of Alternatives

2.19.1 Comparison of Alternatives

Table 2-19. Summarized comparison of the impacts among alternatives for Action 19.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.19.2 Conclusion

2.20 Action 20. Collection of royalties from resource use

Alternative 1. No Action. Do not collect royalties from shareholders for use of the golden crab fishery

Alternative 2. Hold an annual auction of portions of the TAC to fishermen with a golden crab permit. Place funds collected through the auction into an account where the funds help pay for golden crab fishery management.

Alternative 3. Redefine golden crab shares so that they expire every 5 years with a start date upon implementation of this amendment. The Council will determine if the share owner is re-issued the shares for another 5 years after the time has expired. An auction will be used to determine the next owner. Auction participants must own a golden crab permit. Place funds collected through the auction into an account where the funds help pay for golden crab fishery management.

Alternative 4. Redefine golden crab shares so that they expire every 10 years with a start date upon implementation of this amendment. The Council will determine if the share owner is re-issued the shares for another 10 years after the time has expired. An auction will be used to determine the next owner. Auction participants must own a golden crab permit. Place funds collected through the auction into an account where the funds help pay for golden crab fishery management.

Alternative 5. Assess a tax on shareholders equal to an estimation of "super profits" (profits that exceed "normal profit") made in the fishery.

Selection of Alternatives

2.20.1 Comparison of Alternatives

Table 2-20. Summarized comparison of the impacts among alternatives for Action 20.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.20.2 Conclusion

2.21 Action 21. Annual pounds overage

Alternative 1. No Action. Do not allow fishermen to exceed their annual pounds.

Alternative 2. A person on board a vessel with the shareholder's only remaining golden crab allocation may exceed, by up to 5%, the shareholder's annual pounds remaining on the last fishing trip of the year.

Alternative 3. A person on board a vessel with the shareholder's only remaining golden crab allocation may exceed, by up to 10%, the shareholder's annual pounds remaining on the last fishing trip of the year.

Selection of Alternatives

2.21.1 Comparison of Alternatives

Table 2-21. Summarized comparison of the impacts among alternatives for Action 20.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.21.2 Conclusion

2.22 Action 22. Approved landing sites

Alternative 1. No Action. Do not establish approved landing sites for the golden crab catch share program.

Alternative 2. Establish approved landing sites for the golden crab catch share program. All participants must land at one of these sites to participate in the program.

Sub-alternative 2a. Approved landing sites will be selected by fishermen but must be approved by NMFS Office of Law Enforcement (OLE) prior to use.

Sub-alternative 2b. Approved landings sites will be selected by the Council and NMFS, based on industry recommendations and resource availability.

Selection of Alternatives

2.22.1 Comparison of Alternatives

Table 2-22. Summarized comparison of the impacts among alternatives for Action 22.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.22.2 Conclusion

2.23 Action 23. Establish a guaranteed loan program

Alternative 1. No Action. Do not establish a golden crab catch share loan program.

Alternative 2. Set aside 15% of cost recovery fees to establish a guaranteed loan program.

Alternative 3. Set aside 25% of cost recovery fees to establish a guaranteed loan program

Selection of Alternatives

2.23.1 Comparison of Alternatives

Table 2-23. Summarized comparison of the impacts among alternatives for Action 23.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.23.2 Conclusion

2.24 Action 24. Adjustments in Annual Allocations of Commercial TAC

Alternative 1. No Action. Do not allow for adjustments in annual allocation of commercial TAC.

Alternative 2. Annually allocate adjustments in the commercial quota proportionately among eligible shareholders (e.g., those eligible at the time of the adjustment) based on the percentage of the commercial quota each holds at the time of the adjustment.

Alternative 3. Allocate adjustments in the commercial quota through an auction system. All golden crab shareholders are allowed to place bids.

Selection of Alternatives

2.24.1 Comparison of Alternatives

Table 2-24. Summarized comparison of the impacts among alternatives for Action 24.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological					
Economic					
Social					
Administrative					

2.24.2 Conclusion

3 Affected Environment

3.1 Habitat

3.1.1 Description and distribution

Wenner *et al.* (1987) note: "Other studies have described an association of *Geryon quinquedens* (deep-sea red crab) with soft substrates. Wigley *et al.* (1975) noted that bottom sediments throughout the area surveyed for red crab from offshore Maryland to Corsair Canyon (Georges Bank) consisted of a soft, olive-green, silt-clay mixture. If golden crabs preferentially inhabit soft substrates, then their zone of maximum abundance may be limited within the South Atlantic Bight. Surveys by Bullis and Rathjen (1959) indicated that green mud occurred consistently at 270-450 meters between St. Augustine and Cape Canaveral, FL (30°N and 28°N). This same depth range from Savannah, GA to St. Augustine was generally characterized by Bullis and Rathjen (1959) as extremely irregular bottom with some smooth limestone or "slab" rock present. Our study indicates, however, that the bottom due east between Savannah and St. Catherines Island, GA at 270-540 meters consists of mud and biogenic ooze. Further north from Cape Fear, NC to Savannah, bottom topography between 270 and 450 m is highly variable with rocky outcrops, sand and mud ooze present (Low and Ulrich 1983)."

In a subsequent study using a submersible, Wenner and Barans (1990) found the greatest abundance in rock outcrops:

"Observations on density and a characterization of essential habitat for golden crab, *Chaceon fenneri*, were made from a submersible along 85 transects in depths of 389-567 meters approximately 122 kilometers southeast of Charleston, South Carolina. Additional observations on habitat were made on 16 transects that crossed isobaths between 293-517 meters.

Seven essential habitat types can be identified for golden crab from observations:

- A flat foraminiferan ooze habitat (405-567 meters) was the most frequently encountered habitat. This habitat type is characterized by pteropod-foraminiferan debris mixed with larger shell fragments, a sediment surface mostly covered with a black phosphorite precipitate.

- Distinct mounds, primarily of dead coral at depths of 503 to 555 meters, constituted 20% of the bottom surveyed on dives to count crabs. Coral mounds rose approximately 15 to 23 meters in height above the surrounding sea floor and included several that were thinly veneered with a fine sediment and dead coral fragments, as well as a number that were thickly encrusted with live branching ahermatypic corals (*Lophelia prolifera* and *Enallopsammia profunda*). Fan-shaped sponges, pennatulids and crinoids were oriented into the northerly 1.4-1.9 kilometer per hour current. The decapod crustaceans *Bathynectes longispina*, *Eugonatonotus crassus* and *Eumunida picta*, the black-bellied rosefish, *Helicolenus dactylopterus*, and the wreckfish, *Polyprion americanus*, were frequently sighted along transects in the coral mound habitat.

- Ripple habitat (320-539 meters); dunes (389-472 meters); black pebble habitat (446-564 meters); low outcrop (466-512 meters); and soft-bioturbated habitat (293-475 meters). A total of 109 *C. fenneri* were sighted within the 583,480 m^2 of bottom surveyed. Density (mean no. per 1,000 m^2) was significantly different among habitats, with highest values (0.7 per 1,000 m^2) noted among low rock outcrops. Lowest densities were observed in the dune habitat (<0.1 per 1,000 m^2), while densities for other habitats were similar (0.15-0.22 per 1,000 m^2)."

A similar submersible study in the eastern Gulf of Mexico (Lindberg and Lockhart 1993) found similar results with higher abundance of golden crab on hardbottom: "Within the bathymetric range of golden crabs, crab abundance may be related more to habitat type than to depth. The greatest density (36.5 crabs/hectare) occurred on or near hard-bottom canyon features."

Golden crabs occupy offshore oceanic waters along the Atlantic and Gulf of Mexico coasts as adults. Offshore areas used by adults are probably the least affected by habitat alterations and water quality degradation. Currently, the primary threat comes from oil and gas development and production, offshore dumping of dredged material, disposal of chemical and other wastes, and the discharge of contaminants by river systems.

3.1.2 Essential Fish Habitat

Essential fish habitat for golden crab includes the U.S. Continental Shelf from Chesapeake Bay south through the Florida Straits (and into the Gulf of Mexico). In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse golden crab larvae. The detailed description of seven essential fish habitat types (a flat foraminferan ooze habitat; distinct mounds, primarily of dead coral; ripple habitat; dunes; black pebble habitat; low outcrop; and soft-bioturbated habitat) for golden crab is provided above and in Wenner et al. (1987).

Refer to Section 3.0 in the Habitat Plan (SAFMC 1998) for a more detailed description of habitat utilized by the managed species. Also, it should be noted that the Gulf Stream occurs within the EEZ.

Essential Fish Habitat-Habitat Areas of Particular Concern

There is insufficient knowledge of the biology of golden crabs to identify spawning and nursery areas and to identify HAPCs at this time. As information becomes available, the Council will evaluate such data and identify HAPCs as appropriate.

3.2 Biological/Ecological Environment

3.2.1 Species Most Impacted by this Amendment

3.2.1.1 Golden Crab

The golden crab, *Chaceon fenneri* (**Figure 3-1**), is a large gold or buff colored species whose diagnostic characters include a hexagonal carapace; five anterolateral teeth on each side of

carapace; well-developed, large frontal teeth; shallow, rounded orbits; chelipeds unequal; and the dactyli of the walking legs laterally compressed (Manning and Holthuis 1984, 1986). Golden crabs inhabit the continental slope of Bermuda (Luckhurst 1986, Manning and Holthuis 1986) and the southeastern U.S. from off Chesapeake Bay (Schroeder 1959), south through the Straits of Florida and into the eastern Gulf of Mexico (Manning and Holthuis 1984, 1986; Otwell *et al.* 1984; Wenner *et al.* 1987; Erdman 1990).

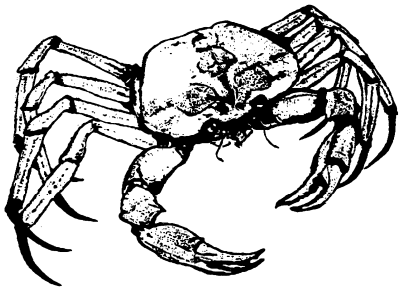

Figure 3-1. Golden Crab, *Chaceon fenneri*.

Reported depth distributions of *C. fenneri* range from 205 meters (672 feet) off the Dry Tortugas (Manning and Holthuis 1984) to 1,007 meters (3,304 feet) (off Bermuda (Manning and Holthuis 1986). Size of males examined ranged from 34 to 139 millimeters (1.3-5.5 inches) carapace length (CL) and females ranged from 39 to 118 millimeters (1.5-4.6 inches) CL. Ovigerous females have been reported during September, October, and November, and ranged in size from 91 to 118 millimeters (3.6-4.6 inches) CL (Manning and Holthuis 1984, 1986).

Reproduction

Reproduction and anatomy of the reproductive tracts of males and females of the golden crab were studied by Hinsch (1988) in specimens collected from deep water of the eastern Gulf of Mexico:

"The male crab is larger than the female. Their reproductive tracts are typical of brachyurans. Light and electron microscopic studies of the testes and vasa deferentia at various times during the year indicate that *G. fenneri* has a single reproductive season. Spermatogenesis begins in the fall. Mating occurs during March and April. The reproductive organs of males are reduced in size from May through September.

The fully developed ovary of golden crabs is purple in color. Females oviposit in September and October. Females undergo vitellogenesis at the same time that they carry eggs undergoing embryonic development. Females with broods have ovaries which vary in color and size. They release their larvae during February and March. Females may be reproductive for several seasons and appear to be capable of mating while in the hardened condition"

Development, growth and movement patterns

Wenner *et al.* (1987) found in the South Atlantic Bight that: "Size-related distribution of *C. fenneri* with depth, similar to that reported for red crab, may occur in the South Atlantic

Bight. We found the largest crabs in the shallowest (274-366 m) and deepest (733-823 m) strata. A clear trend of size-related up-slope migrations such as Wigley *et al.* (1975) reported for *C. quinquedens* (deep-sea red crab) is not apparent, however, because of trap bias for capture of larger crabs of both sexes. Otwell *et al.* (1984) also noted no pattern in size of golden crab by depth for either sex. Tagging studies of red crab off southern New England provided no evidence for migration patterns and indicated instead that tagged crabs seldom moved more than 20 km from their site of release (Lux *et al.* 1982)."

Lindberg and Lockhart (1993) found in the Gulf of Mexico:
"The golden crab *Chaceon fenneri* in the eastern Gulf of Mexico exhibits a typical bathymetric pattern of partial sex zonation and an inverse size-depth relationship, as first reported for red crabs (*C. quinquedens*: Wigley *et al.*, 1975; *C. maritae*: Beyers and Wilke, 1980). Sex segregation, with females shallower than most males, was more evident in our results than in those of Wenner *et al.* (1987) from the South Atlantic Bight, primarily because our trap catch had a higher proportion of females (25.9% compared to 5.2%)."

Ecological relationships
Feeding habits are very poorly known. Golden crabs are often categorized as scavengers that feed opportunistically on dead carcasses deposited on the bottom from overlying waters (Hines 1990).

Abundance and status of stocks
Golden crab abundance studies are limited. Data from the South Atlantic Bight (Wenner *et al.* 1987) estimated abundance from visual assessment was 1.9 crabs per hectare while traps caught between 2 and 10 kilograms (4-22 pounds) per trap. Wenner and Barans (1990) estimated the golden crab population in small areas of 26-29 square kilometers (10-11 square miles) between 300-500 meters (984-1,640 feet) off Charleston to be 5,000-6,000 adult crabs. In the eastern Gulf of Mexico adult standing stock was estimated to be 7.8 million golden crabs and the biomass was estimated to be 6.16 million kilograms (13.6 million pounds) (Lindberg *et al.* 1989). Experimental trapping off Georgia yielded an average catch of 7 kilograms (15 pounds) per trap (Kendall 1990).

Based on exploratory trapping, golden crab maximum abundance occurs between 367 and 549 meters (1,204-1,801 feet) in the South Atlantic Bight. Information on sediment composition suggests that golden crab abundance is influenced by sediment type with highest catches on substrates containing a mixture of silt-clay and foraminiferan shell (Wenner *et al.* 1987).

3.2.2 Other Affected Species

3.2.3 Endangered Species Act (ESA)-Listed Species
Species listed as endangered or threatened under the ESA, along with any designated critical habitat(s) in the action area, are listed below. A review of the species' biology, population status, distribution, and on-going threats is provided in order to evaluate potential effects of the fishery and proposed action(s) on the listed species, as required by Section 7 of the ESA.

Section 7(a)(2) requires federal agencies ensure any activity they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of designated critical habitat.

List of Species and Designated Critical Habitat in the Action Area

Endangered

Blue whale	*Balaenoptera musculus*
Humpback whale	*Megaptera novaeangliae*
Fin whale	*Balaenoptera physalus*
North Atlantic right whale	*Eubalaena glacialis*
Sei whale	*Balaenoptera borealis*
Sperm whale	*Physeter macrocephalus*
Leatherback sea turtle	*Dermochelys coriacea*
Hawksbill sea turtle	*Eretmochelys imbricata*
Kemp's Ridley turtle	*Lepidochelys kempii*
Green turtle*	*Chelonia mydas*
Smalltooth sawfish**	*Pristis pectinata*

*Green turtles in U.S. waters are listed as threatened except the Florida breeding population, which is listed as endangered.
**U.S. distinct population segment.

Threatened

Loggerhead turtle	*Caretta caretta*
Elkhorn coral	*Acropora palmata*
Staghorn coral	*A. cervicornis*

Proposed Species

None

Right Whale Critical Habitat

North Atlantic right whale critical habitat has been designated in the U.S. Southeast Atlantic from the mouth of the Altamaha River, Georgia, to Jacksonville, Florida, out 27 kilometers (15 nautical miles) and from Jacksonville, Florida, to Sebastian Inlet, Florida, out 9 kilometers (5 nautical miles). A portion of this area lies within the EEZ.

Acropora sp. Critical Habitat

The physical feature essential to the conservation of elkhorn and staghorn corals is: substrate of suitable quality and availability to support larval settlement and recruitment, and re-attachment and recruitment of asexual fragments. ''Substrate of suitable quality and availability'' is defined as natural consolidated hard substrate or dead coral skeleton that is free from fleshy or turf macroalgae cover and sediment cover.

Critical habitat includes one specific area of the Atlantic Ocean offshore of Palm Beach, Broward, Miami-Dade, and Monroe counties, Florida, and three specific areas of the Atlantic Ocean and Caribbean Sea offshore of the U.S. Territories of Puerto Rico and the U.S. Virgin Islands. The

boundaries of each specific critical habitat area are described below. Except as specified below, the seaward boundary is the 30-meter (98-foot) depth contour and the shoreward boundary is the line of mean low water (MLW; 33 CFR 2.20). Within these boundaries, discrete areas of water deeper than 30 meters (98 feet) are not included.

(1) Florida Area: The Florida area contains three sub-areas.

(i) The shoreward boundary for Florida sub-area A begins at the 1.8-meter (6-foot) contour at the south side of Boynton Inlet, Palm Beach County at 26° 32′ 42.5″ N; then runs due east to the point of intersection with the 30-meter (98-foot) contour; then follows the 30-meter (98-foot) contour to the point of intersection with latitude 25° 45′ 55″ N, Government Cut, Miami-Dade County; then runs due west to the point of intersection with the 6-foot (1.8-meter) contour, then follows the 1.8-meter (6-foot) contour to the beginning point.

(ii) The shoreward boundary of Florida sub-area B begins at the MLW line at 25° 45′ 55″ N, Government Cut, Miami-Dade County; then runs due east to the point of intersection with the 30-meter (98-foot) contour; then follows the 30-meter (98-foot) contour to the point of intersection with longitude 82° W; then runs due north to the point of intersection with the South Atlantic Fishery Management Council boundary at 24° 31′ 35.75″ N; then follows this boundary to a point of intersection with the MLW line at Key West, Monroe County; then follows the MLW line, the Council boundary (see 50 CFR 600.105(c)), and the COLREGS line (see 33 CFR 80.727. 730, 735, and 740) to the beginning point.

(iii) The seaward boundary of Florida sub-area C (the Dry Tortugas) begins at the northern intersection of the 30-meter (98-foot) contour and longitude 82° 45’ W; then follows the 30-meter (98-foot) contour west around the Dry Tortugas, to the southern point of intersection with longitude 82° 45’ W; then runs due north to the beginning point.

(2) Puerto Rico Area: All areas surrounding the islands of the Commonwealth of Puerto Rico, 30-meter (98-foot) in depth and shallower, seaward of the COLREGS line (see 33 CFR 80.738).

(3) St. Thomas/St. John Area: All areas surrounding the islands of St. Thomas and St. John, U.S. Virgin Islands, and smaller surrounding islands, 30-meter (98-foot) in depth and shallower.

(4) St. Croix Area: All areas surrounding the island of St. Croix, U.S. Virgin Islands, 30-meter (98-foot) in depth and shallower.

Species under U.S. Fish and Wildlife Service (USFWS) Jurisdiction:
Endangered

Bermuda Petrel	*Pterodrama cahow*
Roseate Tern***	*Sterna dougallii*

*** North American populations federally listed under the ESA: endangered on Atlantic coast south to NC, threatened elsewhere.

ESA-Listed Sea Turtles

Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the South Atlantic. The following sections are a brief overview of the general life history characteristics of the sea turtles found in the South Atlantic region. Several volumes exist that cover more thoroughly the biology and ecology of these species (i.e., Lutz and Musick (eds.) 1997, Lutz *et al.* (eds.) 2002).

Green sea turtle hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987, Walker 1994). Pelagic stage green sea turtles are thought to be carnivorous. Stomach samples of these animals found ctenophores and pelagic snails (Frick 1976, Hughes 1974). At approximately 20 to 25 centimeters (8-10 inches) carapace length, juveniles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997). As juveniles move into benthic foraging areas a diet shift towards herbivory occurs. They consume primarily seagrasses and algae, but are also know to consume jellyfish, salps, and sponges (Bjorndal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtles species vary by their life stages. The maximum diving range of green sea turtles is estimated at 110 meters (360 feet) (Frick 1976), but they are most frequently making dives of less than 20 meters (65 feet) (Walker 1994). The time of these dives also varies by life stage. The maximum dive length is estimated at 66 minutes with most dives lasting from 9 to 23 minutes (Walker 1994).

The **hawksbill's** pelagic stage lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 centimeters (8-10 inches) in straight carapace length (Meylan 1988, Meylan and Donnelly 1999). The pelagic stage is followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Little is known about the diet of pelagic stage hawksbills. Adult foraging typically occurs over coral reefs, although other hard-bottom communities and mangrove-fringed areas are occupied occasionally. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998). The hawksbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcareous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely, dives last about 56 minutes (Hughes 1974).

Kemp's ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987, Ogren 1989). Once the juveniles reach approximately 20 centimeters (8 inches) carapace length they move to relatively shallow (less than 50 meters; 164 feet.)

benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridleys feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridleys ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or from discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp's ridleys most routinely make dives of 50 m or less (Soma 1985, Byles 1988). Their maximum diving range is unknown. Depending on the life stage Kemp's ridleys may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985, Mendonca and Pritchard 1986, Byles 1988). Kemp's ridleys may also spend as much as 96% of their time underwater (Soma 1985, Byles 1988).

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean although they will enter coastal waters and are seen over the continental shelf on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherbacks feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks' diets do not shift during their life cycles. Because leatherbacks' ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of 1000 meters (Eckert *et al.* 1989) but more frequently dive to depths of 50 to 84 meters (Eckert *et al.* 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora *et al.* 1984, Eckert *et al.* 1986, Eckert *et al.* 1989, Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora *et al.* 1984).

Loggerhead hatchlings forage in the open ocean and are often associated with *Sargassum* rafts (Hughes 1974, Carr 1987, Walker 1994, Bolten and Balazs 1995). The pelagic stage of these sea turtles are known to eat a wide range of things including salps, jellyfish, amphipods, crabs, syngnathid fish, squid, and pelagic snails (Brongersma 1972). Stranding records indicate that when pelagic immature loggerheads reach 40-60 centimeters (16-23 inches) straight-line carapace length they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic (Witzell 2002). Here they forage over hard- and soft-bottom habitats (Carr 1986). Benthic foraging loggerheads eat a variety of invertebrates with crabs and mollusks being an important prey source (Burke *et al.* 1993). Estimates of the maximum diving depths of loggerheads range from 211 to 233 meters (692-764 feet.) (Thayer *et al.* 1984, Limpus and Nichols 1988). The lengths of loggerhead dives are frequently between 17 and 30 minutes (Thayer *et al.* 1984, Limpus and Nichols 1988, Limpus and Nichols 1994, Lanyan *et al.* 1989) and they may spend anywhere from 80 to 94% of their time submerged (Limpus and Nichols 1994, Lanyan *et al.* 1989).

ESA-Listed Marine Fish

The historical range of the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. In the South Atlantic region, they are most commonly found in Florida, primarily off the Florida Keys (Simpfendorfer and Wiley 2004). Only two

smalltooth sawfish have been recorded north of Florida since 1963 (the first was captured off North Carolina in 1999 (Schwartz 2003) and the other off Georgia 2002 [Burgess unpublished data]). Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 meters (Bigelow and Schroeder 1953, Adams and Wilson 1995), while mature animals occur in waters in excess of 100 meters (Simpfendorfer pers. comm. 2006). Smalltooth sawfish feed primarily on fish. Mullet, jacks, and ladyfish are believed to be their primary food resources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1938, Bigelow and Schroeder 1953).

NMFS convened the Smalltooth Sawfish Recovery Team, comprising sawfish scientists, managers, and environmental managers, to develop a plan to recover the U.S. distinct population segment (DPS) of smalltooth sawfish. The plan recommends specific steps to recover the DPS, focusing on reducing fishing impacts, protecting important habitats, and educating the public. The draft recovery plan was made available for public comment in August 2006 and can be found at www.nmfs.noaa.gov. On May 1, 2009, the Southeast Regional Office, Sustainable Fisheries Division, requested reinitiation of the Endangered Species Act section 7 consultation on the South Atlantic shrimp fishery and its effects on smalltooth sawfish because the amount of authorized incidental take for smalltooth sawfish had been exceeded. The most recent biological opinion on shrimp fishing under the Shrimp Fishery Management Plan for the South Atlantic, completed on February 25, 2005, concluded the continued authorization of the South Atlantic shrimp fishery is not likely to jeopardize the continued existence of smalltooth sawfish. An incidental take statement was issued authorizing the annual incidental lethal take of up to one smalltooth sawfish. A smalltooth sawfish take was observed in a shrimp trawl in the South Atlantic exclusive economic zone (EEZ) on July 26, 2008. It was in poor condition and believed not to have survived the interaction. Three additional smalltooth sawfish were observed taken in a shrimp trawls in the South Atlantic EEZ during a fishing trip from March 5-9, 2009. One of the smalltooth sawfish is thought to have died from the interaction; the other two were released alive and assumed to have survived.

Under the Endangered Species Act (ESA), it is illegal to catch or harm an endangered sawfish. However, some fishermen catch sawfish incidentally while fishing for other species. NMFS and the Smalltooth Sawfish Recovery Team have developed guidelines to fishermen telling them how to safely handle and release any sawfish they catch.

ESA-Listed Marine Invertebrates

Elkhorn (*Acropora palmata)* and staghorn (*A. cervicornis*) coral were listed as threatened under the ESA on May 9, 2006. The Atlantic *Acropora* Status Review (*Acropora* Biological Review Team 2005) presents a summary of published literature and other currently available scientific information regarding the biology and status of both these species.

Elkhorn and **staghorn** corals are two of the major reef-building corals in the wider Caribbean. In the South Atlantic region, they are found most commonly in the Florida Keys; staghorn coral occurs the furthest north with colonies documented off Palm Beach, Florida (26°3'N). The depth range for these species ranges from <1 meter (3 feet) to 60 meters (197 feet). The

optimal depth range for elkhorn is considered to be 1 to 5 meters (3-16 feet) depth (Goreau and Wells 1967), while staghorn corals are found slightly deeper, 5 to 15 meters (16-49 feet) (Goreau and Goreau 1973).

All Atlantic *Acropora* species (including elkhorn and staghorn coral) are considered to be environmentally sensitive, requiring relatively clear, well-circulated water (Jaap *et al.* 1989). Optimal water temperatures for elkhorn and staghorn coral range from 25° to 29°C (77-84°F) (Ghiold and Smith 1990, Williams and Bunkley-Williams 1990). Both species are almost entirely dependent upon sunlight for nourishment, contrasting the massive, boulder-shaped species in the region (Porter 1976, Lewis 1977) that are more dependent on zooplankton. Thus, Atlantic *Acropora* species are much more susceptible to increases in water turbidity than some other coral species.

Fertilization and development of elkhorn and staghorn corals is exclusively external. Embryonic development culminates with the development of planktonic larvae called planulae (Bak *et al.* 1977, Sammarco 1980, Rylaarsdam 1983). Unlike most other coral larvae, elkhorn and staghorn planulae appear to prefer to settle on upper, exposed surfaces, rather than in dark or cryptic ones (Szmant and Miller 2006), at least in a laboratory setting. Studies of elkhorn and staghorn corals indicated that larger colonies of both species[1] had higher fertility rates than smaller colonies (Soong and Lang 1992).

Species of Concern

NOAA Fisheries Service has created a list of Species of Concern as a publicly available list identifying other species of concern. These are species about which NOAA Fisheries Service has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA. NOAA Fisheries Service uses the list to draw proactive attention and conservation action to these species. No federal mandate protects species of concern under the ESA although voluntary protection of these species is urged. To date, no incidental capture of any of these species has been reported in the shrimp fishery or golden crab fishery in the South Atlantic region.

List of Marine Species of Concern in the Southeastern U. S.

Dusky shark	*Carcharhinus obscurus*
Sand tiger shark	*Odontaspis taurus*
Night shark	*Carcharhinus signatus*
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrhynchus*
Mangrove rivulus	*Rivulus mamoratus*
Oposum pipefish	*Microphis barchyurus lineatus*
Key silverside	*Menidia conchorum*
Goliath grouper	*Epinephelus itajara*
Speckled hind	*Epinephelus drummondhayi*
Warsaw grouper	*Epinephelus nigritus*
Nassau grouper	*Epinephelus striatus*
Atlantic white marlin	*Tetrapturus albidus*
Ivory Tree Coral	*Oculina varicosa*

[1] As measured by surface area of the live colony

3.3 Administrative Environment

3.3.1 The Fishery Management Process and Applicable Laws

3.3.1.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the U.S. EEZ, an area extending 200 nautical miles from the seaward boundary of each of the coastal states, and authority over U.S. anadromous species and continental shelf resources that occur beyond the U.S. EEZ.

Responsibility for Federal fishery management decision-making is divided between the U.S. Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for collecting and providing the data necessary for the councils to prepare fishery management plans and for promulgating regulations to implement proposed plans and amendments after ensuring that management measures are consistent with the Magnuson-Stevens Act and with other applicable laws summarized in **Section 8.0**. In most cases, the Secretary has delegated this authority to NOAA Fisheries Service.

The South Atlantic Fishery Management Council is responsible for conservation and management of fishery resources in Federal waters of the U.S. South Atlantic. These waters extend from 3 to 200 miles offshore from the seaward boundary of the States of North Carolina, South Carolina, Georgia, and east Florida to Key West. The Council has thirteen voting members: one from NOAA Fisheries Service; one each from the state fishery agencies of North Carolina, South Carolina, Georgia, and Florida; and eight public members appointed by the Secretary. On the South Atlantic Council there are two public members from each of the four South Atlantic States. Non-voting members include representatives of the U.S. Fish and Wildlife Service, U.S. Coast Guard, State Department, and Atlantic States Marine Fisheries Commission (ASMFC). The South Atlantic Council has adopted procedures whereby the non-voting members serving on the Council Committees have full voting rights at the Committee level but not at the full Council level. Council members serve three-year terms and are recommended by State Governors and appointed by the Secretary of Commerce from lists of nominees submitted by State governors. Appointed members may serve a maximum of three consecutive terms.

Public interests also are involved in the fishery management process through participation on Advisory Panels and through council meetings, which, with few exceptions for discussing personnel matters, are open to the public. The Council uses a Scientific and Statistical Committee to review the data and science being used in assessments and fishery management plans/amendments. In addition, the regulatory process is in accordance with the Administrative Procedures Act, in the form of "notice and comment" rulemaking.

3.3.1.2 State Fishery Management

The state governments of North Carolina, South Carolina, Georgia, and Florida have authority to manage fisheries that occur in waters extending three nautical miles from their respective shorelines. North Carolina's marine fisheries are managed by the Marine Fisheries Division of the North Carolina Department of Environment and Natural Resources. The Marine Resources Division of the South Carolina Department of Natural Resources regulates South Carolina's marine fisheries. Georgia's marine fisheries are managed by the Coastal Resources Division of the Department of Natural Resources. The Marine Fisheries Division of the Florida Fish and Wildlife Conservation Commission is responsible for managing Florida's marine fisheries. Each state fishery management agency has a designated seat on the South Atlantic Council. The purpose of state representation at the council level is to ensure state participation in Federal fishery management decision-making and to promote the development of compatible regulations in state and Federal waters.

The South Atlantic states are also involved through the ASMFC in management of marine fisheries. This commission was created to coordinate state regulations and develop management plans for interstate fisheries. It has significant authority, through the Atlantic Striped Bass Conservation Act and the Atlantic Coastal Fisheries Cooperative Management Act, to compel adoption of consistent state regulations to conserve coastal species. The ASFMC also is represented at the Council level, but does not have voting authority at the Council level.

NOAA Fisheries Service' State-Federal Fisheries Division is responsible for building cooperative partnerships to strengthen marine fisheries management and conservation at the state, inter-regional, and national levels. This division implements and oversees the distribution of grants for two national (Inter-jurisdictional Fisheries Act and Anadromous Fish Conservation Act) and two regional (Atlantic Coastal Fisheries Cooperative Management Act and Atlantic Striped Bass Conservation Act) programs. Additionally, it works with the ASMFC to develop and implement cooperative State-Federal fisheries regulations.

3.3.2 Enforcement

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

Neither NOAA/OLE nor the USCG can provide a continuous law enforcement presence in all areas due to the limited resources of NOAA/OLE and the priority tasking of the USCG. To supplement at-sea and dockside inspections of fishing vessels, NOAA entered into Cooperative Enforcement Agreements with Florida, Georgia, and South Carolina which granted authority to state officers to enforce the laws for which NOAA/OLE has jurisdiction. In recent years, the level of involvement by the states has increased through Joint Enforcement Agreements, whereby states conduct patrols that focus on Federal priorities

and, in some circumstances, prosecute resultant violators through the state when a state violation has occurred.

NOAA General Counsel issued a revised Southeast Region Magnuson-Stevens Act Penalty Schedule in June 2003, which addresses all Magnuson-Stevens Act violations in the Southeast Region. In general, this Penalty Schedule increases the amount of civil administrative penalties that a violator may be subject to up to the current statutory maximum of $120,000 per violation.

3.4 **Human Environment**

3.4.1 Golden Crab Fishery

3.4.1.1 Description of Regulations, Harvest Methods and Gear

The description below was summarized from observations recorded by Council staff (Gregg Waugh, pers. communication) on a commercial golden crab fishing trip aboard the *Lady Mary*, the fishing vessel belonging to the Nielsen family. Additional information was obtained during the course of presentations by fishermen at the April 1995 Council meeting, the 2008 Golden Crab Advisory Panel meeting and a meeting that took place in October 2008 among golden crab fishermen, Council and NOAA Fisheries Service staffs, and NOAA Office of Law Enforcement.

The golden crab fishery employs baited traps attached with gangions to a 5/8" polypropylene line up to 8 kilometers (5 miles) long. There are 20 to 50 traps per line, or "trawl," set 152 meters (500 feet) apart. Fishermen may fish 4 trawls in a two-week period pulling 100 traps one week and 100 the next (Howard Rau, pers. communication). In 2008, vessels in the golden crab fishery averaged 17 meters (57 feet) in length (Golden Crab AP, 2008)

A typical trip to fish for golden crabs begins with the vessel leaving the dock at 3:00 a.m. Bait wells to be placed in the traps are prepared on the way out. The bait consists of available fish heads and racks (cod, snapper, grouper, dolphin, mackerel or any other available fish), chicken parts, pigs' feet, etc. Four and a half hours after leaving dock, the vessel is on site and the crew ready to begin the process of picking up traps and deploying new ones. When the traps are retrieved, the empty bait container is removed and a full one is put in place. It was estimated that at least 65 tons of bait were being used in this fishery at the time this description was compiled.

Trawls are set south to north with the current in areas of soft mud adjacent to deepwater coral habitat. However, due to the strong currents the string of traps may settle on the seabed up to one and a half miles away, east or west, from the vessel. The location of deployment is noted using GPS; buoys are not used to mark the location of traps due to strong currents. Retrieval begins at the south end of the trawl. To begin retrieval, the main line, which may be sitting 305 meters (1,000 feet) below, must be grappled. The success of this operation depends on currents and sea conditions. Also, fishermen must note the conditions during trap deployment in order to predict how far the traps may have moved and where the traps will be located relative to their GPS coordinates. Some vessels rely on their depth finders to locate the gear on the bottom. At different times of the year, when the current is not as swift and is

moving in a favorable direction, it is easier to place the grapple on the bottom. The grapple consists of links of large chain and is used to hook the main line towards one end of the string. On the observed trip, the grapple did not appear to have disturbed the bottom. Sometimes, however, the grapple or the trap itself may have mud adhered to it when it is pulled out of the water.

Once the grapple successfully hooks the main line, the line is pulled up and looped over the pulley allowing crew members to pull over to the first trap on the line. Traps are stacked on deck as the string is worked toward the short end of the line. Upon reaching one end of the line, the vessel turns around to work the string toward the other end. It takes approximately two hours to work a string of traps. The determining factor for how long a day of fishing will last is how quickly each trap string can be grappled. Sometimes it is necessary to move traps up or down the slope, keeping the same latitude and moving in a range of 8 to 24 kilometers (5-15 miles) east or west in order to avoid hardbottom or to follow the crabs. After a soak period, traps may be moved as described depending on the success of the catch. Nine to 13 kilograms (20-30 pounds) of crabs per trap is a desirable catch. On a good season, fishermen may catch 32 to 45 kilograms (70-100 pounds) per trap.

Golden crab traps have two entrances, one on the top and one on the bottom. As each trap is brought on deck, the empty bait wells are replaced with full ones. A spike coming up from the bottom of the frame holds the bait well in place. The trap string is deployed off the stern. The end of the string is weighted and its position recorded using GPS.

Towards the stern of the vessel is a spacious ice hold. As the traps are retrieved and brought on deck, golden crabs are removed by hand. The crabs are immediately placed into plastic boxes or coolers and layered with ice. As each crab is removed from the trap, a crew member checks its size (weight) and sex. All females and individuals weighing less than 1 ¼ pounds are released back into the water. Only male crabs are harvested because, since the beginning of this fishery, fishermen felt that an integral factor in the sustainable harvest of this resource was not to harvest the females. Besides, females are smaller than males and therefore less marketable.

On the observed trip, three trawls were retrieved (about 100 traps) out of which only 20-25 crabs were discarded. Such a low number of crabs are released upon trap retrieval because the majority of the culling is being accomplished through the escape panels while the traps are still submerged. Thus, escape gaps are very effective in culling out undersized individuals.

Detailed trap description

The modern golden crab traps are constructed of 3/8" smooth rebar. The latter makes it easier to place the stainless steel hog rings on it to hold the wire in place. The trap is 1.2 meters (4 feet) long, 76 centimeters (30 inches) wide and 46 centimeters (18 inches) high. The body of the trap consists of 1" x 2" mesh and 14 gauge galvanized wire with plastic coating. The corners of the trap are reinforced with zinc to prevent the wire from falling off. The zinc reinforcements are replaced every four or five months as they wear out. At the time

this description was compiled (1995), golden crab traps cost about $100 to construct. A golden crab trap weighs approximately 30 pounds.

The trap has two funnels through which the crabs enter the trap. Initially one entrance funnel was placed in the center of the trap. However, fishermen soon realized that traps sometimes landed on the bottom upside down thus preventing the crabs' from entering the trap. The only crabs that would then have access to the bait would be the smaller ones that could enter through the escape gaps. Fishermen then designed the traps with two funnels on opposite sides of the trap that were offset to either side. That way, if the trap landed in such a way as to cover up one of the funnels, it would still be able to fish through the other.

Degradable wire is used to lock the traps. To open the trap, the wire is simply cut. Since the main trap door is shut using degradable wire, ghost fishing is not a concern if the trap becomes lost. In addition, traps are required to have two escape gaps on either side of the trap to allow females and small individuals to escape.

Allowable gear

Traps are the only allowable gear in the golden crab fishery. Rope is the only allowable material for mainlines and buoy line. Maximum trap size is 1.8 cubic meters (64 cubic feet) in volume in the Northern zone and 1.4 cubic meters (48 cubic feet) in volume in the Middle and Southern zones. Traps must have at least 2 escape gaps or rings and an escape panel. Traps must be identified with a permit number.

3.4.1.2 Bycatch

[inset bycatch info for golden crab fishery]

3.4.1.3 Economic Description

The Golden Crab Fishery Management Plan was approved and implemented on August 27, 1996 and established three golden crab fishing zones. The Northern Zone is defined as the EEZ north of 28 degrees N. latitude. The Middle Zone is contained within the EEZ between 25 degrees North and 28 degrees North latitude. The Southern Zone extends south from 25 degrees North latitude within the South Atlantic Council's EEZ (see **Figure 4-a**). Federal permits are issued for a specific zone and fishing is allowed only in that zone for which the permit is issued.

Initially 35 vessels were granted permits to operate in this fishery: 27 permits were issued for the southern zone; 6 permits were issued for the middle zone; and 2 permits were granted to vessels for the northern zone. Other management regulations imposed by the golden crab FMP included: dealer and vessel permitting and reporting; limitations on the size of vessels; prescribing allowable gear (including escape gaps and escape panels); and prohibiting possession of female crabs (see the FMP for a complete list of measures).

Number of Participants

The number of permit holders that land golden crab has fluctuated from year to year (**Table 3-a**). The greatest number of vessels making landings since 1995 was 14 (**Table 3-b**). In recent years, only 5 to 6 vessels have landed any golden crab. The majority of vessels

currently fishing for golden crab have Middle Zone permits. In 1997, 1998, and 2000, there were more vessels fishing for golden crab with Southern Zone permits than Middle Zone permits. Only in 2006 and 2007 have vessels with Northern Zone permits participated in the fishery.

Table 3-a. Numbers of active permit holders and vessels landing golden crab, 1996-2007. Source: SEFSC, 2008.

Year	Permit Holders	Vessels Making Landings
1996	34	4
1997	35	14
1998	29	14
1999	11	8
2000	10	10
2001	8	6
2002	12	7
2003	14	6
2004	12	5
2005	11	5
2006	12	6
2007	11	6

Table 3-b. Number of vessels making landings by Zone, 1995-2007.
Source: SEFSC, 2008.

Year	Northern	Middle	Southern
1995	0	confidential	0
1996	0	4	0
1997	0	5	9
1998	0	7	7
1999	0	6	confidential
2000	0	4	6
2001	0	4	confidential
2002	0	5	confidential
2003	0	5	confidential
2004	0	confidential	confidential
2005	0	5	0
2006	confidential	4	confidential
2007	confidential	5	0

Information on the golden crab fishery participation was taken from logbook data (SEFSC 2008), and Accumulative Landings System (ALS) data. If there are three or less participants in the fishery, landings and effort information are confidential.

Annual and Monthly Landings

Total landings and landings by zone of golden crab are shown in **Table 3-c**. **Figure 3-4** shows these data in chart form. Golden crab landings reached a peak of over 1 million pounds in 1997. Since then, landings have averaged about 550,000 pounds annually.

However, the trend shows an average of 665,000 pounds from 1998-2002 and 355,000 pounds from 2003-2006.

The overwhelming majority of landings in recent years have come from the Middle Zone (90-100%) (**Table 3-c**). However, historically, a significant portion of landings came from the Southern Zone (up to 36%). Beginning in 2006, landings there were some landings from the Northern Zone, however that data is confidential. Landings from the Middle Zone have averaged around 470,000 pounds since 1996 with a high of about 662,000 pounds in 1997. Landings from the Southern Zone were significant 1997 through 2001. Landings peaked at about 373,000 pounds in 1997.

Table 3-c. Landings of golden crab by Zone, 1995-2007.
Source: SEFSC, 2008.

Year	Northern Zone	Middle Zone	Southern Zone	Total
1995	0	confidential	confidential	61,660
1996	0	523,160	0	523,160
1997	0	661,896	372,551	1,034,447
1998	0	361,480	156,836	518,316
1999	0	confidential	confidential	682,224
2000	0	584,130	257,617	841,747
2001	0	confidential	confidential	781,138
2002	0	confidential	confidential	500,774
2003	0	confidential	confidential	359,087
2004	0	confidential	confidential	278,336
2005	0	432,846	0	432,846
2006	confidential	566,780	confidential	599,374
2007	confidential	confidential	0	502,292

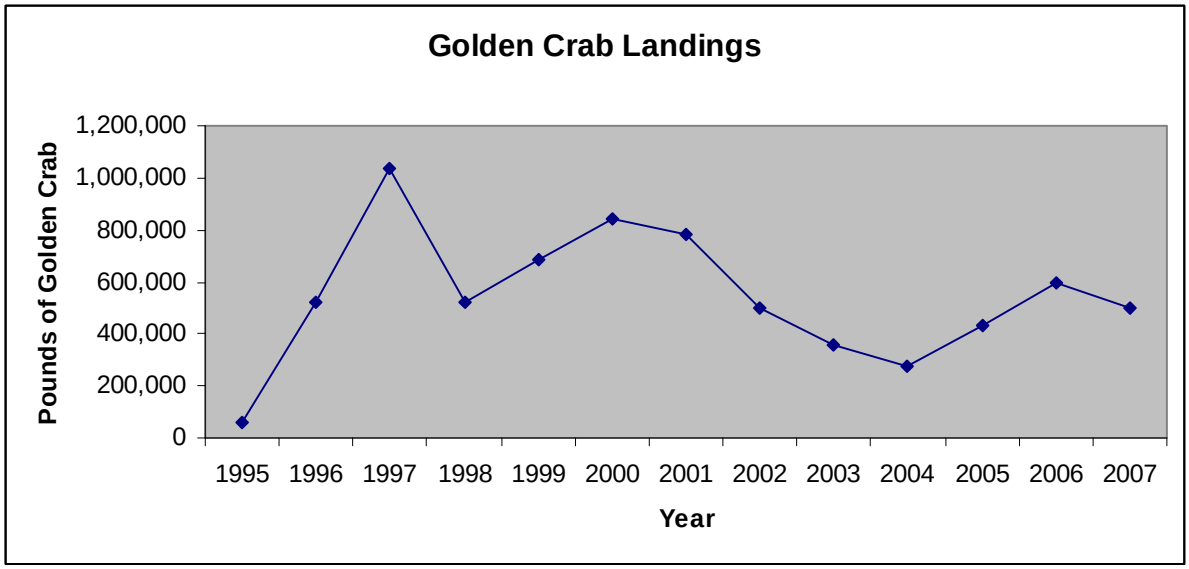

Figure 3-4. Landings of Golden Crab, 1995-2007.

Source: SEFSC 2008.

Figure 3-5 shows monthly golden crab landings from 2003 to 2007. Golden crab landings have varied widely from month to month over the past 5 years. In general, more golden crab are landed from May to December than in the first half of the year due to Keys fishermen entering the fishery in the second half of the year after the spiny lobster season winds down. On average, from 1996 to 2007, 45% of total golden crab landings were made between January and May while 55% of landings were made between May and December.

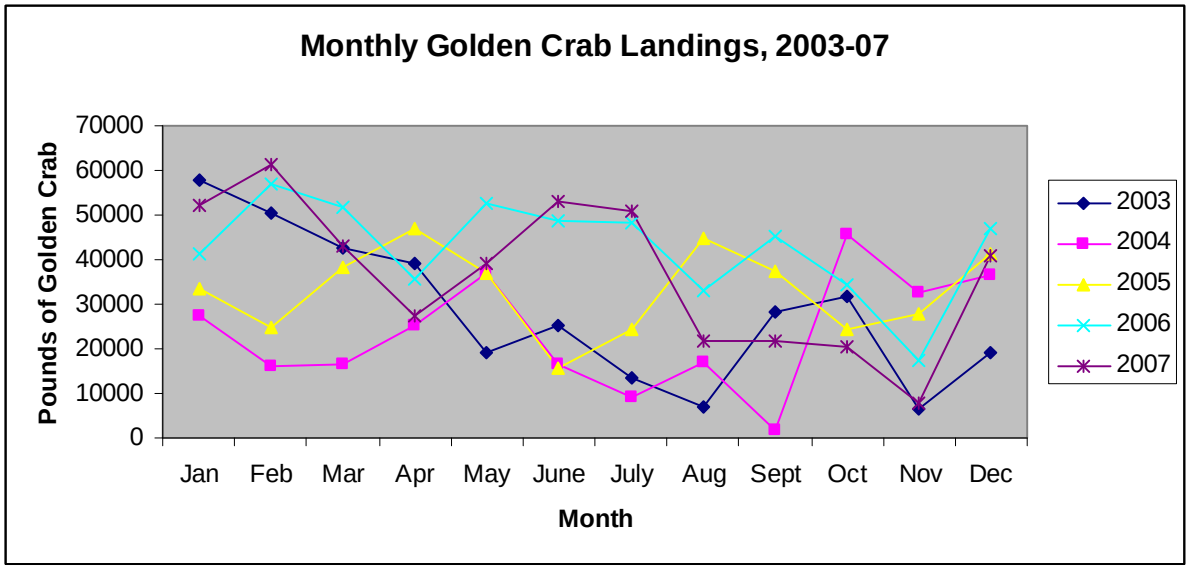

Figure 3-5. Monthly golden crab landings, 2003-2007.
Source: ALS data.

Golden crab is viewed in the marketplace as a substitute for snow crab clusters. Most of the product is processed into clusters, which is not as favored as other large crab species such as snow crabs. The golden crab market is strongly influenced by the wholesale market for snow crabs (Antozzi 1998). A large proportion of the Alaskan catch of snow crab goes to Japan and the drop in the value of the yen can reduce export demand for this product. The excess supply entered the domestic market and lowered snow crab prices, which may be partly responsible for depressed golden crab prices. The increase in production from Russia and Canada also magnified this problem.

Antozzi (1997) concluded that the market for golden crab is inhibited from expanding due to a supply constraint. He attributes this lack of production to the difficulty and cost of operating in this fishery, which requires a sizable investment in specialized gear including on-board holding facilities that keep crabs alive. This fishery takes place in deep water and this can result in lengthy trips under adverse sea conditions. Some industry members have stated that vessels larger than 15 meters (50 feet) are needed to cope with rough sea conditions offshore and to provide the stability needed for trap deployment and retrieval.

The future outlook for this market will be strongly influenced by the market supply of other large crabs, and the health of export markets. The outlook on this market would improve if this product could be viewed as more than just a substitute for snow crabs.

In recent years, ex-vessel price value has ranged from $1.25 to $1.55 per pound (Howard Rau, personal communication, 2008).

3.4.1.4 Social and Cultural Environment

The fishing communities of North Carolina, South Carolina and Georgia are included in the FEP (SAFMC, 2009); however, the actions proposed in this amendment are limited to the golden crab fishery that currently operate off the east coast of Florida. Thus, presented below is information to provide the reader a general view of the potential fishing communities existing off the east coast of Florida.

Florida Fishing Infrastructure and Community Characterization

The following tables provide a general view of the presence or absence of fishing infrastructure located within the coastal communities of Florida with substantial fishing activity. There are many other attributes that might have been included in this table; however, because of inconsistency in rapid appraisal for all communities, these items were selected as the most consistently reported or had secondary data available to determine presence or absence. In some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. **Table 3-13** offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 3-13. Fishing infrastructure table for Florida potential fishing communities.

Community	Federal Commercial Permits (5+)	State Commercial Licenses (10+)	Federal Charter Permits (5+)	Seafood Landings	Seafood retail markets	Fish processors, Wholesale fish house	Recreational docks / marinas	Recreational Fishing Tournaments	Total
Atlantic Beach	-	+	-	+	+	+	+	-	5
Big Pine Key	+	+	+	+	+	+	+	-	7
Boca Raton	+	+	-	-	+	-	+	-	4
Cape Canaveral	+	+	-	+	+	+	+	+	7
Fernandina Beach	+	+	+	+	+	+	+	+	8
Fort Pierce	+	+	+	+	+	+	+	+	8
Islamorada	+	+	+	+	+	+	+	+	8
Jupiter	+	+	+	+	+	+	+	+	8
Key Largo	+	+	+	+	+	+	+	+	8
Key West	+	+	+	+	+	+	+	+	8
Marathon	+	+	+	+	+	+	+	+	8
Merritt Island	+	+	-	+	+	+	+	-	6
Palm Beach	+	+	-	+	+	-	+	+	6
Ponce Inlet	+	+	+	+	+	+	+	+	8

Sebastian	+	+	+	+	+	+	+	+	8
St. Augustine	+	+	+	+	+	+	+	+	8

In attempting a preliminary characterization of potential fishing communities in **Table 3-14**, we have provided a grouping of communities that appear to have more involvement in various fishing enterprises and therefore are classified as primarily involved. These communities have considerable fishing infrastructure, but also have a history and culture surrounding both commercial and recreational fishing that contributes to an appearance and perception of being a fishing community in the mind of residents and others. The communities are not ranked in any particular order, this is merely a categorization.

Table 3-14. Preliminary Characterization of Potential Fishing Communities in Florida.

Primarily-Involved	Secondarily-Involved
Fernandina Beach	Atlantic Beach
Fort Pierce	Boca Raton
Islamorada	Palm Beach
Jupiter	
Key Largo	
Key West	
Marathon	

Many of these communities are in transition due to various social and demographic changes from coastal development, growing populations, increasing tourism, changing regulations, etc. This preliminary characterization is just that and should not be considered a definite designation as fishing community, but a general guide for locating communities that may warrant consideration as a potential fishing community.

4 Environmental Consequences

4.1 **Action 1.**

Alternative 1. No action.

Alternative 2.

Effects on Protected Species

4.1.1 Economic Effects

General Effects

4.1.1.1 Commercial Fishery

4.1.1.2 Non-Use Value

4.1.2 Social Effects

4.1.3 Administrative Effects

4.1.4 Conclusion

4.2 Action 2.

4.2.1 Biological Effects

Effects on Protected Species

4.2.2 Economic Effects

4.2.3 Social Effects

4.2.4 Administrative Effects

4.2.5 Conclusion

4.3 Action 3.

4.3.1 Biological Effects

Effects on Protected Species

4.3.2 Economic Effects

4.3.3 Social Effects

4.3.4 Administrative Effects

4.3.5 Conclusion

4.4 **Action 4.**

4.4.1 Biological Effects

Effects on Protected Species

4.4.2 Economic Effects

4.4.3 Social Effects

4.4.4 Administrative Effects

4.4.5 Conclusion

4.5 **Cumulative Effects**

As directed by the National Environmental Policy Act (NEPA), federal agencies are mandated to assess not only the indirect and direct impacts, but the cumulative impacts of proposed actions as well. NEPA defines a cumulative impact as *"the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time"* (40 CFR 1508.7). Cumulative effects can either be additive or synergistic. A synergistic effect is when the combined effects are greater than the sum of the individual effects.

The Council on Environmental Quality (CEQ) offers guidance on conducting a Cumulative Effects Analysis (CEA) in a report titled "Considering Cumulative Effects under the National Environmental Policy Act" (CEQ 1997). The report outlines 11 items for consideration in drafting a CEA for a proposed action.

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
2. Establish the geographic scope of the analysis.
3. Establish the timeframe for the analysis.
4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.
5. Characterize the resources, ecosystem, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses.
6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
7. Define a baseline condition for the resources, ecosystems, and human communities.
8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
9. Determine the magnitude and significance of cumulative effects.
10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.
11. Monitor the cumulative effects of the selected alternative and adapt management.

4.5.1 Biological

SCOPING FOR CUMULATIVE EFFECTS

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.

The CEQ cumulative effects guidance states that this step is done through three activities. The three activities and the location in the document are as follows:

I. The direct and indirect effects of the proposed action (**Section 4.0**);

II. Which resources, ecosystems, and human communities are affected (**Section 3.0**). Which effects are important if from a cumulative effects perspective (information contained in this CEA).

2. Establish the geographic scope of the analysis.

The immediate impact area would be the federal 200-nautical mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West; specifically, deepwater ecosystems identified in **Section 3.0**.

3. Establish the timeframe for the analysis.

It would be advantageous to go back to a time when there was a natural, or some modified (but ecologically sustainable) condition. However, data collection for many fisheries began when species were already fully exploited. Therefore, the timeframe for any analysis should be initiated when data collection began for the subject fishery. In determining how far into the future to analyze cumulative effects, the length of the effects would depend on the species. This amendment would…

4. Identify the other actions affecting the resources, ecosystems, and human communities of concern

The cumulative effects to the human communities are discussed in **Section 4.0.**
Listed are other past, present, and reasonably foreseeable actions occurring in the South Atlantic region. These actions, when added to the proposed management measures, may result in cumulative effects on the biophysical environment.

I. Fishery-related actions affecting South Atlantic golden crab.

A. Past

The reader is referred to **Section 1.3 History of Management** for past regulatory activity for golden crab.

B. Present

In this amendment the Council has recommended:

B. Reasonably Foreseeable Future

II. Non-Council and other non-fishery related actions, including natural events affecting deepwater coral, shrimp, and golden crab.

A. Past
B. Present
C. Reasonably foreseeable future

AFFECTED ENVIRONMENT

5. **Characterize the resources, ecosystem, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses.**

This step should identify the trends, existing conditions, and the ability to withstand stresses of the environmental components.

6. **Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.**

7. Define a baseline condition for the resources, ecosystems, and human communities.

The purpose of defining a baseline condition for the resource and ecosystems in the area of the proposed action is to establish a point of reference for evaluating the extent and significance of expected cumulative effects.

DETERMINING THE ENVIRONMENTAL CONSEQUENCES OF CUMULATIVE EFFECTS

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.

The relationship between human activities and biophysical ecosystems within the context of this amendment is solely related to extractive activities and the installment of regulations as outlined in **Table 4-X**.

9. Determine the magnitude and significance of cumulative effects.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

The cumulative effects on the biophysical environment are expected to be negligible. Therefore, avoidance, minimization, and mitigation are not necessary.

11. Monitor the cumulative effects of the selected alternative and adapt management.

The effects of the proposed action are, and will continue to be, monitored through collection of data by NOAA Fisheries Service, states, stock assessments, stock assessment updates, life history studies, and other scientific observations.

4.5.1.1 Effects on protected species

ESA-listed species that occur within areas where the action area would be located and that may be impacted by unrelated, future, non-federal activities reasonably certain to occur within the action area include:

Marine Mammals

Sea Turtles

Fish

4.5.2 Socioeconomic

A description of the human environment and associated key fishing communities is contained in **Section 3.4** and incorporated herein by reference.

4.5.3 Administrative

4.6 Bycatch Practicability Analysis

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

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

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

Agency guidance provided at 50 CFR §600.350(d)(3)(ii) suggests the Councils adhere to the precautionary approach found in the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (Article 6.5) when faced with uncertainty concerning these ten practicability factors. According to Article 6.5 of the FAO Code of Conduct for Responsible Fisheries, using the absence of adequate scientific information as a reason for postponing or failing to take measures to conserve target species,

associated or dependent species, and non-target species and their environment, would not be consistent with a precautionary approach.

4.6.1 Population Effects for the Bycatch Species

4.6.1.1 Background

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

4.6.2 Ecological Effects Due to Changes in the Bycatch of the Species

4.6.3 Changes in Bycatch of Other Fish Species and Resulting Population and Ecosystem Effects

4.6.4 Effects on Marine Mammals and Birds

4.6.5 Changes in Fishing, Processing, Disposal, and Marketing Costs

4.6.6 Changes in Fishing Practices and Behavior of Fishermen

4.6.7 Changes in Research, Administration, and Enforcement Costs and Management Effectiveness

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

4.6.9 Changes in the Distribution of Benefits and Costs

4.6.10 Social Effects

The Social Effects of the proposed management measures are described in **Section 4.0**.

4.6.11 Conclusion

4.7 Unavoidable Adverse Effects

4.8 Effects of the Fishery on the Environment

4.8.1 Effects on Ocean and Coastal Habitats

4.8.2 Public Health and Safety

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

4.8.3 Endangered Species and Marine Mammals

4.9 Relationship of Short-Term Uses and Long-Term Productivity

4.10 Irreversible and Irretrievable Commitments of Resources

4.11 Monitoring and Mitigation Measures

5 Regulatory Impact Review

5.1 Introduction

The NOAA Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest. The RIR does three things: (1) it provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action; (2) it provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and (3) it ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR also serves as the basis for determining whether the proposed regulations are a 'significant regulatory action' under the criteria provided in Executive Order (E.O.) 12866 and provides information that may be used in conducting an analysis of impacts on small business entities pursuant to the Regulatory Flexibility Act (RFA). This RIR analyzes the expected impacts of this action on the golden crab fishery. Additional details on the expected economic effects of the various alternatives in this action are included in **Section 4.0** and are incorporated herein by reference.

5.2 Problems and Objectives

The purpose and need, issues, problems, and objectives of the proposed amendment are presented in **Section 1.0** and are incorporated herein by reference. In summary, the purpose of this amendment includes

5.3 Methodology and Framework for Analysis

This RIR assesses management measures from the standpoint of determining the resulting changes in costs and benefits to society. To the extent practicable, the net effects of the proposed measures are stated in terms of producer and consumer surplus, changes in profits, and participation by for-hire vessel fishermen and private anglers. In addition, the public and private costs associated with the process of developing and enforcing regulations of this amendment are provided.

5.4 Description of the Fishery

5.5 Impacts of Management Measures

Details on the economic impacts of all alternatives are included in **Section 4.0** and are included herein by reference. The following discussion provides a summary of the expected effects of the preferred alternatives.

5.6 Public and Private Costs of Regulations

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

Council costs of document preparation, meetings, public hearings, and information dissemination	$
NOAA Fisheries administrative costs of document preparation, meetings and review	$
Annual law enforcement costs	unknown
TOTAL	$

Law enforcement currently monitors regulatory compliance in these fisheries under routine operations and does not allocate specific budgetary outlays to these fisheries, nor are increased enforcement budgets expected to be requested to address any component of this action.

5.7 **Summary of Economic Impacts**

5.8 **Determination of Significant Regulatory Action**

6 Initial Regulatory Flexibility Analysis

6.1 Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration. The RFA does not contain any decision criteria; instead, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of various alternatives contained in the FMP or amendment (including framework management measures and other regulatory actions) and to ensure that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the FMP and applicable statutes.

With certain exceptions, the RFA requires agencies to conduct a regulatory flexibility analysis for each proposed rule. The regulatory flexibility analysis is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. In addition to analyses conducted for the RIR, the regulatory flexibility analysis provides: (1) a statement of the reasons why action by the agency is being considered; (2) a succinct statement of the objectives of, and legal basis for the proposed rule; (3) a description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply; (4) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; (5) an identification, to the extent practical, of all relevant Federal rules which may duplicate, overlap, or conflict with the proposed rule; and (6) a description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities.

In addition to the information provided in this section, additional information on the expected economic impacts of the proposed action was presented in **Sections 4.0** and **5.0** and is included herein by reference.

6.2 Statement of Need for, Objectives of, and Legal Basis for the Rule

The purpose and need, issues, problems, and objectives of the proposed rule are presented in **Section 1.0** and are incorporated herein by reference. The purpose and need, issues, problems, and objectives of the proposed amendment are presented in **Section 1.0** and are incorporated herein by reference. In summary, the purpose of this amendment includes

6.3 Identification of All Relevant Federal Rules Which May Duplicate, Overlap, or Conflict with the Proposed Rule

No duplicative, overlapping, or conflicting Federal rules have been identified.

6.4 Description and Estimate of the Number of Small Entities to Which the Proposed Rule will Apply

This proposed action is expected to directly impact commercial fishermen. The SBA has established size criteria for all major industry sectors in the U.S. including fish harvesters. A business involved in fish harvesting is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of $4.0 million (NAICS code 114111 and 114112, finfish and shellfish fishing) for all its affiliated operations worldwide.

6.5 Description of the Projected Reporting, Record-keeping and Other Compliance Requirements of the Proposed Rule, Including an Estimate of the Classes of Small Entities Which will be Subject to the Requirement and the Type of Professional Skills Necessary for the Preparation of the Report or Records

The proposed actions do not impose any new reporting, record-keeping or other compliance requirements.

6.6 Substantial Number of Small Entities Criterion

6.7 Significant Economic Impact Criterion

The outcome of 'significant economic impact' can be ascertained by examining two issues: disproportionality and profitability.

Disproportionality: Do the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities?

All entities that are expected to be affected by the proposed rule are considered small entities so the issue of disproportionality does not arise in the present case.

Profitability: Do the regulations significantly reduce profit for a substantial number of small entities?

6.8 Description of Significant Alternatives

The Council's preferred alternatives are:

7 Fishery Impact Statement – Social Impact Assessment

7.1 Summary of Biological Effects

7.2 Summary of Economic Effects

7.3 Summary of Social Effects

7.4 Summary of Administrative Effects

7.5 Note for CEQ Guidance to Section 1502.22

In accordance with the CEQ Guidance for 40 CFR Section 1502.22 of the NEPA (1986), the Council has made "reasonable efforts, in the light of overall costs and state of the art, to obtain missing information which, in its judgment, is important to evaluating significant adverse impacts on the human environment"…At this time, the Council has made reasonable efforts in light of the costs, to obtain additional social and community information in order to analyze the social impacts of the proposed actions and alternatives. However, additional sociologists or anthropologists and funding are needed to conduct community surveys and needed enthnographies that would allow a comprehensive analysis.

7.6 E.O. 12898: Environmental Justice

This Executive Order mandates that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions. Federal agency responsibilities under this Executive Order include conducting their programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefit of, or subjecting persons to discrimination under, such programs, policies and activities, because of their race, color, or national origin. Furthermore, each federal agency responsibility set forth under this Executive Order shall apply equally to Native American programs.

Specifically, federal agencies shall, to the maximum extent practicable: conduct human health and environmental research and analysis; collect human health and environmental data; collect, maintain, and analyze information on the consumption patterns of those who principally rely on fish and/or wildlife for subsistence; allow for public participation and access to information relating to the incorporation of environmental justice principals in Federal agency programs or policies; and share information and eliminate unnecessary

duplication of efforts through the use of existing data systems and cooperative agreements among Federal agencies and with State, local, and tribal governments.

The Council conducted XX scoping meetings for this amendment in which the public was invited to provide input on actions contained therein. Comments received were considered during the development of this amendment, and no environmental justice issues were raised during the scoping process. No Native American programs would be affected by actions contained within this amendment; therefore no tribal consultation has been initiated.

8 Other Applicable Law

8.1 Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedures Act (APA) (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NMFS is required to publish notification of proposed rules in the Federal Register and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it takes effect, with some exceptions. This amendment complies with the provisions of the APA through the Council's extensive use of public meetings, requests for comments and consideration of comments. The proposed rule associated with this amendment will have request for public comments which complies with the APA.

8.2 Information Quality Act

The Information Quality Act (Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-443)) which took effect October 1, 2002, directed the Office of Management and Budget (OMB) to issue government-wide guidelines that "provide policy and procedural guidelines to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." OMB directed each federal agency to issue its own guidelines, establish administrative mechanisms allowing affected persons to seek and obtain correction of information that does not comply with OMB guidelines, and report periodically to OMB on the number and nature of complaints.

The NOAA Section 515 Information Quality Guidelines require a series of actions for each new information product subject to the Information Quality Act. This document has used the best available information and made a broad presentation thereof. The process of public review of this document provides an opportunity for comment and challenge to this information, as well as for the provision of additional information.

The information contained in this document was developed using best available scientific information. Therefore, this Amendment and EIS are in compliance with the IQA.

8.3 Coastal Zone Management Act

Section 307(c)(1) of the federal Coastal Zone Management Act (CZMA) of 1972 requires that all federal activities that 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 South Atlantic Council to have management measures that complement those of the states, Federal and state administrative procedures vary and regulatory changes are unlikely to be fully instituted at the same time. Based on the analysis of the environmental consequences of the proposed action in Section 4.0, the Council has concluded this amendment would improve Federal management of deepwater coral ecosystems.

The Council believes this amendment is consistent to the maximum extent practicable with the Coastal Zone Management Plans of Florida, Georgia, South Carolina, and North Carolina. This determination will be submitted to the responsible state agencies under Section 307 of the CZMA administering approved Coastal Zone Management Programs in the States of Florida, South Carolina, Georgia, and North Carolina.

8.4 Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 U.S.C. Section 1531 et seq.) requires that federal agencies must ensure actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or the habitat designated as critical to their survival and recovery. The ESA requires NOAA Fisheries Service to consult with the appropriate administrative agency (itself for most marine species, and the U.S. Fish and Wildlife Service for all remaining species) when proposing an action that may affect threatened or endangered species or adversely modify critical habitat. Consultations are necessary to determine the potential impacts of the proposed action. They are concluded informally when proposed actions may affect but are "not likely to adversely affect" threatened or endangered species or designated critical habitat. Formal consultations, resulting in a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" threatened or endangered species or adversely modify designated critical habitat. There have been no known interactions between the golden crab fishery and endangered species in the South Atlantic region and due to the nature of the fishing activity any interactions are expected to be minimal.

8.5 Executive Order 12612: Federalism

E.O. 12612 requires agencies to be guided by the fundamental federalism principles when formulating and implementing policies that have federalism implications. The purpose of the Order is to guarantee the division of governmental responsibilities between the Federal government and the States, as intended by the framers of the Constitution. No federalism issues have been identified relative to the actions proposed in this amendment and associated regulations. Therefore, preparation of a Federalism assessment under E.O. 13132 is not necessary.

8.6 Executive Order 12866: Regulatory Planning and Review

E.O. 12866, signed in 1993, requires federal agencies to assess the costs and benefits of their proposed regulations, including distributional impacts, and to select alternatives that maximize net benefits to society. To comply with E.O. 12866, NMFS prepares a Regulatory Impact Review (RIR) for all fishery regulatory actions that implement a new FMP or that significantly amend an existing plan. RIRs provide a comprehensive analysis of the costs and benefits to society associated with proposed regulatory actions, the problems and policy objectives prompting the regulatory proposals, and the major alternatives that could be used to solve the problems. The reviews also serve as the basis for the agency's determinations as to whether proposed regulations are a "significant regulatory action" under the criteria provided in E.O. 12866 and whether proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the RFA. A regulation is

significant if it is likely to result in an annual effect on the economy of at least $100,000,000 or if it has other major economic effects.

In accordance with E.O. 12866, the following is set forth by the Council: (1) this rule is not likely to have an annual effect on the economy of more than $100 million or to adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; (2) this rule is not likely to create any serious inconsistencies or otherwise interfere with any action take or planned by another agency; (3) this rule is not likely to materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; (4) this rule is not likely to raise novel or policy issues arising out of legal mandates, or the principles set forth in the Executive Order; (5) this rule is not controversial.

8.7 Executive Order 12898: Environmental Justice

E.O. 12898 requires that "to the greatest extent practicable and permitted by law…each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations in the United States and its territories and possessions…"

The alternatives being considered in this amendment are not expected to result in any disproportionate adverse human health or environmental effects to minority populations or low-income populations of Florida, North Carolina, South Carolina or Georgia, rather the impacts would be spread across all participants in the golden crab and shrimp fisheries participants regardless of race or income.

8.8 Executive Order 12962: Recreational Fisheries

E.O. 12962 requires Federal agencies, in cooperation with States and Tribes, to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities through a variety of methods including, but not limited to, developing joint partnerships; promoting the restoration of recreational fishing areas that are limited by water quality and habitat degradation; fostering sound aquatic conservation and restoration endeavors; and evaluating the effects of Federally-funded, permitted, or authorized actions on aquatic systems and evaluating the effects of Federally-funded, permitted, or authorized actions on aquatic systems and recreational fisheries, and documenting those effects. Additionally, the order establishes a seven member National Recreational Fisheries Coordination Council responsible for, among other things, ensuring that social and economic values of healthy aquatic systems that support recreational fisheries are considered by Federal agencies in the course of their actions, sharing the latest resource information and management technologies, and reducing duplicative and cost-inefficient programs among Federal agencies involved in conserving or managing recreational fisheries. The Council also is responsible for developing, in cooperation with Federal agencies, States and Tribes, a Recreational Fishery Resource Conservation Plan - to include a five-year agenda. Finally, the Order requires NMFS and the U.S. Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

The alternatives considered in this amendment are consistent with the directives of E.O. 12962.

8.9 **Executive Order 13089: Coral Reef Protection**

E.O. 13089, signed by President William Clinton on June 11, 1998, recognizes the ecological, social, and economic values provided by the Nation's coral reefs and ensures that Federal agencies are protecting these ecosystems. More specifically, the Order requires Federal agencies to identify actions that may harm U.S. coral reef ecosystems, to utilize their program and authorities to protect and enhance the conditions of such ecosystems, and to ensure that their actions do not degrade the condition of the coral reef ecosystem.

The alternatives considered in this amendment are consistent with the directives of E.O. 13089.

8.10 **Executive Order 13158: Marine Protected Areas**

E. O. 13158 was signed on May 26, 2000 to strengthen the protection of U.S. ocean and coastal resources through the use of Marine Protected Areas (MPAs). The E.O. defined MPAs as "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." It directs federal agencies to work closely with state, local and non-governmental partners to create a comprehensive network of MPAs "representing diverse U.S. marine ecosystems, and the Nation's natural and cultural resources".

The alternatives considered in this amendment are consistent with the directives of E.O. 13158.

8.11 **Marine Mammal Protection Act**

The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas. It also prohibits the importing of marine mammals and marine mammal products into the United States. Under the MMPA, the Secretary of Commerce (authority delegated to NOAA Fisheries Service) is responsible for the conservation and management of cetaceans and pinnipeds (other than walruses). The Secretary of the Interior is responsible for walruses, sea otters, polar bears, manatees, and dugongs.

Part of the responsibility that NOAA Fisheries Service has under the MMPA involves monitoring populations of marine mammals to make sure that they stay at optimum levels. If a population falls below its optimum level, it is designated as "depleted." A conservation plan is then developed to guide research and management actions to restore the population to healthy levels.

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. This amendment required the preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction; development

and implementation of take-reduction plans for stocks that may be reduced or are being maintained below their optimum sustainable population levels due to interactions with commercial fisheries; and studies of pinniped-fishery interactions. The MMPA requires a commercial fishery to be placed in one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals. Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing; Category II designates fisheries with occasional serious injuries and mortalities; Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities.

Under the MMPA, to legally fish in a Category I and/or II fishery, a fisherman must take certain steps. For example, owners of vessels or gear engaging in a Category I or II fishery, are required to obtain a marine mammal authorization by registering with the Marine Mammal Authorization Program (50 CFR 229.4). They are also required to accommodate an observer if requested (50 CFR 229.7(c)) and they must comply with any applicable take reduction plans.

The golden crab fishery in the South Atlantic is listed as a Category III fishery in the 2009 Proposed List of Fisheries (LOF)(73 FR 33760; June 13, 2008). No incidentally killed or injured marine mammal species has been documented in this fishery.

8.12 **Migratory Bird Treaty Act and Executive Order 13186**

The Migratory Bird Treaty Act (MBTA) implemented several bilateral treaties for bird conservation between the United States and Great Britain, the United States and Mexico, the United States and Japan, and the United States and the former Union of Soviet Socialists Republics. Under the MBTA, it is unlawful to pursue, hunt, take, capture, kill, possess, trade, or transport any migratory bird, or any part, nest, or egg of a migratory bird, included in treaties between the, except as permitted by regulations issued by the Department of the Interior (16 U.S.C. 703-712). Violations of the MBTA carry criminal penalties. Any equipment and means of transportation used in activities in violation of the MBTA may be seized by the United States government and, upon conviction, must be forfeited to it.

Executive Order 13186 directs each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement a memorandum of understanding (MOU) with the U.S. Fish and Wildlife Service (USFWS) to conserve those bird populations. In the instance of unintentional take of migratory birds, NOAA Fisheries Service would develop and use principles, standards, and practices that will lessen the amount of unintentional take in cooperation with the USFWS. Additionally, the MOU would ensure that NEPA analyses evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern.

An MOU is currently being developed, which will address the incidental take of migratory birds in commercial fisheries under the jurisdiction of NOAA Fisheries Service. NOAA Fisheries Service must monitor, report, and take steps to reduce the incidental take of seabirds that occurs in fishing operations. The United States has already developed the U.S.

National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries. Under that plan many potential MOU components are already being implemented.

The alternatives considered in this amendment are consistent with the directives of E.O. 13186.

8.13 **National Environmental Policy Act**

This amendment to the Councils' Golden Crab FMP has been written and organized in a manner that meets NEPA requirements, and thus is a consolidated NEPA document, including a draft Environmental Impact Statement, as described in NOAA Administrative Order (NAO) 216-6, Section 6.03.a.2.

Purpose and Need for Action
The purpose and need for this action are described in **Section 1.1.**

Alternatives
The alternatives for this action are described in **Section 2.0.**

Affected Environment
The affected environment is described in **Section 3.0**.

Impacts of the Alternatives
The impacts of the alternatives on the environment are described in **Section 4.0.**

8.14 **National Marine Sanctuaries Act**

Under the National Marine Sanctuaries Act (NMSA) (also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972), as amended, the U.S. Secretary of Commerce is authorized to designate National Marine Sanctuaries to protect distinctive natural and cultural resources whose protection and beneficial use requires comprehensive planning and management. The National Marine Sanctuary Program is administered by the Sanctuaries and Reserves Division of the NOAA. The Act provides authority for comprehensive and coordinated conservation and management of these marine areas. The National Marine Sanctuary Program currently comprises 13 sanctuaries around the country, including sites in American Samoa and Hawaii. These sites include significant coral reef and kelp forest habitats, and breeding and feeding grounds of whales, sea lions, sharks, and sea turtles. The two main sanctuaries in the South Atlantic EEZ are Gray's Reef and Florida Keys National Marine Sanctuaries.

The alternatives considered by this document are not expected to have any adverse impacts on the resources managed by the Gray's Reef and Florida Keys National Marine Sanctuaries.

8.15 **Paperwork Reduction Act**

The purpose of the Paperwork Reduction Act (PRA) is to minimize the burden on the public. The Act is intended to ensure that the information collected under the proposed action is needed and is collected in an efficient manner (44 U.S.C. 3501 (1)). The authority to manage information collection and record keeping requirements is vested with the Director of the

Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications. The PRA requires NMFS to obtain approval from the OMB before requesting most types of fishery information from the public.

8.16 **Regulatory Flexibility Act**

The Regulatory Flexibility Act (RFA) of 1980 (5 U.S.C. 601 et seq.) requires Federal agencies to assess the impacts of regulatory actions implemented through notice and comment rulemaking procedures on small businesses, small organizations, and small governmental entities, with the goal of minimizing adverse impacts of burdensome regulations and record-keeping requirements on those entities. Under the RFA, NMFS must determine whether a proposed fishery regulation would have a significant economic impact on a substantial number of small entities. If not, a certification to this effect must be prepared and submitted to the Chief Counsel for Advocacy of the Small Business Administration. Alternatively, if a regulation is determined to significantly impact a substantial number of small entities, the Act requires the agency to prepare an initial and final Regulatory Flexibility Analysis to accompany the proposed and final rule, respectively. These analyses, which describe the type and number of small businesses, affected, the nature and size of the impacts, and alternatives that minimize these impacts while accomplishing stated objectives, must be published in the Federal Register in full or in summary for public comment and submitted to the chief counsel for advocacy of the Small Business Administration. Changes to the RFA in June 1996 enable small entities to seek court review of an agency's compliance with the Act's provisions.

This amendment document includes an Initial Regulatory Flexibility Analysis (IRFA) in **Section 6.0**.

8.17 **Small Business Act**

Enacted in 1953, the Small Business Act requires that agencies assist and protect small-business interests to the extent possible to preserve free competitive enterprise. The objectives of the act are to foster business ownership by individuals who are both socially and economically disadvantaged; and to promote the competitive viability of such firms by providing business development assistance including, but not limited to, management and technical assistance, access to capital and other forms of financial assistance, business training, and counseling, and access to sole source and limited competition federal contract opportunities, to help firms achieve competitive viability. Because most businesses associated with fishing are considered small businesses, NMFS, in implementing regulations, must make an assessment of how those regulations will affect small businesses.

8.18 **Public Law 99-659: Vessel Safety**

Public Law 99-659 amended the MSFCMA to require that a FMP or FMP 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 a fishery for vessels that would be otherwise prevented from participating in the fishery because of safety concerns related to weather or to other ocean conditions.

No vessel would be forced to participate in South Atlantic fisheries under adverse weather or ocean conditions as a result of the imposition of management regulations proposed in this amendment.

No concerns have been raised by South Atlantic fishermen or by the U.S. 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, this amendment proposes neither procedures for making management adjustments due to vessel safety problems nor procedures to monitor, evaluate, or report on the effects of management measures on vessel or crew safety under adverse weather or ocean conditions.

9 List of Preparers

Interagency CE-BA 1 Planning Team/Reviewers

10 List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent

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

11 References

Acropora Biological Review Team. 2005. Atlantic *Acropora* Status Review Document. Report to National Marine Fisheries Service, Southeast Regional Office, March 3. 152 p + App.

GMFMC (Gulf of Mexico Fishery Management Council) and South Atlantic Fishery Management Council. 1982. Fishery Management Plan and Final Environmental Impact Statement for Coral and Coral Reefs of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 881, Tampa, Florida. 316 pp.

GMFMC (Gulf of Mexico Fishery Management Council) and South Atlantic Fishery Management Council. 1990. Amendment 1 and Final Environmental Impact Statement for Coral and Coral Reefs of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 881, Tampa, Florida.

GMFMC (Gulf of Mexico Fishery Management Council) and South Atlantic Fishery Management Council. 1994. Amendment 2 and Final Environmental Impact Statement for Coral and Coral Reefs of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 881, Tampa, Florida. 316 pp.

GMFMC (Gulf of Mexico Fishery Management Council). 1995. Amendment 8 to the fishery management plan for the shrimp fishery of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 881, Tampa, Florida.

GMFMC (Gulf of Mexico Fishery Management Council). 2005a. Final Amendment Number 13 to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters. Available at: http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/shrimp%20Amend%2013%20Final%.pdf

GMFMC (Gulf of Mexico Fishery Management Council). 2005b. Shrimp Amendment 13 FAQs. Available at: http://www.gulfcouncil.org/Beta/GMFMCWeb/Shrimp12FAQs.htm

Jaap, W. C., W. G. Lyons, P. Dustan, and J. C. Halas. 1989. Stony coral (Scleractinia and Milleporina) community structure at Bird Key Reef, Ft. Jefferson National Monument, Dry Tortugas, Florida. Florida Marine Research Publication 46: 31.

Jensen, A. and R. Frederickson. 1992. The fauna associated with the bank-forming deepwater coral *Lophelia pertusa* (Scleractinia) on the Faroe Shelf. Sarsia 77: 53-69.

Keinath, J. A. and J. A. Musick. 1993. Movements and diving behavior of a leatherback sea turtle, *Dermochelys coriacea*. Copeia, 1993:1010.

Keiser, R. K. 1976. Distribution of the Rock Shrimp (*Sycionia brevirostris*) in coastal waters of the southeastern United States. South Carolina Marine Resources Research Institute, Charleston, SC. 19 p.

Kendall, D. 1990. An Assessment of the Georgia golden crab fishery. Pages 18-19 *In*: Lindberg, W. J. and E. L. Wenner (eds.). 1990. Geryonid Crabs and Associated Continental Slope Fauna: A Research Workshop Report. S.C. Sea Grant Consortium and FL Sea Grant College Program. FL SG Technical Paper 58:61 pp.

Kennedy F. S., J. J. Crane, R. A. Schlieder, and D. G. Barber. 1977. Studies of the rock shrimp, *Sycionia brevirostris*. A new fishery on Florida's Atlantic Shelf. Florida Department of Natural Resources, Marine Research Laboratory, St. Petersburg, FL. 69 p.

Koenig, C. C. 2001. Oculina Banks: habitat, fish populations, restoration and enforcement. Report to the South Atlantic Fishery Management Council available at http://www.safmc.net

Koslow, J. A., G. W. Boehlert, J. D. M. Gordon, R. L. Haedrich, P. Lorance, and N. Parin. 2000. Continental slope and deep-sea fisheries: implications for a fragile ecosystem. ICES Journal of Marine Science 57: 548–557.

Krieger, K. J. and B. L. Wing. 2002. Megafaunal associations with deepwater corals (*Primnoa* spp.) in the Gulf of Alaska. Hydrobiologia 471:83-90.

Lanyon, J. M., C. J. Limpus, and H. Marsh. 1989. Dugongs and turtles: grazers in the seagrass system. *In*: Larkum, A.W.D, A. J. McComb and S. A. Shepard (eds.). Biology of Seagrasses. Elsevier, Amsterdam, 610p.

Leeworthy, V. S., and P. C. Wiley. 2002. Socioeconomic impact analysis of marine reserve alternatives for the Channel Islands National Marine Sanctuary. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects, Silver Spring, MD.

Lewis, J. B. 1977. Suspension feeding in Atlantic reef corals and the importance of suspended particulate matter as a food source. Proceedings of the 3rd International Coral Reef Symposium 1:405-408.

Limpus, C. J. and N. Nichols. 1988. The southern oscillation regulates the annual numbers of green turtles (*Chelonia mydas*) breeding around northern Australia. Australian Journal of Wildlife Research, 15:157.

Limpus, C. J. and N. Nichols. 1994. Progress report on the study of the interaction of El Niño Southern Oscillation on annual *Chelonia mydas* numbers at the southern Great Barrier Reef rookeries. *In*: Proceedings of the Australian Marine Turtle Conservation Workshop, Queensland, Australia.

Lindberg, W. J., N. J. Blake, H. M. Perry, R. S. Waller, F. D. Lockhart, and R. B. Erdman. 1989. Fisheries development of the deep-sea golden crab, *Geryon fenneri*: Geographic and seasonal production potential in the Gulf of Mexico. Final Project Report. Marine Fisheries Initiation Program, National Marine Fisheries Service, 98pp.

Lindberg, W. J. and F. D. Lockhart. 1993. Depth-stratified population structure of Geryonid crabs in the eastern Gulf of Mexico. Journal Crustacean Biology 13(4): 713-732.

Low, R. N. and G. F. Ulrich. 1983. Deep-water demersal finfish resources and fisheries off South Carolina. S.C. Mar. Resour. Cent. Tech. Rep. No. 57, 24 p.

Luckhurst, B. 1986. Discovery of deep-water crabs (Geryon spp.) at Bermuda – A new potential fishery resource. Proceedings of the Gulf and Caribbean Fisheries Institute, 37th Meeting. P. 209-211.

Lumsden S. E, T. F. Hourigan, A. W. Bruckner, G. Dorr (eds.). 2007. The State of Deep Coral Ecosystems of the United States. NOAA Technical Memorandum CRCP-3. Silver Spring, MD.

Lutz, P. L. and J. A. Musick (eds.). 1997. The Biology of Sea Turtles. CRC Press, Boca Raton, Florida.

Lutz, P. L., J. A. Musick, and J. Wyneken. 2002. The Biology of Sea Turtles, Volume II. CRC Press, Boca Raton, Florida.

Lux, F. E., A. R. Ganz, and W. F. Rathjen. 1982. Marking studies on the red crab, *Geryon quinquedens* Smith off southern New England. J. Shellfish Res. 2(1): 71-80.

Manning, R. B. and L. B. Holthuis. 1984. *Geryon fenneri*, a new deep-water crab from Florida (Crustacea: Decapoda: Geryonidae). Proceedings of the Biological Society of Washington 97:666-673.

Manning, R. B. and L. B. Holthuis. 1986. Notes on the *Geryon* from the Bahamas, with the description of *Geryon inghami*, a new species (Crustacea: Decapoda: Geryonidae). Proceedings of the Biological Society of Washington 99: 366-373.

Márquez -M, R. 1994. Synopsis of biological data on the Kemp's ridley turtles, *Lepidochelys kempii* (Garman, 1880). NOAA Technical Memorandum, NMFS-SEFSC-343. Miami, FL.

Masson, D. G., B. J. Bett, and D. S. M. Billet. 2003. The origin of deep-water, coral topped mounds in the northern Rockall Trough, Northeast Atlantic. Marine Geology 194:159-180.

McCosker, J. E. and S. W. Ross. In press. A new deepwater species of the snake eel genus *Ophichthus* (Anguilliformes: Ophicthidae), from North Carolina. Copeia.

McGoodwin, J. R. 1990. Crisis in the World's Fisheries, Stanford: Stanford University Press.

Mendonca, M. T. and P. C. H. Pritchard. 1986. Offshore movements of post-nesting Kemp's ridley sea turtles (*Lepidochelys kempi*). Herpetologica, 42:373.

Messing, C. G., A. C. Neuman, and J. C. Lang. 1990. Biozonations of deep-water lithoherms and associated hardgrounds in the northeastern Straits of Florida. Palaios 5:15-33.

Meylan, A. 1984. Feeding Ecology of the Hawksbill turtle (*Eretmochelys imbricata*): Spongivory as a Feeding Niche in the Coral Reef Community. Ph.D., University of Florida, Gainesville, FL.

Meylan, A. 1988. Spongivory in hawksbill turtles: a diet of glass. Science 239:393-395.

Meylan, A. B. and M. Donnelly. 1999. Status justification for listing the hawksbill turtle (*Eretmochelys imbricata*) as critically endangered on the 1996 IUCN Red List of Threatened Animals. Chelonian Conservation and Biology 3(2): 200-204.

Milliman, J. D. 1972. Atlantic Continental Shelf and Slope of the United States- Petrology of the sand fraction of sediments, northern New Jersey to southern Florida. U.S.G.S. Prof. Pap. 529-J. 40 pp.

Morgan, L. E. and R. Chuenpagdee. 2003. Shifting gears: addressing the collateral impacts of fishing methods in U.S. waters. Island Press, Washington. 42 p.

Mortensen, P. B. 2000. *Lophelia pertusa* in Norwegian waters: distribution, growth and associated fauna. Ph.D. Dissertation, University of Bergen, Department of Fisheries and Marine Biology.

_____, L. Buhl-Mortensen, D.C. Gordon Jr., G. B. J. Fader, D. L. McKeown and D. G. Fenton. 2005. Effects of fisheries on deepwater gorgonian corals in the Northeast Channel, Nova Scotia. *In* Barnes, P. W. and J. P. Thomas (eds.). Benthic habitats and the effects of fishing. American Fisheries Society Symposium 41. Bethesda, MD.

_____, and J. H. Fosså. 2006. Species diversity and spatial distribution of invertebrates on *Lophelia* reefs in Norway. Pages 1849-1868 *In:* Proceedings of the 10th International Coral Reef Symposium, Okinawa, Japan.

_____, and H. T. Rapp. 1998. Oxygen and carbon isotope ratios related to growth line patterns in skeletons of *Lophelia pertusa* (L) (Anthozoa, Scleractinia): implications for determination of linear extension rates. Sarsia 83: 433-446.

Mortimer, J. A. 1981. The feeding ecology of the West Caribbean green turtle (*Chelonia mydas*) in Nicaragua. Biotropica 13:49.

Mortimer, J. A. 1982. Feeding ecology of sea turtles. *In*: Bjorndal, K. A. (ed.). Biology and Conservation of Sea Turtles. Smithsonian Institute Press, Washington, D.C.

Myers, R. A. and G. Mertz. 1998. Reducing uncertainty in the biological basis of fisheries management by meta-analysis of data from many populations: A synthesis. Fish. Res. 37: 51-60.

NOAA Fisheries Service. 2000. Smalltooth Sawfish Status Review. NOAA National Marine Fisheries Service, Southeast Regional Office. St. Petersburg, FL. 73 p.

NOAA Fisheries Service. 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce, National Marine Fisheries Service, Miami, FL SEFSC Contribution PRD-00/01-08, Parts I-III and Appendices I-VI.

NOAA Fisheries Service. 2004. Final programmatic supplemental groundfish environmental impact statement for Alaska groundfish fisheries. U.S. Department of Commerce, NOAA, NMFS, Alaska Region, Juneau.

NOAA (National Oceanic and Atmospheric Administration). 2004a. Historical Highlights, 1950s. Available at: http://www.nefs.noaa.gov/history/timeline/1950.html

NOAA (National Oceanic and Atmospheric Administration). 2004b. Historical Highlights, 1960s. Avaialble at http://nefs.noaa.gov/history/timeline/1960.html

NOAA (National Oceanic and Atmospheric Administration). 2004c. Baird's Legacy; Progress and Change 1947-1971. Avaialble at http://www.nefsc.noaa.gov/history/stories/legacy/1947-71.html

Nance, J. M. (Editor). 1998. Report to Congress. Southeastern United States Shrimp Trawl Bycatch Program. NOAA National Marine Fisheries Service, Southeast Fisheries Science Center Galveston Laboratory, 154 p.

NRC (National Research Council). 2002. Effects of Trawling and Dredging on Seafloor Habitat: Phase 1. National Research Council, National Research Council Committee on Ecosystem Effects of Fishing. National Academies Press, Washington, DC.

National Shrimp Festival. 2004. Shrimp Info. Available at: http://www.gulf-shores-shrimp-festival.com/shrimp-info-recipies.html

Norman, J. R. and F. C. Fraser. 1938. Giant Fishes, Whales and Dolphins. W.W. Norton and Company, Inc, New York, NY. 361 pp.

NPFMC (North Pacific Fishery Management Council). 2003. Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/ Aleutian Islands region. North Pacific Fishery Management Council, Anchorage, AK.

Ogren, L. H. 1989. Distribution of juvenile and subadult Kemp's ridley turtles: Preliminary results from the 1984-1987 surveys. *In*: C.W. Caillouet, Jr. and A. M. Landry, Jr. (eds.) Proceedings from the 1st Symposium on Kemp's ridley Sea Turtle Biology, Conservation, and Management. Sea Grant College Program, Galveston, TX. 116p.

Otwell, W. S., J. Bellairs, and D. Sweat. 1984. Initial development of a deep sea crab fishery in the Gulf of Mexico. Fla. Sea Grant Coll. Rep. No. 61, 29p.

Paredes, R. P. 1969. Introduccion al Estudio Biologico de *Chelonia mydas agassizi* en el Perfil de Pisco. M.S. Thesis, Universidad Nacional Federico Villareal, Lima, Peru.

Paull, C. K., A. C. Neumann, B. A. am Ende, W. Ussler, III, and N. M. Rodriguez. 2000. Lithoherms on the Florida-Hatteras slope. Marine Geology 166: 83-101. Abstract.

Perez-Farfante, I. 1977. American solenocerid shrimps of the genera *Hymenopenaeus*, *Halioporides*, *Pleoticus*, *Hadropenaeus* new genus, and *Mesopenaeus* new genus. U.S. Fish. Bull. 75:261-346.

Perry, H. and K. Larsen. 2004. Picture Guide to Shelf Invertebrates of the Northern Gulf of Mexico. NOAA/NMFS. Avaialble at: http://www.gsmfc.org/seamap/picture_guide/main.htm

Popenoe, P. and F. T. Manheim. 2001. Origin and history of the Charleston Bump-geological formations, currents, bottom conditions, and their relationship to wreckfish habitats on the Blake Plateau. Pages 43-93 *In:* G. R. Sedberry (ed.). Island in the Stream: oceanography and fisheries of the Charleston Bump. American Fisheries Society Symposium 25. American Fisheries Society, Bethesda, MD.

Porter, J. W. 1976. Autotrophy, heterotrophy, and resource partitioning in Caribbean reef corals. Amer Nat 110: 731-742.

Puglise, K. A., R. J. Brock, and J. J. McDonough. 2005. Identifying critical information needs and developing institutional partnerships to further the understanding of Atlantic deep-sea coral ecosystems. *In* Freiwald, A. and J. M. Roberts (eds). Cold-water corals and ecosystems. Springer-Verlag, Berlin.

Reed, J. K. 1983. Nearshore and shelf-edge *Oculina* coral reefs: the effects of upwelling on coral growth and on the associated faunal communities. NOAA Symposium Series Undersea research 1:119-124.

_____. 2002b. Comparison of deep-water coral reefs and lithoherms off southeastern U.S.A. Hydrobiologia 471: 57–69.

Reed, J. K., S. A. Pomponi, D. Weaver, C. K. Paull, and A. E. Wright. 2005a. Deep-water sinkholes and bioherms of south Florida and the Pourtales Terrace-habitat and fauna. Bulletin of Marine Science 77: 267-296.

Reed, J. K., A. Shepard, C. Koenig, K. Scanlon, and G. Gilmore. 2005b. Mapping, habitat characterization, and fish surveys of the deep-water *Oculina* coral reef Marine Protected Area: a review of historical and current research. Pages 443-465 *In:* Freiwald, A., and J. M. Roberts (eds.). Cold-water Corals and Ecosystems, Proceedings of Second International Symposium on Deep Sea Corals, Sept. 9-12, 2003, Erlangen, Germany, Springer-Verlag, Berlin Heidelberg.

Reed, J. K., D. C. Weaver, and S. A. Pomponi. 2006. Habitat and fauna of deep-water *Lophelia pertusa* coral reefs off the southeastern U.S.: Blake Plateau, Straits of Florida, and Gulf of Mexico. Bulletin of Marine Science 78: 343–375.

Rezak, R., T. J. Bright, and D. W. McGrail. 1985. Reefs and Banks of the Northwestern Gulf of Mexico. New York: John Wiley and Sons.

Richer de Forges, B., J. A. Koslow, and G. C. B. Poore. 2000. Diversity and endemism of the benthic seaount fauna in the southwest Pacific. Nature 405:944-947.

Risk, M. J., J. M. Heikoop, M. G. Snow, and R. Beukens. 2002. Lifespans and growth patterns of two deep-sea corals: *Primnoa resedaeformis* and *Desmophyllum cristagalli*. Hydrobiologia 471 (1-3): 125-131.

Rogers, A. D. 1999. The biology of *Lophelia pertusa* (Linnaeus 1758) and other deep-water reef-forming corals and impacts from human activities. International Review of Hydrobiology 84: 315-406.

Rogers, A. D. 2004. The biology, ecology and vulnerability of seaount communities. International Union for the Conservation of Nature and Natural Resources http:///www.iucn.org/themes/marine/pdf/AlexRogers-CBDCOP7-Seamounts-Complete.pdf

Ross, S. W. and M. S. Nizinski. 2007. State of the U.S. Deep Coral Ecosystems in the Southeastern United States Region: Cape Hatteras to the Florida Straits. NOAA Tech. Memo. NMFS-OPR-29. Silver Spring, MD.

Ross, S. W. and A. M. Quattrini. 2007. The Fish Fauna Associated with Deep Coral Banks off the Southeastern United States. Deep-sea Research I 54:975-1007.

Rothschild, B. J. 1986. Dynamics of marine fish populations. Harvard University Press, Cambridge, MA.

Rylaarsdam, K.W. 1983. Life histories and abundance patterns of colonial corals on Jamaican reefs. Mar Ecol Prog Ser 13: 249-260.

SAFMC (South Atlantic Fishery Management Council). 1988. Amendment 1 to the Snapper Grouper Fishery Management Plan. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1990. Amendment 1 to the Fishery Management Plan for Coral and Coral Reefs, (Including Environmental Assessment, Regulatory Impact Review, and Initial Regulatory Flexibility Analysis). Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 881, Tampa, Florida. 18 pp.

SAFMC (South Atlantic Fishery Management Council). 1991a. Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 184 p + appendices.

SAFMC (South Atlantic Fishery Management Council). 1991b. Amendment 5 (Wreckfish) to the Snapper Grouper Fishery Management Plan. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1995. Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407. 239 pp.

SAFMC (South Atlantic Fishery Management Council). 1996a. Amendment 1 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region (Rock Shrimp). South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 118 p + appendices.

SAFMC (South Atlantic Fishery Management Council). 1996b. Amendment 2 (Bycatch Reduction) to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 108p + appendices.

SAFMC (South Atlantic Fishery Management Council). 1997. Framework Seasonal Adjustment #1. Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1998a. Habitat Plan for the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Ste 306, Charleston, S.C. 29407-4699

SAFMC (South Atlantic Fishery Management Council). 1998b. Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1998c. Comprehensive Amendment Addressing Sustainable Fishery Act Definitions and Other Required Provisions in Fishery Management Plans of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 151 pp.

SAFMC (South Atlantic Fishery Management Council). 2000. Amendment 3 to the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 2002a. Amendment 5 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region (Rock Shrimp). South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 139 p + appendices.

SAFMC (South Atlantic Fishery Management Council). 2002b. Fishery Management Plan for Pelagic *Sargassum* Habitat. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 228 p.

SAFMC (South Atlantic Fishery Management Council). 2003a. Fishery Management Plan for the Dolphin and Wahoo Fishery of the Atlantic. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 2003b. Fishery Management Plan for the Dolphin and Wahoo Fishery of the Atlantic. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 2005. Amendment 6 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 256p + appendices.

SAFMC (South Atlantic Fishery Management Council). 2007. Amendment 14 to the Snapper Grouper Fishery Management Plan. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201; North Charleston, SC 29405.

SAFMC (South Atlantic Fishery Management Council). 2009. Snapper Grouper Amendment 16. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405.

SAFMC (South Atlantic Fishery Management Council). 2008. Amendment 7 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, , 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405. 186 pp.

SAFMC (South Atlantic Fishery Management Council). 2009a. Snapper Grouper Amendment 15B. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405.

SAFMC (South Atlantic Fishery Management Council). 2009b. Fishery Ecosystem Plan For the South Atlantic Region, Volumes I-V. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405. 3,000 pp.

SAFMC (South Atlantic Fishery Management Council). 2009c. Comprehensive Ecosystem-Based Amendment 1. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405.

SAFMC (South Atlantic Fishery Management Council). In prep. Snapper Grouper Amendment 17. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405.

SAFMC (South Atlantic Fishery Management Council). In prep. Comprehensive Annual Catch Limits (ACL) Amendment. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405.

Sammarco, P. W. 1980. *Diadema* and its relationship to coral spat mortality: grazing, competition, and biological disturbance. Journal of Experimental Marine Biology and Ecology 45:245-272.

Sanchirico, J. N., K. A. Cochran, and P. M. Emerson. 2002. Marine protected areas: economic and social implications. Resources for the Future, Discussion Paper 02-26, Washington, D.C.

Scelzo, M. A. and E. E. Boschi. 1975. Cultivo del langostino *Hymenopenaeus muelleri* (Crustacea, Decapoda, Penaeidae). Physis, Secc. A, 34: 193-197.

Schroeder, W. C. 1959. The lobster *Homarus americanus*, and the red crab, *Geryon quinquedenes*, in the offshore waters of the western North Atlantic. Deep-Sea Research 5: 266-279.

Schwartz, F. J. 2003. Bilateral asymmetry in the rostrum of the smalltooth sawfish, *Pristis pectinata* (pristiformes: family pristidae). Journal of North Carolina Academy of Science, 119:41-47.

Sea Grant Louisiana. 2006. Rock Shrimp. Lagniappe Vol.30, No.9

Shaver, D. J. 1991. Feeding ecology of wild and head-started Kemp's ridley sea turtles in south Texas waters. Journal of Herpetology, 25:327.

Sherwood, O. A., D. B. Scott, M. J. Risk, and T. P. Guilderson. 2005. Radiocarbon evidence for annual growth rings in the deep-sea octocoral *Primnoa resedaeformis*. Marine Ecology Progress Series 301: 129-134.

Shrimp Lady (Accessed 2007). Available at: http://www.shrimplady.com/default.htm

Simpfendorfer, C. A. 2001. Essential habitat of the smalltooth sawfish, *Pristis pectinata*. Report to the National Fisheries Service's Protected Resources Division. Mote Marine Laboratory Technical Report (786) 21pp.

Simpfendorfer, C. A. and T. R. Wiley. 2004. Determination of the distribution of Florida's remnant sawfish population, and identification of areas critical to their conservation. Mote Marine Laboratory Technical Report, July 2, 2004 37 pp.

Soma, M. 1985. Radio biotelemetry system applied to migratory study of turtle. Journal of the Faculty of Marine Science and Technology, Tokai University, Japan, 21:47.

Soong, K. and J. C. Lang. 1992. Reproductive integration in coral reefs. Biol. Bull. 183: 418-431.

Squires, D. F. 1959. Deep sea corals collected by the Lamont Geological Observatory. I. Atlantic corals. American Museum Novitates No. 1965:1-42.

Standora, E. A., J. R. Spotila, J. A. Keinath, and C. R. Shoop. 1984. Body temperatures, diving cycles, and movements of a subadult leatherback turtle, *Dermochelys coriacea*. Herpetologica, 40:169.

Stiles, M. L., E. Harrould-Kolieb, P. Faure, H. Ylitalo-Ward and M. F. Hirshfield. 2007. Deep Sea Trawl Fisheries of the Southeast US and Gulf of Mexico: Rock shrimp, Royal red shrimp, Calico scallops. Oceana. Washington, DC.

Szmant, A. M. and M. Miller. 2006. Settlement preferences and post-settlement mortality of laboratory cultured and settled larvae of the Caribbean hermatypic corals *Montastraea faveolata* and *Acropora palmata* in the Florida Keys, USA. Proceedings of the 10th International Coral Reef Symposium.

Thayer, G. W., K. A. Bjorndal, J. C. Ogden, S. L. Williams, and J. C. Zieman. 1984. Role of large herbivores in seagrass communities. Estuaries, 7:351.

Van Dam, R. and C. Diéz. 1998. Home range of immature hawksbill turtles (*Eretmochelys imbricata*) at two Caribbean islands. Journal of Experimental Marine Biology and Ecology 220(1):15-24.

Van Dover, C.L., P. Aharonb, J. M. Bernhardc, E. Caylord, M. Doerriesa, W. Flickingera, W. Gilhoolyd, S. K. Goffredie, K. E. Knicka, S. A. Mackod, S. Rapoporta, E. C. Raulfsa, C. Ruppelf, J. L. Salernoa, R. D. Seitzg, B. K. Sen Guptah, T. Shanki, M. Turnipseeda and R. Vrijenhoeke. 2003. Blake Ridge methane seeps: characterization of a soft-sediment, chemosynthetically based ecosystem. Deep Sea Research Part I : Oceanographic Research Papers 50(2) :281-300.

Walker, T. A. 1994. Post-hatchling dispersal of sea turtles. p. 79. *In*: Proceedings of the Australian Marine Turtle Conservation Workshop, Queensland Australia.

Waring, G. T., D. L. Palka, P. J. Clapham, S. Swartz, M. Rossman, T. Cole, K. D. Bisack, and L. J. Hansen. 1998. U.S. Atlantic Marine Mammal Stock Assessments. NOAA NOAA Technical Memorandum NMFS-NEFSC. Northeast Fisheries Science Center, Woods Hole, Massachusetts 02543-1026. December.

Waring, G. T., J. M. Quintal, and C. P. Fairfield (eds). 2002. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2002. NOAA Technical Memorandum NMFS-NE-169. Northeast Fisheries Science Center, Woods Hole, Massachusetts 02543-1026. September.

Weaver, D. C. and G. R. Sedberry. 2001. Trophic subsidies at the Charleston Bump: food web structure of reef fishes on the continental slope of the southeastern United States. P. 137-152 *In:* Sedberry, G.R. (ed.). Island in the Stream: oceanography and fisheries of the Charleston Bump. American Fisheries Society Symposium 25. American Fisheries Society, Bethesda, MD.

Wenner, E. L., G. F. Ulrich, and J. B. Wise. 1987. Exploration for the golden crab, *Geryon fenneri*, in the south Atlantic Bight: distribution, population structure, and gear assessment. Fishery Bulletin 85: 547-560.

Wenner, E. L. and C. A. Barans. 1990. *In situ* estimates of golden crab, *Chaceon fenneri*, from habitats on the continental slope, southeast U.S. Bulletin of Marine Science 46(3): 723-734.

Wenner, E. L. and C. A. Barans. 2001. Benthic habitats and associated fauna of the upper- and middle-continental slope near the Charleston Bump. Pages 161-178 *In:* Sedbery, G. R. (ed.). Island in the Stream: oceanography and fisheries of the Charleston Bump. American Fisheries Society Symposium 25. Bethesda, MD.

Whitaker, D. L. 1982. Notes on biology of the rock shrimp off South Carolina. Presented at the joint Southeastern Estuarine Research Society/Gulf Estuarine Research Society meeting, Nov. 12, 1982. 14 p.

White, D. B., D. M. Wyanski, and G. R. Sedberry. 1998. Age, growth, and reproductive biology of the blackbelly rosefish from the Carolinas, USA. J. Fish Biol. 53(6):1274-1291.

Wigley, R. L., R. B. Theroux, and H. E. Murray. 1975. Deep sea red crab, *Geryon quinquedens*, survey off northeastern United States. Mar. Fish. Rev. 37(8):1-27.

Williams, E. H. and L. Bunkley-Williams. 1990. The world-wide coral reef bleaching cycle and related sources of coral mortality. Atoll Research Bulletin 335: 1-71.

Williams, B., M. J. Risk, S. W. Ross, and K. J. Sulak. 2006. Deep-water Antipatharians: proxies of environmental change. Geology 34(9): 773-776.

Williams, B., M. J. Risk, S. W. Ross, K. J. Sulak. In press. Stable isotope records from deep-water antipatharians: 400-year records from the south-eastern coast of the United States of America. Bulletin of Marine Science.

Wilson, J. B. 1979. "Patch" development of the deep-water coral *Lophelia pertusa* (L.) on Rockall Bank. Journal of the Marine Biological Association of the United Kingdom 59:165-177.

Witzell, W. N. 2002. Immature Atlantic loggerhead turtles (*Caretta caretta*): suggested changes to the life history model. Herpetological Review 33(4):266-269.

WWF (World Wildlife Fund). 2006. Policy proposals and operational guidance for ecosystem-based management of marine capture fisheries. WWF International, Gland, Switzerland, 80pp.

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Appendix A. Alternatives Considered but Eliminated from Analysis

Appendix B. Golden Crab AP Catch Shares Report

Golden Crab AP Catch Shares Report

August 25, 2009
Charleston, SC

Attendees:
David Cupka (Council Member and Golden Crab Committee Chair)
Bill Whipple (AP member)
Howard Rau (AP member)
Randy Manchester (AP member)
Glenn Ulrich (AP member)
Nuno Almeida (Golden Crab Fisherman)
Kate Quigley (SAFMC staff)
Gregg Waugh (SAFMC staff)

WORKING DOCUMENT

Program Goals:

- Enable the crab fishery to fulfill its potential to deliver high quality live crab anywhere in the world.

Program Objectives:

1. Develop catch share management that provides flexibility such that boat repairs and illness do not interrupt the ability of fishermen to make a living.
2. Allow for permit stacking on one vessel to maximize efficiency and enable fishing more than one zone in a trip.
3. Allow fishermen the ability to sell portions of their harvest privileges via catch shares.
4. Allow for increased stewardship opportunities for fishermen to protect corals by allowing for ownership of catch share privileges.
5. Provide protection for historical participation and traditional fishing grounds by implementing a catch share program that relies on catch history for initial allocation and prevents fishermen exceeding the TAC.

Eligibility for Initial Allocation

Option 1: Any person holding a current permit as of implementation date (yet unspecified) in any zone is eligible for initial allocation. Eligibility is based on vessel logbook data and varies based on initial allocation formula. Catch history is based on currently permitted vessels as of September 2009.

Vessel Catch History Initial Allocation

The following possible initial allocation formulas were developed and analyzed:

Option 1: 2002-2008 aggregate catch history by vessel

Option 2: 1995-2008 aggregate catch history by vessel

Option 3: 1998-2008 aggregate catch history by vessel. Vessels with below 5% initial allocation receive an extra 2% per vessel excluding those receiving greater than 30% initial allocation on vessels combined. Extra 2% comes out of highest share holder. Must have 25,000 pounds aggregate to receive bonus.

Option 4: 1998-2008 catch history by vessel **and** must have catch history since 1998. Vessels below 5% initial allocation receive an extra 5% per vessel excluding those receiving greater than 30% initial allocation on vessels combined. Extra 5% comes out of highest share holder. Must have 25,000 pounds aggregate to receive bonus.

Option 5: 2006-2008 catch history by vessel. Vessels fishing between 2007 and 2009 that get less than 10% initial allocation receive an additional 7% per vessel excluding those that receive greater than 20% initial allocation on vessels combined. Extra 7% comes out of highest share holder. Must have 50,000 pounds aggregate to receive bonus.

Option 6: 2006-2008 catch history by vessel. If vessels fished in the last 5 years and received less than 20% initial allocation, each vessel owner receives an additional 5% excluding those that receive greater than 20% initial allocation on vessels combined. Extra 5% comes out of highest share holder. Must have 50,000 pounds aggregate to receive bonus.

Option 7: 50% catch history + 50% equal allocation

Sub-option 1: 1995-2008
1a: Must have 25,000 pounds aggregate to receive equal allocation portion.
1c: Must have 50,000 pounds aggregate to receive allocation portion.

Sub-option 2: 2005-2008
1a: Must have 25,000 pounds aggregate to receive allocation portion.
1b: Must have 50,000 pounds aggregate to receive allocation portion.

Sub-option 3: 2002-2008, 50,000, 25,000
1a: Must have 25,000 pounds aggregate to receive allocation portion.
1b: Must have 50,000 pounds aggregate to receive allocation portion.

Option 8: 75% catch history + 25% equal allocation

Sub-option 1: 1995-2008
1a: Must have 25,000 pounds aggregate to receive allocation portion.
1b: Must have 50,000 pounds aggregate to receive allocation portion.

Sub-option 2: 2005-2008
1a: Must have 25,000 pounds aggregate to receive allocation portion.
1b: Must have 50,000 pounds aggregate to receive allocation portion.

Sub-option 3: 2002-2008, 50,000, 25,000
1a: Must have 25,000 pounds aggregate to receive allocation portion.
1b: Must have 50,000 pounds aggregate to receive allocation portion.

Option 9: Equal allocation of the TAC

Sub-option 1: 11 vessel owners
Sub-option 2: 4 active vessels

Option 10: Best 3 years averaged

Sub-option 1: 1995-2008
1a: Must have 25,000 pounds aggregate to receive allocation portion.
1b: Must have 50,000 pounds aggregate to receive allocation portion.
Sub-option 2: 2005-2008
1a: Must have 25,000 pounds aggregate to receive allocation portion.
1b: Must have 50,000 pounds aggregate to receive allocation portion.
Sub-option 3: 2002-2008, 50,000, 25,000
1a: Must have 25,000 pounds aggregate to receive allocation portion.
1b: Must have 50,000 pounds aggregate to receive allocation portion.

*Disadvantages of using vessel catch history – individuals that own two active permits and one vessel, would suffer under vessel catch history allocation.

*Disadvantages of using permit catch history – some individuals lease permits but use their own vessel. Using permit catch history, they would not be included in the initial allocation

*Disadvantages of no allocation for latent permits – Individuals with inactive permits receive nothing for their permit even though they made an investment in the fishery

*Advantages of no allocation for latent permits – Active vessels receive more than if latent permits are included, which would enable active participants to continue fishing if the ACL is low.

Permit Catch History Initial Allocation

*Permit catch history data has been requested and will be available by December.

Eligibility for Harvest

Preferred Option 1: Any person holding a current (as in paid fees) permit in any zone is eligible to participate in the golden crab catch share program. New entrants to the fishery must purchase annual pounds and purchase or lease a permit. There are 11 permits in the fishery and to obtain a permit, someone would have to purchase or lease one of the 11 permits.

Appeals Process

Preferred Option 1: 1-2% of TAC will be set aside for the appeals process. If set aside is not used, it will be returned back to the overall quota pool and will be redistributed based on the original initial allocation to all share holders. The NMFS Regional Administrator would administer the appeals process. The process will be conducted 90 days after initial allocation and before the bonus is distributed. There will be no hardship clause and the appeals process will rely upon trip tickets to establish additional landings.

Program Duration

Preferred Option 1: The program will exist in perpetuity unless modified by the SAFMC.

Program review

Preferred Option 1: Perform review every 5-7 years. The program reviews would coincide (one year post) with stock assessments, if possible, so that changes to the program in response to the stock assessment can occur.

Transferability

Preferred Option 1: Program allows for all or a portion of permanent (quota share) and temporary (annual pounds) sale of quota among all permit holders and those leasing a permit.

Quota Share Ownership Caps

Option 1. Cap on ownership of quota share where the maximum percentage (quota share) initially allocated would serve as the ownership cap.
Option 2. 55%
Option 3. 65%
Option 4. 75%
Option 5. Cap on ownership of quota share that is lower than the amount initially allocated to the highest quota share holder

Sub-option A. 55%
Sub-option B. 65%
Sub-option C. 75%

Use It or Lose It

Preferred Option 1: Permit owner or person leasing a permit must have used at least 10% of an individual's quota share for one year (fished, quota share sale, or sale of annual lbs) on a cumulative basis during a two year period using a running average.

Cost Recovery

As defined by the MSA

*NMFS cost estimates requested.

Boat Length Limit

Option 1: Leave boat length limit rule.
Preferred Option 2: Eliminate boat length limit rule in the middle and southern zones.

Rationale: Greater length is sometimes needed after implementation of the RSW system. A larger boat is more efficient. However, the vessel length is somewhat limited by the catch shares and the quota share ownership cap.

Zone Issues

Preferred Option 1: Participants can use quota in any zone for which they possess a permit.
Preferred Option 2: Eliminate box in southern zone originally established to protect against very large vessels.

Note: not mutually exclusive. The GC AP has an interest in both occurring.

Rationale: Eliminating the box would allow vessels over 65 feet to participate in that area. Very little fishing has occurred in the Southern Zone, perhaps because of the box, for some time and it is seen as no longer necessary in that the problem that created this solution (implementation of the box) no longer exists. If you are smaller than 65 feet and have a permit in the Southern Zone, you are restricted to fishing in the box and cannot fish outside the box.

Permit Stacking

Preferred Option 1: Allow for stacking of up to three permits on one vessel so that any zones for which the vessel has a permit can be fished in one trip.

Monitoring

Option 1: Phase in additional monitoring as necessary based on the economic capacity of the fishery. Explore real-time reporting via electronic monitoring (recording trip ticket and logbook data on a website upon landing).

Note: There may be a discrepancy between logbook landings and trip ticket if, during shipping, there is shrinkage (5-10%) and any such comparison between logbooks and trip tickets would need to account for this.

Enforcement

Option 1: Consider requiring hail in (at least 3 hrs ahead of time whereby a message could be left or texted in excess of 3 hours) when landing with location and time or other information deemed necessary by enforcement. The specific hours of landing and departing are difficult to identify due to weather, tides, and nature of the Gulf Stream. Because the crabs are brought in live, time is of the essence. In order to maintain a quality product, landings need to occur immediately upon arrival at the dock. Also, renewing re-circulating seawater is not always an option near shore where water is murky and of low salinity. Therefore, landings need to occur at any time during 24 hrs. Work with law enforcement to determine specifics.

New Entrants

Option 1: Set aside some amount of annual pounds for new entrants when quota is:

- ❖ released as a part of a violation

- ❖ lost quota (use it or lose it provision); and
- ❖ when the TAC exceeds 3 million pounds

Note: Look into what new entrant programs have been implemented in other catch shares programs.

Banking and Borrowing

Preferred Option 1: 20,000 lbs borrowing allowance each year (Check with Monica – Is there a problem with this given ACLs and AMs?)
Preferred Option 2: 20,000 lbs banking allowance each year