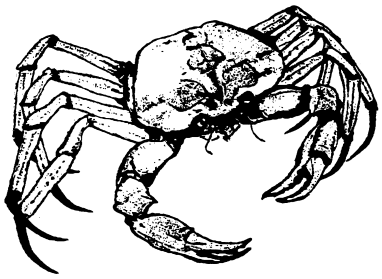

Amendment 6

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

February 2012

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February 2012

Definitions of Abbreviations and Acronyms Used in the Amendment

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
ACT	Annual Catch Target
AM	Accountability Measure
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
EA	Environnemental Assessment
EBM	Ecosystem-Based Management
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFH-HAPC	Essential Fish Habitat - Habitat Area of Particular Concern
EIS	Environnemental 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

LAPP	Limited Access Privilege Program
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
OFL	Overfishig Limit
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 6

AMENDMENT 6 TO THE FISHERY MANAGEMENT PLAN FOR THE GOLDEN CRAB FISHERY OF THE SOUTH ATLANTIC REGION

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

Proposed actions:	For golden crab, implement a catch share program with measures to define eligibility and allocate shares; define excessive shares; designate a cost recovery program, monitoring and enforcement, use or lose provision, and set-aside for borrowing and for new entrants; establish criteria for transferability.
Lead agency:	FMP Amendments – South Atlantic Fishery Management Council EA- NOAA Fisheries Service
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NOI:	
Scoping meetings held:	January-February 2011
Public Hearings Held:	January 24, 2012 through February 2, 2012

Abstract

The need for action through Amendment 6 to the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region (Amendment 6) is to implement a Catch Share or Limited Access Privilege program for the South Atlantic golden crab fishery. More specifically, the actions proposed in Amendment 6 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 annual catch limit (ACL);
    - Allocate privileges to fish a portion of the ACL to individual entities and define criteria for transferability;
    - Establish a cap on ownership of privileges;
    - Designate a set-aside for new entrants and for borrowing;
    - Implement a use or lose provision;
    - Devise a method for recovery of the costs of administering, monitoring, and enforcing management of the golden crab fishery.

The Draft Environmental Assessment analyzes the effects of implementing the proposed actions listed above.

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Action 9. Restrictions on where permitted vessels can fish for golden crab

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SUMMARY
of
AMENDMENT 6
to the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region

The Golden Crab Fishery Management Plan relies on a system of traditional fishery management plus controlled access. Traditional fishery 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); measures to enable law enforcement (depth limitations and prohibit possession of whole fish or fillets of snapper grouper species); identification of the number of participants (vessel and dealer/processor permits); collection of 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 South Atlantic Fishery Management Council (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.

The purpose of this amendment is focused on the development of a catch share program for the golden crab fishery. Currently, the golden crab fishery is a limited entry fishery and has had a relatively low level of participation. The fishery operates near several deepwater coral habitats of particular concern, which were developed to protect sensitive deepwater coral ecosystems. The level of experience needed to fish near but not among the deepwater coral reefs is quite high and a catch share program is expected to further limit participation in the golden crab fishery to those individuals who have a high level of experience in the fishery.

A catch share program would also provide current fishery participants with the ability to enhance their at-sea storage systems and develop new markets for the golden crab products.

This document is intended to serve as a SUMMARY for all the actions and alternatives in the Environmental Assessment (EA) Amendment 6 to the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region (Amendment 6). It also provides background information and includes a summary of the expected biological and socio-economic effects from the proposed management measures.

Why is the Council Taking Action?

The Council is taking action now because of the unique nature of this fishery. The Council wants to ensure that participants are well-qualified while still protecting sensitive deepwater habitat near where the golden crab fishery occurs.

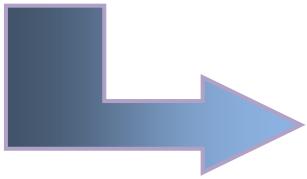
The purpose of Amendment 6 is to facilitate the maximum harvest in the golden crab fishery that otherwise might not occur due to a combination of inactive shares and the likelihood there will be a large annual catch limit (ACL) in place.

The Council concluded that establishing a catch share program for golden crab would help them meet the needs for this amendment:

Photo credit: NOAA Fisheries

What Are the Proposed Actions?

There are fifteen actions in Amendment 6/EA. Each *action* has a range of *alternatives*, including a 'no action alternative' and a 'preferred alternative'.



Proposed Actions in Amendment 6/EA

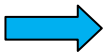
1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

Action 1. Establish eligibility criteria for a golden crab catch share program

Alternative 1. No Action. Do not establish eligibility criteria for a golden crab catch share program

Alternative 2. Restrict eligibility to valid commercial golden crab permit holders who have made landings of 1 pound or greater from 2001 through 2010.

Alternative 3. Restrict eligibility to valid commercial golden crab permit holders who have made landings of 1 pound or greater from 2005 through 2010.



Preferred Alternative 4. Restrict eligibility to valid commercial golden crab permit holders. Eligibility for participation in this catch share program is defined as having a valid commercial golden crab permit as of the effective date of the final rule.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
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What Are the Expected Effects?

Biological Impacts

This action would not directly affect the biological environment. However, alternatives for this action could have indirect effects by influencing the total number of shareholders and how the fishery is prosecuted (**Table S-1**).

Table S-1. Number of permits eligible under each alternative for Action 1 for 2001-2010

Alternative	Number of Permits Eligible to Receive Initial Allocation
1	11
2	8
3	7
4	11

Economic Impacts

While the number of currently valid permits is understood to be 11, each vessel must have a valid permit on board, and only 5 vessels per year landed golden crab on average in 2006-2010, compared with as many as 11-15 vessels in 1995-2010. Some of the five or so "small business entities" engaged in harvesting golden crab appear to own, or control through affiliation, more than one permitted vessel. Whether the golden crab fishery would become more economically viable and profitable with fewer vessels over the long term is not clear.

Social Impacts

Establishing a catch share program may affect participation in the golden crab fishery, although fewer eligible participants could produce negative social effects by excluding some golden crab permit holders. **Alternatives 2** and **3** would exclude some golden crab permit holders as ineligible**,** which may have negative impacts if the permit holders planned to start harvesting golden crab again due to the new requirement to hold catch shares or annual pounds. **Preferred Alternative 4** would designate all 11 permit holders as eligible to receive catch shares and likely have the least impact on the social environment. There would be no criteria for endorsement qualification under **No-Action Alternative 1**; therefore, all 11 active Golden Crab permit holders would be able to participate in the catch share program. There would be no difference in negative social economic effects between **Alternative 1 (No Action)** and **Preferred Alternative 4**.

Action 2. Initial apportionment of catch shares

Alternative 1. No action. Do not specify a method for initial apportionment of catch shares.

Alternative 2. Distribute initial catch shares proportionately among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 2002 through 2010.

Alternative 3. Distribute initial catch shares proportionately among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010.

Alternative 4. Distribute 50% of initial catch shares equally among eligible participants and distribute 50% of initial catch shares among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010:

> **Sub-alternative 4a.** To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings from 1997 through 2010 associated with an eligible participant's current permit must equal or exceed 25,000 pounds.
>
> **Sub-alternative 4b.** To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings from 1997 through 2010 associated with an eligible participant's current permit must equal or exceed 50,000 pounds.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
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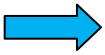
Alternative 5. Distribute 25% of initial catch shares equally among eligible participants and distribute 75% of initial catch shares among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010:

Sub-alternative 5a. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings from 1997 through 2010 associated with an eligible participant's current permit must equal or exceed 25,000 pounds.



Preferred Sub-alternative 5b. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings from 1997 through 2010 associated with an eligible participant's current permit must equal or exceed 50,000 pounds.

Alternative 6. Distribute initial catch shares proportionately among eligible participants based on the best consecutive three year average of golden crab logbook landings associated with their current permit(s) during the time period 1997 through 2010

What Are the Expected Effects?

Biological Impacts

This action would not directly affect the biological environments. However, alternatives for this action could have indirect effects by influencing the total number of shareholders and how the fishery is prosecuted.

Alternatives 2-6 would base initial allocation on vessel catch history based on certain landing years and landing requirements. It would be expected that vessels with the most recent landing history and those that meet the highest requirements for pounds landed would have the most experience in the fishery. This may result in less gear and time used in pursuing golden crab and, consequently, less adverse impacts in the form of habitat interactions, regulatory discards, and bycatch of non-target species as described in Action 1.

Economic Impacts

The economic impacts for this action are tied to the Council's preferred alternative in **Action 1**. Regardless of the alternative selected in **Action 1**, the current ACL would result in allocation of shares to individuals that are higher than the individual's current landings, resulting in potential economic gains.

Social Impacts

The social effects of the initial allocation of catch shares are mostly associated with vesting these fishing privileges to an individual, which would result in social benefits and social costs. An allocation would allow fishermen to harvest golden tilefish when it is most efficient, profitable, and safe. For fishermen who do not receive an allocation (or receive an allocation that is smaller than needed), the allocation of catch shares could have broad negative social impacts at the individual and community level. These fishermen could lose current and future access to the fishery.

Action 3. Establish criteria and structure of an appeals process

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

Alternative 2. A percentage of the golden crab shares for the initial fishing year under the program will be set-aside to resolve appeals for a period of 90-days starting on the effective date of the final rule. The Regional Administrator (RA) will review, evaluate, and render final decisions on appeals. Hardship arguments will not be considered. The RA will determine the outcome of appeals based on NMFS' logbooks. If NMFS' logbooks are not available, the RA may use state landings records. Appellants must submit NMFS' logbooks or state landings records to support their appeal. After the appeals process has been terminated, any amount remaining from the set-aside will be distributed back to remaining shareholders according to the redistribution method selected under Action 2:

Preferred Sub-alternative 2a. Three percent of golden crab shares will be set aside for appeals.

Sub-alternative 2b, Five percent of golden crab shares will be set aside for appeals.

Sub-alternative 2c. Ten percent of golden crab shares will be set aside for appeals.

Sub alternative 2d. Two percent of golden crab shares will be set aside for appeals.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
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10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
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What Are the Expected Effects?

Biological Impacts

Establishing an appeals process for a catch share program is an administrative action. Therefore, it is not anticipated to directly or indirectly affect the physical, biological, or ecological environments in a positive or negative manner.

Social and Economic Impacts

The sub-alternatives under **Alternative 2** serve to help ensure the golden crab ACL would not be exceeded the first year of the program in the event many appeals are settled in favor of fishermen. Setting aside a portion of the ACL for appeals purposes limits the likelihood of major share adjustments that would need to take place after initial allocation in an effort for fishermen to adjust their shares to current catches. Smaller reductions in allocation would be more acceptable to currently active fishermen than large reductions in share allocations during the first fishing season. Use of initial allocation methodologies that allocate shares to currently active fishermen would also be beneficial.

The establishment of an appeals process, and the design of its structure, have mainly equity effects. While equity considerations are important, they have less significance in shaping the economic implications of a catch share system. Thus, neither the appeals process nor its structure is expected to have a noticeable effect on the benefits associated with implementation of the catch share program. This is particularly true when an appeals process would only marginally affect the initial distribution of shares among eligible participants. Economic changes would only be evident if the number of successful appeals were large compared to the number of qualifying persons or vessels.

An appeals process provides the potential participants an avenue to set the record straight with respect to transfers of licenses and the associated landings history for each license. Since most of the landings histories are currently on record through logbook submissions, the aggregate amount of contentious landings involved in the appeals is expected to be relatively low. The administrative and public cost of an appeals process for the proposed catch share cannot be estimated but may be expected to rise with the number of appeals.

Action 4. Establish criteria for transferability

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

Alternative 2. Shares or annual pounds can only be transferred to golden crab permit holders.

Alternative 3. 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.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
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14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

Alternative 1 (No Action) could have the greatest biological benefit for the golden crab stock if it results in decreased landings of golden crab. However, based on recent data there does not appear to be a biological need to decrease landings of golden crab. Since this action is administrative and does not establish immediate harvest objectives, it will not directly affect the protected species. **Alternatives 2** and **3**, which would allow transferability of golden crab annual pounds, would not be expected to negatively impact the golden crab stock. The biological effects of **Alternatives 2** and **3** would likely be very similar as landings would be constrained by the ACL for the golden crab stock.

Economic Impacts

Alternative 1 (No Action) is not consistent with implementation of a catch share program. **Alternative 2** requires the sale of shares only to another fisherman already permitted in the fishery. Such a requirement could make it more difficult for a fisherman to sell shares because the potential pool of buyers would be greatly reduced to only those few already in the fishery, thus making it more difficult for a fisherman wanting to sell shares. **Alternative 3** has the same requirements as **Alternative 2**, but only for five years. After that initial period, this alternative requires U.S. citizenship or permanent resident status for permit ownership. **Alternative 2** allows sale between permit holders, which decreases the risk of speculation because it adds an additional cost to the ability to transfer shares. That is, it increases the likelihood that only fishermen would transfer shares. If **Alternative 3** is selected, purchasers of allocation who do not fish it, could lose it later depending on the selected alternative in **Action 6**. The ability to transfer shares allows for increased efficiency for harvesters to land amounts of golden crab equivalent to their operational capacity, increasing profitability for the fleet as a whole.

Social Impacts

Allowing transferability would provide an avenue for new entrants to enter the fishery and for current participants to expand operations. **Alternative 1 (No Action)** would be expected to result in reduced social benefits relative to the other alternatives. Because **Alternative 2** would limit the number of potential buyers, it would likely result in fewer social benefits than **Alternative 3**, although potential buyers who intend to harvest golden crab with the catch shares need to hold one of the 11 available golden crab permits, which limits the number of buyers regardless. However, allowing any eligible entity to purchase shares (**Alternative 3**) may result in some buyers purchasing shares without intent to harvest, and this would result in negative social impacts on active harvesters.

Action 5. Define quota share ownership caps

Alternative 1. No Action. Do not constrain the percentage of catch shares held by a person, including a corporation or other entity.

Alternative 2. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of the maximum share initially issued to any person at the beginning of the IFQ program.

Alternative 3. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 25 percent of the total shares.

Alternative 4. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 35 percent of the total shares.

Preferred Alternative 5. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 49 percent of the total shares.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
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10. Modify the small vessel sub-zone restriction
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Note: For the purposes of considering the share cap, an individual's total catch share is determined by adding the applicable catch shares held by the individual and the applicable catch shares equivalent to the corporate share the individual holds in a corporation. A corporation's total catch share is determined by

adding the applicable catch shares held by the corporation and any other IFQ shares held by a corporation(s) owned by the original corporation prorated based on the level of ownership.

What Are the Expected Effects?

Biological Impacts

This action would not directly affect the biological environment.

Social and Economic Impacts

Establishment of a limit on the proportion of shares that one individual may own has important social implications that are tied to the economic effects, such as market control, and equity issues for a fishery. Excessive share holding is a major concern in regards to catch share programs and may change the distribution of effort and ownership if concentration occurs. In general, there must be a balance between preventing concentration and market control, and allowing fishermen to optimize harvest. **Alternative 1 (No Action)** would not establish a share cap and would likely have negative social impacts due to the potential for one individual to control a majority of the shares, which would affect distribution among other harvesters. **Alternative 2** could result in a large share cap (depending on how shares are allocated), which would allow for expansion but could cause concentration of the fishery. As the potential share cap increases in **Alternatives 3 – Preferred Alternative 5**, the possibility of concentration increases, but so does the potential for expansion of the fishery.

It should be noted that with the ACL for golden crab, it is likely that each permit holder would receive shares in excess of their recent landings history. Therefore, it is possible that the share caps in **Alternatives 3 – Preferred Alternative 5** would not have negative social impacts that often result from limit on share ownership.

Action 6. Use it or lose it policy

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

Alternative 2. Shares that remain inactive for 3 CONSECUTIVE years will be revoked and redistributed proportionally among the remaining shareholders. "Inactive" is defined as less than 10% of the aggregate annual average utilization of the catch share quota over a 3 year moving average period:

Sub-alternative 2a. Landed crabs only.

Sub-alternative 2b. Landed crabs and/or transfer of annual pounds

Alternative 3. Shares that remain inactive for 3 CONSECUTIVE years will be revoked and redistributed proportionally among the remaining shareholders. "Inactive" is defined as less than 30% of the aggregate annual average utilization of the catch share quota over a 3 year moving average period:

Sub-alternative 3a. Landed crabs only.

Sub-alternative 3b. Landed crabs and/or transfer of annual pounds.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
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13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

Alternative 1 (No Action) would provide the greatest benefit to the biological environment because participants would not be required to fish or lease their shares in order to retain them. If fishermen choose not to fish, then habitat-gear interactions would be reduced. **Alternative 3** would result in the least benefits to the biological environment of any of the action alternatives because it would require participants to harvest on average 50 percent or more of their allotted shares over a three year period in order to retain them. The effects of **Alternative 2** would be intermediate to those of **Alternative 1 (No Action)** and **3**. The fewer shares shareholders are required to fish in order to retain shares, the greater the benefit to the marine environment.

Social and Economic Impacts

Economically under a "use it or lose it" provision, it would not make sense for fishermen to hold shares and not use them. At a minimum they would forgo the revenue associated with selling their shares. If they were efficient harvesters, the value of the shares they would forgo would be even greater. Because traditional harvesters of golden crab would be inclined to harvest their shares, the discussions associated with this provision frequently focus on non-consumptive users buying shares. However, there may be other reasons why fishermen who have shares may not be able to use them for an extended period of time. Potential reasons for fishermen not to use their shares might be vessel breakdowns, fishermen health issues, or the desire of a fisherman to bank shares for future use.

Alternative 1 (No Action) would allow people to hold shares but not use them. **Alternatives 2** and **3** would not prevent individuals from buying shares for the purpose of not harvesting the shares, however it would force the shareowners to fish a portion of their shares each year. If **Sub-alternative 2b** or **3b** is selected, shareholders could meet these harvest requirements by transferring their shares to another fisherman and never actually have to fish themselves. Therefore, the provision may not be totally effective in limiting shareholders to persons wanting to harvest the available resource. Redistributing inactive shares could benefit members of the fleet that remain active. However, a minimal number of shares are expected to be redistributed among the fleet because of this option.

Action 7. Cost recovery plan

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

Alternative 2. Cost recovery fees would be calculated at time of sale at a registered dealer:

Sub-alternative 2a. Cost recovery fees would be based on actual ex-vessel value of landings.

Preferred Sub-alternative 2b. Cost recovery fees would be based on standard ex-vessel value of landings, as calculated by NMFS.

Alternative 3. Fee collection and submission shall be the responsibility of the:

Sub-alternative 3a. Shareholder.

Preferred Sub-alternative 3B. Dealer.

Alternative 4. Fees submitted to NMFS:

Preferred Sub-alternative 4a. Quarterly

Sub-alternative 4b. Monthly

Sub-alternative 4c. Annually

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

None of the cost recovery alternatives are expected to directly or indirectly affect the biological environment.

Social and Economic Impacts

Alternative 1 (No Action) is inconsistent with requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). **Alternatives 2-4,** and associated sub-alternatives**,** would implement a cost recovery plan. This cost recovery plan also specifies the calculation of the ex-vessel value as basis for the fee (either as actual or standard ex-vessel value), the fee collection and submission responsibility (either by the shareholder or the dealer), and the timing of fee submission to NMFS (either quarterly, monthly, or annually).

In general, social benefits are associated with lower economic costs for fishermen, and **Alternative 1 (No Action)** would be expected to result in the most social benefits. Although cost recovery is required by the Magnuson-Stevens Act, **Sub-alternatives a** and **b** under **Alternatives 2-4** would provide flexibility in how fees are collected by defining how fees are calculated (**Alternative 2**), who collects and submits fees (**Alternative 3**) and timing of fees (**Alternative 4**). **Sub-alternative 2a** would use actual ex-vessel values paid to the fisherman for the landed crabs for calculating cost recovery fees. **Sub-alternative 2b** would use standard ex-vessel values for calculating cost recovery fees. For example, the ex-vessel price per pound paid to fishermen would be averaged across all fishery participants over a specific time period. That averaged price per pound would be used for calculating cost recovery fees for all pounds landed by all participants during that period. **Preferred Sub-alternative 2b** would be expected to have more social benefits than **Sub-alternative 2a** due to a standard and consistent fee schedule for fishermen. **Preferred Sub-alternative 3b** would place the burden of collection and submission on the dealers and **Sub-alternative 3a** would place burden on the fishermen. Lastly, **Preferred Sub-alternative 4a** would reduce the burden on fishermen and dealers in fee submission more than **Sub-alternative 4b**, but less than **Sub-alternative 4c**..

Action 8. Establish boat length limit rule.

Alternative 1. No Action. To obtain a permit for the middle or southern zone via transfer, the documented length overall of the replacement vessel may not exceed the documented length overall, or aggregate documented lengths overall, of the replaced vessel(s) by more than 20 percent.

Alternative 2. Eliminate vessel length restrictions for obtaining a permit for the middle and southern zones via transfer.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

Taking action to modify the boat length limit rule is an administrative action, which is not expected to affect the program's potential to provide the environmental benefits. However, the potential exists to impact golden crab resources through overharvesting in these zones.

Economic Impacts

The current regulations regarding **Action 1 (No Action)** (boat length restrictions) were set in Amendment 3 to the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region. In order "to obtain a permit for the middle or southern zone via transfer, the documented length overall of the replacement vessel may not exceed the documented length overall, or aggregate documented lengths overall, of the replaced vessel(s) by more than 20 percent". **Alternative 2** proposes to eliminate the vessel size rule.

Economically, **Alternative 2**, which would allow fishermen to fish in all three zones, would benefit fishermen. Currently, no single fishing operation possesses permits for all three zones. Eliminating size limit rules in the middle and southern zones could potentially allow more Golden Crab permit holders to fish closer to their homeport and therefore reduce trip costs. It is possible that opening up this area to larger vessels might encourage localized depletion in a zone. However, if fishing in an area becomes less productive, fishermen are likely to balance the economic benefits of traveling further from their homeport to have larger harvests.

Social Impacts

The social benefits of this action are tied to the economic benefits of allowing fishermen to expand operation size by increasing boat size. As the golden crab fishery continues to expand, multi-day trips and larger catches per trip, along with new gear on board to keep crabs alive, may require a larger vessel. Additionally, multi-day trips on larger vessels would be more efficient. Overall, social benefits would be greater with **Alternative 2**, which would allow fishermen to move permits to larger vessels if needed, than for **Alternative 1 (No Action).**

Action 9. Restrictions on where permitted vessels can fish for golden crab

Alternative 1. No Action. A vessel with a permit to fish for golden crab in the northern zone or the middle zone may fish only in that zone. No vessel with a documented length overall greater than 65 ft (19.8 m) may fish for golden crab in the small vessel sub-zone within the southern zone. The small vessel subzone is bounded on the north by 24°15' N. lat., on the south by 24°07' N. lat., on the east by 81°22' W. long., and on the west by 81°56' W. long. Upon request from an owner of a permitted vessel, the NMFS Regional Administrator will change the zone specified on a permit from the middle or southern zone to the northern zone. A vessel may possess golden crab only in a zone in which it is authorized to fish, except that other zones may be transited if the vessel notifies NMFS Office for Law Enforcement in advance and does not fish in a zone in which it is not authorized to fish.

Alternative 2. Participants can use quota in any zone for which they possess a permit.

Preferred Alternative 3. A vessel with a permit to fish golden crab can use annual pounds in any of the three golden crab fishing zones.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

Taking action to modify share allocation among the fishing zones is an administrative action, which is not expected to affect the program's potential to provide the environmental benefits. However, there is some concern that if **Alternative 2** or **Preferred Alternative 3** are selected as preferred, most of the fishing effort would occur in the Middle and Southern Zones and increase pressure on the stocks in those areas.

Social and Economic Impacts

The social benefits of this action are tied to the economic benefits of allowing fishermen to maximize efficiency on each trip and take advantage of multiple zones on one trip. Social benefits would be expected to be greater under **Alternative 2 and Preferred Alternative 3** than under **Alternative 1 (No Action)**. In regards to **Preferred Alternative 3**, fishermen would be able to fish in any zone they chose as long as they have golden crab shares.

Action 10. Modify the small vessel sub-zone restriction

Alternative 1. **No Action**. Do not eliminate the small vessel sub-zone within the southern zone that was originally established to protect against very large vessels fishing in the sub-zone.

Alternative 2. Eliminate the small vessel sub-zone within the southern zone that was originally established to protect against very large vessels fishing in the subzone

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

Removing the small vessel sub-zone as proposed in **Alternative 2** would only have a biological effect if larger vessels moved in and started extracting more crabs than are already being removed from this sub-zone. This could set up a potential scenario for localized depletion.

Social and Economic Impacts

The sub-zone was originally established to help smaller vessels have a separate fishing area where they could fish more safely and not have to compete with some of the larger vessels. None of the smaller vessels that the sub-zone was designed to protect are currently participating in the fishery.

Whether or not a larger vessel would move into the sub-zone as a result of **Alternative 2** would largely be dependent on stock availability and economic factors. Larger vessels would fish in the sub-zone as long as their rate of return exceeds what they would expect from fishing in other zones. Localized depletion of golden crabs is not likely under **Alternative 2** because such a reduction in stock could cause trips to become costlier based on rate of return. Fishermen would move to areas where they can maximize their rate of return based on effort and trip costs. Additionally, the catch share program planned for this fishery would keep it from having an expanded number of participants. **Alternative 2** which would eliminate the small vessel zone, social benefits would be expected due to harvesters having the opportunity to fish in an area that is no longer used by small vessels.

Action 11. Establish criteria for permit stacking

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

Alternative 2. 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.

Alternative 3. Allow an unlimited number of golden crab permits on a single vessel so that any zones for which the vessel has a permit can be fished in one trip.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

This action is primarily administrative and so would not have any direct effects on the biological environment.

Social and Economic Impacts

Under the current regulations, fishermen are allowed only to fish in one zone per trip and must reassign permits after returning to port in order to fish other zones for which they have a permit. **(Alternative 1 No Action)**. **Alternative 2** would allow fishermen to have permits for multiple zones on the vessel at one time and allow them to fish between permitted zones on any given fishing trip. Depending on the preferred alternatives selected by the Council for **Actions 8** and **9,** this action may or may not be relevant.

From an economic perspective, **Alternative 2** would provide the most flexibility for fishermen and would allow them to better balance their trip costs against anticipated harvest levels. Fishermen would incur additional costs associated with the purchase of permits for zones they are not currently permitted to fish, assuming they wish to fish in other zones. However, the additional cost might well be offset by the increased flexibility they have in deciding where they could fish and in potential reduction of trip costs if they choose to fish closer to their home port.

Action 12. Monitoring and enforcement

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

Alternative 2. 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 2a. The purchase, installation, and maintenance of the VMS equipment and communications costs will be paid for or arranged by the shareholder.

Sub-alternative 2b. The purchase, installation, and maintenance of the VMS equipment and communications costs will be paid for or arranged by NMFS.

Sub-alternative 2c. The purchase of VMS equipment will be reimbursed by the National OLE VMS reimbursement account if funding is available. Installation, maintenance, and communication costs will be paid for or arranged by the shareholder.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

Alternative 1 (No Action) would not require vessel monitoring system (VMS) on golden crab vessels participating in the catch share program. It was been determined by the NOAA Fisheries Service Office of Law Enforcement (OLE) that VMS is not a useful enforcement tool for the golden crab fishery as it cannot provide information on where the gear is on the seabed. However, VMS traditionally is used in catch share programs and is essential to their operation and has other benefits besides providing information on where fishing gear is located (**Alternative 2**).

Social and Economic Impacts

Sub-alternative 2a would have the greatest economic impact on fishermen as they would be required to bear the entire burden of the cost of establishing VMS on their vessels and pay for ongoing maintenance and data transmission costs. **Sub-alternative 2b** would have the least economic impact on fishermen as the entire costs of VMS systems would be paid for by NMFS. **Sub-alternative 2c** could split the costs between NMFS and the fishermen with NMFS paying for the equipment if funds are available, and fishermen paying for installation, maintenance, and communications cost. If no funds are available in the National OLE VMS reimbursement account, **Sub-alternative 2c** would have the same economic impact as **Sub-alternative 2a**.

There are social benefits that are associated with improved monitoring programs. Overall, the proposed measures may impose some additional burdens on fishermen, administrators, and law enforcement, but negative impacts would be outweighed by the social benefits of improved monitoring through electronic reporting, VMS use, and hail-in requirements. The proposed measures in this action would improve data for the golden crab fishery, and this would generate broad long-term social benefits.

Even if the Council chooses **Alternative 1 (No Action)** as its preferred alternative for this action, OLE can implement certain procedures as required in managing a catch share program. For example, a hail-in requirement prior to landing with location and time or other information, or the potential to phase in additional monitoring measures as necessary based on the economic capacity of the fishery.

Action 13. 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 ACL exceeds 3 million pounds.

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

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

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

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

There are no expected biological impacts from this action.

Social and Economic Impacts

Unless the Council chooses **Alternative 3** as their preferred alternative for **Action 4**, under **Alternative 1 (No Action)** there would be no way for new entrants to come into the fishery. **Action 12** provides four methods for new entrants to the Golden Crab fishery. **Alternative 2** would allow for new entrants through shares taken as part of a violation, revoked through the "use it or lose it" provision (**Action 6**), or should the ACL reach 3 million pounds. **Alternatives 3** through **5** would set aside 2%, 5%, or 10% of the shares (respectively) to be made available to new entrants through an annual auction.

It is likely that **Alternative 2** would have relatively little negative economic impact on the current fishery participants. However, **Alternatives 3** through **5**, depending on the alternative selected, could have an adverse impact on current participants as they would have their annual share allocations reduced by the amount of the selected alternative.

Alternative 2 does not describe how shares taken through violations, revoked through the "use it or lose it" provision, or an ACL exceeding 3 million pounds would be distributed to new participants. Therefore, it is impossible to determine how new participants would be economically impacted, positively or negatively under this alternative. **Alternatives 3** through **5** indicate that the percent of shares set aside each fishing year would be sold off at auction. Costs to new entrants would be the price they would have to pay for shares and that amount would vary by fisherman depending on the price paid per share and the number of shares purchased.

In most cases, implementation of a new catch share program results in additional capital required for new entrants, which may impact fishing communities and affect the continuation of inter-generational fishing in families. Therefore, program provisions, such as set-asides, that assist new entrants in accessing shares would be expected to produce broad, long-term social effects. **Alternative 1** would not be expected to produce any social benefits, but may impact new entrants and the fishery overall if there are too few fishermen. The set-asides proposed in **Alternatives 2-5** would provide shares for new entrants without significantly affecting current participants, particularly because the ACL for golden crab is much higher than current landings. In general, the more access to shares that is provided for new entrants, the more overall and long-term social benefits there would be. In this way, **Alternative 5** would likely produce the most social benefits by setting aside the highest percentage of shares for new entrants, as long as new entrants used the shares for harvest.

Action 14. Annual pounds overage

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

Alternative 2. A person on board a vessel with the shareholder's only remaining golden crab annual pounds may exceed, by up to 10%, the shareholder's annual pounds remaining on the last fishing trip of the year. Shareholders who incur an overage will be required to pay back the annual pounds overage in the subsequent fishing year.

Alternative 3. A person on board a vessel with the shareholder's only remaining golden crab annual pounds may exceed, by up to 20%, the shareholder's annual pounds remaining on the last fishing trip of the year. Shareholders who incur an overage will be required to pay back the annual pounds overage in the subsequent fishing year.

Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

The annual pounds overage action would allow fishermen to exceed their annual pounds during the last trip of the fishing year but repay their overage in the following fishing year. This action is not expected to have a biological impact as the overage would be addressed in the following fishing year. However, if overages occurred commonly and over several years, this could affect fishermen through management measures if the ACL is exceeded.

Social and Economic Impacts

One purpose of this action is to provide potential economic relief for fishermen. **Alternative 1 (No Action)** would require fishermen to stop fishing at or below their quota share to ensure it is not exceeded. However, **Alternatives 2** and **3** would allow a fisherman who goes over his share on the last trip of the season to exceed the allowed quota share by either 10% or 20%. Any overage would come off the next fishing year's share allocation. Allowing the flexibility would improve margins compared to trip costs on the last trip of the year. The economic downside of selecting **Alternative 2** or **3** would be that any overage would reduce the following year's allocation; therefore, potential earnings from that year might be reduced, as well.

The social benefits of allowing an overage for the last trip of the season are associated with the economic benefits of this type of provision. **Alternative 1** would likely not produce any social benefits by not allowing overage, but could negatively impact fishermen by causing early termination of a trip. **Alternatives 2** and **3** would likely be beneficial to the fishermen and allow them to maximize efficiency on the last trip of the year.

Action 15. 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 an approved landing site to participate in the program:

Preferred Sub-alternative 2a. Approved landing sites will be selected by fishermen but must be approved by NMFS Office of Law Enforcement (OLE) in consultation with the appropriate state law enforcement agency prior to use.

Sub-alternative 2b. Approved landing sites will be selected by the Council and NMFS in consultation with the appropriate state law enforcement agency, based on industry recommendations and resource availability.

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Proposed Actions in Amendment 6/EA

1. Establish eligibility criteria for a golden crab catch share program
2. Initial apportionment of catch shares
3. Establish criteria and structure of an appeals process
4. Establish criteria for transferability
5. Define quota share ownership caps
6. Use it or lose it policy
7. Cost recovery plan
8. Establish boat length limit rule
9. Restrictions on where permitted vessels can fish for golden crab
10. Modify the small vessel sub-zone restriction
11. Establish criteria for permit stacking
12. Monitoring and enforcement
13. Establish criteria for new entrants program
14. Annual pounds overage
15. Approved landing sites

What Are the Expected Effects?

Biological Impacts

Establishing approved landing sites is an administrative action. Therefore, designation of approved landings sites is not expected to directly or indirectly affect the physical, biological, or ecological environments in a positive or negative manner.

Economic Impacts

Alternative 1 (No Action) would not require certification or use of approved landing sites, and thus this alternative would not result in any additional cost. If many landing sites are either not readily identified or inaccessible to law enforcement officers, the likelihood of not properly monitoring the catch share system would increase. This could eventually be disruptive to the proper functioning of the system, which in turn could reduce the economic benefits from the program.

Alternative 2 and associated sub-alternatives would establish landing sites for the commercial golden crab fishery. The cost for certifying a landing site is reportedly minimal for both the fishing participants and fishery managers, including enforcement personnel. Whatever benefits gained from properly enforcing landing/offloading rules would enhance the benefits from the catch share system. One possible negative feature of this option is that fishermen may have to incur more travel and other costs if they are compelled to land their fish in locations far removed from their usual landing sites. Naturally, this would happen only if their usual landing sites could not be approved and this would be minimized under **Preferred Sub-alternative 2a.**

Social Impacts

In general, measures that contribute to improved monitoring and enforcement are expected to produce broad, long-term social benefits, and potentially some short-term social impacts associated with any economic costs from the proposed requirements. It is likely that designated landings sites would contribute to improved monitoring and data collection, and **Alternative 1 (No Action)** would likely not produce any of these long-term social benefits. **Alternative 2** and **Preferred Sub-alternative 2a** and **Sub-alternative 2b** would implement landing site designations and produce social benefits through improved monitoring. The flexibility in **Preferred Sub-alternative 2a** would have fewer impacts on fishermen by eliminating the possibility that harvesters would have to change landings sites under **Sub-alternative 2b**.

Chapter 1.
Introduction

1.1 Purpose and Need

Amendment 6 to the Fishery Management Plan (FMP) for the Golden Crab Fishery of the South Atlantic Region (Golden Crab FMP) consists of regulatory actions that focus on the development of a catch share program for the golden crab fishery. Currently, the fishery for golden crab is limited entry and has had a low level of participation. The fishery operates near several deepwater coral habitats of particular concern, which were developed to protect sensitive deepwater coral ecosystems. The level of experience needed to fish near but not among the deepwater coral reefs is quite high and a catch share program is expected to limit participation in the golden crab fishery to those with a high level of experience in the fishery.

A catch share program would also allow current fishery participants the ability to enhance their at-sea storage systems and develop new markets for the golden crab products.

Management actions proposed in this amendment include:

- Implement a catch share program for golden crab. Management measures being considered include:
    - Identify eligibility requirements for initial allocation of privileges to fish a portion of the annual catch limit (ACL);
    - Allocate privileges to fish a portion of the ACL to individual entities and define criteria for transferability;
    - Establish a cap on ownership of privileges;
    - Designate a set-aside for new entrants and for borrowing;
    - Implement a use or lose provision;
    - Devise a method for recovery of the costs of administering, monitoring, and enforcing management of the golden crab fishery.

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 (F_{msy})
2. Promote orderly utilization of the resource.
3. Provide for a flexible management system that minimizes regulatory delays while retaining substantial South Atlantic Fishery Management Council (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 conserve 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 1995) 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); measures to enhance law enforcement (depth limitations and prohibit possession of whole fish or fillets of snapper grouper species); identification of the number of participants (vessel and dealer/processor permits); collection of 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 NOAA Fisheries Service 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 to the Golden Crab FMP (SAFMC 1998b) was a part of the Council's Comprehensive Habitat 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 exclusive economic zone, is 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 Fishery Ecosystem Plan (SAFMC 2009b) 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 habitat of particular concern (HAPCs). Amendment 1 indicated that 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 NOAA Fisheries Service 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) to the Golden Crab FMP 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 Fishery Conservation and Management Act and the National Standard guidelines."

Amendment 3 to the Golden Crab FMP (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 to the Golden Crab FMP, included in the Comprehensive Ecosystem-Based Amendment 1 (SAFMC 2009b), established allowable golden crab fishing areas that allow fishermen to harvest golden crab in two of the Coral HAPCs. 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).

Amendment 5 to the Golden Crab FMP (Amendment 5), included in the Comprehensive ACL Amendment (SAFMC 2011) established an ACL for golden crab at a level of 2 million pounds. **Amendment 5** also implemented accountability measures if the ACL is reached.

Chapter 2. Proposed Actions

This section outlines the proposed actions and alternatives considered by the South Atlantic Fishery Management Council (Council). A complete analysis of these alternatives can be found in **Section 4.0.** Alternatives the Council considered during the development of Amendment 6 to the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region and/or presented at the first round of public hearings but eliminated from further detailed study are described in **Appendix A**.

2.1 Action 1. Establish eligibility criteria for a golden crab catch share program

Alternative 1. No Action. Do not establish eligibility criteria for a golden crab catch share program.

Alternative 2. Restrict eligibility to valid commercial golden crab permit holders who have made landings of 1 pound or greater from 2001 through 2010.

Alternative 3. Restrict eligibility to valid commercial golden crab permit holders who have made landings of 1 pound or greater from 2005 through 2010.

Preferred Alternative 4. Restrict eligibility to valid commercial golden crab permit holders. Eligibility for participation in this catch share program is defined as having a valid commercial golden crab permit as of the control date of 12/7/2010.

Selection of Alternatives

2.1.1 Comparison of Alternatives

This action would not directly affect the biological environments. However, alternatives for this action could have indirect effects by influencing the total number of shareholders and how the fishery is prosecuted. **Alternative 1** would not restrict participation in the catch share program (Table 4-1). All golden crab permitted fishermen would be eligible to participate in the catch share program, regardless of their previous participation in the fishery. **Alternatives 2-4** would restrict initial participation in the program to individuals who already have some experience in the golden crab fishery. Under **Preferred Alternative 4** all golden crab permitted fishermen would meet the eligibility criteria to participate in a catch share program. Therefore, the effects of **Alternative 1 (No Action)** and **Preferred Alternative 4** would be the same, Generally, the amount of effort applied to the fishery would decrease as participation is limited to fewer, more efficient individuals. This would result in less gear and time used in pursuing golden crab and, consequently, less adverse impacts in the form of habitat interactions, regulatory discards, and bycatch of non-target species.

If **Preferred Alternative 4** were to be accepted for use in subsequent actions to establish a catch share system under Amendment 6, then 11 currently valid permits could be eligible. Only 8 of the 11 currently valid permits would meet the **Alternative 2** qualification criteria, and 7 would meet the **Alternative 3** criteria**.** Whether the golden crab fishery would become more economically viable and profitable with

fewer vessels over the long term is not clear. What appears to have been increased fishing effort during 1995-2010 may be assumed to have affected costs, even though the number of vessels with landings decreased (Section 3.4.2). For vessels that landed golden crab, the overall total vessel gross revenue was $913,000 (2010$) per year during 2006-2010, regardless of species, area of capture, or gear (Table 3.4.1, FTT data). This averages $198,000 per vessel. The total is less than the $2,244,000 for 1996-2000 ($239,000 per vessel) when other species accounted for half of the total. For the golden crab fishery as a whole, costs appear to have increased, because trip fishing effort appears to have increased to equal or exceed what it was in the late 1990s. Catch per unit effort (CPUE) in pounds per trap is lower, and the depth of fishing is greater, approximately 1,600 feet below the water surface in the last five years (Tables 3.4.1-3.4.3 and Figure 3.4.2). The numbers of trips, traps fished, and time fished (time away from port) would be expected to increase the costs for fuel, an important part of trip costs, and fuel prices have been much higher than in the late 1990s (U.S. Bureau of Labor Statistics, producer price index, no. 2 diesel).

Establishing a catch share program may affect participation in the golden crab fishery. **Alternatives 2** and **3** would exclude some golden crab permit holders as ineligible (see **Table 4-1),** which may have negative impacts if the permit holders planned to start harvesting golden crab again due to the new requirement to hold catch shares or annual pounds. **Preferred Alternative 4** would designate all 11 permit holders as eligible to receive catch shares and likely have the least impact on the social environment. There would be no criteria for endorsement qualification under **No-Action Alternative 1**; therefore, all 11 active Golden Crab permit holders would be able to participate in the catch share program. There would be no difference in negative social economic effects between **Alternative 1 (No Action)** and **Preferred Alternative 4**. In general, the social impacts would be more directly caused by allocation of catch shares among eligible individuals (**Action 2**).

Allowing more individuals eligibility for initial allocation in the catch share program increases the amount of administrative burden involved in implementing the program. Depending on which alternative is chosen, the number of potential participants in the catch share program varies. **Alternative 1 (No Action)** and **Preferred Alternative 4** would potentially include the most participants and require the greatest amount of work to implement. **Alternative 3** would include at most 7 participants and potentially have the lowest administrative burden, followed by 8 eligible permits in **Alternative 3**.

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

	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Biological	n/a	n/a	n/a	n/a
Economic	n/a	n/a	n/a	n/a
Social	n/a	n/a	n/a	n/a
Administrative	Least Restrictive			

2.1.2 Conclusion

2.2 Action 2. Establish vessel catch history initial allocation (Suggest to change to: Initial apportionment of catch shares)

Alternative 1. No action. Do not specify a method for initial apportionment of catch shares.

Alternative 2. Distribute initial catch shares proportionately among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 2002 through 2010.

Alternative 3. Distribute initial catch shares proportionately among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010.

Alternative 4. Distribute 50% of initial catch shares equally among eligible participants and distribute 50% of initial catch shares among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010.

Sub-alternative 4a. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings from 1997 through 2010 associated with an eligible participant's current permit must equal or exceed 25,000 pounds.

Sub-alternative 4b. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings from 1997 through 2010 associated with an eligible participant's current permit must equal or exceed 50,000 pounds.

Alternative 5. Distribute 25% of initial catch shares equally among eligible participants and distribute 75% of initial catch shares among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010.

Sub-alternative 5a. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings from 1997 through 2010 associated with an eligible participant's current permit must equal or exceed 25,000 pounds.

Sub-alternative 5b. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings from 1997 through 2010 associated with an eligible participant's current permit must equal or exceed 50,000 pounds.

Alternative 6. Distribute initial catch shares proportionately among eligible participants based on the best consecutive three year average of golden crab logbook landings associated with their current permit(s) during the time period 1997 through 2010

Note: the pounds requirement sub-alternatives for **Alternative 6** are recommended to be dropped because they made reference to distributing shares equally among participants, however, **Alternative 6** refers to proportional distribution. Therefore, if the Council wants to have minimum amount of landings to qualify for proportional distribution, the Council should clarify and develop revised sub-alternatives.

2.2.1 Comparison of Alternatives

This action would not directly affect the biological environments. However, alternatives for this action could have indirect effects by influencing the total number of shareholders and how the fishery is prosecuted. **Alternative 1** would not establish catch history allocation and would essentially not establish a catch share program. Therefore, this alternative is inconsistent with the purpose and need of this amendment. **Alternatives 2-6** would base initial allocation on certain landing years and catch levels. Vessels with the most recent landing history and those that meet the highest requirements for pounds landed would be expected to have the most experience in the fishery. This may result in less gear and time used in pursuing golden crab and, consequently, less adverse impacts in the form of habitat interactions, regulatory discards, and bycatch of non-target species.

All 11 permits would quality under **Action 1**, **Preferred Alternative 4**, and they would have initial allocations ranging from near 0% through 57% under **Alternatives 2-6** for **Action 2**. Taking the two preferred alternatives together, the initial allocations for permit holders would be in the range of near-zero percent through 36% (**Action 1**, **Preferred Alternative 4**, and **Action 2**, **Preferred Alternative 5b).**

The social effects of the initial allocation of catch shares are mostly associated with vesting these fishing privileges to a permit, which would result in social benefits and social costs. Beneficial effects would be experienced by individuals with permits who receive an allocation by allowing fishermen to harvest golden crab during times when it is most efficient, profitable, and safe. For fishermen who do not receive an allocation (or receive an allocation that is smaller than needed to make a profit), the allocation of catch shares could have broad negative social impacts at the individual and community level.

Alternative 1, no action would have the least impact on the administrative environment as it would not establish initial allocation based on catch history and would not lead to the establishment of a catch share program. However, this action is inconsistent with the purpose and need for this amendment. The initial allocation schemes as described under **Alternatives 2-6** and associated sub-alternatives would have similar administrative impacts associated with reviewing the catch history and determining who would qualify under the different alternatives.

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

	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4a**	**Alternative 4b**
Biological					
Economic					
Social					
Administrative					

Table 2-2 continued

	Alternative 5a	**Alternative 5b**	**Alternative 6**
Biological			
Economic			
Social			
Administrative			

2.2.2 Conclusion

2.3 Action 3. Establish criteria and structure of an appeals process

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

Alternative 2. A percentage of the golden crab shares for the initial fishing year under the program will be set-aside to resolve appeals for a period of 90-days starting on the effective date of the final rule. The Regional Administrator (RA) will review, evaluate, and render final decisions on appeals. Hardship arguments will not be considered. The RA will determine the outcome of appeals based on NMFS' logbooks. If NMFS' logbooks are not available, the RA may use state landings records. Appellants must submit NMFS' logbooks or state landings records to support their appeal. After the appeals process has been terminated, any amount remaining from the set-aside will be distributed back to remaining shareholders according to the redistribution method selected under Action 2.

Preferred Sub-alternative 2a: Three percent of golden crab shares will be set aside for appeals.
Sub-alternative 2b: Five percent of golden crab shares will be set aside for appeals.
Sub-alternative 2c: Ten percent of golden crab shares will be set aside for appeals.
Sub-alternative 2d: Two percent of golden crab shares will be set aside for appeals.

Selection of Alternatives

2.3.1 Comparison of Alternatives

Establishing an appeals process for a catch share program is an administrative action. Therefore, it is not anticipated to directly or indirectly affect the physical, biological or ecological environments in a positive or negative way. Impacts associated with an appeals process are likely to be economic or social in nature. **Alternative 1 (No Action)** would indirectly benefit the biological environment because it would not allow any additional golden crab effort after the catch shares are distributed to eligible permit holders. Indirect effects on the biological environment may be caused if additional permit holders are issued catch shares as a result of implementing an appeals process.

The establishment of an appeals process and the design of its structure have mainly equity effects. While equity considerations are important, they have less significance in the shaping the economic implications of a catch share system. Thus, neither the appeals process nor its structure is expected to have a noticeable effect on the benefits associated with the implementation of the catch share program. This is particularly true when an appeals process would only marginally affect the initial distribution of shares among eligible participants. Economic changes would only be evident if the number of successful appeals were large compared to the number of qualifying persons or vessels.

Establishment of an appeals process is an important component of a catch shares program because it provides an avenue for fishermen to request a review of the allocations. The absence of an appeals process, as would occur under **Alternative 1 (No Action),** would likely result in fewer social benefits

than **Alternative 2,** if any golden crab fishermen did not receive an allocation or had an allocation that did not accurate reflect landings history. Establishment of an appeals process in **Alternative 2** would also contribute to a fair and equitable allocation for the catch share program. The set-asides to be used for appeals (**Sub-alternatives 2a-2d**) would result in social benefits by providing a specific amount of golden crab shares to be used to resolve any appeals. Although **Sub-alternative 2d** designates the lowest percentage (2 percent) for appeals, it would be as beneficial as **Sub-alternatives 2a-2c** due to the 2 million pound ACL for the golden crab fishery and the fact that the fishery has not reached such harvest levels in recent years.

Alternative 1 could cause administrative difficulties by failing to provide a formal process to use in resolving the complaints of those who challenge eligibility or initial allocation decisions. The appeals processes proposed in **Alternative 2** and associated sub-alternatives would be somewhat burdensome to administer. The set-aside proposed in **Alternative 2** and associated sub-alternatives would allow needed share adjustments resulting from the appeals process to occur more expeditiously.

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

	Alternative 1	**Alternative 2a**	**Alternative 2b**	**Alternative 2c**
Biological				
Economic				
Social				
Administrative				

2.3.2 Conclusion

2.4 Action 4. Establish criteria for transferability

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

Alternative 2. Shares or annual pounds can only be transferred to golden crab permit holders.

Alternative 3. 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.

Selection of Alternatives

2.4.1 Comparison of Alternatives

Alternative 1 (No Action) would not allow for transferability of golden crab catch share annual pounds and could result in decreased participation in the golden crab fishery if golden crab fishermen are unable to fish their annual pounds. Over time, decreased participation could result in a corresponding decrease in effort and landings of golden crab. Therefore, among **Alternatives 1-3**, **Alternative 1** could

have the greatest biological benefit for the golden crab stock if it results in decreased landings of golden crab. However, based on recent data there does not appear to be a biological need to decrease landings of golden crab. Since this action is administrative and does not establish immediate harvest objectives, it would not directly affect the protected species. The biological effects of **Alternatives 2** and **3** would likely be very similar as landings would be constrained by the ACL for the golden crab stock. Therefore, the effects of **Alternatives 2** and **3** may have more economic and administrative impacts than biological impacts.

In general, allowing for transferability of shares increases the efficiency of harvest operations and maximizes the harvest of golden crab, subject to ACL restrictions. **Alternative 1** is not consistent with implementation of a catch share program. **Alternative 2** requires the sale of shares only to another fisherman already permitted in the fishery. Such a requirement could stifle new entrants into the fishery as well as make it more difficult for a fisherman to sell shares because the potential pool of buyers would be greatly reduced to only those few already in the fishery, thus making it more difficult for a fisherman wanting to sell shares. **Alternative 3** is less restrictive than **Alternative 2**. It allows any U.S. citizen to transfer shares after five years. This may result in speculation and drive up the price for golden crab shares. It also results in flexibility. Given the small number of permit holders, this increases the opportunities for fishermen to purchase shares if other fishermen are unwilling to sell shares to them. This could increase aggregate profits for the fishery. However, this could also decrease aggregate profits if it increases the cost of fishing through increase share price due to speculation.

Social benefits that are tied to economic outcomes would be maximized the fewer the constraints placed on the transfer of an asset. Unencumbered transfer allows the largest pool of recipients, which would be expected to result in the payment of the highest price for the asset. **Alternative 1 (No Action)** would be expected to result in reduced social benefits relative to the other alternatives. Because **Alternative 2** would limit the number of potential buyers, it would likely result in fewer social benefits than **Alternative 3**, although potential buyers who intend to harvest golden crab with the catch shares need to hold one of the 11 available golden crab permits, which limits the number of buyers regardless. However, allowing any eligible entity to purchase shares (**Alternative 3**) may result in some buyers purchasing shares without intent to harvest, and this would result in negative social impacts on active harvesters.

Adding transferability (Action 4) to the structure of the catch share program would increase the administrative burden, requiring the tracking of shares or annual pounds, once transferred. The least administratively burdensome alternative would be **Alternative 1 (No Action),** which would not allow transferability. **Alternatives 2-3** would allow some form of transferability between users. These alternatives are expected to have similar administrative impacts and most of these impacts would be related to the development of an online platform to support the catch share program.

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

	Alternative 1	**Alternative 2**	**Alternative 3**
Biological			
Economic			
Social			

Administrative			

2.4.2 Conclusion

2.5 Action 5. Define quota share ownership caps

Alternative 1. No Action. Do not constrain the percentage of catch shares held by a person, including a corporation or other entity

Alternative 2. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of the maximum share initially issued to any person at the beginning of the catch share program,

Alternative 3. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 25 percent of the total shares.

Alternative 4. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 35 percent of the total shares.

Preferred Alternative 5. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 49 percent of the total shares.

Note: For the purposes of considering the share cap, an individual's total catch share is determined by adding the applicable catch shares held by the individual and the applicable catch shares equivalent to the corporate share the individual holds in a corporation. A corporation's total catch share is determined by adding the applicable catch shares held by the corporation and any other catch shares held by a corporation(s) owned by the original corporation prorated based on the level of ownership.

Selection of Alternatives

2.5.1 Comparison of Alternatives

This action would not directly affect the biological environment. However, alternatives for this action could have indirect effects by influencing the total number of individuals holding catch shares.

A share cap could increase the amount of consolidation in the fishery. Ownership caps are designed to prevent monopolies from developing. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), in Section 303A(c)(5)(D), indicates limited access privilege programs such as catch share programs must include provisions to prevent an individual or entity from holding an excess amount of shares. **Alternative 1** does not comply with the Magnuson-Stevens Act. National Standard 4 states that management measures should be "carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share" of fishing privileges. Without a share cap,

accumulation of excessive shares could not be prevented, shares could become concentrated among only a few participants, and those participants could gain excessive market power. **Alternatives 2-5 (Preferred)** would limit the amount of shares an individual or entity could own. This amount would include shares owned individually and through a corporation. A cap on share ownership would allow some consolidation while preventing accumulation of excessive shares.

Incorporating the proposed regulations of **Actions 1-2**, **Action 5** would result in share caps ranging from "0" (no share cap to a 49% share cap), as follows: **Alternative 2** (no share cap); **Alternative 3** (maximum share of 25% per person); **Alternative 4** (maximum, 35% per person); and **Preferred Alternative 5** (maximum, 49% per person). The proposed action could help achieve long-range planning, investment and marketing objectives of the Amendment (Section 1.2).

Establishment of a limit on the proportion of shares that one individual may own has important social implications that are tied to the economic effects, such as market control, and also in equity issues for a fishery. Excessive share holding is a major concern in regards to catch share programs and may change distribution of effort and ownership if concentration occurs. In general, there must be a balance between preventing concentration and market control, and allowing fishermen to optimize harvest. **Alternative 1 (No Action)** would not establish a share cap and would likely have negative social impacts due to the potential for one individual to control a majority of the shares, which would affect distribution among other harvesters. **Alternative 2** could result in a large share cap (depending on how shares are allocated), which would allow for expansion but could cause concentration of the fishery. As the potential share cap increases in **Alternatives 3-5 (Preferred)**, the possibility of concentration increases.

Establishing a catch share cap would be administratively burdensome on the agency. An online catch share system would have to be developed in such a way to track share transfers and enforce the cap(s) and would require a system to prevent transfers that would exceed the cap(s). However, once the online catch share system is developed, the burden associated with maintaining the share cap is likely to minimal. Of the action alternatives, **Preferred Alternative 5** would allow for the greatest amount of consolidation and would have the least administrative burden.

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. Use it or Lose it policy

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

Alternative 2. Shares that remain inactive for 3 CONSECUTIVE years will be revoked and redistributed proportionally among the remaining shareholders. "Inactive" is defined as less than 10% of the aggregate annual average utilization of the catch share quota over a 3 year moving average period"

Sub-alternative 2a. Landed crabs only.

Sub-alternative 2b. Landed crabs and/or transfer of annual pounds

Alternative 3. Shares that remain inactive for 3 CONSECUTIVE years will be revoked and redistributed proportionally among the remaining shareholders. "Inactive" is defined as less than 30% of the aggregate annual average utilization of the catch share quota over a 3 year moving average period"

Sub-alternative 3a. Landed crabs only.

Sub-alternative 3b. Landed crabs and/or transfer of annual pounds.

Selection of Alternatives

2.6.1 Comparison of Alternatives

A catch share program would directly benefit the physical environment by reducing and consolidating capacity. Less effort would result in less habitat-gear interactions, unless there is a shift in usage/effort to gear that may have greater negative impacts on the physical environment. **Alternative 1 (No Action)** would provide the greatest benefit to the biological environment, because participants would not be required to fish or lease their shares in order to retain them. **Alternative 3** would result in the least benefits to the biological environment of any of the action alternatives, because it would require participants to harvest on average 50 percent or more of their allotted shares over a three year period in order to retain them.

Concerns associated with persons buying catch shares for the sole purpose of not using them are often cited as a reason to consider a "use it or lose it" provision. Economically, under a "use it or lose it" provision, it would not make sense for fishermen to hold shares and not use them. **Alternative 1 (No Action)** would allow people to hold shares but not use them. The amount of shares that would go unused is expected to be small, unless the cost of harvesting is greater than the revenue received from the catch. Implementing any sub-alternative of **Alternatives 2** or **3** would require buyers of shares to make certain the shares they are buying would not be subject to being revoked after they are purchased. **Alternatives 2** and **3** would not prevent individuals from buying shares for the purpose of not harvesting the shares. It would only force the shareowners to fish a portion of their shares each year. If **Sub-alternative 2b** or **3b** is selected, shareholders could meet these harvest requirements by transferring their shares to another fisherman and never actually have to fish themselves. Therefore, the provision may not be totally effective in limiting shareholders to persons wanting to harvest the available resource. It is anticipated few share certificates would be redistributed among the fleet and the economic impacts of the action are expected be minimal.

The "use or lose" provision is intended to protect active fishermen; prevent shareholders from keeping shares with the intention to lease annual pounds for an extended period of time; and to allow the fishery to achieve maximum harvest by letting the shares be fished. In general, this type of provision is expected to

result in broad, long-term social benefits and it would be expected that **Alternative 1 (No Action)** would result in fewer social benefits than **Alternative 2** or **3**.

Alternative 1 (No Action) would not directly affect the administrative environment. Shares could remain unused and managers would not have to track share usage. The administrative environment could be indirectly affected by a loss in cost recovery fees (Action 7) resulting from unused shares. **Alternatives 2-3** would require administrative tracking of the "expiration date" of unused quota shares, and the average percentage of quota caught for each shareholder. This requirement could directly affect the administrative environment by requiring significant administrative monitoring effort. However, this would be done through the online catch share system (based on similar programs developed for the Gulf of Mexico catch share programs) and once developed, would likely be straightforward and simple for both fishermen and administrative staff to use.

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

	Alternative 1	Alternative 2a	Alternative 2b	Alternative 3a	Alternative 3b
Biological					
Economic					
Social					
Administrative					

2.6.2 Conclusion

2.7 Action 7. Cost recovery plan

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

Alternative 2. Alternative 2. Cost recovery fees would be calculated at time of sale at a registered dealer.

Sub-alternative 2a. Cost recovery fees would be based on actual ex-vessel value of landings,
Preferred Sub-alternative 2b: Cost recovery fees would be based on standard ex-vessel value of landings, as calculated by NMFS.

Alternative 3. Fee collection and submission shall be the responsibility of:
Sub-alternative 3a: Shareholder
Preferred Sub-alternative 3B: Dealer

Alternative 4, Fees submitted to NMFS
Preferred Sub-alternative 4a: Quarterly
Sub-alternative 4b: Monthly
Sub-alternative 4c: Annually

Selection of Alternatives

2.7.1 Comparison of Alternatives

Establishing a cost recovery plan for a catch share program is an administrative action, which is not expected to affect the program's potential to provide environmental benefits. None of the cost recovery alternatives are expected to directly or indirectly affect the biological environment.

Alternative 1 is inconsistent with direction provided through the Magnuson-Stevens Act. While **Alternative 1** is inconsistent with the Magnuson-Stevens Act, it is theoretically preferable to the other alternatives if the objective of the program is to achieve maximum economic yield and a socially optimum stock size. Imposing a fee would distort the net benefits and economic impacts of the program and could impact stock size in the long run. **Alternative 2**, associated sub-alternatives and options would implement a cost recovery plan, with the cost recovery fee being the responsibility of the shareholder. Cost recovery fees would be based on either the actual ex-vessel price paid to the harvester or a "standard" ex-vessel price calculated by NOAA Fisheries Service. Standard prices would be set by specific geographic area based on what NOAA Fisheries Service determines to be appropriate. Whether the dealers or the harvesters are required to send the check, the money is expected to come from the harvesters. Dealers would likely hold back the required fee from the payment they make to the harvesters. That money would then be placed in an account and earmarked to pay the fee. Alternatively, NOAA Fisheries Service could bill the harvester directly. Either way the cost recovery fee is actually paid by the harvester and would reduce their producer surplus.

In general, social benefits are associated with lower economic costs for fishermen, and **Alternative 1 (No Action)** would be expected to result in the most social benefits. Although cost recovery is required by the Magnuson-Stevens Act, **Sub-alternatives a** and **b** under **Alternatives 2-4** provide flexibility in how fees are collected by defining how fees are calculated (**Alternative 2**), who collects and submits fees (**Alternative 3**) and timing of fees (**Alternative 4**). **Preferred Sub-alternative 2b** would be expected to have more social benefits than **Sub-alternative 2a** due to a standard and consistent fee schedule for fishermen. **Preferred Sub-alternative 3b** would place the burden of collection and submission on the dealers and **Sub-alternative 3a** would place burden on the fishermen. Lastly, **Preferred Sub-alternative 4a** would reduce the burden on fishermen and dealers in fee submission than **Sub-alternative 4b** and **Sub-alternative 4c**.

The administrative effects of implementing a cost recovery plan are expected to be minimal, in part, because the plan would at least partially pay for itself. **Alternative 1 (No Action)** would require NOAA Fisheries Service assume all costs of administering the proposed catch share program. **Alternative 2** would require NOAA Fisheries Service account for cost recovery fee transactions**. Sub-Alternative 2a**, which requires NOAA Fisheries Service calculate the standard ex-vessel price of golden crab, would be more burdensome than **Sub-alternative 2b,** which would base fees on the actual ex-vessel value of golden crab landings. Alternatives and associated sub-alternatives considered under **Alternatives 3** and **4**, and associated sub-alternatives pertain to the way and the frequency in which the fees are collected.

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

	Alternative 1	Alternative 2a	Alternative 2b	Alternative 3a	Alternative 3b
Biological					

Economic					
Social					
Administrative					

Table 2-7. (continued)

	Alternative 4a	**Alternative 4b**
Biological		
Economic		
Social		
Administrative		

2.7.2 Conclusion

2.8 Action 8. Establish boat length limit rule

(Recommendation: Reword action to read: Eliminate boat length limit rule)
Recommendation: Alternative 1. No Action: Do not eliminate boat length limit rule.

Alternative 1. No Action. To obtain a permit for the middle or southern zone via transfer, the documented length overall of the replacement vessel may not exceed the documented length overall, or aggregate documented lengths overall, of the replaced vessel(s) by more than 20 percent.

Alternative 2. Eliminate vessel length restrictions for obtaining a permit for the middle and southern zones via transfer.

Selection of Alternatives

2.8.1 Comparison of Alternatives

The current regulations regarding **Action 1 (No Action)** (boat length restrictions) were set in Amendment 3 to the Golden Crab FMP. The size rule was initially put into place to help prevent larger vessels from fishing in the middle and southern zones, which are not as large as the northern zone. There is some concern that if **Alternative 2** is selected as preferred, most of the fishing effort would occur in the Middle and Southern Zones, increasing the pressure put on the stock. Recent information provided to the Council's Scientific and Statistical Committee suggests that the golden crab stock is healthy and can withstand greater fishing pressure than currently occurs.

Economically, **Alternative 2** would be better for fishermen because eliminating the boat length rules in the middle and southern zones would allow more fishermen to fish closer to their homeport and therefore reduce trip costs. The social benefits of this action are tied to the economic benefits of allowing fishermen to expand operation size by increasing boat size. As the golden crab fishery continues to expand, multi-day trips and larger catches per trip, along with refrigerated sea water systems onboard to

keep crabs alive, may require a larger vessel. Additionally, multi-day trips on larger vessels would be more efficient.

This action would eliminate the restriction on upgrading vessel size in the golden crab fishery. Administrative action would be required in the form of rule making, education, and outreach. However, the administrative impacts are expected to be reduced from the status quo as it would allow for greater flexibility for the fishermen with less involvement from the regional office and law enforcement.

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

	Alternative 1	Alternative 2
Biological		
Economic		
Social		
Administrative		

2.8.2 Conclusion

2.9 Action 9. Restrictions on where permitted vessels can fish for golden crab

Alternative 1. No Action. A vessel with a permit to fish for golden crab in the northern zone or the middle zone may fish only in that zone. No vessel with a documented length overall greater than 65 ft (19.8 m) may fish for golden crab in the small vessel sub-zone within the southern zone. The small vessel subzone is bounded on the north by 24°15' N. lat., on the south by 24°07' N. lat., on the east by 81°22' W. long., and on the west by 81°56' W. long. Upon request from an owner of a permitted vessel, the NMFS Regional Administrator will change the zone specified on a permit from the middle or southern zone to the northern zone. A vessel may possess golden crab only in a zone in which it is authorized to fish, except that other zones may be transited if the vessel notifies NMFS Office for Law Enforcement in advance and does not fish in a zone in which it is not authorized to fish.

Alternative 2. Participants can use quota in any zone for which they possess a permit.

Alternative 3. A vessel with a permit to fish golden crab can use annual pounds in any of the three golden crab fishing zones.

2.9.1 Comparison of Alternatives

Currently, fishing vessels are issued a permit for one of the golden crab fishing zones and a vessel with a northern or middle zone permit may only fish in those zones. **Alternative 2** would not differ from the no action alternative in that fishermen are able to fish in the zones for which they hold a permit. **Alternative 3** would allow fishermen with a federal golden crab permit to fish in any of the zones.

The overall cost of fishing for golden crab could be less under **Alternative 3** than under **Alternative 1** or **Alternative 2**. Cost and returns along with logbook data would needed to specify and estimate models of fishing behavior, including shifts in fishing among zones.

Social benefits would be expected to be greater under **Alternative 2** than under **Alternative 1 (No Action)**. In regards to **Alternative 3**, which would eliminate the small vessel zone, social benefits would be expected due to harvesters having the opportunity to fish an area that is no longer used by small vessels.

There would be minor administrative impacts associated with the action alternatives. These impacts would be related to outreach, education and rulemaking. However, the administrative impacts are expected to be reduced from the status quo as it would allow for greater flexibility for the fishermen with less involvement from the regional office and law enforcement.

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

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

2.9.2 Conclusion

2.10 Action 10. Modify the small vessel sub-zone restriction

Alternative 1. No Action. Do not eliminate the small vessel sub-zone within the southern zone that was originally established to protect against very large vessels fishing in the subzone

Alternative 2. Eliminate the small vessel sub-zone within the southern zone that was originally established to protect against very large vessels fishing in the subzone.

Selection of Alternatives

2.10.1 Comparison of Alternatives

Taking action to eliminate the small vessel sub-zone is not expected to result in negative biological impacts on the resource or protected species. However, under **Alternative 2**, there is the potential for localized depletion of golden crab in the small vessel sub-zone if larger vessels relocate their fishing operations in the small vessel sub-zone.

During 2005-2010, only one vessel appears to have fished in the southern zone (not necessarily in the small-vessel subzone). **Alternative 2** may better address the Amendment's objectives than **Alternative 1**, because it could allow greater flexibility in captain's decisions. Under **Alternative 2**, vessels greater

than 65 feet in length could fish in what was established as a small vessel sub-zone within the southern zone to allow smaller vessels to fish in the absence of competition by very large vessels. During 2005-2010, only one vessel appears to have fished in the southern zone (not necessarily in the small-vessel subzone). Although as many as 11 vessels could fish for golden crab, only 4-5 have done so in recent years, and relaxing regulations on zones may allow them to operate more efficiently. Therefore, elimination of the small vessel subzone within the southern zone would be expected to have positive social effects for fishermen with golden crab permits.

The action to eliminate the small vessel sub-zone would not result in administrative impacts other than those associated with rule-making. Enforcement impacts would be reduced as the elimination of this sub-zone would allow all vessels to fish in this area.

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

	Alternative 1	Alternative 2	Alternative 3
Biological			
Economic			
Social			
Administrative			

2.10.2 Conclusion

2.11 Action 11. Establish criteria for permit stacking

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

Alternative 2. 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.

Alternative 3. Allow an unlimited amount of golden crab permits on a single vessel so that any zones for which the vessel has a permit can be fished in one trip.

IPT Recommendations:

Change wording: Modify "One Vessel, One Permit" policy for Golden Crab

Alternative 1: Do not modify "one vessel, one permit" policy for golden crab.

Alternative 2: Allow for up to three permits to be issued to one vessel so that any zones for which the vessel has a permit can be fished in one trip.
Sub-Alterantive 2a. Two permits per vessel
Sub-Alternative 2b. Three permits per vessel

Alternative 3: Allow an unlimited amount of golden crab permits on a single vessel so that any zones for which the vessel has a permit can be fished in one trip.

Selection of Alternatives

2.11.1 Comparison of Alternatives

This action is primarily administrative and would not have any direct effects on the biological environment. **Alternative 1 (No Action),** would not affect the fishery as it is currently prosecuted; therefore, this alternative should have no effect on the physical or biological environment. **Alternative 2** and **Alternative 3** would allow vessels to fish multiple zones on one trip.

The overall cost of fishing for golden crab could be less under **Alternative 3** than under **Alternative** 1 or **Alternative 2**, pending possible clarification in wording of **Alternative 2.** That is, **Alternative 3** would accord more freedom to captains and owners on where to fish and the cost-effective use of vessels.

The social benefits of this action are tied to the economic benefits of allowing fishermen to maximize efficiency on each trip, and take advantage of multiple zones on one trip by obtaining multiple permits on a vessel. Social benefits would be expected to be greater under **Alternative 2** and **Alternative 3** than under **Alternative 1 (No Action)**.

This action is primarily an administrative in nature. **Alternative 1**, no action, would not increase or decrease the administrative burden managing the golden crab fishery. **Alternatives 2** and **3** would remove the permits office policy that issues on permit to one vessel. By making it clear that this policy would not apply to the golden crab fishery, a vessel would be allowed to hold and fish more than one permit in each trip. It is expected that the administrative impacts of this action would be minimal.

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

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

2.11.2 Conclusion

2.12 Action 12. Monitoring and enforcement

NOTE: Council may consider a hail-in/hail out requirement that would require fishermen to call in before and after their fishing trips to better monitor the catch share program.

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

Alternative 2. Require all fishing vessels permitted 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 2a. The purchase, installation, and maintenance of the VMS equipment and communications costs will be paid for or arranged by the shareholder.
Sub-alternative 2b. The purchase of the VMS equipment will be paid for by NMFS and the installation, maintenance, and communications costs of the VMS equipment will be paid for or arranged by the shareholder.
Sub-alternative 2c. The purchase of VMS equipment will be reimbursed by the National OLE VMS reimbursement account if funding is available. Installation, maintenance, and communication costs will be paid for or arranged by the shareholder.

Note: The Council may want to consider **i**mplementing a 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.

Selection of Alternatives

2.12.1 Comparison of Alternatives

Alternative 1 (No action) would not require a vessel monitoring system (VMS) on golden crab vessels participating in the catch share program. VMS is typically used in conjunction with closed area enforcement and catch share programs to identify when and where fishermen are fishing and when they are returning to port. Knowing the vessel's location gives the VMS monitoring staff an idea of when, at least, gross closed area violations are occurring. The Comprehensive-Ecosystem Based Amendment 1 explored the idea of VMS for the golden crab fishery but after many discussions with the fishery participants and law enforcement, it was determined that VMS is not an effective tool to monitor the location of golden crab fishing gear. However, catch share programs use VMS to monitor when fishing vessels are fishing and when they are returning to port. All catch share programs in the South Atlantic Region and in the United States require the use of VMS.

Alternative 2 and associated **Sub-alternatives 2a-2c** would require the use of VMS for vessels fishing in the golden crab catch share program. The sub-alternatives vary the way the VMS would be paid for. **Alternative 2, Sub-alternative 2a, 2b, 2c** would result in increased costs to golden crab

fishermen. Under **Alternative 2, sub-alternative 2c** the initial purchase would be the responsibility of NOAA Fisheries Service and would not result in an increased cost to the golden crab fishermen, except for the installation, maintenance, and communication. However, some fishermen may consider the requirement of a VMS to be an intrusion on their privacy and their autonomy as an independent fisherman.

This action is primarily administrative, but there are social benefits associated with improved monitoring programs. Overall, the proposed measures may impose some additional burdens on fishermen, administrators, and law enforcement, but negative impacts would be outweighed by the social benefits of improved monitoring through electronic reporting, VMS use, and hail-in requirements. The proposed measures in this action would improve data for the golden crab fishery, and this would generate broad long-term social benefits.

Alternative 1 (No action) would produce no increased administrative cost or burden beyond the status-quo. **Alternative 2** and associated sub-alternatives would require the use of vessel monitoring on federally permitted golden crab vessels participating in the golden crab fishery. VMS is an important tool used in monitoring of catch share programs and is strongly encouraged by the OLE as a tool used in this fishery. The administrative impacts associated with the action alternatives are associated with rule-making, outreach, monitoring and enforcement. These impacts are expected to be significant on the agency.

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

	Alternative 1	**Alternative 2a**	**Alternative 2b**	**Alternative 2c**
Biological				
Economic				
Social				
Administrative				

2.12.2 Conclusion

2.13 Action 13. 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 ACL exceeds 3 million pounds (Golden Crab AP).

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

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

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

Selection of Alternatives

2.13.1 Comparison of Alternatives

Establishing a new entrants program would allow a mechanism for new entrants to participate in the fishery. This program would be an administrative change and would not be expected to result in biological impacts to the resource as the harvest of golden crab is constrained by an ACL.

Unless the Council chooses **Alternative 3** as their preferred alternative for **Action 4**, under **Alternative 1 (No Action)** there would be no way for new entrants to come into the fishery. **Action 13** provides four methods for new entrants to enter. **Alternative 2** would allow entrants to come in through shares taken as part of a violation, revoked through the "use it or lose it" provision (**Action 6**), or should the ACL reach 3 million pounds. **Alternatives 3** through **5** would set aside 2%, 5%, or 10% of the shares (respectively) to be made available to new entrants through an annual auction.

It is likely that **Alternative 2** would have relatively little negative economic impact on the current fishery participants. However, **Alternatives 3 through 5**, depending on the alternative selected, could have an adverse impact on current participants as they would have their annual share allocations reduced by the amount of the selected alternative.

In most cases, implementation of a new catch share program results in additional capital required for new entrants, which may impact fishing communities and affect the continuation of intergenerational fishing in families (Buck 1995; McCay 2004). Therefore, program provisions, such as set-asides, that assist new entrants in accessing shares would be expected to produce broad, long-term social effects. In general, the more access to shares that is provided for new entrants, the more overall and long-term social benefits. In this way **Alternative 5** would likely produce the most social benefits by setting aside the highest percentage of shares for new entrants, as long as new entrants used the shares for harvest.

The establishment of a new entrants program as described in the action alternatives would be administratively burdensome. Depending on how the program is structured, there would need to be staff available to manage the program.

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. 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 10%, the shareholder's annual pounds remaining on the last fishing trip of the year. Shareholders who incur an overage will be required to payback the overage in the subsequent year of their allocation.

Alternative 3. A person on board a vessel with the shareholder's only remaining golden crab allocation may exceed, by up to 20%, the shareholder's annual pounds remaining on the last fishing trip of the year. Shareholders who incur an overage will be required to payback the overage in the subsequent year of their allocation.

Selection of Alternatives

2.14.1 Comparison of Alternatives

The annual pounds overage action would allow fishermen to exceed their annual pounds during the last trip of the fishing year but repay their overage in the following fishing year. This action is not expected to have a negative biological impact as the overage would be addressed in the following fishing year. This type of system is regularly used in other catch share programs with success.

The purpose of **Action 14** is to provide potential economic relief for fisherman and to prevent wasting golden crab biomass. **Alternatives 2** and **3** would allow a fisherman who goes over his or her share on the last trip of the season to exceed the allowed pounds by either 10 or 20%. Any overage would come off that fisherman's next fishing year's annual pounds allocation. Allowing the fisherman flexibility would improve a fisherman's profit margin compared to trip costs on the last trip of the year.

Alternatives 2 and **3** would likely be beneficial to the fishermen and allow them to maximize efficiency on the last trip of the year. However, if overages occurred commonly and over several years, this could affect fishermen through management measures if the ACL is exceeded.

The action alternatives would have some administrative burden associated with tracking the overage against the following years quota. However, it is expected that this type of overage would be built into

the computerized system and would not require large amounts of staff time during the implementation phase. There would be no difference in the administrative burden between **Alternatives 2** and **3**.

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

	Alternative 1	Alternative 2	Alternative 3
Biological			
Economic			
Social			
Administrative			

2.14.2 Conclusion

2.15 Action 15. 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.

> **Preferred Sub-alternative 2a.** Approved landing sites will be selected by fishermen but must be approved by NMFS Office of Law Enforcement (OLE) in consultation with the appropriate state law enforcement agency prior to use.
>
> **Sub-alternative 2b.** Approved landings sites will be selected by the Council and NMFS in consultation with the appropriate state law enforcement agency, based on industry recommendations and resource availability.

Selection of Alternatives

2.15.1 Comparison of Alternatives

Establishing approved landing sites is an administrative action. Therefore, is not expected to directly or indirectly affect the physical, biological or ecological environments in a positive or negative way.

Alternative 1 (No Action) would not require certification of landing sites, and thus this alternative would not result in any additional cost. **Alternative 2** and associated sub-alternatives would establish landing sites for all catch share programs in the commercial golden crab fishery. The cost for certifying a landing site is reportedly minimal for both the fishing participants and fishery managers, including enforcement personnel.

In general, measures that contribute to improved monitoring and enforcement are expected to produce broad, long-term social benefits, and potentially some short-term social impacts associated with any economic costs from the proposed requirements.

Alternative 1 (No Action) would be the least burdensome on the administrative environment because approved landing sites would not be established. Establishing approved landings is expected to be more burdensome on the administrative environment than status quo because NMFS OLE has to approve sites, which includes visiting sites to ensure addresses are valid. Additionally, approved landings sites would have to be tracked and updated as needed and VMS landing notification forms would need to be updated if approved sites change. It is expected that during the implementation phase of the catch share program there would be more administrative burden to identify and certify landing sites. However, it is expected that once most landing sites are identified the administrative burden would be reduced significantly.

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

	Alternative 1	**Alternative 2a**	**Alternative 2b**
Biological			
Economic			
Social			
Administrative			

2.15.2 Conclusion

Chapter 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, Florida (30°N and 28°N). This same depth range from Savannah, Georgia, to St. Augustine, Florida 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. Catherine's Island, Georgia, at 270-540 meters consists of mud and biogenic ooze. Further north from Cape Fear, North Carolina, 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 exclusive economic zone (EEZ).

3.1.3 Essential Fish Habitat-Habitat Areas of Particular Concern (HAPC)

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).

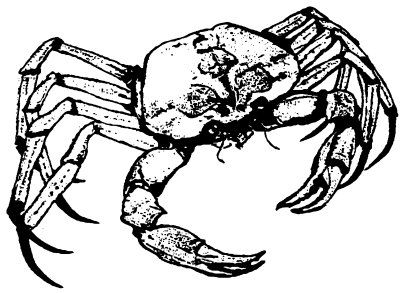

Figure 3-1. Golden Crab, *Chaceon fenneri.*

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 *C. 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 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.

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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*
Atlantic Sturgeon	*Acipenser oxyrinchus*

*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 spp. 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

Smalltooth Sawfish

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 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 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.

Atlantic Sturgeon

Since the completion of the June 7, 2006 opinion, Atlantic sturgeon has been listed under the ESA, effective April 6, 2012 [77 FR 5914; February 6, 2012]. Atlatic sturgeon are primarily found in estuarine waters far from the golden crab fishing grounds. Additionally, because of their diet and feeding mechanisms, Atlantic sturgeon are not likely to be effected by the operation of the golden crab fishery. Atlantic sturgeon are described generally as being omnivorous benthic feeders and filter large quantities of substrate when they suction food into their protrusible mouth. In the marine environment, Atlantic sturgeon feed on mollusks, polychaete worms, gastropods, shrimps, amphipods, isopods, and small fish.[1] These species would not be used as bait to harvest golden crab.

[1] Scott, W.B. and E.J. Crossman. 1973. Freshwater fishes of Canada. Fisheries Research Board of Canada Bulletin 184: 966 pp.

Adverse effects on newly listed Atlantic sturgeon from trap/pot entanglement are equally unlikely. While traps would be baited, the traps will be set miles from the natural habitat of the Atlantic sturgeon and in depths in excess of 600 feet. Therefore, it is not expected that the golden crab fishery would have any adverse impacts on Atlantic sturgeon.

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[2] 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 golden crab fishery in the South Atlantic region.

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

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*

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 (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 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 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 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 Atlantic States Marine Fisheries Commission (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.

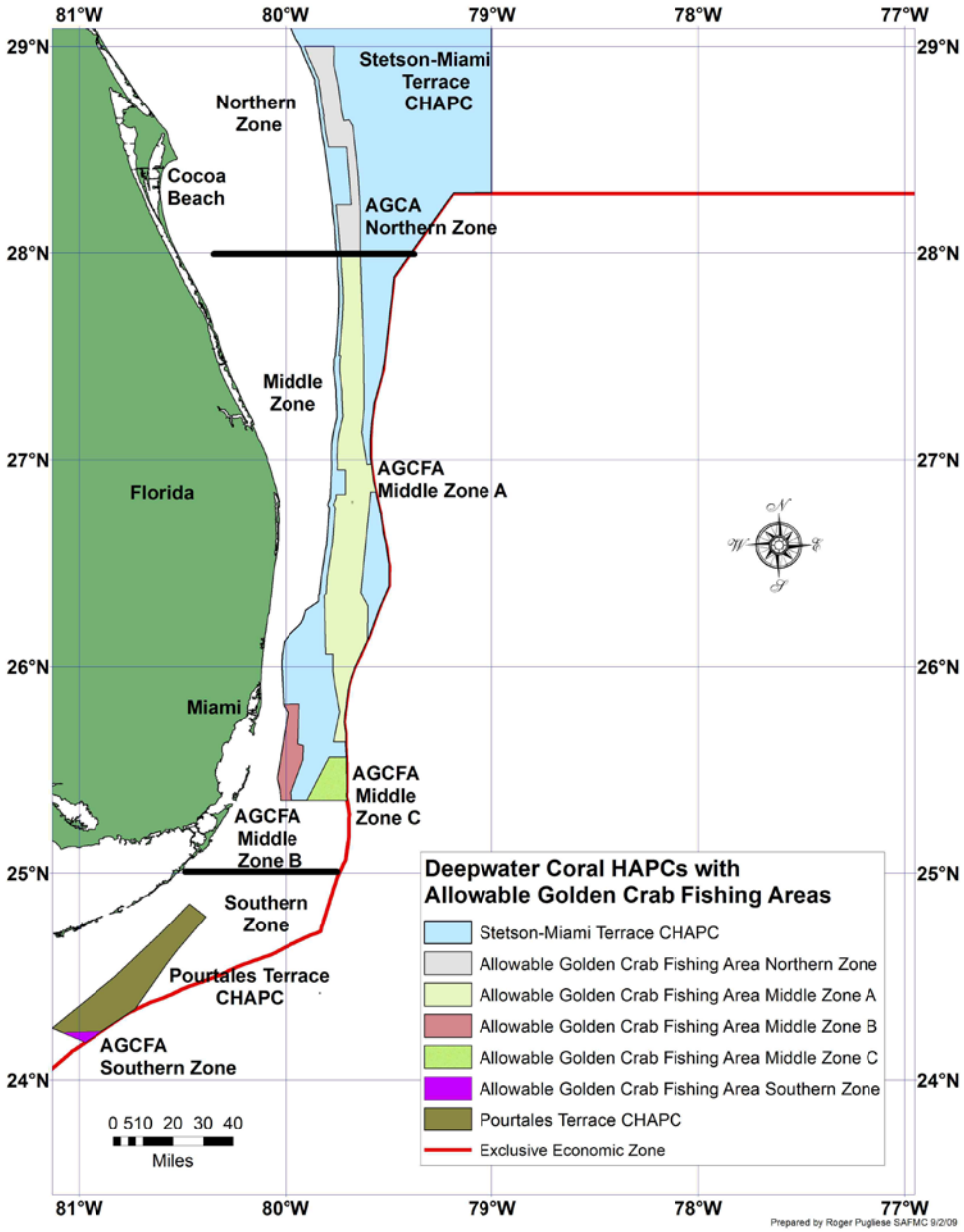
3.4 Human Environment

3.4.1 Golden Crab Fishery

3.4.1.1 Description of Harvest Methods, Gear, and Zones

Fishing Zones

The Golden Crab FMP established three golden crab fishing zones (Figure 3.2). The Northern Zone is defined as being that portion of the South Atlantic EEZ north of 28^0 N (to the North Carolina-Virginia border). The Middle Zone is contained within the EEZ between 25^0 N and 28^0 N. The Southern Zone extends south from 25^0 N within the South Atlantic EEZ.



Harvest Methods

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.

3.4.2 Economic Description

3.4.2.1 Economic Description

Data and Methods

Commercial fishing for golden crab is described in 1995-2010 at the fishery, vessel and trip levels using NMFS, SEFSC Florida Trip Ticket (FTT), Golden Crab Logbook (LKB), and Accumulated Landings System (ALS) data bases.[3] The data are shown in whole weight (ww), and 2010 dollars (2010$), referring to the dollar amount paid to fishermen by dealers (first buyers).[4] FTT and LBK data are used in vessel and trip summaries (LBK with ALS dollar values added).[5] Fishermen landed golden crab in the early 1980s (Golden Crab FMP, 1995, Section 3.5); official collection of mostly confidential began in 1986.[6] Because of the small number of participants, fishing activity of high liner vessels may contribute to fluctuations in indicator variables, and proxies are used for landings and ex-vessel value for 2005.[7]

Golden Crab Commercial Fishing

Allowing for differences among data sources, landings of golden crab ranged from 0.5 to 1.7 million pounds (ww) in 1995-2010, and averaged 0.491 mp in 2006-2010, with an ex-vessel value of $871,000 (**Figure 3.1** and **Table 3.1**, FTT). The total vessel gross revenue is $913,000 for all species landed by the same vessels, albeit for separate trips, areas of capture, and/or gear (**Table 3.1**). The ex-vessel value for golden crab alone is virtually the same as total trip gross, because little if anything else is reported for the trips. Besides golden crab, the $913,000 total includes $71,000 for stone crab, $26,400 for spiny lobster, and $1,334 for other species (FTT). Species other than golden crab were more important in the past, accounting for half of the $2.2-million total for vessel gross in 1996-2000. This indicates a change for the "fleet" of vessels, not necessarily a counterpart change for each vessel. Ex-vessel prices of golden crab in 2010 dollars exhibited a mostly upward trend during 1995-2010, and they averaged $1.77 / lb in 2006-2010 (**Table 3.1** and **Figure 3.1**).

[3]The data used for analysis are NMFS, SEFSC managed: Florida Trip Ticket (FTT) System (1986-1996, 19Mar10, and 1997-2011, 02Sep11); LBK (1995-96, 26Aug10, and 1997-2010, 02Jun11); and Accumulated Landings System (ALS) (03Feb11). For all LBK data and some FTT data, dollar values are added. For early FTT data, the initial step is as follows: [ex-vessel value = landed weight * price]. If dollar values for 1986-1996 are still missing, they are estimated [ex-vessel value = ALS price (ww) * FTT pounds (ww)], where [FTT pounds (ww) = landed weight * conversion factor], and [ALS ex-vessel price (ww) = ALS ex-vessel value / ALS pounds (ww)]. ALS data are used sequentially starting with file merges in SAS by species, year, month and state.

[4]To offset the effects of general price inflation in the U.S. economy over time, a "deflator" is used to translate "current" dollars into 2010 dollars by month (U.S. Bureau of Labor Statistics, BLS, index for producer prices, all commodities, not seasonally adjusted).

[5]The FTT data include the U.S. Coast Guard or state-assigned VESIDs for the most part for 1997 onward. The Saltwater Products License number (SPL) is used in the place of the VESID for 1986-1996, and for some other years (1997, 12 of 225 trips; 1998, 32 of 139 trips; 2002, 3 of 278 trips; and 2004, 5 of 176 trips).

[6]There are for fewer than three dealers for South Carolina in 1987, 1995, and 1996; the Florida west coast (NMFS state code 11) in 1993, 2000, 2003, and 2005 onward; and for the Florida non-coastal counties (NMFS state code 12) in 1994 and 1995. Data may have been included inseparably in aggregates for several species.

[7]The number of vessels associated with each small business entity is estimated by year. Quoting SBA: "Individuals or firms that have identical (or substantially identical) business or economic interests may be treated as though they are affiliated. Family members, persons with common investments, or firms that are economically dependent through contractual (or other) relationships, are among those treated this way" (13 C.F.R. § 121.103(f)). Permit-LBK data are used, courtesy of Andy Strelcheck (22Sep10 & 03Jun11), based on work by Janet L. Miller, NMFS, SERO, and Kevin McCarthy, Michael Judge, and David Gloeckner, NMFS, SEFSC.

Table 3.1. Golden crab commercial fishing (FTT).

Year	Ves-sels	Vessel gross, 2010$ * 10^3		Golden crab						
		Total	Per vessel	Thsnd lbs (ww)	Thsnd 2010$	2010$ / lb	Lbs / vessel	Trips	Lbs / trip	2010$ / trip
1995	15			1,738	$2,471	$1.42	115,840	481	3,612	$5,138
1996	7	$2,127	$304	830	$1,006	$1.21	118,616	150	5,535	$6,703
1997	14	$3,406	$243	1,032	$1,295	$1.25	73,727	225	4,587	$5,754
1998	9	$1,999	$222	425	$567	$1.34	47,199	139	3,056	$4,082
1999	6	$1,337	$223	834	$1,247	$1.50	138,963	183	4,556	$6,814
2000	11	$2,349	$214	934	$1,502	$1.61	84,875	301	3,102	$4,989
2001	9	$1,782	$198	764	$1,265	$1.66	84,834	331	2,307	$3,821
2002	13	$1,169	$90	516	$907	$1.76	39,680	278	1,856	$3,261
2003	6	$600	$100	332	$587	$1.77	55,388	180	1,846	$3,263
2004	6	$570	$95	312	$553	$1.77	51,987	176	1,772	$3,142
2005	7	$762	$109	392	$732	$1.86	55,992	313	1,252	$2,337
2006	6	$955	$159	416	$910	$1.78	69,325	331	1,257	$2,750
2007	4	$700	$175	440	$699	$1.59	109,989	321	1,371	$2,177
2008	4	$761	$190	494	$759	$1.54	123,443	244	2,024	$3,110
2009	5	$1,147	$229	549	$1,007	$1.83	109,843	291	1,887	$3,459
2010	4	$1,001	$250	557	$979	$1.76	139,247	338	1,648	$2,896
Five-year averages. Vessel, trip and price averages based on data in rows.										
96-00	9	$2,244	$239	811	$1,123	$1.39	86,270	200	4,063	$5,628
01-05	8	$976	$119	463	$809	$1.75	56,477	256	1,812	$3,164
06-10	5	$913	$198	491	$871	$1.77	106,777	305	1,610	$2,855

Source: NMFS, SEFSC, Florida Trip Ticket (FTT), and US BLS, PPI. The pound and dollar totals for 2005 are estimated. The numbers of vessels for 1995-1998, 2002 and 2004 are estimate using available data to link SPLs with VESIDs.

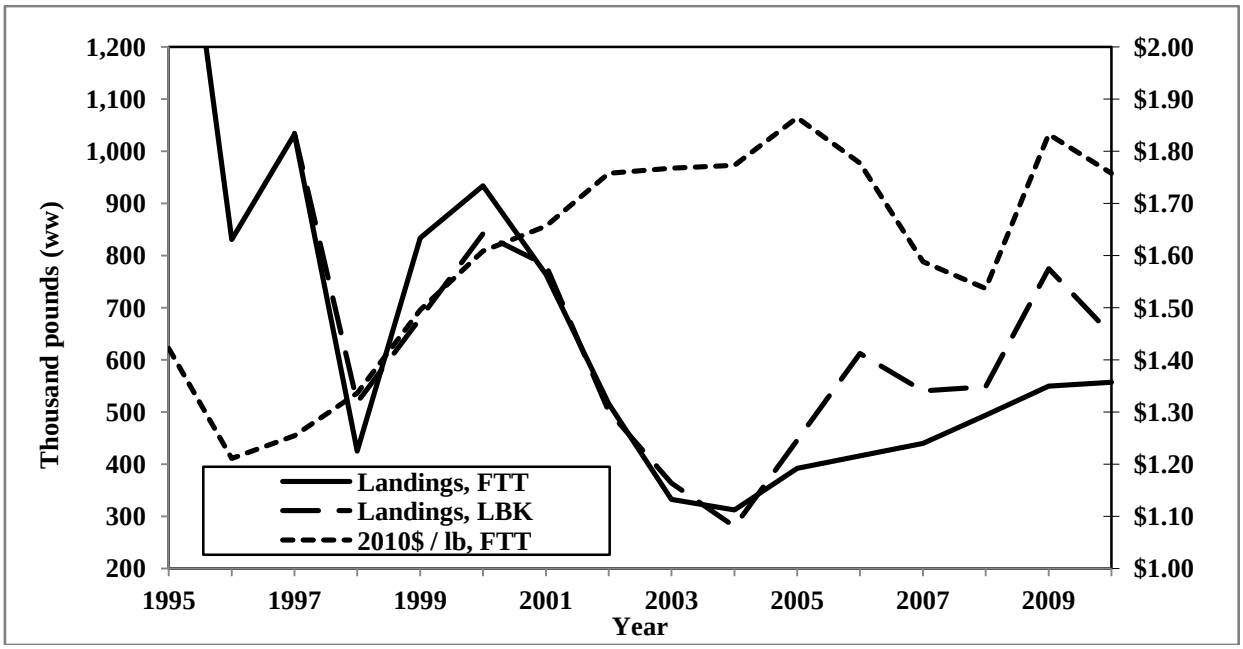


Figure 3.1. Golden crab, landings and ex-vessel prices (vertical axes do not start at zero).

If an independently owned and operated vessel is to continue fishing over time, its gross revenue must cover its operating costs, such as docking fees, insurance, permits, and repairs (vessel, engine, and traps), as well as trip costs (Shivlani et al., 2005, Tables 20-22, survey data for the early 2000s for vessels fishing mostly for spiny lobster and stone crab, and some golden crab). Information on vessels, and cost and returns is contained in the Golden Crab FMP, 1995, Section 3.5. A cost-and-returns survey is planned (Scott Crosson, NMFS, SEFSC). Vessels averaged 107,000 pounds of golden crab, and $198,000 in gross revenue (for all species, not just golden crab) in 2006-2010, compared with 86,000 pounds of golden crab, and $239,000 in gross revenue in 1996-2000. The increase in landings per vessel of golden crab and higher prices were not enough to offset the loss in revenue for other species (**Table 3.1**). There was a good deal of variability in gross revenue during 1995-2010, from approximately $10,000 or less per vessel to $400,000 or more. Vessel gross revenue cannot be computed using LBK data, but it is needed to describe vessel economic activity, and for the RFA analysis. Vessels landing golden crab averaged approximately 42-62 feet in length, and engines averaged 432-743 horsepower (NMFS, SERO, permits data, 1997-2006; more complete information on vessels obtained in public hearings is provided in the FMP, 1995, Section 3.7, Tables 6-7).

There are some caveats for data summaries. The Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region (Golden Crab FMP is for the South Atlantic EEZ; it has a permit-based limited-access system, with permits that may be specific to fishing zones (50 CFR § 622.4 (a) (2) (x); 50 CFR § 622.17). Today, there are 11 permitted vessels, 5 vessels on average with landings in 2006-2010, and fewer than 3 small business entities with landings in 2005 (**Tables 3.1-3.3**; "Data and Methods" in this section).[8] Under proposed regulations in Amendment 6 for a catch share program, more permit applicant data may become available to

[8]Other numbers for participants are shown in "Overview," SAFMC Golden Crab Committee, March 3, 2009, Jekyll Island Club Hotel, 371 Riverview Drive, Jekyll Island, GA.

assess confidentiality issues, which are more likely by zone than by year.[9] Meanwhile, landings by zone are not shown in this section.

Table 3.2. Golden crab commercial fishing (LBK).

Year	Ves-sels	Lbs * 10^3	2010$ * 10^3	Lbs / vessel	Trips	Lbs / trip	2010$ / trip	Days fished	Traps	Depth fished
1997	11	1,034	$1,371	94,041	245	4,222	$5,595	345	27,703	1,377
1998	9	518	$743	57,591	156	3,323	$4,760	245	19,205	1,329
1999	5	680	$1,114	135,904	129	5,268	$8,636	245	18,069	1,352
2000	8	842	$1,397	105,218	168	5,010	$8,317	416	25,076	1,344
2001	5	781	$1,306	156,228	172	4,542	$7,594	343	20,683	1,405
2002	6	501	$914	83,462	150	3,338	$6,093	247	13,687	1,229
2003	5	363	$650	72,697	103	3,529	$6,311	191	7,790	1,188
2004	4	280	$502	69,992	62	4,516	$8,089	107	5,391	1,355
2005	4	446	$797	111,530	129	3,458	$6,178	156	12,440	1,241
2006	5	612	$1,092	122,455	164	3,733	$6,660	247	16,947	1,428
2007	4	540	$865	135,028	169	3,196	$5,120	369	18,411	1,544
2008	5	548	$856	109,691	151	3,632	$5,666	298	17,436	1,591
2009	6	775	$1,419	129,098	206	3,760	$6,890	501	29,031	1,675
2010	5	648	$1,131	129,619	160	4,051	$7,069	327	31,706	1,746
Vessel and trip averages based on data across rows.										
97-00	8	769	$1,156	93,152	175	4,404	$6,626	313	22,513	1,351
01-05	5	474	$834	98,812	123	3,850	$6,767	209	11,998	1,284
06-10	5	625	$1,073	124,941	170	3,675	$6,310	348	22,706	1,597

Source: NMFS, SEFSC, Golden Crab Logbook (LBK), and ALS; US, BLS, PPI. The pound and dollar totals for 2005 are estimated.

Vessel captains tend to have long tenure and experience in commercial fishing, and they are likely to make a trip only if they expect trip gross revenue to cover trip costs, such as for fuel, ice, bait, food, and crew shares (payment methods vary for owner captains, hired captains, and crew; Shivlani et al., 2005, Tables 20 & 46). Demographic information on fishermen obtained in public hearings is summarized in the FMP, 1995, Section 3.7, Tables 4-5). Based on available, data, crews fishing for golden crab consist of four people, including the captain (FTT data for 2006-2010 for fewer trips than those with landings, 50th percentiles; half of the trips had smaller crews, and half had larger crews). Trip gross revenue was quite variable during 1995-2010, ranging from approximately $100 or less to $10,000 or more. The average for trip gross has been level to declining, and productivity (CPUE) in pounds per trap has declined (**Tables 3.1-3.2; Figure 3.2**).

[9]Although logbook reports became mandatory on October 28, 1996, there are some reports for late 2005 onward, and the data has been summarized by zone for analyst use (David Gloeckner, and Michael Judge, NMFS, SEFSC, personal communication, respectively, 14Sep10 and 16Aug10).

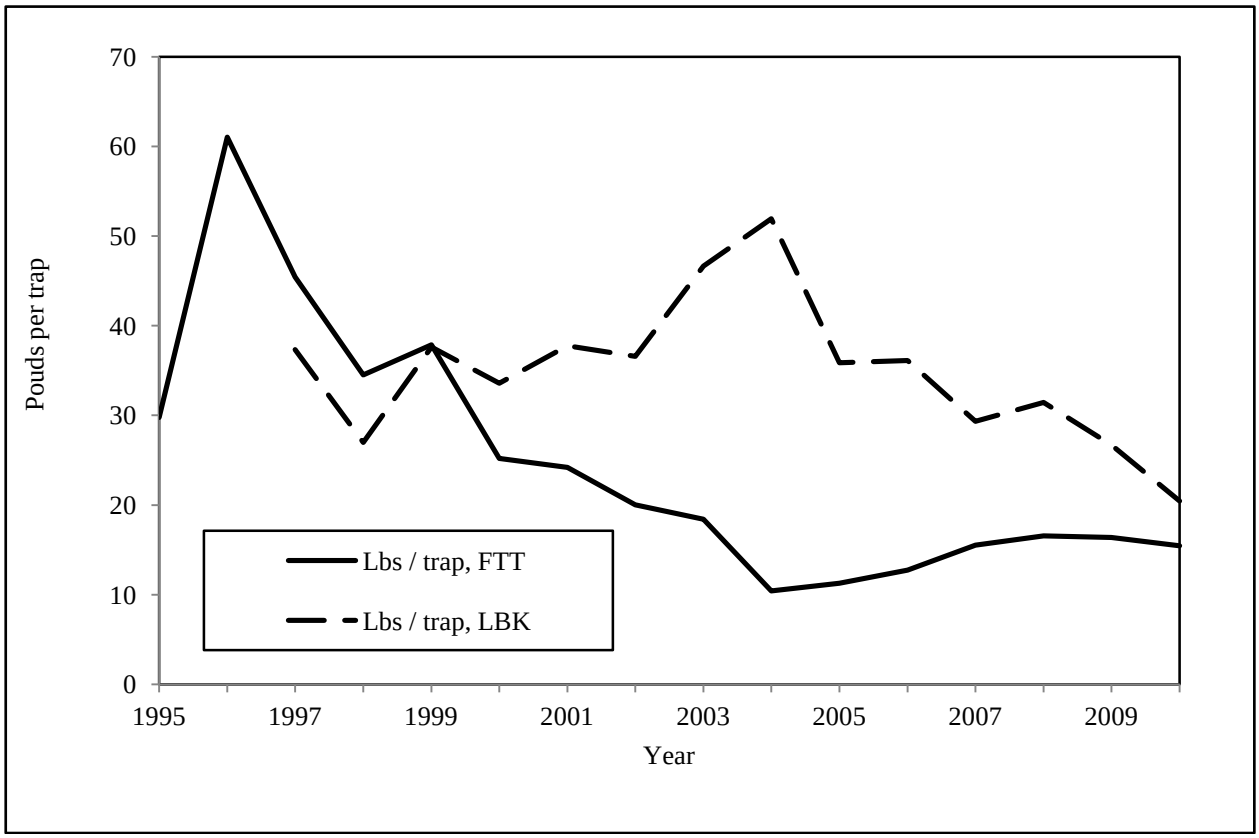


Figure 3.2. Golden crab, productivity (CPUE, FTT and LBK).

Some indices of fishing activity, effort and productivity (CPUE) for golden crab in 1995-2010 seem to be at variance (**Tables 3.1-3.3** and **Figures 3.2-3.3**).[10] Increases in fishing effort since 2003-2004 appear to have boosted fishery landings (upper portion, **Figure 3.3**).

[10]This may trace to several factors, such as: underlying differences among sources in the observed values used for indices, the use of trap hauling date (LBK) and trip landing date (FTT) to assign date, year-to-year changes in fishing activity for high liner vessels, the small number of vessels with landings, and the limits of descriptive analysis.

Table 3.3. Golden crab commercial fishing effort and productivity (FTT).

Year	Thsnd lbs (ww)	Trips	Lbs / trip	Traps	Lbs / trap	Hours fished	Lbs / hour fished	Depth fished (feet)
1995	1,738	481	3,612	58,405	30	19,452	89	769
1996	830	150	5,535	13,604	61	7,311	114	985
1997	1,032	225	4,587	22,716	45	8,666	119	991
1998	425	139	3,056	12,303	35	4,323	98	997
1999	834	183	4,556	22,018	38	4,933	169	1,012
2000	934	301	3,102	37,038	25	8,449	111	1,078
2001	764	331	2,307	31,538	24	8,053	95	1,279
2002	516	278	1,856	25,774	20	8,377	62	1,202
2003	332	180	1,846	18,051	18	6,247	53	1,226
2004	312	176	1,772	29,941	10	7,386	42	1,270
2005	392	313	1,252	34,720	11	10,562	37	1,229
2006	416	331	1,257	32,698	13	13,640	30	1,360
2007	440	321	1,371	28,337	16	13,190	33	1,567
2008	494	244	2,024	29,834	17	10,806	46	1,589
2009	549	291	1,887	33,522	16	16,803	33	1,677
2010	557	338	1,648	36,021	15	20,247	28	1,723
Five-year averages based on data in rows.								
96-00	811	200	4,063	21,536	38	6,736	120	1,013
01-05	463	256	1,812	28,005	17	8,125	57	1,241
06-10	491	305	1,610	32,082	15	14,937	33	1,583

Source: NMFS, SEFSC, Florida Trip Ticket (FTT), and US BLS, PPI. The pound and dollar totals for 2005 are estimated.

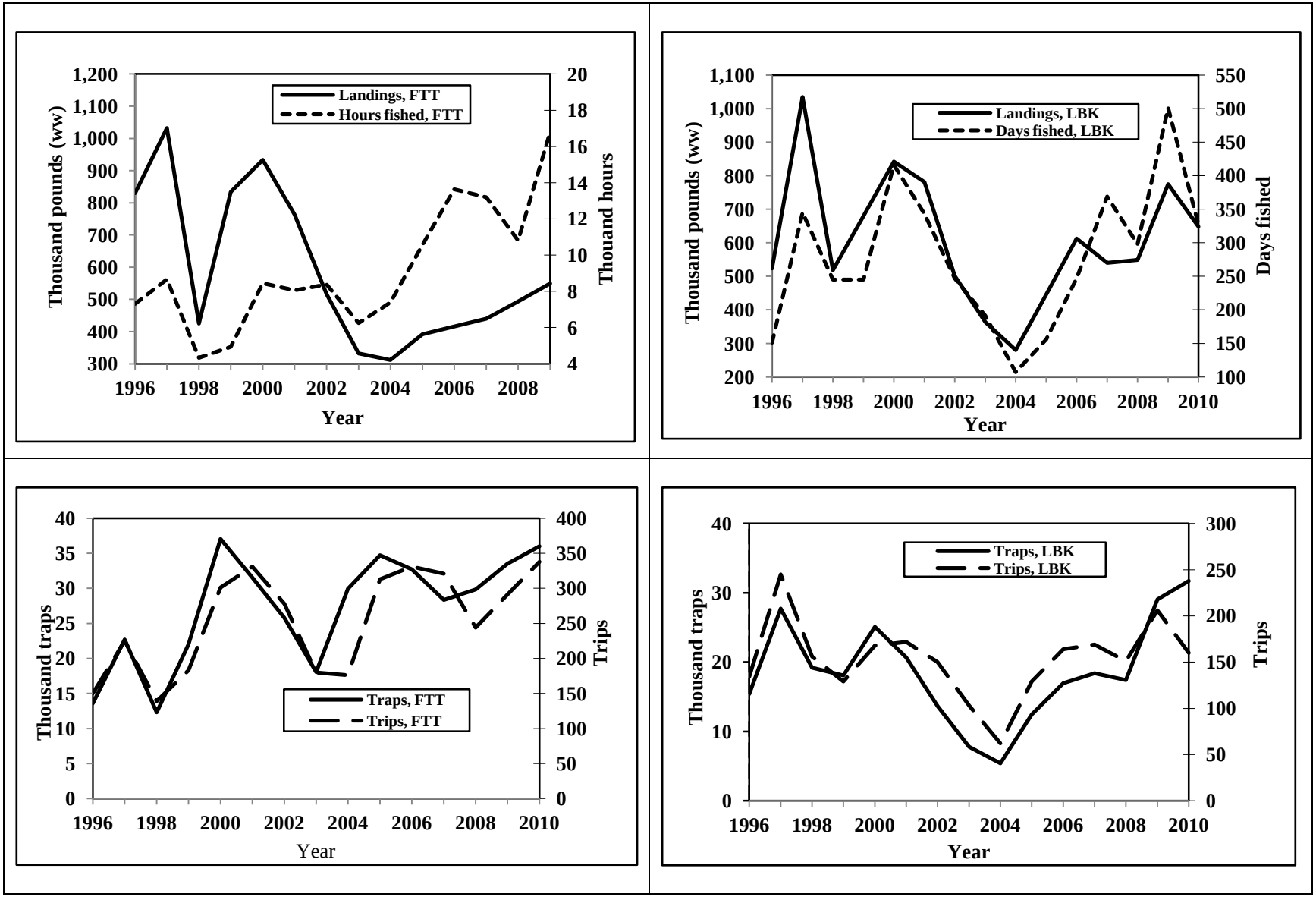


Figure 3.3. Golden crab, landings and fishing effort (FTT and LBK, vertical axes may not begin zero).

In the last two 5-year periods, monthly landings of golden crab have tended to be higher in February-May, approximately 40,000 to 50,000 pound per month, and seasonally low in November, 21,000 pounds (**Figure 3.4**). Effort is seasonal as well, ranging from as much as 1500 hours fished per month in January-September to a low of 800 hours in November, while the number of trips ranges from approximately 30 per month in January-May to a low of 15 in November (**Figure 3.5**, averages by month based on data for 2006-2010).

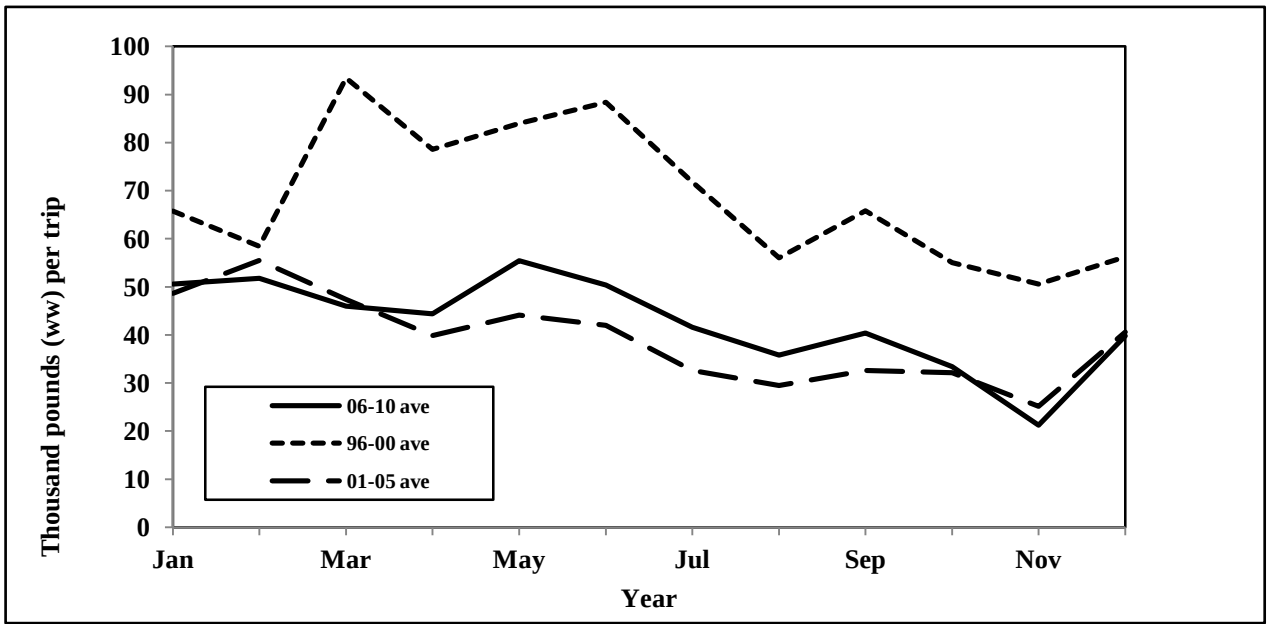


Figure 3.4. Monthly landings, golden crab (FTT).

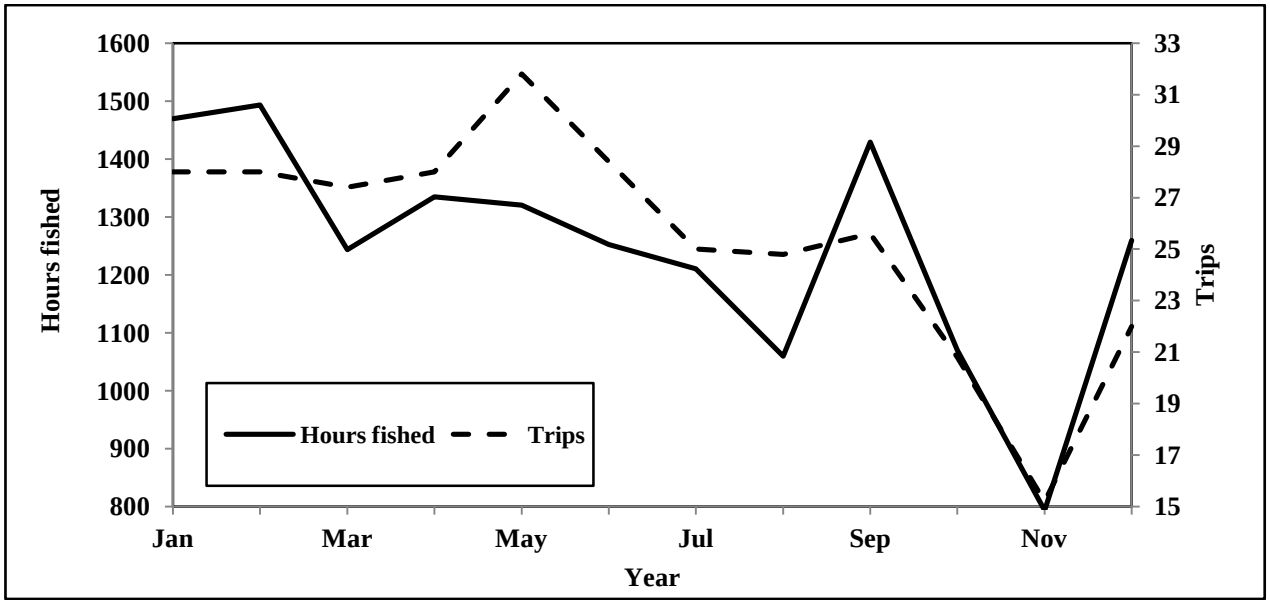


Figure 3.5. Monthly effort, golden crab (LBK, vertical axes do not begin at zero).

3.4.2 Social and Cultural Environment

The fishing communities of North Carolina, South Carolina and Georgia are included in the Fishery Ecosystem Plan (SAFMC, 2009); however, the actions proposed in this Amendment to the Golden Crab FMP are limited to the golden crab fishery that currently operates 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 3.4** offers an overview of the presence of the selected infrastructure items and provides an overall total score that is merely the total of infrastructure present.

Table 3.4. 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 3.5**, 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 3.5. 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.

Chapter 4. Environmental Consequences

4.1 Action 1. Establish eligibility criteria for a golden crab catch share program

Alternative 1. No Action. Do not establish eligibility criteria for a golden crab catch share program

Alternative 2. Restrict eligibility to valid commercial golden crab permit holders who have made landings of 1 pound or greater between 2001 and 2010.

Alternative 3. Restrict eligibility to valid commercial golden crab permit holders who have made landings of 1 pound or greater between 2005 and 2010.

Preferred Alternative 4. Restrict eligibility to valid commercial golden crab permit holders. Eligibility for participation in this catch share program is defined as having a valid commercial golden crab permit as of the control date of 12/7/2010.

4.1.1 Biological Effects

This action would not directly affect the biological environments. However, alternatives for this action could have indirect effects by influencing the total number of shareholders and how the fishery is prosecuted.

Alternative 1 would not restrict participation in the catch share program (Table 4-1). All golden crab permitted fishermen would be eligible to participate in the catch share program, regardless of their previous participation in the fishery. **Alternatives 2-4** would restrict initial participation in the program to individuals who already have some experience in the golden crab fishery. Under **Preferred Alternative 4** all golden crab permitted fishermen would meet the eligibility criteria to participate in a catch share program. Therefore, the effects of **Alternative 1 (No Action)** and **Preferred Alternative 4** would be the same, Generally, the amount of effort applied to the fishery would decrease as participation is limited to fewer, more efficient individuals. This would result in less gear and time used in pursuing golden crab and, consequently, less adverse impacts in the form of habitat interactions, regulatory discards, and bycatch of non-target species.

Table 4-1. Number of permits eligible under each alternative for Action 1 for 2001-2010.

Alternative	Number of Permits Eligible to Participate in Catch Share Program
1	11
2	8
3	7
4 (Preferred)	11

4.1.2 Economic Effects

For purposes of analysis, it is assumed that there are currently 11 valid vessel permits, and that a valid permit is required to be onboard each vessel that possesses or lands golden crab from the South Atlantic EEZ. **Action 1**, **Alternative 1** (no action) would neither open the fishery to unlimited numbers of participants nor address the Council's intent to establish a catch share program in response to an industry request. Only 8 of 11 permit holders would meet **Alternative 2** qualification criteria to be eligible to participate in the proposed catch share program (**Table 4.1**). Seven permit holders would meet **Alternative 3** criteria, and all 11 would meet **Preferred Alternative 4** criteria. **Action 1** is part of a three-stage determination for **Actions 1, 2, and 5**. The nuanced economic assessment is discussed mostly in this section. It appears that the proposed regulation (preferred alternatives under **Actions 1, 2, and 5**) would result in eight initial individual shareholders. However, because of the nature of fishery data, economic effects are discussed in terms of vessels, trips, and fishing effort, rather than in terms of initial individual shareholders. Switching to a decision-making construct, there are currently an estimated five "small business entities" (SBA definition) engaged in harvesting golden crab, and most of them appear to own or control through affiliation more than one permitted vessel.[11]

If it could be estimated, the potential change in producer surplus would be an indicator of the economic effect of the proposed regulation. Producer surplus is approximately the difference between total vessel gross revenue and total fishing cost (vessel costs, trip costs, and returns to captains and owners, if not already included in costs). How producer surplus would be affected by the proposed regulation is not known, but several component variables are discussed in this section. Allowing for caveats, producer surplus is not expected to change much from what it was in 2006-10. Of course, if the proposed regulation were to be implemented, vessel-permit holders and catch-share holders could lease or sell rights to someone else, possibly introducing another set of decision makers. This could affect the dynamics of fishery behavior.

Number of Vessels Fishing

How many vessels would fish in a year under the proposed regulation is not known; perhaps, the number could continue to be near five, the average in 2006-10. The reduction in the number of vessels fishing during 1995-2010 would likely have reduced the vessel-cost portion of fishing costs. Any increase in the number of vessels actually fishing could have the opposite effect. Compared with 11 vessel permits, an average of 5 vessels per year landed golden crab in 2006-10 (Section 3.4.2). In 1995-2010, there were as many 11-15 vessels per year with landings, and 36 individual vessels in all with landings. There was a turnover of vessels, though some vessels fished several years in a row and four fished for 10-15 years during 1996-2010. Landings averaged 0.491 mp in 2006-10 (FTT data), well below the Annual Catch Limit (ACL) of 2.0 mp (SAFMC 2009c). Landings averaged 0.811 mp in 1996-2000 and 0.463 mp in 2001-05; they may have been 1.7 mp in 1995, before the FMP was implemented. For vessels that landed golden crab, the overall total vessel gross revenue was $913,000 (2010$) per year during 2006-10, regardless of species, area of capture, or gear (**Table 3.4.1**, FTT data). This averages $198,000 per vessel. This is less than in 1996-2000 when other species accounted for half of the total (total gross revenue of $2,244,000; average of $239,000 per vessel).

[11]The U.S. Small Business Administration (SBA) states: "Individuals or firms that have identical (or substantially identical) business or economic interests may be treated as though they are affiliated. Family members, persons with common investments, or firms that are economically dependent through contractual (or other) relationships, are among those treated this way" (13 C.F.R. § 121.103(f)).

The availability of skilled captains and crews capable of operating vessels under difficult conditions seems to be recognized as a limiting factor that may help to explain the decline in number of vessels landing golden crab during 1995-2010 (Sections 1.1 and 3.4.2). Section 3.4.1 describes the very difficult conditions associated with harvesting golden crab, as does Section 3.4.1 of the "Comprehensive Ecosystem-Based Amendment 1 for the South Atlantic Region" (SAFMC 2009c). For example, the cost of losing one line of traps, perhaps $2,900-$7,200, is significant when compared with the 2006-10 average for trip gross revenue, $2,855.[12]

Fuel and Other Fishing Costs

Another factor affecting the number of vessels fishing may be the relative cost of vessel repairs. This could help explain the decrease in the number of vessels with landings during 1995-2010 to the extent that decisions are now being made by 5 or so small business entities (i.e., fewer than 11 at one per valid vessel permit). On the other hand and allowing for volatility, fishing effort appears to greater than in late 1990s, hence trip costs for the fishery as a whole are likely higher, given the increase in energy and fuel prices. Fuel cost now appears to be greater than the vessel portion of repair costs.[13] Catch per unit effort (CPUE) in pounds per trap is lower than in the late 1990s, and the depth of fishing is greater, approximately 1,600 feet in the last five years (**Tables 3.4.1-3.4.3** and **Figure 3.4.2**). In the last two years or so, allowable fishing area was further reduced for golden crab, i.e., area closures were implemented (SAFMC 2009c). This could affect CPUE and fishing effort.

The numbers of trips, traps fished, and hours or days fished (time away from port), as well as depth fished would be expected to affect the costs for fuel, an important part of trip costs, and prices of fuel and energy have increased since the late 1990s (U.S. Bureau of Labor Statistics, producer price index, no. 2 diesel). Of course, any transition to more fuel-efficient fishing practices, engines, hulls, and vessels would offer some offset. For example, a response to sharply rising fuel prices in 2004-08 may be seen in a shift to longer, multiple-day trips in 2009-10; i.e., relatively less of the time away from port is used for traveling to and from the fishing grounds (SAFMC 2009c; unpublished FTT data, as of 02Sep11).[14] Two to three vessels may have shifted to on-board refrigerated seawater storage systems by 2009. These systems are expected to result in better quality for end-product users, whether for frozen golden crab, or live/fresh golden crab (Section 1.1; SAFMC 2009c). The use of refrigerated seawater systems would reduce trip costs for ice (which requires energy to make), but increase the overall investment and repair costs for

[12]Average for trip gross revenue, $2,855 (**Table 3.4.1**.); data on trawls, 20-50 traps per line or "trawl," which may be 5 miles long (SAFMC 2009c, Section 3.4.1); and the dollar value per trap, $143 (Scott Crosson, NMFS, SEFSC, pers. comm., preliminary data, 30Jan12).

[13]Scott Crosson, NMFS, SEFSC, pers. comm., January 30, 2012, preliminary data collected in the fall 2011 for vessels that fished for golden crab in 2010. Similar breakouts of cost data are shown in Shivlani et al. 2004 (Tables 21 & 22), and Murray 2005 (Tables 1 & 2), although the surveyed multi-species vessels engaged in little or no fishing for golden crab, respectively. All three sources indicate investment costs (capital costs or asset values) associated with vessels and traps. Applying breakouts from the other two sources to the golden crab data from Crosson suggests that at least two thirds of the annual repair costs may be for the vessel repairs per se, with the rest being for trap repairs. To the extent that this true, much of the repair part of the total cost of fishing (vessel plus trip costs) for golden crab may be reduced by not using a vessel in fishing, though some repair costs, insurance costs, and overhead costs could not be avoided, if a vessel is to be kept ready for fishing.

[14]NMFS, SEFSC, unpublished FTT data, as of 03Sep11, indicate significant increases in annual averages for the number of hauls of trap lines per trip in 2008-10, to 12-15, compared with 3-6 per trip in 2003-07. The annual averages for hours fished per trip in 2009-10 were 58-68 hours, compared with 34-41 hours per trip in 2004-08. Thus, the 9 hours per trip for traveling to and from the fishing ground dropped in relative importance.

vessels. Investment cost (capital cost or asset value) for refrigerated seawater systems was a distant third in order behind investment costs for vessels and traps in 2010 (Scott Crosson, pers. comm., NMFS, SEFSC, 30Jan12).

Ex-Vessel Prices

Ex-vessel prices in 2010 dollars have increased, from an average of $1.39 per pound (ww) in 1996-2000 to $1.77 in 2006-10. However, the average for pounds landed per trip is lower, and average trip gross revenue is approximately the same in 2010 dollars (LBK data), or lower (FTT data). If the 1996-2000 prices (in 2010 dollars) had prevailed in 2006-10, average gross revenue per vessel would have been approximately $155,000 rather than $198,000, and average gross revenue per trip would have been $2,242 rather than $2,855 (FTT data in **Table 3.4.1**). If fishermen do not expect trip gross revenue to exceed trip costs, they would not have an economic incentive to make a trip, though other factors may affect their decision, such as scheduled-delivery contracts for golden crab, and/or economic incentives for captains and crews not covered in trip costs. Vessels would not be expected to continue to operate over a period of years if vessel gross revenue does not cover out of pocket vessel costs and trip costs, along with return on investment to owners, and payments to captain, if the owner is not the captain. Methods of payment to owners, captains and crews may vary.

Although one could attribute higher ex-vessel prices to the decline in landings of golden crab during 1995-2010, other factors likely have been at work, such as improved product quality and cooperative marketing efforts of vessel owners, processors, restaurants and others, all of which would be expected to increase market demand (shifted the demand curve). Of course, U.S. and foreign seafood markets include many products that may compete more or less directly with golden crab, and the ability of participants in golden fishery to control the ex-vessel prices is limited (see "the sub-section on "Other Economic Factors)."

Other Economic Factors

If not already discussed, some terms or concepts indicated in the management objectives in the Amendment are briefly discussed (Section 1.2); e.g., producer and consumer benefits, over-capitalization, vessel (or small business entity) entry and exit, and dissipation of returns under open access fishing.

Open access fishing and producer surplus: The golden crab fishery has operated under limited access conditions with 11 or so valid vessel permits since the implementation in 1996-97 of the original FMP of 1995. That is, the golden crab fishery is not an open access fishery in which economic returns or producer surplus could be dissipated by the uncontrolled entry of large numbers of vessels, although open access conditions existed prior to the implementation of the original FMP of 1995. Economic returns to the harvesting sector of the fishery are essentially the same as producer surplus, which, as indicated earlier, is approximately the difference between total vessel gross revenue and total fishing cost (vessel costs, trip costs, and returns to captains and owners, if not already included in costs). Producer surplus is not expected to change much from what it was in 2006-10 under the proposed regulation, allowing for caveats. Economic returns to vessel owners are essentially similar, noting that owners would not receive payments to hired captains. Economic returns to vessel owners in this construct are not the same as taxable income to owners, because taxable income for a business is computed following specific guidelines for deductions for depreciation, interest expense and perhaps other items.

Price and demand analysis: Empirical demand functions have been estimated for some fishery products, but not for golden crab. A two-variable (two-axis) graphical representation of the demand function

assumes that "other things are fixed" (values for other variables are not allowed to change); it has a downward slope (from left to right), with price on the left or vertical axis, and quantity on the horizontal axis. This depicts the inverse relationship between quantity and price, following economic theory; i.e., holding other factors constant, increases in landings of golden crab would reduce price, and decreases in landings would increase price. For agricultural and fishery products, there is a long history of estimating and specifying empirical, single-equation, price-dependent demand models, and more complex, multi-function models, including supply functions. Results may differ, such as because of availability of data, analyst knowledge of the product and market, time intervals for the data used (daily, monthly, quarterly, and annual data), time period selected, level in the marketing chain (going from the vessel to end user), model specification, and for other reasons. As an example, an empirical, price-dependent demand equation could be specified along the following lines (read "price is a function of variables in parentheses"): price = f (landings, variables to represent competing products, a variable to represent income, and other factors). For golden crab during 1995-2010, one would expect that the two-variable demand curve would have shifted to the right because of improvements in product quality, market development, and changes in income over time; i.e., the price for any specified amount of golden crab would be higher today than in the 1990s. The drop in ex-vessel prices of golden crab in the late 2000s likely reflects the downturn in the U.S. economy (**Figure 3.4.1**).

Over-capitalization: Over-capitalization may be seen as referring to a situation wherein fishing capacity (landings capability) exceeds sustainable landings. Using then-available FTT data, the original FMP (SAFMC 1995, Sections 3.4.6-3.4.7) included estimates of domestic harvesting capacity in terms of pounds that could be landed for golden crab to compare with MSY. The potential for over-capitalization helped to establish a limited access program that has prevailed with some modification (11 valid vessel permits, with permits by zone). Fishing capacity and potential for over-capitalization have not been re-visited for the golden crab fishery. There is a large body of technical literature on the topic, methods, and available proprietary software programs (see "capacity and technical efficiency toolbox," on the website for NOAA Fisheries, Office of Science and Technology). A good explanation of over-capitalization is provided by Gréboval and Munro (1999).[15]

Industry concentration ratios: Reviewers of the Amendment at some point may have concerns about the concentration ratio for the harvesting sector of the golden crab fishery. The concentration ratio is quite high, because only five or so small business entities are involved and together they produce 100% of the output. The number of small business entities in the processing sector is not known. Perhaps ten seafood dealers (processors and/or wholesalers) purchased golden crab in 2004-2009 (NMFS, SEFSC, ALS data as of 03Feb11). However, their ability to exhibit market control over prices is limited, given the nature of competition in global seafood markets (see sub-section on "Ex-Vessel Prices").

Summary

To sum up, the economic effect of the proposed regulation (preferred alternatives for **Actions 1, 2, and 5**) would be determined by landings, the number of vessels fishing, vessel costs, the level of fishing effort and per-trip costs (especially fuel costs), catch per unit effort (CPUE), and ex-vessel prices. Assuming

[15]Dominique Gréboval and Gordon Munro. 1999. "Overcapitalization and excess capacity in world fisheries: underlying economics and methods of control," chapter 1 in FAO, Managing Fishing Capacity: Selected Papers on Underlying Concepts and Issues (selected papers from the FAO, Technical Working Group on the Management of Fishing Capacity in La Jolla, USA, from 15 to 18 April 1998). Fisheries Policy Division, FAO, Viale Terme di Caracalla 00100 Rome, Italy, FAO Fisheries Technical Paper T386, 206 p. James Kirkley and Dale Squires authored chapter 3: "Measuring capacity and capacity utilization in fisheries."

the values for these variables remain about as in 2006-10, a reduction in producer surplus would not be expected. A loss in producer surplus compared with 2006-10 would represent an economic impact for the proposed regulation.

4.1.3 Social Effects

Establishing a catch share program may affect participation in the golden crab fishery. Negative social effects could be experienced by some golden crab permit holders who did not meet the eligibility requirements under **Alternatives 2-3**. **Alternatives 2** and **3** would exclude some golden crab permit holders as ineligible (see **Table 4-1),** which may have negative impacts if the permit holders planned to start harvesting golden crab again due to the new requirement to hold catch shares or annual pounds. **Preferred Alternative 4** would designate all 11 permit holders as eligible to receive catch shares and likely have the least impact on the social environment. There would be no criteria for endorsement qualification under **No-Action Alternative 1**; therefore, all 11 active Golden Crab permit holders would be able to participate in the catch share program. Therefore, there would be no difference in negative social economic effects between **Alternative 1 (No Action)** and **Preferred Alternative 4**. In general, the social impacts would be more directly caused by allocation of catch shares among eligible individuals (**Action 2**).

4.1.4 Administrative Effects

Allowing more individuals eligibility for initial allocation in the catch share program increases the amount of administrative burden involved in implementing the program. Depending on which alternative is chosen, the number of potential participants in the catch share program varies. **Alternative 1** and **Preferred Alternative 4** would potentially include the most participants and require the greatest amount of work to implement. **Alternative 3** would include at most 7 participants and potentially have the lowest administrative burden, followed by 8 eligible permits in **Alternative 3**.

Action 1 would create eligibility requirements for participation in the golden crab catch share program. This program would follow the format of other catch share programs that have been implemented in the Southeast Region. The following text describes program requirements that would be implemented under a catch share program for golden crab. While some of these provisions are inherent with the establishment of a catch share program, other provisions are included in this document for Council consideration. Provisions discussed herein apply to golden crab in the South Atlantic EEZ, to any person aboard a vessel with a golden crab catch share account, or to any person with a golden crab dealer endorsement. These provisions apply to South Atlantic golden crab regardless of where harvested or possessed.

Golden crab allocations and landings would be measured in terms of whole weight. This is the standard metric for golden crab caught commercially and sold to dealers in the South Atlantic. Shares would be initially distributed at the onset of the program as a percentage equal to or greater than one pound of allocation. All allocation derived from shares will be rounded to the nearest pound whole weight. All golden crab catch share holders would be required to possess a valid golden crab permit to harvest golden crab under the catch share program. Additionally, vessels harvesting golden crab would be required to have an electronic catch share account with sufficient allocation to cover golden crab being landed.

All dealers who purchase golden crab from an catch share holder would be required to possess a valid federal dealer permit for South Atlantic golden crab and a catch share endorsement verifying the dealer is a catch share participant without which possessing, transporting, selling, purchasing, or processing golden crab would be prohibited. The golden crab catch share dealer endorsement would be available for download from the NMFS online catch share website at no cost to the golden crab dealer. Although South Atlantic golden crab permits and golden crab dealer permits must be renewed annually at a cost in accordance with established permit fees, the golden crab IFQ dealer endorsement would remain valid as long as the individual possesses a valid golden crab dealer permit and abides by all reporting and cost recovery requirements of the catch share program. Possessing, transporting, selling, purchasing, or processing in intrastate or interstate commerce any golden crab harvested under the commercial catch share program in violation of the aforementioned restrictions would be prohibited.

Possession beyond the harvesting vessel without a NMFS transaction approval code would be prohibited. The approval transaction code would verify the share/allocation holder had sufficient allocation in his/her vessel account to conduct the sales transaction and that the sales transaction has taken place.

NMFS would require all catch share and allocation (pounds) transfers be registered with the agency, and would prohibit the carryover transfer of unused portions of annual allocations (pounds) for use in the next fishing year, except as discussed in Action 13. Additionally, all catch share transfers and landing transactions would need to be completed by 6:00 p.m. (eastern time), December 31 to allow NMFS the time necessary for end-of-year program management. Electronic functions for the online catch share system will resume again on January 1 at 2 p.m. eastern time the following fishing year.

Catch share and allocation transfers would be tracked using an electronic online data collection system developed by NMFS. The catch share/allocation holder, dealer, and vessel accounts would record catch share/allocation transactions. NMFS would monitor catch share/allocation transactions. If catch share participants indicate an error occurred during completion of a landing transaction, NMFS would require participants to complete a landing transaction correction form.

NMFS will also monitor catch shares suspended prior to issuance and other legal actions taken against catch share/allocation holders. Only catch shares pursuant to sanctions or rule violations would revert to the management program. Any catch shares permanently revoked would be redistributed among the existing catch shareholders or be used to allow new entrants into the fishery as considered in Action 13

The electronic accounting/reconciliation process would be used to collect and monitor the following data and information:

- Landing transactions (i.e. when catch share/allocation holder has sold golden crab), including the following information:
  - ☐ The actual ex-vessel value of golden crab;
  - ☐ The weight of the catch sold;
  - ☐ Information necessary to identify the fisherman, vessel, and dealer involved in the transaction; and
  - ☐ Whether the seller has sufficient allocation to complete the sales transaction.
  - ☐ Issuance of NMFS landing transaction approval codes.
  - ☐ Reporting of landing notifications and issuance of landing notification confirmation codes.

☐Allocation and share transfers between catch share participants.

Catch share/allocation holders may electronically purchase additional catch share allocation and catch shares from other catch share/allocation holders.

For enforcement purposes, fishermen participating in the catch program would be required to offload their golden crab landings at permitted golden crab dealers between 6:00 a.m. and 6:00 p.m. daily. All persons landing would be able to land 24 hours a day but would be required to notify NMFS three to twelve hours in advance of the time of landing. At sea or at dockage transfers of crabs on board catch share vessels also would be prohibited to facilitate law enforcement activities.

If golden crab are offloaded to a vehicle for transportation to a dealer or are on a vessel that is trailered for transport to a dealer, on-site capability to accurately weigh the crab and to connect electronically to the online catch share reporting system to complete the transaction and obtain the transaction approval code is required. After a landing transaction has been completed, a transaction approval code verifying a legal transaction of the amount of golden crab in possession and a copy of the dealer endorsement must accompany any golden crab from the landing location through possession by a dealer. This requirement also applies to golden crab possessed on a vessel that is trailered for transport to a dealer. Additionally, **Action 12** would require vessel monitoring systems onboard golden crab fishing vessels operating under the catch share program.

4.1.5 Conclusion

4.2 Action 2. Initial apportionment of catch shares

Alternative 1. No action. Do not specify a method for initial apportionment of catch shares.

Alternative 2. Distribute initial catch shares proportionately among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 2002 through 2010.

Alternative 3. Distribute initial catch shares proportionately among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010.

Alternative 4. Distribute 50% of initial catch shares equally among eligible participants and distribute 50% of initial catch shares among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010

> **Sub-alternative 4a.** To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings between 1997 and 2010 associated with an eligible participant's current permit must equal or exceed 25,000 pounds.

Sub-alternative 4b. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings between 1997 and 2010 associated with an eligible participant's current permit must equal or exceed 50,000 pounds.

Alternative 5. Distribute 25% of initial catch shares equally among eligible participants and distribute 75% of initial catch shares among eligible participants based on the aggregate annual golden crab landings from logbooks associated with their current permit(s) during the time period 1997 through 2010

Sub-alternative 5a. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings between 1997 and 2010 associated with an eligible participant's current permit must equal or exceed 25,000 pounds.

Preferred Sub-alternative 5b. To receive catch shares distributed equally among eligible participants, aggregate golden crab logbook landings between 1997 and 2010 associated with an eligible participant's current permit must equal or exceed 50,000 pounds.

Alternative 6. Distribute initial catch shares proportionately among eligible participants based on the best consecutive three year average of golden crab logbook landings associated with their current permit(s) during the time period 1997 through 2010

4.2.1 Biological Effects

This action would not directly affect the biological environments. However, alternatives for this action could have indirect effects by influencing the total number of shareholders and how the fishery is prosecuted.

Alternative 1 would not establish catch history allocation and would essentially not establish a catch share program. Therefore, this alternative is inconsistent with the purpose and need of this amendment. **Alternatives 2-6** would base initial allocation on certain landing years and catch levels. Vessels with the most recent landing history and those that meet the highest requirements for pounds landed would be expected to have the most experience in the fishery. This may result in less gear and time used in pursuing golden crab and, consequently, less adverse impacts in the form of habitat interactions, regulatory discards, and bycatch of non-target species.

4.2.2 Economic Effects

For purposes of analysis, the effects of 3 alternatives under Action 1 are combined with the effects of 9 alternatives under Action 2, but the individual initial catch shares for the resulting 27 combinations cannot be shown in **Table 4.2.1** for reasons of confidentiality. Instead, only the median percentages for catch shares are shown, noting that each median has a set of 7-11 underlying percentages. Each of the median percentages may be explained as follows: half of the eligible participants for a cell in **Table 4.2.1** have a higher catch share percentage than the median, and the other half have a lower catch share percentage. The numbers of eligible participants under **Action 1** are as follows: **Alternative 2**, 8; **Alternative 3**, 7; and **Preferred Alternative 4**, 11. The initial catch shares for individual shareholders range from 0% (or a

near-zero percentage) to more than 49%, with 49% being the maximum under Action 5. The median catch shares range from 1.27% to 12.78% in **Table 4.2.1**. Using the ACL of 2.0 mp per se, and ignoring reductions under other actions, the median for individual catch shares could range from 25,400 pounds (1.27%) to 255,600 pounds (12.78%). Combining the effects of **Preferred Alternative 4**, **Action 1**, and **Preferred Alternative 5b, Action 2**, the median for individual catch shares is 7.21% (**Table 4.2.1**). The economic effects of **Actions 1, 2, and 5** taken together are assessed in Section 4.2.1 and summarized in Section 4.5.2.

Table 4.2.1. Golden crab, median catch share percentages for shareholders, based on Actions 1 and 2.

Act 2, Alt 2	Act 2, Alt 3	Act 2, Alt 4	Act 2, Alt 4a	Act 2, Alt 4b	Act 2, Alt 5	Act 2, Alt 5a	**Preferred: Act 2, Alt 5b**	Act 2, Alt 6
Action 1--Alt. 2 (n=8); Action 2 (n=6)								
5.86%	5.81%	9.15%	9.15%	11.24%	7.48%	7.48%	8.52%	9.64%
Action 1--Alt. 3 (n=7); Action 2 (n=5)								
8.93%	5.56%	9.92%	9.92%	12.78%	7.74%	7.74%	9.17%	8.27%
Action 1--**Preferred Alt. 4** (n=11); Action 2 (n=8)								
1.27%	4.06%	6.58%	8.28%	10.36%	5.32%	6.17%	**7.21%**	3.92%

Alt 1 - no action.
Alt 2 - Distribute proportionally among eligible participants based on aggregate annual landings in 2002-2010.
Alt 3 - Distribute proportionally among eligible participants based on aggregate annual landings in 1997-2010.
Alt 4 - Distribute 50% equally and 50% proportionally based on aggregate annual landings in 1997-2010.
Subalt 4a - To receive catch shares distributed equally must have >25,000 lbs in 1997-2010.
Subalt 4b - To receive catch shares distributed equally must have >50,000 lbs in 1997-2010.
Alt 5 - Distribute 25% equally and 75% proportionally based on aggregate annual landings in 1997-2010.
Subalt 5a - To receive catch shares distributed equally must have >25,000 lbs in 1997-2010.
Subalt 5b - To receive catch shares distributed equally must have >50,000 lbs in 1997-2010.
Alt 6 - Distribute proportionally based on best consecutive 3-year average golden crab landings in 1997-2010.

4.2.3 Social Effects

The social effects of the initial allocation of catch shares are mostly associated with vesting these fishing privileges to an individual, which will result in social benefits and social costs. For fishermen who receive an allocation, this is beneficial for individuals by allowing fishermen to harvest when it is most efficient, profitable, and safe for them. For fishermen who do not receive an allocation (or receive an allocation that is smaller than needed), the allocation of catch shares can have broad negative social impacts at the individual and community level. These fishermen may lose current and future access to the fishery.

For the golden crab fishery, the ACL will result in allocation of shares to individuals that are higher than the individuals' current landings, and the expected social costs from limited harvest will not occur for this

catch share program at this time. With the golden crab catch share program, overall social impacts would likely result more from implementation of a catch share program.

The overall outcomes from allocating shares and from the different allocation formulas are described in details in **Sections 4.2.1** and **4.2.2**. **Alternative 1** would likely result in no social effects because no catch shares would be allocated to golden crab fishermen. Allocation formulas that are based completely on catch history, as in **Alternatives 2** and **3**, will benefit larger operations by allocating more shares to fishermen who have harvested more golden crab during the qualifying periods. For newer entrants or smaller operations, **Alternatives 2** and **3** may result in smaller allocations that limit opportunity for future expansion, although the shorter qualifying period in **Alternative 3** would be more beneficial to the smaller operations. **Alternative 4** and **Preferred Alternative 5** consider combination formulas using landings history and an equal allocation, which would allow smaller operations and newer entrants to receive more shares than under **Alternatives 2** and **3. Preferred Alternative 5** uses a heavier weight for landings history than in **Alternative 4**, and will be more beneficial for larger operations. **Alternative 6** would result in a similar distribution of shares as **Alternative 4** and **Preferred Alternative 5**, and would be expected to have similar social effects. **Sub-alternatives 4a, 5a** and **6a** require lower minimum landings requirement to qualify than **Sub-alternative 4b, Preferred Sub-alternative 5b** and **Sub-alternative 6b,** and would allow fishermen with lower landings history to receive allocation.

4.2.4 Administrative Effects

Alternative 1, no action would have the least impact on the administrative environment as it would not establish initial allocation based on catch history and would not lead to the establishment of a catch share program. However, this action is inconsistent with the purpose and need for this amendment. The initial allocation schemes as described under **Alternatives 2-6** and associated sub-alternatives would have similar administrative impacts associated with reviewing the catch history and determining who would qualify under the different alternatives. It is expected that the development of a catch share program would be administratively burdensome and the selection of one alternative over another in this action would not result in relief of that burden.

4.2.5 Conclusion

4.3 Action 3. Establish criteria and structure of an appeals process

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

Alternative 2. A percentage of the golden crab shares for the initial fishing year under the program will be set-aside to resolve appeals for a period of 90-days starting on the effective date of the final rule. The Regional Administrator (RA) will review, evaluate, and render final decisions on appeals. Hardship arguments will not be considered. The RA will determine the outcome of appeals based on NMFS' logbooks. If NMFS' logbooks are not available, the RA may use state landings records. Appellants must submit NMFS' logbooks or state landings records to support their appeal. After the appeals process has

been terminated, any amount remaining from the set-aside will be distributed back to remaining shareholders according to the redistribution method selected under Action 2.

Preferred Sub-alternative 2a: Three percent of golden crab shares will be set aside for appeals.
Sub-alternative 2b: Five percent of golden crab shares will be set aside for appeals.
Sub-alternative 2c: Ten percent of golden crab shares will be set aside for appeals.
Sub-alternative 2d: Two percent of golden crab shares will be set aside for appeals.

4.3.1 Biological Impacts

Establishing an appeals process for a catch share program is an administrative action. Therefore, it is not anticipated to directly or indirectly affect the physical, biological or ecological environments in a positive or negative way. Impacts associated with an appeals process are likely to be economic or social in nature. **Alternative 1 (No Action)** would indirectly benefit the biological environment because it would not allow any additional golden crab effort after the catch shares are distributed to eligible permit holders. Indirect effects on the biological environment may be caused if additional permit holders are issued catch shares as a result of implementing an appeals process.

4.3.2 Economic Impacts

The adoption of **Alternative 1**, the no action alternative, would not include the establishment of an appeals process in the catch share program. **Alternative 2** with sub-alternatives considers the establishment of an appeals process. **Alternative 2 and associated sub-alternatives** serve to help ensure the golden crab ACL would not be exceeded the first year of the program in the event many appeals are settled in favor of fishermen. Setting aside a portion of the ACL for appeals purposes limits the likelihood of major share adjustments that would need to take place after initial allocation in an effort for fishermen to adjust their shares to current catches. Smaller reductions would be more acceptable to currently active fishermen than large reductions in share allocations during the first fishing season. Use of initial allocation methodologies that allocate shares to currently active fishermen would also help with the appeals process.

The establishment of an appeals process and the design of its structure have mainly equity effects. While equity considerations are important, they have less significance in the shaping the economic implications of a catch share system. Thus, neither the appeals process nor its structure is expected to have a noticeable effect on the benefits associated with the implementation of the catch share program. This is particularly true when an appeals process would only marginally affect the initial distribution of shares among eligible participants. Economic changes would only be evident if the number of successful appeals were large compared to the number of qualifying persons or vessels.

An appeals process provides the potential participants an avenue to set the record straight with respect to transfers of licenses and the associated landings history for each license. Since most of the landings histories are currently on record through logbook submissions, the aggregate amount of contentious landings involved in the appeals is expected to be relatively low. The administrative and public cost of an appeals process for the proposed catch share cannot be estimated but may be expected to rise with the

number of appeals. However, the fishery is limited to only 11 permits, so it can be assumed that the administrative costs would be low.

4.3.3 Social Impacts

Establishment of an appeals process is an important component of a catch shares program because it provides an avenue for fishermen to request a review of the allocations. The absence of an appeals process, as would occur under **Alternative 1 (No Action)** would likely result in fewer social benefits than **Preferred Alternative 2** if any golden crab fishermen did not receive an allocation or had an allocation that did not accurate reflect landings history. Establishment of an appeals process in **Preferred Alternative 2** would also contribute to a fair and equitable allocation for the catch share program. The set-asides to be used for appeals (**Sub-alternatives 2a-2c**) would result in social benefits by providing a specific amount of golden crab shares to be used to resolve any appeals. Although **Preferred Sub-alternative 2a** designates the lowest percentage (3 percent) for appeals, it will be as beneficial as **Sub-alternatives 2b** and **2c** due to the ACL of 2 million lbs for the golden crab fishery.

4.3.4 Administrative Impacts

Alternative 1 could cause administrative difficulties by failing to provide a formal process to use in resolving the complaints of those who challenge eligibility or initial allocation decisions. The appeals processes proposed in **Alternative 2** and associated sub-alternatives would be somewhat burdensome to administer. The set-aside proposed in **Alternative 2** and associated sub-alternatives would allow needed share adjustments resulting from the appeals process to occur more expeditiously.

4.3.5 Conclusion

4.4 Action 4. Establish criteria for transferability

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

Alternative 2. Shares or annual pounds can only be transferred to golden crab permit holders.

Alternative 3. 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.

4.4.1 Biological Impacts

Alternative 1 (No Action) would not allow for transferability of golden crab catch share annual pounds and could result in decreased participation in the golden crab fishery if golden crab fishermen are unable to fish their annual pounds. Over time, decreased participation could result in a corresponding decrease in effort and landings of golden crab. Therefore, among **Alternatives 1-3**, **Alternative 1** could have the greatest biological benefit for the golden crab stock if it results in decreased landings of golden crab. However, based on recent data there does not appear to be a biological need to decrease landings of

golden crab. Since this action is administrative and does not establish immediate harvest objectives, it would not directly affect the protected species.

Alternatives 2 and **3**, which would allow transferability of golden crab shares or annual pounds, would not be expected to negatively impact the golden crab stock. The biological effects of **Alternatives 2** and **3** would likely be very similar as landings would be constrained by the ACL for the golden crab stock. Therefore, the effects of **Alternatives 2** and **3** may have more economic and administrative impacts than biological impacts.

4.4.2 Economic Impacts

In general, allowing for transferability of shares increases the efficiency of harvest operations and maximizes the harvest of golden crab, subject to ACL restrictions. Without an allowance for transferability of shares, two things can occur. First, if sale of annual pounds is allowed, shareholders would likely need to lease/sell annual pounds when their vessel needs maintenance or other issues arise that prevent them from being able to fish for a significant period of time. This can lead to large levels of leasing and an environment that is often referred to as "sharecropping" or allowing for "armchair" fishermen to benefit from share ownership. Second, if sale of annual pounds is not allowed and shareholders are not able to fish due to sickness, vessel mechanical problems, or other issues, the ACL would not be reached and maximum profits (subject to variability in weather conditions) would not be realized.

Alternative 1 is not consistent with implementation of a catch share program. **Alternative 2** requires the sale of shares only to another fisherman already permitted in the fishery. Such a requirement could stifle new entrants into the fishery as well as make it more difficult for a fisherman to sell shares because the potential pool of buyers would be greatly reduced to only those few already in the fishery, thus making it more difficult for a fisherman wanting to sell shares. **Alternative 3** has the same requirements as **Alternative 2**, but only for five years. After that initial period, this alternative requires U.S. citizenship for permit ownership. It allows sale between permit holders, which decreases the risk of speculation because it adds an additional cost to the ability to transfer shares. That is, it increases the likelihood that only fishermen would transfer shares. The ability to transfer shares allows for increase efficiency for harvesters to land amounts of golden crab equivalent to their operational capacity, increasing profitability for the fleet as a whole.

Alternative 3 is less restrictive than **Alternative 2**. It allows any U.S. citizen to transfer shares after five years. This may result in speculation and drive up the price for golden crab shares. It also results in flexibility. Given the small number of permit holders, this increases the opportunities for fishermen to purchase shares if other fishermen are unwilling to sell shares to them. This could increase aggregate profits for the fishery. However, this could also decrease aggregate profits if it increases the cost of fishing through increase share price due to speculation.

4.4.3 Social Impacts

Generally, it can be argued that social benefits that are tied to economic outcomes would be maximized the fewer the constraints placed on the transfer of an asset and that less restricted transferability allows the largest pool of recipients, which would be expected to result in the payment of the highest price for the

asset. Additionally, allowing transferability would provide an avenue for new entrants to enter the fishery and for current participants to expand operations. Although it would take time for such to occur, an inability to transfer golden crab shares as would be the case under **Alternative 1 (No Action)**, would likely result in the number of entities harvesting golden crab decreasing over time as fishermen retire or exit the fishery for other reasons, eventually ending in no participants or legal commercial harvest. As a result, **Alternative 1 (No Action)** would be expected to result in reduced social benefits relative to the other alternatives.

Because **Alternative 2** would limit the number of potential buyers, it would likely result in fewer social benefits than **Alternative 3**, although potential buyers who intend to harvest golden crab with the catch shares need to hold one of the 11 available golden crab permits, which limits the number of buyers regardless. However, allowing any eligible entity to purchase shares (**Alternative 3**) may result in some buyers purchasing shares without intent to harvest, and this would result in negative social impacts on active harvesters and future new entrants.

Any ability to transfer catch shares may result in equity criticisms, because it would bestow harvest privileges to the recipient and the recipient would possess a new marketable asset. The value of the catch share would represent a windfall profit for the catch share recipient, in addition to any benefits from actual harvests, a circumstance that may seem inequitable to entities denied an allocation upon their initial issuance.

4.4.4 Administrative Impacts

Establishing a catch share program would have some level of administrative burden on the agency related to developing and administering the program as well as providing information to the fishing community on the program. Adding transferability (Action 4) to the structure of the catch share program would increase the administrative burden, requiring the tracking of shares or annual pounds, once transferred. The least administratively burdensome alternative would be **Alternative 1 (No Action),** which would not allow transferability. However, the economic and social implications of this alternative would be inconsistent with the objectives of the Golden Crab FMP (Section 1.2). **Alternatives 2-3** would allow some form of transferability between users. These alternatives are expected to have similar administrative impacts and most of these impacts would be related to the development of an online platform to support the catch share program. An administrative burden would also be felt by fishermen through all of the alternatives, through the process of transferring the endorsements, logging the transfer into the online system and keeping track of transfers.

4.4.5 Conclusion

5.5 Action 5. Define quota share ownership caps

Alternative 1. No Action. Do not constrain the percentage of catch shares held by a person, including a corporation or other entity

Alternative 2. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of the maximum share initially issued to any person at the beginning of the IFQ program,

Alternative 3. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 25 percent of the total shares.

Alternative 4. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 35 percent of the total shares.

Preferred Alternative 5. No person, including a corporation or other entity, may individually or collectively hold catch shares in excess of 49 percent of the total shares.

Note: For the purposes of considering the share cap, an individual's total catch share is determined by adding the applicable catch shares held by the individual and the applicable catch shares equivalent to the corporate share the individual holds in a corporation. A corporation's total catch share is determined by adding the applicable catch shares held by the corporation and any other catch shares held by a corporation(s) owned by the original corporation prorated based on the level of ownership.

5.5.1 Biological Impacts

This action would not directly affect the biological environment. However, alternatives for this action could have indirect effects by influencing the total number of individuals holding catch shares.

A share cap could increase the amount of consolidation in the fishery. Ownership caps are designed to prevent monopolies from developing. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), in Section 303A(c)(5)(D), indicates limited access privilege programs such as catch share programs must include provisions to prevent an individual or entity from holding an excess amount of shares. In other terms, a catch share program must set a cap on share ownership. The lower the cap is set, the more likely the current makeup of the participants by size of operation would be maintained and community structure would be supported. However, if the cap is too low, efficiency would be impaired. If the cap is set below the historical maximum share, those participants above the cap are typically grandfathered in at their historical share. Sale of grandfathered shares has restrictions. Caps apply to shares owned individually and through corporations.

Alternative 1 does not comply with the Magnuson-Stevens Act. National Standard 4 states that management measures should be "carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share" of fishing privileges. Without a share cap, accumulation of excessive shares could not be prevented, shares could become concentrated among only a few participants, and those participants could gain excessive market power. As a result, availability of golden crab could decrease and prices for consumers could increase. National Standard 8 requires management measures take into account sustained participation of fishing communities. If shares accumulate with only a few participants, the structure of the fishery and its relationship to communities would be disrupted. Conversely, consolidation of shares would increase the efficiency of the fishery, consistent with National Standard 5. Fewer vessels in the fishery would result in lower overall operational costs.

Alternatives 2-5 (Preferred) would limit the amount of shares an individual or entity could own. This amount would include shares owned individually and through a corporation. A cap on share ownership would allow some consolidation while preventing accumulation of excessive shares.

4.5.2 Economic Impacts

For purposes of analysis, the effects of alternatives under **Actions 1, 2 and 5** are combined in **Table 4.5.1**, but the individual catch share percentages cannot be shown for reasons of confidentiality. Instead, only the median percentage for individual catch shares is shown for each of the 108 combinations, recognizing that each median has a set of underlying percentages. Each median catch share shown in **Table 4.5.1** may be explained as follows: half of the shareholders for each cell in **Table 4.5.1** have a higher individual catch share percentage than the median, and the other half have a lower individual catch share percentage. The range for medians for individual catch shares in **Table 4.5.1** is 2% to 25%, considering the effect of all alternatives under **Actions 1, 2, and 5**. Under the proposed regulation (preferred alternatives under **Actions 1, 2 and 5**), the median for individual catch share percentages is 11%. Of course, if the proposed regulation were to be implemented, then vessel-permit and catch-share holders could lease or sell the rights to someone else. This could affect the number of small business entities, shareholders, and vessels fishing.

Table 4.5.1. Golden crab, median catch share percentages for shareholders, based on Actions 1, 2 and 5.

Act 2, Alt 2	Act 2, Alt 3	Act 2, Alt 4	Act 2, Alt 4a	Act 2, Alt 4b	Act 2, Alt 5	Act 2, Alt 5a	**Preferred, Act 2, Alt 5b**	Act 2, Alt 6
Action 1--Alt. 2 (n=8); Action 5 - No share cap (n=7)								
6%	6%	12%	12%	11%	10%	10%	9%	10%
Action 1--Alt. 2 (n=8); Action 5 - 25% Share cap (n=6)								
21%	19%	17%	17%	19%	19%	19%	18%	20%
Action 1--Alt. 2 (n=8); Action 5 - 35% Share cap (n=6)								
13%	15%	15%	15%	16%	16%	16%	16%	15%
Action 1--Alt. 2 (n=8); Action 5 - 49% Share cap (n=6)								
12%	12%	12%	12%	12%	13%	13%	12%	12%
Action 1--Alt. 3 (n=7); Action 5 - No share cap (n=6)								
9%	6%	14%	14%	13%	10%	10%	9%	9%
Action 1--Alt. 3 (n=7); Action 5 - 25% Share cap (n=5)								
25%	25%	25%	25%	25%	25%	25%	25%	25%
Action 1--Alt. 3 (n=7); Action 5 - 35% Share cap (n=5)								
22%	16%	15%	15%	15%	16%	16%	16%	19%
Action 1--Alt. 3 (n=7); Action 5 - 49% Share cap (n=5)								
20%	16%	15%	15%	17%	16%	16%	17%	15%
Action 1--Alt. 4 (n=11); Action 5 - No share cap (n=9)								
2%	5%	9%	10%	11%	7%	7%	8%	6%
Action 1--Alt. 4 (n=11); Action 5 - 25% Share cap (n=8)								

12%	14%	14%	14%	17%	14%	14%	16%	12%
Action 1--Alt. 4 (n=11); Action 5 - 35% Share cap (n=8)								
6%	12%	12%	12%	15%	12%	13%	14%	8%
Action 1—**Preferred Alt. 4** (n=11); Action 5, **Preferred Alt. 4** - 49% Share cap (n=8)								
4%	9%	9%	10%	12%	9%	10%	**11%**	7%

Action 2 alternatives:
Alt 1 - no action.
Alt 2 - Distribute proportionally among eligible participants based on aggregate annual landings in 2002-2010.
Alt 3 - Distribute proportionally among eligible participants based on aggregate annual landings in 1997-2010.
Alt 4 - Distribute 50% equally and 50% proportionally based on aggregate annual landings in 1997-2010.
Subalt 4a - To receive catch shares distributed equally must have >25,000 lbs in 1997-2010.
Subalt 4b - To receive catch shares distributed equally must have >50,000 lbs in 1997-2010.
Alt 5 - Distribute 25% equally and 75% proportionally based on aggregate annual landings in 1997-2010.
Subalt 5a - To receive catch shares distributed equally must have >25,000 lbs in 1997-2010.
Subalt 5b - To receive catch shares distributed equally must have >50,000 lbs in 1997-2010.
Alt 6 - Distribute proportionally based on best consecutive 3-year average golden crab landings in 1997-2010.

As indicated in the summary to Section 4.1.2, the economic effect of the proposed regulation (preferred alternatives for **Actions 1, 2, and 5**) would be determined by landings, the number of vessels fishing, vessel costs, the level of fishing effort and per-trip costs (especially fuel costs), catch per unit effort (CPUE), and ex-vessel prices. Assuming the values for these variables remain about as in 2006-10, a reduction in producer surplus would not be expected. A loss in producer surplus compared with 2006-10 would represent an economic impact for the proposed regulation.

Potentially, the landings for all golden crab would be allowed to increase under the proposed regulation from the current 0.5-0.6 mp to as much as 2.0 mp, the ACL, allowing for adjustments for the effect of other actions in the Amendment. Any actual increase in landings for the fishery as a whole would depend upon decisions by the small business entities involved (perhaps five), and the extent of increase allowed by initial individual catch shares and the number of vessel permits they control. Most of the five or so small business entities appear to own or control through affiliation more than one permitted vessel (SBA definition).[16] Further increases beyond these limits for any one small business entity would require the purchase of shares and/or vessel permits from others at private market prices which would not be known until markets are established. The amount for purchases of valid vessel permits (for which there are 11) and/or catch shares could affect the decision to expand production. For a new entrant into the fishery, the cost of a valid vessel permit, and the cost of catch shares would in addition to the cost of a fully equipped vessel, which could be approximately $300,000 (for a U.S. Coast Guard documented vessel, if purchased from someone in the fishery).[17]

It is noted that the concentration ratio is quite high for the harvesting sector of the golden crab fishery, because only five or so small business entities produce all of the output (in Section 4.1.2, see sub-sections on “Ex-vessel Prices,” and “Other Economic Factors”). A related issue relates to the difference between

The U.S. Small Business Administration (SBA) states: “Individuals or firms that have identical (or substantially identical) business or economic interests may be treated as though they are affiliated. Family members, persons with common investments, or firms that are economically dependent through contractual (or other) relationships, are among those treated this way” (13 C.F.R. § 121.103(f)).

[17]Scott Crosson, NMFS, SEFSC, pers. comm., 30Jan12, vessel valued at current equity, approximately $200,000, with the remainder of the $300,000 being for traps and a refrigerated seawater system.

catch shares for the top-end and other catch shareholders. For purposes of illustration, the following paragraphs provide 3 possible examples out of 108 combinations of alternatives for **Actions 1, 2, and 5** in **Table 4.5.1**. Because of differences in median catch-share percentages and related catch shares in pounds, example 2 may best accommodate ongoing change in the fishery. The dynamics of fishery behavior in the last few years may be seen from examination of confidential data; briefly, since 2004, some small business entities have exhibited stronger rates of growth in landings than others, and they have come to account for relatively higher shares of fishery landings than they did in the past. They have helped in the recovery in total landings from the low point in 2004. The volatile landings for the fishery as a whole had reached their most recent low point in 2004 (**Figure 3.4.1**). Under example 2, as compared with example 1, emerging small business entities and/or vessels would not be as limited by initial catch shares, and several of the Amendment's managements objectives may be better addressed (objectives 2, 4, 5 and 9; see Section 1.2).

Example 1: The median percentage for individual catch shares under the proposed regulation (preferred alternatives for **Actions 1, 2, and 5**) is 11%, which translates into nearly 220,000 pounds (ww) [**Action 1**, **Preferred Alternative 4**; **Action 2**, **Preferred Alternative 5b;** and **Action 5**, **Preferred Alternative 4**, 49% maximum catch share]. The 220,000 pounds is in excess of the per-vessel average rate of landings in 2006-10, 107,000-125,000 pounds, and would cover nearly two vessels at these rate, but not landings for one top-end vessel during 1996-2010, more than 300,000 pounds per vessel (Section 3.4.2). By contrast, the maximum percentage for individual shareholders under the proposed regulation, 49%, translates into a share of as much as 980,000 pounds, and this is enough to cover 8-9 vessels at the per-vessel 2006-10 average rate of landings, or nearly 3 vessels at the top-end rate of landings in 1996-2010.

Example 2: Going one cell above in the same column in **Table 4.5.1** from that for the preferred alternatives for **Actions 1, 2, and 5**, the median catch share percentage is 16% [**Action 1**, **Preferred Alternative 4**, **Preferred Alternative 5b**; and **Action 5**, **Alternative 3**, 35% maximum catch share]. At the maximum of 35% for this combination of alternatives, the top-end individual share translates into nearly 700,000 pounds, enough for 5-6 vessels at the per-vessel average rate of landings in 2006-10, or enough for perhaps two top-end vessels at the rate of landings in 1996-2010. The median percentage of 16% translates into nearly 320,000 pounds, enough for nearly three vessels at the per-vessel average rates of landings in 2006-10, or enough for close to two vessels at the top-end rate of landings in 1996-2010.

Example 3: Going two cells above in the same column in **Table 4.5.1** from that for the preferred alternatives for **Actions 1, 2, and 5**, the median catch share percentage is 14% [**Action 1**, **Preferred Alternative 4**; **Action 2**, **Preferred Alternative 5b**; and **Action 5**, **Alternative 2**, 25% maximum catch share]. At the maximum of 25% for this combination of alternatives, the top-end share is nearly 500,000 pounds, enough for four vessels at the per-vessel average rate of landings in 2006-10, or enough for one top-end vessel at the rate of landings in 1996-2010. The median percentage of 14% translates into nearly 280,000 pounds, enough for two vessels at the per-vessel average rate of landings in 2006-10, or enough for nearly one vessel at the top-end rate of landings in 1996-2010, more than 300,000 pounds.

4.5.3 Social Impacts

Establishment of a limit on the proportion of shares that one individual may own has important social implications that are tied to the economic effects, such as market control, and also in equity issues for a fishery. Excessive share holding is a major concern in regards to catch share programs and may change

distribution of effort and ownership if concentration occurs. In general, there must be a balance between preventing concentration and market control, and allowing fishermen to optimize harvest. **Alternative 1** would not establish a share cap and would likely have negative social impacts due to the potential for one individual to control a majority of the shares, which would affect distribution among other harvesters. **Alternative 2** could result in a large share cap (depending on how shares are allocating), which would allow for expansion but could cause concentration of the fishery. As the potential share cap increases in **Alternative 3, Alternative 4**, and **Preferred Alternative 5**, the possibility of concentration increases, but so does the potential for fishermen to expand.

It should be noted that with the ACL of two million lbs for golden crab, it is likely that each permit holder will receive shares in excess of his recent landings history. Therefore it is possible that the share caps in **Alternative 3, Alternative 4**, and **Preferred Alternative 5** will not have social impacts that often result from a limit on share ownership.

4.5.4 Administrative Impacts

Establishing a catch share cap would be administratively burdensome on the agency. An online catch share system would have to be developed in such a way to track share transfers and enforce the cap(s) and would require a system to prevent transfers that would exceed the cap(s). However, once the online catch share system is developed, the burden associated with maintaining the share cap is likely to minimal.

Greater consolidation would result in fewer individuals and a lower administrative burden as described in **Action 1**. **Alternative 1 (No Action)** would allow the greatest amount of consolidation but would not be in compliance with the Magnuson-Stevens Act. Of the action alternatives, **Preferred Alternative 5** would allow for the greatest amount of consolidation and would have the least administrative burden.

4.5.4 Conclusion

4.6 Action 6. Use it or lose it policy

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

Alternative 2. Shares that remain inactive for 3 CONSECUTIVE years will be revoked and redistributed proportionally among the remaining shareholders. "Inactive" is defined as less than 10% of the aggregate annual average utilization of the catch share quota over a 3 year moving average period"

Sub-alternative 2a. Landed crabs only.

Sub-alternative 2b. Landed crabs and/or transfer of annual pounds.

Alternative 3. Shares that remain inactive for 3 CONSECUTIVE years will be revoked and redistributed proportionally among the remaining shareholders. "Inactive" is defined as less than 30% of the aggregate annual average utilization of the catch share quota over a 3 year moving average period"

Sub-alternative 3a. Landed crabs only.

Sub-alternative 3b. Landed crabs and/or transfer of annual pounds.

4.6.1 Biological Impacts

A catch share program would directly benefit the physical environment by reducing and consolidating capacity. Less effort would result in less habitat-gear interactions, unless there is a shift in usage/effort to gear that may have greater negative impacts on the physical environment. **Alternative 1 (No Action)** would provide the greatest benefit to the biological environment, because participants would not be required to fish or lease their shares in order to retain them. If fishermen choose not to fish, then habitat-gear interactions would be reduced. **Alternative 3** would result in the least benefits to the biological environment of any of the action alternatives, because it would require participants to harvest on average 50 percent or more of their allotted shares over a three year period in order to retain them. The effects of **Alternative 2** would be intermediate to those of **Alternative 1** and **3**. The less fishermen are required to fish in order to retain shares, the greater the benefit to the marine environment.

4.6.2 Economic Impacts

Concerns associated with persons buying catch shares for the sole purpose of not using them are often cited as a reason to consider a "use it or lose it" provision. Economically, under a "use it or lose it" provision, it would not make sense for fishermen to hold shares and not use them. At a minimum they would forgo the revenue associated with selling their shares. If they were efficient harvesters, the value of the shares they would forgo would be even greater. Because traditional harvesters of golden crab would be inclined to harvest their shares, the discussions associated with this provision usually focus on non-consumptive users buying shares.

Allowing persons to hold shares and not fish them would reduce net benefits to the Nation in the short run, but may benefit the golden crab stocks by reducing total removals. Short-term net benefits to the Nation would be reduced because the total amount of golden crab being produced would decrease, but the decrease in supply is not expected to have a significant impact on price.

The price flexibility associated with the amount of golden crab without a use it or lose it provision cannot be estimated with certainty. Price flexibility is estimated for a specific point on a demand curve. Determining the price flexibility associated with the use it or lose it provision would require estimating a demand curve for golden crab and making assumptions about the amount of quota that would not be fished. Both of those tasks are beyond the scope of this analysis.

Allowing people to buy shares and hold them would likely increase share prices. Fishermen would need to bid against persons who are not buying shares to make a profit, but are basing their share value on keeping golden crab in the ocean. If the value they place on the share were more than the value fishermen can derive from holding the quota, then the price of shares would be higher. The person selling the share would benefit from the higher price. Fishermen wishing to buy shares could be priced out of the market, if there is sufficient demand from other buyers. This is not a likely scenario, especially if constraints are placed on who may purchase shares.

Alternative 1 (No Action) would allow people to hold shares but not use them. The amount of shares that would go unused is expected to be small, unless the cost of harvesting is greater than the revenue received from the catch. Fishermen can either fish the shares themselves or transfer shares to another fisherman to generate revenue. Even when a shareholder is facing some type of physical or mechanical hardship, they would still be allowed to transfer shares to generate revenue. These provisions make it likely that the vast majority of the quota would be harvested if economic incentives exist to do so. However, we assume fisherman would operate to maximize profits. If the golden crab stock decreases to a level that makes harvesting too costly, fishermen would be expected to leave shares unused. Regulations that would require harvesters to catch their allocation would result in a long-term disruption in the efficient functioning of the market as stocks recover or demand increases. This would result in decreases in producer surplus.

It is not possible to predict if people would purchase shares for some other non-consumptive use. However, if the amount of shares that are purchased and not used is beyond what the Council feels is acceptable, they have the authority to revise the program at a later date to implement a use it or lose it provision.

Alternatives 2 and **3** differ on two dimensions. **Alternative 2** would require shareholders to harvest at least 10% of their annual allocation on average, for any three consecutive year period. **Sub-alternative 2a** would apply the "inactive" definition only to actual landed crabs. **Sub-alternative 2b** would apply the "inactive" definition to any combination of landed crabs and pounds transferred. **Alternative 3** would require shareholders to harvest at least 30% of their annual allocation on average, for any three consecutive year period. **Sub-alternative 3a** would apply the "inactive" definition only to actual landed crabs. **Sub-alternative 3b** would apply the "inactive" definition to any combination of landed crabs and pounds transferred.

Implementing any sub-alternative of **Alternatives 2** or **3** would require buyers of shares to make certain the shares they are buying would not be subject to being revoked after they are purchased. It is possible a person could buy shares and lose them the next year because of this rule. This possibility makes it imperative buyers know the status of share certificates. Tracking the status of share certificates would be done by NOAA Fisheries Service. They would then provide buyers with the status of share certificate before share certificates were transferred. Tracking this additional information would be expected to increase the monitoring cost of the program. Although this will be done through the online catch share system (based on similar programs developed for the Gulf of Mexico catch share programs) and once developed, would likely be straightforward and simple for both fishermen and administrative staff to use.

Alternatives 2 and **3** would not prevent individuals from buying shares for the purpose of not harvesting the shares. It would only force the shareowners to fish a portion of their shares each year. If **Sub-alternative 2b** or **3b** is selected, shareholders could meet these harvest requirements by transferring their shares to another fisherman and never actually have to fish themselves. Therefore, the provision may not be totally effective in limiting shareholders to persons wanting to harvest the available resource.

Redistributing inactive shares could benefit members of the fleet that remain active. However, a minimal number of shares are expected to be redistributed among the fleet because of this option. Fishermen that hold share certificates would be expected to sell them before they would allow them to be revoked. Economically, it would not make sense to allow shares to be revoked when they can be sold for

approximately the discounted value of future net revenues. Even persons that may buy shares for the purpose of keeping them from being fished would understand the rules for retaining the share certificates. If they did purchase the shares, they would likely devise a strategy that would allow them to be retained. Therefore, it is anticipated few share certificates would be redistributed among the fleet and the economic impacts of the action are expected be minimal.

4.6.3 Social Impacts

The "use or lose" provision is intended to protect active fishermen; prevent shareholders from keeping shares with the intention to lease annual pounds for an extended period of time; and to allow the fishery to achieve maximum harvest by letting the shares be fished. In general, this type of provision is expected to result in broad, long-term social benefits and it would be expected that **Alternative 1 (No Action)** would result in fewer social benefits than **Alternative 2** or **3**.

However, if minimum landings requirements are too rigid, this may have short-term social impacts on business decisions of the golden crab fishermen. **Alternative 2** would provide more flexibility than **Alternative 3** by requiring a lower minimum. **Sub-alternative a** (under **Alternatives 2** and **3**) provides less flexibility than **Sub-alternative b**, and would likely result in fewer social benefits.

4.6.4 Administrative Impacts

Alternative 1 (No Action) would not directly affect the administrative environment. Shares could remain unused and managers would not have to track share usage. The administrative environment could be indirectly affected by a loss in cost recovery fees (Action 7) resulting from unused shares. **Alternatives 2-3** would require administrative tracking of the "expiration date" of unused quota shares, and the average percentage of quota caught for each shareholder. This requirement could directly affect the administrative environment by requiring significant administrative monitoring effort. However, this would be done through the online catch share system (based on similar programs developed for the Gulf of Mexico catch share programs) and once developed, would likely be straightforward and simple for both fishermen and administrative staff to use.

The differences in the administrative burden between **Alternatives 2-3** are small. Since monitoring of landings would be based on a moving average for all alternatives, administrators would carry out the same tasks for each alternative. The only difference between the two alternatives is that managers may have to revoke shares from more participants under **Alternative 3** than **Alternative 2**, because **Alternative 3** has a higher use requirement. If sub-alternative b under either action alternative is selected, it is likely that the number of shares revoked would be lower as fishermen would be more willing to sell their annual pounds than their shares. Losses in cost recovery fees would potentially be greater under **Alternative 2** than **Alternative 3**, because participants would be able to harvest less fish to retain their allotted shares. However, the likelihood shares would remain unused is low given their economic value, and given that expired quota shares would be allocated to someone else, negating any conservation value from "retired" shares.

4.6.5 Conclusion

4.7 Action 7. Cost recovery plan

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

Alternative 2. Cost recovery fees would be calculated at time of sale at a registered dealer.
Sub-alternative 2a: Cost recovery fees would be based on actual ex-vessel value of landings.
Preferred Sub-alternative 2b: Cost recovery fees would be based on standard ex-vessel value of landings, as calculated by NMFS.

Alternative 3. Fee collection and submission shall be the responsibility of the:
Sub-alternative 3a: Shareholder
Preferred Sub-alternative 3b: Dealer

Alternative 4. Fees submitted to NMFS
Preferred Sub-alternative 4a: Quarterly
Sub-alternative 4b: Monthly
Sub-alternative 4c: Annually

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

4.7.1 Biological Impacts

Establishing a cost recovery plan for a catch share program is an administrative action, which is not expected to affect the program's potential to provide environmental benefits. None of the cost recovery alternatives are expected to directly or indirectly affect the biological environment.

4.7.2 Economic Impacts

Alternative 1 is inconsistent with direction provided through the Magnuson-Stevens Act. The Magnuson-Stevens Act mandates recovery of actual costs directly related to the enforcement and management of new catch share programs, through a cost recovery fee of up to three percent of the ex-vessel value of fish harvested under the program. If this option were implemented it would not change the producer surplus or net benefits to the Nation.

While **Alternative 1** is inconsistent with the Magnuson-Stevens Act, it is theoretically preferable to the other alternatives if the objective of the program is to achieve maximum economic yield and a socially optimum stock size. Imposing a fee would distort the net benefits and economic impacts of the program and could impact stock size in the long run.

Alternative 2, associated sub-alternatives and options would implement a cost recovery plan, with the cost recovery fee being the responsibility of the shareholder. This cost recovery plan also specifies the calculation of the ex-vessel value as basis for the fee (either as actual or standard ex-vessel value), the fee collection and submission responsibility (either by the shareholder or the dealer), and the timing of fee submission to NOAA Fisheries Service (either quarterly or monthly).

Cost recovery fees would be based on either the actual ex-vessel price paid to the harvester or a "standard" ex-vessel price calculated by NOAA Fisheries Service. Standard prices would be set by specific geographic area based on what NOAA Fisheries Service determines to be appropriate. These prices would be set to reflect changes in prices received in various ports. If prices are not adjusted by area, and there is variation in the ex-vessel price by port, some harvesters would underpay their actual fee while others would overpay.

If prices are based on the actual ex-vessel payment from the process, NOAA Fisheries Service would need to verify prices that seem too low relative to what other harvesters are paid in the area. Reporting lower prices than were actually received would reduce the cost recovery fee that is paid. Those reports should help verify the actual prices paid to fishermen, and reduce concerns over using accurate prices for determining the fee. Although not necessarily a problem in the short term, the issue of transfer pricing within a vertically integrated firm could eventually arise and could create problems in determining actual ex-vessel value for calculating the fees. Transfer pricing is a common technique used by vertically integrated firms, whereby cost is assigned to the least profitable operation in order to minimize the payment of fees or taxes. Regardless of the method of calculating ex-vessel values, the resulting fee, being the responsibility of the shareholder, would reduce the shareholder's producer surplus.

Whether the fee collection and submission to NOAA Fisheries Service is the responsibility of the shareholder or the dealer and whether the frequency of fee collection and submission is quarterly or monthly, such activity would result in additional bookkeeping and reporting costs. A monthly submission may be expected to result in higher bookkeeping and reporting costs. The amount of those costs would reduce producer surplus for the entities that incur them.

Whether the dealers or the harvesters are required to send the check, the money is expected to come from the harvesters. Dealers would likely hold back the required fee from the payment they make to the harvesters. That money would then be placed in an account and earmarked to pay the fee. Alternatively, NOAA Fisheries Service could bill the harvester directly. Either way the cost recovery fee is actually paid by the harvester and would reduce their producer surplus.

Since dealers/processors incur monetary and non-monetary costs in the cost recovery program, they have the incentive to pass on the cost forward to the next market level (retailers/consumers, for example) or backward to the harvesters. If passed onto the harvesters, dealers may quote lower prices for harvesters or may charge additional "service" fees. Lower prices may in turn result in lower recovery fees. Certainly, there are dealers who have more leverage than others in passing the cost back to harvesters.

4.7.3 Social Impacts

In general, social benefits are associated with lower economic costs for fishermen, and **Alternative 1 (No Action)** would be expected to result in the most social benefits. Although cost recovery is required in limited access privilege programs by the MSA, **Sub-alternatives a** and **b** under **Alternatives 2-4** provide flexibility in how fees are collected by defining how fees are calculated (**Alternative 2**), who collects and submits fees (**Alternative 3**) and timing of fees (**Alternative 4**). **Preferred Sub-alternative 2b** would be expected to have more social benefits than **Sub-alternative 2a** due to a standard and consistent fee schedule for fishermen. **Preferred Sub-alternative 3b** will place the burden of collection and submission on the dealers and **Sub-alternative 3a** would place burden on the fishermen. Lastly, **Sub-alternative 4c** will likely result in less of a burden on fishermen and dealers in timing of fee submission than **Preferred Sub-alternative 4a** or **Sub-alternative 4b**.

4.7.4 Administrative Impacts

The administrative effects of implementing a cost recovery plan are expected to be minimal, in part, because the plan would at least partially pay for itself. **Alternative 1 (No Action)** would require NOAA Fisheries Service assume all costs of administering the proposed catch share program. **Alternative 2** would require NOAA Fisheries Service account for cost recovery fee transactions**. Sub-Alternative 2a**, which requires NOAA Fisheries Service calculate the standard ex-vessel price of golden crab, would be more burdensome than **Sub-alternative 2b,** which would base fees on the actual ex-vessel value of golden crab landings. Because the standard ex-vessel price is based on an average ex-vessel value from the previous year, it is impossible to predict whether the cost recovery fee would be higher or lower if based on the standard ex-vessel price versus the actual ex-vessel value.

Alternatives and associated sub-alternatives considered under **Alternatives 3** and **4**, and associated sub-alternatives pertain to the way and the frequency in which the fees are collected.

4.7.5 Conclusion

4.8 Action 8. Establish boat length limit rule

Alternative 1. No Action. To obtain a permit for the middle or southern zone via transfer, the documented length overall of the replacement vessel may not exceed the documented length overall, or aggregate documented lengths overall, of the replaced vessel(s) by more than 20 percent.

Alternative 2. Eliminate vessel length restrictions for obtaining a permit for the middle and southern zones via transfer.

4.8.1 Biological Impacts

The current regulations regarding **Action 1 (No Action)** (boat length restrictions) were set in Amendment 3 to the Golden Crab FMP. In order "to obtain a permit for the middle or southern zone via transfer, the documented length overall of the replacement vessel may not exceed the documented length overall, or aggregate documented lengths overall, of the replaced vessel(s) by more than 20 percent" (SAFMC 2000). **Alternative 2** proposes to eliminate the vessel size rule.

The size rule was initially put into place to help prevent larger vessels from fishing in the middle and southern zones, which are not as large as the northern zone. It was felt, at the time the regulations went into place, that the stock in the middle and southern zones could not withstand the pressure of heavy fishing by larger vessels. The current regulations keep larger vessels from replacing smaller ones through permit transfers.

There is some concern that if **Alternative 2** is selected as preferred, most of the fishing effort would occur in the Middle and Southern Zones, increasing the pressure put on the stock. Recent information provided to the Council's Scientific and Statistical Committee suggests that the golden crab stock is healthy and can withstand greater fishing pressure than currently occurs.

By allowing larger vessels in the middle or southern zone, there is potential for localized depletion of the stock. Larger vessels are necessary to accommodate refrigerated sea water systems to allow for longer trips and larger harvests.

4.8.2 Economic Impacts

The current regulations regarding **Action 1 (No Action)** (boat length restrictions) were set in Amendment 3 to the Golden Crab FMP. In order "to obtain a permit for the middle or southern zone via transfer, the documented length overall of the replacement vessel may not exceed the documented length overall, or aggregate documented lengths overall, of the replaced vessel(s) by more than 20 percent" (SAFMC 2000). **Alternative 2** proposes to eliminate the vessel size rule.

The size rule was initially put into place to help prevent larger vessels from fishing in the middle and southern zones, which are not as large as the northern zone. It was felt, at the time the regulations went into place, that the stock in the middle and southern zones could not withstand the pressure of heavy fishing by larger vessels. The current regulations keep larger vessels from replacing smaller ones through permit transfers.

Economically, **Alternative 2** would be better for fishermen because eliminating the boat length rules in the middle and southern zones would allow more fishermen to fish closer to their homeport and therefore reduce trip costs. It is possible that opening up this area to larger vessels might encourage localized depletion in these zones. However, if fishing in the middle and southern zones becomes less productive, fishermen are likely to balance the economic benefits of traveling further from their homeport in order to have larger harvests.

4.8.3 Social Impacts

The social benefits of this action are tied to the economic benefits of allowing fishermen to expand operation size by increasing boat size. As the golden crab fishery continues to expand, multi-day trips and larger catches per trip, along with refrigerated sea water systems onboard to keep crabs alive, may require a larger vessel. Additionally, multi-day trips on larger vessels would be more efficient. Overall, social benefits would be greater with **Alternative 2**, which would allow fishermen to move permits to larger vessels if needed, than for **Alternative 1 (No Action).**

4.8.4 Administrative Impacts

This action would eliminate the restriction on upgrading vessel size in the golden crab fishery. Administrative action would be required in the form of rule making, education, and outreach. However, the administrative impacts are expected to be reduced from the status quo as it would allow for greater flexibility for the fishermen with less involvement from the regional office and law enforcement.

4.8.5 Council

4.9 Action 9. Restrictions on where permitted vessels can fish for golden crab

Alternative 1. No Action. A vessel with a permit to fish for golden crab in the northern zone or the middle zone may fish only in that zone. No vessel with a documented length overall greater than 65 ft (19.8 m) may fish for golden crab in the small vessel sub-zone within the southern zone. The small vessel subzone is bounded on the north by 24°15' N. lat., on the south by 24°07' N. lat., on the east by 81°22' W. long., and on the west by 81°56' W. long. Upon request from an owner of a permitted vessel, the NMFS Regional Administrator will change the zone specified on a permit from the middle or southern zone to the northern zone. A vessel may possess golden crab only in a zone in which it is authorized to fish, except that other zones may be transited if the vessel notifies NMFS Office for Law Enforcement in advance and does not fish in a zone in which it is not authorized to fish.

Alternative 2. Participants can use quota in any zone for which they possess a permit.

Alternative 3. A vessel with a permit to fish golden crab can use annual pounds in any of the three golden crab fishing zones.

IPT Recommendation: Change wording of alternative to: “Modify regulations on golden crab fishing zones”

No Action: Do not modify regulations on golden crab fishing zones.

4.9.1 Biological Impacts

Currently, fishing vessels are issued a permit for one of the golden crab fishing zones and a vessel with a northern or middle zone permit may only fish in those zones. Vessels may only possess crabs in the zone in which they are authorized to fish. **Alternative 2** would not differ from the no action alternative in that fishermen are able to fish in the zones for which they hold a permit. **Alternative 3** would allow fishermen with a federal golden crab permit to fish in any of the zones. This assumes that the long-standing permits office policy of issuing one permit per vessel for a zone would be eliminated. However, there is some concern that if **Alternative 2** or **3** is selected as preferred, most of the fishing effort will occur in the middle and southern zones, potentially leading to overfishing of the resource in those areas.

4.9.2 Economic Impacts

Judging by the number of VESIDs (identification numbers issued by the U.S. Coast Guard or states), there have been as many as 36 individual vessels that landed golden crab in all years since 1996, and as many as 16 in one year, but there may be fewer than 3 vessels or dealers with landings from 1, 2 or all 3 fishing zones for golden crab in some years (unpublished, confidential golden crab logbook data, 1997-2010; NMFS, SEFSC, Miami; zones depicted in Figure 3.2). Thus, annual data on landings and fishing activity by zone for most years cannot be published. While there are understood to be 11 permits for the golden fishery, there appears to have been fewer small business entities (independent decision makers; see Section 4.1.2 on SBA definitions of small business entities). For whatever reasons, there appears to have been a relative shift in fishing activity away from the southern zone toward the middle and northern zones during 1997-2010.

Recognizing caveats to any statement, the overall cost of fishing for golden crab could be less under **Alternative 3** than under **Alternative 1** or **Alternative 2**, pending possible clarification in wording of **Alternative 2.** That is**, Alternative 3** would accord more freedom to captains and owners on where to fish and the cost-effective use of vessels. It is noted that the number of vessels with landings of golden crab has fallen since 1997, but this does not appear to be case for the more volatile data on fishing effort, and CPUE appears to have fallen (see Section 3.4.2). Cost and returns along with logbook data would needed to specify and estimate models of fishing behavior, including shifts in fishing among zones. Information on vessels, and cost and returns is contained in the Golden Crab FMP, 1995, Section 3.5.

4.9.3 Social Impacts

The social benefits of this action are tied to the economic benefits of allowing fishermen to maximize efficiency on each trip, and take advantage of multiple zones on one trip. Social benefits would be expected to be greater under **Alternative 2** than under **Alternative 1 (No Action)**. In regards to **Alternative 3**, which would eliminate the small vessel zone, social benefits would be expected due to harvesters having the opportunity to fish an area that is no longer used by small vessels.

4.9.4 Administrative Impacts

There would be minor administrative impacts associated with the action alternatives. These impacts would be related to outreach, education and rulemaking. However, the administrative impacts are

expected to be reduced from the status quo as it would allow for greater flexibility for the fishermen with less involvement from the regional office and law enforcement.

4.9.5 Conclusion

4.10 Action 10 Elimination of the Small-Vessel Sub-Zone

Alternative 1. **No Action.** Do not eliminate the small vessel sub-zone within the southern zone that was originally established to protect against very large vessels fishing in the subzone.

Alternative 2. Eliminate the small vessel sub-zone within the southern zone that was originally established to protect against very large vessels fishing in the subzone

4.10.1 Biological Impacts

Taking action to eliminate the small vessel sub-zone is not expected to result in negative biological impacts on the resource or protected species. However, under **Alternative 2**, there is the potential for localized depletion of golden crab in the small vessel sub-zone if larger vessels relocate their fishing operations in the small vessel sub-zone.

4.10.2 Economic Impacts

Judging by the number of VESIDs (identification numbers issued by the U.S. Coast Guard or states), there have been as many as 36 individual vessels that landed golden crab in all years since 1996, and as many as 16 in one year, but there may be fewer than 3 vessels or dealers with landings from 1, 2, or all 3 fishing zones for golden crab in some years (unpublished, confidential golden crab logbook data, 1997-2010; NMFS, SEFSC, Miami; zones depicted in Figure 3.2). Thus, annual data on landings and fishing activity by zone for most years cannot be published. For whatever reasons, there appears to have been a relative shift in fishing activity away from the southern zone toward the middle and northern zones during 1997-2010.

The NOAA Fisheries Service, Southeast Regional Office (SERO), permits database contains applicant-supplied data on vessel length, engine horsepower and other physical characteristics of vessels. During 2005-2010 (data as of June 24, 2011), there appear to have been 16 permit holders, and 27 vessels with permits for the golden crab fishery, allowing for caveats. For example, a vessel is counted for a year if it had a valid permit that allowed it fish at least some time during a calendar year, recognizing that only 11 vessels are allowed to have valid permits at any one point in time under the limited access program for the golden crab fishery. It appears that there was a significant turnover in vessels that could fish for golden crab; in other words, in terms of permits, vessels entered and exited the fishery during 2005-2010, though only 11 could fish at any one time. Typically, vessels have landed golden crab for several consecutive years. Among 36 vessels with landings during 1996-2010, 4 had landings in each of 10-15 years, but data on physical characteristics for all of these years does not appear to be as complete as for

more recent years, pending further examination of data records. Using instead data for 2005-2010 on vessel characteristics, 27 vessels that could have fished for golden crab averaged 56 feet in length (median, 53 feet), and the engines averaged 678 horsepower. The range for length is 14-118 feet (horsepower, 18-2700).

Among the 27 vessels for which data on physical characteristics are available for 2005-2010, 9 had lengths greater than 65 feet, and would not have been able to fish in the small-vessel subzone within the southern zone for the golden crab fishery; 18 of the 27 vessels would have been able to fish in this subzone, which is restricted to vessels with lengths of 65 feet or less. During 2005-2010, only one vessel appears to have fished in the southern zone (not necessarily in the small-vessel subzone).

According to data obtained during public hearings, there were 18 vessels operating in 1995 in what was seen as being primarily a small-boat fishery in south Florida; they averaged 58 feet in length and ranged from 34 feet to 85 feet (based on Golden Crab FMP, 1995, Table 6a and related text). In addition, two larger vessels (120 feet and 180 feet) were discussed in terms of having greater harvesting capability; they may have fished farther north (north of Cape Canaveral, or at least north of Fort Pierce). Data for the 20 vessels are summarized (Golden Crab FMP, 1995, Table 6a, average length for 20 vessels, 67 feet, range 34-180 feet). As the original FMP was being developed, there was concern about several things, including the potential for overcapitalization, the potential for golden crab fishery entry by relatively large vessels that had fished in New England and Alaska, and the potential for exceeding MSY (SAFMC 1995).

Conceivably, **Alternative 2** may better address the Amendment's objectives than **Alternative 1**, because it could allow greater flexibility in captain's decisions. Under **Alternative 2**, vessels greater than 65 feet in length could fish in what was established as a small vessel sub-zone within the southern zone to allow smaller vessels to fish in the absence of competition by very large vessels. It is important to note that where vessels fish is affected by their permits, which are for specific zones (addressed in Action 9). Though as many as 11 vessels could fish for golden crab, only 4-5 have done so in recent years, and relaxing regulations on zones may allow them to operate more efficiently. Length is a key physical characteristic of commercial fishing vessels that has been used in models of fishery behavior. More applicant-supplied information on length, engine horsepower, gross tons, net tons, hold capacity, year-built, and hull material has been included in the NOAA Fisheries Service, SERO, permits data base, but not necessarily for all vessels. Information on on-board equipment is not included, though it may be important in analyzing fishery behavior. Vessel length may or may not be a good indicator of other vessel characteristics, and larger vessels in terms of net tons and hold capacity could more easily accommodate refrigerated circulating seawater systems that are reported to assure higher quality of golden crabs than the below-deck holds with ice that have been used for many years. In 2009, 3 vessels were reported to have or planning to install the newer systems, according to industry-supplied information in the Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1) For The South Atlantic Region (CE-BA 1, 2009, Section 3.4.1, p. 3-33). The effect of reductions in allowable area for fishing golden crab on fishing by zone and sub-zone has not been assessed for this amendment (area closures were assessed and implemented in CE-BA 1, 2009). Ostensibly, fishing for golden crab could occur over what seems to be a relatively large area within the Council's jurisdiction (from the Virginia-North Carolina border through South Florida), but it occurs predominantly off the Atlantic coast of Florida. These areas have been reduced in size, and this could affect where captains choose to operate under very exacting and difficult conditions (as described in CE-BA 1, 2009, Section 3.4.1.).

4.10.3 Social Impacts

Similar to Action 9, this action addresses a current rule that may no longer be useful for the fishery, particularly following implementation of a catch share program. The original rule was established to provide a fishing area for smaller vessels. However, these vessels no longer participate in the fishery and vessel size has been limited by the boat length limit rule (Action 8). In general, the area is closed to other golden crab vessels but is no longer serving its purpose of maintaining a small-vessel zone.

Alternative 1 (No Action) would likely result in minimal social impacts, with the exception that the area may be productive fishing grounds that are not accessible. **Alternative 2** may result in social benefits due to harvesters having the opportunity to fish an area that is no longer used by small vessels.

4.10.4 Administrative Impacts

The action to eliminate the small vessel sub-zone would not result in administrative impacts other than those associated with rule-making. Enforcement impacts would be reduced as the elimination of this sub-zone would allow all vessels to fish in this area.

4.10.5 Conclusion

4.11 Action 11: Establish criteria for permit stacking

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

Alternative 2. 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.

Alternative 3. Allow an unlimited amount of golden crab permits on a single vessel so that any zones for which the vessel has a permit can be fished in one trip.

4.11.2 Biological Impacts

This action is primarily administrative and would not have any direct effects on the biological environment. **Alternative 1 (No Action),** would not affect the fishery as it is currently prosecuted; therefore, this alternative should have no effect on the physical or biological environment. **Alternative 2** and **Alternative 3** would allow vessels to fish multiple zones on one trip. Under these alternatives, a vessel may harvest more in one trip than they might have historically as they can move freely between the zones in which they hold permits. This action associated with the action to remove the boat length rule (**Action 8)** has the potential to increase harvest of golden crabs by increasing time at sea.

4.11.3 Economic Impacts

Judging by the number of VESIDs (identification numbers issued by the U.S. Coast Guard or states), there have been as many as 36 individual vessels that landed golden crab in all years since 1996, and as many as 16 in one year, but there may be fewer than 3 vessels or dealers with landings from 1, 2 or all 3 fishing zones for golden crab in some years (unpublished, confidential golden crab logbook data, 1997-2010; NMFS, SEFSC, Miami; zones depicted in Figure 3.2). Thus, annual data on landings and fishing activity by zone for most years cannot be published. While there are understood to be 11 permits for fishery, there appear to have been fewer small business entities (independent decision makers; see Section 4.1.2 on SBA definitions of small business entities). For whatever reasons, there appears to have been a relative shift in fishing activity away from the southern zone toward the middle and northern zones during 1997-2010. Recognizing caveats to any statement, the overall cost of fishing for golden crab could be less under **Alternative 3** than under **Alternative** 1 or **Alternative 2**, pending possible clarification in wording of **Alternative 2.** That is, **Alternative 3** would accord more freedom to captains and owners on where to fish and the cost-effective use of vessels. It is noted that the number of vessels with landings of golden crab has fallen since 1997, but this does not appear to be case for the more volatile data on fishing effort, and CPUE appears to have fallen (see Section 3.4.2). Cost and returns along with logbook data would needed to specify and estimate models of fishing behavior, including shifts in fishing among zones. Information on vessels, and cost and returns is contained in the Golden Crab FMP, 1995, Section 3.5.

4.11.3 Social Impacts

The social benefits of this action are tied to the economic benefits of allowing fishermen to maximize efficiency on each trip, and take advantage of multiple zones on one trip by obtaining multiple permits on a vessel. Social benefits would be expected to be greater under **Alternative 2** and **Alternative 3** than under **Alternative 1 (No Action)**.

4.11.4 Administrative Impacts

This action is primarily an administrative in nature. **Alternative 1**, no action, would not increase or decrease the administrative burden managing the golden crab fishery. **Alternatives 2** and **3** would remove the permits office policy that issues on permit to one vessel. By making it clear that this policy would not apply to the golden crab fishery, a vessel would be allowed to hold and fish more than one permit in each trip. It is expected that the administrative impacts of this action would be minimal.

4.11.5 Conclusion

4.12 Action 12. Monitoring and enforcement

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

Alternative 2. Require all fishing vessels permitted 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 2a. The purchase, installation, and maintenance of the VMS equipment and communications costs will be paid for or arranged by the shareholder.

Sub-alternative 2b. The purchase of the VMS equipment will be paid for by NMFS and the installation, maintenance, and communications costs of the VMS equipment will be paid for or arranged by the shareholder.

Sub-alternative 2c. The purchase of VMS equipment will be reimbursed by the National OLE VMS reimbursement account if funding is available. Installation, maintenance, and communication costs will be paid for or arranged by the shareholder.

Question: Do we want to add an alternative for a hail-in requirement? The AP voted to go the hail-in route. Do we ask the Council to add alternative or do we just write it into the structure of the program?

Note: The Council may want to consider **i**mplementing a 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.

4.12.1 Biological Impacts

Alternative 1 (No action) would not require a vessel monitoring system (VMS) on golden crab vessels participating in the catch share program. VMS is typically used in conjunction with closed area enforcement and catch share programs to identify when and where fishermen are fishing and when they are returning to port. During the development of the CE-BA 1, the use of VMS for the golden crab fishery was explored. It was determined by the NOAA Fisheries Service, Office of Law Enforcement (OLE) that VMS was not a useful enforcement tool for the golden crab fishery as it could not provide the precise location of where the gear is on the seabed.

Alternative 2 and associated sub-alternatives would require VMS on golden crab vessels participating in the catch share program. The on-board VMS equipment would help locate the vessel. Knowing the vessel's location gives the VMS monitoring staff an idea of when, at least, gross closed area violations are occurring. OLE currently has developed VMS monitoring expertise more suited to this type of monitoring. When necessary golden crab trap seabed locations may be calculated based on VMS vessel location and sea current data. With the vessel's location determined, it may be possible to gain biological benefits. If golden crab trap locations could be determined, then some biological benefit would accrue via the result of action by fishermen on their own (or through law enforcement intervention) to relocate or haul in traps, such as if traps were moved by underwater currents outside of the allowable areas for golden crab fishing (Sections 3.1-3.3; Figure 3.4.1 provides a map of allowable golden crab fishing areas).

4.12.2 Economic Impacts

Alternative 1 (No action) would not require use of an approved VMS by any vessel participating in the golden crab catch shares program. The CE-BA 1 explored the idea of VMS for the golden crab fishery but after many discussions with the fishery participants and law enforcement, it was determined that VMS is not an effective tool to monitor the location of golden crab fishing gear. However, catch

share programs use VMS to monitor when fishing vessels are fishing and when they are returning to port. All catch share programs in the South Atlantic Region and in the United States require the use of VMS.

Alternative 2 and associated **Sub-alternatives 2a-2c** would require the use of VMS for vessels fishing in the golden crab catch share program. The sub-alternatives vary the way the VMS would be paid for. **Alternative 2, Sub-alternative 2a, 2b, 2c** would result in increased costs to golden crab fishermen. Under **Alternative 2, sub-alternative 2c** the initial purchase would be the responsibility of NOAA Fisheries Service and would not result in an increased cost to the golden crab fishermen, except for the installation, maintenance, and communication. However, some fishermen may consider the requirement of a VMS to be an intrusion on their privacy and their autonomy as an independent fisherman.

If government funds were made available **(Sub-alternative 2b)** to cover the costs of VMS units, there would still be ongoing costs associated with maintenance and operation of the VMS units. There are eleven currently active permits in the golden crab fishery. Of these, seven permits have landed at least 1,000 pounds of golden crab sometime between 2005 and 2007. Therefore, if those permits remained active and continued to fish, seven permits would require installation of VMS units under **Alternative 2.**

The VMS unit costs differ depending on the model purchased. The NMFS-approved VMS unit costs are shown in **Table 4-2**.

Table 4-2. NMFS-approved VMS units and costs.

Brand and Model	Cost
Boatracs FMCT-G	$3095
Thrane and Thrane TT-3026D	$3595
Faria Watchdog KTW304	$3295

Source: Data provided by NMFS Office of Law Enforcement, July 2008.

The current reimbursement amount from NOAA Fisheries Servie Service for the Highly Migratory Species (HMS) and rock shrimp fisheries for purchase of a VMS unit is $3,100.

The VMS regulations changed in 2008 and now only authorize the purchase of Enhanced Mobile Transmitting Units (EMTU). These are VMS units that have a computer screen which enables the fishermen to submit any forms. Previously, HMS and rock shrimp vessel owners were able to purchase "pingers" only which were half the cost of these newer units. All fisheries are now required to comply with the new EMTU requirements and those estimated costs are provided in **Table 4-2**.

If all seven vessels were outfitted with VMS units, the total cost to the fishery to purchase the seven units would range from $21,665 to $25,165. If reimbursements were issued, the aggregate cost of unit purchase to the fishery would range from $0 to $3,465. Individually, this results in $0 to $495 per vessel. The cost to federal management would be $21,700. However, this does not include the cost of installation or maintenance. While installation costs are approximately $300 per unit, maintenance costs cannot be estimated with existing information. Communication costs for each of the models which average from $30 to $80 per month are provided in **Table 4-3**.

Table 4-3. NMFS-approved VMS communications costs.

1. Qualcomm (for Boatracs units)
$30/mo satellite fee, $.30/message, $.006 per character for messaging (average price $80/month which includes 24/7 operations center support)

2. Telenor (for Thrane units)
$.06 per position report or $1.44 per day for 1 hour reporting. If in the "In Harbor" mode, then $.36 per day. Messaging costs $.24 per e-mail. ($30/mo average)

3. Xantic (for Thrane units)
$.06 per position report or $1.44 per day for 1 hour reporting. If in the "In Harbor" mode, then $.36 per day. Messaging costs $.22 per message and $.22 per e-mail. ($35/mo average)

4. Iridium/Cingular Wireless (for Faria units)
$44.95 per month which includes 4,000 Iridium bytes and 35,000 GSM bytes for email and e-forms reporting.

Source: Data provided by NMFS Office of Law Enforcement, July 2008.

The annual aggregate costs of implementing VMS under **Alternatives 2** and **associated sub-alternatives** assuming management does not help subsidize the cost of the VMS units is summarized in **Table 4-4** and the annual aggregate costs of implementing VMS under **Alternatives 2** assuming management helps subsidize the cost of the VMS units is summarized in **Table 4-5**.

Table 4-4. Summary of annual costs to fishermen of implementing Alternatives 3 assuming VMS unit cost is not subsidized[1].

Alternatives	**Total VMS Purchase Cost**	**Total Installation Cost**	**Total Annual Maintenance Cost**	**Total Annual Communication Cost**	**Total Cost[2]**
Alternative 2					
First year	$21,665-$25,165	$2,100	Unknown	$2,520-$6,720	$26,285-$33,985+ maintenance cost
Subsequent years	NA	NA	Unknown	$2,520-$6,720	$2,520-$6,720+ maintenance cost
Alternative 3					
First year	$34,045-$39,545	$3,300	Unknown	$3,960-$10,560	$41,305-$53,405+ maintenance cost
Subsequent years	NA	NA	Unknown	$3,960-$10,560	$3,960-$10,560+ maintenance cost

Note 1: This table assumes that the VMS unit cost is not subsidized by management under **sub-alternative 3b**
Note 2: The Total Cost column uses the lower Unit Cost and lower Communication Cost estimates to calculate the value at the lower end of the range. Likewise, the Total Cost column uses the higher Unit Cost and higher Communication Cost estimates to calculate the value at the lower end of the range.

Note 3: These costs do not include the incremental administrative costs associated with data collection, employees, function, and maintenance of the VMS system for the golden crab fishery.

Table 4-5. Summary of annual costs to fishermen of implementing Alternatives 2 and 3 assuming VMS unit cost is subsidized[1].

Alternatives	Unit Cost (fishermen/ management)	Implementation of Unit (fishermen)	Unit Maintenance (fishermen)	Communication Costs (fishermen)	Total Cost (fishermen/ management)[2]
Alternative 2					
First year	($0-$3,465)/ ($21,700)	$2,100	Unknown	$2,520-$6,720	$4,620-$12,285 + maintenance cost
Subsequent year	NA	NA	Unknown	$2,520-$6,720	$2,520-$6,720 + maintenance cost
Alternative 3					
First year	($0-$5,445) ($34,100)	$3,300	Unknown	$3,960-$10,560	$7,260-$13,860 + maintenance cost
Subsequent year	NA	NA	Unknown	$3,960-$10,560	$3,960-$10,560 + maintenance cost

Note 1: This table assumes that the VMS unit cost is subsidized by management under **sub-alternative 3b**
Note 2: The Total Cost column uses the lower Unit Cost and lower Communication Cost estimates to calculate the value at the lower end of the range. Likewise, the Total Cost column uses the higher Unit Cost and higher Communication Cost estimates to calculate the value at the lower end of the range.
Note 3: This $0 estimate does not account for the fact that management may subsidize VMS units that need replacement. It is not possible to make an estimate as to how many units may need replacement at this time.
Note 4: These costs do not include the incremental administrative costs associated with data collection, employees, function, and maintenance of the VMS system for the golden crab fishery.

If the fleet pays the cost of VMS **(Sub-alternative 2a),** the producer surplus would be expected to decrease by the variable component of the total VMS costs, since VMS is expected to neither increase revenue nor decrease fishing costs not associated with the VMS. If NOAA Fisheries Service pays for the cost of the VMS (**Sub-alternative 2b, 2c**) it would not change producer surplus because transfer payments are excluded from the calculation.

Alternative 2 would require use of an approved VMS by any vessel fishing with a limited access golden crab permit in the Council's area of jurisdiction. **Alternative 2** and associated sub-alternatives would result in increased costs to all golden crab fishermen unless government funding was used to subsidize those costs. **Sub-alternatives 2b** and **2c** provide would subsidize the purchase of the units but would not remove all costs from the fishermen. There are eleven currently active permits in the golden crab fishery. Under **Alternative 2**, all eleven vessels would be required to install VMS units on their vessels to remain active. The costs of implementing VMS under **Alternatives 2** and associated sub-alternatives are summarized in **Table 4-9**.

If all eleven vessels purchased VMS units, the cost would range from $34,045 to $39,545. If reimbursements were issued, the aggregate cost to the fishery would be from $0 to $5,445 (**Table 4-10**). The average cost to the 11 fishermen would be $495. The cost to management would be $34,100.

However, this does not include the cost of installation or maintenance. While installation costs approximate $300 per unit, maintenance costs cannot be estimated with existing information. Communication costs for each of the models are provided in **Table 4-2**.

4.12.3 Social Impacts

This action is primarily administrative, but there are social benefits associated with improved monitoring programs. Overall, the proposed measures may impose some additional burdens on fishermen, administrators, and law enforcement, but negative impacts would be outweighed by the social benefits of improved monitoring through electronic reporting, VMS use, and hail-in requirements. The proposed measures in this action would improve data for the golden crab fishery, and this would generate broad long-term social benefits. **Alternative 1 (No Action)** would not produce any social costs or benefits due to no change in the current requirements for the golden crab fishery. **Alternative 2** would have some short-term social impacts, such as fishermen possibly needing to purchase and learn to use new equipment, but there would also likely be long-term social benefits from improved and timely data collection. **Alternative 2** and **Sub-alternatives 2a-2c** requires VMS and designates financial responsibility for associated costs. In general, lower costs for fishermen are associated with social benefits, and **Sub-alternative 3b** would be expected to produce the most social benefits by not contributing to fishing costs. The hail-in requirement proposed in **Alternative 3** will likely produce long-term social benefits by improving enforcement and monitoring for the golden crab fishery.

4.12.4 Administrative Impacts

Alternative 1 (No action) would produce no increased administrative cost or burden beyond the status-quo. **Alternative 2** and associated sub-alternatives would require the use of vessel monitoring on federally permitted golden crab vessels participating in the golden crab fishery. During the development of the CE-BA 1, it was determined that VMS is not an appropriate monitoring mechanism for the golden crab fishery. Requiring VMS for the catch share program may result in an increased enforcement burden due to the need for increased training for the VMS personnel and the increased possibility of unnecessary at-sea enforcement.

The most problematic issue related to the use of VMS in this fishery is born from environmental and mechanical variables that often lead to a great distance between the gear itself and the vessel during both deployment and haul back. The combination of current and depth cause the gear to be as far away from the vessel as one and one half miles. This unavoidable aspect of golden crab fishing would create scenarios in which the vessel itself is located outside the allowable area but within protected Coral Habitat Areas of Particular Concern, while that vessel's gear is located within the allowable area. Since the VMS unit would be located on the vessel and not the gear, a violation would be incurred and would require OLE to process citations, thus adding to their administrative burden. Additionally, the irregular and sometimes very narrow shape of the proposed allowable golden crab fishing areas would compound the difficulty of utilizing VMS as a fishery monitoring tool and successfully prosecuting violations.

However, VMS is an important tool used in monitoring of catch share programs and is strongly encouraged by the OLE as a tool used in this fishery. The administrative impacts associated with the action alternatives are associated with rule-making, outreach, monitoring and enforcement. These impacts are expected to be significant on the agency.

4.12.5 Conclusion

4.13 Action 13. 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 ACL exceeds 3 million pounds.

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

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

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

4.13.1 Biological Impacts

Establishing a new entrants program would allow a mechanism for new entrants to participate in the fishery. This program would be an administrative change and would not be expected to result in biological impacts to the resource as the harvest of golden crab is constrained by an ACL. The golden crab fishery is also constrained to 11 federal permits by a limited access program.

4.13.2 Economic Impacts

Unless the Council chooses **Alternative 3** as their preferred alternative for **Action 4**, under **Alternative 1 (No Action)** there would be no way for new entrants to come into the fishery. **Action 13** provides four methods for new entrants to enter. **Alternative 2** would allow entrants to come in through shares taken as part of a violation, revoked through the "use it or lose it" provision (**Action 6**), or should the ACL reach 3 million pounds. **Alternatives 3** through **5** would set aside 2%, 5%, or 10% of the shares (respectively) to be made available to new entrants through an annual auction.

It is likely that **Alternative 2** would have relatively little negative economic impact on the current fishery participants. However, **Alternatives 3 through 5**, depending on the alternative selected, could have an adverse impact on current participants as they would have their annual share allocations reduced by the amount of the selected alternative.

Alternative 2 does not describe how shares taken through violations, revoked through the "use it or lose it" provision, or an ACL exceeding 3 million pounds would be distributed to new participants. Therefore, it is impossible to determine how new participants would be economically impacted, positively or negatively under this alternative. **Alternatives 3** through **5** indicate that the percent of shares set aside

each fishing year would be sold off at auction. The costs to new entrants would be the price they would have to pay for each share and that amount would vary by fisherman depending on the price paid per share and the number of shares purchased.

4.13.3 Social Impacts

In most cases, implementation of a new catch share program results in additional capital required for new entrants, which may impact fishing communities and affect the continuation of intergenerational fishing in families (Buck 1995; McCay 2004). Therefore, program provisions, such as set-asides, that assist new entrants in accessing shares would be expected to produce broad, long-term social effects. **Alternative 1** would not be expected to produce any social benefits, but may impact new entrants and the fishery overall if there are too few fishermen. The set-asides proposed in **Alternatives 2-5** would provide shares for new entrants without affecting current participants, particularly because the ACL for golden crab is much higher than current landings. In general, the more access to shares that is provided for new entrants, the more overall and long-term social benefits. In this way **Alternative 5** would likely produce the most social benefits by setting aside the highest percentage of shares for new entrants, as long as new entrants used the shares for harvest.

4.13.4 Administrative Impacts

The establishment of a new entrants program as described in the action alternatives would be administratively burdensome. Depending on how the program is structured, there would need to be staff available to manage the program. **Alternatives 2-5** would result in a set aside that would result in an administrative burden to staff. These alternatives would require staff to calculate the set-aside based on the sub-options in **Alternative 2** or the directions of **Alternatives 3-5**. The auction described in **Alternatives 3-5** may work well in a fishery with many participants but with golden crab being such a small fishery it may be possible to have an auction with only one or two permit holders. This would defeat the purpose of having this type of set aside.

4.13.5 Conclusion

4.14 Action 14. Annual pounds overage

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

Alternative 2. A person on board a vessel with the shareholder's only remaining golden crab annual pounds may exceed, by up to 10%, the shareholder's annual pounds remaining on the last fishing trip of the year. Shareholders who incur an overage will be required to payback the annual pounds overage in the subsequent fishing year.

Alternative 3. A person on board a vessel with the shareholder's only remaining golden crab annual pounds may exceed, by up to 20%, the shareholder's annual pounds remaining on the last fishing trip of

the year. Shareholders who incur an overage will be required to payback the annual pounds overage in the subsequent fishing year.

4.14.1 Biological Impacts

The annual pounds overage action would allow fishermen to exceed their annual pounds during the last trip of the fishing year but repay their overage in the following fishing year. This action is not expected to have a negative biological impact as the overage would be addressed in the following fishing year. This type of system is regularly used in other catch share programs with success.

4.14.2 Economic Impacts

The purpose of **Action 14** is to provide potential economic relief for fisherman and to prevent wasting golden crab biomass. **Alternative 1 (No Action)** would require fishermen to stop fishing immediately when their annual pounds allocation was reached. However, **Alternatives 2** and **3** would allow a fisherman who goes over his or her share on the last trip of the season to exceed the allowed pounds by either 10 or 20%. Any overage would come off that fisherman's next fishing year's annual pounds allocation. Allowing the fisherman flexibility would improve a fisherman's profit margin compared to trip costs on the last trip of the year. The economic downside of selecting **Alternative 2** or **3** would be that any overage would reduce the following year's allocation; therefore, potential earnings from that year might be reduced, as well.

4.14.3 Social Impacts

The social benefits of allowing an overage for the last trip of the season are associated with the economic benefits of this type of provision. **Alternative 1 (No Action)** would likely not produce any social benefits by not allowing overage, but could negatively impact fishermen by causing early termination of a trip. **Alternatives 2** and **3** would likely be beneficial to the fishermen and allow them to maximize efficiency on the last trip of the year. However, if overages occurred commonly and over several years, this could affect fishermen through management measures if the ACL is exceeded.

4.14.4 Administrative Impacts

The action alternatives would have some administrative burden associated with tracking the overage against the following years quota. However, it is expected that this type of overage would be built into the computerized system and would not require large amounts of staff time during the implementation phase. There would be no difference in the administrative burden between **Alternatives 2** and **3**.

4.14.5 Conclusion

4.15 Action 15. 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 an approved landing site to participate in the program.

Preferred Sub-alternative 2a. Approved landing sites will be selected by fishermen but must be approved by NMFS Office of Law Enforcement (OLE) in consultation with the appropriate state law enforcement agency prior to use.

Sub-alternative 2b. Approved landings sites will be selected by the Council and NMFS in consultation with the appropriate state law enforcement agency, based on industry recommendations and resource availability.

4.15.1Biological Impacts

Establishing approved landing sites is an administrative action. Therefore, is not expected to directly or indirectly affect the physical, biological or ecological environments in a positive or negative way.

4.15.2 Economic Impacts

Alternative 1 (No Action) would not require certification of landing sites, and thus this alternative would not result in any additional cost. Were it to become the case that many landing sites are either not readily identified or inaccessible to law enforcement officers, the likelihood of not properly monitoring the catch share system would increase. This could eventually be disruptive to the proper functioning of the system, which in turn could reduce the economic benefits from the program.

Alternative 2 and associated sub-alternatives would establish landing sites for all catch share programs in the commercial golden crab fishery. The cost for certifying a landing site is reportedly minimal for both the fishing participants and fishery managers, including enforcement personnel. If such were the case, whatever benefits gained from properly enforcing landing/offloading rules would enhance the benefits from the catch share system. One possible negative feature of this option is that fishermen may have to incur more travel and other costs if they are compelled to land their fish in other places far removed from their usual landing sites. Naturally, this would happen only if their usual landing sites could not be approved and this would be minimized under **Sub-alternative 2a.**

4.15.3 Social Impacts

In general, measures that contribute to improved monitoring and enforcement are expected to produce broad, long-term social benefits, and potentially some short-term social impacts associated with any economic costs from the proposed requirements. It is likely that designated landings sites would contribute to improved monitoring and data collection, and **Alternative 1 (No Action)** would likely not produce any of these long-term social benefits. **Alternative 2** and **Sub-alternatives 2a** and **2b** would implement landing site designations and produce social benefits through improved monitoring. The

flexibility in **Sub-alternative 2a** would have fewer impacts on fishermen by eliminating the possibility that harvesters would have to change landings sites under **Sub-alternative 2b**.

4.15.4 Administrative Impacts

Alternative 1 (No Action) would be the least burdensome on the administrative environment because approved landing sites would not be established. Establishing approved landings is expected to be more burdensome on the administrative environment than status quo because NMFS OLE has to approve sites, which includes visiting sites to ensure addresses are valid. Additionally, approved landings sites would have to be tracked and updated as needed and VMS landing notification forms would need to be updated if approved sites change. It is expected that during the implementation phase of the catch share program there would be more administrative burden to identify and certify landing sites. However, it is expected that once most landing sites are identified the administrative burden would be reduced significantly.

4.15.5 Conclusion

Chapter 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.

5.1Biological

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.

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

The impacts 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. The most recent amendment for the golden crab fishery, Amendment 5 to the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region (Golden Crab FMP) implemented an annual catch limit (ACL) of 2 million pounds and established an accountability measure in which the fishery would be closed if the ACL was reached (SAFMC 2011).

B. Present

In this amendment (Amendment 6 to the Golden Crab FMP) the South Atlantic Fishery Management Council (Council) has recommended the development of a catch share program for the golden crab fishery. This amendment includes actions that would establish eligibility criteria for annual pounds, allocation of shares, establish a cap on ownership, designate a set aside for new entrants, transferability of shares, implement a use or lose provision, require vessel monitoring system, approve landing sites, and devise a method for cost recovery.

B. Reasonably Foreseeable Future

The golden crab fishery operates in relative isolation from other South Atlantic fisheries. The golden crab fishermen tend not to fish for other species and there is no bycatch in the golden crab fishery. Furthermore, there is no amendment that would adjust management for the golden crab fishery in the reasonably foreseeable future. The Comprehensive Ecosystem-Based Amendment 3 (CE-BA 3) is being developed by the Council and could consider an action that would modify the boundaries of the deepwater coral habitat areas of particular concerns, near which the golden crab fishermen currently fish.

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

In terms of natural disturbances, it is difficult to determine the effect of non-Council and non-fishery related actions on stocks of golden crab. Annual variability in natural conditions such as water temperature, currents, food availability, predator abundance, etc. can affect the abundance of golden crab, which survive the egg and larval stages each year to become juveniles (i.e., recruitment). Furthermore, natural factors such as storms, red tide, cold-water upwelling, etc. can affect the survival of juvenile and adult crabs; however, it is very difficult to quantify the magnitude of mortality these factors may have on a stock. Alteration of preferred habitats for golden crab could affect survival at any stage in their life cycles. However, golden crab occur deepwater mud habitat and habitat alteration is not likely.

How global climate changes will affect the golden crab fishery is unclear. Climate change can impact marine ecosystems through ocean warming by increased thermal stratification, reduced upwelling, sea level rise, increases in wave height and frequency, loss of sea ice, and increased risk of diseases in marine biota. Decreases in surface ocean pH due to absorption of anthropogenic CO_2 emissions may impact a wide range of organisms and ecosystems, particularly organism that absorb calcium from surface waters, such as corals and crustaceans (IPCC 2007, and references therein).

The BP/Deepwater Horizon oil spill event, which occurred in the Gulf of Mexico on April 20, 2010, is not expected to impact fisheries operating the South Atlantic. Oil from the spill site was never detected in the South Atlantic region, and is not likely to pose a threat to the South Atlantic golden crab fishery.

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.

In terms of the biophysical environment, the resources/ecosystems identified in earlier steps of the CEA are the populations directly or indirectly affected by the regulations. This step should identify the trends, existing conditions, and the ability to withstand stresses of the environmental components.

The species most likely to be impacted by actions in this amendment is golden crab. Trends in the condition of golden crab are determined through the Southeast Fisheries Science Center and the Council's Scientific and Statistical Committee. The golden crab fishery has not been assessed through the Southeast Data, Assessment, and Review process.

The annual catch limit (ACL) for golden crab was established by the Council through the implementation of the Comprehensive ACL amendment. The ACL was set 2 million pounds based on the Council's Scientific and Statistical Committee's recommendation for an acceptable biological catch. The ACL is higher than historic catches.

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

Quantitative definitions of overfished and overfishing for the golden crab resource in the South Atlantic are identified in Amendment 2 to the Golden Crab FMP (SAFMC 1998c).

Maximum Sustainable Yield (MSY)

Amendment 2 to the Golden Crab FMP (SAFMC 1998c) states MSY should not be specified for the South Atlantic, but as soon as sufficient information becomes available to calculate MSY, the framework procedure in the Golden Crab FMP (SAFMC 1995) would be used to incorporate the MSY figures into the FMP.

Optimum Yield (OY)

OY is all golden crab that are harvested legally under the provisions of the Golden Crab FMP, which is equivalent to that level of golden crab harvest that would minimize user conflict among vessels, minimize the cost of fishing, produce a stable level of landings that would maximize returns to the fishermen, provide for a stable supply, and minimize management costs.

Overfished and Overfishing Definitions

Currently there is no specific definition of an overfished condition for golden crab in the South Atlantic. Amendment 2 to the Golden Crab FMP (SAFMC 1998c) defines overfishing as any rate of fishing mortality in excess of F_{MSY}, where the maximum allowable fishing mortality rate is estimated to equal the natural mortality rate of mature male crabs; in-season fishing mortality rate may be based on a change in the in-season ratio of catch-per-unit (CPUE) effort of legal to mature male crabs or proportionate reduction in average weekly CPUE. Overfishing thresholds would not be exceeded as a result of the proposed actions in addition to other cumulative activities affecting this resource.

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.

The overfished status of golden crab is listed as unknown in the NMFS 2010 Report to Congress on Status of Fisheries of the United States. Considering the small number of fishery participants, the established ACL, and the possible implementation of a catch share program, it is unlikely that golden crab may be fished above a sustainable level in the near future.

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.

Proposed management actions, as summarized in **Section 2** of this document, would establish a catch share program for golden crab. Detailed discussions of the magnitude and significance of the preferred alternatives appear in **Section 4** of this consolidated document.

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. The golden crab catch share program would not impact the harvest of golden crabs as they are constrained by a ACL. Therefore, avoidance, minimization, and mitigation are not necessary.

11. Monitor the cumulative effects of the selected alternatives 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.

Effects on protected species

Cumulative effects, as defined under the Endangered Species Act (ESA), refer to any known unrelated, future, non-federal activities reasonably certain to occur within the action area that are likely to affect listed or proposed species. Future federal actions requiring separate consultation (unrelated to the proposed action) are not considered in this document.

ESA-listed species that occur within areas where the golden crab fishery operates and that 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

For listed whales occurring within the action area, the potential for adverse effects from the South Atlantic golden crab fishery executed within the action area are unlikely. However, these whale species may incur negative impacts from other sources such as disease, vessel strikes, entanglements in other fishery‘s gear, and habitat degradation due to chemical and noise pollution, as well as marine debris. These impacts may cause adverse effects on a population‘s overall recovery. For detailed descriptions on cumulative impacts to listed whale species found in the action area see Warring *et al*. (2002).

Sea Turtles

To fully assess the recovery of sea turtles, the full range of human and natural phenomena need to be considered. Hurricanes may have potentially negative effects on the survival of eggs or on nesting habitat itself if the beach is greatly reduced. Human-related activities pose multiple threats such as: entanglement in fishing gear; diminished nesting success due to coastal development and artificial lighting on nesting beaches; degradation of the marine habitat by chemical pollution and marine debris; and the direct (legal or illegal) taking of eggs or individual turtles. The impacts of many of these activities are under-monitored, particularly on the international level. NOAA Fisheries Service has estimated that thousands

of sea turtles of all species are incidentally or intentionally caught or killed annually by international activities (NOAA Fisheries Service 2001).

Some anthropogenic mortality that contributed to the decline of sea turtles has been mitigated since sea turtles were listed under ESA. Examples include the use of turtle excluder devices in shrimp trawlers, reduction or closure of certain fisheries that use entangling nets, and prohibiting the harvest of eggs and nesting females in the U.S. as well as other areas (for further information on sea turtle impacts see NOAA Fisheries Service 2001).

Fish

Smalltooth sawfish are extremely vulnerable to overexploitation because of their tendency to become entangled in nets, their restricted habitat, and low rate of population growth. Smalltooth sawfish are vulnerable to incidental capture in various fisheries including gillnet, otter trawl, trammel net, seine, and to a lesser degree, hand line (NOAA Fisheries Service 2000). Due to this species' dependence on coastal habitat, loss and degradation of coastal habitat by urban development, agriculture, and channel dredging have also contributed to their decline. Marine pollutants may also negatively impact the smalltooth sawfish, particularly because of its slow growth and late maturation.

Adverse effects on newly listed Atlantic sturgeon from direct harvest or trap/pot entanglement are unlikely. Atlantic sturgeon reside is esturine habitat far from the golden crab fishing areas. It is not expected that the golden crab fishery will have any impact on the population of Atlantic sturgeon.

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. A description of the history of management of the golden crab fishery is contained in **Section 1.3** and is incorporated herein by reference. Participation in and the economic performance of the golden crab fishery has been effected by a combination of regulatory, biological, social, and external economic factors.

Given the variety of factors that affect fisheries, persistent data issues, and the complexity of trying to identify cause-and-effect relationships, it is not possible to differentiate actual or cumulative regulatory effects from external cause-induced effects. For each regulatory action, expected effects are projected. However, these projections typically only minimally, if at all, are capable of incorporating the variety of external factors, and evaluation in hindsight is similarly incapable of isolating regulatory effects from other factors.

It can be stated that the regulatory environment for all fisheries has become progressively more complex and burdensome, increasing, in tandem with other adverse influences, the pressure on economic losses, business failure, occupational changes, and associated adverse pressures on associated families, communities, and industries. Some reversal of this trend is possible and expected. However, certain pressures would remain, such as total effort and total harvest considerations, increasing input costs, import induced price pressure, and competition for coastal access.

Detailed descriptions of the expected social and economic impacts of the actions in this amendment are contained elsewhere in **Section 4.0** and are herein incorporated by reference.

Administrative

A description of the administrative environment is contained in **Section 3.3** and incorporated herein by reference. The cumulative impacts of the preferred alternatives contained within this amendment when considered with those of past, present, and reasonably foreseeable actions may be large in the short term and minimal in the long term. Prior to, and upon implementation of, actions in the this amendment, several forms of outreach materials in the form of letters, fishery bulletins, web sites, and notices will need to be developed to inform vessel owners of the program. However, the fishery is small and many fishermen have played active roles in getting the program developed. Early coordination with the Division of Sustainable Fisheries, the office of General Counsel and the Office of Law Enforcement would be necessary to change current regulatory text, implement the actions, and enforce new catch share program. An online computerized catch share program would need to be developed to ensure accurate and efficient implementation of the program. This is likely to take a large amount of time in the development phase and staff time to fix issues as they arise.

Chapter 6. Bycatch Practicability Analysis

Bycatch is defined as fish harvested in a fishery, but not sold or retained for personal use. This definition includes both economic and regulatory discards and excludes fish released alive under a recreational catch-and-release fishery management program. Economic discards are generally undesirable from a market perspective because of their species, size, sex, and/or other characteristics. Regulatory discards are fish required by regulation to be discarded, but also include fish that may be retained but not sold.

Agency guidance provided at 50 CFR 600.350(d)(3) identifies ten factors to consider 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, and 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.

The Councils are encouraged to adhere to the precautionary approach outlined in Article 6.5 of the Food and Agriculture Organization of the United Nations Code of Conduct for Responsible Fisheries when uncertain about these factors.

Golden crab (*Chaecon fenneri*) are harvested commercially far offshore in deep water, in three zones in the exclusive economic zone of the South Atlantic Region (see Section 3.4.1.1 of this amendment for more details). Baited traps are attached with gangions to a 5/8" polypropylene line up to eight kilometers (5 miles) long. There are 20 to 50 traps per line, or "trawl," set 152 meters (500 feet) apart. Fishermen may fish four trawls in a two-week period pulling 100 traps one week and 100 the next (Howard Rau, pers. communication). Golden crab traps are required to have two escape gaps on either side of the trap to allow females and small individuals to escape. Thus, a small number of golden crabs are released upon trap retrieval because the majority of the culling is accomplished through the escape panels while the traps are still submerged. Furthermore, release mortality of golden crab is presumed to be very low. Also, since the main trap door is shut using degradable wire, ghost fishing is not a concern if the trap becomes lost.

Nine to 13 kilograms (20-30 pounds) of golden crabs per trap is a desirable catch. On a good season, fishermen may catch 32 to 45 kilograms (70-100 pounds) of golden crabs per trap. All female golden crabs and individuals weighing less than 1 ¼ pounds are released back into the water. Only male golden 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, female golden crabs are

smaller than males and therefore less marketable. On one observed trip, three trawls were retrieved (about 100 traps) out of which only 20-25 golden crabs were discarded.

There is very little bycatch information available for the golden crab fishery. In 2001, under the NOAA Fisheries Service Southeast Fisheries Science Center's logbook program, isopods, crabs (including female golden crabs), hagfish, shark, and hake were observed as bycatch species (J. Poffenberger, personal communication). However, there were no estimates reported for bycatch mortality, and it was assumed to be minimal. Furthermore, the magnitude of bycatch in golden crab traps has not been investigated.

Golden crab are harvested in areas that are designated as essential fish habitat for deepwater corals. Amendment 4 to the Fishery Management Plan for the Golden Crab Fishery of the South Atlantic Region included in the Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1, SAFMC 2009b), established five coral habitat areas of particular concern (CHAPCs). CE-BA 1 also established allowable golden crab fishing areas that allow fishermen to harvest golden crab in two of the five CHAPCs. Actions in CE-BA 1 were designed to prohibit damaging gear from operating in deepwater coral habitat. The actions were expected to have a positive impact on reducing the potential for bycatch interactions to the degree it reduced interaction of gear, habitat, and deepwater species that may be directly or indirectly affected by habitat damage or unintended capture. Management measures implemented by CE-BA 1 minimize any future bycatch in the proposed CHAPCs by:
1) Prohibiting use of bottom longline, trawls (mid-water and bottom), dredge, pot, or trap;
2) prohibiting use of anchor and chain, or use of grapple and chain; 3) prohibiting possession of any species regulated by the coral FMP; and 4) restricting fishing for golden crab and royal red shrimp to designated areas. Therefore, the establishment of deepwater CHAPCs is expected to likely result in positive ecological benefits in the community structure and species diversity of deepwater ecosystems occupied by these species, including golden crab.

Under the actions implemented by CE-BA 1 (SAFMC 2009b), the golden crab fishery would be allowed to continue operating in traditional fishing areas where no damage to deepwater coral habitat is expected. In the future, however, this fishery would not be allowed to expand into other areas located within the CHAPCs. Other fisheries that use bottom-tending gear or anchors would also be prohibited from expanding their operations into the CHAPCs.

NOAA Fisheries Service has created a list of Species of Concern as a publicly available list identifying other species of concern (see Section 3.2.3 of this amendment for details). These are species such as sharks, groupers, marlin, ivory tree coral, etc., 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 Endangered Species Act (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. The longline and hook-and-line gear components of the snapper-grouper and golden crab fisheries in the South Atlantic are classified in the proposed 2012 List of Fisheries (76 FR 37716, June 28, 2011) as Category III fisheries. No incidentally killed or injured marine mammal species has been documented in this fishery.

Therefore, regarding factors 1-4, as noted in Section 3.4.1.1 of this amendment and above, there is very little information available to determine the effects on bycatch and bycatch mortality that result from the commercial golden crab fishery in the South Atlantic under current regulations.

The actions in this amendment are largely administrative in nature and their implementation is not expected to significantly implicate factors 5-10 (see Sections 3.0 and 4.0 of this amendment for details). Management actions proposed in this amendment include components necessary to implement a catch share program for golden crab, with no direct effects to the biological environment. Indirect effects could result from how the total number of golden crab shareholders changes and how the fishery may be prosecuted. However, the total harvest would still be limited to the annual catch limit (ACL) of 2 million pounds for golden crab, when the Comprehensive ACL Amendment (SAFMC 2011) is implemented.

Any additional actions to reduce bycatch in the golden crab fishery would affect effort or gear, resulting in potentially adverse changes to associated costs, benefits, and behavior of fishery participants. Also, new measures would result in additional administrative burdens related to implementation and enforcement.

Chapter 7. Other Things to Consider

7.1 Unavoidable Adverse Effects

The establishment of a catch share program may result in unavolidable adverse effects related to the equity and distribution of the shares. However, the South Atlantic Fishery Management Council has worked closely with the Golden Crab Advisory Panel, which includes members of industry to develop a catch share program that would be suitable for the fishery participants. At the same time, the annual catch limit for golden crab 2 million pounds which exceeds the current harvest level significantly. In that regard, fishery participants are likely to receive more allocation that they currently harvest. An appeals process, the use it or lose it provision, and a new entrants program are being considered to alleviate some of the concerns that arise through the development of catch share programs.

7.2 Effects of the Fishery on the Environment

The biological impacts of the proposed actions are described in **Section 4.0**, including impacts on habitat. No actions proposed by this amendment are expected to have any adverse impacts on essential fish habitat (EFH) or EFH-habitat of particular concern for managed species. One of the goals of this amendment is to protect deepwater coral habitat by ensuring a high level of skill in the golden crab fishery.

7.3 Effects on Ocean and Coastal Habitats

The actions in the amendment are not expected to have any effects on ocean and coastal habitats.

7.4 Public Health and Safety

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

7.5 Endangered Species and Marine Mammals

The proposed actions are not expected to change the level of marine mammal or endangered species impacts from the status quo. 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. A description of the endangered species in the action area can be found in Section 3 and in the cumulative effects analysis.

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

The relationship between short-term uses and long-term productivity would not be affected by this amendment. The proposed actions limit participation and effort in the golden tilefish portion of the snapper grouper fishery but do not constrain catch. The actions being proposed in this amendment would not have an impact on the short-term uses and long-term productivity.

7.7 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments are defined as commitments that cannot be reversed, except perhaps in the extreme long-term, whereas irretrievable commitments are lost for a period of time. None of the actions proposed by this amendment would result in irreversible or irretrievable commitments of resources.

7.8 Monitoring and Mitigation Measures

Action 12 relates to the monitoring of the golden crab fishery and proposes vessel monitoring system (VMS) equipment onboard vessels in this fishery. The most problematic issue related to the use of VMS in this fishery is born from environmental and mechanical variables that often lead to a great distance between the gear itself and the vessel during both deployment and haul back. The combination of current and depth cause the gear to be as far away from the vessel as one and one half miles. VMS has been determined not to be a practical or effective way to monitor where the fishing gear is on the seabed. However, VMS is used in every catch share program in the United States and is highly recommended by the OLE existence and it is been deemed effective for monitoring a catch share program.

Chapter 8. Regulatory Impact Review

(to be completed once Preferred alternatives are chosen)

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.

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 implementing a catch share program for the golden crab fishery, including establishment of criteria for eligibility, allocate privileges, establish a cap on privilege ownership, and devise methods for cost recovery.

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.

Description of the Fishery

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.

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 this fishery under routine operations and does not allocate specific budgetary outlays to this fishery, nor are increased enforcement budgets expected to be requested to address any component of this action.

Summary of Economic Impacts

Determination of Significant Regulatory Action

Chapter 9. Initial Regulatory Flexibility Analysis

I (to be completed once Preferred alternatives are chosen)

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.

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 implementing a catch share program for the golden crab fishery, including establishment of criteria for eligibility, allocate privileges, establish a cap on privilege ownership, and devise methods for cost recovery.

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

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

Description 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.

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.

Substantial Number of Small Entities Criterion

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?

Description of Significant Alternatives
The Council's preferred alternatives are:

Chapter 10. Fishery Impact Statement – Social Impact Statement

(to be completed once Preferred alternatives are chosen)

Summary of Biological Effects
Summary of Economic Effects
Summary of Social Effects
Summary of Administrative Effects

Chapter 11. Other Applicable Law

11.1 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 South Atlantic Fishery Management Council's (Council) 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.

11.2 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 (IQA). 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 Environmental Assessment are in compliance with the IQA.

11.3 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 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 the golden crab fishery and 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.

11.4 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.

11.5 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.

11.6 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.

11.7 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.

11.8 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.

11.9 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.

11.10 Marine Mammal Protection Act

The Marine Mammal Protection Act (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.

11.11 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.

11.12 National Environmental Policy Act

This amendment to the South Atlantic 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.**

11.13 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 exclusive economic zone 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.

11.14 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. PRA requires NMFS to obtain approval from the OMB before requesting most types of fishery information from the public.

11.15 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.

11.16 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.

11.17 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.

11.18 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 ethnographies that would allow a comprehensive analysis.

11.19 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 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.

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Chapter 13. List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent

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List of Agencies, Organizations, and Persons Consulted

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
Atlantic States Marine Fisheries Commission
Gulf and South Atlantic Fisheries Development Foundation
Gulf of Mexico Fishery Management Council
National Marine Fisheries Service
- Washington Office
- Office of Ecology and Conservation
- Southeast Regional Office
- Southeast Fisheries Science Center

Chapter 14. 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

Gréboval, D. and G. Munro. 1999. "Overcapitalization and excess capacity in world fisheries: underlying economics and methods of control," chapter 1 in FAO, Managing Fishing Capacity: Selected Papers on Underlying Concepts and Issues (selected papers from the FAO, Technical Working Group on the Management of Fishing Capacity in La Jolla, USA, from 15 to 18 April 1998). Fisheries Policy Division, FAO, Viale Terme di Caracalla 00100 Rome, Italy, FAO Fisheries Technical Paper T386, 206 p

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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