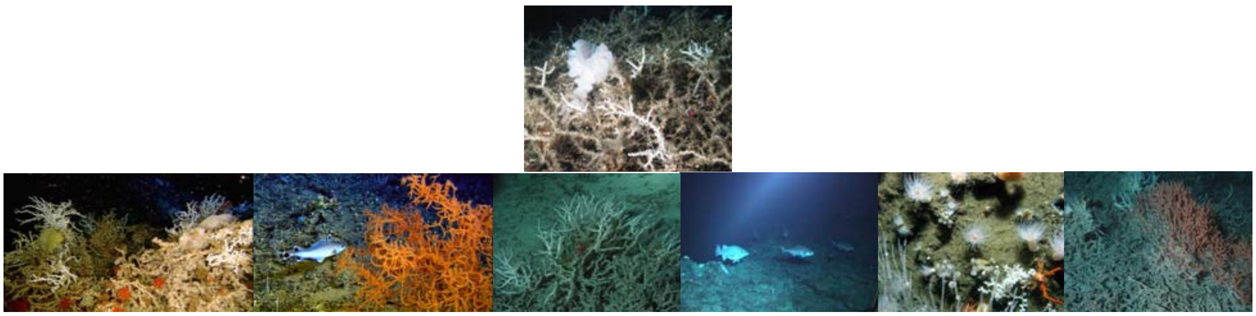
PUBLIC HEARING DRAFT
COMPREHENSIVE ECOSYSTEM AMENDMENT 1 OF THE SOUTH ATLANTIC REGION



AMENDMENT 6 TO THE CORAL, CORAL REEFS, AND LIVE/HARD BOTTOM HABITAT FISHERY MANAGEMENT PLAN
AND
AMENDMENT 3 TO THE GOLDEN CRAB FISHERY MANAGEMENT PLAN

(INCLUDING A DEIS, IRFA, RIR & SIA/FIS)

August 2008

South Atlantic Fishery Management Council
4055 Faber Place, Suite 201
North Charleston, South Carolina 29405
(843) 571-4366 / FAX (843) 769-4520
Toll Free (866) SAFMC-10
email: safmc@safmc.net

National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
(727) 824-5301 / FAX (727) 824-5308

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ABBREVIATIONS AND ACRONYMS

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

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

COMPREHENSIVE ECOSYSTEM AMENDMENT 1
FOR THE SOUTH ATLANTIC REGION

AMENDMENT 6 TO THE CORAL, CORAL REEFS, AND LIVE/HARD BOTTOM HABITAT FISHERY MANAGEMENT PLAN, AMENDMENT 3 TO THE GOLDEN CRAB FISHERY MANAGEMENT PLAN

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

Proposed actions:

ACTION 1. Establish Deepwater Coral Habitat Areas of Particular Concern: Cape Lookout Lophelia Banks HAPC; Cape Fear Lophelia Banks HAPC; Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace HAPC; Pourtales Terrace HAPC; and the Blake Ridge Diapir Methane Seep HAPC.

ACTION 2. Create a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace C-HAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS).

ACTION 3. Create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries: create an "Allowable Golden Crab Fishing Area" in the Northern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; create an "Allowable Golden Crab Fishing Area" in the Middle Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; and create an "Allowable Golden Crab Fishing Area" in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries.

ACTION 4. Amend the Golden Crab Fishery Management Plan to Require Vessel Monitoring.

This Amendment also addresses the spatial requirements of the Essential Fish Habitat mandates in the Final Rule and highlights the availability of updated data contained in the Fishery Ecosystem Plan supporting existing EFH and EFH-HAPC designations.

Lead agency:	FMP – South Atlantic Fishery Management Council EIS - NOAA Fisheries
For Further Information Contact:	Robert K. Mahood 4055 Faber Place, Suite 201 North Charleston, SC 29405 843-571-4366 843-769-4520 (fax) 866-SAFMC-10 safmc@safmc.net Roy E. Crabtree NOAA Fisheries, Southeast Region 263 13th Avenue South St. Petersburg, FL 33701 727-824-5301 727-824-5320 (fax)
NOI for CEA 1:	[May 23, 2005; 70 FR 29482]
Scoping meetings held:	February 28 – June 13, 2005

The Council added "Ecosystem-Based Management" as an agenda item to each of the Advisory Panel meetings in 2004 and 2005. Each Advisory Panel was asked to address the items identified above as well as providing their recommendations on the Council's approach to develop a Fishery Ecosystem Plan and on what items should be addressed in the Comprehensive FEP Amendment. Advisory Panels met as follows:

Advisory Panel	Date/Location
Mackerel	June 16, 2004 in Key West, FL
Information & Education	August 24-26, 2004 in Charleston, SC
Joint Habitat and Coral	October 25-29, 2004 in Charleston, SC
Shrimp	September 2004 in Pawley's Island, SC
Law Enforcement	November 2004
Snapper Grouper	June 13-14, 2005
Marine Protected Areas	2005

Beginning with the September 2004 meeting, the Council also scheduled time during each species committee meeting and each Ecosystem-Based Management committee meeting to give the public an opportunity to provide input on these issues.

Supporting development of Actions presented in CEA 1, the Council through their Habitat and Coral Advisory Panels initiated a Coral Habitat Area of Particular Concern Development process pursuant the the Coral FMP provisions. The Habitat Adisory Panel began review of background material and supported the need for additional characterization and mapping. A refined Coral Advisory Panel was constituted formally enganging the primary deepwater researchers into the development process as members of the Advisory Panel. The Habitat and Coral Advisory Panel subsequently met jointly between 2004 and 2007 providing the Council with recommendations supporting CHAPC designation, regulatory provisions in Comprehensive Ecosystem Amendment 1 and future research needs.

Advisory Panel	Date/Location
Joint Habitat and Coral	October 25-29, 2004 in Charleston, SC
Joint Habitat and Coral	June 2006 in Miami, FL
Rock Shrimp	May 2007 in Charleston, SC
Joint Habitat and Coral	November 2007 in Charleston, SC
Golden Crab	January 2008 in Cape Canaveral, FL
Deepwater Shrimp	January 2008 in Cape Canaveral, FL

A first round of public hearings for the Draft Comprehensive Ecosystem Amendment 1 and Fishery Ecosystem Plan were held between May 7 and May 15, 2008.

Wednesday, May 7, 2008 Key Largo Grande Resort & Beach Club (MM #97) 97000 South Overseas Highway Key Largo, Florida 33037	**Tuesday, May 13, 2008** Hilton Garden Inn 5265 International Blvd. N. Charleston, South Carolina 29418
Friday, May 9, 2008 Radisson Resort at the Port 8701 Astronaut Boulevard Cape Canaveral, Florida 32920	**Thursday May 15, 2008** Sheraton New Bern 100 Middle Street New Bern, North Carolina 28560
Monday, May 12, 2008 Mighty Eighth Air Force Museum 175 Bourne Ave. Pooler, Georgia 31322	

Advisory Panel	Scheduled 2008 Meeting Date/Location
Golden Crab	September 2008 in Charleston, SC
Deepwater Shrimp	September 2008 in Charleston, SC
Joint Habitat and Coral	November 17-19, 2008 in Charleston, SC

A second round of public hearings for the Draft Comprehensive Ecosystem Amendment 1 and Fishery Ecosystem Plan will be held between October 27 and November 3, 2008.

October 27, 2008 Key Largo Grande 97000 South Overseas Highway Key Largo, Florida 33037 Phone: 305-852-5553	**October 28, 2008** Double Tree Hotel 2080 N. Atlantic Avenue Cocoa Beach, Florida 32931 Phone: 321-783-9222
October 29, 2008 Bridge Pointe Hotel 101 Howell Road New Bern, North Carolina 28582 Phone: 252-636-3637	**October 30, 2008** Hilton Garden Inn 5265 International Blvd. N. Charleston, South Carolina 29418 Phone: 843-308-9331
November 3, 2008 Mighty Eighth Air Force Museum 175 Bourne Avenue Pooler, Georgia 31322 Phone: 912-748-8888	

This approach followed the Council's process for gathering stakeholder input and incorporating the input into the FMP/Amendment development process.

DEIS filed:	DATE TO BE FILLED IN
DEIS Comments received by:	DATE TO BE FILLED IN
FEIS filed:	DATE TO BE FILLED IN
FEIS Comments received by:	DATE TO BE FILLED IN

ABSTRACT

There are three aspects of CEA 1. The first are the regulatory actions being proposed which would:

- Amend the Coral FMP to establish Deepwater Coral Habitat Areas of Particular Concern: Cape Lookout Lophelia Banks HAPC; Cape Fear Lophelia Banks HAPC; Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace HAPC; Pourtales Terrace HAPC; and The Blake Ridge Diapir Methane Seep HAPC.

- Amend the Coral FMP to create a “Shrimp Fishery Access Area” (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS).

- Amend the Coral FMP to create “Allowable Golden Crab Fishing Areas” within the proposed Coral HAPC boundaries; create an “Allowable Golden Crab Fishing Area” in the Northern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; create an “Allowable Golden Crab Fishing Area” in the Middle Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; and create an “Allowable Golden Crab Fishing Area” in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries.

- Amend the Golden Crab Fishery Management Plan to Require Vessel Monitoring.

The second aspect which is non-regulatory, is highlighting the commitment of the South Atlantic Council to using the CEA FEP devolpment process to facilitate the move to Ecosystem-Based Management in the region.

A third also-non regulatory aspect is the comprehensive spatial presentation of Council designated Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern.

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

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Summary

Purpose and Need

Development of this Comprehensive Ecosystem Amendment initiates the Council's move to a new era of ecosystem-based management. While CEA 1 focuses on deepwater coral ecosystem conservation and addressing EFH-related issues, future CEAs will be developed annually and will contain regulatory actions based on a full review of management needs. This effort will draw from and build on the biological, economic, and social information presented in the FEP and address possible issues or future management actions identified within it. This process will allow the Council to evaluate the impacts of actions across multiple fisheries, thus facilitating development of management regulations that could apply across FMPs.

Alternatives Being Considered

Action 1: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Establish Deepwater Coral HAPCs

Alternative 1. No Action. Do not establish additional coral HAPCs.

Preferred Alternative 2. Establish Deepwater Coral Habitat Areas of Particular Concern:
Sub-Alternative 2a. Cape Lookout Lophelia Banks HAPC;
Sub-Alternative 2b. Cape Fear Lophelia Banks HAPC;
Sub-Alternative 2c. Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace HAPC;
Sub-Alternative 2d. Pourtales Terrace HAPC; and
Sub-Alternative 2e. The Blake Ridge Diapir Methane Seep HAPC.

Action 2: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries

Alternative 1. No Action. Do not create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries.

Preferred Alternative 2.
Sub-Alternative 2a. Create an "Allowable Golden Crab Fishing Area" in the Northern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries;
Sub-Alternative 2b. Create an "Allowable Golden Crab Fishing Area" in the Middle Golden Crab Fishing Zone within the proposed Coral HAPC boundaries;

Sub-Alternative 2c. Create an "Allowable Golden Crab Fishing Area" in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; and

Alternative 3. Move the western boundary of the proposed Northern and Middle Zone Allowable Golden Crab Fishing Areas west to include the proposed Shrimp Fishery Access Areas.

Action 3: Amend the Coral FMP to Create a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries.

Alternative 1. No Action. Do not create a "Shrimp Fishery Access Areas" within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace boundaries .

Preferred Alternative 2. Create a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS).

Alternative 3. Move the west boundary of the proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds.

Action 4: Amend the Golden Crab FMP to Require Vessel Monitoring

Alternative 1. No action. Would not require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit.

Alternative 2. Require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit and approved crustacean traps fishing for golden crab within designated areas in the Stetson-Miami Terrace HAPC and Pourtales Terrace HAPC where fishing has occurred historically and does not impact deepwater coral habitats.

Alternative 3. Require use of an approved vessel monitoring system (VMS) by any vessel fishing with a limited access golden crab permit in the South Atlantic Council's area of jurisdiction.

Affected Environment

The immediate impact area would be the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia and east Florida to Key West.

The biological environment is described in Section 3.2. A description of the human environment is provided in Section 3.4. Section 4.5 provides a description of the essential fish habitat for all SAFMC managed species.

<u>Environmental Consequences</u>

Action 1: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Establish Deepwater Coral HAPCs

Alternative 1 (No-action) would not meet the objectives of the amendment and have adverse biological effects. In addition, it would not prevent fisheries that may use gear that would have long-term negative impacts from developing. Alternative 2 would result in long-term positive biological effects. Of the two alternatives considered, Alternative 2 would be expected to produce the greatest long-term beneficial effects on the socioeconomic environment.

Action 2: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries

Meeting the objective of the Coral FMP amendment to protect deepwater coral ecosystems would have a significant impact on the golden crab fishery by eliminating operation ares in the Northern and more importantly the Middle Zone where the majority of production in the fishery occurs. Alternative 2 would meet the intent of the Council to create a regulatory structure that will allow traditional fisheries that are managed to minimize impact on deepwater habitat to continue. Therefore, Alternative 2 will result in long-term positive biological effects as well as socio-economic benefits.

Action 3: Amend the Coral FMP to Create a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries.

Alternative 1 (No-action) would not meet the objectives of the Amendment and have adverse biological effects. Of all the alternatives considered, Alternative 2 would be expected to produce the most beneficial direct effects on the socioeconomic environment by providing for traditional fishing operations given the knife-edge charteristics of the fishery along the west of the proposed Stetson-Miami CHAPC. Alternative 3 was one of four proposed by the deepwater Advisory Panel and brought to Public Hearings in May 2008. It was rejected as not meeting the objective of the amendment because it overlaps significant known and highly probable low and high relief deepwater coral habitats, allows the fishery to expand into non-traditional fishing grounds and would create gear conflict by allowing trawling within the major golden crab fishing area in the Middle Zone.

Action 4: Amend the Golden Crab FMP to Require Vessel Monitoring

Alternative 1 (No-action) would not meet the objectives of the amendment or the intent that allowing fishing for golden crab in specified areas of the CHAPC be contingent upon monitoring of those vessels as recommended by the Habitat, Coral, and Golden Crab Advisors. Alternative 2 and Alternative 3 would have similar administrative and economic impacts and would result in long-term positive biological effects and socio-economic benefits.

1 Introduction

A 1999 congressionally-mandated report set the stage for subsequent federal efforts to implement EBM. In response to a congressional request, the National Marine Fisheries Service (NMFS) convened a panel of experts to assess the extent to which ecosystem principles are currently applied in fisheries research and management, and recommend how best to integrate these principles into future activities. This Ecosystem Principles Advisory Panel (EPAP) concluded that NMFS and the regional Fishery Management Councils do apply some EBM principles, goals and policies, but don't apply them comprehensively or evenly. They attributed this to the lack of a clear mandate and resources to carry out EBM, and the "considerable gaps in knowledge and practice" of this new concept. EPAP recommended that Councils continue to use Fishery Management Plans (FMPs) for single species and species complexes, but amend these to incorporate ecosystem approaches consistent with an overall Fishery Ecosystem Plan (FEP). The objectives of the FEP are:

- To provide Council members with a clear description and understanding of the physical, biological and human/institutional context of ecosystems;

- Direct how that information should be used within FMPs; and

- Set policies by which management options would be developed and recommended.

EPAP outlined eight elements that should be included in each FEP and recommended that the Magnuson-Stevens Act be amended to require FEPs. It urged the development of an initial demonstration FEP as a model to facilitate rapid implementation of a full FEP when ultimately required under Magnuson-Stevens. It also called on NMFS and the Fishery Management Councils to establish guidelines for FEP development.

The Council developed the South Atlantic FEP with the long-term vision of embracing the 8 elements presented by the EPAP:

1. Delineate the geographic extent of the ecosytem(s) that occur(s) within Council authority, including characterization of the biological, chemical, and physical dynamics of those ecosystems, and "zone" the area for alternative uses. Figure 1-1 shows the Council's management jurisdiction and the core area of the South Atlantic Ecosystem. Building on the scope of the Habitat Plan the area of consideration extends from the coastal watersheds including extent of anadroumous and catadromous species to off the continental shelf through the extent of the Councils' jurisdiction. However, the South Atlantic ecosystem is invariably linked to other systems and cooperation and collaboration to link research efforts and share management considerations will be pursued.

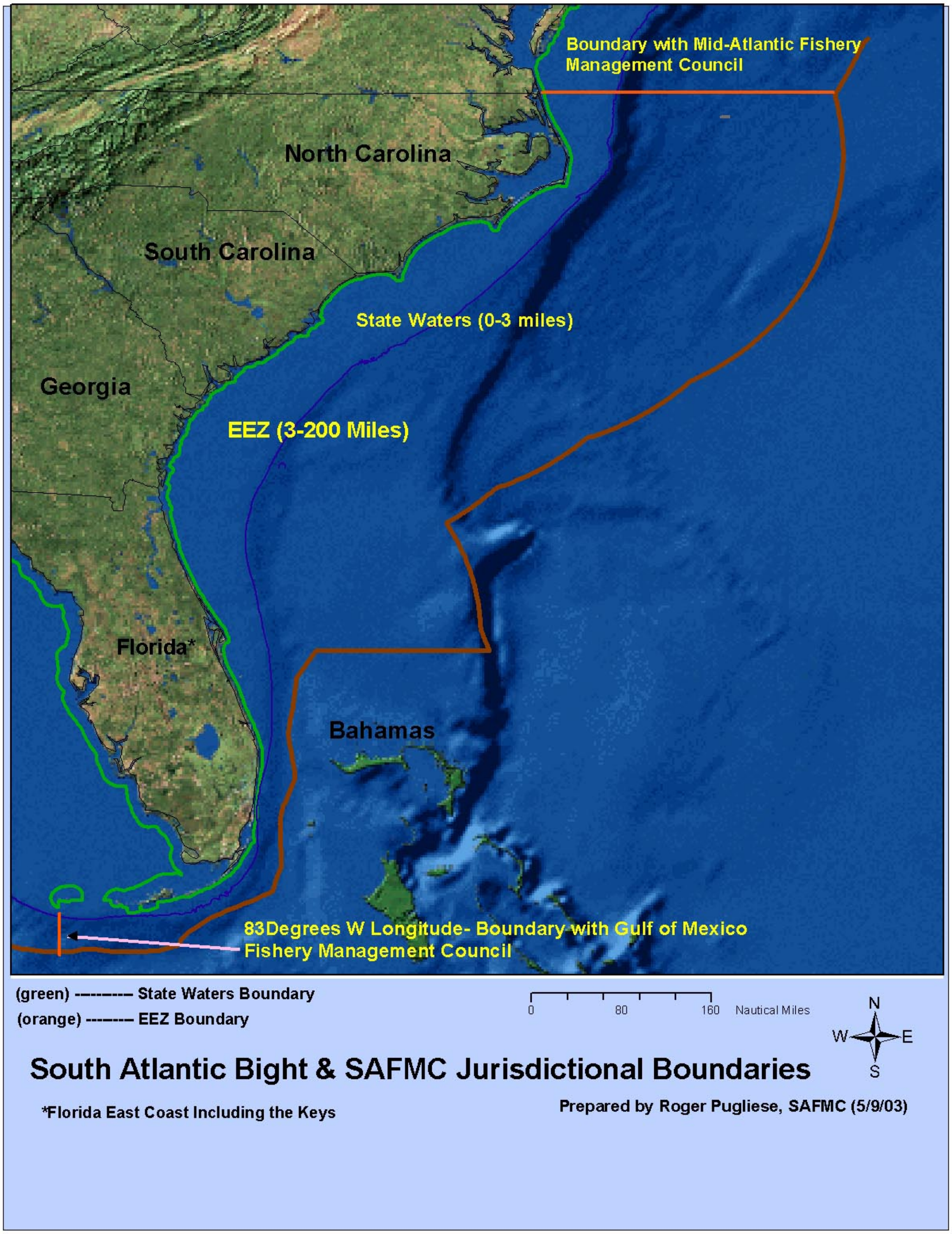


Figure 1-1. Jurisdictional boundaries of the South Atlantic Fishery Management Council.

2. Develop a conceptual model of the food web.

3. Describe the habitat needs of different life history stages for all plants and animals that represent the "significant food web" and how they are considered in conservation and management measures.

4. Calculate total removals – including incidental mortality – and show how they relate to standing biomass, production, optimum yields, natural mortality, and trophic structure.

5. Assess how uncertainty is characterized and what kind of buffers against uncertainty are included in conservation and management actions.

6. Develop indices of ecosystem health as targets for management.

7. Describe available long-term monitoring data and how they are used.

8. Assess the ecological, human, and institutional elements of the ecosystem which most significantly affect fisheries and are outside of Council/Department of Commerce authority, and include a strategy to address those influences.

The South Atlantic Fishery Managment Council has developed the first regional FEP to serve as a source document of biological, economic, and social information for all FMPs and CEAs:

Fishery Ecosystem Plan for the South Atlantic Region (SAFMC, 2008a.) volume structure:

FEP Volume I	Introduction and Overview
FEP Volume II	South Atlantic Habitats and Species
FEP Volume III	South Atlantic Human and Institutional Environment
FEP Volume IV	Threats to South Atlantic Ecosystem and Recommendations
FEP Volume V	South Atlantic Research Programs and Data Needs
FEP Volume VI	References and Appendices

Background

Moving to Ecosystem-Based Management

The development of a regional FEP (SAFMC 2008a) provides the first opportunity to compile and review available habitat, biological, social, and economic fishery and resource information for fisheries in the South Atlantic ecosystem. The South Atlantic Council views habitat conservation at the core of the move to EBM in the region. Therefore, the development of the FEP is a natural next step in the evolution and expands and significantly updates the SAFMC Habitat Plan (SAFMC 1998) incorporating comprehensive details of all managed species (SAFMC, South Atlantic States, ASMFC, and NOAA Fisheries Highly Migratory Species and Protected Species) including their biology, and food web dynamics, and economic and social characteristics of the fisheries and habitats essential to their survival. The FEP therefore serves as a source document which, over time, will present more complete and detailed information describing the

South Atlantic ecosystem and the impact of the fisheries on the environment. This FEP, to the degree information or data is available, updates available information on designated Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concern; expands descriptions of biology and status of managed species; presents information that will support ecosystem considerations for managed species; and describes the social and economic characteristics of the fisheries in the region. In addition, it expands the discussion and description of existing research programs and needs to identify biological, social, and economic research needed to fully address ecosystem-based management in the region. In is anticipated that the FEP, as a living source document will also, through an expanded Volume IV Threats and Recommendations, provide a greater degree of guidance by fishery, habitat or major ecosystem consideration including but not limited to bycatch reduction, prey-predator interactions, maintaining biodiversity, and spatial management needs.

Building from a Habitat to an Ecosystem Network to Support the Evolution

Starting with our Habitat and Environmental Protection Advisory Panel, the Council expanded and fostered a comprehensive Habitat network in our region to develop the Habitat Plan of the South Atlantic Region completed in 1998 to support the EFH rule. Building on the core regional collaborations, the Council facilitated an expansion to a Habitat and Ecosystem network to support the development of the FEP and CEA 1 as well as coordinate with partners on other regional efforts. These efforts include, but are not limited to, participation as a member the Southeast Coastal Regional Ocean Observing Association (SECOORA) to guide and direct priority needs for observation and modeling to support fisheries oceanography and integration into stock assessment process through SEDAR. In addition, the Council serves on the National Habitat Board and as a member of the Southeast Aquatic Resource Partnership, has highlighted the collaboration by including the Southeast Aquatic Habitat Plan (SARP 2008) and associated watershed conservation restoration targets into the FEP. Many of the habitat, water quality and water quantity conservation needs identified in the threats and recommendations Volume of the FEP are directly addressed by on the ground projects supported by SARP. The cooperation results in funding fish habitat restoration and conservation intended to increase the viability of fish populations and fishing opportunity which also meets needs to conserve and manage Essential Fish Habitat for Council managed species or habitat important to their prey. Initially discussed as a South Atlantic Eco-regional Compact, the Council has also cooperated with South Atlantic States in the formation of a South Atlantic Governor's Alliance. This will also provide regional guidance and resources that will address State and Council broader habitat and ecosystem conservation goals.

Building Tools to support EBM in the South Atlantic Region

To support the effort the Council has developed a Habitat and Ecosystem Section of the website http://www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx and, in cooperation with the Florida Wildlife Research Institute (FWRI), developed a Habitat and Ecosystem Internet Map Server (IMS) http://www.safmc.net/EcosystemManagement/EcosystemBoundaries/MappingandGISData/tabid/62/Default.aspx . The IMS was developed to support Council and regional partners' efforts in the transition to EBM. Other regional partners including NMFS Habitat Conservation, South Atlantic States, local management authorities, other Federal partners, universities, conservation organizations, and recreational and commercial fishermen to name a few. Development of ecosystem information systems to support Council management should build on existing tools (e.g., Ecosystem IMS) and provide funding to the Council and other regional cooperating partners for expansion to address long-term Council needs.

Implementing EBM

The Council has implemented ecosystem-based principles through several existing fishery management actions including establishment of deepwater Marine Protected Areas for the Snapper Grouper fishery, proactive harvest control rules on species (e.g., dolphin and wahoo) which are not overfished, implementing extensive gear area closures which in most cases eliminate the impact of fishing gear on Essential Fish Habitat and use of other spatial management including Special Management Zones. Pursuant to the development of Comprehensive Ecosystem Amendment 1, the Council is taking an ecosystem approach to protect deepwater ecosystems while providing for traditional fisheries for the Golden Crab and Royal Red shrimp in areas where they do not impact deepwater coral habitat. The stakeholder based process taps in on an extensive regional Habitat and Ecosystem network. Support tools facilitate Council deliberations and with the help of regional partners, are being refined to address long-term ecosystem management needs.

Ecosystem Approach to Deepwater Ecosystem Management

The South Atlantic Council manages coral, coral reefs and live/hard bottom habitat, including deepwater corals, through the Fishery Management Plan for Coral, Coral Reefs and Live/Hard Bottom Habitat of the South Atlantic Region (Coral FMP). Mechanisms exist in the FMP, as amended, to further protect deepwater coral and live/hard bottom habitats. The SAFMC's Habitat and Environmental Protection Advisory Panel and Coral Advisory Panel have supported proactive efforts to identify and protect deepwater coral ecosystems in the South Atlantic region.

Management actions proposed in CEA 1 include the establishment of deepwater coral HAPCs (C-HAPCs) to protect what is thought to be the largest continuous distribution (>23,000 square miles) of pristine deepwater coral ecosystems in the world. Comprehensive Ecosystem Amendment 1 (CEA 1) is supported by the FEP which also updates supporting information for existing EFH and EFH-HAPC information and addresses the spatial requirements of the Final EFH Rule (e.g., GIS presented for all EFH and EFH-HAPCs).

Broader Scope of the CEA Development Process

CEA 1 development process serves as the vehicle to move the Council to a new era of ecosystem-based management. While CEA 1 is limited in its management scope, future FMP actions will be addressed by having a full review of management needs to initiate preparation of a new CEA to address all FMP amendment needs in the coming year. This effort will not only draw from and build on the biological, economic, and social information presented in the FEP, but will also address possible issues or future management actions identified in the FEP. This process will provide the Council with the opportunity to evaluate needed actions across multiple fisheries, evaluate the impacts of management, and facilitate development of FMP amendments or measures that could apply across FMPs.

While CEA 1 is focused on addressing immediate needs for deepwater coral conservation, the Council acknowledges the combined development of the FEP and CEA 1 establishes a process to facilitate the transition from single species to ecosystem-based management in the region.

New South Atlantic Scoping Public Hearing Process

The Council in moving towards EBM in fisheries has indicated their intent to promote stability within the management process. The Council has proposed updating the Fishery Ecosystem Plan every five years and implementing a regular schedule for amendments to their FMPs. This will allow fishermen and the public to know when the Council will be holding scoping meetings, public hearings, and committee/Council meetings to finalize regulatory changes. The Council's changes would take place in January of the following year.

Such a schedule would be as follows:

1. Scoping Process (meeting and written comments) – February and March
2. Committee/Council review scoping comments and develop options and approve for public hearing
3. Committee/Council finalizes options and approve for public hearings – June meeting.
4. Public hearings – August and September
5. Committee/Council review public input (hearing and written comments), finalize alternatives, and approve for sending to the Secretary of Commerce – September meeting.
6. Final documents sent to Secretary of Commerce – September/October
7. Final review and implementation – October through December
8. Regulations effective January 1st.

In 2008, the Council held the first consolidated scoping meetings in February. These meetings were held during the day with appropriate staff available to interact with public attending. The structure of these and future scoping meetings involves taking formal comments on issues being scoped and a question and answer session in a workshop setting with staff manning topic oriented tables (e.g., Snapper Grouper, SEDAR, Habitat and Ecosystem Considerations, Outreach etc.)

In order to move the deepwater ecosystem management measures forward expediently the Council deferred other actions to CEA 2 which will go to scoping in February of 2009. It is anticipated that after all the existing individual Amendments moving through the system at present are completed that a single CEA will be developed by 2010 or 2011 that will address all actions for an individual fishery or across fisheries.

Future Challenges and Needed Resources to Fully Implement EBM in the Region

One of the greatest challenges to the long-term move to EBM in the region is funding high priority research, including but not limited to, comprehensive benthic mapping and ecosystem model and management tool development. In addition, collecting detailed information on fishing fleet dynamics including defining fishing operation areas by species, species complex and season, as well as catch relative to habitat is critical for assessment of fishery, community and habitat impacts and for Council use of place based management measures. Additional resources need to be dedicated to expand regional coordination of modeling, mapping, characterization of species use of habitats, and full funding of regional fishery independent surveys (e.g., MARMAP and SEAMAP) which are linking directly to addressing high priority management needs.

The combined FEP and CEA development process complements, but does not replace, existing FMPs. The FEP serves as an evolving source document, which, in combination with commitment to develop future CEAs, represent the Council's intent to streamline the management process and embraces a system which considers individual management needs as well as needs across fisheries in the South Atlantic Region.

NOAA should support and build on regional coordination efforts of the Council as it transitions to a broader management approach. Resources need to be provide support information necessary to update and refine our FEP and support future across fishery actions including but not limited to complete one of the highest priority needs to support EBM, the completion of mapping of near-shore, mid-shelf, shelf edge and deepwater habitats in the South Atlantic region.

It is anticipated that in the development of future FEPs, the Council will draw on SAFEs (Stock Assessment and Fishery Evaluation reports) which NMFS is required to provide the Council for all FMPs implemented under the Magnuson-Stevens Act. The FEP, serving as the source document for CEAs, could also meet NMFS SAFE requirements if information is provided to the Council to update necessary sections.

The U.S. Commission on Ocean Policy (USCOP 2004) defined the principle of ecosystem-based management (EBM) as follows: U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live.

The following highlights how the Council is addressing directives from guidance documents supporting ecosystem-based management:

Council Activities Addressing Ocean Commission (USCOP) Report and Pew Guiding Principles and Recommendations

<u>Guiding Principles in the Ocean Commission Report</u>:

- **Sustainability** – *the Council's goal is to conserve and manage South Atlantic fishery resources. In addition it provides long-term conservation of benthic and pelagic habitats and has reduced or eliminated the impact of fishing activities on Essential Fish Habitat*

- **Stewardship** – *the Council strives to balance different uses of fishery resources in the South Atlantic EEZ*

- **Ocean-Land-Atmosphere Connections –** *the Council is actively engaged in partnerships that aim to characterize these connections (Ocean Observing Systems) in order to integrate them into management*

- **Ecosystem-based Management –** *the Council has been working with partners since 2002 to develop the Fishery Ecosystem Plan and Comprehensive Ecosystem Amendment*

- **Multiple Use Management** -- *the Council uses diverse management strategies to ensure sustainability of regional resources*

- **Preservation of Marine Biodiversity**— *examples of action include EFH, EFH-HAPCs, Oculina Bank HAPC, Oculina Experimental Closed Area, proposed deepwater Coral HAPCs, MPAs, and Special Management Zones*

- **Best Available Science and Information** —*the Council is directed to use best available science and throughstock assessments developed through the Southeast Data and Asessment Review (SEDAR). In addition, guidance is provided by the Council's Scientific and Statistical Committee (SSC), Species and Technical Advisory Panels.*

- **Participatory Governance**— *the Council relies on its Habitat, Coral, and many other Advisory Panels whose members represent all stakeholders; scoping meetings, public hearings, workshops, and Council meetings provide the public numerous opportunities to participate in the process*

Specific Recommendations Related to EBM in USOCP and Pew Reports

- **Develop Regional Ecosystem Assessments --** *the Council's FEP consolidates best available scientific information on the South Atlantic ecosystem into a single document that will be updated periodically*

- **Employ Marine Protected Areas as a Management Tool –** *the Council has undergone an extensive process to design and implement MPAs under its Snapper Grouper FMP; Amendment 14 would establish a network of MPAs and is currently being reviewed by the Secretary of Commerce*

- **Improve Habitat Conservation and Restoration –** *the Council emphasizes the conservation of habitat through several FMPs (direct gear prohibitions, EFH and EFH-HAPCs) and through Habitat Policies and commenting on projects that impact EFH and EFH-HAPCs*

- **Develop Prioritized Management Information Needs –** *The FEP contains Research and Monitoring Plans for the Oculina Closed Area and Deepwater Coral Ecosystems as well as identifying fish, habitat, and human information needs in the South Atlantic region*

- **Enhance Data Needs for Recreational Fisheries** – *the Council is evaluating requiring permits for all commercial and recreational fishermen to fish for, harvest, or possess any resource in the EEZ*

- **Enhance Cooperative Research** -- *the Council is directly involved in the cooperative research program in the South Atlantic and is pushing to fill our data gaps*

- **Establish Dedicated Access Privileges –** *the Council employs this approach to manage wreckfish in the EEZ and is evaluating implementing a Limited Access Privilege Program (LAPP) for the golden tilefish fishery.*

- **Maximize the Use of VMS for Fishery-Related Activities –** *the Council requires VMS on rock shrimp vessels, is proposingrequiring the use of VMS in the golden crab fishery and will evaluate the need to require VMS on other fishing vessels in future comprehensive ecosystem amendments*

- **Expand EFH designations –** *the Council is exploring available analytical methods to refine and expand EFH designations and will address the possible designation of new EFH-HAPCs as has been proposed by the Habitat Advisory Panel through CEA 2*

- **Address Environmental Impacts of Aquaculture –** *the Council approved a Policy Statement on Marine Aquaculture developed through its Habitat Advisory Panel*

- **Address Environmental Impacts of Offshore Oil and Gas Production –** *the Council updated its policy on energy development and transportation (and offshore renewable energy development) with advice from its Habitat and Coral Advisory Panels*

- **Regulate Destructive Fishing Gear –** *the Council already has regulations in place to protect habitat from destructive fishing gear; for example*
    - *prohibition on use of all fish traps, black sea bass pots south of Cape Canaveral Florida, roller-rig trawls, and entanglement nets in the snapper grouper fishery*

- *prohibition on use of longlines shallower than 50 fathoms*
- *prohibition of bottom longlines in the wreckfish fishery*

The Council intends to further protect habitat from damaging gear by prohibiting the use of bottom trawls, mid-water trawls, bottom longlies, and fish traps and pots, anchors chains and grapples in deepwater CHAPCs.

- **Reduce Bycatch –** *the Council strongly supports the continued implementation of ACCSP to have better access to bycatch data to inform management decisions*
  - *BRDs are required in penaeid and rock shrimp fisheries*
  - *prohibition on use of fish traps, trawls and entanglement nets in the snapper grouper fishery*
  - *prohibition on the use of drift gill nets in the coastal migratory pelagic fishery*
  - *prohibition of the use of bottom longlines inshore of 50 fathoms and retention of anything but deepwater snapper grouper species when using the gear.*

- **Improve the Management of U.S. Coral Resources** – *the Council protects coral, coral reefs, and live/hard bottom habitat in the South Atlantic EEZ through harvest and gear restrictions in the Coral and Snapper Grouper FMPs and Amendments*
  - *All coral harvest is prohibited except allowable octocorals (small quota) and aquacultured live rock*
  - *The Council is now proposing designation of deepwater Coral HAPCs to protect vulnerable deepwater coral communities*

- **Commit to Creation of the IOOS –** *the Council as a member of the SECOORA Steering Committee and recently elected member of the the Board of Directors is facilitating expanding the observing systems ability to meet fishery oceanography monitoring and assessment needs that will support an ecosystem approach to the management of fishery resources in the South Atlantic*

- **Enhance Data and Information Management –** *the Council has developed, in cooperation with the Florida Fish and Wildlife Conservation Commission, a Habitat and Ecosystem Internet Mapping Server and Section of the Council's website to support the move to ecosystem management and disseminate data and information to a broad user body*

Regional Collaborations Supporting Ecosystem-Based Managment

South Atlantic Alliance

The Council views a key to long-term support for implementing ecosystem-based management in the region is the cooperation and collaboration of South Atlantic States. The South Atlantic States, in cooperation with the Council, created a final framework (Appendix M) for the development of a South Atlantic Governors' Alliance (Figure 1-2).

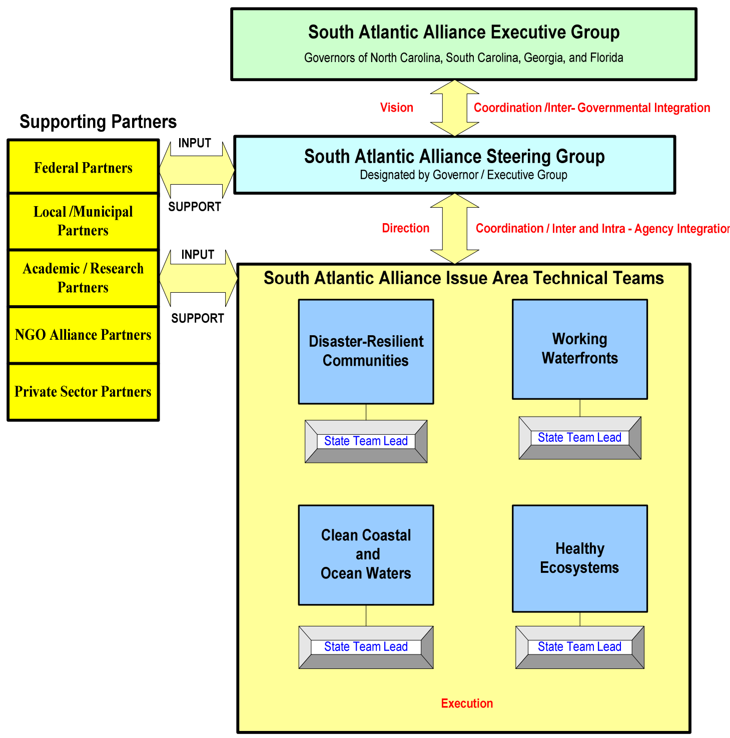


Figure 1-2. South Atlantic Alliance Implementing Organization Diagram.

As part of the early stages of the process the Council began discussions between South Atlantic States investigating the possible formation of an Eco-regional partnership.

National Habitat Plan and Regional Partnerships: SARP

The Southeast Aquatic Resources Partnership (SARP) was formed in 2001 to address the many complex issues related to the management of aquatic resources in the southeastern United States. These issues include significant threats to the aquatic resources of the Southeast. Given the predicted increased pressure on southeastern aquatic resources in the future, SARP decided to coordinate habitat initiatives on a larger scale such as across state boundaries, provide technical assistance and coordinate cooperative efforts in priority areas. The Southeast Aquatic Resources Partnership (SARP) includes fish and wildlife agencies from 14 states, (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia); the Gulf and Atlantic States Marine Fisheries Commissions; the Gulf of Mexico and South Atlantic Fishery Management Councils; the U.S. Fish andWildlife Service; and NOAA Fisheries. These entities have signed a Memorandum of Understanding pledging to work together for the conversation and management of aquatic resources in the Southeast. The SARP also includes a number of other Federal agency partners such as U.S. Geologic Survey, Army Corps of Engineers, and The U.S. Environmental Protection Agency. It also includes private industry and non-governmental organizations such as Southern Company, B.A.S.S., Inc, Bass Pro Shops, Triton Boats, The Nature Conservancy,World Wildlife Fund and SoutheastWatershed Forum.

As a member of SARP, the Council participates in restoration of aquatic habitats in South Atlantic watersheds providing EFH for managed and prey species. The local community habitat protection projects supported by SARP provide an of habitat and water qua;li

<u>Regional Ocean Observing System: SECOORA</u>

The Council, as a member the Southeast Coastal Regional Ocean Observing Association (SECOORA) (Figure 1-3), has the opportunity to guide and direct priority needs for observation and modeling to support fisheries oceanography and integration into stock assessment process through SEDAR.

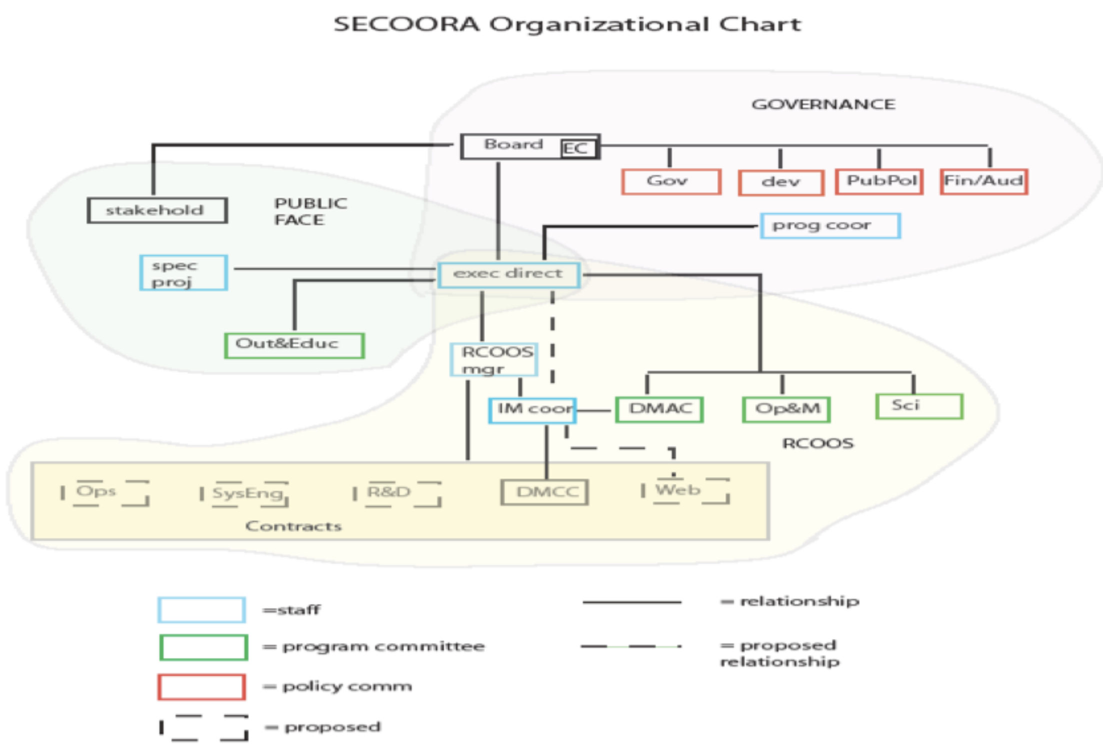


Figure 1-3. Southeast Coastal Ocean Observing Regional Association organization chart.

1.1 *Purpose and Need*

Development of this Comprehensive Ecosystem Amendment initiates the Council's move to a new era of ecosystem-based management. While CEA 1 focuses on deepwater coral ecosystem conservation and addressing EFH-related issues, future CEAs will be developed annually and will contain regulatory actions based on a full review of management needs. This effort will draw from and build on the biological, economic, and social information presented in the FEP and address possible issues or future management actions identified within it. This process will allow the Council to evaluate the impacts of proposed actions across multiple fisheries, thus facilitating development of management regulations that could apply across FMPs.

There are three aspects of CEA 1. The first are the regulatory actions being proposed which would:

- **Amend the Coral FMP to establish Deepwater Coral Habitat Areas of Particular Concern:** Cape Lookout Lophelia Banks CHAPC; Cape Fear Lophelia Banks CHAPC; Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC; Pourtales Terrace CHAPC; and The Blake Ridge Diapir Methane Seep CHAPC.

- **Amend the Coral FMP to create a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS).**

- **Amend the Coral FMP to create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries:** create an "Allowable Golden Crab Fishing Area" in the Northern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; create an "Allowable Golden Crab Fishing Area" in the Middle Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; and create an "Allowable Golden Crab Fishing Area" in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries.

- **Amend the Golden Crab Fishery Management Plan to Require Vessel Monitoring**.

The second aspect, which is non-regulatory, is highlighting the commitment of the South Atlantic Council to using the CEA FEP devolpment process to facilitate the move to Ecosystem-Based Management in the region.

A third, also-non regulatory aspect, is the comprehensive spatial presentation of Council designated Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern.

The following excerpt from the Environmental Law Institute July 2007 publication, *Ecosystem Based Management: Laws and Institutions*, highlights the conection between EFH requirements and the move to ecosystem based management:

"The National Oceanic and Atmospheric Administration (NOAA) manages federal fisheries pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA). While limited in scope to fisheries, the Act's essential fish habitat provisions could provide some opportunity to conduct place-based EBM in critical fishery areas. One of the purposes of the MSA is "to promote the protection of essential fish habitat in the review of projects conducted under Federal permits, licenses, or other authorities that affect or have the potential to affect such habitat."NOAA is to coordinate with other federal agencies regarding conservation and enhancement of essential fish habitat. Also, the MSA requires other federal agencies to consult with NOAA for actions that may adversely affect essential fish habitat. This enables fisheries managers to evaluate whether actions taken by other sectors will adversely impact critical fishery areas, and to potentially evaluate cumulative impacts based on multiple agency actions in essential fish habitat areas."

Ecosystem Approach to the Conservation of Deepwater Coral Ecosystems

In 1982, NMFS approved the Fishery Management Plan and Final Environmental Impact Statement for Coral and Coral Reefs (GMFMC and SAFMC, 1982). The guidelines for developing Fishery Management Plans of the time (50 CFR Part 602.3b.6.ii) described "areas of special biological significance" as those "which are of particular concern because of a requirement in the life cycle of the stock(s), e.g., spawning grounds, nurseries, migratory routes, etc..(and)…those areas which are currently or potentially threatened with destruction or degradation.". Under these guidelines, the Councils established criteria for habitat areas of particular concern "to focus regulatory and enforcement abilities on particular localized areas of significance."

In 1998, the Secretary of Commerce approved the SAFMC's Comprehensive Essential Fish Habitat Amendment of the South Atlantic (SAFMC 1998b). In addition to identifying and describing EFH and EFH-HAPCs for each fishery, the amendment carried forward a framework procedure originally implemented through the joint SAFMC and GMFMC Coral FMP in 1982. This framework process allows for the expedient establishment of new, or modification of existing, EFH-HAPCs and Coral-HAPCs.

The SAFMC is proposing to establish Coral-Habitat Areas of Particular Concern in accordance with the framework procedure (Appendix O) established in their Coral and Coral Reef Fishery Management Plan and the 1998 Comprehensive Amendment.

Deepwater coral ecosystems (DWCEs) as addressed in this document are deepwater coral, coral reefs, and live/hard bottom habitat in waters extending from 400 m to the seaward boundary of the EEZ. Azooxanthellate cnidarians include branching stony corals (Scleractinia), gorgonians and soft corals (Octocorallia), black corals (Antipatharia) and lace corals (Stylasteridae). These deepwater coral ecosystems therefore include the constructional habitats generated chiefly by colonial scleractinians as well as the non-constructional “gardens” dominated chiefly by other anthozoans and sponges. Deepwater coral ecosystems within the Exclusive Economic Zone (EEZ) off the southeastern U.S. include a variety of high-relief, hardbottom habitats at numerous sites from the Blake Plateau off North Carolina southward through the Straits of Florida to the eastern Gulf of Mexico. Despite a series of exploratory expeditions during the last decade, only a few deepwater coral ecosystems in this region have been mapped in detail, observed directly or had their benthic and fish assemblages examined. The limited number of direct observations via submersible or Remotely Operated Vehicle (ROV) indicate that they provide hard substrates and habitat for a relatively unknown but biologically rich and diverse community of associated fishes and invertebrates, including economically important species such as wreckfish (*Polyprion americanus*), deepwater groupers, and golden crab (*Chaceon fenneri*). In addition, Ross *et al.* (2007) recently identified over 99 species of fish associated with deepwater coral habitats.

The underlying need for the proposed actions in this amendment is to protect the deepwater coral ecosystems in the South Atlantic Fishery Management Council’s jurisdiction. Potential threats to the deep ocean include damage from fishing gear and energy exploration and development creating a time-sensitive need to map and characterize these habitats. A moratorium on oil/gas exploration in Florida waters has long prevented impact from fossil fuel extraction; however, recent U.S. legislation directed at expanding energy production in the Gulf of Mexico, coupled with exploration by Cuba in waters adjacent to the Florida Keys, has expanded this threat. Liquefied natural gas re-gassification facilities and several proposed natural gas pipelines and offshore facilities could also directly impact local deepwater coral ecosystems. With respect to fishing, deepwater coral ecosystems worldwide have been seriously impacted by bottom trawls (Fosså *et al.* 2002, Freiwald *et al.* 2004).

The Proposed actions in this CEA would protect deepwater corals by:

- Establishing a network of deepwater coral Habitat Areas of Particular Concern. In the deepwater coral HAPCs, no person may:
    1. Use a bottom longline, trawls (mid-water and bottom), dredge, pot or trap;
    2. If aboard a fishing vessel, anchor, use of an anchor and chain, or use a grapple and chain;
    3. Possess any species regulated by the coral FMP; and
    4. Fish for golden crab in allowable gear areas without an approved VMS.

  It is the intent of the Council to allow the wreckfish fishery to operate in the proposed CHAPCs. The fishery addressed eliminating habitat related gear impacts through prohibiting the use of bottom longlines to capture wreckfish.

Addressing Essential Fish Habitat and the EFH Final Rule

The EFH Final Rule that requires FMPs to include maps that display, within the constraints of available information, the geographic locations of EFH or the geographic boundaries within which EFH for each species and life stage is found. Maps should identify the different types of habitat designated as EFH to the extent possible. Maps should explicitly distinguish EFH from non-EFH areas and should be incorporated into a geographic information system (GIS) to facilitate analysis and presentation. Therefore, the Council is updating information presented in the Habitat Plan (SAFMC 1998a) and Comprehensive Essential Fish Habitat Amendment (SAFMC 1998b) in the Fishery Ecosystem Plan of the South Atlantic Region (SAFMC 2008a) to refine support information for designated Essential Fish Habitat (EFH) and EFH- Habitat Areas of Particular Concern.

1.2 *History of Management*

The following is a summary of management actions for plans amended pursuant to CEA 1 (Coral, Coral Reefs and Live/Hardbottom Habitat and The Golden Crab Fishery Management Plans of the South Atlantic Region). Other summaries of Council actions and history of management pursuant to other Fishery Management Plans are available online at www.safmc.net.

The Fishery Management Plan for Coral, Coral Reefs and Live/Hardbottom Habitat of the South Atlantic Region

Management of coral resources was originally promulgated under the joint Gulf of Mexico and South Atlantic Coral Fishery Management Plan (GMFMC and SAFMC 1982). The FMP's intent was to optimize the benefits generated from the coral resource while conserving the coral and coral reefs. Specific management objectives addressed through the FMP were to (1) develop scientific information necessary to determine feasibility and advisability of harvest of coral; (2) minimize, as appropriate, adverse human impacts on coral and coral reefs; (3) provide, where appropriate, special management for Coral Habitat Areas of Particular Concern (C-HAPCs); (4) increase public awareness of the importance and sensitivity of coral and coral reefs and (5) provide a coordinated management regime for the conservation of coral and coral reefs. The FMP implemented the following management measures for coral and coral reefs; (1) disallowed any level of foreign fishing and established the domestic annual harvest to equal the Optimum Yield (OY); (2) prohibited the taking of stony corals and sea fans or the destruction of these corals and coral reefs anywhere in the EEZ of the Gulf and South Atlantic Councils' area of jurisdiction; (3) established that stony corals and sea fans taken incidentally in other fisheries must be returned to the water in the general area of capture as soon as possible (with the exception for the groundfish, scallop or other similar fisheries where the entire unsorted catch is landed, in which case stony corals and sea fans may be landed but not sold); (4) established that the Councils may notify the Secretary of the threat of widespread or localized depletion from overharvest of one or more species of octocorals and recommend specific actions; (5) established a permit system for the use of chemicals for the taking of fish or other organisms that inhabit coral reefs; (6) established a permit system for taking prohibited corals for scientific and educational purposes and (7) identified Habitat Areas of Particular Concern and established time and area restrictions in Habitat Areas of Particular Concern.

Amendment 1 to the FMP (September 1990) implemented the following regulations: (1) included octocorals in the management unit as a controlled species; (2) implemented a combined octocoral quota for the Gulf of Mexico and South Atlantic EEZ of 50,000 individual colonies; (3) stated the Optimum Yield (OY) for coral reefs, stony corals and sea fans to be zero; (4) included a definition of overfishing; (5) established a permit system to take octocorals; (6) provided reporting requirements for those taking corals under federal permit (7) included a section on Vessel Safety Considerations and (8) revised the section on Habitat.

Amendment 2 to the FMP (GMFMC and SAFMC 1994) included the following regulations: (1) defined live rock and added it to the Coral FMP management unit (live rock is defined as living marine organisms or an assemblage thereof attached to a hard substrate including dead coral or rock); (2) redefined allowable octocorals to mean erect non-encrusting species of the subclass Octocorallia, except the prohibited sea fans, including only the substrate covered by and within one inch of the holdfast; (3) revised management measures to address bycatch of octocorals; (4) provided for different management in the jurisdictional areas of the two Councils by promulgating a separate set of management measures and regulations for the South Atlantic; (5) prohibited all wild live rock harvest north of Dade County, Florida, and prohibited chipping throughout the jurisdiction of the South Atlantic Council; (6) capped harvest of wild live rock to 485,000 pounds annually until January 1, 1996 when all wild live rock harvest was prohibited; (7) allowed and facilitated aquaculture of live rock in the EEZ and required live rock harvest federal permits; (8) required a federal permit for harvest and possession of prohibited corals and prohibited live rock from the EEZ for scientific, educational, and restoration purposes.

Amendment 3 (July 1995) implemented the following: (1) established a live rock aquaculture permit system for the South Atlantic EEZ; (2) prohibited octocoral harvest north of Cape Canaveral to prevent expansion of the fishery to areas where octocorals constitute a more significant portion of the live/hard bottom habitat and (3) prohibited anchoring of all fishing vessels in the Oculina Habitat Area of Particular Concern.

Amendment 4/EIS to the Coral FMP, included in the Comprehensive SFA Amendment (SAFMC 1998a) expanded the Oculina Bank Habitat Area of Particular Concern (HAPC) to an area bounded to the west by 80°W. Longitude, to the north by 28°30'N. Latitude, to the south by 27°30'N. Latitude and to the east by the 100 fathom (600 feet) depth contour. Amendment 4 expanded the Oculina Bank HAPC to include the area closed to rock shrimp harvest. The Draft Calico Scallop FMP proposes to close this area to calico scallop harvest. The expanded Oculina Bank HAPC is 60 nautical miles long by about 5 nautical miles wide although the width tracks the 100 fathom (600 foot) depth contour rather than a longitude line. Within the expanded Oculina Bank HAPC area the following regulations apply:

1. Use a bottom longline, bottom trawl, dredge, port, or trap.
2. If aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain.

3. Fish for rock shrimp or possess rock shrimp in or from the area on board a fishing vessel.
4. Possess *Oculina* coral.

Amendment 5 (SAFMC 1998b) Comprehensive Amendment to address the Sustainable Fisheries Act, extended the Optimum Yield (OY) definition to include harvest allowances under live rock aquaculture permits.

Specific details on these and all the other regulations implemented in the coral fishery as they appear in the Code of Federal Regulations (CFR) section 622 are shown below.

Definitions

Allowable octocoral means an erect, nonencrusting species of the subclass Octocorallia, except the seafans *Gorgonia flabellum* and *G. ventalina*, plus the attached substrate within 1 inch (2.54 cm) of an allowable octocoral. (Note: An erect, nonencrusting species of the subclass Octocorallia, except the seafans *Gorgonia flabellum* and *G. ventalina*, with attached substrate exceeding 1 inch (2.54 cm) is considered to be live rock and not allowable octocoral).

Aquacultured live rock means live rock that is harvested under a Federal aquacultured live rock permit.

Gulf and South Atlantic prohibited coral means, in the Gulf and South Atlantic, one or more of the following, or a part thereof:

(1) Coral belonging to the Class Hydrozoa (fire corals and hydrocorals).
(2) Coral belonging to the Class Anthozoa, Subclass Hexacorallia, Orders Scleractinia (stony corals) and Antipatharia (black corals).
(3) A seafan, *Gorgonia flabellum* or *G. ventalina*.
(4) Coral in a coral reef, except for allowable octocoral.
(5) Coral in an HAPC, including allowable octocoral.

Live rock means living marine organisms, or an assemblage thereof, attached to a hard substrate, including dead coral or rock (excluding individual mollusk shells).

Coral permits

Allowable chemical. For an individual to take or possess fish or other marine organisms with an allowable chemical in a coral area, other than fish or other marine organisms that are landed in Florida, a Federal allowable chemical permit must have been issued to the individual. Such permit must be available when the permitted activity is being conducted and when such fish or other marine organisms are possessed, through landing ashore.

Allowable octocoral. For an individual to take or possess allowable octocoral in the Gulf or South Atlantic EEZ, other than allowable octocoral that is landed in Florida, a

Federal allowable octocoral permit must have been issued to the individual. Such permit must be available for inspection when the permitted activity is being conducted and when allowable octocoral is possessed, through landing ashore.

Aquacultured live rock. For a person to take or possess aquacultured live rock in the Gulf or South Atlantic EEZ, a Federal aquacultured live rock permit must have been issued for the specific harvest site. Such permit, or a copy, must be on board a vessel depositing or possessing material on an aquacultured live rock site or harvesting or possessing live rock from an aquacultured live rock site.

Prohibited coral. A Federal permit may be issued to take or possess Gulf and South Atlantic prohibited coral or Caribbean prohibited coral only as scientific research activity, exempted fishing, or exempted educational activity.

Florida permits. Appropriate Florida permits and endorsements are required for the following activities, without regard to whether they involve activities in the EEZ or Florida's waters:

(A) Landing in Florida fish or other marine organisms taken with an allowable chemical in a coral area.
(B) Landing allowable octocoral in Florida.
(C) Landing live rock in Florida.

Prohibited and limited-harvest species

Gulf and South Atlantic prohibited coral taken as incidental catch in the South Atlantic EEZ must be returned immediately to the sea in the general area of fishing. In fisheries where the entire catch is landed unsorted, such as the scallop and groundfish fisheries, unsorted prohibited coral may be landed ashore; however, no person may sell or purchase such prohibited coral.

Atlantic EEZ seasonal and/or area closures

Allowable octocoral closed area. No person may harvest or possess allowable octocoral in the South Atlantic EEZ north of 28°35.1' N. lat. (due east of the NASA Vehicle Assembly Building, Cape Canaveral, FL).

Oculina Bank Habitat Area of Particular Concern. The Oculina Bank HAPC encompasses an area bounded on the north by 28°30' N. lat., on the south by 27°30' N. lat., on the east by the 100-fathom (183-m) contour, as shown on the latest edition of NOAA chart 11460,and on the west by 80°00' W. long.; and two adjacent areas: the first bounded on the north by 28°30' N. lat., on the south by 28°29' N. lat., on the east by 80°00' W. long., and on the west by 80°03' W. long.; and the second bounded on the north by 28°17' N. lat., on the south by 28°16' N. lat., on the east by 80°00 W. long., and on the west by 80°03' W. long.

In the Oculina Bank HAPC, no person may:

(i) Use a bottom longline, bottom trawl, dredge, pot, or trap.

(ii) If aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain.

(iii) Fish for rock shrimp or possess rock shrimp in or from the area on board a fishing vessel.

Experimental Closed Area. Within the Oculina Bank HAPC, the experimental closed area is bounded on the north by 27°53' N. lat., on the south by 27°30' N. lat., on the east by 79°56' W. long., and on the west by 80°00' W. long. No person may fish for South Atlantic snapper-grouper in the experimental closed area, and no person may retain South Atlantic snapper-grouper in or from the area. In the experimental closed area, any South Atlantic snapper-grouper taken incidentally by hook-and-line gear must be released immediately by cutting the line without removing the fish from the water.

Species-specific limitations

Aquacultured live rock. In the Gulf or South Atlantic EEZ:
Aquacultured live rock may be harvested only under a permit, and aquacultured live rock on a site may be harvested only by the person, or his or her employee, contractor, or agent, who has been issued the aquacultured live rock permit for the site. A person harvesting aquacultured live rock is exempt from the prohibition on taking prohibited coral for such prohibited coral as attached to aquacultured live rock.

The following restrictions apply to individual aquaculture activities:

(i) No aquaculture site may exceed 1 acre (0.4 ha) in size.

(ii) Material deposited on the aquaculture site--

(A) May not be placed over naturally occurring reef outcrops, limestone ledges, coral reefs, or vegetated areas.

(B) Must be free of contaminants.

(C) Must be nontoxic.

(D) Must be placed on the site by hand or lowered completely to the bottom under restraint; that is, not allowed to fall freely.

(E) Must be placed from a vessel that is anchored.

(F) In the Gulf EEZ, must be distinguishable, geologically or otherwise (for example, be indelibly marked or tagged), from the naturally occurring substrate.

(G) In the South Atlantic EEZ, must be geologically distinguishable from the naturally occurring substrate and, in addition, may be indelibly marked or tagged.

(iii) A minimum setback of at least 50 ft (15.2 m) must be maintained from natural vegetated or hard bottom habitats.

Mechanically dredging or drilling, or otherwise disturbing, aquacultured live rock is prohibited, and aquacultured live rock may be harvested only by hand. In addition, the following activities are prohibited in the South Atlantic: Chipping of aquacultured live rock in the EEZ, possession of chipped aquacultured live rock in or from the EEZ, removal of allowable octocoral or prohibited coral from aquacultured live rock in or from the EEZ, and possession of prohibited coral not attached to aquacultured live rock or allowable octocoral, while aquacultured live rock is in possession. See the definition of "Allowable octocoral" for clarification of the distinction between allowable octocoral and live rock. For the purposes of this paragraph, chipping means breaking up reefs, ledges, or rocks into fragments, usually by means of a chisel and hammer.

Not less than 24 hours prior to harvest of aquacultured live rock, the owner or operator of the harvesting vessel must provide the following information to the NMFS Office for Law Enforcement, Southeast Region, St. Petersburg, FL, by telephone (727-824-5344):

(i) Permit number of site to be harvested and date of harvest.
(ii) Name and official number of the vessel to be used in harvesting.
(iii)Date, port, and facility at which aquacultured live rock will be landed.

Quotas

Gulf and South Atlantic allowable octocoral. The quota for all persons who harvest allowable octocoral in the EEZ of the Gulf and South Atlantic is 50,000 colonies. A colony is a continuous group of coral polyps forming a single unit.

Restrictions on sale/purchase

Gulf and South Atlantic wild live rock. Wild live rock in or from the Gulf EEZ or South Atlantic EEZ may not be sold or purchased. The prohibition on sale or purchase does not apply to wild live rock from the South Atlantic EEZ that was harvested and landed prior to January 1, 1996, or to wild live rock from the Gulf EEZ that was harvested and landed prior to January 1, 1997.

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

The golden crab resource and fishery in the South Atlantic Region were 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, 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); provides for law enforcement (depth limitations and prohibit possession of whole fish or fillets of snapper grouper species); determine the number of participants (vessel and dealer/processor permits); collect the necessary data (vessel/fishermen and dealer/processor reporting); and a framework procedure to adjust the management program (framework adjustments and adjustments to activities authorized by the Secretary of Commerce). Use of these traditional management techniques in other fishery management plans has not solved all fisheries management problems. At best, the fishery resource, in this case golden crab, is biologically protected. Ignored or even exacerbated are underlying social and economic problems resulting from gear conflicts, high regulatory costs, and low marketing incentives. To solve these social and economic problems, managers have increasingly turned to various forms of controlled access or effort limitation. The Council chose to limit the number of vessels in the golden crab fishery. Combining the more traditional fisheries management measures with controlled access best allowed the Council to solve problems in the golden crab fishery.

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

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

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

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 SAFMC. It is hoped that such efforts will increase the legitimacy of the future regulations and make the rationale for such regulations more understandable to all involved.”

1.3 *Management Objectives*

Management objectives of the Coral, Coral Reefs and Live/Hardbottom Habitat FMP addressed by this amendment include the following:

1. Minimize, as appropriate, adverse human impacts on coral and coral reefs;
2. Provide, where appropriate, special management for Coral Habitat Areas of Particular Concern (C-HAPCs);
3. Increase public awareness of the importance and sensitivity of coral and coral reefs; and
4. Provide a coordinated management regime for the conservation of coral and coral reefs.

Management Objectives Addresed by CEA 1

1. Take a precautionary approach in protecting deepwater coral ecosystems.

2. Reduce or eliminate, to the maximum extent practical, the impact of fishing and non-fishing activities on habitat including coral coral reefs and live hard bottom habitat.

3. Refine habitat information supporting existing EFH and EFH-HAPCs and present them in a spatial framework.

To address the immediate need to protect deepwater coral habitats as recommended by the Habitat and Coral Advisory Panels, the Council has deferred other habitat actions including but not limited to further refinement of EFH definitions and proposals for new EFH-HAPCs to be included in Comprehensive Ecosystem Amendment 2 during 2009.

2 Actions and Alternatives

Section 2.1 outlines the actions proposed and alternatives considered by the Council in this amendment and Section 2.2 compares their environmental consequences (environmental consequences of the alternatives are described in detail in Section 4.0). These alternatives were identified and developed over a number of years, with input from numerous sources, and through multiple processes, including the scoping process conducted for the FEP Comprehensive Ecosystem Amendment and meetings of the Council, the Council's Habitat and Ecosystem Committees, Habitat and Environmental Protection Advisory Panel, Coral Advisory Panel, Deepwater Shrimp Advisory Panel, Golden Crab Advisory Panel and Scientific and Statistical Committee. Alternatives the Council considered during the development of this amendment and/or presented at the first round of public hearings but eliminated from further detailed study are described in Appendix K.

Each alternative retained for analysis is designed to accomplish the following:

- Establish deepwater Coral Habitat Areas of Particular Concern.

Table 2-1. Summary of the species specific actions proposed in CEA 1.

	Type of action			
Species	Establish Deepwater Coral Habitat Areas of Particular Concern	Create Allowable Golden Crab Fishing Areas within the CHAPC	Create Shrimp Fishery Access Areas within the CHAPC	Require Vessel Monitoring
Coral, Coral Reefs and Live/Hard Bottom Habitat	√	√	√	
Golden Crab				√

2.1 *Description of Alternatives*

2.1.1 Action 1: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Establish Deepwater Coral HAPCs

In October 2004, at a joint meeting of the Council's Habitat and Environmental Protection and Coral Advisory Panels six areas were proposed as new deepwater coral HAPCs. Subsequently the Council, at their December 2004 meeting, approved establishing the new deepwater coral HAPCs through the developing Comprehensive Ecosystem Amendment. At their joint meeting in Miami in June 2006, the Habitat and Coral Advisory Panels received updated reports on recent research on the status and distribution of deepwater coral systems in the region. Based on this new information, the

Panels proposed to consolidate and expand the six original areas into four. The Council subsequently voted to adopt the Panel's proposal and take action to establish the four new deepwater coral HAPCs through this Comprehensive Ecosystem Amendment. At their November 2007 meeting, the Habitat and Coral Advisory Panels recommended an additional Methane Seep Coral HAPC. In December 2007 the Council approved adding consideration of a fifth Coral HAPC the Blake Ridge Diapir (methane seep).

Alternative 1. No Action. Do not establish deepwater Coral Habitat Areas of Particular Concern.

Discussion

This alternative would not provide regulations to protect additional extensive deepwater coral ecosystems, however, regulations established through amendments to the Coral FMP, the Shrimp FMP and Snapper Grouper FMP, established to protect the *Oculina* HAPC, would remain in effect.

Preferred Alternative 2. Establish Deepwater Coral Habitat Areas of Particular Concern:

Sub-Alternative 2a. Cape Lookout Lophelia Banks CHAPC;
Sub-Alternative 2b. Cape Fear Lophelia Banks CHAPC;
Sub-Alternative 2c. Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC;
Sub-Alternative 2d. Pourtales Terrace CHAPC; and
Sub-Alternative 2e. The Blake Ridge Diapir Methane Seep CHAPC.

Discussion

In the deepwater coral HAPCs (Figure 2-1), no person may:

1. Use a bottom longline, trawls (mid-water and bottom), dredge, pot or trap.
2. If aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain.
3. Possess any species regulated by the coral FMP.
4. Fish for golden crab in designated areas without an approved VMS.

It is the intent of the Council to allow the wreckfish fishery to operate in the proposed CHAPCs. The fishery addressed eliminating significant habitat related gear impacts through prohibiting the use of bottom longlines to capture wreckfish.

This alternative is based on the latest recommendation of the Habitat and Coral Advisory Panels supported by information presented in both the 2004 and 2006 reports (Appendix C and Appendix D) to South Atlantic Council on deepwater coral habitat distribution in the South Atlantic Region. The Habitat and Coral Advisory Panels expanded their rationale and provided additional justification for these Coral HAPCs at their November 2007 meeting (Appendix B). In addition, John Reed provided updated deepwater habitat distribution information that was reviewed in relationship to deepwater shrimp and golden crab advisory panel proposals presented at the March 2008 meeting.

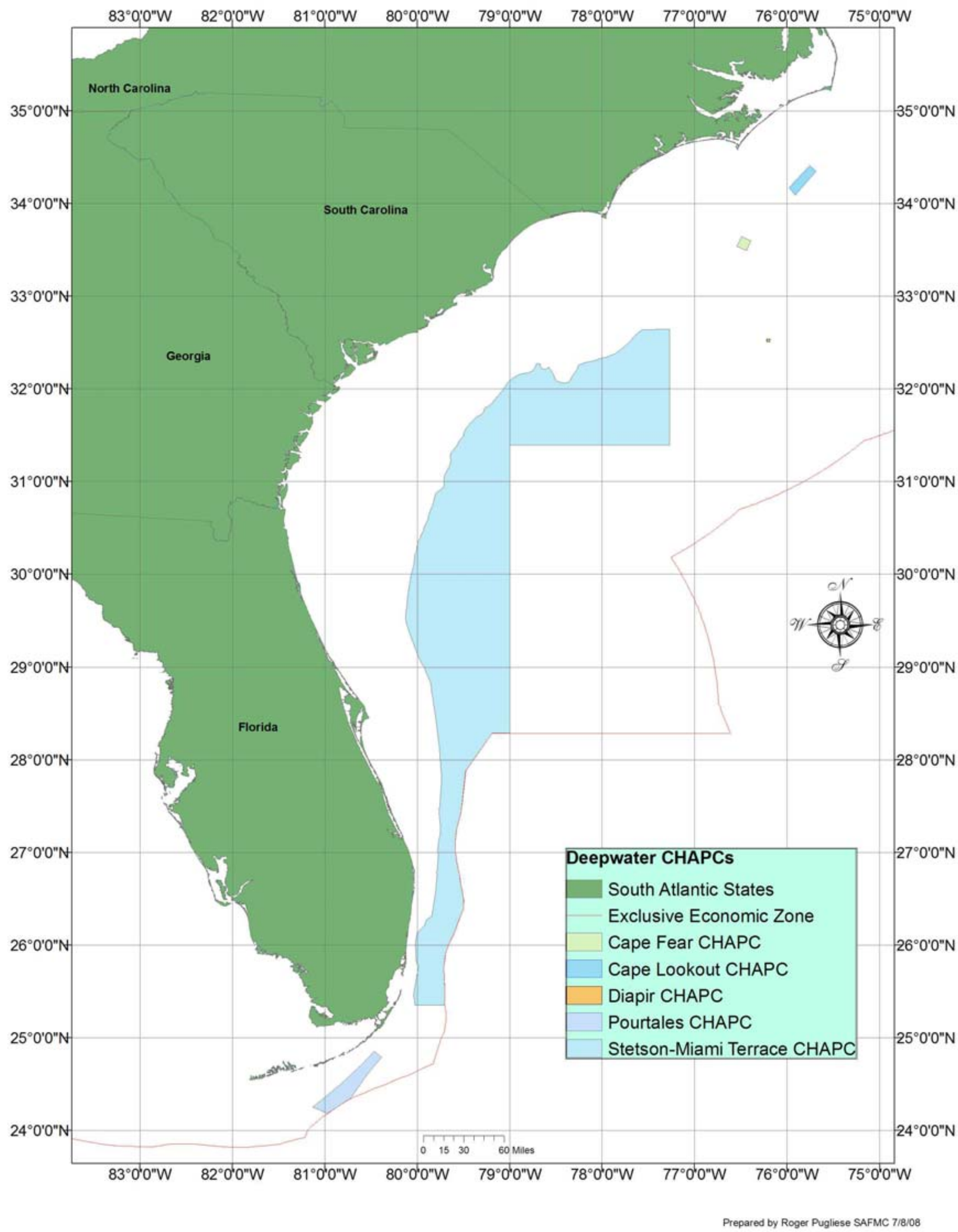


Figure 2-1. Proposed Deepwater Coral Habitat Areas of Particular Concern.

2.1.2 Action 2: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries

Alternative 1. No Action.

Alternative 2. Create Allowable Golden Crab Fishing Areas

- **Sub-Alternative 2a. Create an "Allowable Golden Crab Fishing Area" in the Northern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries;**
- **Sub-Alternative 2b. Create an "Allowable Golden Crab Fishing Area" in the Middle Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; and**
- **Sub-Alternative 2c. Create an "Allowable Golden Crab Fishing Area" in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries.**

Alternative 3. Move the western boundary of the proposed Northern and Middle Zone Allowable Golden Crab Fishing Areas west to include the proposed Shrimp Fishery Access Areas.

<u>Discussion</u>

The Golden Crab Advisory Panel met formally and informally between January and March 2008 to develop proposals for Council consideration that would allow the fishery to continue to operate while avoiding damaging deepwater coral habitat. The Council approved bringing the alternatives developed by the Advisory Panel to public hearing to collect additional information and input on the proposals. The Advisory Panel chairman clarified at the March 2008 Council meeting that the Panel was recommending the establishment of allowable gear areas for golden crab fishing which lie within the deepwater CHAPC versus moving the boundaries. The Council requested comment on the industry proposal to establish fishing areas where the traditional fishery has operated and can continue to operate without impacting deepwater coral habitat. The Advisory Panel provided a revised recommendation at public hearing (see Appendix K). Panel members collaborated with Council staff to further refine those proposals to focus operation areas on traditional fishing grounds and areas which would not impact deepwater coral habitat. In order to maximize the likelihood of success, a requirement for electronic monitoring of permitted golden crab fishing vessels (e.g., require Vessel Monitoring System) is proposed as a provision to be allowed to fish in the allowable golden crab fishing areas. The Council adopted these alternatives as preferred. The Council also at the request of industry, added a non preferred alternative for public hearing Alternative 3 which is a consideration allowing fishing for golden crab in the Shrimp Fishery Access Areas.

2.1.3 ACTION 3: Amend the Coral FMP to Create a “Shrimp Fishery Access Area” (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries.

Alternative 1. No Action. Do not create “Shrimp Fishery Access Areas” (SFAAs) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace boundaries .

Preferred Alternative 2. Create a “Shrimp Fishery Access Area” (SFAA) (Figures 2-2, 2-3 and 2-4) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS).

Alternative 3. Move the west boundary of the proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds

<u>Discussion</u>
Comments provided at public hearing were reviewed by Council and evaluated the proposals developed. The Council subsequently recommended moving alternatives proposing the movement of the CHAPC boundary to the Considered but Rejected Appendix K. The Council reviewed and adopted an alternative developed as a follow-up to an industry recommendation provided at public hearing. The alternative, developed through cooperation with industry and representatives of the Habitat and Coral Advisory Panels was developed to both address fishery operation concerns and the fact that a small portion of historic traditional grounds based on VMS points and industry provided royal red shrimp trawl tracks, occurred close to the western edge of the Stetson Reefs, Savannah and East Florida Lithoherms and Miami Terrace CHAPC. Alternative 2 was adopted as a preferred alternative.

2.1.4 Action 4: Amend the Golden Crab Fishery Management Plan to Require Vessel Monitoring

Alternative 1. No action. Do not require the use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit.

Alternative 2. Require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit and approved crustacean traps fishing for golden crab within designated areas in the Stetson-Miami Terrace HAPC and Pourtales Terrace HAPC where fishing has occurred historically and does not impact deepwater coral habitats.

Alternative 3. Require use of an approved vessel monitoring system (VMS) by any vessel fishing with a limited access golden crab permit in the South Atlantic Council’s area of jurisdiction.

Discussion

The cost of the system shall not exceed $3,100 ? for equipment and installation. Annual communication costs should not exceed $_______, except annual communication costs may go up to $_______ if NMFS determines that additional communication is necessary. For a person aboard a fishing vessel with a limited access golden crab permit to fish for golden crab in the EEZ in South Atlantic Council's area of jurisdiction, possess golden crab in or from the South Atlantic Council's EEZ, off-load golden crab from the South Atlantic Council's EEZ, or sell golden crab in or from the South Atlantic Council's EEZ, an approved vessel monitoring system must be on board the vessel, be in operational condition, and be turned on.

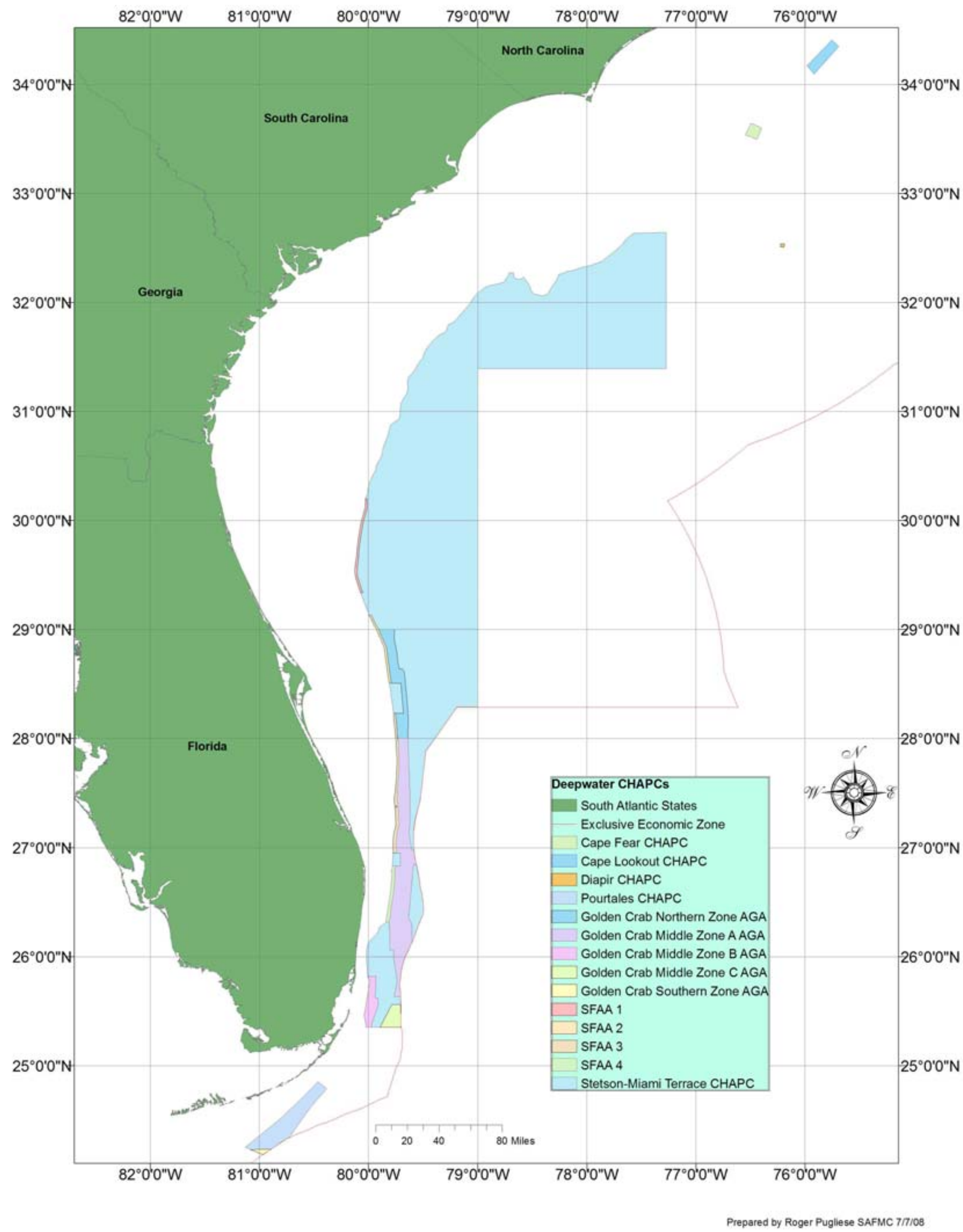


Figure 2-2. Proposed Deepwater Coral Habitat Areas of Particular Concern, Golden Crab Allowable Gear Areas and Shrimp Fishery Access Areas.

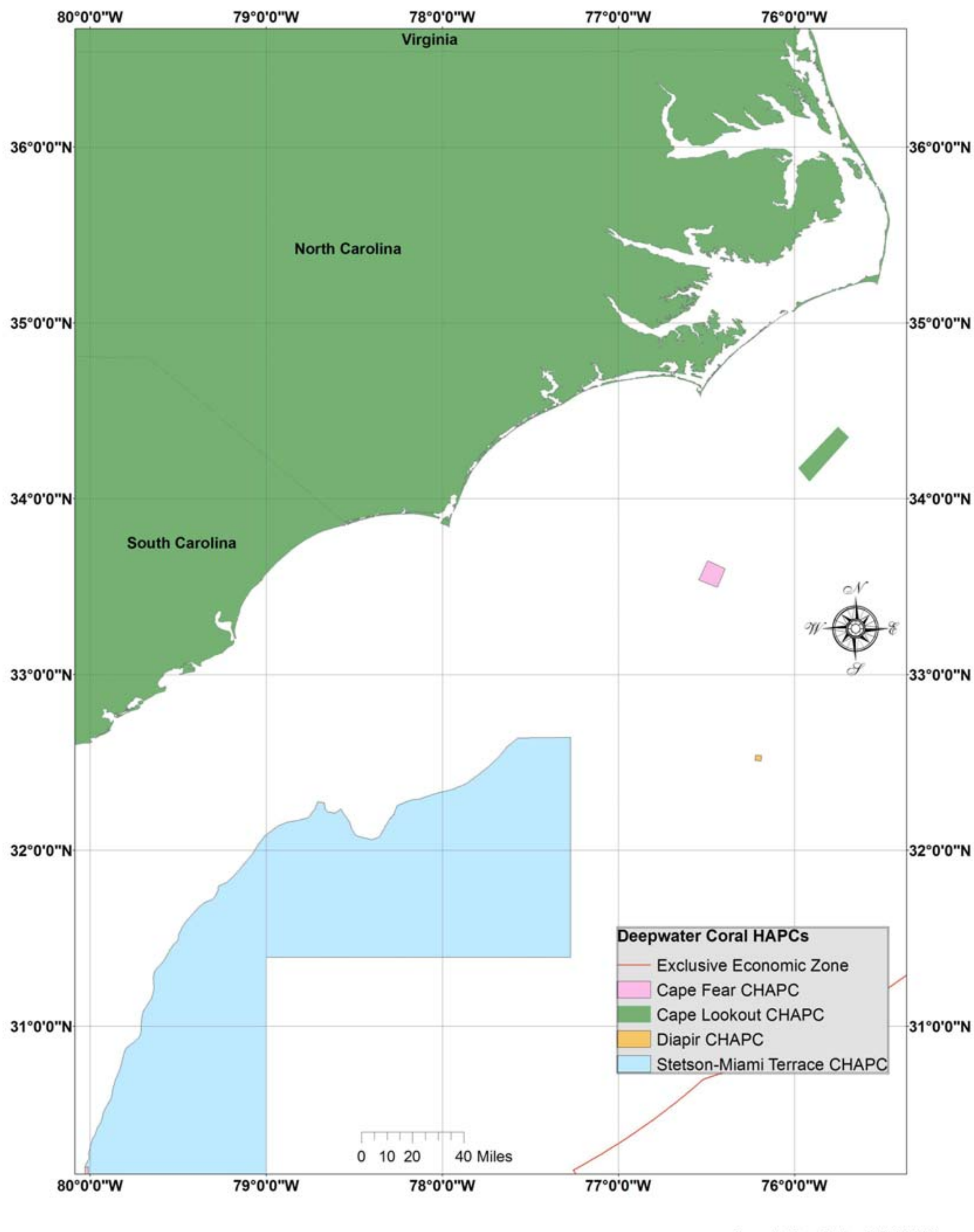


Figure 2-3. Proposed Deepwater Coral Habitat Areas of Particular Concern, Golden Crab Allowable Gear Areas and Shrimp Fishery Access Areas (North of 30 Degrees N. Latitude).

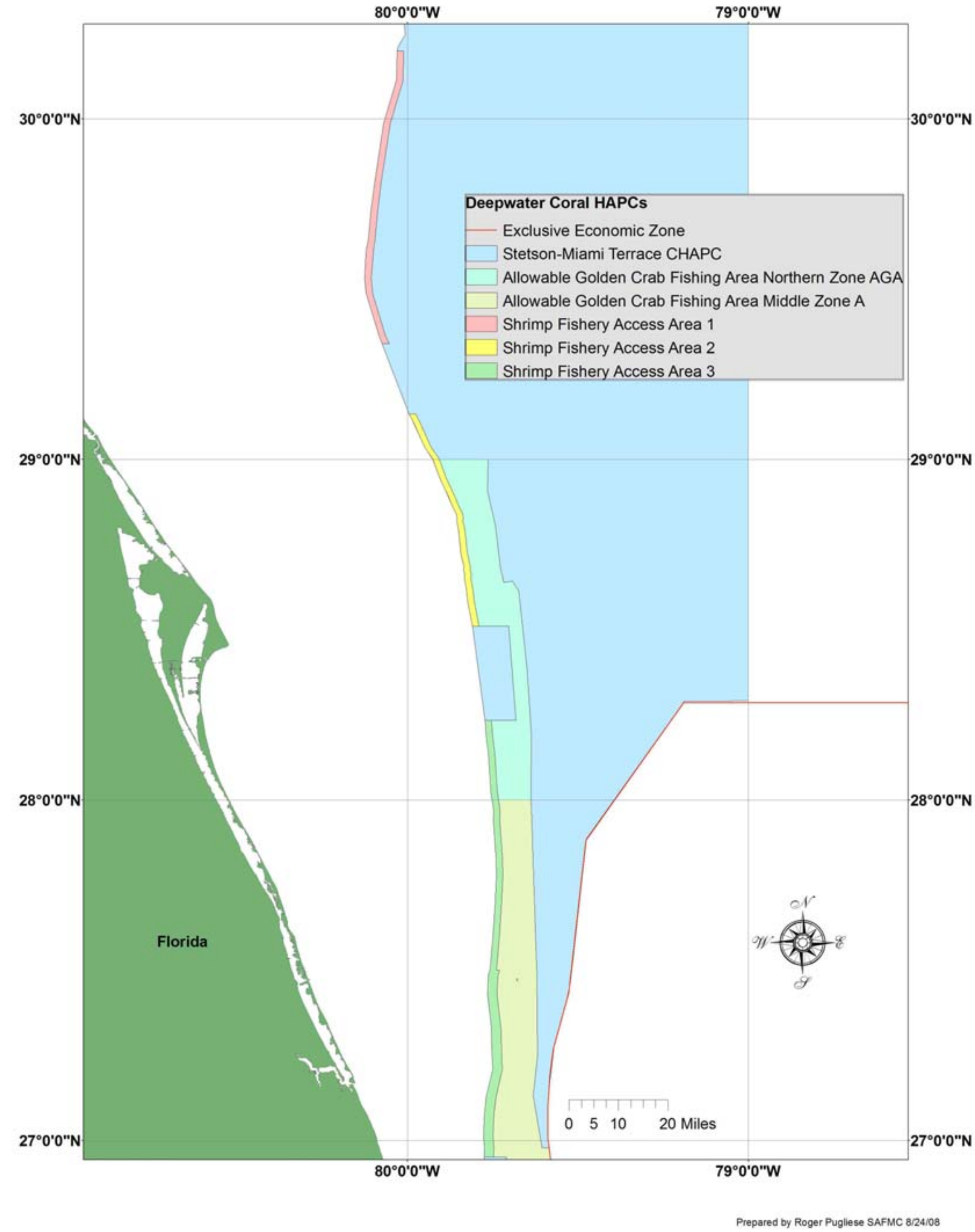


Figure 2-4. Proposed Deepwater Coral Habitat Areas of Particular Concern, Golden Crab Allowable Gear Areas and Shrimp Fishery Access Areas (North of 27 Degrees N. Latitude).

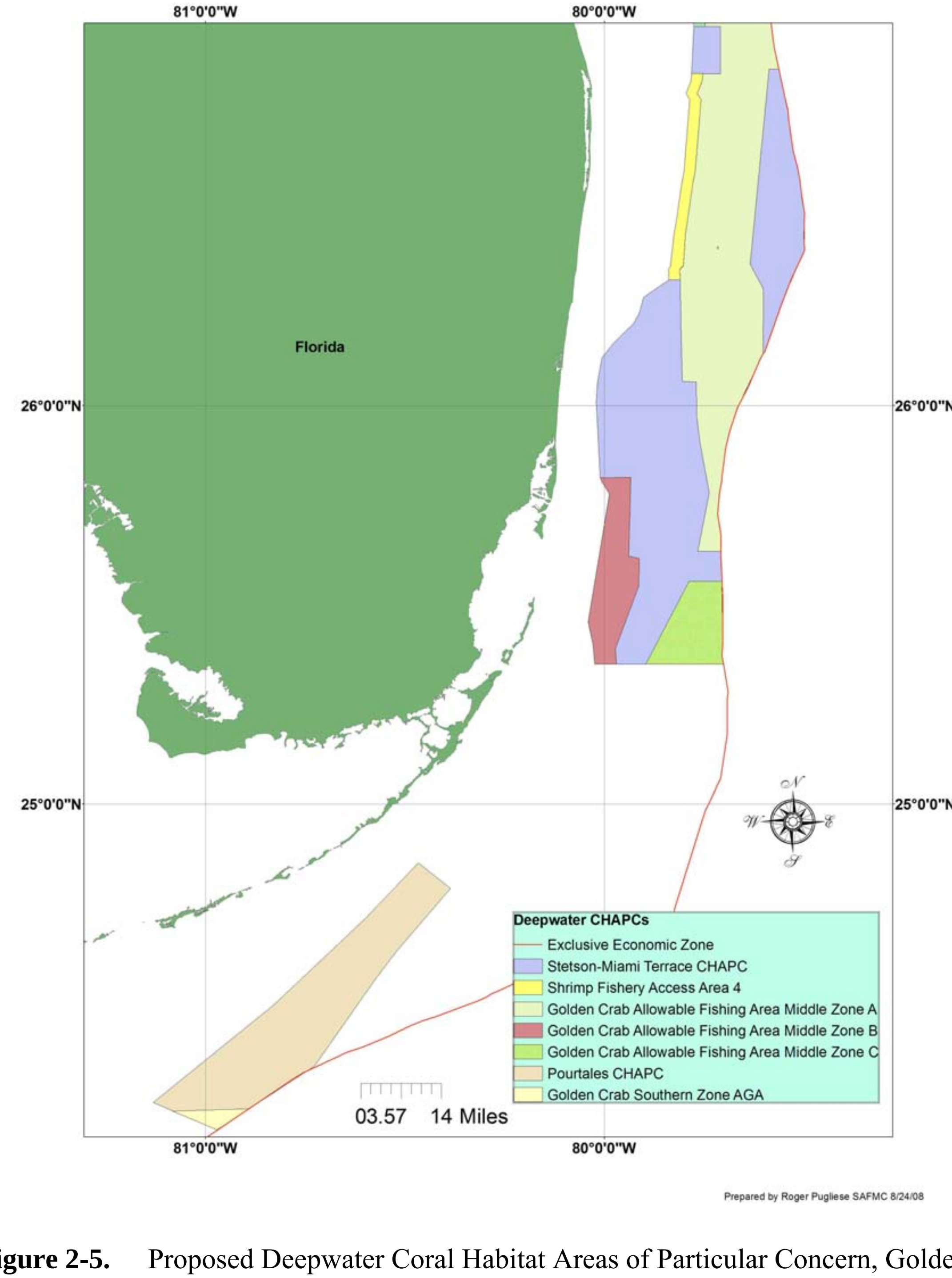


Figure 2-5. Proposed Deepwater Coral Habitat Areas of Particular Concern, Golden Crab Allowable Gear Areas and Shrimp Fishery Access Areas (South of 27 Degrees N. Latitude).

Comparison of Alternatives

2.1.5 Action 1: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Establish Deepwater Coral HAPCs

Alternative 1 (No-action) would not meet the objectives of the amendment and have adverse biological effects. In addition, it would not prevent fisheries that may use gear that would have long-term negative impacts from developing. Alternative 2 would result in long-term positive biological effects. Of all the alternatives considered, Alternative 2 would be expected to produce the most long-term beneficial direct effects on the socioeconomic environment.

Table 2-2. Summary and comparison of alternatives for Action 1.

Action 1. Amend the Coral FMP to establish deepwater Coral Habitat Areas of Particular Concern.	**Biological Effects**	**Economic, Social, and Administrative Effects**
Alternative 1. No Action. Do not establish deepwater coral Habitat Areas of Particular Concern.	Would not provide long-term protection to pristine deepwater ecosystem.	Unprotected deepwater habitats resulting in possible damage to deepwater habitats and subsequent long-term negative economic and social impacts to fishery resources.
Preferred Alternative 2. Establish Deepwater Coral CHAPCs **Sub-Alternative 2a.** Cape Lookout Lophelia Banks CHAPC; **Sub-Alternative 2b.** Cape Fear Lophelia Banks CHAPC; **Sub-Alternative 2c.** Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC; **Sub-Alternative 2d.** Pourtales Terrace CHAPC; and **Sub-Alternative 2e.** The Blake Ridge Diapir Methane Seep CHAPC.	 Would protect the Cape Lookout Lophelia Banks. Would protect the Cape Fear Lophelia Banks. Protection of deepwater coral habitat from the Stetson Reefs through the Miami Terrace. Would protect deepwater coral habitat on the Pourtales Terrace. Would protect unique benthic deepwater habitat	No negative impacts are expected for recreational vessels that do not anchor. Most fishing vessels would not be able to anchor effectively in depths greater than 300 meters anyway which is the depth of the proposed C-HAPCs. However, the action would act as a deterrent to vessels anchoring on the tops of the hundreds of existing pinnacles, where all observations to date indicate thriving undisturbed complex coral ecosystems exist. The recreational fishery is expected to benefit in the long-term from an overall healthier ecosystem resulting from protection of corals and habitat and from increased stock levels resulting from protected habitat. No negative impact on the rock shrimp fishery is expected which operates shallower than proposed CHAPCs. Wreckfish fishery would not be using damaging gear and would be able to proceed unimpacted. There would be a minimal impact on the royal red shrimp fishery. Analysis provided by NMFS SEFSC of VMS data indicates that less than 1 % of all VMS points collected between 2003 and 2007 occurred inside of the proposed Stetson-Miami Terrace CHAPC. Industry provided vessel tracks however show some overlap in the area just north of the Miami Terrace

Action 1. Amend the Coral FMP to establish deepwater Coral Habitat Areas of Particular Concern.	**Biological Effects**	**Economic, Social, and Administrative Effects**
		and because of fishing the edge of the 400 meter line normal operations outside the CHAPC could be problematic. It is not possible to estimate the quantitative economic and social impact of this alternative with respect to the royal red shrimp fishery however, the impacts are expected to be small. Virtually all of the impact will be eliminated with the proposed establishment of Shrimp Fishery Access Areas as proposed in Action 3. The golden crab fishery is expected to suffer short-term negative impacts from Alternative 2. Analyzed logbook data indicates that the golden crab fishery caught 510,000 pounds on average over the period 2005-2007. In the absence of establishment of “Allowable Golden Crab Fishing Areas” (Action 2), the fishery, consisting of 7 commercial golden crab vessels that landed golden crab between 2005 and 2007, would likely lose almost all of these landings estimated at approximately $714,000 ex-vessel value annually. Impact on the golden crab fishery will be reduced if allowable gear areas are established as proposed in Action 2. Protecting this habitat described in Action 2 is expected to result in overall positive net economic benefits to society. Specifically, society is expected to benefit from the possible availability of new information resulting from avoiding the loss of coral species that could be used to benefit society, an increase in bequest value, and an increase in existence value.

2.1.6 Action 2: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries

Alternative 1 (No-action) while meeting the objective of the amendment to protect deepwater coral ecosystems would have a significant impact on the golden crab fishery by eliminating major operation ares in the Northern and more importantly the Middle Zone where the majority of production in the fishery occurs. Alternative 2 would meet the intent of the Council to create a regulatory structure that will allow traditional fisheries that are managed as not to impact deepwater habitat to continue. Therefore, the cooperative development of Alternative 2 will result in long-term positive biological effects as well as socio-economic benefits.

Table 2-3. Summary and comparison of alternatives under consideration for Action 2.

Action 2. Amend the Coral FMP to Establish Allowable Gear Areas for the Golden Crab Fishery in the proposed C-HAPCs.	**Biological Effects**	**Economic, Social, and Administrative Effects**
Alternative 1. No Action. **Preferred Alternative 2: Create Allowable Golden Crab Fishing Areas within the proposed CHAPC**	Would not constrain the fishery to areas of the Northern, Middle or Southern Golden Crab Fishing Zones where it would not impact deepwater coral habitat. Taking no action would potentially allow the fishery to expand into non-traditional fishing areas and increase the potential for gear impacts on habitat.	The golden crab fishery would operate in designated areas in the absence of implementation of Coral HAPCs. If Alternative 2 under Action 1 (Coral HAPCs) is approved and allowable golden crab fishing areas are not, then golden crab vessels would be prohibited from fishing in those Coral HAPCs. The golden crab fishery is expected to suffer short-term negative impacts. Under this scenario and Alternative 1, the golden crab fishery, consisting of 7 commercial golden crab vessels that landed golden crab between 2005 and 2007, would likely lose almost all of these landings estimated at approximately $714,000 ex-vessel value annually.
Sub-Alternative 2a. Create an "Allowable Golden Crab Fishing Area" in the Northern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries;	The refined proposal significantly reduces the potential for impact of the Golden Crab Fishery operating in the Northern Zone on deepwater coral and live/hard bottom habitat.	
Sub-Alternative 2b. Create an "Allowable Golden Crab Fishing Area" in the Middle Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; and	The refined proposal significantly reduces the potential for impact of the Golden Crab Fishery operating impact in the Middle Zone. on deepwater coral and live/hard bottom habitat	Sub-Alternative 2a and 2b track virtually all of traditional fishing operations in the Northern and Middle Zones. Sub-Alternative 2c tracks the majority of traditional fishing operations in the Southern Zone.
Sub-Alternative 2c. Create an "Allowable Golden Crab Fishing Area" in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries.	The refined proposal significantly reduces the potential for impact of the Golden Crab Fishery operating impact in the Southern Zone on deepwater coral and live/hard bottom habitat.	

2.1.7 Action 3: Amend the Coral FMP to Create a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries.

Alternative 1 (No-action) would not meet the objectives of the Amendment and have adverse biological effects. Of all the alternatives considered, Alternative 2 would be expected to produce the most beneficial direct effects on the socioeconomic environment by providing for traditional fishing operations given the knife-edge characteristics of the fishery along the west of the proposed Stetson-Miami CHAPC. Alternative 3 was one of four proposed by the deepwater Advisory Panel and brought to Public Hearings in May 2008. It was rejected as not meeting the objective of the amendment because it overlaps significant known and highly probable low and high relief deepwater coral habitats, allows the fishery to expand into non-traditional fishing grounds and would create gear conflict by allowing trawling within the major golden crab fishing area in the Middle Zone.

Table 2-4. Summary and comparison of alternatives under consideration for Action 3.

Action 3. Amend the Coral FMP to Create a Shrimp Fishery Access Area within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC	**Biological Effects**	**Economic, Social, and Administrative Effects**
Alternative 1. No Action.	Would not prevent fishing on both high and low profile deepwater coral habitat.	The shrimp fisheries would operate in designated areas in the absence of implementation of Coral HAPCs. If Alternative 2 under Action 1 (Coral HAPCs) is approved and allowable shrimp fishing areas are not, then shrimp vessels would be prohibited from fishing in those Coral HAPCs. This would have minor impacts on the royal red shrimp fishery. Analysis provided by NMFS SEFSC of VMS data indicates that monitoring between 2003 and 2007 shows less than 1 % of all individual points occurred inside the boundaries of the proposed Stetson-Miami Terrace CHAPC.
Preferred Alternative 2. Create a Shrimp Fishery Access Area within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel with a rock shrimp limited access endorsement and equipped with an approved vessel monitoring	Would prevent fishing on both high and low profile deepwater coral habitat associated with Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries.	Alternative 2 would eliminate the minimal impact to the fishery expected under Action 1 and provide minor positive economic benefits but would allow fishing on known high and low profile deepwater coral habitat which could have negative long-term economic impacts on all fisheries.

system (VMS). **Alternative 3.** Move the west boundary of the Stetson-Miami proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds N.	Would allow the fishery to expand and operate in areas of both high and low profile deepwater coral habitat. Trawling deeper than 400 meters would impact deepwater coral and live/hard bottom habitat essential to deepwater species golden crab, royal red shrimp and wreckfish. As with rock shrimp areas deeper and in coral and live bottom habitat provides nursery grounds for a number of deepwater species including golden crab and royal red shrimp.	Alternative 3 would provide shrimp vessels with additional trawling grounds compared to Alternative 2. If this area is not harvested, there are no expected economic impacts to the shrimp fleet. There is the potential for this area to provide new fishing opportunities for the shrimp fleet which would have positive economic impacts to the fleet. However, the intention of Alternative 3 is provide space for drifting as needed for shrimp operations. Allowing an expansion of trawling into areas > 400m would create significant conflict with the major traditional fishing grounds for the golden crab fishery in the Middle Zone.

2.1.8 Action 4: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Create “Allowable Golden Crab Fishing Areas” within the proposed Coral HAPC boundaries

Alternative 1 (No-action) would not meet the objectives of the amendment or the intent that allowing fishing for golden crab in specified areas of the CHAPC is contingent upon monitoring of those vessels as was recommended by the Habitat, Coral and Golden Crab Advisors. Alternative 2 and Alternative 3 would have similar administrative and economic impacts and would result in long-term positive biological effects and socio-economic benefits.

Table 2-5. Summary of alternatives under consideration for Action 4.

Action 4: Amend the Golden Crab FMP to Require Vessel Monitoring	Biological Effects	Economic, Social, and Administrative Effects
Alternative 1. No Action. Do not require monitoring of golden crab vessels.	Would not facilitate enforcement of CHAPC and constrain golden crab fishing to areas which did not impact habitat.	If allowable gear areas for golden crab are established under Action 2 there would be no way to monitor the golden crab fishery. This could result in long-term economic and social negative impacts to all fishery participants and the public if habitat areas outside the allowable gear areas for golden crab were negatively impacted.
Alternative 2. Require the use of an approved vessel Monitoring System (VMS) by any vessel with a limited access golden crab permit and approved crustacean traps fishing for golden crab within designated areas in the Stetson Reefs, Savannah and East Florida Lithoherms, and Miami	Will protect low and high relief deepwater coral habitat by facilitating enforcement of the Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC and Pourtales CHAPC and limitation of golden crab fishing to traditional areas which did not impact habitat.	Would establish a system to monitor the golden crab fishery and verify operations to ensure fishing on traditional fishing areas which did not impact deepwater coral habitat. This would negatively economically impact golden crab fishermen. If management did not subsidize VMS unit cost, the total cost to the 7 vessels participating in the golden crab fishery would range about $26,200-

Action 4: Amend the Golden Crab FMP to Require Vessel Monitoring	Biological Effects	Economic, Social, and Administrative Effects
Terrace CHAPC and Pourtales CHAPC where fishing has occurred historically and does not impact deepwater coral habitat.		$34,000 in the first year and about $2,500-$6,700 in each subsequent year. If VMS unit cost was subsidized by management, the total cost to 7 vessels in the fishery would range about $4,600-$12,300 in the first year and about $2,500-$6,700 in subsequent years. Administrative costs for unit subsidization would total about $21,700 in the first year and $0 in subsequent years. VMS system and infrastructure costs would apply but are not estimated here.
Alternative 3. Require use of an approved VMS by any vessel fishing with a limited access golden crab permit.	Will protect low and high relief deepwater coral habitat by facilitating enforcement of CHAPC and limitation of golden crab fishing to traditional areas and areas which did not impact habitat. Could provide a platform, when coupled with electronic logbooks or environmental sensors, to refine fishing operations to better avoid sensitive habitat as well as better defing golden crab habitat preferences. Industry supports cooperative research to couple VMS and other technologies to accomplish this.	Would establish a system to monitor the golden crab fishery and verify operations to ensure fishing on traditional fishing areas which did not impact deepwater coral habitat. This would negatively economically impact golden crab permit holders. If management did not subsidize VMS unit cost, the total cost to the 11 permit holders would range about $41,300-$53,400 in the first year and about $3,900-$10,500 in each subsequent year. If VMS unit cost was subsidized by management, the total cost to the 11 permit holders in the fishery would range about $7,300-$13,900 in the first year and about $4,000-$10,600 in subsequent years. Administrative costs for unit subsidization would total about $34,100 in the first year and $0 in subsequent years. VMS system and infrastructure costs would apply but are not estimated here.

3 Affected Environment

3.1 *Deepwater coral habitat*

3.1.1 Description and distribution

Much of the information on the description and distribution is taken from Appendices C, D, E, F, G and H.
The southeast U.S. slope area, including the slope off the Florida Keys, appears to have a unique assemblage of deepwater Scleractinia (Cairns and Chapman 2001). The warm temperate assemblage identified by Cairns and Chapman (2001) contained about 62 species, four endemic to the region. This group was characterized by many free living species, few species living deeper than 1000 m, and many species with amphi-Atlantic distributions. For the southeastern U.S., in areas deeper than 200 m, we report a similar assemblage, consisting of 57 species of scleractinians (including 47 solitary and ten colonial structure-forming corals), four antipatharians, one zoanthid, 44 octocorals, one pennatulid, and seven stylasterids. Thus the region contains at least 114 species of deep corals (classes Hydrozoa and Anthozoa). This list is conservative, however; we expect that more species will be discovered in the region as exploration and sampling increase. Below we discuss the major structure-forming corals that most contribute to reef-like habitats in the southeastern U.S.

Stony Corals (Class Anthozoa, Order Scleractinia)

The dominant structure-forming coral on the southeastern U.S. outer shelf (<200 m) is *Oculina varicosa* (ivory tree coral). Although it occurs from Bermuda and North Carolina south through the Gulf of Mexico and the Caribbean in 2-152 m depths, this coral only forms large reefs off east-central Florida, 27° 32' N to 28° 59' N, in 70-100 m (Figure 3-1; Reed 2002b). The shallow water form of *Oculina* may have symbiotic zooxanthellae, but the deeper form does not.

The Stetson Bank (white box) is described in the text. Note that these areas do not represent all sites where deep (> 200 m) corals occur nor all sites visited by other researchers. See Reed *et al.* (2005, 2006) and Partyka *et al.* (in press) for additional deep coral sites in this region.

The deeper reefs are almost monotypic mounds and ridges which exhibit a vertical profile of 3-35 m (Avent et al. 1977; Reed 2002b). Superficially, these structures resemble the deep reefs formed by *Lophelia pertusa*. Despite cool temperatures, the shelf edge *Oculina* exhibit rapid growth, probably facilitated by regular upwellings of nutrient rich water (Reed 1983).

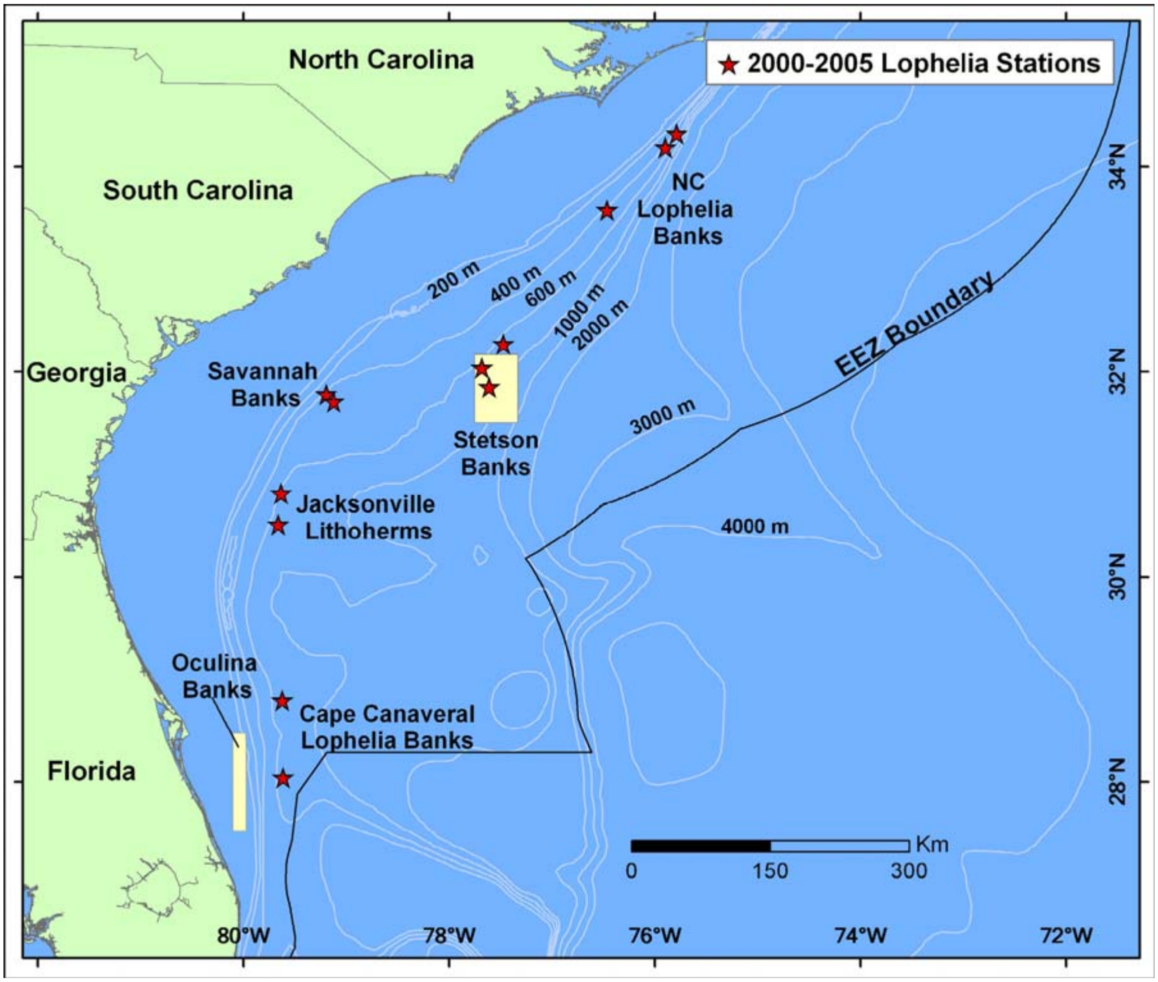


Figure 3-1. Southeastern United States regional report area, indicating general areas of *Oculina varicosa* reefs and the deeper coral (*Lophelia* mostly) habitats sampled by Ross *et al.* from 2000-2005 (red stars).

Lophelia pertusa, the major structure building coral in the deep sea, is the dominant scleractining off the southeastern U.S. This species has a cosmopolitan distribution, occurring on the southeastern U.S. slope, in the Gulf of Mexico, off Nova Scotia, in the northeastern Atlantic, the South Atlantic, the Mediterranean, Indian Ocean and in parts of the Pacific Ocean over a depth range of 50 to 2170 m (Cairns 1979; Rogers 1999). The 3380m depth record off New York for *L. pertusa* reported by Squires (1959) was based on a misidentified specimen (Cairns 1979). Coral habitats dominated by *Lophelia pertusa* are common throughout the southeast U.S. in depths of about 370 to at least 800 m.

Although *Lophelia* may occur in small scattered colonies attached to various hard substrata, it also forms complex, high profile features. For instance, off North Carolina, *Lophelia* forms what may be considered classic mounds that appear to be a sediment/coral rubble matrix topped with almost monotypic stands of *L. pertusa*. Along the sides and around the bases of these banks are rubble zones of dead, gray coral pieces which may extend large distances away from the mounds. To the south sediment/coral mounds vary in size, and *L. pertusa* and other hard and soft corals populate the abundant hard substrata of the Blake Plateau in great numbers

Data are lacking on how *Lophelia* coral banks in the southeastern U.S. are formed. Hypotheses for coral mound formation in the northeastern Atlantic were proposed (Hovland et al. 1998; Hovland and Risk 2003; Masson et al. 2003), but it is unclear how relevant these are off the southeastern U.S. The mounds off North Carolina and those in other locations off the southeastern U.S. (particularly east of south-central Florida) appear to be formed by successive coral growth, collapse, and sediment entrapment (Wilson 1979; Ayers and Pilkey 1981; Paull et al. 2000; Popenoe and Manheim 2001). Other coral formations in the area (especially on the Blake Plateau) seem to form by coral colonization of appropriate hard substrates, without mound formation by the corals. If bottom currents are too strong, mound formation may be prevented (Popenoe and Manheim 2001) because sediments cannot be trapped. Ayers and Pilkey (1981) suggested that Gulf Stream currents may erode coral mounds, and that present coral bank sizes may be related to historical displacements of that current. Assuming currents also carry appropriate foods, it may be that currents with variable speeds or at least currents of moderate speeds (fast enough to facilitate filter feeding but not too fast to prevent sediment entrapment) coupled with a supply of sediment are the conditions necessary to facilitate coral mound formation (Rogers 1999). Regardless of how coral formations are created, we agree with Masson et al. (2003) that elevated topography appears to be an important attribute for well developed coral communities.

Deep-coral reefs are fragile and susceptible to physical destruction (Fossa et al. 2002). It is estimated that these deep reefs may be hundreds to thousands of years old (Neumann et al. 1977; Wilson 1979; Ayers and Pilkey 1981; Mikkelsen et al. 1982; Mortensen and Rapp 1998); however, aging data are so limited (especially in the western Atlantic) that age of coral mounds in the western Atlantic is unclear. Recent drilling on coral mounds off Ireland indicated that these structures started forming over two million years ago and that formation was not related to hydrocarbon seeps (Williams T et al. 2006). While the genetic structure (gene flow, population relationships, taxonomic relationships) of *Lophelia* in the northeastern Atlantic is being described (Le Goff-Vitry et al. 2004), such studies are just beginning in the western Atlantic (C. Morrison et al. unpublished data). Preliminary genetic results from the southeast region suggest that the population structure of *L. pertusa* is more diverse than expected (C. Morrison et al. unpublished data). Understanding the population genetics and gene flow will provide insights into coral biology, dispersal and distribution of deep corals off the southeastern U.S.

Although *Lophelia* is the dominant hard coral off North Carolina, other scleractinians contribute to the overall complexity of the habitat (Table 3-1). Overall, species diversity of scleractinians increases south of Cape Fear, NC, but *L. pertusa* is still dominant. For example, the colonial corals *Madrepora oculata* and *Enallopsammia profunda*, rare off Cape Lookout, NC, are relatively common south of Cape Fear, NC. These hard corals tend not to occur singly or as species-specific mounds, but rather live on or adjacent to the *Lophelia* mounds. A variety of solitary corals are also found off the southeastern U.S. Individuals are often attached to coral rubble or underlying hard substrata. Most species appear to be either uncommon or rare. But, in some instances, particularly in the central portion of the region, local abundance can be high. For example, aggregations of *Thecopsammia socialis* and *Bathypsammia fallosocialis* carpet the bottom adjacent to reef habitat at study sites off South Carolina and northern Florida (Ross et al., unpublished data).

Black corals (Class Anthozoa, Order Antipatharia)

Black corals (Families Leiopathidae and Schizopathidae, ca. four species) are important structure-forming corals on the southeastern U.S. slope (Table 3-1). These corals occur locally in moderate abundances, but their distributions seem to be limited to the region south of Cape Fear, NC. Colonies may reach heights of 1-2 m. Black coral colonies, occurring singly or in small aggregations, may be observed either in association with hard coral colonies or as separate entities. Some of these living components of the deep reefs attain ages of hundreds to thousands of years (Williams B et al. 2006; Williams *et al.* in press; C. Holmes and S.W. Ross, unpublished data), and thus, along with gold corals, are among the oldest known animals on Earth. Black corals form annual or regular bands, and these bands contain important chemical records on past climates, ocean physics, ocean productivity, pollution, and data relevant to global geochemical cycles. An effort to investigate these geochemical data is underway by U.S. Geological Survey (C. Holmes and S.W. Ross).

Gold corals (Class Anthozoa, Order Zoanthidae)

Gerardia spp. colonies are found most often singly away from other coral structure, but these corals are also found associated with colonies of other structure-forming corals such as *Lophelia pertusa*, *Keratoisis* spp., or antipatharians (*Leiopathes* spp.). Very little is known about this group of organisms. They apparently exhibit slow growth, reaching ages of at least 1800 years old (Griffin and Druffel 1989; Druffel *et al.* 1995) and may be valuable in paleoecology studies.

Table 3-1. Attributes of structure-forming deep-sea corals of the southeastern United States.

Taxa	Reef-building	Abundance	Max colony size	Morphology	Associations with other structure-forming invertebrates	Colony spatial dispersion	Overall structural importance
Lophelia pertusa	Yes	High	Large	Branching	Many	Clumped	High
Solenosmillia variabilis	No	Low	Small	Branching	Many	Clumped	Low
Enallopsammia profunda	No	Low-Medium	Small-Medium	Branching	Many	Clumped	Low-Medium
Madrepora oculata	No	Low	Small	Branching	Many	Clumped	Low
Oculina varicosa	Yes	High	Large	Branching	Many	Clumped	High
Madracis myriaster	No	Low	Small-Medium	Branching	Many	Clumped	Low
Leiopathes glaberrima	No	Medium	Medium - Large	Branching	Many	Solitary	Medium
Bathypathes alternata	No	Low	Medium - Large	Branching	Many	Solitary	Low
Keratoisis spp.	No	Medium	Medium - Large	Branching	Many	Solitary	Medium

Table Key	
Attribute	**Measure**
Reef-Building	Yes/No
Relative Abundance	Low/ Medium/ High
Size (width or height)	Small (< 30cm)/ Medium (30cm-1m)/ Large (>1m)
Morphology	Branching/ Non-branching
Associations	None/ Few (1-2)/ Many (>2)
Spatial Dispersion	Solitary/ Clumped
Overall Rating	Low/ Medium/ High

Gorgonians (Class Anthozoa, Order Gorgonacea)

The gorgonians are by far the most diverse taxon on the southeastern U.S. slope represented by seven families, 17 genera, and 32 species. The diversity of gorgonians increases dramatically south of Cape Fear, NC. Additional sampling is likely to increase the numbers of known species in this group for this region. To date, material we collected off Jacksonville, FL represented a newly described species (*Thourella bipinnata* Cairns 2006); the specimen of *Chrysogorgia squamata* also collected off Jacksonville represented the fifth known specimen of this species and increased our knowledge of its geographic range (previously known only from the Caribbean).

Bamboo corals (Family Isididae, four species), possibly the best known members of this group because of their larger size and distinctive morphology, are also important structure-forming corals off the southeast region (Table 3-1). They occur locally in moderate abundances, and their distributions also seem to be limited to the region south of Cape Fear, NC. Colonies may reach heights of 1-2 m. Bamboo coral colonies occur either singly or in small aggregations and may be observed either in association with hard coral colonies or as separate entities.

True soft corals (Class Anthozoa, Order Alcyonacea)
Three families, Alcyoniidae, Nephtheidae, and Nidaliidae, comprise the Alcyonacea off the southeastern U.S. No family is speciose; total known diversity for this group is only six species. The most abundant species observed in the region is *Anthomastus agassizi*, which is relatively abundant at sites off Florida. It is usually attached to dead *Lophelia*, but some individuals have also been observed on dermosponges and coral rubble. The majority of the alcyonacean species are smaller in size, both in vertical extent and diameter, than the gorgonians. Thus, these corals add to the overall structural complexity of the habitat by attaching to hard substrata such as dead scleractinian skeletons and coral rubble.

Stoloniferans, a suborder (Stolonifera) within the Alcyonacea, are represented by one family (Clavulariidae) off the southeast region. Six species from four genera have been reported from the region. One species, *Clavularia modesta*, is widespread throughout the western Atlantic; the other five species are known from North Carolina southward to the Caribbean.

Pennatulaceans (Class Anthozoa, Order Pennatulacea)
Little is known about pennatulids (sea pens) off the southeastern U.S. It is unlikely that this group contributes significantly to the overall complexity and diversity of the system. No sea pens have been observed during recent surveys (Ross et al., unpublished data) and based on museum records, only one species (*Kophobelemnon sertum*) is known in the region.

Stylasterids (Class Hydrozoa, Order Anthoathecatae)
Although not found in great abundances, stylasterids (lace corals) commonly occur off the southeastern U.S. Seven species representing four genera have been reported from the region. Individuals observed in situ are often attached to dead scleractinian corals or coral rubble. Abundance and diversity of stylasterids increase southward from the Carolinas.

The following detailed descriptions of deepwater coral areas included in the SAFMC's proposal for HAPC designation were extracted from reports developed by S. Ross and J. Reed for the SAFMC in 2006 and 2004, respectively.

North Carolina Deep Coral Banks (Source: Appendix F)
Off North Carolina, *Lophelia* forms what may be considered classic mounds (three areas surveyed so far) that appear to be a sediment/coral rubble matrix topped with almost monotypic stands of *L. pertusa*. Although *Lophelia* is the dominant hard coral off North Carolina, other scleractinians contribute to the overall complexity of the habitat. These include the colonial corals *Madrepora oculata* and *Enallopsammia* spp. as well as a variety of solitary corals. These hard corals tend to live on or within the *Lophelia* matrix. The three

North Carolina *Lophelia* mounds are the northernmost coral banks in the southeast U.S. Because these banks seem to be a northern terminus for a significant zoogeographic region, they may be unique in biotic resources as well as habitat expression. The three NC banks are generally similar in physical attributes and faunal composition. Some observed differences, however, are being investigated, and more detailed results will be presented in several peer reviewed publications in preparation (Ross et al.). For convenience these three areas have been designated as Cape Lookout *Lophelia* Bank A, Cape Lookout *Lophelia* Bank B, and Cape Fear *Lophelia* Bank. These names are to facilitate research and may eventually be changed. General descriptions of the NC coral mounds and associated fauna follows. Since there are almost no data published for the NC deep coral banks and because they are different than those to the south, they are discussed in more detail below. Between summer 2000 and fall 2005 Ross et al. (unpubl. data) sampled these areas extensively using a variety of methods throughout the water column. Their major method for collecting bottom data on the reef proper was the *Johnson-Sea-Link* (JSL) research submersible.

<u>Cape Lookout Lophelia Bank A</u>

Preliminary observations suggest that this area contains the most extensive coral mounds off North Carolina; however, it must be emphasized that data are lacking to adequately judge overall sizes and areal coverage. Ross et al. JSL submersible dives in this area ranged from 370-447 m. Mean bottom temperatures ranged from 6.3 to 10.9°C, while mean bottom salinities were always around 35 ppt. There appear to be several prominences capping a ridge system, thus, presenting a very rugged and diverse bathymetry, but there are also other mounds away from the main ridge sampled (Figure 3-2). The main mound system rises vertically nearly 80 m over a distance of about 1 km, and in places exhibits slopes in excess of 50-60 degrees. Sides and tops of these mounds are covered with extensive colonies of living *Lophelia pertusa*, with few other corals being observed. Dead colonies and coral rubble interspersed with sandy channels are also abundant. Extensive coral rubble zones surround the mounds for a large, but unknown, distance (exact area not yet surveyed), especially at the bases of the mounds/ridges, and in places seem to be quite thick. These mounds appear to be formed by successive coral growth, collapse, and sediment entrapment (Wilson 1979; Popenoe and Manheim 2001). These topographic highs accelerate bottom currents, which favor attached filter feeders; very strong bottom currents have also been observed.

<u>Cape Lookout Lophelia Bank B</u>

The least amount of data are available for this area. Mounds appear to cover a smaller area than those described above, but here again better mapping data are needed. Ross et al. JSL dives in this area ranged from 396-449 m. Mean bottom temperatures ranged from 5.8 to 10.4°C, and as above mean bottom salinities were always around 35 ppt. These mounds rise at least 53 m over a distance of about 0.4 km. There is a small mound away from the main system (Figure 3-3), and in general these mounds were less dramatic than those described above. They appeared to be of the same general construction as Bank A, appearing to be built of coral rubble matrix that had trapped sediments. Extensive fields of coral rubble surrounded the area. Both living and dead corals were common on this bank, with some living bushes being quite large.

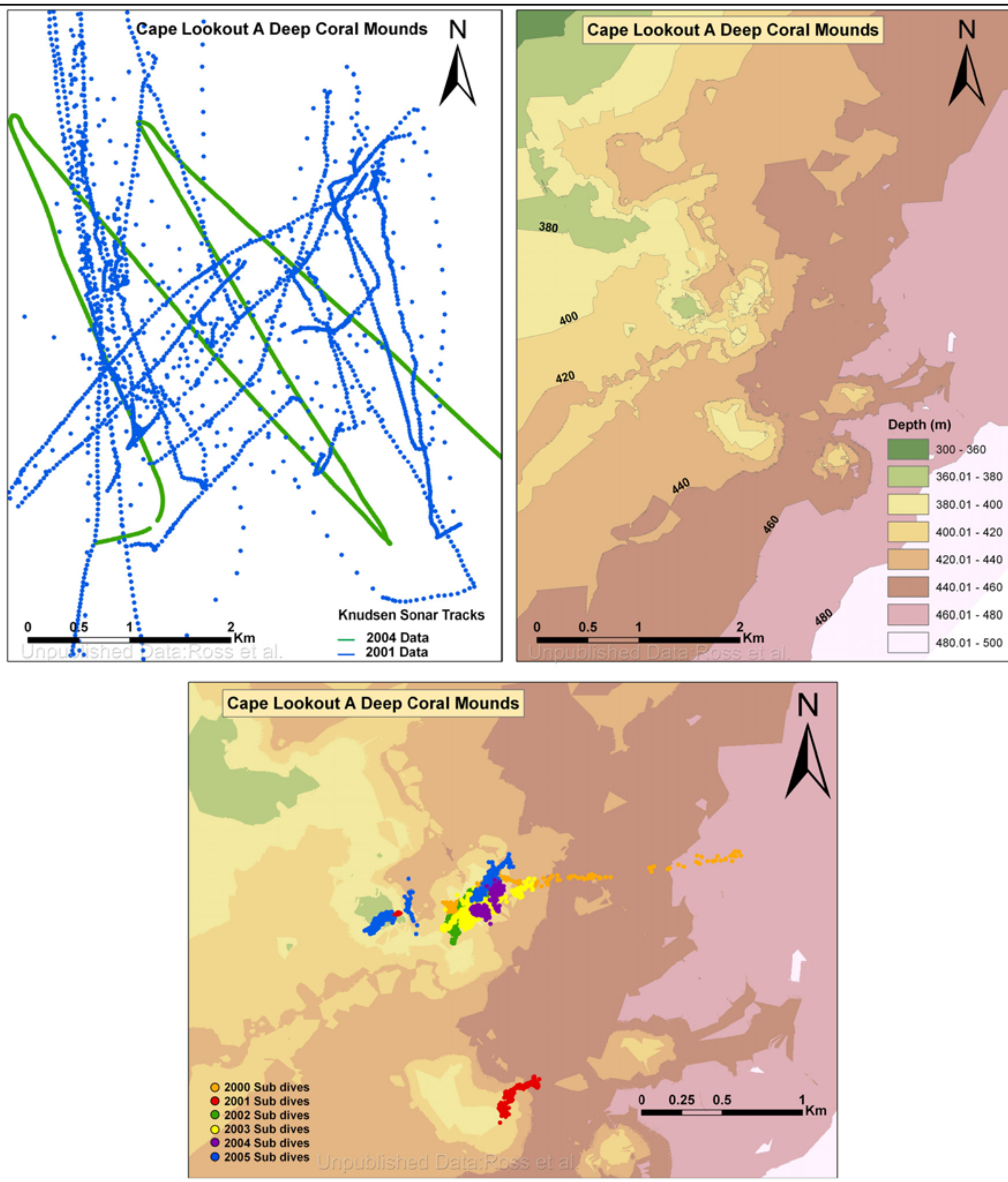


Figure 3-2. Ship collected sonar tracks (top left) and resulting bathymetry maps (top right) from the deep coral area off Cape Lookout, NC (A).
In this area additional data from our files were added for the bathymetry map. Bottom panel shows JSL submersible dive tracks in this area from 2000- 2005. All data are from Ross *et al.* (unpublished). See Fig. 3-1 to locate this area.

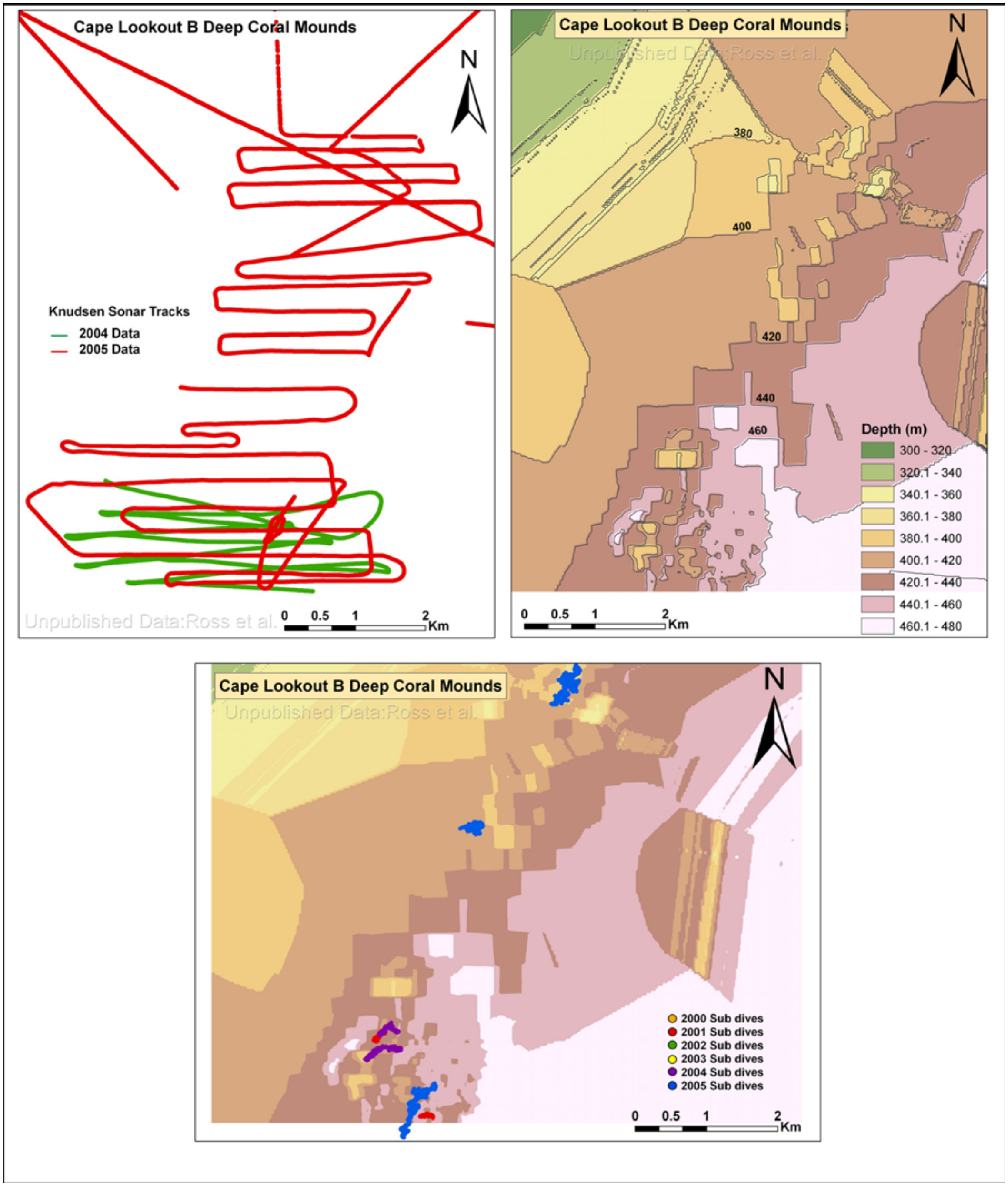


Figure 3-3. Ship collected sonar tracks (top left) and resulting bathymetry maps (top right) from the deep coral area off Cape Lookout, NC (B).
Bottom panel shows JSL submersible dive tracks in this area from 2000-2005. All data are from Ross et al. (unpublished). See Fig. 3-1 to locate this area.

<u>Cape Fear Lophelia Bank</u>

Aside from the map in EEZ-SCAN 87 Scientific Staff (1991) there are no published data from this coral mound and no indication that it was sampled before the studies initiated by Ross et al. (unpubl. data) between summer 2002 and fall 2005. Ross et al. located this bank based on estimated coordinates from the USGS survey (EEZ-SCAN 87 Scientific Staff

1991). As above, the JSL submersible was the major method for collecting bottom data on the reef proper. Sampling in this area was focused on a relatively small area (Figure 3-4), but data are lacking to accurately estimate the size and area covered by coral mounds or rubble zones. Ross *et al.* JSL dives in this area ranged from 371-449 m. Mean bottom temperatures ranged from 8.7 to 11.7°C, and as above mean bottom salinities were always near 35 ppt. These mounds rise nearly 80 m over a distance of about 0.4 km, and exhibit some of the most rugged habitat and vertical excursion of any area sampled. This mound system also appears to be of the same general construction as Banks A and B, being built of coral rubble matrix with trapped sediments. Fields of coral rubble are common around the area. Both living and dead corals were common on this bank.

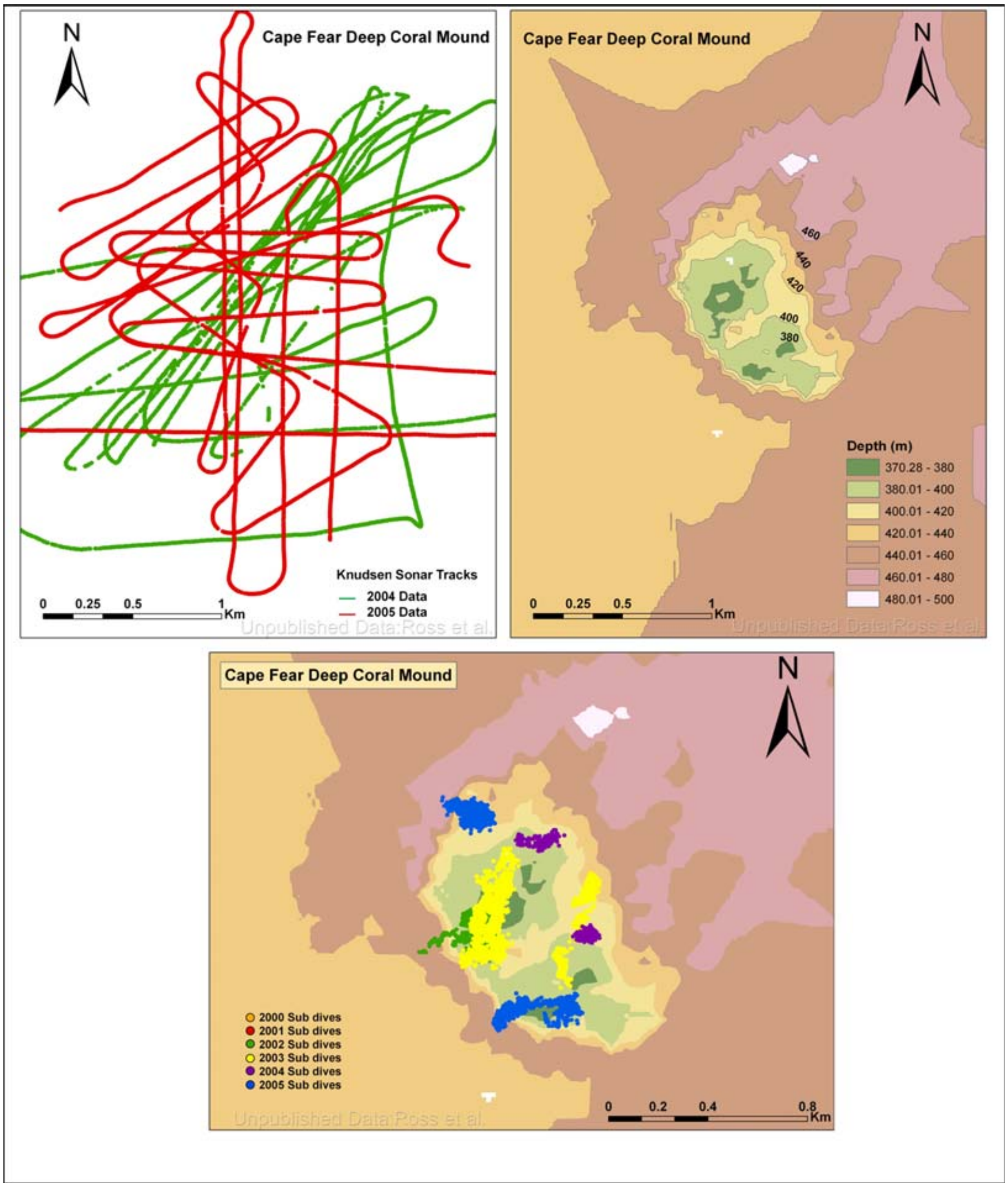


Figure 3-4. Ship collected sonar tracks (top left) and resulting bathymetry maps (top right) from the deep coral area off Cape Fear, NC.

Bottom panel shows JSL submersible dive tracks in this area from 2000-2005. All data are from Ross *et al.* (unpublished). See Fig. 3-1 to locate this area.

<u>Potential NC Coral Mounds</u>

Several potential deep coral banks (Figure 3-3) were identified in the USGS survey of the EEZ off of North Carolina (EEZ-SCAN 87 Scientific Staff 1991). During surveys with the NR-1 submarine (Sulak and Ross unpubl. data, 1993) and again during a cruise of the R/V *Cape Hatteras* (S.W. Ross, Chief Scientist, 2001), attempts were made to locate the bank between Cape Lookout Bank A and Bank B (Figure 3-3). However, no coral mounds were observed in this area. It is possible that there are coral mounds in this area but the small search pattern and potential navigation issues prevented finding them. Other banks may exist on the slope south of 33°N (Figure 3-3). As far as known these have not been accurately located or confirmed as coral banks, although the location referenced by George (2002) is near one of these areas. These banks would be important to confirm as they would occur in what may be a transition area between a region of coral/sediment built mounds composed almost entirely of *Lophelia pertusa* and the area to the south where coral development is generally quite different.

<u>Coral Banks of the Blake Plateau</u>

South of Cape Fear sediment/coral mounds are smaller and scattered; however, *L. pertusa* and other hard and soft corals populate the abundant hard substrates of the Blake Plateau in great numbers. Overall, species diversity of anthozoans and other associated sessile invertebrates (e.g., sponges, hydrozoans) increases south of Cape Fear, NC. For convenience, some deep coral study areas in this region have been named, giving the impression of isolated areas of coral habitat. It appears, however, that Blake Plateau coral habitats are larger and more continuous than these names imply. Future detailed mapping of the area combined with ground-truthing will clarify coral habitat distributions and the extent to which areas may require discrete names.

There are existing research data for this area, but historically most of it was geological. Most deepwater coral expeditions south of North Carolina concentrated around the area described by Stetson et al. (1962), referred to as "Stetson Banks" (Figure 3-5), an area off Georgia ("Savannah Banks"), the Charleston Bump (Sedberry 2001), a large area straddling the Georgia/Florida border ("Jacksonville Lithoherms") and numerous coral sites along the FL East coast. General properties of these study areas were described in several papers by Reed and colleagues (Reed 2002, Reed unpubl. rept. to SAFMC 2004, Reed and Ross 2005, Reed et al. 2005, 2006). Because it is unclear that these coral study areas are physically separate, they are not discussed individually.

The Stetson Bank is a very large region of extremely diverse, rugged topography and bottom types. There is a deep canyon on the eastern side of this system with abundant corals on its western rim. While the surface waters of Stetson Bank are often outside the main Gulf Stream path, bottom currents can be quite strong. This is one of the deeper and more interesting of the Blake Plateau coral areas and warrants further exploration. The Savannah Bank system appears to have a heavier sediment load, perhaps because it is closest to the continental shelf. Deepwater corals occur there in scattered patches and are often less well developed than at other sites. Many sites in the "Jacksonville area" were composed of rocky ledges to which corals were attached, especially on the northern end. Bottom types in this area are diverse as is the fauna. Topographic highs, most having corals, are very abundant from the "Jacksonville area" to just south of Cape Canaveral (see also Reed *et al.* 2005, 2006). Faunal diversity is quite high in this region.

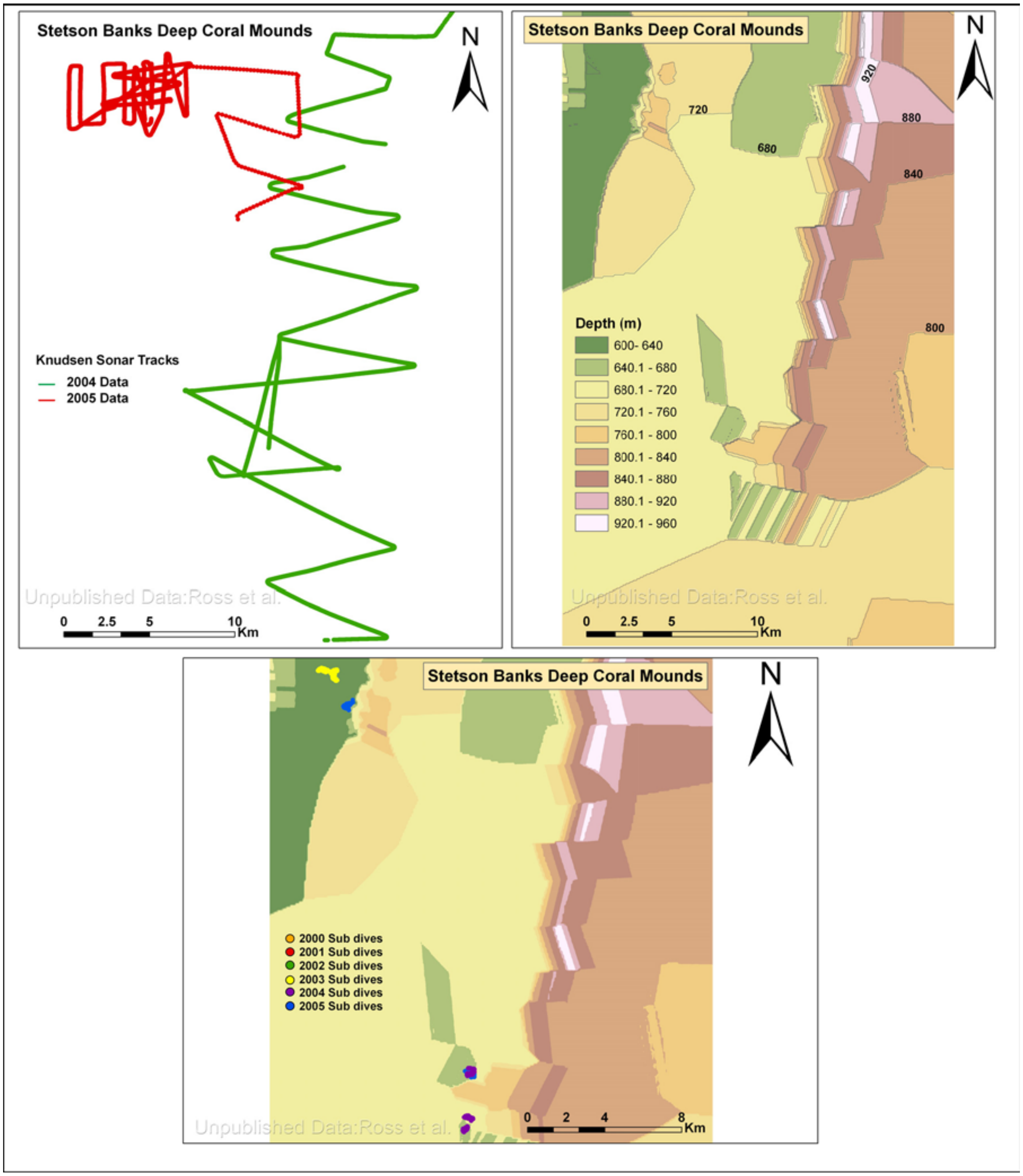


Figure 3-5. Ship collected sonar tracks (top left) and resulting bathymetry maps (top right) from the Stetson deep coral area off of SC.

Bottom panel shows JSL submersible dive tracks in this area from 2000-2005. All data are from Ross *et al.* (unpublished). See Fig. 3-1 to locate this area.

<u>Stetson Reefs, Eastern Blake Plateau</u> (from Reed, 2002a; Reed et al., 2004b)
This site is on the outer eastern edge of the Blake Plateau, approximately 120 nm SE of Charleston, South Carolina, at depths of 640-869 m (Figures 3-6 and 3-7). Over 200 coral mounds up to 146 m in height occur over this 6174 km^2 area that was first described by Thomas Stetson from echo soundings and bottom dredges (Stetson et al., 1962; Uchupi, 1968). These were described as steep-sloped structures with active growth on top of the banks. Live coral colonies up to 50 cm in diameter were observed with a camera sled. *Enallopsammia profunda* (=*D. profunda*) was the dominant species in all areas although *L. pertusa* was concentrated on top of the mounds. Densest coral growth occurred along an escarpment at Region D1. Stetson et al. (1962) reported an abundance of hydroids, alcyonaceans, echinoderms, actiniaria, and ophiuroids, but a rarity of large mollusks. The flabelliform gorgonians were also current-oriented. Popenoe and Manheim (2001) have made detailed geological maps of this Charleston Bump region which also indicate numerous coral mounds.

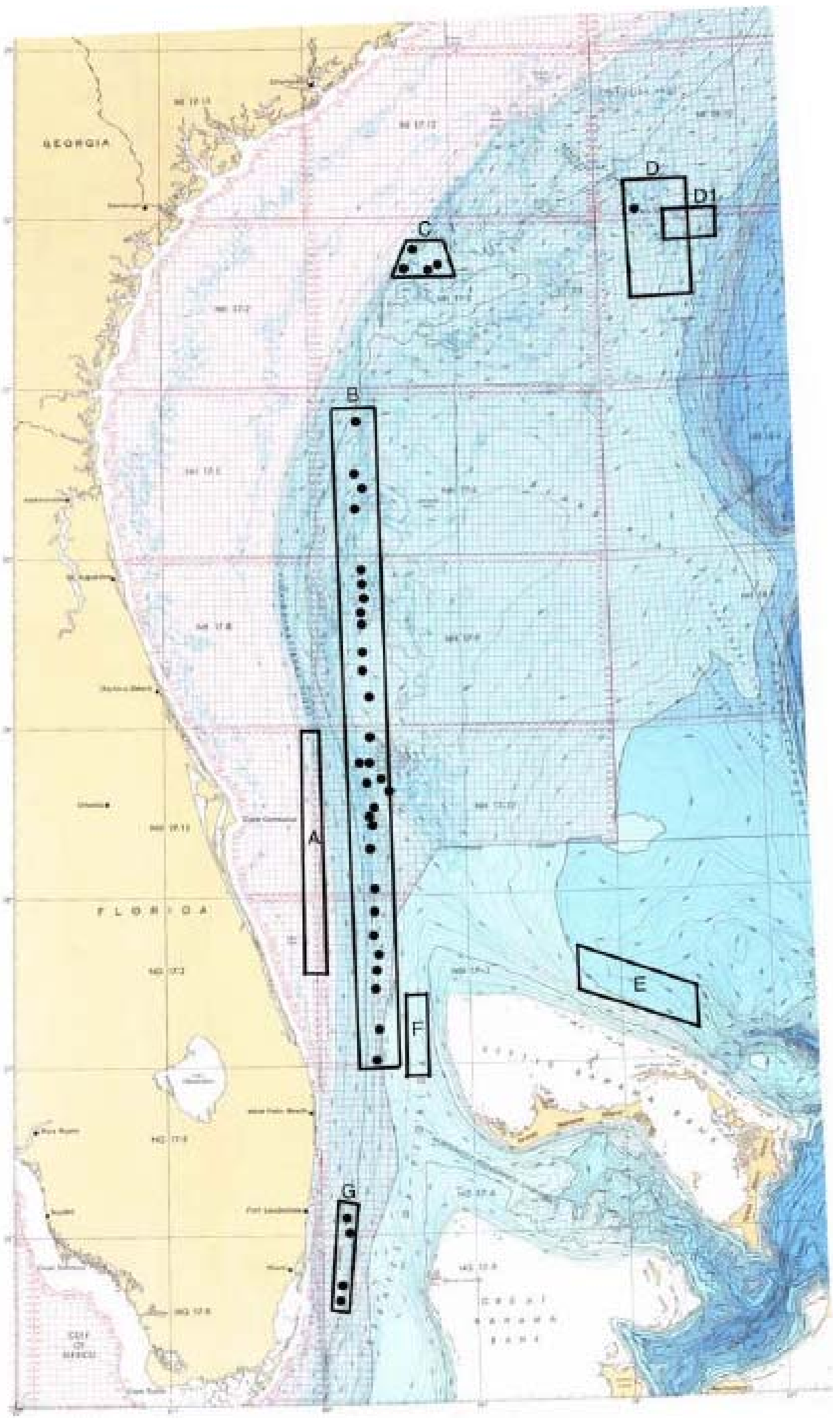


Figure 3-6. Deep-water coral reef regions off southeastern U.S.A. *Johnson-Sea-Link* I and II submersible dive sites and echosounder sites of high-relief reefs; Regions: A=*Oculina* Coral Reefs, B= East Florida *Lophelia* Reefs, C= Savannah Lophelia Lithoherms, D= Stetson's Reefs (D1= region of dense pinnacles), E= *Enallopsammia* Reefs (Mullins et al., 1981), F= Bahama Lithoherms (Neumann et al., 1977), G= Miami Terrace Escarpment. (from Reed *et al*., 2004b; chart from NOAA, NOS, 1986).

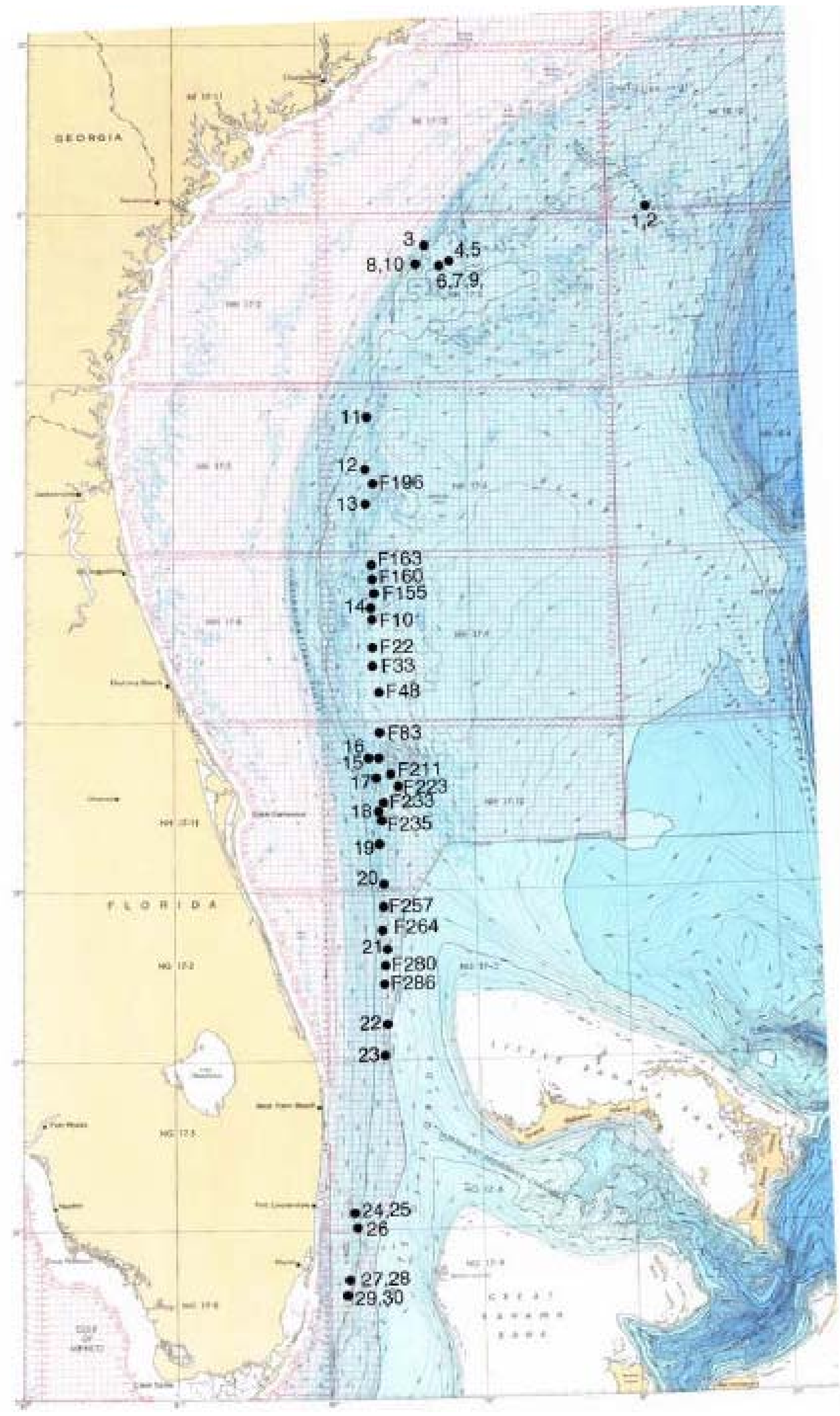


Figure 3-7. Bathymetry and submersible dive sites on Pourtalès Terrace at Region H. *Johnson-Sea-Link* and *Clelia* submersible dive sites; JS= Jordan Sinkhole, MS= Marathon Sinkhole, TB1= Tennessee Humps Bioherm #1, TB2= Tennessee Humps Bioherm #2, AB3= Alligator Humps Bioherm #3, AB4= Alligator Humps Bioherm #4 (from Reed et al., 2004b; chart from Malloy and Hurley, 1970; Geol. Soc. Amer. Bull. 81: 1947-1972).

Fathometer transects by J. Reed indicated dozens and possibly hundreds of individual pinnacles and mounds within the small region that we surveyed which is only a fraction of the Stetson Bank area (Reed and Pomponi, 2002b; Reed et al., 2002; Reed et al., 2004b). Two pinnacle regions were selected from fathometer transects. Three submersible dives were made on “Pinnacle 3” and four dives on “Stetson’s Peak” which is described below. A small subset of the Stetson Bank area was first mapped by six fathometer transects covering approximately 28 nm^2, in which six major peaks or pinnacles and four major scarps were plotted. The base depth of these pinnacles ranged from 689 m to 643 m, with relief of 46 to 102 m. A subset of this was further mapped with 70 fathometer transects spaced 250 m apart (recording depth, latitude and longitude ~ every 3 seconds), covering an area of 1 x 1.5 nm, resulting in a 3-D bathymetric GIS Arcview map of a major feature, which was named named Stetson’s Pinnacle (Figure 3-8).

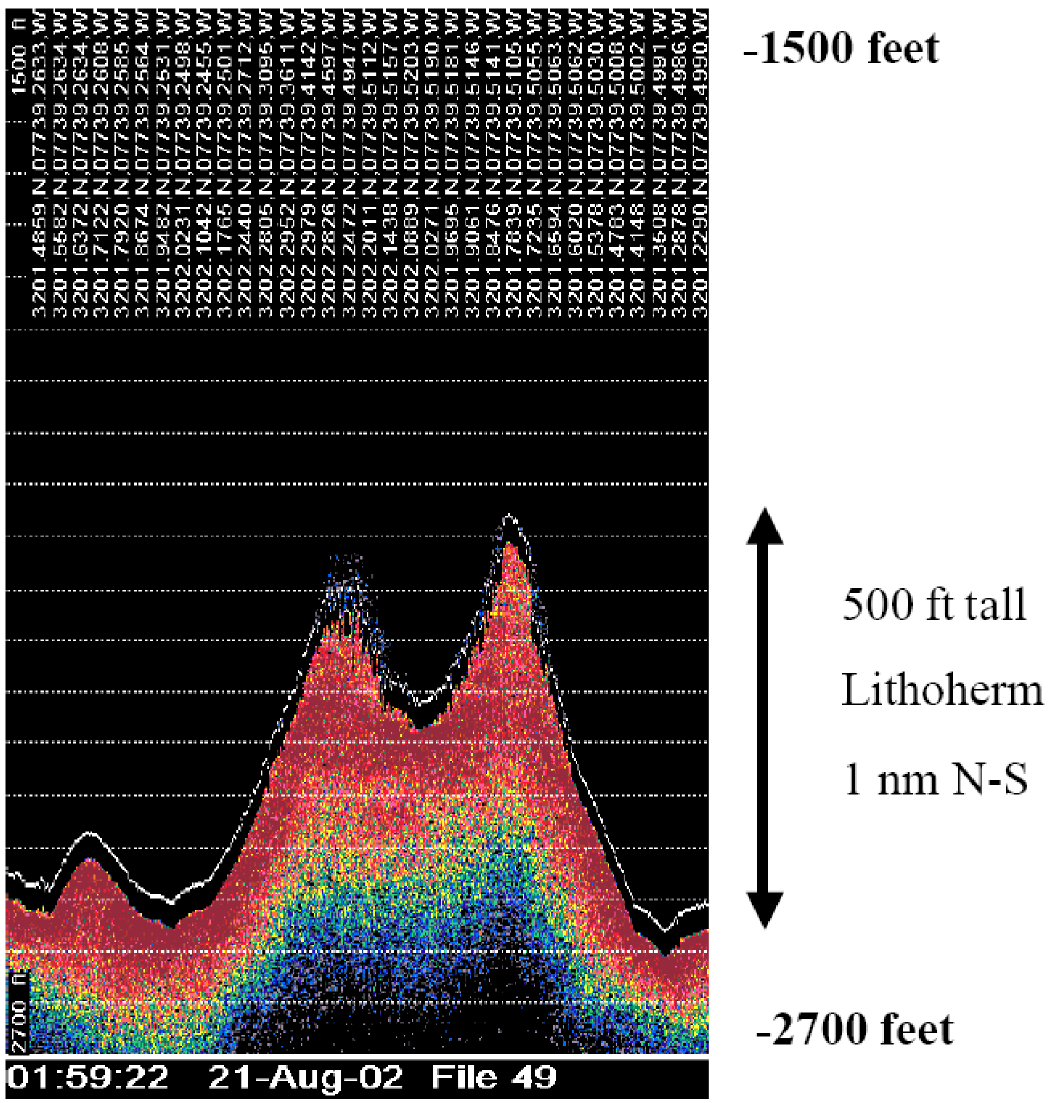


Figure 3-8. Echosounder profile of Stetson’s Pinnacle (depth 780 m, relief 153 m). Source: Reed *et al.* (2004b)

Stetson's Pinnacle was 780 m at the south base and the peak was 627 m. This represents one of the tallest *Lophelia* coral lithoherms known, nearly 153 m in relief. The linear distance from the south base to the peak was approximately 0.5 nm. The lower flank of the pinnacle from ~762 m to 701 m on the south face was a gentle slope of 10-30° with a series of 3-4 m high ridges and terraces that were generally aligned 60-240° across the slope face. These ridges were covered with nearly 100% *Lophelia* coral rubble, 15-30 cm colonies of live *Lophelia*, and standing dead colonies of *Lophelia*, 30-60 cm tall. Very little rock was exposed, except on the steeper exposed, eroded faces of the ridges. Some rock slabs, ~30 cm thick, have slumped from these faces. From 701 m to 677 m the slope increased from ~45° to 60 °. From 671 m to the peak, the geomorphology was very complex and rugged, consisting of 60-90° rock walls and 3-9 m tall rock outcrops. Colonies of *Lophelia*, 30-60 cm tall, were more common, and some rock ledges had nearly 100% cover of live *Lophelia* thickets. The top edge of the pinnacle was a 30 cm thick rock crust which was undercut from erosion; below this was a 90° escarpment of 3-6 m. The peak was a flat rock plateau at 625-628 m and was approximately 0.1 nm across on a S-N submersible transect. The north face was not explored in detail but is a vertical rock wall from the peak to ~654 m then grades to a 45° slope with boulders and rock outcrops.

Dominant sessile macrofauna consisted of scleractinia, stylasterine hydrocorals, gorgonacea and sponges. The colonial scleractinia were dominated by colonies of *Lophelia pertusa* (30-60 cm tall) and *Enallopsammia profunda*, and *Solenosmilia variabilis* were present. Small stylasterine corals (15 cm tall) were common and numerous species of solitary cup corals were abundant. Dominant octocorallia consisted of colonies of Primnoidae (15-30 cm tall), paramuriceids (60-90 cm), Isididae bamboo coral (15-60 cm), stolonifera, and stalked Nephtheidae (5-10 cm). Dominant sponges consisted of Pachastrellidae (25 cm fingers and 25- 50 cm plates), Corallistidae (10 cm cups), Hexactinellida glass sponges (30 cm vase), *Geodia sp*. (15-50 cm spherical), and *Leiodermatium sp*. (50 cm frilly plates). Although motile fauna were not targeted, some dominant groups were noted. No large decapods crustaceans were common although some red portunids were observed. Two species of echinoids were common, one white urchin and one stylocidaroid. No holothurians or asteroids were noted. Dense populations of Ophiuroidea were visible in close-up video of coral clusters and sponges. No large Mollusca were noted except for some squid. Fish consisted mostly of benthic gadids and rattails. On the steeper upper flank, from 671 to 625 m the density, diversity, and size of sponges increased; 15- 50 cm macro sponges were more abundant. Massive *Spongosorites sp*. were common, Pachastrellidae tube sponges were abundant, and Hexactinellida glass sponges were also common. On the peak plateau the dominant macrofauna were colonies of *Lophelia pertusa* (30- 60 cm tall), coral rubble, *Phakellia sp*. fan sponges (30-50 cm), and numerous other demosponges were abundant. No large fish were seen on top.

<u>Savannah Lithoherms, Blake Plateau</u> (from Reed, 2002a; Reed et al., 2004b)
A number of high-relief lithoherms occur within this region of the Blake Plateau, approximately 90nm east of Savannah, Georgia (Figures 3-6 and 3-7). This region is at the base of the Florida-Hatteras Slope, near the western edge of the Blake Plateau, and occurs in a region of phosphoritic sand, gravel and rock pavement on the Charleston Bump (Sedberry, 2001). Wenner and Barans (2001) described 15-23 m tall coral mounds in this region that

were thinly veneered with fine sediment, dead coral fragments and thickets of *Lophelia* and *Enallopsammia*. They found that blackbellied rosefish and wreckfish were frequent associates of this habitat. In general, the high-relief *Lophelia* mounds occur in this region at depths of 490-550 m and have maximum relief of 61 m. JSL-II dives 1690, 1697 and 1698 reported a coral rubble slope with <5% cover of 30 cm, live coral colonies (Reed, 2002a). On the reef crest were 30-50 cm diameter coral colonies covering approximately 10% of the bottom.

Some areas consisted of a rock pavement with a thin veneer of sand, coral rubble, and 5-25 cm phosphoritic rocks. At *Alvin* dive sites 200 and 203, Milliman et al. (1967) reported elongate coral mounds, approximately 10 m wide and 1 km long, that were oriented NNE-SSW. The mounds had 25-37° slopes and 54 m relief. Live colonies (10-20 cm diameter) of *E. profunda* (=*D. profunda*) dominated and *L. pertusa* (=*L. prolifera*) was common. No rock outcrops were observed. These submersible dives found that these lithoherms provided habitat for large populations of massive sponges and gorgonians in addition to the smaller macroinvertebrates which have not been studied in detail. Dominant macrofauna included large plate-shaped sponges (*Pachastrella monilifera*) and stalked, fan-shaped sponges (*Phakellia ventilabrum*), up to 90 cm in diameter and height.

At certain sites (JSL-II dive 1697), these species were estimated at 1 colony/10 m^2. Densities of small stalked spherical sponges (*Stylocordyla sp*., Hadromerida) were estimated in some areas at 167 colonies/10 m^2. Hexactinellid (glass) sponges such as *Farrea*? sp. were also common. Dominant gorgonacea included *Eunicella* sp. (Plexauridae) and *Plumarella pourtalessi* (Primnoidae).

Recent fathometer transects by J. Reed at Savannah Lithoherm Site #1 (JSL II-3327) extended 2.36 nm S-N revealed a massive lithoherm feature that consisted of five major pinnacles with a base depth of 549 m, minimum depth of 465 m, and maximum relief of 83 m (Reed and Pomponi, 2002b; Reed et al., 2002; Reed et al., 2004b). The individual pinnacles ranged from 9 to 61 m in height. A single submersible transect, south to north, on Pinnacle #4 showed a minimum depth of 499 m. The south flank of the pinnacle was a gentle 10-20° slope, with ~90% cover of coarse sand, coral rubble and some 15 cm rock ledges. The peak was a sharp ridge oriented NW-SE, perpendicular to the prevailing 1 kn current. The north side face of the ridge was a 45° rock escarpment of about 3 m which dropped onto a flatter terrace. From a depth of 499 to 527 m, the north slope formed a series of terraces or shallow depressions, ~9-15 m wide, that were separated by 3 m high escarpments of 30-45°. Exposed rock surfaces showed a black phosphoritic rock pavement. The dominant sessile macrofauna occurred on the exposed pavement of the terraces and in particular at the edges of the rock outcrops and the crest of the pinnacle.

The estimated cover of sponges and gorgonians was 10% on the exposed rock areas. Colonies of *Lophelia pertusa* (15-30 cm diameter) were common but not abundant with ~1% coverage. Dominant Cnidaria included several species of gorgonacea (15-20 cm tall), Primnoidae, Plexauridae (several spp.), *Antipathes* sp. (1 m tall), and *Lophelia pertusa*. Dominant sponges included large *Phakellia ventilabrum* (fan sponges, 30-90 cm diameter), Pachastrellidae plate sponges (30 cm), *Choristida* plate sponges (30 cm), and Hexactinellid glass sponges. Motile fauna consisted of decapod crustaceans (*Chaceon fenneri*, 25 cm; and Galatheidae, 15 cm) and mollusks. Few large fish were observed but a 1.5 m swordfish, several 1 m sharks, and numerous blackbelly rosefish were noted.

A fathometer transect by J. Reed at Savannah Lithoherm Site 2 (Figure 3-9) extended 4.6 nm, SW to NE, mapped 8 pinnacles with maximum depth of 549 m and relief of 15-50 m.

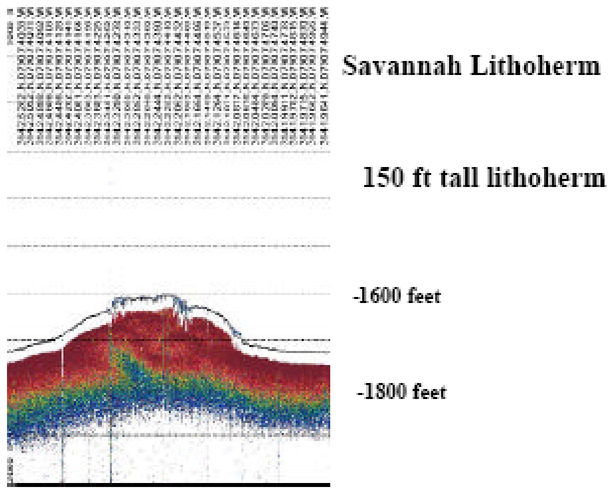


Figure 3-9. Echosounder profile of Savannah Lithoherm, Site 2, Pinnacle #1 (depth 537 m, relief 50 m) Source: Reed *et al.* (2004b).

Submersible dives were made on Pinnacles 1, 5 and 6 of this group. Pinnacle 1 was the largest feature of this group; the base was 537 m and the top was 487 m. The south face, from a depth of 518 to 510 m, was a gentle 10° slope, covered with coarse brown sand and *Lophelia* coral rubble. A 3-m high ridge of phosphoritic rock, extended NE-SW, cropped out at a depth of 510 m. This was covered with nearly 100% cover of 15 cm thick standing dead *Lophelia* coral and dense live colonies of *Lophelia pertusa* (15-40 cm). From depths of 500 m to 495 m were a series of exposed rock ridges and terraces that were 3-9 m tall with 45° slopes.

Some of the terraces were ~30 m wide. Each ridge and terrace had thick layers of standing dead *Lophelia*, and dense live coral. These had nearly 100% cover of sponges (*Phakellia* sp., *Geodia* sp., Pachastrellidae, and Hexactinellida), scleractinia (*Lophelia pertusa*, *Madrepora oculata*), stylasterine hydrocorals, numerous species of gorgonacea (Ifalukellidae, Isididae, Primnoidae), and 1 m bushes of black coral (*Antipathes* sp.). Deep deposits of sand and coral rubble occurred in the depressions between the ridges. The north face, from 500 m to 524 m was a gentle slope of 10° that had deep deposits of coarse brown foraminiferal sand and coral rubble. Exposed rock pavement was sparse on the north slope, but a few low rises with live bottom habitat occurred at 524 m. Dominant mobile fauna included decapod crustaceans (*Chaceon fenneri*, 15 cm Galatheidae), rattail fish, and 60 cm sharks were common.

Florida

Deepwater coral ecosystems in U.S. EEZ waters also exist along the eastern and southwest Florida shelf slope (in addition to the Oculina HAPC and deep shelf-edge reefs with hermatypic coral). These include a variety of high-relief, hardbottom, live-bottom habitats at numerous sites along the base of the Florida-Hatteras Slope off northeastern and central eastern Florida, the Straits of Florida, the Miami Terrace and Pourtales Terrace off southeastern Florida, and the southwestern Florida shelf slope. The predominate corals on these reefs are the azooxanthellate, colonial scleractinian corals, *Lophelia pertusa*, *Madrepora oculata*, and *Enallopsammia profunda*; various species of hydrocorals of the family Stylasteridae, and species of the bamboo octocoral of the family Isididae. Various types of high- relief, live-bottom habitat have been discovered in the area: *Lophelia* mud mounds, lithoherms, sinkholes, ancient Miocene escarpments and karst topographic features (Reed 2002b; Reed et al. 2004a, b). These all provide hardbottom substrate and habitat for sessile macrofauna including deepwater corals, octocorals (gorgonians), black coral, and sponges, which in turn provide habitat and living space for a relatively unknown but biologically rich and diverse community of associated fish, crustaceans, mollusks, echinoderms, polychaete and sipunculan worms, and other macrofauna, many of which are undoubtedly undescribed species. Preliminary studies by Reed et al. (2004a, b) have found new species of octocorals and sponges from some these sites.

<u>Florida Lophelia Pinnacles</u> (from Reed, 2002a; Reed et al., 2004b)

Numerous high-relief *Lophelia* reefs and lithoherms occur in this region at the base of the Florida- Hatteras Slope and at depths of 670-866 m. The reefs in the southern portion of this region form along the western edge of the Straits of Florida and are 15-25 nm east of the *Oculina* HAPC. Along a 222-km stretch off northeastern and central Florida (from Jacksonville to Jupiter), nearly 300 mounds from 8 to 168 m in height (25- 550 ft) were recently mapped by J. Reed using a single beam echosounder (Figure 3-10; Reed et al. 2004b). Between 1982 and 2004, dives with the *Johnson-Sea-Link* (JSL) submersibles and ROVs by J. Reed confirmed the presence of *Lophelia* mounds and lithoherms in this region (Reed 2002a; Reed et al. 2002; Reed and Wright 2004; Reed et al. 2004b). The northern sites off Jacksonville and southern Georgia appeared to be primarily lithoherms which are pinnacles capped with exposed rock (described in part by Paull et al. 2000), whereas the features from south of St. Augustine to Jupiter were predominately *Lophelia* coral pinnacles or mud mounds capped with dense 1m-tall thickets of *Lophelia pertusa* and *Enallopsammia profunda* with varying amounts of coral debris and live coral. Dominant habitat-forming coral species were *Lophelia pertusa*, *Madrepora oculata*, *Enallopsammia profunda*, bamboo coral (Isididae), black coral (Antipatharia), and diverse populations of octocorals and sponges (Reed et al. 2004b).

Paull et al. (2000) estimated that over 40,000 coral lithoherms may be present in this region of the Straits of Florida and the Blake Plateau. Their dives with the *Johnson-Sea-Link* submersible and the U.S. Navy's submarine NR-1 described a region off northern Florida and southern Georgia of dense lithoherms forming pinnacles 5 to 150 m in height with 30-60° slopes that had thickets of live ahermatypic coral (unidentified species, but photos suggest *Lophelia* and/or *Enallopsammia*). The depths range from 440 to 900+ m but most mounds were within 500-750 m. Each lithoherm was ~100-1000 m long and the ridge crest was generally oriented perpendicular to the northerly flowing Gulf Stream current (25-50 cm/s on flat bottom, 50-100 cm/s on southern slopes and crests).

Thickets of live coral up to 1 m were mostly found on the southern facing slopes and crests whereas the northern slopes were mostly dead coral rubble. These were termed lithoherms since the mounds were partially consolidated by a carbonate crust, 20-30 cm thick, consisting of micritic wackestone with embedded planktonic foraminifera, pteropods, and coral debris (Paull et al. 2000).

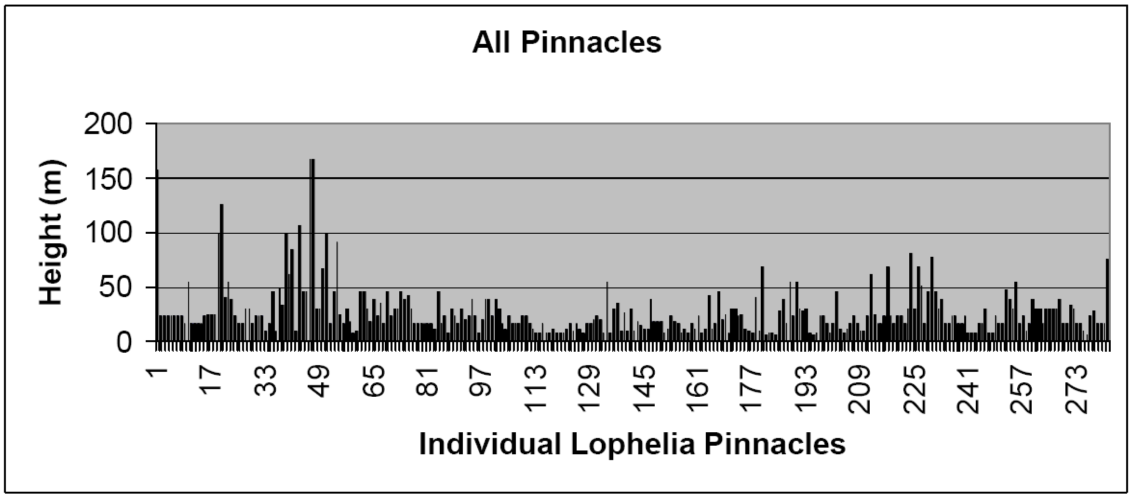


Figure 3-10. Height of *Lophelia* pinnacles and lithoherms on echosounder transects from Jacksonville to Jupiter, Florida at depths of 600 to 800 m.
Source: Reed *et al.* (2004b)

A recent echosounder transect by J. Reed revealed a massive lithoherm, 3.08 nm long (N-S) that consisted of at least 7 individual peaks with heights of 30-60 m (Figure 3-11; Reed and Wright 2004; Reed et al. 2004b). The maximum depth was 701 m with total relief of 157 m. Three submersible dives (JSL II-3333, 3334; I-4658) were made on Peak 6 of pinnacle #204B which was the tallest individual feature of the lithoherm with maximum relief of 107 m and a minimum depth at the peak of 544 m (Reed et al. 2004b). The east face was a 20-30° slope and steeper (50°) near the top. The west face was a 25-30° slope which steepened to 80° from 561 m to the top ridge. The slopes consisted of sand and mud, rock pavement and rubble. A transect up the south slope reported a 30-40° slope with a series of terraces and dense thickets of 30-60 cm tall dead and live *Lophelia* coral that were mostly found on top of mounds, ridges and terrace edges. One peak at 565 m had dense thickets of live and dead standing *Lophelia* coral (~20% live) and outcrops of thick coral rubble. Dominant sessile fauna consisted of *Lophelia pertusa*, abundant Isididae bamboo coral (30-60 cm) on the lower flanks of the mound, Antipatharia black coral, and abundant small octocorals including the gorgonacea (*Placogorgia* sp., *Chrysogorgia* sp, and Plexauridae) and Nephtheidae soft corals (*Anthomastus* sp., *Nephthya* sp.). Dominant sponges consisted of *Geodia* sp., *Phakellia* sp., *Spongosorites* sp., Petrosiidae, Pachastrellidae and Hexactinellida.

Further south off Cape Canaveral, echosounder transects by J. Reed on *Lophelia* Pinnacle #113 revealed a 61 m tall pinnacle with maximum depth of 777 m (Figure 3-12). The width (NW-SE) was 0.9 nm and consisted of at least 3 individual peaks or ridges on top, each with 15-19 m relief. One submersible dive (JSL II-3335) reported 30-60° slopes, with sand, coral rubble, and up to 10% cover of live coral. No exposed rock was observed. This appeared to be a classic *Lophelia* mud mound.

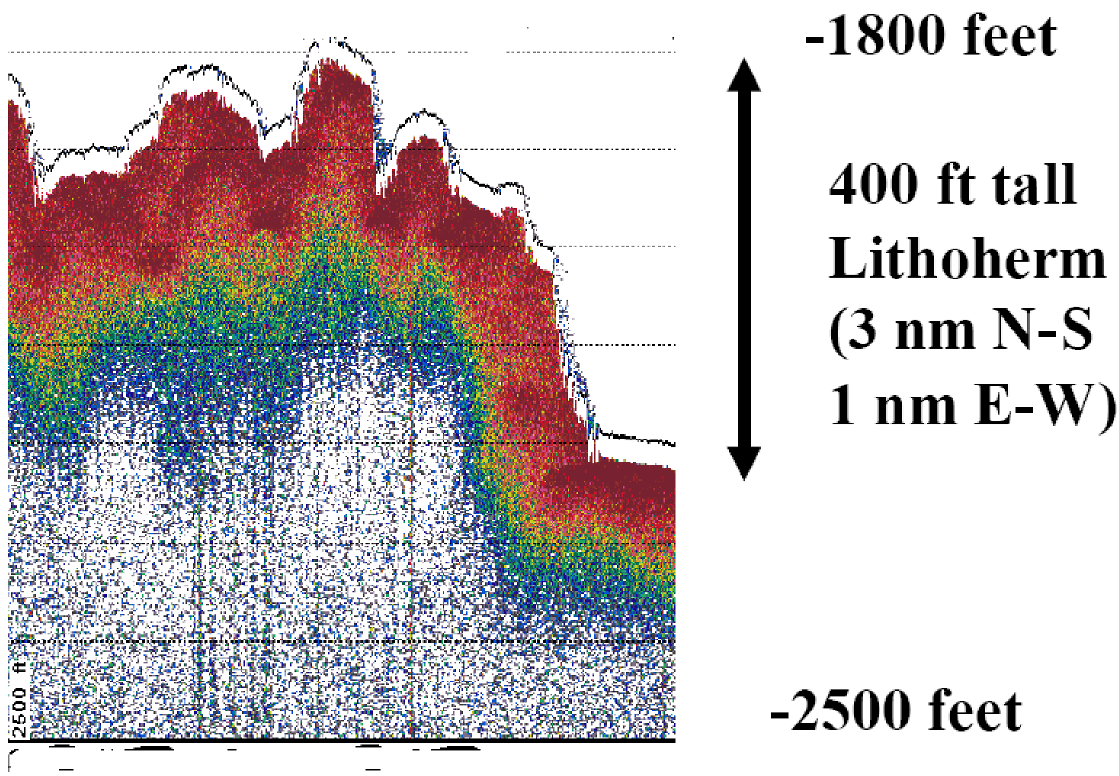


Figure 3-11. Echosounder profile of Jacksonville Lithoherm, Pinnacle #204B (depth 701 m, relief 157 m).
Source: Reed *et al.* (2004b).

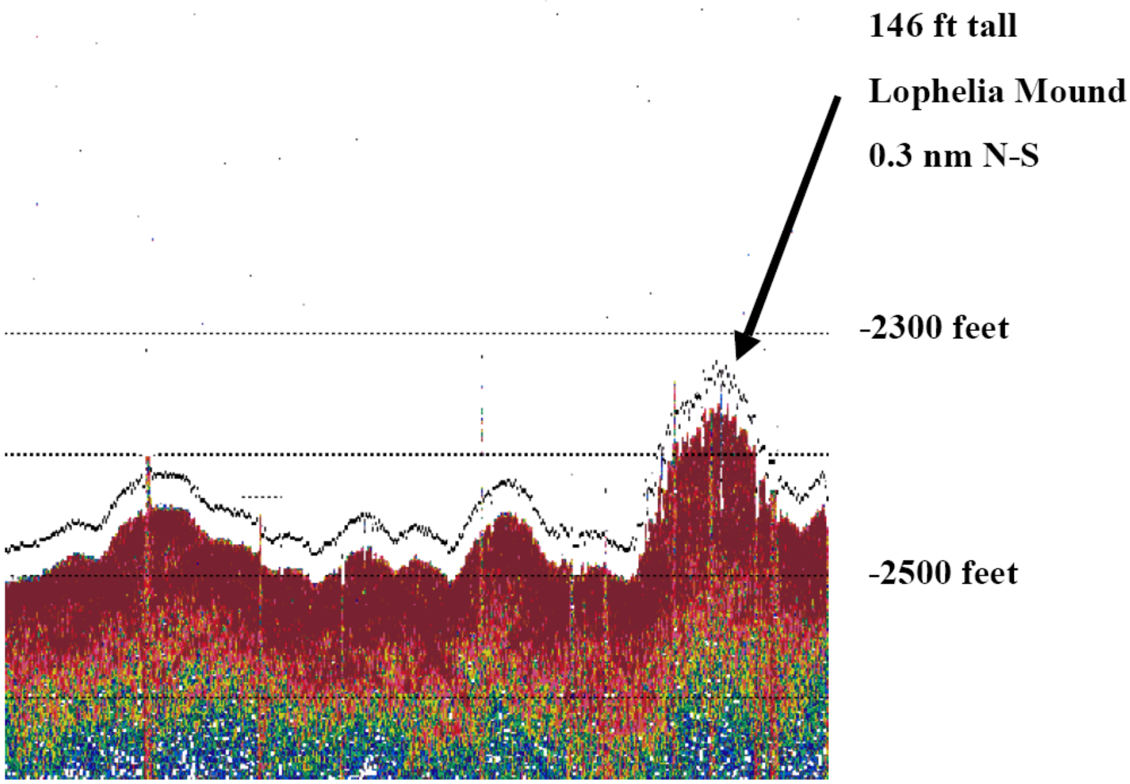


Figure 3-12. Echosounder profile of Cape Canaveral Lophelia Reef, Pinnacle #113 (depth 777 m, relief 61 m) Source: Reed *et al.* (2004b).

The second dive site (JSL II-3336) at Pinnacle #151 was also a deepwater *Lophelia* coral reef comprised entirely of coral and sediment. Maximum depth was 758 m, with 44 m relief, and ~0.3 nm wide (N-S). The top was a series of ridged peaks from 713 to 722 m in depth. The lower flanks of the south face was a 10-20° slope of fine light colored sand with a series of 1-3 m high sand dunes or ridges that were linear NW-SE. The ridges had ~50% cover of thickets of *Lophelia pertusa* coral. The thickets consisted of 1 m tall dead, standing and intact, *Lophelia pertusa* colonies. Approximately 1-10% was alive on the outer parts (15-30 cm) on top of the standing dead bases. There was very little broken dead coral rubble in the sand and there was no evidence of trawl or mechanical damage. Most of the coral was intact, and the dead coral was brown. The sand between the ridges was fine and light colored, with 7-15 cm sand waves. The upper slope steepened to 45° and 70-80° slope near the upper 10 m from the top. The top of the pinnacle had up to 100% cover of 1-1.5 m tall coral thickets, on a narrow ridge that was 5-10 m wide. The coral consisted of both *Lophelia pertusa* and *Enallopsammia profunda*. Approximately 10-20% cover was live coral of 30-90 cm. The north slope was nearly vertical (70-80°) for the upper 10 m then consisted of a series of coral thickets on terraces or ridges. No exposed rock was visible and the entire pinnacle appeared to be a classic *Lophelia* mud mound.

No discernable zonation of macrobenthic fauna was apparent from the base to the top. Corals consisted of *Lophelia pertusa*, *Enallopsammia profunda*, *Madrepora oculata*, and some stylasterine hydrocorals. Dominant octocoral gorgonacea included Primnoidae (2 spp.), Isididae bamboo coral (*Isidella* sp. and *Keratoisis flexibilis*), and the alcyonaceans *Anthomastus* sp. and *Nephthya* sp. Dominant sponges consisted of several species of Hexactinellida glass sponges, large yellow demosponges (60-90 cm diameter), Pachastrellidae, and *Phakellia* sp. fan sponges. Echinoderms included urchins (cidaroid and *Hydrosoma*? sp.) and comatulid crinoids, but no stalked crinoids. Some large decapod crustaceans included *Chaceon fenneri* and large galatheids. No mollusks were observed but were likely within the coral habitat that was not collected. Common fish were 2 m sharks, 25 cm eels, 25 cm skates, chimaera and blackbelly rosefish.

<u>Miami Terrace Escarpment</u> (from Reed et al., 2004b)
The Miami Terrace is a 65-km long carbonate platform that lies between Boca Raton and South Miami at depths of 200-400 m in the northern Straits of Florida. It consists of high-relief Tertiary limestone ridges, scarps and slabs that provide extensive hardbottom habitat (Uchupi 1966, 1969; Kofoed and Malloy 1965; Uchupi and Emery 1967; Malloy and Hurley 1970; Ballard and Uchupi 1971; Neumann and Ball 1970). At the eastern edge of the Terrace, a high-relief, phosphoritic limestone escarpment of Miocene age with relief of up to 90 m at depths of 365 m is capped with *Lophelia pertusa* coral, stylasterine hydrocoral (Stylasteridae), bamboo coral (Isididae), and various sponges and octocorals (Reed et al. 2004b; Reed and Wright 2004). Dense aggregations of 50-100 wreckfish were observed here by J. Reed during JSL submersible dives in May 2004 (Reed et al. 2004b). Previous studies in this region include geological studies on the Miami Terrace (Neumann and Ball 1970; Ballard and Uchupi 1971) and dredge- and trawl-based faunal surveys in the 1970s primarily by the University of Miami (e.g., Halpern 1970; Holthuis 1971, 1974; Cairns 1979). *Lophelia* mounds are also present at the base of the escarpment (~670 m) within the axis of the Straits of Florida, but little is known of their distribution, abundance or associated fauna. Using the *Aluminaut* submersible, Neumann and Ball (1970) found thickets of *Lophelia*, *Enallopsammia* (=*Dendrophyllia*), and *Madepora* growing on elongate depressions, sand ridges and mounds. Large quantities of *L. pertusa* and *E. profunda* have also been dredged from 738-761 m at 26°22' to 24'N and 79°35' to 37'W (Cairns 1979).

Recent JSL submersible dives and fathometer transects by J. Reed at four sites (Reed Site #BU4, 6, 2, and 1b) indicated the outer rim of the Miami Terrace to consist of a double ridge with steep rocky escarpments Reed and Wright 2004; Reed et al. 2004b). At Miami Terrace Site #BU4, the narrow N-S trending east ridge was 279 m at the top and had a steep 95 m escarpment on the west face. The east and west faces of the ridges were 30-40° slopes with some near vertical sections consisting of dark brown phosphoritic rock pavement, boulders and outcrops. The crest of the east ridge was a narrow plateau approximately 10 m wide. At Site #BU6, the crest of the west ridge was 310 m and the base of the valley between the west and east ridges was 420 m. At Site #BU2, the echosounder transect showed a 13 m tall rounded mound at a depth of 636 m near the base of the terrace within the axis of the Straits of Florida. The profile indicated that it is likely a *Lophelia* mound. West of this feature the east face of the east ridge was a steep escarpment from 567 m to 412 m at the crest. The west ridge crested at 321 m. Total distance from the deep mound to the west ridge was 2.9 nm. Site #BU1b was the most southerly transect on the Miami Terrace. An E-W echosounder profile at this site indicated a double peaked east ridge cresting at 521 m, then a valley at 549 m, and the west ridge at 322 m. The east face of the west ridge consisted of a 155 m tall escarpment (Figure 3-13).

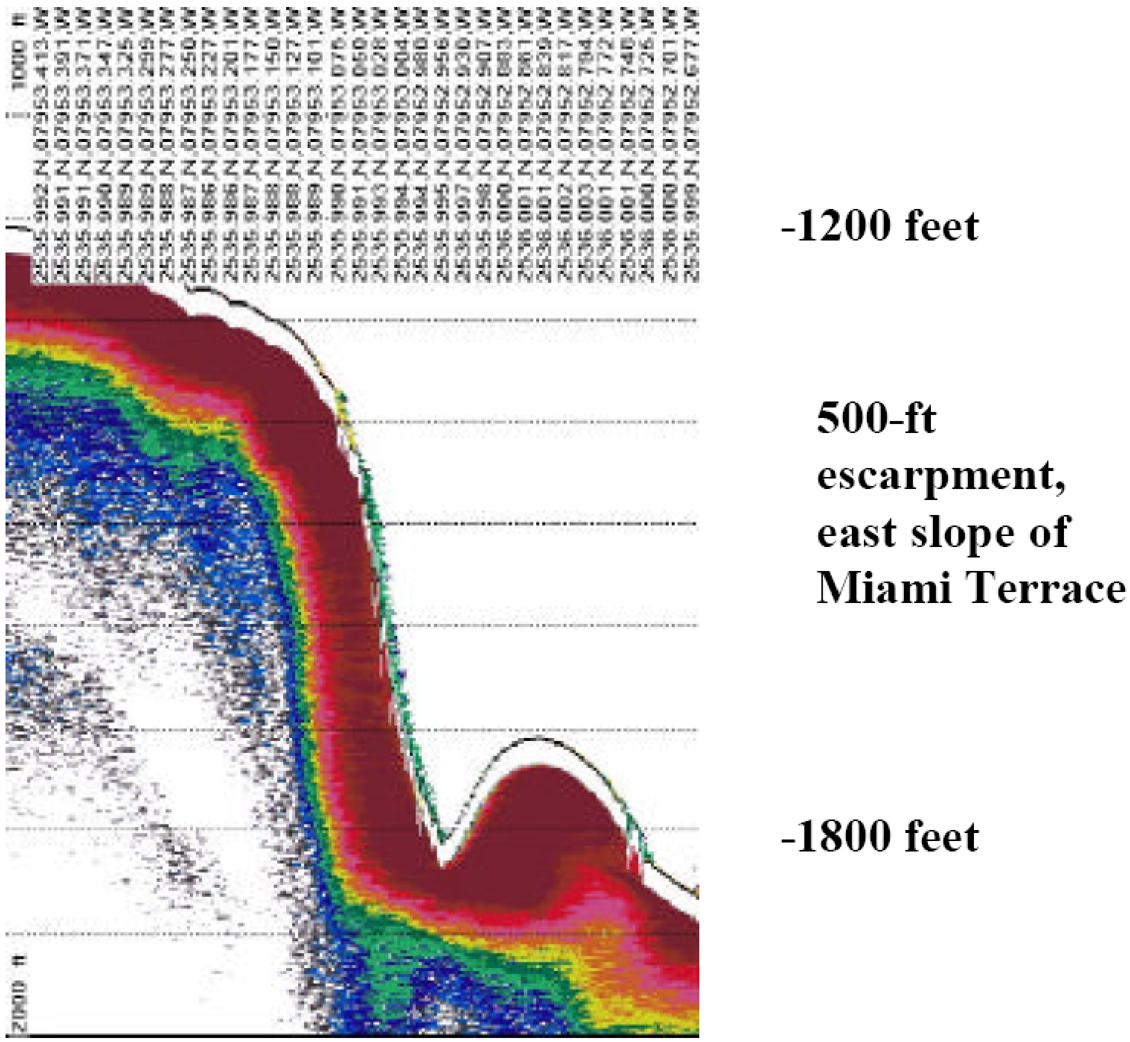


Figure 3-13. Echosounder profile of Miami Terrace Escarpment, Site #BU1b, west ridge (depth 549 m at base, relief 155 m).
Source: Reed *et al.* (2004b).

There were considerable differences among the sites in habitat and fauna; however, in general, the lower slopes of the ridges and the flat pavement on top of the terrace were relatively barren. However, the steep escarpments especially near the top of the ridges were rich in corals, octocorals, and sponges. Dominant sessile fauna consisted of the following Cnidaria: small (15-30 cm) and large (60-90 cm) tall octocoral gorgonacea (*Paramuricea* spp., *Placogorgia* spp., Isididae bamboo coral); colonial scleractinia included scattered thickets of 30-60 cm tall *Lophelia pertusa* (varying from nearly 100% live to 100% dead), *Madrepora oculata* (40 cm), and *Enallopsammia profunda*; stylasterine hydrocorals (15-25 cm); and Antipatharia (30-60 cm tall). Diverse sponge populations of Hexactinellida and Demospongiae included: *Heterotella* sp., *Spongosorites* sp., *Geodia* sp., *Vetulina* sp., *Leiodermatium* sp., *Petrosia* sp., Raspailiidae, Choristida, Pachastrellidae, and Corallistidae. Other motile invertebrates included *Asteroporpa* sp. ophiuroids, *Stylocidaris* sp. urchins, Mollusca, Actiniaria, and Decapoda crustaceans (*Chaceon fenneri* and Galatheidae). Schools of ~50-100 wreckfish (*Polyprion americanus*), ~60-90 cm in length, were observed on several submersible dives along with blackbelly rosefish, skates, sharks and dense schools of jacks.

Pourtalès Terrace Lithoherms (from Reed et al., 2004a)
The Pourtalès Terrace provides extensive, high-relief, hardbottom habitat, covering 3,429 km^2 (1,000 nm^2) at depths of 200-450 m. The Terrace parallels the Florida Keys for 213 km and has a maximum width of 32 km (Jordan 1954; Jordan and Stewart 1961; Jordan et al. 1964; Gomberg 1976; Land and Paull 2000). Reed et al. (2004a) surveyed several deepwater, high-relief, hardbottom sites including the Jordan and Marathon deepwater sinkholes on the outer edge of the Terrace, and five high-relief bioherms on its central eastern portion. The JSL and *Clelia* submersibles were used to characterize coral habitat and describe the fish and associated macrobenthic communities. These submersible dives were the first to enter and explore any of these features. The upper sinkhole rims range from 175 to 461 m in depth and have a maximum relief of 180 m. The Jordan Sinkhole may be one of the deepest and largest sinkholes known.

The high-relief area of the middle and eastern portion of the Pourtalès Terrace is a 55 km-long, northeasterly trending band of what appears to be karst topography that consists of depressions flanked by well defined knolls and ridges with maximum elevation of 91 m above the terrace (Jordan et al. 1964; Land and Paull 2000). Further to the northeast of this knoll-depression zone is another zone of 40-m high topographic relief that lacks any regular pattern (Gomberg 1976). The high-relief bioherms (the proposed HAPC sites within this region) lie in 198 to 319 m, with a maximum height of 120 m. A total of 26 fish taxa were identified from the sinkhole and bioherm sites. Species of potential commercial importance included tilefish, sharks, speckled hind, yellow-edge grouper, warsaw grouper, snowy grouper, blackbelly rosefish, red porgy, drum, scorpion fish, amberjack, and phycid hakes. Many different species of Cnidaria were recorded, including Antipatharia black corals, stylasterine hydrocorals, octocorals, and one colonial scleractinian (*Solenosmilia variabilis*).

<u>Tennessee and Alligator Humps, Bioherms #1-4- Pourtalès Terrace</u> (from Reed et al., 2004a)
The Tennessee and Alligator Humps are among dozens of lithoherms that lie in a region called "The Humps" by local fishers, ~14 nm south of the Florida Keys and south of Tennessee and Alligator Reefs. Three dives were made by J. Reed on Bioherm #3 (Clelia 597, 598, 600; Aug. 2001), approximately 8.5 nm NE of Bioherm #2 (Figure 3-14). Bioherm #3 consisted of two peaks 1.05 nm apart with a maximum relief of 62 m. The North Peak's minimum depth was 155 m and was 653 m wide at the base, which was 217 m deep at the east base and 183 m at the west side. The minimum depth of South Peak was 160 m and was about 678 m in width E to W at the base. The surrounding habitat adjacent to the mounds was flat sand with about 10% cover of rock pavement. From 213 m to the top, generally on the east flank of the mound, were a series of flat rock pavement terraces at depths of 210, 203, 198, 194, 183, and 171 m and the top plateau was at 165 m. Between each terrace a 30-45° slope consisted of either rock pavement or coarse sand and rubble. Below each terrace

was a vertical scarp of 1-2 m where the sediment was eroded away leaving the edge of the terrace exposed as a horizontal, thin rock crust overhang of <1 m and 15-30 cm thick. The top of the bioherm was a broad plateau of rock pavement with 50-100% exposed rock, few ledges or outcrops, and coarse brown sand. Less time was spent on the western side, which was more exposed to the strong bottom currents. The west side of South Peak sloped more gradually than the eastern side, had more sediment, and no ledges were observed.

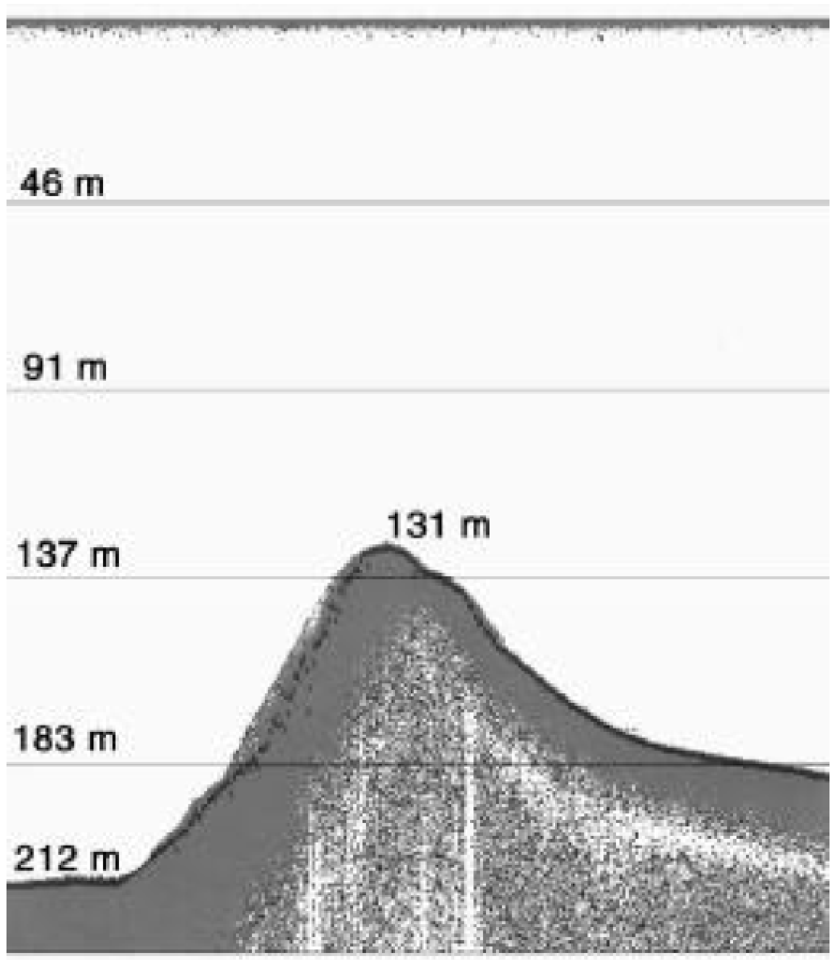


Figure 3-14. Echosounder profile of Pourtalès Terrace, Tennessee Bioherm #2 (depth 212 m at base, relief 85 m) Source: Reed *et al.* (2004a).

3.1.2

3.1.3 Ecological role and function

Deep-sea slope coral areas (>150 m, but most >300 m)

Deep coral habitat may be more important to western Atlantic slope species than previously known. Some commercially valuable deep-water species congregate around deep-coral habitat (Table 3-2). Various crabs, especially galatheoids, are abundant on the deep reefs, playing a role of both predator on and food for the fishes. Other invertebrates, particularly ophiuroids, populate the coral matrix in high numbers. On the relatively barren Blake

Plateau, reefs (coral and hardgrounds) and surrounding coral rubble habitat seem to offer abundant shelter and food.

There are few deep-coral ecosystem references for the southeast region related to fishes, and those are generally qualitative (fishes neither collected nor counted) or fishes were not a specific target of the research (Popenoe and Manheim 2001; Weaver and Sedberry 2001; Reed et al. 2005, 2006). In the most detailed study of fishes to date, Ross and Quattrini (2007) identified 99 benthic or benthopelagic fish species on and around southeastern U.S. deep-coral banks, 19% of which yielded new distributional data for the region. Additional publications resulting from their fish database documented the anglerfish fauna (Caruso et al. 2007), midwater fish interactions with the reefs (Gartner et al. in review), a new species of eel (McCosker and Ross in press), and a new species of hagfish (Fernholm and Quattrini in press). Although some variability in fish fauna was observed over this region, most of the deep-coral habitat was dominated by relatively few fish species (Table 3-2).

Many of these species are cryptic, being well hidden within the corals (e.g., *Hoplostethus occidentalis*, *Netenchelys exoria*, *Conger oceanicus*). Various reef habitats were characterized by *Laemonema melanurum*, *L. barbatulum*, *Nezumia sclerorhynchus*, *Beryx decadactylus*, and *Helicolenus dactylopterus* (Ross and Quattrini 2007). Nearby off reef areas were dominated by *Fenestraja plutonia*, *Laemonema barbatulum*, *Myxine glutinosa*, and *Chlorophthalmus agassizi*. *Beryx decadactylus* usually occurs in large aggregations moving over the reef, while most other major species occur as single individuals. The morid, *Laemonema melanurum*, is one of the larger fishes abundant at most sites with corals. This fish seems to rarely leave the prime reef area, while its congener *L. barbatulum* roams over a broader range of habitats. Although *Helicolenus dactylopterus* can be common in all habitats, it occurs most often around structures. It is intimately associated with the coral substrate, and it is abundant around deep-reef habitat. Results (Ross and Quattrini 2007) suggested that some of the fishes observed around the deep-coral habitats may be primary (obligate) reef fishes.

Table 3-2. Dominant benthic fish species (in phylogenetic order) observed and/or collected during submersible dives (2000-2005) on or near southeastern U.S. *Lophelia* habitat. Source: Based on Ross and Quattrini (2007). Asterisk (*) indicate commercially important species.

Myxinidae (mixed Myxine glutinosa and Eptatretus spp.)	hagfishes
Scyliorhinus retifer	chain dogfish
Scyliorhinus meadi	
Cirrhigaleus asper	roughskin dogfish
Dysommina rugosa	
Synaphobranchus spp.	cutthroat eels
*Conger oceanicus**	conger eel
Netenchelys exoria	
Nezumia sclerorhynchus	
Laemonema barbatulum	shortbeard codling
Laemonema melanurum	reef codling
Physiculus karrerae	
Lophiodes beroe	
Hoplostethus occidentalis	western roughy
*Beryx decadactylus**	red bream
*Helicolenus dactylopterus**	blackbelly rosefish
Idiastion kyphos	
Trachyscorpia cristulata	Atlantic thornyhead
*Polyprion americanus**	wreckfish

One of the most impressive biological aspects of these coral habitats (aside from the corals themselves) is the diverse and abundant invertebrate fauna (Table 3-3 and Reed et al. 2006). *Eumunida picta* (galatheoid crab; squat lobster) and *Novodinia antillensis* (brisingid seastar) were particularly obvious, perched high on coral bushes to catch passing animals or filter food from the currents. One very different aspect of the North Carolina deep-coral habitat compared to the rest of the southeast region is the massive numbers of the brittle star, *Ophiacantha bidentata*, covering dead coral colonies, coral rubble, and to a lesser extent, living Lophelia colonies. It is perhaps the most abundant macroinvertebrate on these banks and may constitute a major food source for fishes (Brooks et al. 2007). In places the bottom is covered with huge numbers of several species of anemones. The hydroid fauna is also rich with many species being newly reported to the area and some species being new to science (Henry et al. in press). The abundance of filter feeders suggests a food rich habitat. Various species of sponges, echinoderms, cnidarians (Messing et al. 1990) and crustaceans (Wenner and Barans 2001) also have been reported from deep-coral reefs off Florida, the northeastern Straits of Florida and the Charleston Bump region (Reed et al. 2006). Reed et al. (2006) provided a preliminary list of invertebrates, mostly sponges and corals, from some deep-coral habitats on the Blake Plateau and Straits of Florida; however, most taxa were not identified to species. Lack of data on the invertebrate fauna associated with deep corals is a major deficiency.

Table 3-3. Preliminary list of dominant benthic megainvertebrates observed or collected on or near southeastern U.S. deep coral habitats.
Source: References are 1= Nizinski et al. unpublished data, 2= Reed et al. 2006, 3 = Henry et al. in review.

Dominant Non-Coralline Invertebrate Taxa	
Phylum Porifera (Sponges) Class Demospongiae multiple species[1,2] Class Hexactinellida (glass sponges) multiple species[1,2] including *Aphrocallistes beatrix*[1]	Phylum Cnidaria Class Hydrozoa (Hydroids) multiple species (≥ 37 species)[3] Class Anthozoa Order Actinaria (anemones) multiple species including *Actinaugi rugosa* (Venus flytrap anemone)[1] Order Zoanthidea (zoanthids) multiple species[1,2]
Phylum Mollusca Class Cephalopoda Squids, *Ilex* sp.[1] Octopus, multiple species[1] Class Gastropoda *Coralliophila* (?) sp.[1]	Phylum Annelida Class Polychaeta (polychaetes) multiple species including *Eunice* sp.[1]
Phylum Arthopoda Subphylum Crustacea Class Malacostraca Order Decapoda Infraorder Anomura Family Chirostylidae (squat lobster) *Eumunida picta* [1,2] *Gastroptychus salvadori*[1] *Uroptychus* spp.[1] Family Galatheidae (squat lobster) *Munida* spp.[1] *Munidopsis* spp.[1] Superfamily Paguroidea (hermit crabs and their relatives) multiple species[1] Infraorder Brachyura Family Pisidae *Rochinia crassa* (inflated spiny crab)[1] Family Geryonidae *Chaceon fenneri* (golden deepsea crab)[1,2] Family Portunidae *Bathynectes longispina* (bathyal swimming crab)[1,2] Other taxa Shrimps, multiple species[1]	Phylum Echinodermata Class Crinoidea (crinoids) multiple species[1] Class Asteroidea (sea stars) multiple species[1,2] Order Brisingida (brisingid sea star) Family Brisingidae *Novodinia antillensis*[1] Class Ophiuroidea (brittle stars) multiple species[1], including *Ophiacantha bidentata*[1] Class Echinoidea (sea urchins) Order Echinoida Family Echinidae *Echinus gracilis*[1] *E. tylodes*[1] Order Echinothurioida Family Echinothuriidae *Hygrosoma* spp.[2] Order Cidaroida Family Cidaridae *Cidaris rugosa*[1] *Stylocidaris* spp.[2]

Although the invertebrate assemblage associated with northeastern Atlantic *Lophelia* reefs has been described as being as diverse as shallow water tropical coral reefs (e.g., Jensen and

Frederickson 1992), data analysis of invertebrates associated with western Atlantic deep corals is too preliminary to speculate on the degree of species richness. Preliminary data on the invertebrate fauna (Nizinski et al. unpublished data) seem to indicate a faunal and habitat transition with latitude. In addition to changes in reef structure and morphology (see above), relative abundance within a single species decreases, overall species diversity increases, and numerical dominance between species decreases with decreasing latitude. In contrast to some fishes, the reef associated invertebrate assemblage appears to use deep reefs more opportunistically.

3.1.4 Deepwater coral habitat as Essential Fish Habitat

(Excerpts from Hourigan, et al. 2007.)
As the understanding of deep coral communities and ecosystems has increased, so has appreciation of their value. Deep coral communities can be hot-spots of biodiversity in the deeper ocean, making them of particular conservation interest. Stony coral "reefs" as well as thickets of gorgonian corals, black corals, and hydrocorals are often associated with a large number of other species. Through quantitative surveys of the macroinvertebrate fauna, Reed (2002b) found over 20,000 individual invertebrates from more than 300 species living among the branches of ivory tree coral (*Oculina varicosa*) off the coast of Florida. Over 1,300 species of invertebrates have been recorded in an ongoing census of numerous Lophelia reefs in the northeast Atlantic (Freiwald et al. 2004), and Mortensen and Fosså (2006) reported 361 species in 24 samples from Lophelia reefs off Norway. Gorgonian corals in the northwest Atlantic have been shown to host more than 100 species of invertebrates (Buhl-Mortensen and Mortensen 2005). An investigation by Richer de Forges et al. (2000) reported over 850 macro- and megafaunal species associated with seamounts in the Tasman and south Coral Seas with many of these species associated with the deep coral Solenosmilia variabilis (Rogers 2004). The three-dimensional structure of deep corals may function in very similar ways to their tropical counterparts, providing enhanced feeding opportunities for aggregating species, a hiding place from predators, a nursery area for juveniles, fish spawning aggregation sites, and attachment substrate for sedentary invertebrates (Fosså et al. 2002; Mortensen 2000; Reed 2002b).

The high biodiversity associated with deep coral communities is intrinsically valuable, and may provide numerous targets for chemical and biological research on marine organisms. For example, several deep-water sponges have been shown to contain bioactive compounds of pharmaceutical interest; sponges are often associated with deep coral communities. Bamboo corals (family Isididae) are being investigated for their medical potential as bone grafts and for the properties of their collagen-like gorgonin (Ehrlich et al. 2006). A number of deep corals are also of commercial importance, especially black corals (order Antipatharia) and pink and red corals (Corallium spp.), which are the basis of a large jewelry industry. Black coral is Hawaii's "State Gem."

Deep coral communities have also been identified as habitat for certain commercially-important fishes. For example, commercially valuable species of rockfish, shrimp, and crabs are known to use coral branches for suspension feeding or protection from predators in Alaskan waters (Krieger and Wing 2002). Husebø et al. (2002) documented a higher abundance and larger size of commercially valuable redfish, ling, and tusk in Norwegian waters in coral habitats compared to non-coral habitats. Costello et al. (2005), working at several sites in the Northeast Atlantic, report that 92% of fish species, and 80% of individual fish were associated with Lophelia reef habitats rather than on the surrounding seabed. Koenig (2001) found a relationship between the abundance of economically valuable fish (e.g., grouper, snapper, sea bass, and amberjack) and the condition (dead, sparse and intact) of *Oculina* colonies. *Oculina* reefs off Florida have been identified as essential fish habitat for federally-managed species, as have gorgonian-dominated deep coral communities off Alaska and the West Coast of the United States. In other cases, however, the linkages between commercial fisheries species and deep corals remain unclear (Auster 2005; Tissot et al. 2006) and may be indirect.

Due to their worldwide distribution and the fact that some gorgonian and stony coral species can live for centuries, deep corals may serve as a proxy for reconstructing past changes in global climate and oceanographic conditions (Risk et al. 2002; Williams et al. 2007). The calcium carbonate skeletons of corals incorporate trace elements and isotopes that reflect the physical and chemical conditions in which they grew. Analysis of the coral's microchemistry has allowed researchers to reconstruct past oceanic conditions.

Essential fish habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S. C. 1802(10)). Specific categories of EFH identified in the South Atlantic Bight which are utilized by federally managed fish and invertebrate species include both estuarine/inshore and marine/offshore areas. Specifically, marine/offshore EFH includes: Live/hard bottom habitats, coral and coral reefs, artificial and manmade reefs, *Sargassum* species, and marine water column. Deepwater coral ecosystems are, therefore, EFH for some snapper grouper species.

Snapper Grouper

EFH utilized by snapper grouper species in this region includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 183 meters [600 feet (but to at least 2,000 feet for wreckfish)] where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical fish complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for survival of larvae and growth up to and including settlement. In addition, the Gulf Stream is also EFH because it provides a mechanism to disperse snapper grouper larvae.

Dolphin Wahoo

EFH for dolphin and wahoo is the Gulf Stream, Charleston Gyre, Florida Current, and pelagic Sargassum.

Note: This EFH definition for dolphin was approved by the Secretary of Commerce on June 3, 1999 as a part of the South Atlantic Council's Comprehensive Habitat Amendment (SAFMC, 1998b) (dolphin was included within the Coastal Migratory Pelagics FMP). This definition does not apply to extra-jurisdictional areas. A detailed description of the pelagic habitats used by dolphin and wahoo is presented the Habitat Plan and Volume II of the Fishery Ecosystem Plan.

Habitat Areas of Particular Concern

Snapper Grouper

Areas which meet the criteria for essential fish habitat-habitat areas of particular concern (EFH-HAPCs) species in the snapper grouper management unit associated with the deepwater coral HAPCs include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; The Point, and Big Rock (North Carolina); The Charleston Bump (South Carolina); pelagic *Sargassum*; Hoyt Hills for wreckfish; all hermatypic coral habitats and reefs; and manganese outcroppings on the Blake Plateau. Areas that meet the criteria for designating essential fish habitat-habitat areas of particular concern include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages).

Coastal Migratory Pelagics

Areas which meet the criteria for essential fish habitat-habitat areas of particular concern (EFH-HAPCs) include sandy shoals of Capes Lookout, Cape Fear, and Cape Hatteras from shore to the ends of the respective shoals, but shoreward of the Gulf stream; The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and Hurl Rocks (South Carolina); The Point off Jupiter Inlet (Florida); *Phragmatopoma* (worm reefs) reefs off the central east coast of Florida; nearshore hard bottom south of Cape Canaveral; The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The "Wall" off of the Florida Keys; Pelagic Sargassum; and Atlantic coast estuaries with high numbers of Spanish mackerel and cobia based on abundance data from the ELMR Program. Estuaries meeting this criteria for Spanish mackerel include Bogue Sound and New River, North Carolina: Bogue Sound, North Carolina (Adults May-September salinity >30 ppt); and New River, North Carolina (Adults May-October salinity >30 ppt). For Cobia they include Broad River, South Carolina; and Broad River, South Carolina (Adults & juveniles May-July salinity >25ppt).

Dolphin Wahoo

EFH-HAPCs for dolphin and wahoo in the Atlantic include The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and The Georgetown Hole (South Carolina); The Point off Jupiter Inlet (Florida); The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The "Wall" off of the Florida Keys; and Pelagic Sargassum.

Note: This EFH-HAPC definition for dolphin was approved by the Secretary of Commerce on June 3, 1999 as a part of the South Atlantic Council's Comprehensive Habitat Amendment (dolphin was included within the Coastal Migratory Pelagics FMP).

In addition to protecting deepwater coral habitat from fishing related degradation though FMP regulations, the Council in cooperation with NOAA Fisheries, actively comments on non-fishing projects or policies that may impact essential fish habitat. The Council adopted a habitat policy and procedure document that established a four-state Habitat Advisory Panel and adopted a comment and policy development process. With guidance from the Advisory Panel, the Council has developed and approved habitat policies: energy exploration, development, transportation and hydropower re-licensing; beach dredging and filling and large-scale coastal engineering; protection and enhancement of submerged aquatic vegetation; alterations to riverine, estuarine and nearshore flows; and marine aquaculture.

3.2 *Biological/Ecological Environment*

3.2.1 Species Most Impacted By CEA 1

3.2.1.1 Deepwater corals

A description of the dominant deepwater coral species in the South Atlantic region and their distribution is included in Section 3.1.1 above.

Reproduction

Lophelia pertusa has been studied more extensively than other species, using samples from Norway, the Gulf of Mexico and the Florida Straits. Seasonality of gametogenesis appears to vary with location. The gametogenic cycle of samples collected from the Norwegian Fjords began in April and terminated with spawning in March the following year (Brooke and Jarnegren in prep.). In the Gulf of Mexico, however, gametogenesis begins in November and spawning probably occurs in late September/October (S. Brooke unpubl.). Fecundity of both sets of samples is high but quantified data have not yet been compiled. Research into reproduction of octocorals from Alaska and New England is also underway (Simpson unpubl), and some work has been done on reproduction in Alaskan stylasterines, which are all brooders and produce short-lived planulae (Brooke and Stone in review). Larval biology has been described for *O. varicosa* (Brooke and Young 2005) but not for any of the other deepwater corals.

Development and growth

The growth of *L. pertusa* has been measured using various methods (Duncan 1877; Dons 1944; Freiwald 1998; Gass and Roberts 2006), which have estimated growth rates between 4-26 mm per year, with the most likely estimates at approximately 5mm per year (Mortensen and Rapp 1998). These methods have measured linear extension rather than calcification rates, but the latter could potentially be calculated from growth rates and skeletal density. Growth rates of some gorgonians and antipatharians have also been measured using rings in the gorgonian skeleton and isotopic analysis (e.g., Sherwood et al. 2005, Andrews et al.

2002, Risk et al. 2002; Williams et al. 2006) and in some cases the colonies are extremely old (hundreds to thousands of years) and have very slow growth rates (e.g., Druffel et al. 1995; C. Holmes et al. unpubl. data).

Field observations on distribution of *L. pertusa* indicate that the upper thermal limit for survival is approximately 12°C, and laboratory studies on *L. pertusa* tolerance to temperature extremes corroborate these observations (S. Brooke unpubl. data). Preliminary experiments with heat shock proteins show expression of HSP-70 in response to exposure of temperature greater than 10°C (S. Brooke unpubl. data). Experiments on tolerance to sediment load indicate that samples of *L. pertusa* from the Gulf of Mexico show >50% survival in sediment loads of 103 mgL-1 for 14 days, and can survive complete burial for up to 2 days (Continental Shelf Associates in review). Given the proximity of some coral habitats to oil and gas extraction sites, tolerance to drilling fluids and fossil fuels should also be investigated.

Further laboratory and field experiments are needed to examine the individual and interactive effects of environmental conditions such as temperature, sedimentation, and toxins. A range of responses or endpoints should be examined including more modern techniques such as cellular diagnostics. These include examination of levels of stress proteins produced by cells in response to external conditions such as heat shock proteins, ubiquitin, etc. There are general classes of cellular products that are known to be indicative of specific stressors such as nutritional stress, xenobiotics, metals, temperature. These techniques are being increasingly used in shallow coral systems as a more sensitive organismal response to stress (i.e. more sensitive than mortality). These responses should be measured in combination with more standard parameters such as growth, respiration, and fecundity.

Coral growth rates provide information on the rates of habitat production in deepwater coral ecosystems while coral mortality and bioerosion counterbalance this production with destruction. Understanding the positive and negative sides of this balance, particularly under the changes in environmental conditions that are anticipated in the coming decade or two, is crucial to the management and conservation of deepwater coral habitat and habitat function (e.g. fishery production).

3.2.2 Other Affected Council-Managed Species

3.2.2.1 Golden Crab

3.2.2.1.1 *Description and Distribution*

The golden crab, *Chaceon fenneri* (Figure 3-15*)*, is a large gold or buff colored species whose diagnostic characters include an 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, 1989). Golden crabs inhabit the continental slope of Bermuda (Luckhurst 1986, Manning and Holthuis 1986) and the southeastern United States 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).

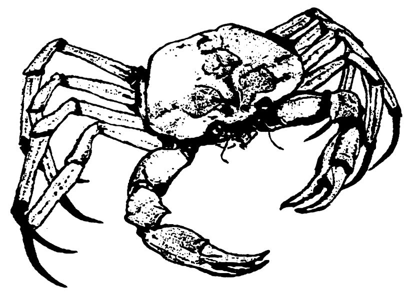


Figure 3-15. Golden Crab, *Chaceon fenneri*.

Reported depth distributions of *C. fenneri* range from 205 m off the Dry Tortugas (Manning and Holthuis 1984) to 1007 m off Bermuda (Manning and Holthuis 1986). Size of males examined range from 34 to 139 mm carapace length (CL) and females range from 39 to 118 mm CL. Ovigerous females have been reported during September, October and November, and range in size from 91 to 118 mm CL (Manning and Holthuis 1984, 1986).

Wenner *et al.* (1987) note: "Other studies have described an association of *G. quinquedens* 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 m between St. Augustine and Cape Canaveral, FL (30°N and 28°N). This same depth range from Savannah, GA to St. Augustine was generally characterized by Bullis and Rathjen (1959) as extremely irregular bottom with some smooth limestone or "slab" rock present. Our study indicates, however, that the bottom due east between Savannah and St. Catherines Island, GA at 270-540 m consists of mud and biogenic ooze. Further north from Cape Fear, NC to Savannah, bottom topography between 270 and 450 m is highly variable with rocky outcrops, sand and mud ooze present (Low and Ulrich 1983)."

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

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

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

- A flat foraminiferon ooze habitat (405-567 m) 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 and 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 km- h-1 current. The decapod crustaceans *Bathynectes longispina*, *Eugonatonotus crassus* and *Eumunida pita*, 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 m); dunes (389-472 m); black pebble habitat (446-564 m); low outcrop (466-512 m); and soft-bioturbated habitat (293-475 m). 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 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/ha) 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.

3.2.2.1.2 *Reproduction*

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

"The male crab is larger than female. Their reproductive tracts are typical of brachyurans. Light and electron microscopic studies of the testes and vasa deferentia at various times during the year indicate that *G. fenneri* has a single reproductive season. Spermatogenesis begins in the fall. By January, many acini of the testes are filled with mature sperm and spermatophores and seminal fluids accumulate in the anterior and middle vasa deferentia. In March all portions of the vasa deferentia are swollen with seminal products. 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"

3.2.2.1.3 *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* 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%)."

3.2.2.1.4 *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).

3.2.2.1.5 *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 kg per trap. Wenner and Barans (1990) estimated the golden crab population in small areas of 26-29 square km between 300-500 m 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 kg (13.6 million pounds) (Lindberg *et al.* 1989). Experimental trapping off Georgia yielded an average catch of 7 kg per trap (Kendall 1990).

Based on exploratory trapping, golden crab maximum abundance occurs between 367 and 549 meters 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).

Golden Crab Fishery

Information on the golden crab fishery participation was taken from the Stock Assessment and Fishery Evaluation (SAFE) report (SAFMC 2004), logbook data (SEFSC, 2008), and ALS data.

Annual and Monthly Landings

Total landings and landings by zone of golden crab are shown in Table3-4. Figure 3-16 shows this data in chart form. Golden crab landings reached a peak of over 1 million pounds in 1997 (Table 3-4, Figure 3-16). Since then, landings have averaged about 550,000 annually. However, the trend shows an average of 665,000 pounds from 1998-2002 and 355,000 pounds from 2003-2006.

The overwhelming majority of landings in recent years have come from the Middle Zone (90-100%). However, historically, a significant portion of landings came from the Southern Zone (10-36%). Only in the past two years since implementationof the zoned permit system, have any landings at all come from the Northern Zone (1% in 2006 and 10% in 2007). Landings from the Middle Zone have averaged around 470,000 pounds since 1996 with a low of about 250,000 pounds in 2004 and a high of about 662,000 pounds in 1997. Landings from the Southern Zone were significant 1997 through 2001 (30-36%). Landings peaked at about 372,000 pounds in 1997 and were maintained at over 100,000 pounds until they dropped off sharply in 2002.

Table 3-4. Landings of Golden Crab by Zone, 1995-2007. SEFSC, 2008.

Year	Middle Zone	Northern Zone	Southern Zone	Total
1995	61,660	0	0	61,660
1996	523,160	0	0	523,160
1997	661,896	0	372,551	1,034,447
1998	361,480	0	156,836	518,316
1999	457,041	0	225,183	682,224
2000	584,130	0	257,617	841,747
2001	530,255	0	250,883	781,138
2002	448,254	0	52,520	500,774
2003	351,587	0	7,500	359,087
2004	251,307	0	27,029	278,336
2005	432,846	0	0	432,846
2006	566,780	7,484	25,110	599,374
2007	452,562	49,730	0	502,292

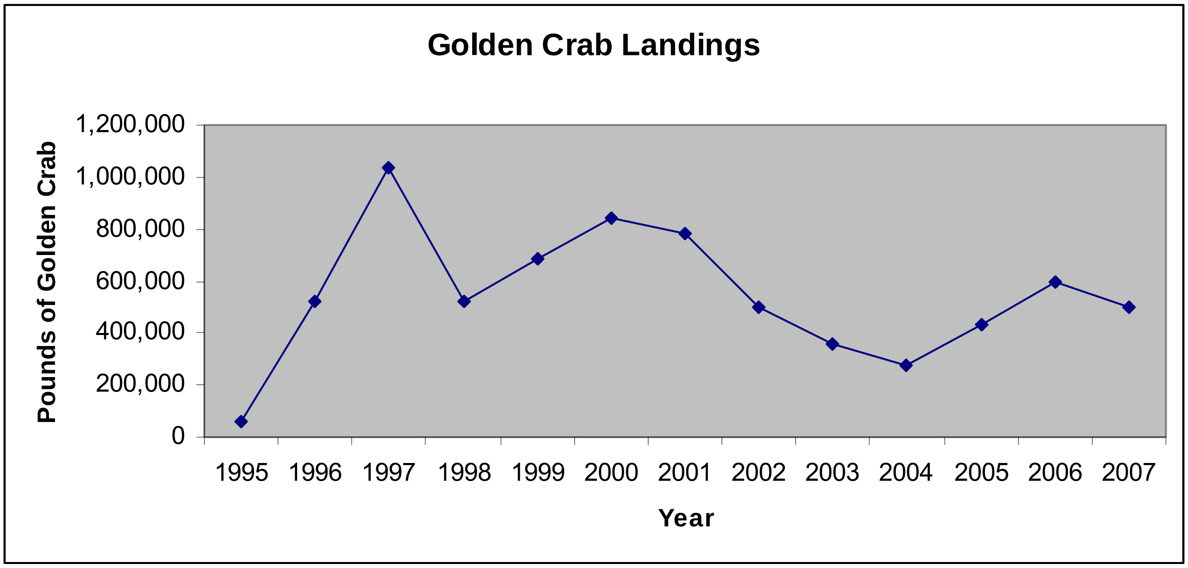


Figure 3-16. Landings of Golden Crab, 1995-2007. SEFSC, 2008.

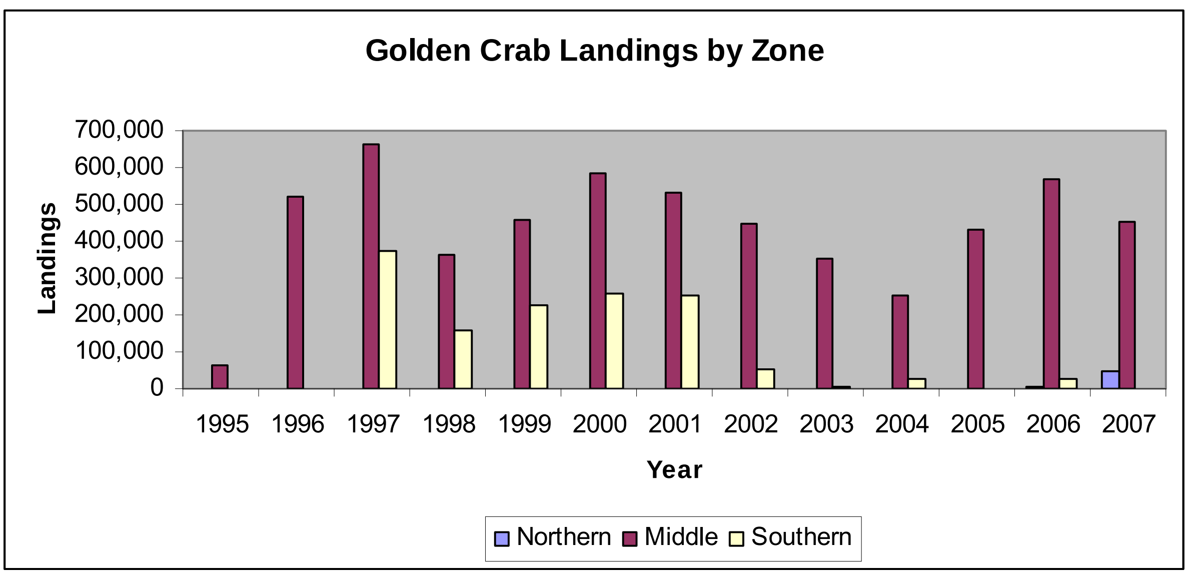


Figure 3-17. Landings of Golden Crab by Zone, 1995-2007. SEFSC, 2008.

Figure 3-17 shows monthly golden crab landings from 2003 to 2007. Golden crab landings have varied widely from month to month over the past 5 years. In general, more golden crab are landed from May to December than in the first half of the year due to Keys fishermen entering the fishery in the second half of the year after the spiny lobster season winds down.

On average, from 1996 to 2007, 45% of total golden crab landings were made between January and May while 55% of landings were made between May and December.

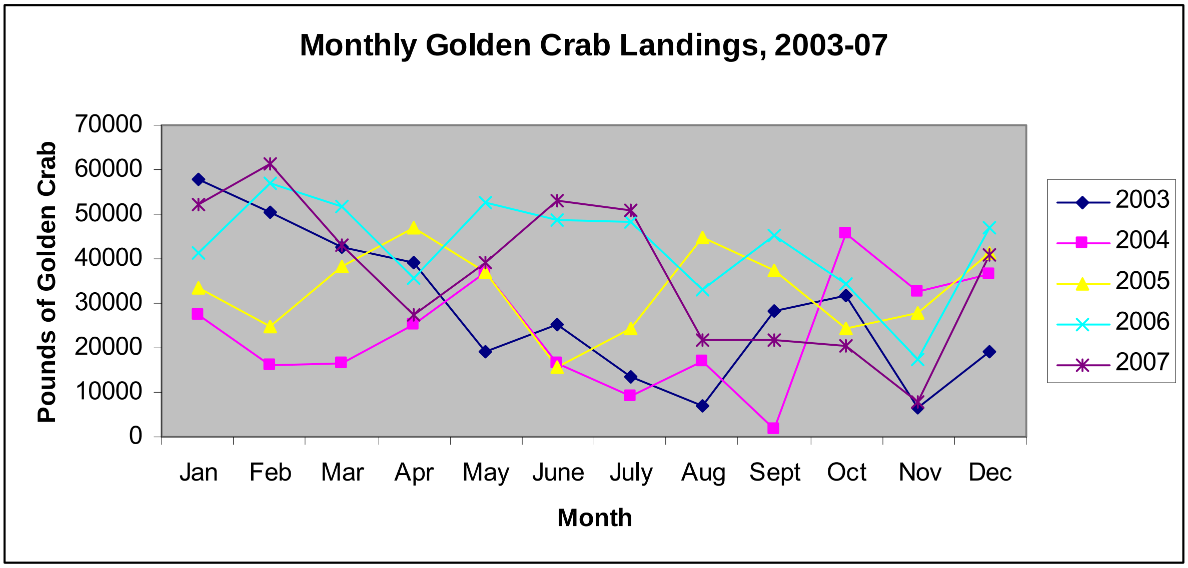


Figure 3-18. Monthly Golden Crab Landings, 2003-07. ALS data.

<u>Catch per Unit Effort (CPUE)</u>

Data on Catch per Unit Effort (CPE) for golden crab is only available from 1995 to 2003 at this point in time. Based on that data, annual CPUE has been fairly consistent from 1995 to 2003, ranging from 39 to 59 lbs per trap (Figure 3-16). CPUE in 2003 was the highest since records began in 1995 (Figure 3-18). Monthly CPUE has been relatively consistent during the last five years (Figures 3-19a). Record high CPUE in 2001 was primarily due to unusually high CPUE from January through May. CPUE in 2003 was higher than in most other years measured, during the months for which data were available (Figure 3-19a).

In contrast to the Middle Zone, CPUE in the Southern Zone decreased from 1999 to 2002, stabilizing at about 22-25 lbs per trap from 2000 to 2002 (Figure 3-18). CPUE has been lower in the Southern compared to the Middle Zone in every year but 1999 (Figure 3-18). CPUE in the Southern Zone was approximately 50%-60% of CPUE in the Middle Zone from 2000 to 2002 (Figure 3-18).

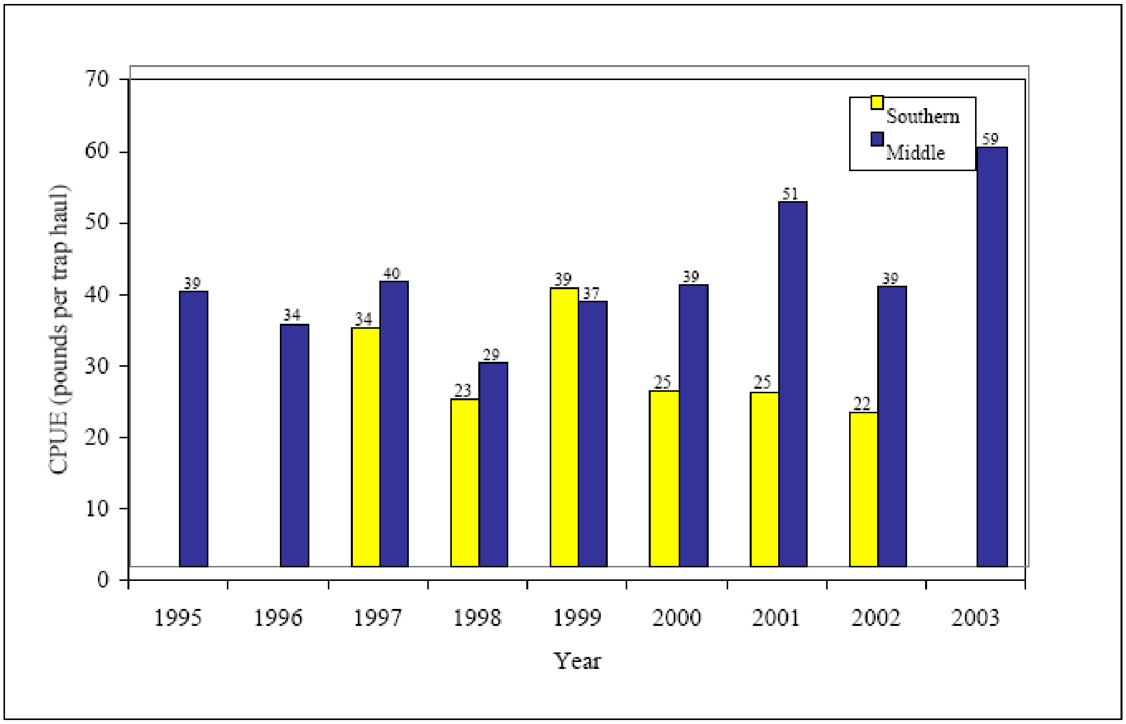


Figure 3-19. Golden crab CPUE by year and zone.

Southern Zone CPUE for the first five months of 2002 was at or below average for the period 1999-2002 (Figure 3-19b. Monthly CPUE has been more variable in this zone compared to the Middle Zone (Figure 3-20b).

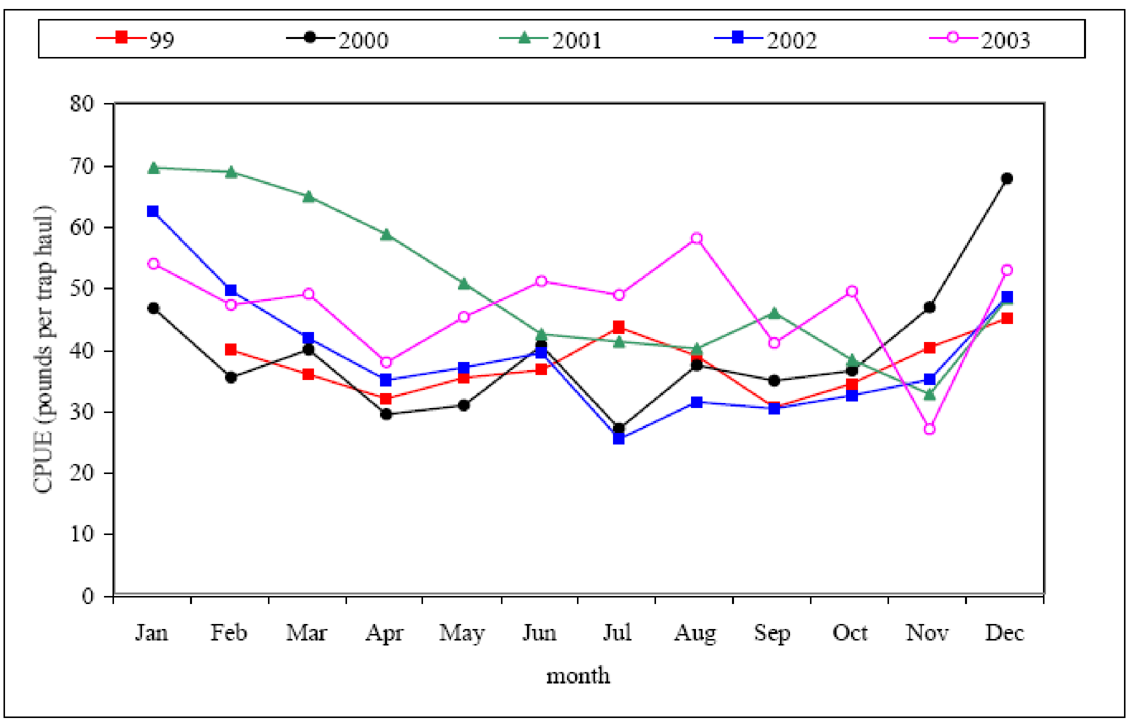


Figure 3-20a. Monthly CPUE of golden crab by year, Middle Zone.

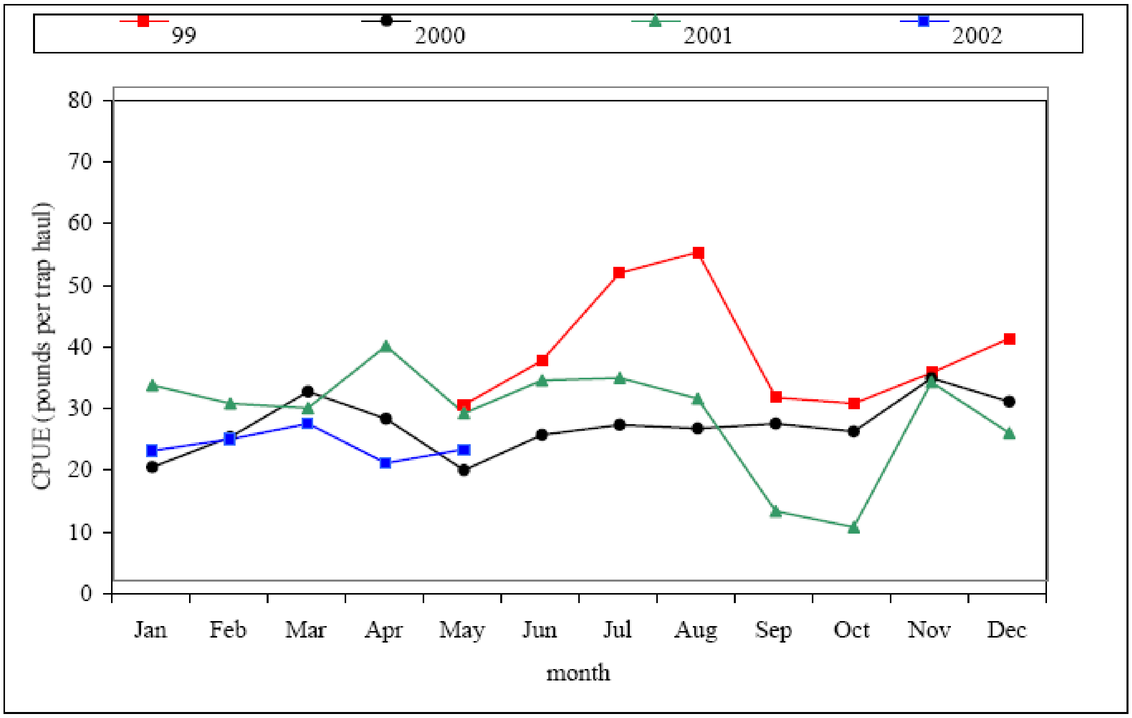


Figure 3-20b. Monthly CPUE of golden crab by year, Southern Zone.

<u>TIP Sampling</u>

The 1999 SAFE report presented size data through December 1997. This report includes samples collected through December 2003 (NMFS 2004, Appendix 2). In the interim, 12,269 crabs were measured, bringing the total measured from May 1995 to December 2003 to 17,187. Mean monthly size has been variable, and there have been no obvious trends in size by month across years (Figure 3-20). In addition, there has been little evidence of annual trends in mean size, although crabs were smaller in the first five months of 1999 than in other years (Figure 3-20, e), and in 1997, crabs were larger in most months than they were in other years (Figure 3-20, c).

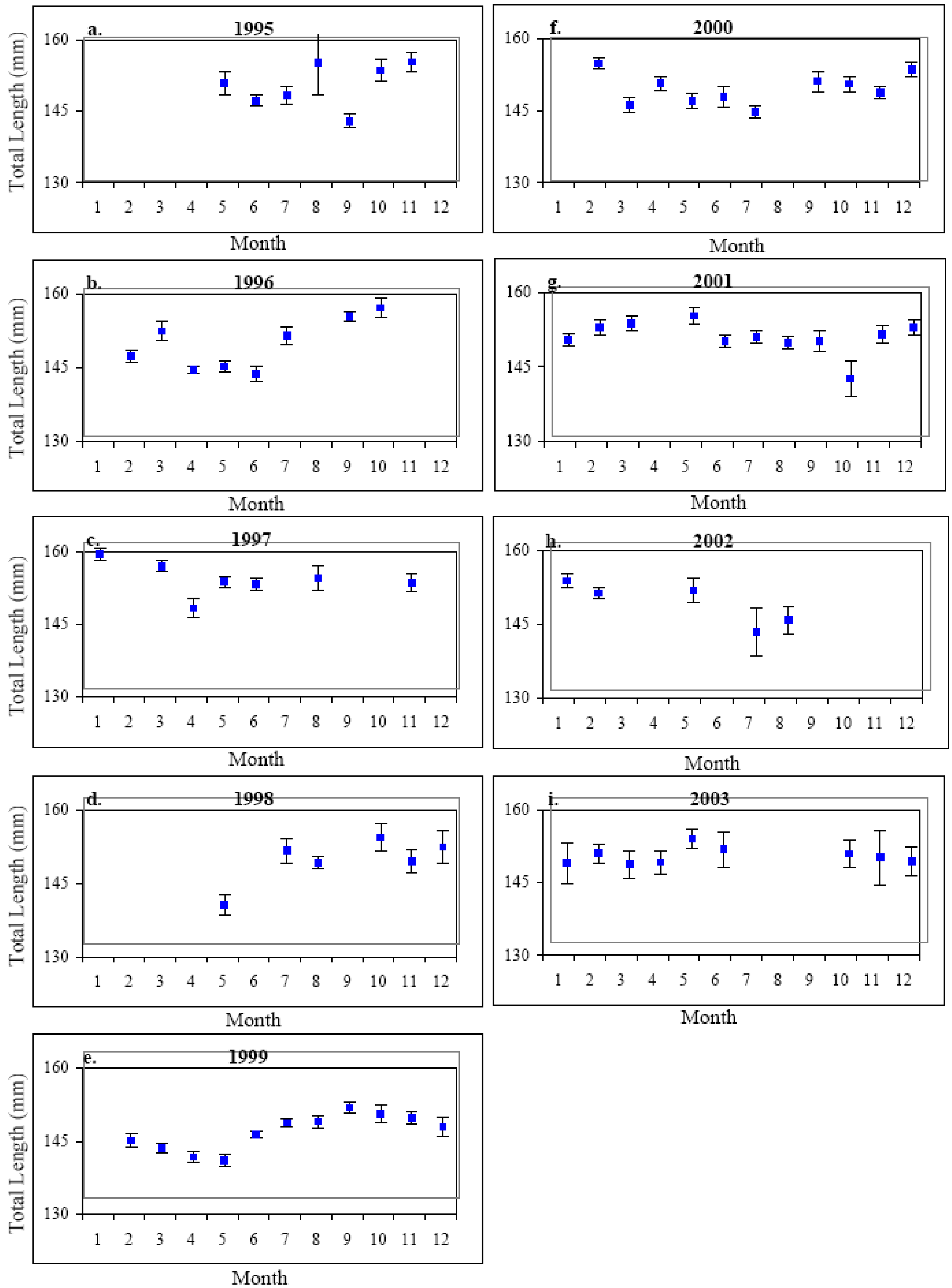


Figure 3-21a. Mean monthly size of golden crab by year, with 95% C.I.

In contrast to mean monthly size, the length distribution of golden crabs sampled in the TIP survey has been remarkably consistent from 1995 to 2003 (Figure 3-21). Except for 1999 (Figure 3-21, e), the modal length appears to be very close to 150 mm in all years, and the breadth of sizes observed has also been similar (Figure 3-21, d,f-i). The modal length was notably smaller in 1999 than in other years (Figure 3-21, e).

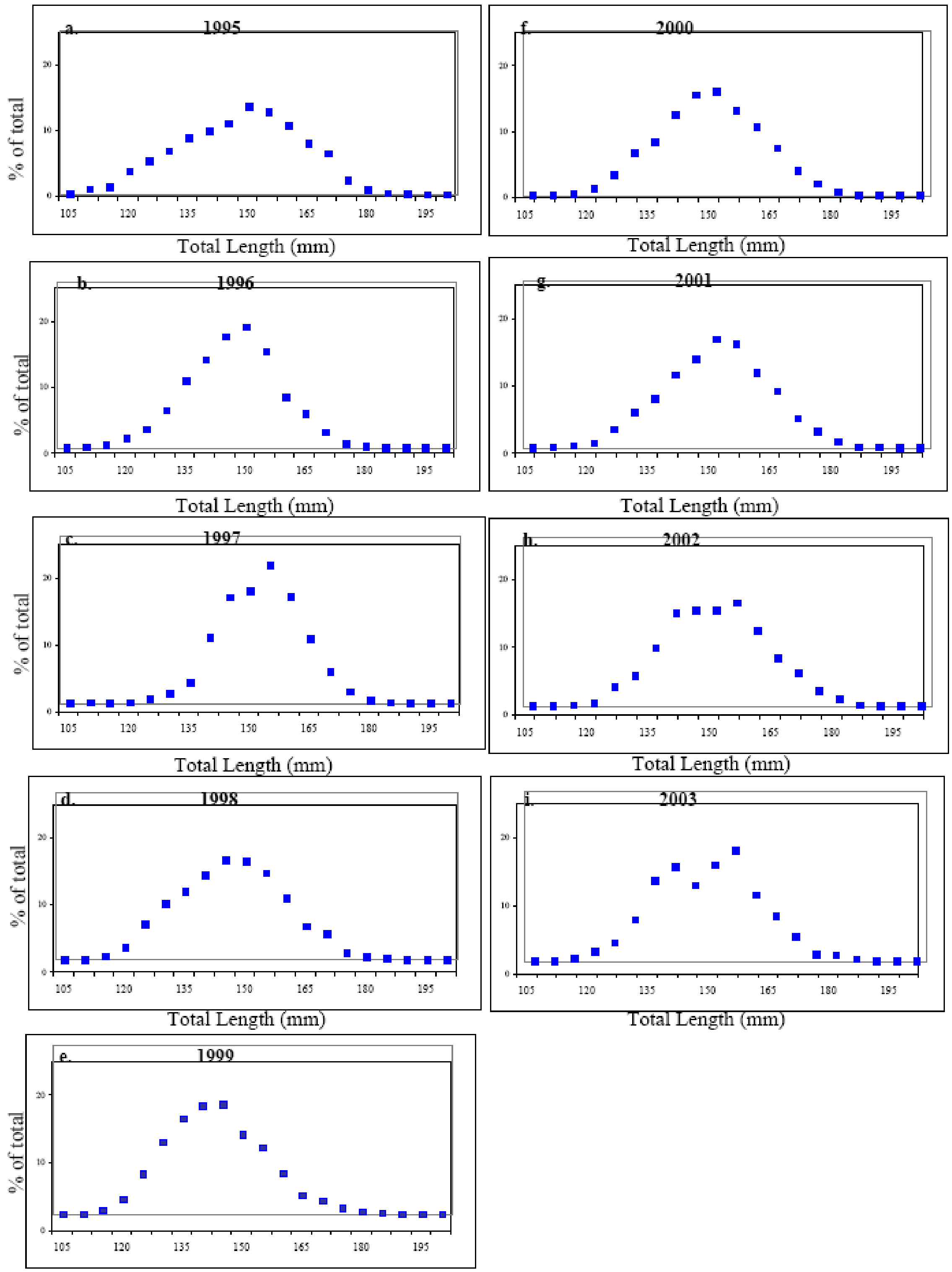


Figure 3-21b. Length frequency of golden crabs measured in the TIP survey, 1995-2003

Production Model Analysis

Catch and estimated effort data were fit with a non-equilibrium production model to estimate stock status relative to MSY levels. The model was fit to both quarterly and annual estimates of catch and effort. Two paired annual observations of catch and effort were added to the new analysis (1999 and 2000), increasing the number of paired observations to 5 and increasing confidence in the model to some extent (Harper et al. 2000, Appendix 3). Seven quarterly estimates of catch and effort were added to the analysis (May 1998 through January 2000).

Harper et al. (2000) concluded that fitting the model with the five annual catch and effort observations resulted in less certain, although similar, estimates of stock status than did use of quarterly observations. The Harper et al. (2000) assessment concluded that, as of 2000, golden crab were neither overfished nor undergoing overfishing. Current biomass was slightly less than BMSY, but above MSST (Table 3-5). Current F was nearly equal to FMSY and MFMT (Table 3-5). The 2003 Status of Stocks report (NMFS 2004) also indicated the stock was not overfished or undergoing overfishing in 2003.

Table 3-5. Stock assessment parameters from the non-equilibrium production model. Source: Harper *et al.* (2000) and NMFS (2004 Appendix 3).

Parameter	Value - 2000 quarterly analysis
B_{CURR}	818,140 lbs
B_{MSY}	837,400 lbs
MSST ($0.9B_{MSY}$, where M=0.1)	753,660 lbs
MSY (lbs)	684,000 lbs
F_{CURR}	0.20
F_{MSY}	0.21
MFMT (Annual Median F_{MSY})	0.21

3.2.2.2 Deepwater Shrimp

3.2.2.2.1 *Description and distribution*

Rock Shrimp

Rock shrimp, *Sicyonia brevirostris*, (Figure 3-22) are very different in appearance from the three penaeid species. Rock shrimp can be easily separated from penaeid species by their thick, rigid, stony exoskeleton. The body of the rock shrimp is covered with short hair and the abdomen has deep transverse grooves and numerous tubercles.

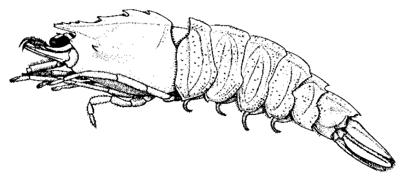


Figure 3-22. Rock shrimp, *Sicyonia brevirostris*.

Recruitment to the area offshore of Cape Canaveral occurs between April and August with two or more influxes of recruits entering within one season (Kennedy *et al.* 1977). Keiser (1976) described the distribution of rock shrimp in coastal waters of the southeastern United States. Whitaker (1982) presented a summary of information on rock shrimp off South Carolina. The only comprehensive research to date on rock shrimp off the east coast of Florida was by Kennedy *et al.* (1977). This section presents some of the more significant findings by Kennedy *et al.* (1977) regarding the biology of rock shrimp on the east coast of Florida.

Rock shrimp are found in the Gulf of Mexico, Cuba, the Bahamas, and the Atlantic Coast of the U.S. up to Virginia (SAFMC 1993). The center of abundance and the concentrated commercial fishery for rock shrimp in the south Atlantic region occurs off northeast Florida south to Jupiter Inlet. Rock shrimp live mainly on sand bottom from a few meters to 183 m (600 ft), occasionally deeper (SAFMC 1993). The largest concentrations are found between 25 and 65 m (82 and 213 ft).

Although rock shrimp are also found off North Carolina, South Carolina, and Georgia and are occasionally landed in these states, no sustainable commercially harvestable quantities of rock shrimp comparable to the fishery prosecuted in the EEZ off Florida are being exploited.

Royal Red Shrimp

Royal red shrimp, *Pleoticus robustus* (Figure 3-23) are members of the family Solenoceridae, and are characterized by a body covered with short hair and a rostrum with the ventral margin toothless. Color can range from orange to milky white. Royal red shrimp are found on the continental slope throughout the Gulf of Mexico and South Atlantic area from Cape Cod to French Guiana. In the South Atlantic they are found in large concentrations primarily off northeast Florida. They inhabit the upper regions of the continental slope from 180 m

(590 ft) to about 730 m (2,395 ft), but concentrations are usually found at depths of between 250 m (820 ft) and 475 m (1,558 ft) over blue/black mud, sand, muddy sand, or white calcareous mud. Royal red shrimp are not burrowers but dig grooves in the substrate in search of small benthic organisms (Carpenter 2002). They have been commercially harvested in a relatively limited capacity. Life history information is limited for royal red shrimp and additional information if available will be added after public hearing.

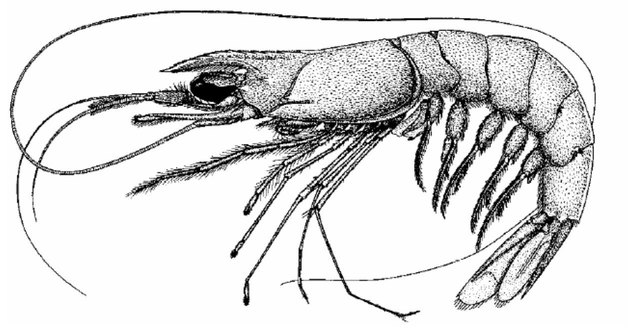


Figure 3-23. Royal red shrimp, *Pleoticus robustus* (Perez-Farfante and Kenlsey 1997)

3.2.1.1.1 Reproduction

Rock Shrimp

Rock shrimp are dioecious (separate sexes). Female rock shrimp attain sexual maturity at about 17 mm carapace length (CL), and all males are mature by 24 mm CL. Seasonal temperature initiates maturation. Rock shrimp have ovaries that extend from the anterior end of the cephalothorax to the posterior end of the abdomen.

Female rock shrimp attain sexual maturity at about 0.7 in (17 mm) carapace length (CL), and all males are mature by 0.9 in (24 mm) CL. Rock shrimp, as with most shrimp species, are highly fecund. Fecundity most probably, as with penaeids, increases with size. In rock shrimp, copulation is believed to take place between hard-shelled individuals. During copulation, similar to penaeid shrimp, the male anchors the spermatophore to the female's thelycum by the petasma and other structures and a glutinous material. Fertilization is believed to take place as ova and spermatozoa are simultaneously expulsed from the female. The spawning season for rock shrimp is variable with peak spawning beginning between November and January and lasting 3 months (Kennedy *et al.* 1977). Individual females may spawn three or more times in one season. Peak spawning activity seems to occur monthly and coincides with the full moon (Kennedy *et al.* 1977).

Kennedy *et al.* (1977) found rock shrimp larvae to be present year round with no trend relative to depth, temperature, salinity, and length or moon phase. The development from egg to postlarvae takes approximately one month. Subsequently the development from postlarvae to the smallest mode of recruits takes two to three months.

3.2.2.2.2 *Development, growth and movement patterns*

Rock Shrimp

For rock shrimp the development from egg to postlarvae takes approximately one month. Subsequently, the development from postlarvae to the smallest mode of recruits takes two to three months. The major transport mechanism affecting planktonic larval rock shrimp is the shelf current systems near Cape Canaveral, Florida (Bumpus 1973). These currents keep larvae on the Florida Shelf and may transport them inshore during spring. Recruitment to the area offshore of Cape Canaveral occurs between April and August with two or more influxes of recruits entering within one season (Kennedy *et al.* 1977).

Rates of growth in rock shrimp are variable and depend on factors such as season, water temperature, shrimp density, size, and sex. Rock shrimp grow about 2 to 3 mm CL (0.08 – 0.1 in) per month as juveniles and 0.5 - 0.6 mm CL (0.02 in) per month as adults (Kennedy *et al.* 1977).

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

Since rock shrimp live between 20 and 22 months, natural mortality rates are very high, and with fishing, virtually the entire year class will be dead at the end of the season. The intense fishing effort that exists in today's fishery, harvests exclusively the incoming year class. Three year classes were present in sampling conducted between 1973 and 1974 by Kennedy *et al.* (1977). Fishing mortality in combination with high natural mortality and possibly poor environmental conditions may be high enough to prevent any significant escapement of adults to constitute a harvestable segment of the population. The better than average rock shrimp production in the 1996 season possibly resulted from better environmental conditions more conducive to rock shrimp reproduction and spawning.

3.2.2.2.3 *Ecological relationships*

Rock Shrimp

Along the Florida Atlantic coast, the predominant substrate inside of 200 m depth is fine to medium sand with small patches of silt and clay (Milliman 1972). Juvenile and adult rock shrimp are bottom feeders. Rock shrimp are most active at night (Carpenter 2003). Stomach contents analyses indicated that rock shrimp primarily feed on small bivalve mollusks and decapod crustaceans (Cobb *et al.* 1973). Kennedy *et al.* (1977) found the relative abundance of particular crustaceans and mollusks in stomach contents of rock shrimp corresponding to their availability in the surrounding benthic habitat. The diet of *Sicyonia brevirostris* consists primarily of mollusks, crustaceans and polychaete worms. Also included are nematodes, and foraminiferans. Ostracods, amphipods and decapods made up the bulk of the diet, with lesser amounts of tanaidaceans, isopods, cumaceans, gastropods, and other bivalves also present (Kennedy *et al.* 1977).

Kennedy *et al.* (1977) characterized rock shrimp habitat and compiled a list of crustacean and molluscan taxa associated with rock shrimp benthic habitat. The bottom habitat on which rock shrimp thrive is limited and thus limits the depth distribution of these shrimp. Cobb *et al.* (1973) found the inshore distribution of rock shrimp to be associated with terrigenous and biogenic sand substrates and only sporadically on mud. Rock shrimp also utilize hardbottom and coral, more specifically *Oculina*, habitat areas. This was confirmed with research trawls capturing large amounts of rock shrimp in and around the Oculina Bank HAPC prior to its designation.

3.2.2.2.4 *Abundance and status of stocks*

Rock Shrimp

For stocks such as rock shrimp information from which to establish stock status determination criteria are limited to measures of catch. Nevertheless, with the development of a permitting system and reporting requirements associated with the permit, better information will be collected on the effort and catch in this fishery. Data should be reviewed periodically to determine if better inferences can be drawn to address $B_{MSY.}$ Additionally, any time that annual catch levels trigger one of the selected thresholds, new effort should be made to infer B_{MSY} or a reasonable proxy.

Stock status determination criteria for rock shrimp were calculated from catch estimates as reported in Amendment 1 of the Shrimp Plan (SAFMC 1996a) during the period 1984-1996 (Table 3-6).

Table 3-6. Landings data used to calculate the current MSY value for rock shrimp in the South Atlantic.

Year	Landings
1986	2,514,895
1987	3,223,692
1988	1,933,097
1989	3,964,942
1990	3,507,955
1991	1,330,919
1992	2,572,727
1993	5,297,197
1994	6,714,761

Note: Data for the period 1986 to 1994 are taken from Shrimp Amendment 1 (SAFMC 1996a).

Maximum Sustainable Yield

Because rock shrimp live only 20 to 22 months, landings fluctuate considerably from year to year depending primarily on environmental factors. Although there is a good historical time series of catch data, the associated effort data were not considered adequate to calculate a biologically realistic value for MSY. Nevertheless, two standard deviations above the mean total landings was considered to be a reasonable proxy for MSY (SAFMC 1996a). The MSY proxy for rock shrimp, based on the state data from 1986 to 1994, is 6,829,449 pounds heads on (SAFMC 1996a).

Optimum Yield

OY is equal to MSY. The intent is to allow the amount of harvest that can be taken by U.S. fishermen without reducing the spawning stock below the level necessary to ensure adequate reproduction. This is appropriate for an annual crop like rock shrimp when recruitment is dependent on environmental conditions rather than female biomass. A relatively small number of mature shrimp can provide sufficient recruits for the subsequent year's production (SAFMC 1996a).

Overfished Definition

The South Atlantic rock shrimp resource is overfished when annual landings exceed a value two standard deviations above mean landings during 1986 to 1994 (mean=3,451,132 lb., s.d. =1,689,159), or 6,829,449 pounds heads on (SAFMC 1996a). In other words, the stock would be overfished if landings exceeded MSY. The status of rock shrimp stocks in the South Atlantic are not considered overfished at this time. High fecundity enables rock shrimp to rebound from a very low population size in one year to a high population size in the next when environmental conditions are favorable (SAFMC 1996a).

Overfishing Definition

There is no designation of overfishing for rock shrimp. The overfished definition, which is based on landings (and fishing effort) in excess of average catch is, in essence, an overfishing definition.

For further information on rock shrimp, see Shrimp Amendment 7.

3.2.2.2.5 *Description of bycatch in the deepwater shrimp fishery*

As the rock shrimp fishery developed and vessels began fishing earlier in the year (June/July versus August/September), discards of unmarketable juvenile rock shrimp increased. Members of the Advisory Panel recommended the gear modifications implemented in Amendment 5 (SAFMC 2002).

The most recent information on bycatch in this fishery comes from a preliminary report of a NOAA Fisheries Service observer study conducted during the period September 2001 through September 2006. The main findings in this report are:

1. Rock shrimp comprised 19% of the catch by weight and 28% by number.
2. Penaeid shrimp comprised 4% of the catch by weight and 3% by number.
3. Finfish comprised 49% of the catch by weight and 30% of the catch by number.

No observer trips or byactch study exists pertaining to bycatch in the royal red shrimp fishery.

3.2.2.2.6 *Interactions with Protected Species*

There are 31 different species of marine mammals that may occur in the EEZ of the South Atlantic region. All 31 species are protected under the MMPA and six are also listed as endangered under the ESA (i.e., sperm, sei, fin, blue, humpback and North Atlantic right whales). Other species protected under the ESA occurring in the South Atlantic include five species of sea turtle (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); the smalltooth sawfish, and two *Acropora* coral species (elkhorn [*Acropora palmata*] and staghorn [*A. cervicornis*]).

3.2.2.3 ESA-Listed Species

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.

Species 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.

List of Species and Designated Critical Habitat

<u>Endangered</u>

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

*Green turtles in U.S. waters are listed as threatened except the Florida breeding population, which is listed as endangered. Due to the inability to distinguish between populations away from nesting beaches, green turtles are considered endangered wherever they occur in U.S. Atlantic waters.
** in the U.S. distinct population segment.

<u>Threatened</u>

Loggerhead turtle	*Caretta caretta*	
Elkhorn coral	*Acropora palmata*	(Critical Habitat Proposed)
Staghorn coral	*A. cervicornis*	(Critical Habitat Proposed)

<u>Proposed Species</u>

None

<u>Proposed Critical Habitat</u>

The geographical area occupied by *Acropora* species that is within the jurisdiction of the United States is limited to four counties in the State of Florida (Palm Beach County, Broward County, Miami-Dade County, and Monroe County), Flower Garden Banks National Marine Sanctuary, and the U.S. territories of Puerto Rico, U.S.V.I, and Navassa Island. Within these areas, the physical or biological feature of elkhorn and staghorn corals habitat essential to their conservation is substrate of suitable quality and availability, in water depths from 0 to 98 feet (0 to 30 m), to support successful larval settlement, recruitment, and reattachment of asexual fragments. Proposed Critical Habitat areas, therefore, comprise all waters in the depths of 98 feet (30 m) and shallower to the MHW or COLREG line off: (1) Palm Beach, Broward, Miami-Dade, and Monroe Counties, including the Marquesas Keys and the Dry Tortugas, Florida; (2) Puerto Rico and associated Islands; (3) St. John/St. Thomas, U.S.V.I.; and (4) St. Croix, U.S.V.I. Within these specific areas, the "Primary Constituent Elements" (PCEs) consist of consolidated hardbottom or dead coral skeleton that are free from fleshy macroalgae cover and sediment cover.

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.

3.2.2.4 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 cm 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 m (360 ft) (Frick 1976), but they are most frequently making dives of less than 20 m (65 ft.) (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 cm 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 cm carapace length they move to relatively shallow (less than 50m) 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 a 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 m (Eckert *et al.* 1989) but more frequently dive to depths of 50 m to 84 m (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 cm 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 m to 233 m (692-764ft.) (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).

3.2.2.5 ESA-Listed Marine Fish

The historical range of the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. In the South Atlantic region, they are most commonly found in Florida, primarily off the Florida Keys (Simpfendorfer and Wiley 2004). Only two smalltooth sawfish have been recorded north of Florida since 1963 (the first was captured off North Carolina in 1999 (Schwartz 2003) and the other off Georgia 2002 [Burgess unpublished data]). Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 m (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.
Under the Endangered Species Act (ESA), it is illegal to catch or harm an endangered sawfish. However, some fishermen catch sawfish incidentally while fishing for other species. NMFS and the Smalltooth Sawfish Recovery Team have developed guidelines to fishermen telling them how to safely handle and release any sawfish they catch.

Species of concern
NOAA Fisheries Service has created a list of Species of Concern as a publicly available list identifying other species of concern. No federal mandate protects species of concern under the ESA although voluntary protection of these species is urged. To date, no incidental capture of any of these species has been reported in the shrimp fishery operated in the southeast U.S. Federal waters.

<u>List of Marine Species of Concern in the Southeastern U. S.</u>

Dusky shark	*Carcharhinus obscurus*
Sand tiger shark	*Odontaspis taurus*
Night tiger shark	*Carcharhinus signatus*
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrhynchus*
Mangrove rivulus	*Rivulus mamoratus*
Opposum 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*

3.2.2.6 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 (26º3'N). The depth range for these species ranges from <1 m to 60 m. The optimal depth range for elkhorn is considered to be 1 to 5 m depth (Goreau and Wells 1967), while staghorn corals are found slightly deeper, 5 to 15 m (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 (Ghiold and Smith 1990, Williams and Bunkley-Williams 1990). Both species are almost entirely dependent upon sunlight for nourishment, contrasting the massive, boulder-shaped species in the region (Porter 1976, Lewis 1977) that are more dependent on zooplankton. Thus, Atlantic *Acropora* species are much more susceptible to increases in water turbidity than some other coral species.

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

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

3.3 *Administrative Environment*

3.3.1 The Fishery Management Process and Applicable Laws

3.3.1.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The MSFCMA claims sovereign rights and exclusive fishery management authority over most fishery resources within the U.S. Exclusive Economic Zone (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 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 of Commerce (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 MSFCMA and with other applicable laws summarized in Section 7.0. In most cases, the Secretary has delegated this authority to NOAA Fisheries Service.

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

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

3.3.1.2 State Fishery Management

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

The South Atlantic states are also involved through the 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 National Oceanic and Atmospheric Administration (NOAA) Fisheries Office for Enforcement (NOAA/OLE) and the United States Coast Guard (USCG) have the authority and the responsibility to enforce South Atlantic Council 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 fisheries mission.

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 all but one of the states in the Southeast Region

(North 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 Economic Environment

"Marine resources are a type of natural capital that can be invested or used to generate a return to its owner" (Carter 2003). From an economic perspective, these Coral HAPCs may be viewed as an investment instrument that is applied to a public asset (i.e., federal fishery resources). To be considered successful, total social benefits from the Cora HAPCs investment must outweigh all opportunity costs that are incurred, after accounting for risk. The most efficient investment scheme is the one that either maximizes excess social benefit over cost or possibly minimizes excess social cost over benefit. In other words, the preferred regulatory option should be the one that provides the greatest benefit for the least cost. A similar approach was used for Amendment 14 that established a network of MPAs. In this context, the net value of the proposed Coral HAPCs can be evaluated using a traditional benefit-cost framework: Do the potential benefits of protection, adjusted to account for risks, outweigh the potential costs realized over both the short and long run?

For the most part benefit-cost valuation for MPAs, and similar designations (like Coral HAPCs), is determined by distributional effects related to the displacement of recreational and commercial fishermen, changes in economic impact on surrounding communities, and bio-economic linkages associated with the protected stock. However, societal issues may be present as well. Economic benefits and costs resulting from Coral HAPC protection may be characterized as either consumptive (e.g., commercial and recreational fishing) or non-consumptive (e.g., diving). Consumptive costs and benefits are direct biological and economic effects that affect the profitability of the SASG commercial fishing fleet, the satisfaction of recreational fishermen, and the efficient use of society's resources. Non-consumptive benefits and costs include societal losses and gains as well as effects on fishery management. The following subsections describe specific costs and benefits relevant to implementation of Coral HAPCs for deepwater species. After that, specific information is provided regarding the economic environment surrounding the golden crab, royal red shrimp, and wreckfish fisheries.

Costs

Consumptive Costs

Most of the consumptive costs associated with these CHAPCs can be generalized as displacement effects directly incurred by golden crab and royal red shrimp commercial vessels that normally fish in the protected areas. Direct consumptive costs to fishermen unable to fish in protected areas, like CHAPCs, include a decrease in catch levels; an increase in trip-level costs associated with searching for new fishing grounds; an increase in opportunity costs associated with learning a new type of fishing; congestion and user conflicts on new fishing grounds; and increased personal risk. Displacement effects have a negative impact on the predicted value of the proposed CHAPCs in Action 1. Sometimes fishermen are able to mitigate these costs by redirecting effort to open areas and targeting different species. This may not be possible in the case of golden crab. (Actions 2 and 3 propose ways to mitigate these expected negative effects.) Although displaced fishermen may avoid some displacement costs as a result of redirecting effort and targeting different species, the addition of new fishing effort to open areas could have an extra negative effect on the health of other stocks.

Under Actions 2 and 3, fishermen would be allowed to fish in specific areas within the CHAPCs if they carry an approved VMS device. While the shrimp fishery already carries VMS devices, the golden crab vessels do not and would have to incur this cost if government funding was not available.

Figure 3-24 provides a flow chart that describes how different economic values of protected areas are typically categorized.

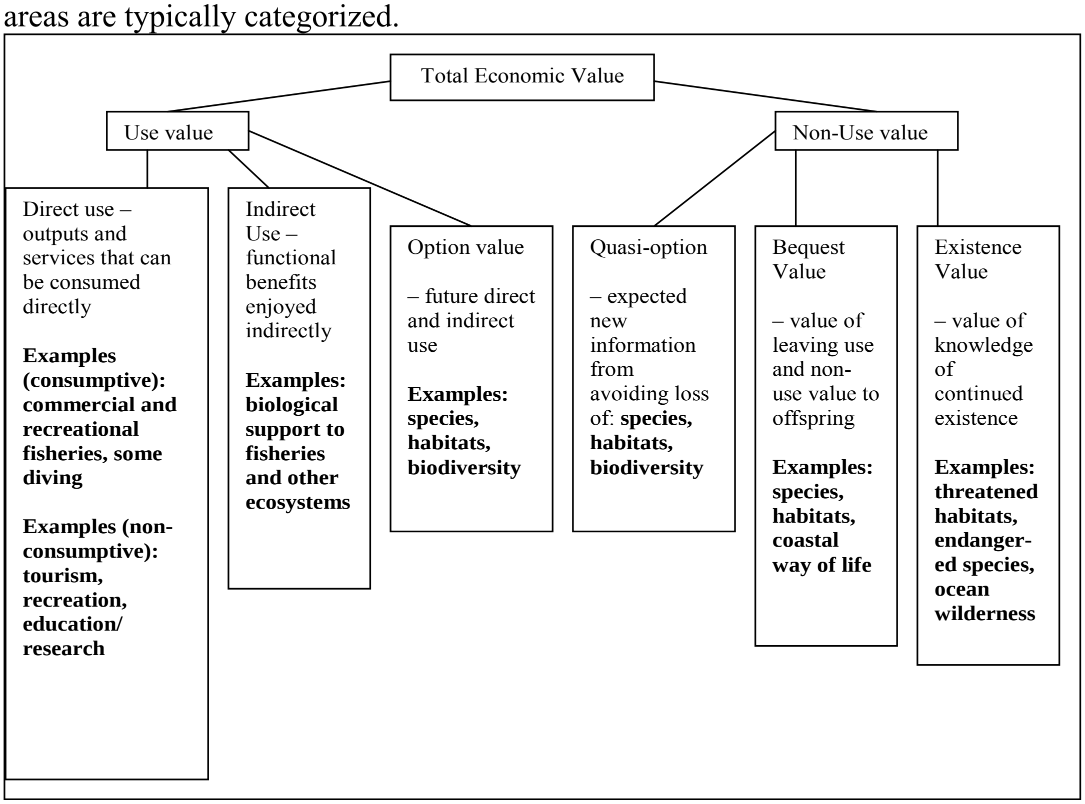


Figure 3-24. Flow chart depicted different economic values associated with protected areas.

Major Types of Displacement Costs

Decreased Catch Levels

In the short run, total catch by displaced vessels may be reduced. This result depends on technological decision-making by the affected vessels in response to an area closure. Changes in fishermen behavior are likely to have a temporal and spatial context and depend on both economic and biological conditions. Short-run technological decisions could involve changes in the variable cost structure, gear modifications, and location choices involving fishing grounds as well as homeports. Decreased harvest levels may be mitigated to the extent that fishermen can find alternative forms of fishing or spillover effects may create future harvest benefits such as increased catches or reduced harvest variability.

Increase in Trip-Level/Search/Opportunity Costs

Perhaps the most significant portion of displacement costs comes from the effect the Closed area has on fishing behavior. Displaced operators must now choose new fishing locations, maybe target new species, or even learn a new type of fishing. These new triplevel decisions have a direct impact on trip-related variable costs as well as time-related opportunity costs. In particular, fuel costs are likely to change. The immediate search for profitable alternative fishing grounds likely results in additional fuel expenditures and lost opportunities to fish. In the case of the deepwater closures, vessels may actually use less fuel if the new fishing grounds are closer to shore or if significant spillover effects are realized on adjacent boundaries. If displaced fishermen try to learn a new type of fishing or employ new types of gear, additional costs may be incurred as the fishermen go along the learning curve.

Harvest and Personal Risks

C losed area regulations could cause fishermen to incur extra risk as they seek new and unfamiliar fishing grounds or employ unfamiliar fishing techniques. This risk could incorporate both harvest and personal dimensions. Again though, the closure of deepwater areas may force vessels inshore, which could decrease the personal risk to the crew while reduced harvest variability from spillover effects could result in extra benefits.

Regional Economic Impacts

A possible indirect consumptive cost is the short-run impact that a reduction in income has on the surrounding communities. If displaced fishermen cannot mitigate all losses incurred from the MPA, their communities likewise will be negatively affected as less income flows through different sectors of the local economy. Fishing income originally spent in the community by fishermen cycles throughout the regional economy producing a multiplier effect, which induces regional expenditures and savings totaling more than the original income. The amount of fishing income lost and the magnitude of the multiplier effect determine the extent of the negative impact on the predicted value.

Non-consumptive Costs

Decreases in the quality of inshore fishing grounds and reduced option, bequest, and existence values resulting from increased fishing pressure redirected toward inshore fish stocks result in non-consumptive costs. (Actions 2 and 3 may mitigate some of these consequences.) To the extent that these costs are realized, a negative influence must be accounted for in the predicted valuation of CHAPCs. See Figure 3-24 for examples of non-consumptive uses and a depiction of how non-consumptive uses relate to other economic values of CHAPCs.

Management Costs

Direct costs incurred by management or some institutional body include funding for planning, maintenance, and enforcement; however, enforcement costs could be mitigated relative to other types of effort restrictions resulting in a net benefit. The added regulatory cost that management must incur due to implementation of an MPA is a negative impact on the predicted value of an MPA. Action 4 in this document considers requiring golden crab vessels to install VMS units. Because the infrastructure to monitor vessels with VMS units has already been implemented for the shrimp fleet and the Gulf red snapper fishery, the management costs associated with requiring golden crab vessels to install and use VMS units will be lower than otherwise. The VMS units installed in the southeast in the referred to fisheries have been subsidized by the federal government. Funding availability for VMS units for the golden crab fishery is uncertain.

Benefits

Consumptive Benefits

Consumptive benefits could be realized over the long run if spillover effects are assumed to affect aggregate harvest levels in the remaining fishable areas as stocks become healthier. Major consumptive benefits include spillover effects, increased stock biomass, increased harvest levels, and reduced variability of harvests and revenues.

Replenishment/Stock Effects

These effects refer to a net increase in biomass and aggregate harvest in the remaining open areas as a result of improved habitat due to implementation of the CHAPCs. The amount of economic benefit that will eventually be derived due to spillover effects from the CHAPCs depends on a myriad of biological and economic factors specific to the species in question and the vessels that target them. The long-term realization of spillover effects will have a positive impact on the predicted economic value of the proposed CHAPCs.

Increased Catch Levels

Over the long run, aggregate catch by displaced and unaffected vessels alike may increase due to spillover effects. This result depends on biological characteristics of the stock as well as fleet wide technological decision-making in response to the area closure. If spillover occurs in open fishing grounds, which historically have contributed a relatively small share towards aggregate catch (perhaps due to overexploitation), then the probability of increased harvests is relatively higher; however, if the protected species are overly sessile, the probability of increased harvests is relatively lower (Sanchirico 2002).

Non-consumptive Benefits

Quality Increases in CHAPCs

If regulation works from a biological perspective, then habitat and protected fish in the CHAPCs over time become more numerous and heavier, on average, due to an increase of older fish in the population. Protection could also increase biodiversity, community structure, and general habitat conditions in the short- and long-term (Leeworthy and Wiley 2002). These benefits could contribute to an overall healthier ecosystem which eventually supports sustained recreational and commercial fishing activities. Thus, environmental quality increases constitute a positive addition to the predicted value of an MPA.

Option Values

Benefits may arise from maintaining the option to use the ecological resources within the proposed CHAPCs in the future. In essence, society is paying a risk premium (i.e., closing the area to certain activities) to keep the option of future use available and hedge the uncertainty associated with damaging corals and their habitat. Thus, the capture of option value through gear restrictions constitutes a positive addition to the predicted value of the proposed CHAPCs. See Figure 3-24for a depiction of how option values relate to other economic values of MPAs.

Bequest and Existence Values

Benefits may arise from CHAPCs as future generations are able to utilize the the resources in these areas. The amount that society is willing to pay for this benefit is known as a bequest value. Additionally, knowing that deepwater species will continue to exist in the future is known as an existence value. Thus, the realization of bequest and existence values through closures constitutes a positive addition to the predicted value of the proposed CHAPCs. See Figure 3-24 for a depiction of how bequest and existence values relate to other economic values of MPAs.

3.4.2 Description of the Golden Crab Fishery

3.4.2.1 Description of fishing practices, vessels and gear

The description below was summarized from observations recorded by Council staff (Gregg Waugh) 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 and the 2008 Golden Crab Advisory Panel meeting.

The golden crab fishery employs baited traps attached with gangions to a 5/8" polypropylene line up to 5 miles long. There are 50 traps per line, or "trawl," set 400 feet apart. Fishermen may fish 4 trawls in a two-week period pulling 100 traps one week and 100 the next (Howard Rau, Golden crab AP). In 2008, vessels in the golden crab fishery averaged 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.

The location of the traps is noted using GPS; buoys are not used to mark the location of traps due to strong currents. Trawls are set south to north with the current. Retrieval begins at the south end of the trawl. To begin retrieval of traps, the main line, which may be sitting 1,000 feet below, must be grappled. The success of this operation depends on currents and sea conditions. 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 5 to 15 miles east or west in order to avoid hard bottom or to follow the crabs. After a soak period, traps may be moved as described depending on the success of the catch. Twenty to 30 lbs of crabs per trap is a desirable catch. On a good season, fishermen may catch 70 to 100 lbs 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. The crabs are somewhat lethargic, but crew members still need to be watchful when handling them. 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.

On the observed trip, the largest crab caught was approximately 190 millimeters carapace width and weighed about 4 lbs. According to the Nielsens, this crab was one of the largest, if not the largest, they had ever caught. Among the rest of the catch for that trip, were two berried females that were released. One of the trawls was fished longer than the others (about a 10-day soak) and the crabs in those traps were larger than those in traps that were fished a shorter period of time. Once all the bait is consumed (after about 10 days), the escape rate tends to increase.

<u>Detailed trap description</u>

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 4 feet long, 30 inches wide and 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 lbs.

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.

3.4.2.1.1 *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 64 cubic feet in volume in the Northern zone and 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.

3.4.2.2 Economic description of the fishery

This section describes economic aspects of the commercial fishery for golden crab in the South Atlantic region. The Golden Crab Fishery Management Plan went into effect beginning on August 27, 1996 and established three golden crab fishing zones. The northern zone is defined as the EEZ north of 28 degrees N. latitude. The Middle Zone is contained within the EEZ between 25 degrees North and 28 degrees North latitude. The Southern zone extends south from 25 degrees North latitude within the South Atlantic Council's EEZ. Federal permits are issued for a specific zone and fishing is allowed only in that zone for which the permit is issued.

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

Number of Participants

The number of permit holders that land golden crab has fluctuated from year to year (Table 3-7). The greatest number of vessels making landings since 1995 was 14. In recent years, only 5 to 6 vessels have landed any golden crab. The majority of vessels currently fishing for golden crab have Middle Zone permits. In 1997, 1998, and 2000, there were more vessels fishing for golden crab with Southern Zone permits than Middle Zone permits. Only in 2006 and 2007 have vessels with Northen Zone permits participated in the fishery.

Table 3-7. Active Permit Holders and Vessels Landings Golden Crab, 1995-2007. SEFSC, 2008.

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

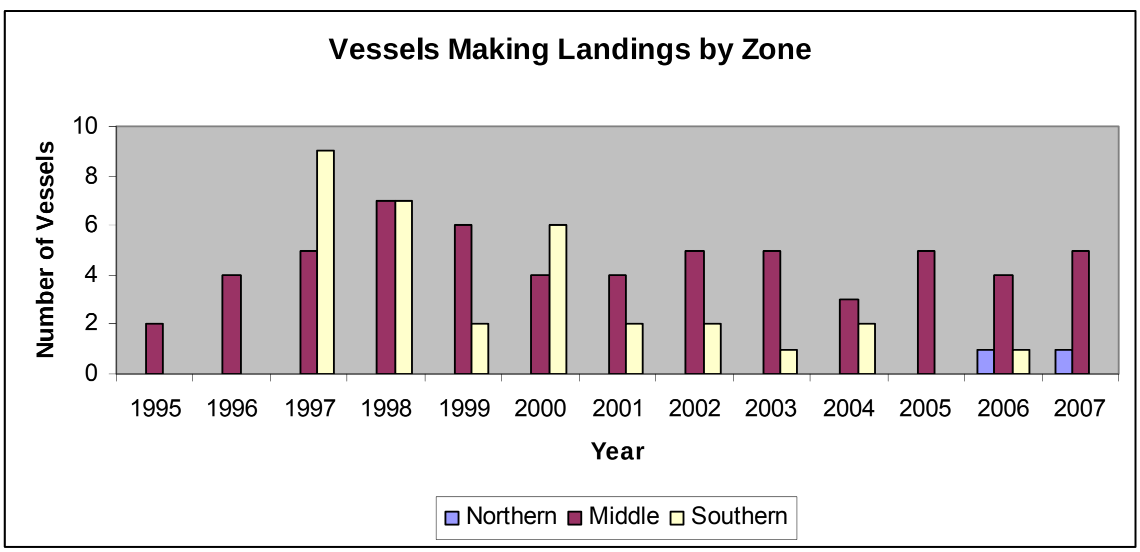


Figure 3-25. Number of Vessels Making Landings by Zone, 1995-2007. SEFSC, 2008.

Table 3-8. Number of Vessels Making Landings by Zone, 1995-2007. SEFSC, 2008.

Year	Northern	Middle	Southern
1995	0	2	0
1996	0	4	0
1997	0	5	9
1998	0	7	7
1999	0	6	2
2000	0	4	6
2001	0	4	2
2002	0	5	2
2003	0	5	1
2004	0	3	2
2005	0	5	0
2006	1	4	1
2007	1	5	0

Annual and montly landings and catch per unit effort data is shown is Section 3.2.2.1.5.

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

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

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

<u>Economic Description</u>

Unless otherwise stated, the ex-vessel price data comes from _____ and is not available at this time for more recent years. The overall annual price paid per pound (obtained by dividing the total annual value by the total pounds landed) decreased from 1998 to 2002, from $1.11 to $0.81 (Figure 3-25). The price then jumped to an all-time high of $1.31 in 2003. In contrast, landings increased from 1998 until 2000, then decreased through 2003

(Figure 3-6). The average ex-vessel price was 26% higher in 2003 ($1.31/lb) than the five-year average value from 1998 to 2003 ($0.98/lb) (Figure 3-26).

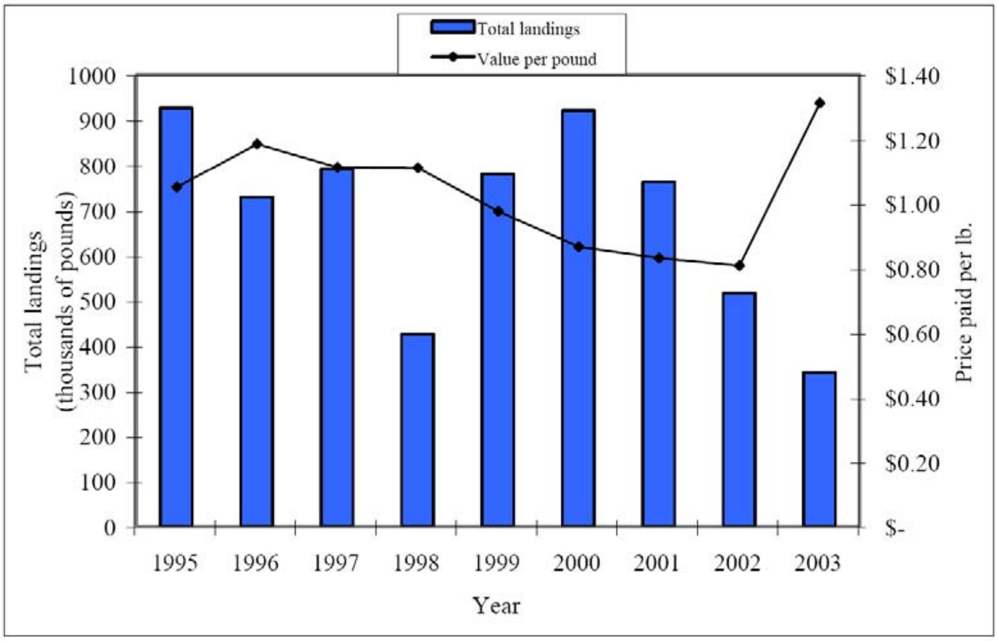


Figure 7: Total annual landings and value of golden crab, 1995 - 2002.

Figure 3-26. Total annual landings and value of golden crab from 1995 – 2002.

In contrast, landings were at an all-time low of 341,000 lbs. The high value could be related to the relatively low value of Alaskan snow crab compared to previous years, and to the low landings of Alaskan snow crab that began in 2000, which could have resulted in greater demand for golden crab. Alaskan snow crab and golden crab fulfill similar seafood markets (Antozzi 2002). In addition, low landings of golden crab could have lead to more competitive pricing for this species.

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

3.4.3 The Deepwater Shrimp Fishery

3.4.3.1 Description of rock shrimp fishing practices, vessels and gear

Description of the Fishery

Given the distance from shore, depth of water, and gear necessary to harvest rock shrimp, there is no recreational fishery. The rock shrimp commercial fishery has existed off the east coast of Florida for approximately thirty years once extending from Jacksonville to Cape Canaveral. The relatively recent beginning for this shrimp fishery, compared to other southeast shrimp fisheries can be attributed to the lack of a viable market for the crustacean once considered "trash." Rock shrimp found a niche in the local fresh market and restaurant trade during the early 1970s, and became a regional delicacy. The increase in participants and market opportunities for smaller rock shrimp brought about a subsequent change in

harvesting patterns as the fishing grounds extended south as far as St. Lucie County (SAFMC 1996a). Limited sporadic harvest has also occurred off Georgia, North Carolina and South Carolina. A limited access program was established in 2003 for vessels harvesting, in possession of and landing rock shrimp in Georgia and Florida. Expanding markets created growth within the industry that in turn has changed the composition of the rock shrimp fishery including the harvesting and the intermediate sectors (SAFMC 1996a).
In the south Atlantic region, essentially the only user group exploiting the rock shrimp resource is commercial trawlers. Rock shrimp harvested by commercial vessels is the only one of six species of *Sicyonia* reported for the south Atlantic coast that attains a commercial size (Keiser 1976). When the rock shrimp industry began, few vessels participated on a full-time basis with some vessels making a few trips a year when the white and brown shrimping ended, or as a bycatch of the penaeid shrimp fishery (Dennis 1992). During the period 1986 to 1994 there was an increase in effort in terms of the number of vessels participating (SAFMC 1996a).

Rock shrimp have been harvested along Florida's east coast from Cape Canaveral to as far north as Jacksonville. At one time, this fishery extended into south Georgia (statements at Public hearings for Shrimp Amendment 5). The increase in participants and market opportunities for smaller rock shrimp brought about a subsequent change in harvesting patterns as vessels began fishing as far south as St. Lucie County. This shift in effort to the south reflected new participation in the fishery as the majority of those harvesting these new areas were from the Gulf region. A control date for this fishery of April 4, 1994 was set to put the industry on notice that the Council could at some future date develop a limited access program for this fishery (SAFMC 1996a).

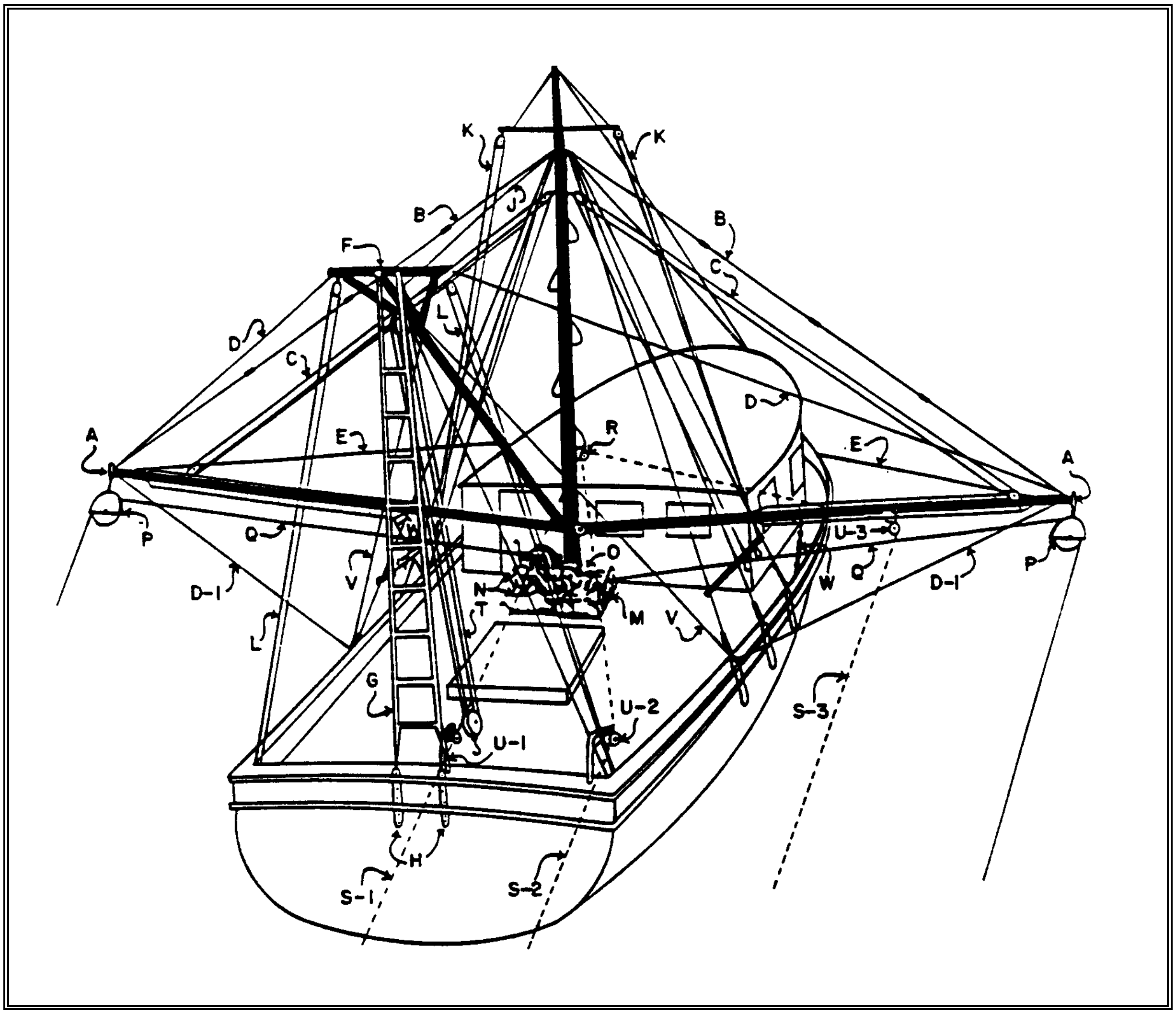
<u>Season and Harvest Area</u>
The peak rock shrimping season generally occurs from July through October (SAFMC 2002). Historically, the fishery did not begin until August or September (SAFMC 1996a). To a degree, the amount and timing of effort in the rock shrimp fishery are dependent on the success of the white and brown shrimp fisheries. During development of Shrimp Amendment 1, the Rock Shrimp Producers Association submitted information to the Council indicating that the harvest area extended between just north of New Smyrna Beach to Stuart between 36.6 m (120 ft) and 47.5 m (156 feet) and between 61 m (200 ft) and 73 m (240 feet) (SAFMC, 1996a). The fishable grounds are hard sand to shell hash bottoms, which run north and south with a width as narrow as one mile. There was an effort shift to the south of Cape Canaveral which exposed the known concentrations of *Oculina* coral and the Oculina Bank HAPC to bottom trawls. Trawling was prohibited in the HAPC (a 4 x 23 nm strip bounded by latitude 27°30' N. and 27°53' N. and longitude 79°56' W. and 80°00' W.) in 1982 as one of the measures under the Coral Fishery Management Plan (GMFMC and SAFMC 1982). In addition, Amendment 1 to the Snapper Grouper Fishery Management Plan prohibited the retention of snapper grouper species caught by roller rig trawls and their use on live/hard bottom habitat north of 28° 35' N. latitude (SAFMC 1988). Furthermore Amendment 1 to the Shrimp Plan (SAFMC, 1996a) prohibited trawling in the area east of 80° 00' W. longitude between 27° 30' N. latitude and 28° 30' N. latitude shoreward of the 183 m (600 ft) contour.

In recent years, fishing activity has been concentrated off the Atlantic coast of Florida and particularly near Cape Canaveral (Sea Grant Louisiana 2006; SAFMC 1999). Some sources describe the coast between Jacksonville and St. Lucie Inlet as being of particular importance (Hill 2005b).

Vessels and Gear

There are two types of vessels in the rock shrimp fishery: ice or fresh boats and freezer boats. Most new rock shrimp trawlers are 23-24 m (75-80 ft) in length and are rigged to tow two to four nets simultaneously. The double-rigged shrimp trawler has two outrigger booms from whose ends the cable from the winch drum is run through a block to the two nets. Testimony at Amendment 1 (SAFMC 1996a) hearings indicated that a standard freezer trawler was around 22 m (73 ft) and would pull four 12 m (40 ft) nets.
Some vessels use twin trawls, which are essentially two trawls on a single set of doors, joined together at the head and foot ropes to a neutral door connected to a third bridle leg. Thus, instead of towing two 21 m (70 ft) nets the vessel tows four 12 m (40 ft) nets. This rig has some advantages in ease of handling and increased efficiency.

The only gear used in the rock shrimp fishery is the trawl (Figure 3-27) which consists of: (1) a cone-shaped bag in which the shrimp are gathered into the tail or cod end; (2) wings on each side of the net for herding shrimp into the bag; (3) trawl doors at the extreme end of each wing for holding the wings apart and holding the mouth of the net open; and (4) two lines attached to the trawl doors and fastened to the vessel. A ground line extends from door to door on the bottom of the wings and mouth of the net while a float line is similarly extended at the top of the wings and mouth of the net. A flat net is more often used when fishing for rock shrimp since they burrow into the bottom to escape the trawl. This net has a wider horizontal spread than other designs and is believed more effective (SAFMC 1996a). The minimum mesh size for the cod end of a rock shrimp trawl net in the South Atlantic EEZ off Georgia and Florida is 4.8 cm (1-7/8 inches), stretched mesh. This minimum mesh size is required in at least the last 40 meshes forward of the cod end drawstring (tie off strings), and smaller mesh bag liners are not allowed. A vessel that has a trawl net on board that does not meet these specifications may not possess rock shrimp in or from the South Atlantic EEZ off Georgia and Florida.



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

Figure 3-27. Rigged shrimp vessel similar to ones used in the rock shrimp fishery. Source: SAFMC 1993.

As of January 12, 2007, on a vessel that fishes for or possesses rock shrimp in the South Atlantic EEZ, each trawl net or try net that is rigged for fishing must have a certified Bycatch Reduction Device (BRD) installed. Turtle Excluder Devices (TEDs) are also required in the rock shrimp fishery.

The tow length varies depending on many factors including the concentration of shrimp. Large boats fishing in offshore waters make much longer drags lasting several hours.

Testimony at public hearings for Shrimp Amendment 1 indicated that vessels may drag up to 30 to 35 miles over a number of tows in one night fishing for rock shrimp (SAFMC 1996a). Data presented in Tables 3-9 and 3-10 indicate that the rock shrimp fleet, though having some heterogeneity, is fairly homogeneous (i.e. the means of these characteristics are fairly large relative to the standard deviations). The average or typical vessel in this fleet is approximately 20 years old, nearly 73 feet in length, gross tonnage of 132 tons, with a fuel capacity of approximately 16,000 gallons and a hold capacity of more than 63,000 pounds of shrimp. The average vessel typically uses four nets of an average length between 55 and 60 feet, and uses between three and four crew on each trip. More than 90 percent of these vessels are "large" while less than 9 percent are "small." The vast majority (more than 87 percent) has on-board freezing capacity and more than two-thirds have steel hulls. The remaining vessels are nearly equally split between fiberglass and wood hulls.

Table 3-9. Physical Characteristics and Selected Statistics for All Vessels with Limited Access Rock Shrimp Endorsements[2].

	Crew Size	Number of Nets	Net Size (ft)	Vessel Age	Length	Horsepower	Fuel Capacity (gallons)	Gross Tons	Hold Capacity (pounds)
# vessels	124	120	122	154	155	155	133	144	142
Minimum	1	2	30	5	12	5	5	51	10
Maximum	5	4	80	42	93	1,720	48,000	205	160,000
Total	429	464	6,912	3,133	11,233	86,571	2,126,333	19,036	9,015,260
Mean	3.5	3.9	56.7	20.3	72.5	558.5	15,987	132.2	63,488
St. Dev.	0.7	0.4	11.0	9.9	16.8	226.9	9,545	27.4	32,541

Table 3-10. Distribution of Additional Physical Characteristics for All Vessels Limited Access Rock Shrimp Endorsements.

Hull Type	Percent	Refrigeration	Percent	Vessel Size Category	Percent
Steel	68.2	Freezer	87.4	Large	91.6
Fiberglass	16.2	Ice	12.6	Small	8.4
Wood	14.9				
Aluminum	.6				

Compared to vessels with limited access rock shrimp endorsements, vessels with open access rock shrimp permits tend to be somewhat smaller and less powerful on average. Proportionally fewer have steel hulls and a much lower percentage have on-board freezing capacity. Given that vessels with endorsements are a significant subset of vessels with open

[2] The 2006 Vessel Operating Units File (VOUF) was the source of data for crew size, number of nets, and net size. The Permits database is the source of data for all other characteristics. Characteristics data was not available for every permitted vessel for a variety of reasons (e.g. tonnage data is not available for state registered boats, vessel owners do not always provide the requested data on their application form, etc.).

access permits, this result implies that vessels with open access permits that do not have endorsements are probably quite a bit smaller, less powerful, and less technologically advanced than those that do have endorsements. As with the other vessel groups that have been discussed, those vessels with open access rock shrimp permits that have been commercially active are somewhat larger and more powerful compared to all vessels that possess such permits. Of the 266 vessels with these permits, 245 (92 percent) have been commercially active in fishing at one point in time or another between 2003 and 2007, though not all of these vessels were active in each year, varying between 198 in 2004 to 225 in 2007.

3.4.3.2 Description of rock shrimp fishing practices, vessels and gear

Economic Environment

As Amendments 1(SAFMC 1996a), 5 (SAFMC 2002), and 6 (SAFMC 2004) to the South Atlantic Shrimp Fisheries Management Plan (FMP) describe in detail, the South Atlantic rock shrimp fishery is quite volatile, demonstrating significant ups and downs in terms of landings, revenues, and vessel participation from one year to the next. These Amendments describe the nature of the fishery from its inception through 2002. Amendment 6 also provides considerable information on the nature and history of the South Atlantic penaeid shrimp fishery. The information from those Amendments is incorporated herein by reference. The purpose of the information provided in this section is to update this historical information and specifically focuses on the years 2003 through 2006, though information specific to the rock shrimp fishery and its participants has been updated through 2007. However, all landings related information for 2007 should be considered preliminary. These years have been selected since data on earlier years has been provided in previous Amendments to the Shrimp FMP.

Table 3-11 presents data on rock shrimp landings and revenues in the South Atlantic states, including preliminary data for 2007. However, from a management perspective, the landings of greatest interest are those coming from a particular body of water (e.g. South Atlantic waters under the Council's jurisdiction) or a particular group of vessels (e.g. vessels that possess a particular type of permit or endorsement issued under one of the Council's FMPs). Thus, in the current case, it is more appropriate to examine rock shrimp landings harvested from South Atlantic waters and rock shrimp landings by vessels with South Atlantic limited access rock shrimp endorsements. The former is presented in Table 3-12 for the years 2003 through 2007. These data and subsequently discussed landings and revenue information represent a compilation of Florida trip ticket data, Gulf shrimp landings data, other South Atlantic states' trip ticket data and Standard Atlantic Fisheries Information Systems (SAFIS) data, the latter two of which are maintained by the Atlantic Coastal Cooperative Statistics Program (ACCSP).

Table 3-11. Rock Shrimp Landings and Revenue in South Atlantic States, 2003-2007 (Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division, Silver Spring, MD and Southeast Fisheries Science Center, Fisheries Statistics Division Miami, FL).

Year	Landings (Heads-on pounds)	Revenue (Nominal)[3]
2003	2,756,101	$4,145,951
2004	5,955,295	$4,416,274
2005	127,827	$123,838
2006	2,951,078	$4,171,062
2007*	233,712	$434,938

*2007 data are preliminary

Table 3-12. South Atlantic Rock Shrimp Landings, Revenue, and Participation, 2003-2007[4].

Year	Number of Harvesting Vessels	Landings (Heads-on pounds)	Revenue (Nominal)	Average Price per Pound	Average Landings per Vessel	Average Revenue per Vessel	Number of Trips	Average Landings per Trip	Average Revenue per Trip
2003	97	2,980,623	$4,489,905	$1.51	30,728	$46,288	360	8,280	$12,472
2004	85	6,591,583	$5,012,147	$0.76	77,548	$58,966	300	21,972	$16,707
2005	21	109,281	$99,611	$0.91	5,204	$4,743	29	3,768	$3,435
2006	44	3,018,322	$4,264,576	$1.41	68,598	$96,922	142	21,256	$30,032
2007*	26	240,550	$441,277	$1.83	9,252	$16,972	78	3,084	$5,657

The information in Tables 3-11 and 3-12 illustrate that the South Atlantic rock shrimp fishery has continued its historically cyclical nature in recent years. Recall that landings in 2002 were at their lowest level in over two decades (i.e. since 1980). In 2003, landings increased significantly, comparable to landings seen between 1997 and 1999. And in 2004, landings increased further, back to levels similar to those experienced in 2000 and 2001 even though the number of participating vessels decreased from 97 to 85 vessels. However, in 2005, landings plunged to their lowest level since South Atlantic rock shrimp landings were first tracked back in 1978 and the number of participating vessels similarly plunged to only 21 vessels. And although landings, revenues, and even prices rebounded in 2006, vessel participation in 2006 (44 vessels) was considerably less than in 2003 or during the previous decade. The fact that landings and revenues per trip and per vessel were relatively high in 2006, even compared to previous "good years," suggests that factors outside the fishery

[3] Nominal values are those that have not been adjusted for inflation.
[4] With the exception of 150 pounds in 2003 and 22 pounds in 2004, all reported landings of rock shrimp from South Atlantic waters could be ascribed to a specific vessel, which reflects a marked improvement in the quality of the data in this respect since the analysis for Amendment 5 was conducted.

played a role in limiting participation. In 2007, production and the number of harvesting vessels fell back to levels just slightly above their historic lows in 2005. Using the MSY/OY figure of approximately 4.912 million lbs for this fishery as a reference point, landings were above this reference point in 2004, below it in 2003 and 2006, and significantly below this value in 2005 and 2007.

Thus, it would appear that the fishery's cyclical nature has intensified in the past four years. It is highly likely that the instability of various economic factors has exacerbated the fishery's biological volatility. Although a definitive explanation cannot be provided at this time, it is likely that the extremely low level of landings in 2005 were not only a function of biological factors (e.g. relatively low abundance), but also economic factors (e.g. historically low rock shrimp prices, particularly relative to other potential target species, and high fuel prices, given that rock shrimp are harvested in more distant waters relative to penaeid species) and possibly natural disasters (e.g. the impact of Hurricane Katrina on vessels from ports in the Gulf of Mexico, particularly in Alabama). For example, rock shrimp prices fell dramatically in 2004, by 50 percent, relative to 2003. Rock shrimp prices basically remained at this historically low level in 2005, likely discouraging potential participants from engaging in the fishery. And although the number of trips is only a very rough estimate of effort, and thus landings per trip are similarly only a rough estimate of abundance, landings per trip were also very low in 2005 and similarly provided a significant disincentive for other vessels to prosecute the fishery that year. And though rock shrimp prices were considerably higher in 2007 than in 2005, so too were fuel prices. In a more distant water fishery such as rock shrimp, the higher fuel expenses likely offset any incentive to participate in the fishery generated by the higher price for rock shrimp. And, as in 2005, the landings per trip were very low, and in fact slightly lower than in 2005. The combination of these two factors likely explains the low level of production in 2007.

Except in 2005, the landings and revenue figures in Table 3-12 are slightly larger than those in Table 3-11, which would indicate that some of the rock shrimp harvested from South Atlantic waters are being landed in Gulf of Mexico ports. Information in Amendment 5 (SAFMC 2002) suggests that participation in the fishery by vessels with homeports in the Gulf of Mexico increased during the 1990s through at least 2000. In combination with data from the NOAA Fisheries Service website, information in Amendment 5 also suggests that the "leakage" of rock shrimp landings from South Atlantic waters to Gulf ports was considerably larger in previous years, particularly in 1999 and 2000, relative to the 2003-2007 time period. And though the subject requires more research, it appears likely that market forces, particularly fuel prices, have caused it to be far less economically viable in recent years for vessels to harvest rock shrimp from South Atlantic waters, particularly off the east coast of Florida, and then transport and land them in Gulf ports, with the exception of Key West, which basically serves as a "dividing point" between South Atlantic and Gulf waters and, to a lesser extent, the Ft. Myers/Ft. Myers Beach area.

<u>Federal Permit Requirements in the South Atlantic Rock Shrimp Fishery</u>

Federal permit requirements in the South Atlantic rock shrimp fishery were initially implemented under Amendment 1 to the South Atlantic Shrimp FMP (SAFMC 1996a). Specifically, the regulations that implemented Amendment 1 state that "for a person aboard a

vessel to fish for rock shrimp in the South Atlantic EEZ or possess rock shrimp in or from the South Atlantic EEZ, a commercial vessel permit for rock shrimp must be issued to the vessel and must be on board." Since available information suggests that the rock shrimp fishery in the South Atlantic is prosecuted exclusively within federal waters, this requirement implies that rock shrimp in the South Atlantic can only be harvested by vessels with a federal South Atlantic rock shrimp permit. At the time of its implementation, and currently, this permit is "open access" in nature. That is, the Council did not impose any restrictions on the number of permits that could be issued or the nature of the vessels to which the permits could be issued. Therefore, in effect, a permit would basically be issued to any vessel whose owner applied for one. Amendment 1 also required permits for rock shrimp dealers. Specifically, the regulations indicate that "for a dealer to receive rock shrimp harvested from the South Atlantic EEZ, a dealer permit for rock shrimp must be issued to the dealer." Both the vessel and dealer permit requirements went into effect in November 1996. The dealer permit requirement has remained unchanged and is still in effect at this time.
As has often been the case in open access fisheries, the number of open access rock shrimp permits exceeded expectations within a few years following the implementation of the vessel permit requirement. Participation in the fishery increased as did potential and expected participation in the future. As noted in Amendment 5 (SAFMC 2002), although the maximum number of active vessels (i.e. vessels with landings in a particular year) reached an apex of approximately 153 vessels in 1996, the number of permits and thus potential participants commonly averaged around 400 vessels in the late 1990s and 2000. As such, considerable concern existed with respect to "latent capacity" in the fishery and its ability to expand effort to levels that would be both biologically and economically unsustainable. The Council determined that the fishery could only sustain, biologically and economically, a maximum of 150 vessels. And as a result of this determination, a limited access program was implemented under Amendment 5 for that portion of the fishery in the EEZ off of east Florida and Georgia, an area which covers the fishery's primary fishing grounds (i.e. the majority of the landings come from this area).

In addition to the creation of the limited access program, the Council also wanted to ensure that, after the program's implementation, the fishery remained economically viable, benefits of the program accrued to "serious" participants in the fishery, and the issue of latent permits/capacity did not resurface. At the time the Council deliberated over the actions in Amendment 5, the rock shrimp fishery was still relatively healthy from an economic perspective and that many owners of non-qualifying vessels wanted to participate in the fishery. As such, the Amendment also included a "use it or lose it" requirement. Specifically, vessels with endorsements would have to harvest at least 15,000 pounds of South Atlantic rock shrimp in at least one out of every four calendar year time period. The Council concluded this provision was necessary to ensure a more stable supply of rock shrimp for consumers, but also believed that the poundage level was sufficiently low and the period of time sufficiently long to allow vessels to participate in other fisheries that may be economically preferable in the short-term without forcing them to forego such opportunities simply to maintain their endorsement and for vessel owners to replace lost or retired vessels. The Council is considering management measures to address the ability of vessels to retain their South Atlantic rock shrimp limited access endorsements. Concern exists regarding the provision to require vessels with endorsements to land a minimum of 15,000 pounds of South

Atlantic rock shrimp in at least one calendar year during four consecutive calendar years. In addition, the Council is considering reinstatement of endorsements lost due to either not meeting the landing requirement by 12/31/2007 or failing to renew the endorsement within the specified timeframe. This is to ensure that enough effort will continue to be active to maintain a viable fishery and its infrastructure. The Council is also concerned about confusion about the rock shrimp limited access endorsement as implemented in the final rule versus the limited access permit as specified in Amendment 5. Indications are that a number of individuals did not renew their endorsements when they renewed their rock shrimp permits because they did not understand they needed both an open access permit and a limited access endorsement. The Council is also concerned about vessels with limited access endorsements fishing in South Atlantic waters without an approved Vessel Monitoring System. Hence an action to verify operation and activation of such a system is being proposed for renewal, reinstatement or transfer of a rock shrimp limited access endorsement. New actions to effect these changes will take place 2009 with implementation of Shrimp Amendment 7.

Rock Shrimp Dealers

Between 40 and 50 dealers have typically held rock shrimp dealer permits at any given point in time during recent years and 46 dealers held one at one time or another during 2006 and 2007. Thus, it is not unexpected that 36 dealers purchased South Atlantic rock shrimp between 2003 and 2007. Some dealers apparently have obtained these permits on the off-chance that one or more of the vessels they typically buy shrimp from harvest South Atlantic rock shrimp. Further, not all of these dealers were active in each year and most were in fact active in only one or two years during this time. However, a careful review of the landings and permit data has revealed some disturbing information. Specifically, of the 36 dealers that have purchased South Atlantic rock shrimp in the past five years, only 21 of them had the legally required federal South Atlantic rock shrimp dealer permit (i.e. 15 dealers did not have the required permit). For some of these dealers, the alleged amount of South Atlantic rock shrimp illegally purchased was relatively minor. In other cases, the amount was more substantial. In the aggregate, these non-permitted dealers are not the most significant dealers in the fishery with respect to landings and revenue. And during 2004, 2005, and 2007, the amount of rock shrimp alleged to have been illegally purchased was relatively trivial or non-existent. However, the problem was more widespread in 2003 and 2006 when more than 7 percent and approximately 6 percent of the landings were apparently purchased by dealers that lacked the required permit. These amounts cannot be considered trivial and the problem should be addressed in some manner.

Although these allegedly illegal purchases may have repercussions for the non-permitted dealers, and possibly even for their permitted competitors, these sales may also have impacts on the vessels from which the rock shrimp were purchased. Specifically, if the rock shrimp were in fact illegally purchased, in general, they cannot count towards those vessels' catch histories and, moreover, they cannot be counted towards meeting the current 15,000-pound landings requirement. As such, it is quite possible that some vessels may not meet the landings requirement, not because they had insufficient landings, but because some or all of those landings were sold through dealers without the federal permit. For more detailed information on rock shrimp dealers and processors, refer to Shrimp Amendment 7 (under development).

3.4.3.3 Description of royal red shrimp fishing practices, vessels and gear

Royal Red Shrimp Fishery

The total landings of royal red shrimp varied with a peak of just under 600,000 pounds in 2002 (Figure 3-28).

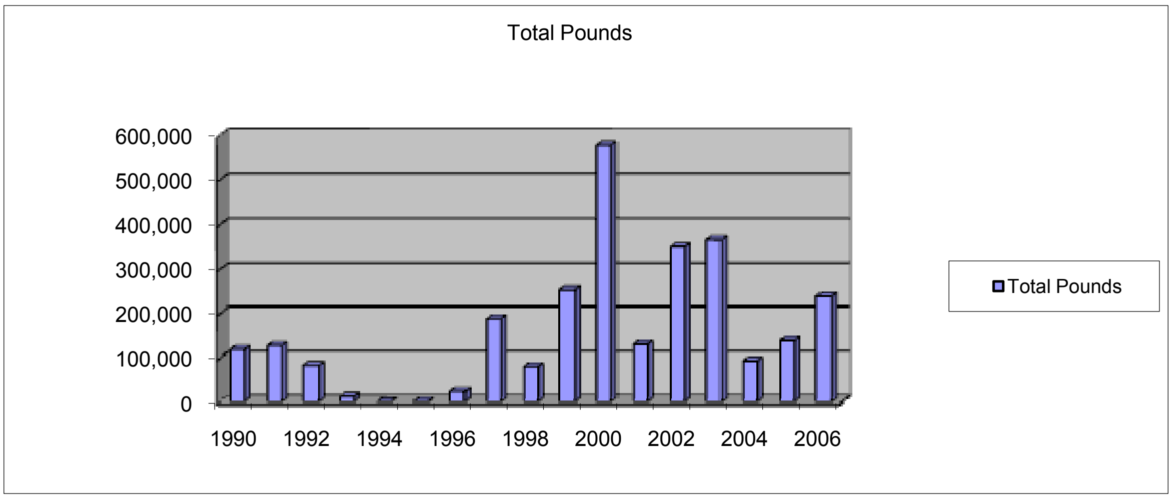


Figure 3-28. Landings of royal red shrimp from 1990-2006 (Data Source: ACCSP).

The Royal Red Shrimp Fishery

The description below was compiled from information obtained in the Oceana's 2007 report "Deep Sea Trawl Fisheries of the Southeast US and Gulf of Mexico: Rock shrimp, Royal red shrimp, Calico scallops" by Margot L. Stiles, Ellycia Harrould-Kolieb, Prisca Faure, Heather Ylitalo-Ward, Michael F. Hirshfield and from personal communications with SAFMC Deepwater Shrimp AP members.

The royal red shrimp fishery had its beginnings as an experimental fishery in 1950 with support from the Bureau of Fisheries, the federal agency that later became NOAA Fisheries (NOAA 2004a, NOAA 2004c, Sherman, personal communication). The commercial fishery began officially in 1962 in the Gulf of Mexico and off Florida's east coast (NOAA 2004b). Trawl boats were converted from other shrimp fisheries and the fleet grew to 19 boats by the end of the first year (NOAA 2004b). The New England fishery did not develop until 1995, when an experimental fishery was initiated (Balcom et. al 1996).

The South Atlantic royal red shrimp fishery is prosecuted in the U.S. EEZ in depths from 1,080 to 1,260 feet (330 - 380 meters) (W. Moore, personal communication) to just over 1,320 feet (400 meters) (M. Solorzano, personal communication). Elsewhere, reported depth for this fishery ranges from 800 feet to more than 1800 feet (250-550m) (Perry and Larson 2004, Rezak et al. 1985, Alabama Sea Grant, 1987). Because of the depths in which this fishery operates, no Turtle Excluder Devices (TEDs) or Bycatch Reduction Devices (BRDs) are required off the east coast of Florida.

The fishery utilizes the same vessels and gear as that used in the rock shrimp fishery. In fact, many rock shrimp fishermen also participate part-time in the royal red shrimp fishery. Off Florida's east coast, as many as 15 vessels once participated in this fishery on a full-time basis. Currently, only two vessels fish for royal red shrimp full-time in the South Atlantic EEZ (W. Moore, personal communication) with 6 total vessels fishing in this season with most also fishing for rock shrimp and penaeid shrimp. In the Gulf of Mexico, less than one percent of the estimated 2,600 shrimp vessels land royal red shrimp in any given year (GMFMC 2005).

The extreme ocean depths of the east coast royal red shrimp fishery require additional cable, approximately 1 mile in length (M. Solorzano, personal communication), strong winches, and a solidly seaworthy boat due to the risk of capsizing in poor weather conditions (Nicholson and Sherman personal communications). Standard shrimp boats focused on shallow-water penaeid species are not always large enough to fish for royal reds and fish for them less often (Nicholson, personal communication). When fishing for royal red shrimp, vessels drag two to four nets at a time that are each 55 feet (17 m) long (Cajun Steamer 2005, Florida Dept. of Agriculture 2006). Nets are made out of eighteen-webbing twine, about a sixteenth-of-an-inch in diameter. The breaking strength is 300 pounds. Unlike the rock shrimp fishery, the royal red shrimp fishery operates 24 hours a-day. Fishing for rock shrimp takes place during nighttime hours. A typical royal red shrimp fishing trip lasts 20 days, during which time a vessel may make 65 to 75 trawls (W. Moore, personal communication).

3.4.3.4 Description of royal red shrimp fishing practices, vessels and gear

Economic Description

Fishermen perceive the royal red shrimp fishery as a more difficult fishery, requiring greater investment and specialization and presenting higher risks. This may explain why past participation has been relatively low. Costs are higher due to the longer distance traveled to reach offshore areas and higher fuel consumption to trawl deep water shrimp (GMFMC 2005). In the strong currents and deep water of the Gulf Stream, sea conditions increase both safety concerns and fuel costs (National Shrimp Festival 2004).

Royal red shrimp occupy a niche market due to their small size, sweet taste, and bright red color. However, the market for royal red shrimp in the South Atlantic is variable as it is difficult to maintain a steady supply of shrimp. Royal red shrimp are often hard to sell because of their red coloration, oftentimes consumers mistakenly think the shrimp have already been cooked and will pass them by (W. Moore, pers. comm.). Currently, a pound of average size heads-off, shrimp sells for $4.00. The most common sizes are a 10/15 count, heads-on, 21/25 count tail or a 26/30 count tail. There are two fish houses that market royal red shrimp in Florida: Safe Harbor Seafood in Mayport, Florida and Tony Herring's fish house . Canaveral Seafood also markets royal red shrimp to the Dixie Crossroads restaurant, owned by Rodney Thompson Deepwater Shrimp Advisory Panel member (M. Soloranzano, personal communication). Tony Herring, who buys for J. B.S. out of Port Arthur Texas and owns Ocean Wild, processes many royal red shrimp (M. Solorzano, personal communication). A good catch of royal red shrimp is between 800 and 1,200 pounds; however, poundage varies with the average size of the catch (W. Moore, personal communication).

Royal red shrimp are sometimes popular because they look good on a plate (Nicholson, personal communication) or are used as "sweet shrimp" in sushi and in Asian restaurants (T. Jamir, personal communication, The Shrimp Lady 2007). The market for this species is relatively small because they do not freeze as well as shallow water shrimp (National Shrimp Festival 2004). Royal red shrimp require specialized equipment on board so that they can be individually quick frozen and stored in brine (Alabama Sea Grant 1987, The Shrimp Lady 2007).

Fishery Location and Seasonality

In the U.S. EEZ off the east coast of Florida, the royal red shrimp fishery operates south of the 30 degree latitude line down to West Palm Beach and in water off the Florida Keys.

Generally, when trawling, a vessel remains within a certain depth and may make several trawls at that depth. Trawling depth in the royal red shrimp fishery off Florida can vary from 1,000 feet to 1,800 feet (off the Florida Keys). Vessels trawl in straight lines with the current and at the same depth at a maximum speed of 2 ½ knots.

In the South Atlantic, the royal red fishing season is more dominant in the winter months (November to April) but it operates year-round.

Royal red shrimp has been caught off Texas, Louisiana, Mississippi, Florida, Georgia, and the Carolinas (GMFMC 2005; Moon, personal communication, Graham and Loney, personal communication). Core areas are located off Florida and the northeastern Gulf, including specific sites off of Mississippi, Tampa and Pensacola on the Gulf coast of Florida, the east coast of Florida, and Georgia (Sherman, personal communication; Moon, personal communication).

Catches from the Gulf of Mexico and South Atlantic council regions are illustrated in Figure 3-29 with data from NOAA Fisheries Statistics.

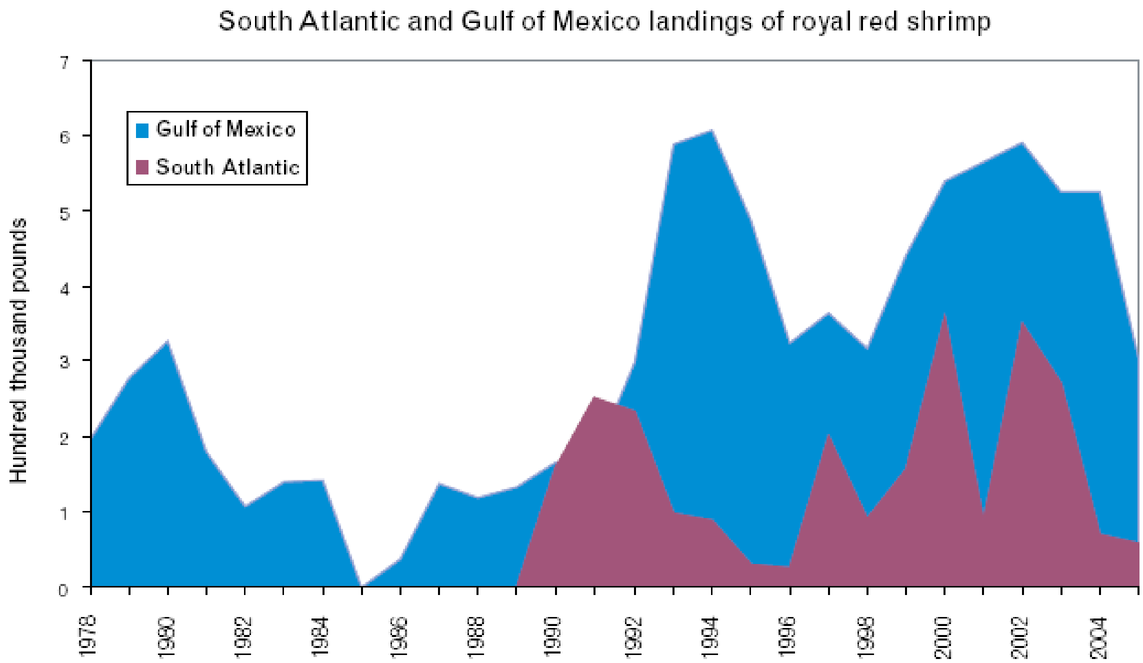


Figure 3-29. Trends in landings of royal red shrimp (Source: NOAA Fisheries Statistics).

Bycatch

Bycatch of sea life in this fishery has not been assessed. However, fishermen claim their nets bring up large quantities of human-made debris (i.e. appliances, Navy supplies, etc.) (W. Moore, personal communication)

3.4.4 South Atlantic Wreckfish ITQ Fishery

Prior to implementation of the Wreckfish ITQ, a classic fishing derby had evolved where approximately 80 vessels were in competition for the 2 million pound quota. A substantial number of vessels added wreckfish reels to catch fish faster, thereby garnering more of the available Total Allowable Catch (TAC), while others began to use bottom longline gear to catch wreckfish more rapidly, despite reportedly significant gear conflicts and losses using bottom longlines.

As the pace of wreckfish landings increased in 1990, ex-vessel prices decreased substantially. The fact that as many as 80 vessels were fishing for wreckfish on the relatively small rock ridge areas known to have concentrations of wreckfish created a potential for conflicts among harvesters and vessel safety problems.

Although still one of the most profitable fishing opportunities in the Southeast in 1990, the wreckfish fishery had already begun to show signs of excess capacity and over-capitalization by the end of the year. Public comment stressed the detrimental effects of continued entry and competitive fishing practices under a restrictive TAC. Along with the economic problems of overcapitalization and excess capacity common to open access fisheries managed by TAC, public comment stressed the absence of conservation incentives and probably lack of regulatory compliance in the fishery. Comments from wreckfish dealers pointed to the tendency for markets to become flooded as the pace of wreckfish harvest increased beyond their ability to move the product through the market chain. Other marketing problems resulting from inconsistent supply when TAC was met were also identified. Amendment 3 had been developed to add wreckfish to the Snapper Grouper management unit, define an optimum yield for wreckfish, establish a control date, and, among other things, identify a Total Allowable Catch (TAC) for the wreckfish resource. The Wreckfish ITQ (Amendment 5) was implemented in March 1992. The overall goal of implementing the South Atlantic Wreckfish ITQ was to "manage the wreckfish sector of the snapper-grouper fishery so that its long-term economic viability will be preserved". Other objectives and stated in Amendment 5 included,

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

Although not an explicit objective, the Council believed that portions or all of management and administrative costs should be recovered from those who held individual quota shares in the wreckfish fishery.

Eligibility for participation required that an applicant needed to own a vessel or vessels that landed at least 5000 pounds (dressed weight) of wreckfish in aggregate between 1987 and September 1990. Initial allocations were made such that 50 of the 100 available shares were divided equally among eligible participants. The remaining 50 shares were divided based on an applicants documented historical catch divided by the total catch of all eligible participants over the same period. Documented historical catch was calculated based on landings of wreckfish made between January 1989 and September 1990 when a control date was issued.

For approximately one month after initial allocation, an Application Oversight Committee considered requests from persons wishing to contest the initial allocations. The Committee was empowered to consider only allegations of improper calculations or improper

determinations based on documentation submitted with application. Hardship circumstances were not considered.
Following initial allocation, coupons were distributed representing shares. Coupons could be sold, leased, or loaned, but only to a person who holds a percentage share in the wreckfish fishery. Fishermen were required to possess a wreckfish vessel permit, logbook, and ITQ coupons equaling the approximate weight of catch in their possession. The coupons had to be signed and dated by the time of landing. Penalties for significant violations included forfeitures of shares, forfeitures of individual quotas, and/or vessel or dealer permit sanctions.

Dealers were required to obtain a Federal wreckfish dealer's permit. The requirements to obtain a dealer's permit were a state wholesaler's permit and a physical facility at a fixed location in the state where the wholesaler's permit is held.

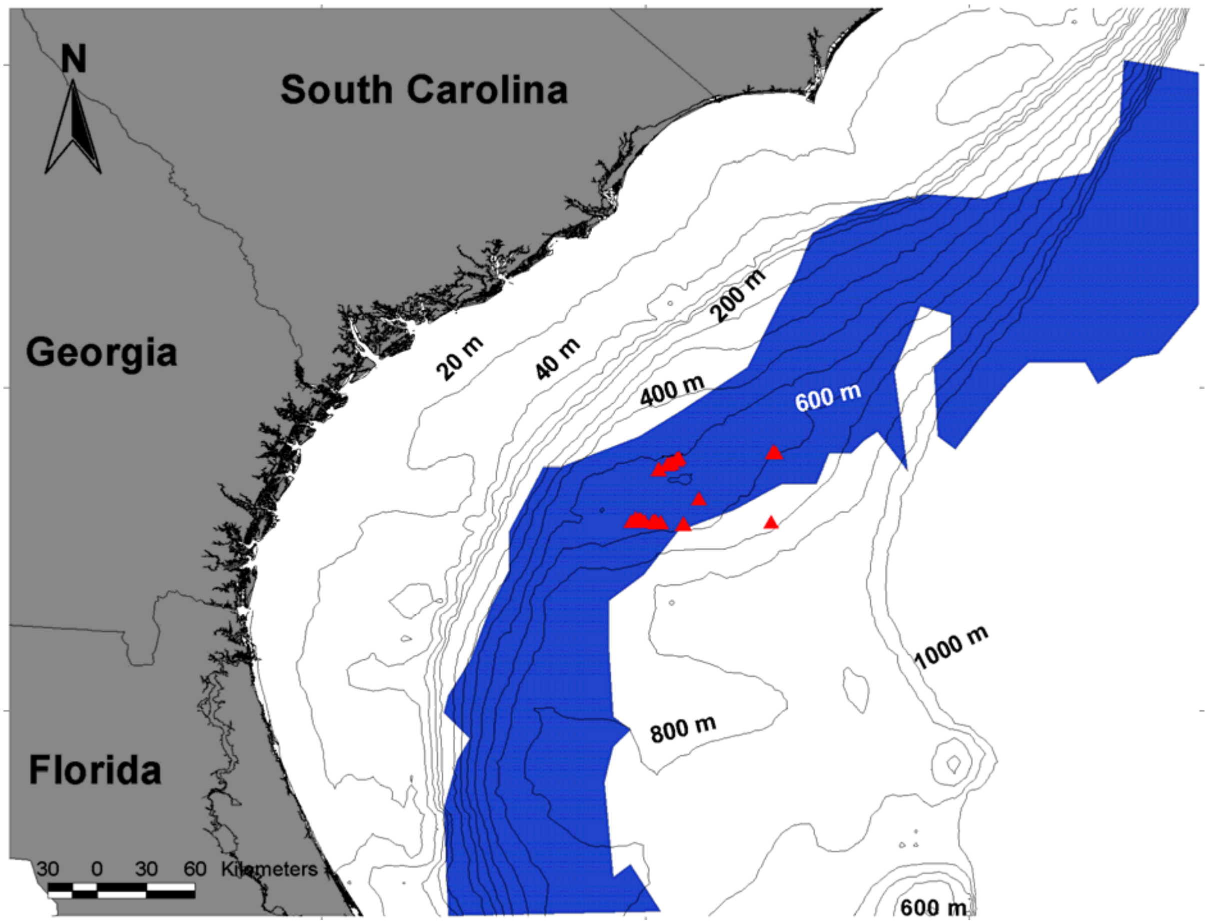


Figure 3-30. Wreckfish occurance by depth on Blake Plateau (Source: George Sedberry pers. comm.)

Landings

Most of the available data is confidential due to the small number of vessels landings wreckfish in recent years.

Social Characteristics

3.4.4.1 North Carolina 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 North Carolina with substantial fishing activity. It should be noted that 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. It should also be noted that in some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. Table 3-13 offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 3-13. Fishing infrastructure table for North Carolina 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
Varnamtown	-	-	-	-	+	+	+	-	3
Southport	+	+	+	+	+	+	+	+	8
Bald Head Island	-	-	-	-	-	-	+	+	2
Carolina Beach	+	+	+	+	+	-	+	+	7
Wilmington	+	+	-	+	+	+	+	+	7
Wrightsville Beach	+	+	-	+	+	+	+	+	7
Topsail Beach/Surf City	-	-	-	+	-	-	+	+	3
Sneads Ferry	+	+	-	+	+	+	+	+	7
Swansboro	+	+	+	+	+	-	+	+	7
Atlantic Beach	+	+	-	-	-	-	+	+	4
Morehead City	+	+	+	+	+	+	+	+	8
Beaufort	+	+	+	+	+	+	+	+	8
Harker's Island	+	+	-	-	-	-	+	-	3
Hatteras	+	+	+	+	+	-	+	+	7
Oriental	+	+	-	+	-	-	+	+	5
Vandemere/Mesic	-	+	-	-	+	+	+	-	4
Bath	-	+	-	-	-	-	+	-	2
Belhaven	-	+	-	-	-	+	+	-	3
Wanchese	+	+	-	+	+	+	+	-	6
Manteo	+	+	+	+	+	+	+	+	8
Ocracoke	-	+	-	-	+	+	+	-	4
Elizabeth City	-	+	-	-	+	+	+	-	4

In providing a preliminary characterization of potential fishing communities in Table 3-14, we have provided a grouping of communities that seem to have more involvement in various fishing enterprises and therefore are classified as primarily involved. These communities seem to have considerable fishing infrastructure, but also appear to 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 of Wilmington and Wrightsville Beach, which have considerable fishing infrastructure but are listed in secondarily involved are placed in that category largely because these two communities are located in a more metropolitan area that has a very diversified economy and while there seems to be an emphasis upon fishing, it is most likely that fishing has a small role in the overall economy and culture of the area. Others like Elizabeth City has a large processor located in the community, but may lack other components that are considered part of fishing culture or history. Many of these communities are in transition due to various social and demographic changes from coastal development, growing populations, 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. Furthermore communities are not ranked in any particular order, this is merely a categorization.

Table 3-14. Preliminary characterization of potential fishing communities in North Carolina.

Primarily-Involved	**Secondarily-Involved**
Southport	Varnamtown
Carolina Beach	Bald Head Island
Sneads Ferry	Wilmington
Swansboro	Wrightsville Beach
Morehead City	Topsail Beach/Surf City
Beaufort	Atlantic Beach
Hatteras	Oriental
Wanchese	Vandemere/Mesic
Manteo	Bath
Harker's Island	Belhaven
	Ocracoke
	Elizabeth City

3.4.4.2 South Carolina 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 South Carolina with substantial fishing activity. It should be noted that 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. It should also be noted that in some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. Table 3-15 offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 3-15. Fishing infrastructure table for South Carolina potential fishing communities.

Community	Federal Commercial Permits (5+)	State Commercial Licenses (10+)	Federal Charter Permits (5+)	Seafood Landings	Fish processors, Wholesale fish house	Recreational docks / marinas	Recreational Fishing Tournaments	Total
Hilton Head Island	-	+	-	+	+	+	+	5
Port Royal	-	-	-	+	+	+	-	3
Edisto Beach	-	+	-	-	+	-	-	2
Seabrook Island	-	+	-	-	-	-	-	1
Mt. Pleasant	+	+	-	+	+	+	-	5
Isle of Palms	-	-	-	-	-	+	-	1
McClellanville	-	+	-	+	+	+	-	3
Georgetown	+	+	-	+	+	+	+	6
Murrells Inlet	+	+	+	+	+	+	-	6
Little River	+	+	+	+	+	+	-	6

In attempting a preliminary characterization of potential fishing communities in Table 3-16, 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 3-16. Preliminary Characterization of Potential Fishing Communities in South Carolina.

Primarily-Involved	Secondarily-Involved
Mt. Pleasant	Edisto Beach
McClellanville	Seabrook Island
Georgetown	Isle of Palms
Murrells Inlet	
Little River	
Hilton Head Island	

Charleston, while having many commercial and charter permits is a large enough metropolitan area that fishing is rather small when compared to the larger economy and although historically may have played a role in the community culture is likely not a major focus historically or does it play a large role in the economy at this time. It is likely that the fishing community of Charleston has become ensconced in other parts of the metropolitan area, such as Shem Creek (Mt. Pleasant) and has become a component of that community's history and culture. 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.

3.4.4.3 Georgia 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 Georgia with substantial fishing activity. It should be noted that 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. It should also be noted that in some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. Table 3-17 offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 3-17. Fishing infrastructure table for Georgia 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
Tybee Island	-	-	-	-	+	-	+	-	2
Thunderbolt	-	-	-	-	-	-	+	-	1
Darien	-	+	-	+	+	+	+	-	5
Brunswick	+	+	-	-	+	+	+	+	6
St. Simons Island	-	-	-	-	+	+	+	+	4
St. Mary's	-	+	-	-	+	-	+	+	4

In attempting a preliminary characterization of potential fishing communities in Table 3-18, 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 3-18. Preliminary Characterization of Potential Fishing Communities in Georgia

Primarily-Involved	Secondarily-Involved
Darien	Tybee Island
Brunswick	Thunderbolt
St. Mary's	
St. Simons Island	

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.

3.4.4.4 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. It should be noted that 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. It should also be noted that in some cases certain infrastructure may exist within a community but was not readily apparent or could not be ascertained through secondary data. Table 3-19 offers an overview of the presence of the selected infrastructure items and provides an overall total score which is merely the total of infrastructure present.

Table 3-19. 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 3-20, 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 3-20. 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	
Fernandina Beach	
Fort Pierce	
Islamorada	

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

4 Environmental Consequences

4.1 *Action 1: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Establish Deepwater Coral HAPCs*

Alternative 1. No Action. Do not establish additional coral HAPCs.

<u>Discussion</u>

This action would not propose any new coral HAPCs and the *Oculina* Bank would remain as the only coral HAPC designated. The following rules would remain in effect in the *Oculina* HAPC, no person may:

1. Use a bottom longline, bottom trawl, dredge, pot, or trap.
2. If aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain.
3. Fish for rock shrimp or possess rock shrimp in or from the area on board a fishing vessel.
4. Possess *Oculina* coral.

This alternative would not provide regulations to protect additional deepwater coral ecosystems. However, regulations established through amendments to the Coral FMP, the Shrimp FMP and Snapper Grouper FMP, established to protect the *Oculina* HAPC, would remain in effect.

Preferred Alternative 2. Establish Deepwater Coral Habitat Areas of Particular Concern:

Sub-Alternative 2a. Cape Lookout Lophelia Banks CHAPC;

Sub-Alternative 2b. Cape Fear Lophelia Banks CHAPC;

Sub-Alternative 2c. Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC;

Sub-Alternative 2d. Pourtales Terrace CHAPC; and

Sub-Alternative 2e. The Blake Ridge Diapir Methane Seep CHAPC.

<u>Discussion</u>

In the deepwater coral HAPCs (Figure 4-1), no person may:

1. Use a bottom longline, trawls (mid-water and bottom), dredge, pot or trap.
2. If aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain.
3. Possess any species regulated by the coral FMP.
4. Fish for golden crab in designated areas without an approved VMS.

It is the intent of the Council to allow the wreckfish fishery to operate in the proposed CHAPCs. The fishery addressed eliminating habitat related gear impacts through prohiobiting the use of bottom longlines to capture wreckfish.

This alternative is based on the latest recommendation of the Habitat and Coral Advisory Panels supported by information presented in both the 2004 and 2006 reports (Appendix C and Appendix D) to South Atlantic Council on deepwater coral habitat distribution in the South Atlantic Region. The Habitat and Coral Advisory Panels expanded their rationale and provided additional justification for these Coral HAPCs at their November 2007 meeting (Appendix B). In addition, John Reed provided updated deepwater habitat distribution information that was reviewed in relationship to deepwater shrimp and golden crab advisory panel proposals presented at the March 2008 meeting.

A brief description of each deepwater coral area is provided below summarized from General Description of Distribution, Habitat and Associated Fauna of Deep Water Coral Reefs on the North Carolina Continental Slope (Appendix C) and Deep-Water Coral Reefs of Florida, Georgia and South Carolina: A Summary of the Distribution, Habitat and Associated Fauna (Appendix D).

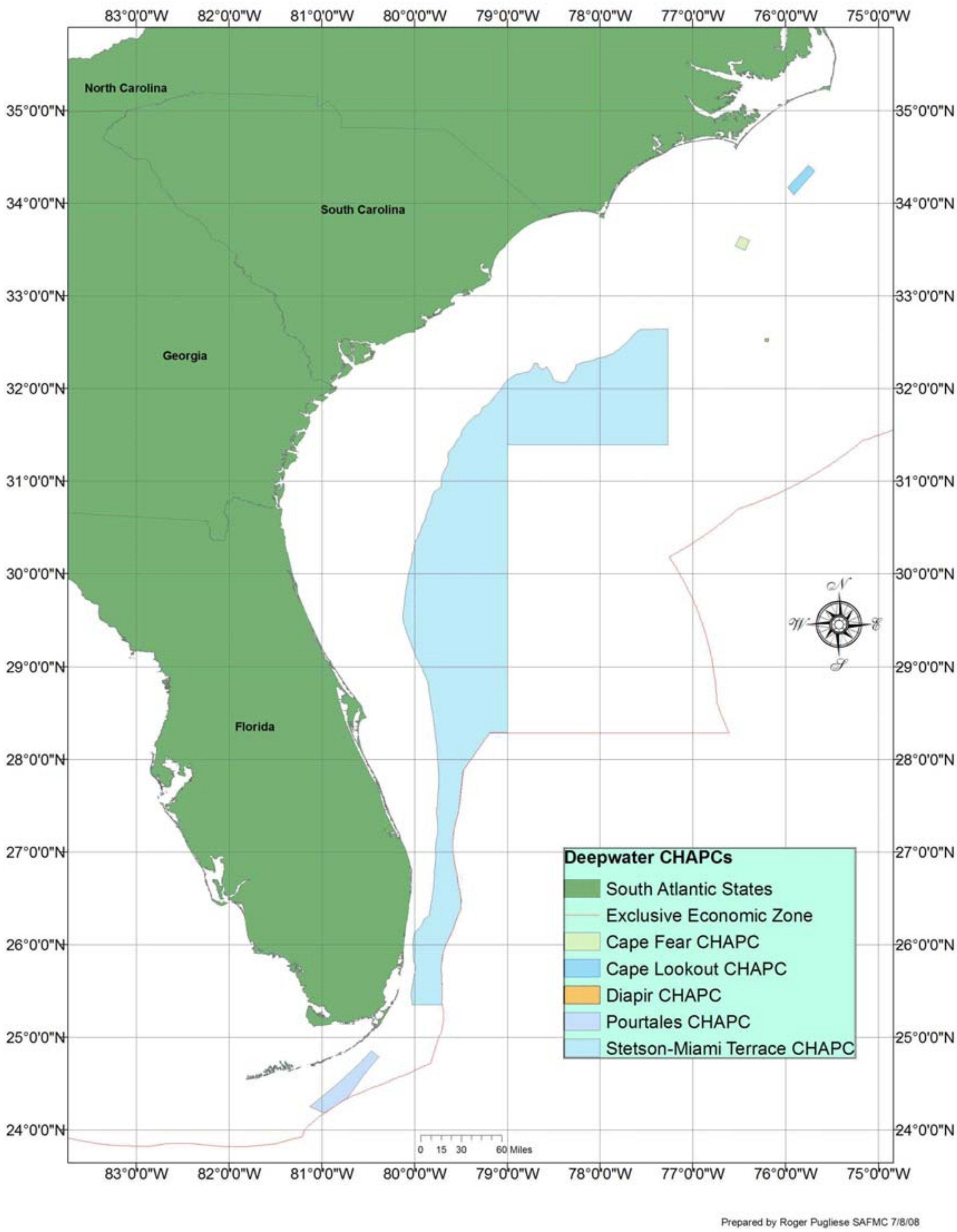


Figure 4-1. Proposed Deepwater Coral Habitat Areas of Particular Concern.

Description of Cape Lookout Lophelia Banks CHAPC

This proposed CHAPC (Table 4-1, Figures 4-2a & 4-2b) encompasses two areas described by Dr. S. Ross in the above mentioned report. This area was originally proposed for HAPC designation in 2004 and reviewed in June 2006. The northernmost area contains the most extensive coral mounds off North Carolina. The main mound system rises vertically nearly 80 meters over a distance of about one kilometer. Sides and tops of these mounds are covered with extensive *Lophelia pertusa*. The second area contains mounds that rise at least 53 meters over a distance of about 0.4 kilometers.

They appear to be of the same general construction as the northern Bank, built of coral rubble matrix that had trapped sediments. Extensive fields of coral rubble surround the area. Both living and dead corals are common to this bank, with some living bushes being quite large. Over 43 fish species and over 11 fish species have been observed along these. In addition, these areas support a well-developed invertebrate fauna.

Table 4-1. Coordinates for the proposed Cape Lookout and Cape Fear Lophelia CHAPC (Source: FWRI/SAFMC).

CapeFearCHAPC.xls 7/8/2008

FID	LatDegMinSec	LongDegMinSec	LATDD	LONGDD
0	33° 38' 49"	76° 29' 32"	33.64694444444	-76.49222222222
1	33° 36' 9"	76° 23' 37"	33.60250000000	-76.39361111111
2	33° 29' 49"	76° 26' 19"	33.49694444444	-76.43861111111
3	33° 32' 21"	76° 32' 38"	33.53916666667	-76.54388888889

CapeLookoutCHAPC.xls 7/8/2008

FID	LatDegMinSec	LongDegMinSec	LATDD	LONGDD
0	34° 24' 37"	75° 45' 11"	34.41027777778	-75.75305555556
1	34° 21' 2"	75° 41' 25"	34.35055555556	-75.69027777778
2	34° 5' 47"	75° 54' 54"	34.09638888889	-75.91500000000
3	34° 10' 26"	75° 58' 44"	34.17388888889	-75.97888888889

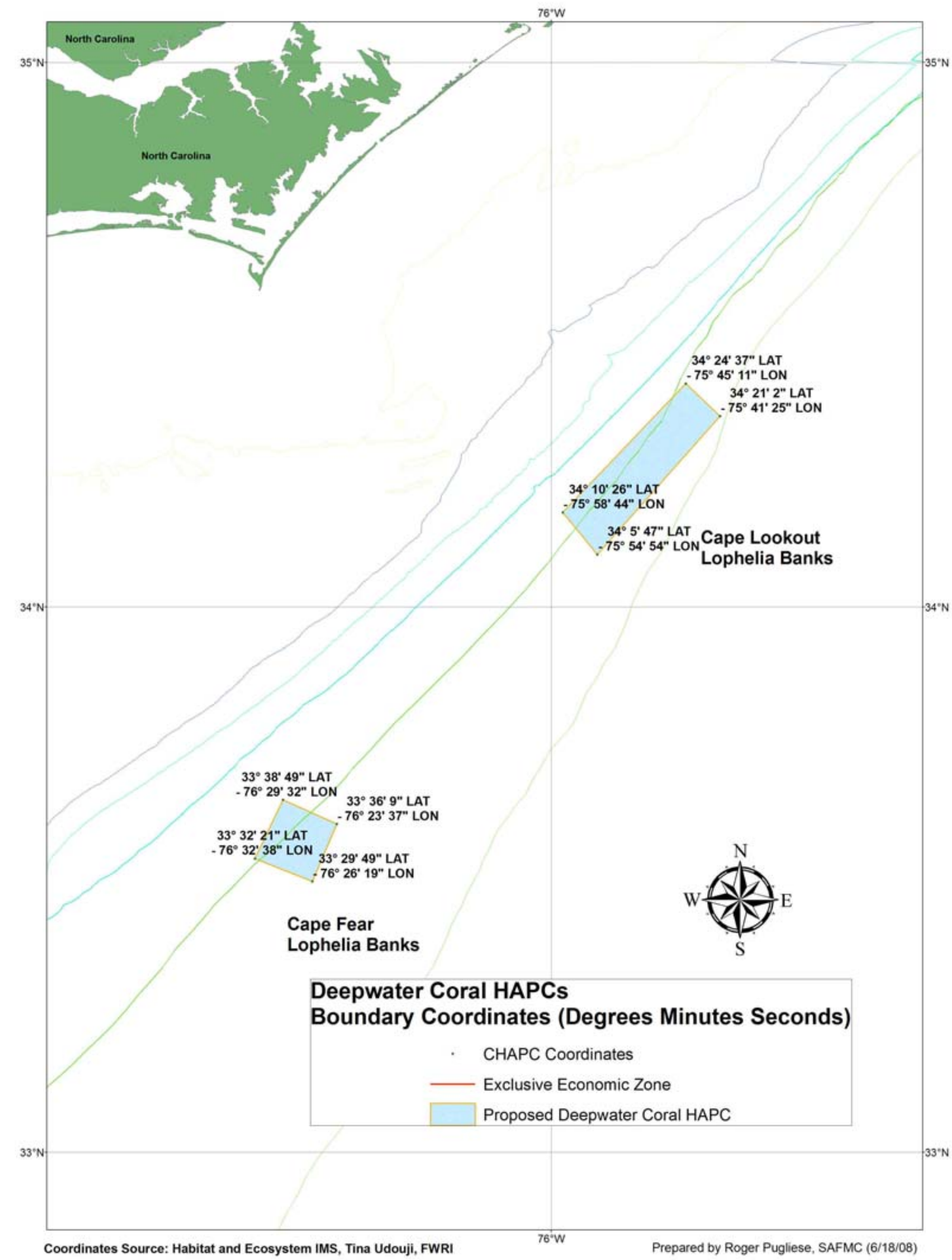


Figure 4-2. Proposed Cape Fear Deepwater Coral Habitat Area of Particular Concern showing corner coordinates (Source: Roger Pugliese, SAFMC).

Description of Cape Fear Lophelia Bank CHAPC

This area was also originally proposed for HAPC designation in 2004 and its boundaries remain unchanged (Appendix D). These mounds rise nearly 80 meters over a distance of about 0.4 kilometers and exhibit some of the most rugged habitat and vertical excursion of any area sampled. They appear to be of the same general construction as Cape Fear Banks, built of coral rubble matrix that had trapped sediments.

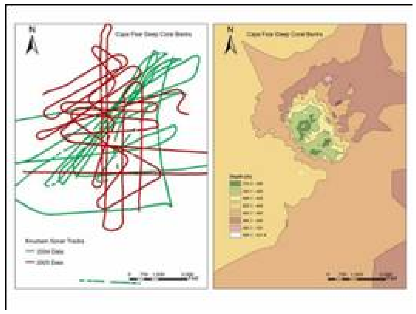


Figure 4-3. Map products for Cape Fear Bank (Source: Ross 2004).

Extensive fields of coral rubble surround the area. Both living and dead corals are common on this bank. Over 12 fish species have been observed, including the greatest numbers of large fishes off North Carolina. In addition, this area supports a well-developed invertebrate fauna. This is the only area off North Carolina where wreckfish have been observed.

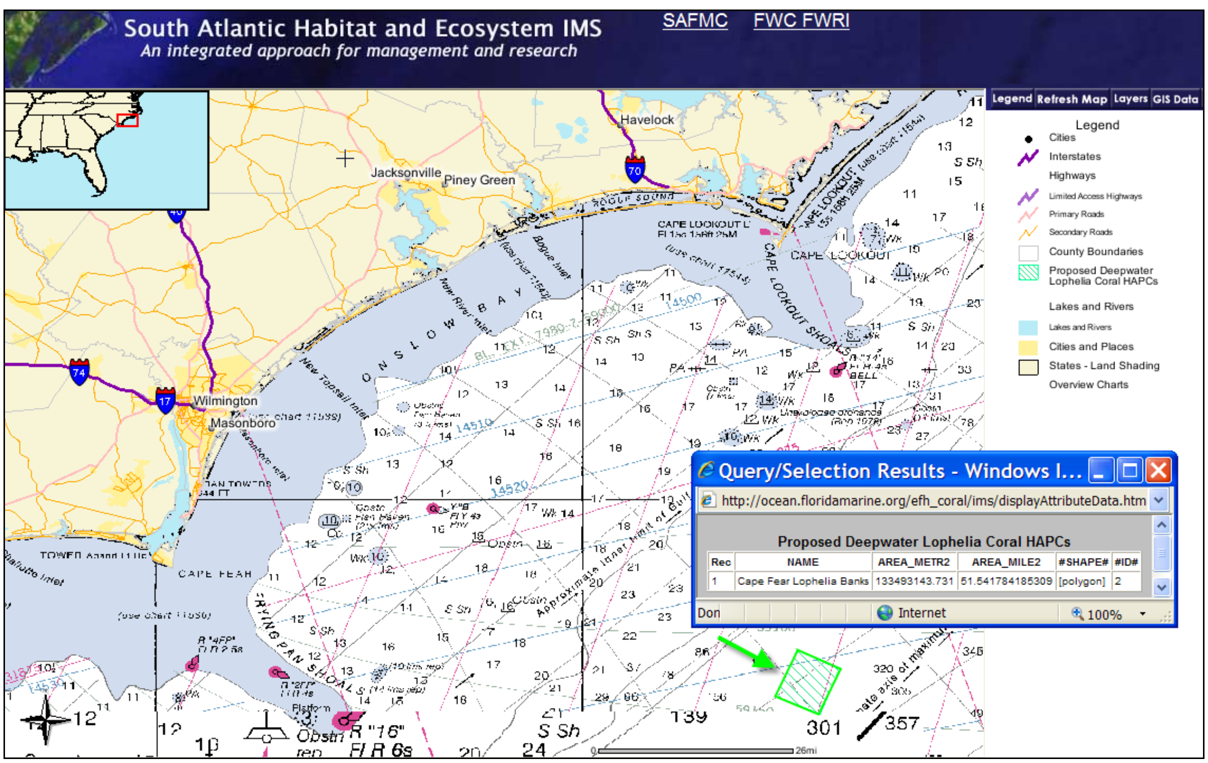


Figure 4-4. Proposed Cape Fear Deepwater Coral Habitat Area of Particular Concern. Source: Roger Pugliese SAFMC staff derived from Ecosystem IMS (August 2007).

Description of Stetson Reef/Savannah and East Florida Lithoherms/Miami Terrace CHAPC

This largest of the five proposed deepwater coral HAPCs encompasses three of the former proposed CHAPCs off the coasts of South Carolina, Georgia and East Florida to the Miami Terrace off of Biscayne Bay and extends the western boundary to the 400-meter depth contour. Below are descriptions of the main areas encompassed by this proposed CHAPC.

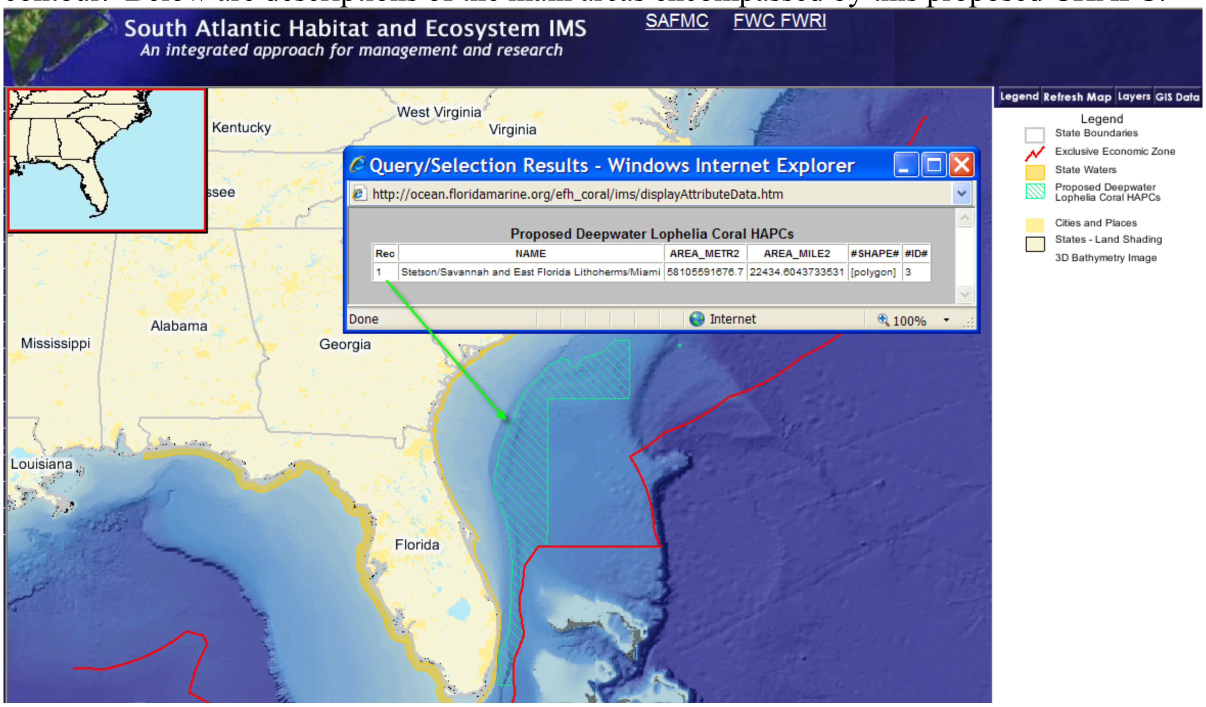


Figure 4-5a. Proposed Stetson Reef, Savannah and East Florida Lithoherms and Miami Terrace Deepwater Coral Habitat Area of Particular Concern.
Source: Roger Pugliese SAFMC staff derived from Ecosystem IMS (August 2008).

Stetson Reef - This site is characterized by hundreds of pinnacles along the eastern Blake Plateau offshore South Carolina. Over 200 coral mounds occur over this area. This area supports a 152 meter-tall pinnacle in 822 meters of water where recent submersible dives discovered live bushes of *Lophelia* coral, sponges, gorgonians, and black coral bushes. This represents one of the tallest *Lophelia* coral lithoherms known.

Savannah and East Florida Lithoherms- This site is characterized by numerous lithoherms at depths of 550 meters with relief up to 60 meters that provide live-bottom habitat. Submersible dives found that these lithoherns provided habitat for large populations of massive sponges and gorgonians in addition to smaller macroinvertebrates which have not been studied in detail. Some ridges have nearly 100 percent cover of sponges. Although few large fish have been observed at this site, a swordfish, several sharks, and numerous blackbelly rosefish were noted. Further south, echosounder transects along a 222-kilometer stretch off northeastern and central Florida (depth 700-800 meters) mapped nearly 300 coral mounds from 8 to 168 meters tall.

Miami Terrace- The Miami Terrace and Escarpment is a Miocene-age terrace off southeast Florida that supports high relief hardbottom habitats and rich benthic communities in 200-600 meter depths. Dense aggregations of 50 to 100 wreckfish were observed, in addition to blackbelly rosefish, skates, sharks, and dense schools of jacks. *Lophelia* mounds are also present at the base of the escarpment, within the Straits of Florida, but little is known of their abundance, distribution, or associated fauna. The steep escarpments, especially near the top of the ridges, are rich in corals, octocorals, and sponges.

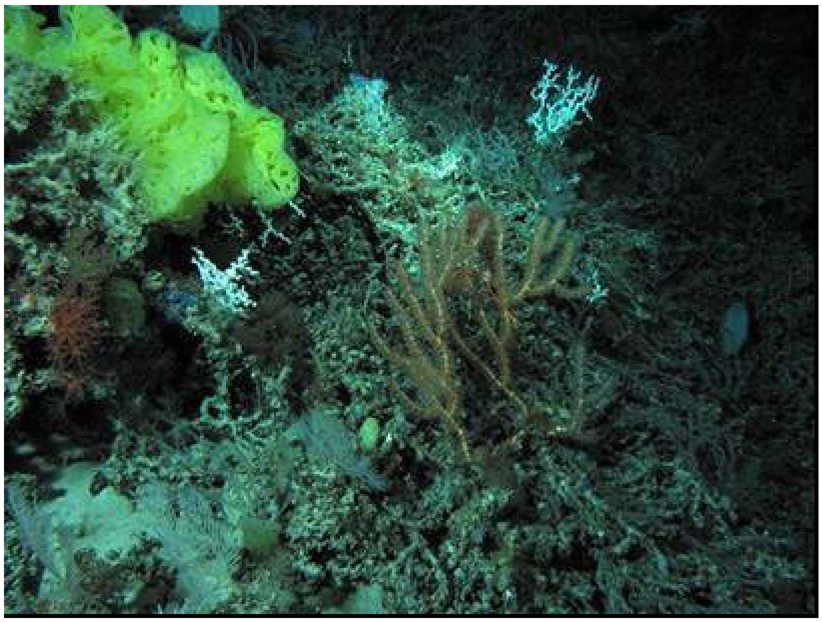


Figure 4-6. Image of deepwater coral habitat on the Miami Terrace (Source: HBOI, UNCW, NURC, 2007).

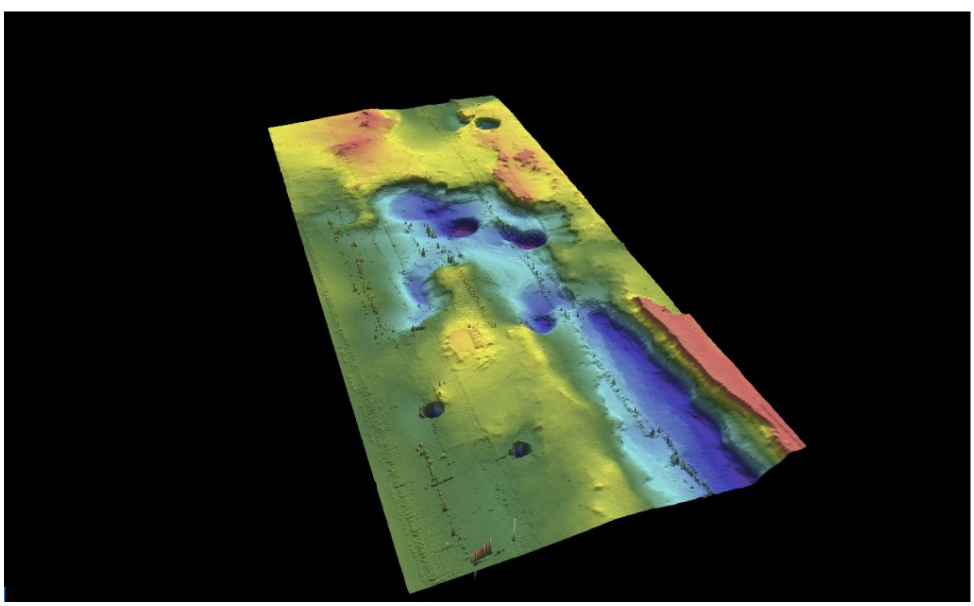


Figure 4-7. High resolution multibeam map of a potion of the Miami Terrace (Source: HBOI, UNCW, NURC, 2007).

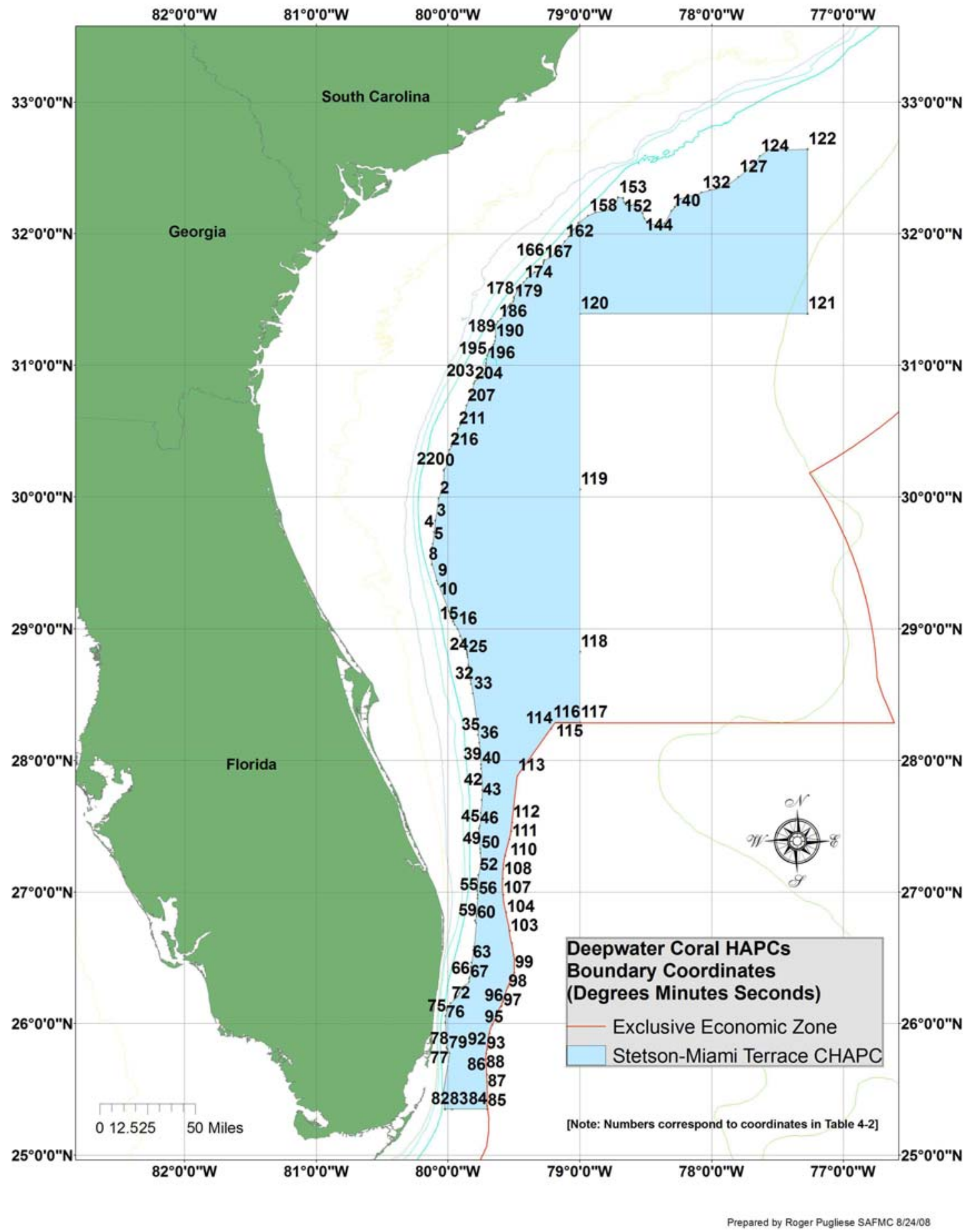


Figure 4-5b. Proposed Stetson Reef, Savannah and East Florida Lithoherms and Miami Terrace Deepwater Coral Habitat Area of Particular Concern.

Table 4-2. Coordinates for the proposed Stetson Reef, Savannah and East Florida Lithoherms and Miami Terrace CHAPC (Source: FWRI/SAFMC).

FID	Shape *	F1	LatDegMinS	LongDegMin	LATDD	LONGDD
0	Point	0	30° 12' 00"	80° 01' 48.799"	30.2	-80.030222
1	Point	1	30° 06' 52.473"	80° 01' 57.709"	30.114576	-80.032697
2	Point	2	29° 59' 16.226"	80° 04' 10.959"	29.987841	-80.069711
3	Point	3	29° 49' 11.913"	80° 05' 43.758"	29.819976	-80.095488
4	Point	4	29° 43' 59.363"	80° 06' 23.848"	29.733156	-80.106624
5	Point	5	29° 38' 37.162"	80° 06' 52.802"	29.643656	-80.114667
6	Point	6	29° 36' 53.968"	80° 07' 18.043"	29.614991	-80.121679
7	Point	7	29° 31' 59.236"	80° 07' 32.149"	29.533121	-80.125597
8	Point	8	29° 29' 14.423"	80° 07' 18.043"	29.48734	-80.121679
9	Point	9	29° 21' 48.241"	80° 05' 1.442"	29.3634	-80.083734
10	Point	10	29° 20' 25"	80° 04' 28.776"	29.340278	-80.07466
11	Point	11	29° 08' 00"	79° 59' 42.582"	29.133333	-79.995162
12	Point	12	29° 06' 55.877"	79° 59' 7.317"	29.115521	-79.985366
13	Point	13	29° 05' 59.455"	79° 58' 43.560"	29.099849	-79.978767
14	Point	14	29° 03' 33.944"	79° 57' 37.487"	29.059429	-79.960413
15	Point	15	29° 02' 10.77"	79° 56' 58.614"	29.036325	-79.949615
16	Point	16	29° 00' 00"	79° 55' 32.371"	29	-79.925659
17	Point	17	28° 56' 54.619"	79° 54' 22.357"	28.948505	-79.90621
18	Point	18	28° 55' 0.088"	79° 52' 30.658"	28.916691	-79.875183
19	Point	19	28° 53' 34.512"	79° 42' 51.123"	28.89292	-79.714201
20	Point	20	28° 51' 47.463"	79° 52' 06.722"	28.863184	-79.868534
21	Point	21	28° 50' 24.744"	79° 51' 26.579"	28.840207	-79.857383
22	Point	22	28° 49' 52.508"	79° 51' 20.497"	28.831252	-79.855694
23	Point	23	28° 49' 01.417"	79° 51' 20.497"	28.81706	-79.855694
24	Point	24	28° 48' 18.841"	79° 51' 09.548"	28.805234	-79.852652
25	Point	25	28° 47' 13.152"	79° 50' 59.209"	28.786987	-79.84978
26	Point	26	28° 43' 29.932"	79° 50' 36.096"	28.724981	-79.84336
27	Point	27	28° 41' 05.173"	79° 50' 04.468"	28.68477	-79.834574
28	Point	28	28° 40' 27.463"	79° 50' 06.901"	28.674295	-79.83525
29	Point	29	28° 39' 49.753"	79° 49' 55.953"	28.66382	-79.832209
30	Point	30	28° 39' 04.136"	79° 49' 58.386"	28.651149	-79.832885
31	Point	31	28° 36' 43.027"	79° 49' 35.273"	28.611952	-79.826465
32	Point	32	28° 35' 0.844"	79° 49' 24.325"	28.583568	-79.823424
33	Point	33	28° 30' 37"	79° 48' 35.058"	28.510278	-79.809738
34	Point	34	28° 14' 00"	79° 46' 20.006"	28.233333	-79.772224
35	Point	35	28° 11' 40.965"	79° 46' 12.228"	28.194713	-79.770063
36	Point	36	28° 08' 01.964"	79° 45' 45.461"	28.133879	-79.762628
37	Point	37	28° 01' 20.327"	79° 45' 19.55"	28.022313	-79.755431
38	Point	38	28° 01' 20.327"	79° 44' 10.529"	28.022313	-79.736258
39	Point	39	27° 58' 13.209"	79° 44' 50.62"	27.970336	-79.747394
40	Point	40	27° 56' 23.119"	79° 44' 53.165"	27.939755	-79.748101
41	Point	41	27° 49' 40.304"	79° 44' 25.165"	27.827862	-79.740324
42	Point	42	27° 46' 27.488"	79° 44' 21.984"	27.774302	-79.73944
43	Point	43	27° 41' 59.581"	79° 44' 33.438"	27.699884	-79.742622
44	Point	44	27° 36' 7.675"	79° 44' 58.256"	27.602132	-79.749516
45	Point	45	27° 30' 00"	79° 45' 29.438"	27.5	-79.758177
46	Point	46	27° 29' 4.496"	79° 45' 47.256"	27.484582	-79.763127
47	Point	47	27° 27' 5.497"	79° 45' 53.619"	27.451527	-79.764894
48	Point	48	27° 25' 46.598"	79° 45' 56.6165"	27.429611	-79.765727
49	Point	49	27° 19' 46.41"	79° 45' 14.165"	27.329558	-79.753935
50	Point	50	27° 17' 53.774"	79° 45' 12.256"	27.298271	-79.753404
51	Point	51	27° 12' 27.959"	79° 45' 0.074"	27.207766	-79.750021
52	Point	52	27° 7' 45.415"	79° 46' 6.983"	27.129282	-79.768606
53	Point	53	27° 4' 46.599"	79° 46' 29.255"	27.079611	-79.774793
54	Point	54	27° 00' 42.873"	79° 46' 38.801"	27.011909	-79.777445
55	Point	55	26° 58' 42.602"	79° 46' 27.983"	26.978501	-79.77444
56	Point	56	26° 57' 06"	79° 46' 32.437"	26.951667	-79.775677
57	Point	57	26° 49' 58"	79° 46' 54.073"	26.832778	-79.781687

Table 4-2 (cont.). Coordinates for the proposed Stetson Reef, Savannah and East Florida Lithoherms and Miami Terrace CHAPC (Source: FWRI/SAFMC).

FID	Shape *	F1	LatDegMinS	LongDegMin	LATDD	LONGDD	FID_1
58	Point	58	26° 48' 57.788"	79° 46' 55.982"	26.816052	-79.782217	58
59	Point	59	26° 47' 1.334"	79° 47' 41.8"	26.783704	-79.794944	59
60	Point	60	26° 46' 4.062"	79° 47' 8.71"	26.767795	-79.785753	60
61	Point	61	26° 35' 9.249"	79° 48' 0.891"	26.585903	-79.800247	61
62	Point	62	26° 33' 36.977"	79° 48' 21.254"	26.560271	-79.805904	62
63	Point	63	26° 27' 55.512"	79° 49' 9.324"	26.46542	-79.819257	63
64	Point	64	26° 25' 54.609"	79° 47' 29.687"	26.431306	-79.797149	64
65	Point	65	26° 21' 5.078"	79° 50' 3.413"	26.351411	-79.834281	65
66	Point	66	26° 20' 30.079"	79° 50' 19.957"	26.341689	-79.838877	66
67	Point	67	26° 18' 56"	79° 50' 16.776"	26.315556	-79.837993	67
68	Point	68	26° 16' 18.878"	79° 54' 5.659"	26.271911	-79.901572	68
69	Point	69	26° 13' 47.758"	79° 54' 48.429"	26.229933	-79.913453	69
70	Point	70	26° 12' 19.367"	79° 55' 36.902"	26.20538	-79.926917	70
71	Point	71	26° 10' 56.679"	79° 57' 5.293"	26.182411	-79.95147	71
72	Point	72	26° 9' 16.883"	79° 58' 45.089"	26.15469	-79.979191	72
73	Point	73	26° 07' 11.424"	80° 00' 22.034"	26.11984	-80.006121	73
74	Point	74	26° 06' 11.547"	80° 00' 33.439"	26.103208	-80.009289	74
75	Point	75	26° 03' 26.17"	80° 01' 1.952"	26.057269	-80.017209	75
76	Point	76	26° 00' 35.091"	80° 01' 13.358"	26.009748	-80.020377	76
77	Point	77	25° 49' 9.773"	80° 00' 38.467"	25.819381	-80.010685	77
78	Point	78	25° 48' 29.86"	80° 00' 22.787"	25.808294	-80.00633	78
79	Point	79	25° 46' 41.552"	79° 59' 14.363"	25.778209	-79.987323	79
80	Point	80	25° 27' 28.3"	80° 02' 26.102"	25.457861	-80.040584	80
81	Point	81	25° 24' 5.881"	80° 01' 44.04"	25.401634	-80.0289	81
82	Point	82	25° 21' 04"	80° 01' 26.934"	25.351111	-80.024148	82
83	Point	83	25° 21' 04"	79° 58' 11.642"	25.351111	-79.969901	83
84	Point	84	25° 21' 04"	79° 42' 3.94"	25.351111	-79.701094	84
85	Point	85	25° 22' 19.784"	79° 42' 19.413"	25.372162	-79.705393	85
86	Point	86	25° 33' 32.247"	79° 42' 8.01"	25.559308	-79.702411	86
87	Point	87	25° 33' 33.508"	79° 42' 8.678"	25.558958	-79.702225	87
88	Point	89	25° 43' 41.372"	79° 42' 59.082"	25.728159	-79.716412	88
89	Point	90	25° 48' 14.7"	79° 42' 24.313"	25.926343	-79.687851	89
90	Point	91	25° 50' 24.659"	79° 42' 11.308"	25.886742	-79.696784	90
91	Point	92	25° 53' 12.271"	79° 41' 48.423"	25.840183	-79.703141	91
92	Point	93	25° 55' 34.834"	79° 41' 16.262"	25.804083	-79.706754	92
93	Point	94	25° 43' 41.372"	79° 42' 59.082"	25.772416	-79.712454	93
94	Point	95	25° 58' 24.289"	79° 36' 26.605"	25.973414	-79.60739	94
95	Point	96	26° 7' 46.095"	79° 36' 8.93"	26.129471	-79.602481	95
96	Point	97	26° 08' 7.952"	79° 35' 53.061"	26.135542	-79.598073	96
97	Point	98	26° 10' 12.983"	79° 35' 8.825"	26.170273	-79.585785	97
98	Point	100	26° 16' 41.317"	79° 32' 49.335"	26.278144	-79.547038	98
99	Point	101	26° 23' 38.961"	79° 29' 58.286"	26.394156	-79.499524	99
100	Point	102	26° 29' 18.208"	79° 29' 48.308"	26.488391	-79.496752	100
101	Point	103	26° 31' 29.343"	79° 30' 21.092"	26.524818	-79.505859	101
102	Point	104	26° 36' 35.807"	79° 31' 8.131"	26.609946	-79.518925	102
103	Point	105	26° 42' 23.607"	79° 32' 3.722"	26.706557	-79.534367	103
104	Point	106	26° 50' 46.071"	79° 35' 12.479"	26.846131	-79.5868	104
105	Point	107	26° 58' 42.185"	79° 35' 2.946"	26.978385	-79.584152	105
106	Point	108	26° 58' 42.185"	79° 36' 18.052"	26.978385	-79.605014	106
107	Point	109	27° 06' 14.715"	79° 35' 13.301"	27.104087	-79.587028	107
108	Point	110	27° 10' 39.841"	79° 34' 56.196"	27.177734	-79.582277	108
109	Point	111	27° 16' 29.065"	79° 34' 12.008"	27.27474	-79.570002	109
110	Point	112	27° 24' 0.919"	79° 32' 9.423"	27.400255	-79.535951	110
111	Point	113	27° 27' 44.708"	79° 31' 22.385"	27.462419	-79.522885	111
112	Point	114	27° 31' 54.154"	79° 30' 53.877"	27.531709	-79.514966	112
113	Point	115	27° 53' 11.319"	79° 28' 31.336"	27.886478	-79.475371	113
114	Point	116	28° 14' 39.887"	79° 13' 14.799"	28.244413	-79.220777	114
115	Point	117	28° 17' 23.808"	79° 11' 17.916"	28.289947	-79.18831	115
116	Point	118	28° 17' 25.234"	79° 5' 10.161"	28.290343	-79.086156	116

Table 4-2 (cont.). Coordinates for the proposed Stetson Reef, Savannah and East Florida Lithoherms and Miami Terrace CHAPC (Source: FWRI/SAFMC).

FID	Shape *	F1	LatDegMinS	LongDegMin	LATDD	LONGDD
117	Point	119	28° 17' 28.085"	79° 00' 00"	28.291135	-79
118	Point	120	28° 49' 37.527"	79° 00' 00"	28.827091	-79
119	Point	121	30° 03' 29.346"	79° 00' 00"	30.058152	-79
120	Point	122	31° 23' 37.113"	79° 00' 00"	31.393642	-79
121	Point	123	31° 23' 37.113"	77° 16' 21.237"	31.393642	-77.272566
122	Point	124	32° 38' 36.748"	77° 16' 21.237"	32.643541	-77.272566
123	Point	125	32° 38' 21.302"	77° 34' 6.312"	32.639251	-77.56842
124	Point	127	32° 35' 24.49"	77° 37' 53.932"	32.590136	-77.631648
125	Point	128	32° 32' 17.516"	77° 40' 26.357"	32.538199	-77.673988
126	Point	129	32° 28' 42.089"	77° 44' 9.912"	32.478358	-77.736087
127	Point	130	32° 25' 51.374"	77° 47' 43.307"	32.430937	-77.795363
128	Point	131	32° 22' 39.647"	77° 52' 4.841"	32.37768	-77.868011
129	Point	132	32° 20' 58.037"	77° 56' 29.029"	32.349455	-77.941397
130	Point	133	32° 20' 29.586"	77° 57' 50.317"	32.341552	-77.963977
131	Point	134	32° 19' 53.006"	78° 00' 49.152"	32.331391	-78.013653
132	Point	135	32° 18' 43.911"	78° 04' 34.728"	32.312198	-78.076313
133	Point	136	32° 17' 35.487"	78° 07' 48.475"	32.293191	-78.130132
134	Point	137	32° 17' 15.164"	78° 10' 41.223"	32.287546	-78.178117
135	Point	138	32° 15' 49.806"	78° 14' 8.52"	32.263835	-78.2357
136	Point	139	32° 15' 20.236"	78° 15' 25.426"	32.255621	-78.257063
137	Point	140	32° 12' 14.629"	78° 16' 36.811"	32.204064	-78.276892
138	Point	141	32° 10' 26.246"	78° 18' 10.711"	32.173957	-78.302975
139	Point	142	32° 12' 15.984"	78° 16' 29.102"	32.20444	-78.274751
140	Point	143	32° 10' 26.246"	78° 18' 9.357"	32.173957	-78.302599
141	Point	144	32° 04' 42.128"	78° 21' 27.157"	32.078369	-78.357544
142	Point	145	32° 03' 41.162"	78° 24' 7.023"	32.061434	-78.401951
143	Point	146	32° 04' 58.385"	78° 29' 18.626"	32.082885	-78.488507
144	Point	147	32° 06' 58.962"	78° 30' 48.042"	32.116378	-78.513345
145	Point	148	32° 09' 26.635"	78° 31' 31.396"	32.157399	-78.525388
146	Point	149	32° 11' 23.147"	78° 32' 47.264"	32.189763	-78.546462
147	Point	150	32° 13' 8.821"	78° 34' 4.487"	32.219117	-78.567913
148	Point	151	32° 14' 8.432"	78° 34' 35.648"	32.235676	-78.576569
149	Point	152	32° 12' 48.499"	78° 36' 33.513"	32.213472	-78.609309
150	Point	153	32° 13' 7.467"	78° 39' 6.607"	32.218741	-78.651835
151	Point	154	32° 14' 16.561"	78° 40' 0.799"	32.237934	-78.666889
152	Point	155	32° 16' 19.847"	78° 40' 18.411"	32.27218	-78.671781
153	Point	156	32° 16' 33.395"	78° 42' 32.336"	32.275943	-78.708982
154	Point	157	32° 14' 26.045"	78° 43' 22.663"	32.240568	-78.722962
155	Point	158	32° 11' 13.664"	78° 45' 42.207"	32.187129	-78.761724
156	Point	159	32° 10' 19.472"	78° 49' 8.136"	32.172076	-78.818927
157	Point	160	32° 09' 41.538"	78° 52' 54.387"	32.161538	-78.881774
158	Point	161	32° 08' 14.538"	78° 56' 10.832"	32.137372	-78.936342
159	Point	162	32° 04' 59.74"	79° 00' 29.598"	32.083261	-79.008222
160	Point	163	32° 01' 54.33"	79° 02' 49.142"	32.031758	-79.046984
161	Point	164	31° 58' 40.397"	79° 04' 51.074"	31.977888	-79.080854
162	Point	165	31° 56' 31.692"	79° 06' 47.586"	31.942137	-79.113218
163	Point	166	31° 53' 26.685"	79° 09' 17.968"	31.890746	-79.154991
164	Point	167	31° 50' 55.703"	79° 11' 29.384"	31.848806	-79.191496
165	Point	168	31° 49' 7.319"	79° 13' 35.38"	31.8187	-79.226494
166	Point	169	31° 47' 55.515"	79° 16' 8.471"	31.798754	-79.26902
167	Point	170	31° 47' 10.807"	79° 16' 30.148"	31.786335	-79.275041
168	Point	171	31° 46' 28.808"	79° 16' 24.729"	31.774669	-79.273536
169	Point	172	31° 44' 30.941"	79° 17' 24.34"	31.741928	-79.290094
170	Point	173	31° 43' 20.491"	79° 18' 26.661"	31.722359	-79.307406
171	Point	174	31° 42' 26.299"	79° 20' 40.785"	31.707305	-79.344662
172	Point	175	31° 41' 9.076"	79° 22' 26.459"	31.685854	-79.374016
173	Point	176	31° 39' 35.595"	79° 23' 58.585"	31.659888	-79.399607
174	Point	177	31° 37' 53.986"	79° 25' 29.357"	31.631663	-79.424821
175	Point	178	31° 35' 57.473"	79° 27' 13.676"	31.599298	-79.453799

Table 4-2 (cont.). Coordinates for the proposed Stetson Reef, Savannah and East Florida Lithoherms and Miami Terrace CHAPC (Source: FWRI/SAFMC).

FID	Shape *	F1	LatDegMinS	LongDegMin	LATDD	LONGDD
176	Point	179	31° 34' 14.154"	79° 28' 24.125"	31.570598	-79.473368
177	Point	180	31° 31' 7.547"	79° 29' 58.961"	31.518763	-79.499711
178	Point	181	31° 30' 25.548"	79° 29' 52.187"	31.507097	-79.49783
179	Point	182	31° 29' 11.035"	79° 30' 11.154"	31.486399	-79.503098
180	Point	183	31° 27' 57.876"	79° 31' 40.541"	31.466077	-79.527928
181	Point	184	31° 27' 6.393"	79° 32' 7.667"	31.451776	-79.535463
182	Point	185	31° 26' 21.685"	79° 32' 48.311"	31.439357	-79.546753
183	Point	186	31° 24' 21.108"	79° 33' 50.631"	31.405863	-79.564064
184	Point	187	31° 22' 53.047"	79° 34' 40.759"	31.381402	-79.577989
185	Point	188	31° 21' 3.308"	79° 36' 0.691"	31.350919	-79.600192
186	Point	189	31° 19' 59.633"	79° 37' 12.496"	31.333231	-79.620138
187	Point	190	31° 18' 34.281"	79° 38' 14.816"	31.309523	-79.637449
188	Point	191	31° 16' 48.607"	79° 38' 36.493"	31.280169	-79.64347
189	Point	192	31° 13' 6.42"	79° 38' 18.881"	31.21845	-79.638578
190	Point	193	31° 11' 4.489"	79° 38' 39.207"	31.18458	-79.644224
191	Point	194	31° 09' 28.298"	79° 39' 9.008"	31.157861	-79.652502
192	Point	195	31° 07' 43.979"	79° 40' 20.812"	31.128883	-79.672448
193	Point	196	31° 05' 52.886"	79° 41' 27.197"	31.098024	-79.690888
194	Point	197	31° 04' 39.727"	79° 42' 9.196"	31.077702	-79.702554
195	Point	198	31° 02' 58.117"	79° 42' 28.163"	31.049477	-79.707823
196	Point	199	31° 01' 2.959"	79° 42' 40.356"	31.017489	-79.71121
197	Point	200	30° 59' 49.8"	79° 42' 43.066"	30.997167	-79.711963
198	Point	201	30° 58' 27.158"	79° 42' 43.066"	30.974211	-79.711963
199	Point	202	30° 57' 15.354"	79° 42' 49.84"	30.954265	-79.713844
200	Point	203	30° 56' 8.969"	79° 43' 27.774"	30.935825	-79.724382
201	Point	204	30° 54' 49.035"	79° 44' 53.126"	30.913621	-79.748091
202	Point	205	30° 53' 44.006"	79° 46' 23.897"	30.895557	-79.773305
203	Point	206	30° 52' 47.104"	79° 47' 39.766"	30.879751	-79.794379
204	Point	207	30° 51' 44.784"	79° 48' 16.347"	30.86244	-79.804541
205	Point	208	30° 48' 36.467"	79° 49' 2.408"	30.81013	-79.817336
206	Point	209	30° 45' 24.086"	79° 49' 55.245"	30.756691	-79.832013
207	Point	210	30° 41' 36.48"	79° 51' 31.436"	30.693467	-79.858732
208	Point	211	30° 38' 37.647"	79° 52' 22.918"	30.643791	-79.873033
209	Point	212	30° 35' 29.331"	79° 52' 54.078"	30.591481	-79.881688
210	Point	213	30° 32' 54.884"	79° 54' 19.431"	30.548579	-79.905398
211	Point	214	30° 31' 5.146"	79° 55' 27.17"	30.518096	-79.924214
212	Point	215	30° 28' 9.022"	79° 56' 6.459"	30.469173	-79.935127
213	Point	216	30° 26' 57.218"	79° 56' 33.555"	30.449227	-79.942654
214	Point	217	30° 25' 25.157"	79° 57' 35.876"	30.423655	-79.959966
215	Point	218	30° 23' 2.839"	79° 58' 24.649"	30.384122	-79.973514
216	Point	219	30° 21' 26.648"	79° 59' 24.26"	30.357402	-79.990072
217	Point	220	30° 18' 22.396"	80° 00' 8.968"	30.306221	-80.002491
218	Point	221	30° 16' 34.012"	80° 00' 33.354"	30.276114	-80.009265
219	Point	222	30° 14' 55.112"	80° 00' 23.482"	30.248642	-80.006523
220	Point	223	30° 12' 35.568"	80° 01' 43.807"	30.20988	-80.028835

Description of the Pourtales Terrace CHAPC

The original proposed CHAPC (Table 4-3, Figures 4-8a 4-8b) was expanded to include additonal, recently documented, deepwater coral habitat. Like the Miami Terrace, the Pourtales Terrace is a Miocene-age terrace. It is located off the Florida Reef Tract and provides high relief hardbottom habitats and rich benthic communities. Sinkholes are present on the outer edge of the terrace, including the Jordon sinkhole, which may be one of the deepest sinkholes known. A total of 26 fish taxa were identified from the sinkhole and bioherm sites. Observed species include tilefish, sharks, speckled hind, yellow-edge grouper, Warsaw grouper, snowy grouper, blackbelly rosefish, red porgy, drum, scorpion fish, amberjack and phycid hakes.

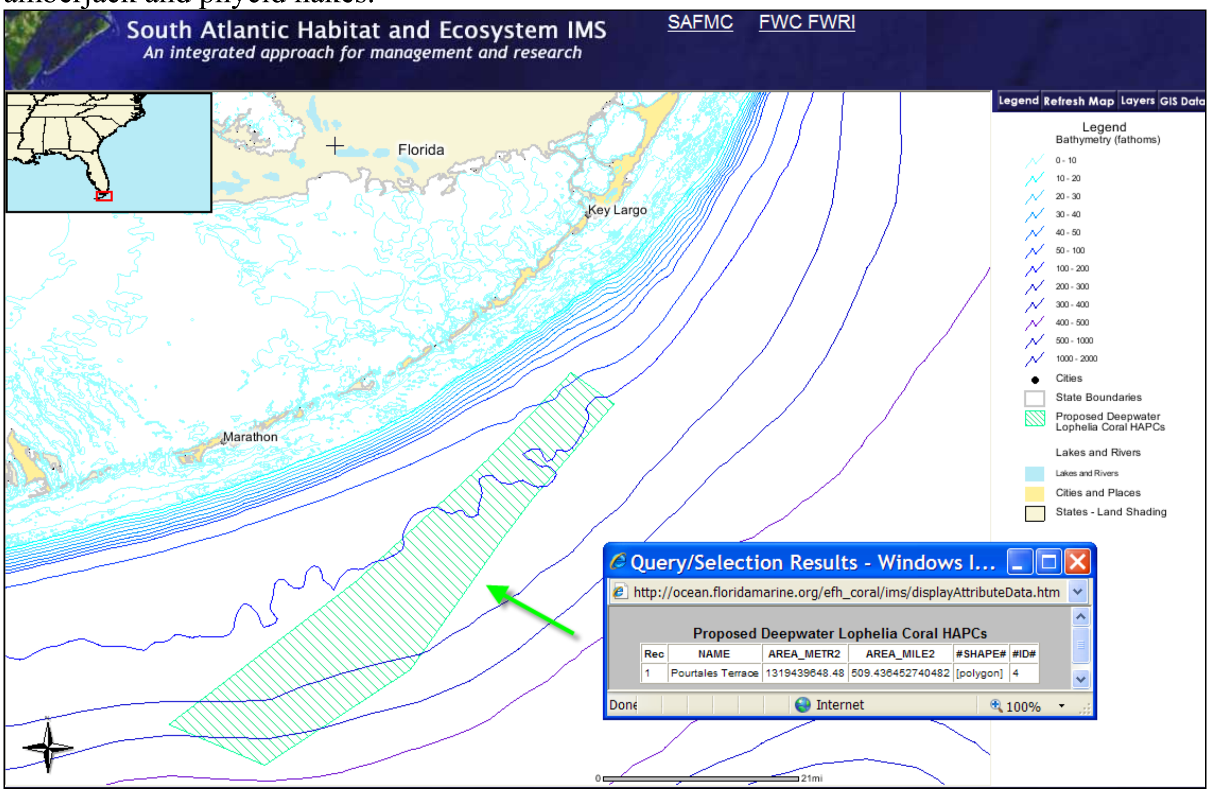


Figure 4-8a. Proposed Pourtales Terrace Deepwater Coral Habitat Area of Particular Concern. Source: Roger Pugliese SAFMC staff derived from Ecosystem IMS (August 2007).

Table 4-3. Coordinates for the proposed Pourtales CHAPC (Source: FWRI/SAFMC).

PourtalesCHAPC.xls 7/8/2008

FID	LatDegMinSec	LongDegMinSec	LATDD	LONGDD
0	24° 15' 4"	81° 7' 52"	24.25111111111	-81.13111111111
1	24° 10' 58"	80° 58' 16"	24.18277777778	-80.97111111111
2	24° 20' 34"	80° 43' 37"	24.34277777778	-80.72694444444
3	24° 33' 42"	80° 34' 23"	24.56166666667	-80.57305555556
4	24° 37' 45"	80° 31' 20"	24.62916666667	-80.52222222222
5	24° 47' 18"	80° 23' 8"	24.78833333333	-80.38555555556
6	24° 51' 8"	80° 27' 58"	24.85222222222	-80.46611111111
7	24° 42' 52"	80° 35' 51"	24.71444444444	-80.59750000000
8	24° 29' 44"	80° 49' 45"	24.49555555556	-80.82916666667

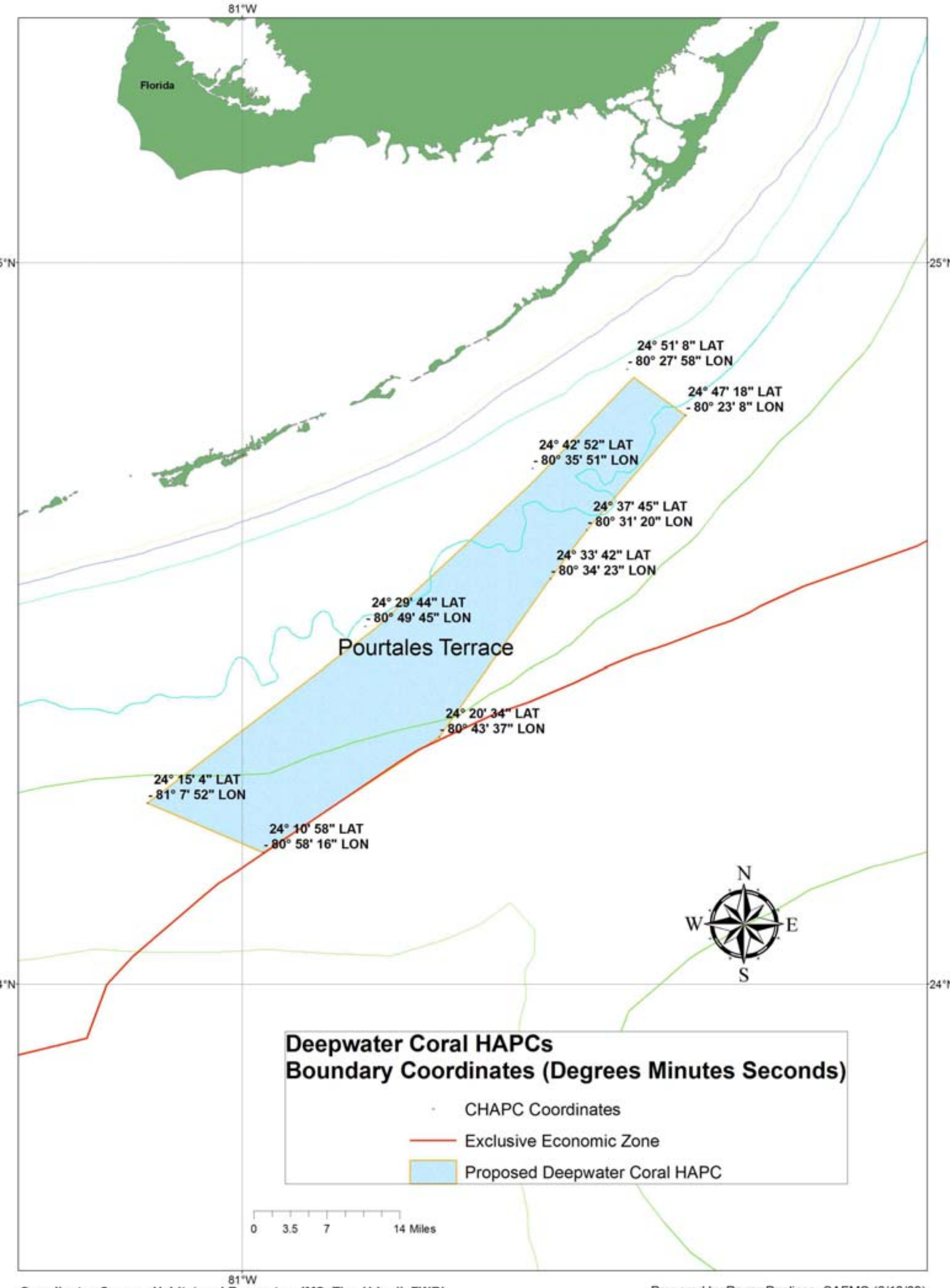
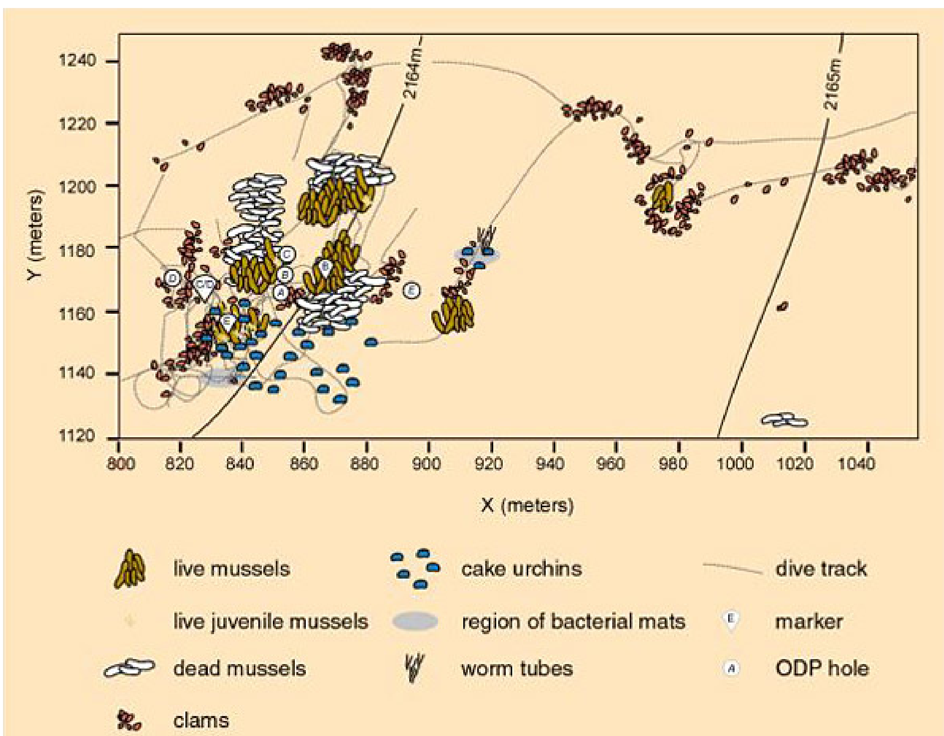


Figure 4-8b. Proposed Pourtales Terrace CHAPC and coordinates (Source: FWRI/SAFMC).

Description of The Blake Ridge Diapir CHAPC

Methane gas hydrate formed below a rock overhang at the sea floor on the Blake Ridge diapir. Images (Figure 4-8), taken from the DSV Alvin during the NOAA-sponsored Deep East cruise in 2001, marked the first discovery of gas hydrate at the sea floor on the Blake Ridge. Methane bubbling out of the sea floor below this overhang quickly “freezes,” forming a downward hanging hydrate deposit, dubbed the “inverted snowcone”. (Source: NOAA Ocean Explorer Dive Logs 2003).

The NOAA Ocean Exploration expedition “Windows to the Deep” focused on exploration of the Blake Ridge and the Blake Ridge Diapir which occurs between 800 and 100 meters deep. The expedition used high-resolution multichannel seismic data that W.S. Holbrook (University of Wyoming), D. Lizarralde (Georgia Tech), and I. Pecher (now in New Zealand) acquired in Autum 2000. The Blake Ridge Diapir was observed for the first time during the expedition. The high- resolution image revealed the distribution of gas hydrate and free gas to depths of hundreds of meters. The new sub-seafloor images provided even greater resolution necessary to better study features near the sea floor, just beneath methane seeps and potential chemosynthetic communities (Figure 4-9) (Source: NOAA Ocean Explorer 2003 Dive Logs).

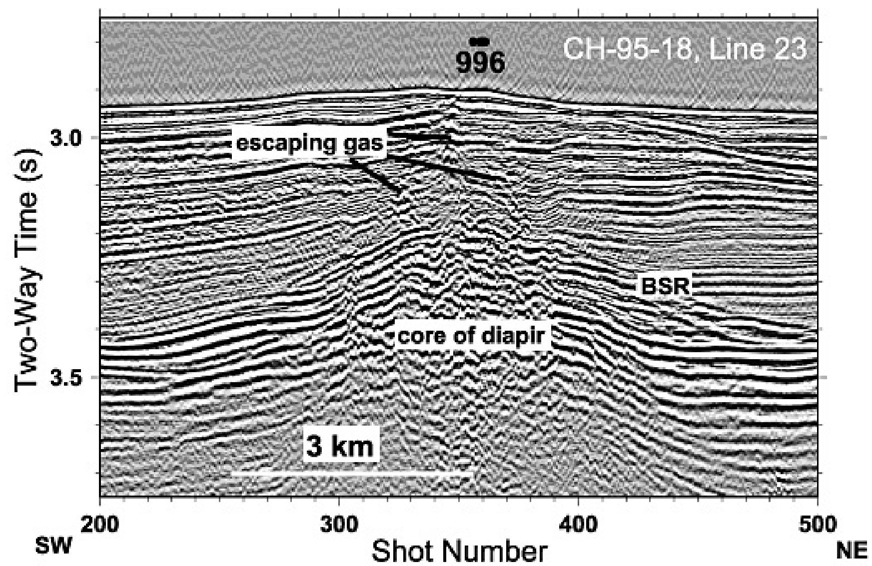


http://oceanexplorer.noaa.gov/explorations/03windows/logs/jul26/media/blakeridgemap.html

Figure 4-9. Map of Blake Ridge Diapir showing distribution of seep organisms. (Source: Van Dover et al. (2003) Deep-Sea Research I 50, p. 287) (Source: NOAA Ocean Explorer.)

On this exploration, scientists used the Alvin submersible and other tools to explore the biology, physics, and chemistry of sea-floor methane seeps at water depths of 2,000 m to 2,800 m off the coast of the southeastern United States. These seeps occur where methane hydrate deposits—a solid form of methane and water stable at high pressures and low temperatures—rise to shallow depths beneath the sea floor and break down to produce methane gas. The Alvin dives explored three sea-floor features where scientists found chemosynthetic communities that live on or near the sea-floor emission sites. (Source: NOAA Ocean Explorer Dive Logs 2003).

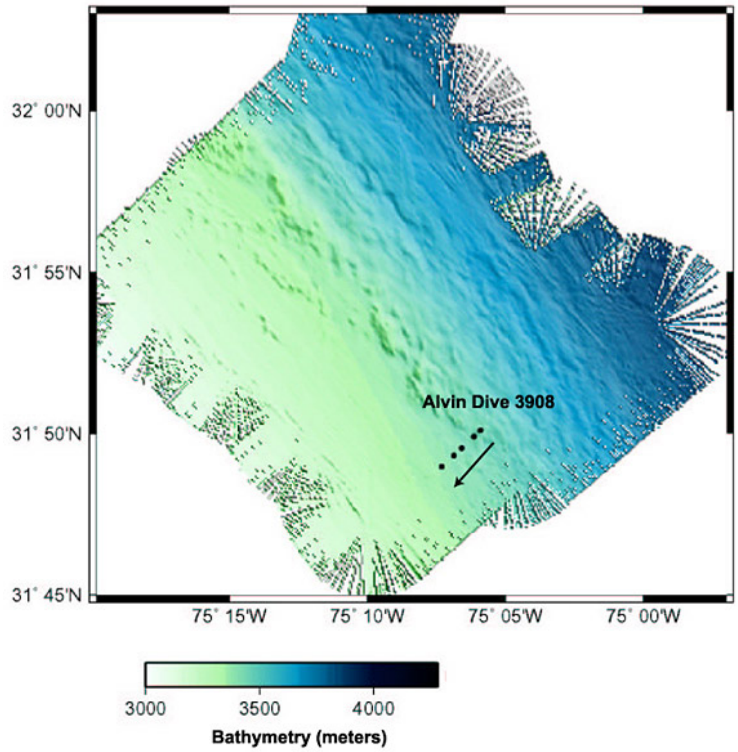
Background information for this exploration can be found on NOAA Ocean Explorer http://oceanexplorer.noaa.gov/explorations/03windows/welcome.html. Daily updates, detailed logs and summaries of exploration activities are posted.



http://oceanexplorer.noaa.gov/explorations/03windows/background/plan/media/fig4_seism.html

Figure 4-10. Single channel seismic data collected by the US Geological Survey crossing the Blake Ridge Diapir from southwest to northeast provides an image of the subseafloor.

Figure 4-10 shows the Blake Ridge Diapir as the pronounced concave feature in the middle of the diagram. The feature labeled BSR is a bottom-simulating reflector that marks the base of the gas hydrate zone. Gas hydrate ("methane ice") is stable in the overlying sediments, but only methane gas can exist in the sediments beneath the BSR. The BSR is clearly visible on the diapir's flanks, but it is warped upward and disrupted over the center of the diapir. Vertically oriented features above the center of the diapir are faults that provide conduits for methane and other chemicals to reach the sea floor, where they can be used to sustain chemosynthetic communities (NOAA Ocean Explorer 2003 Dive Logs).



http://oceanexplorer.noaa.gov/explorations/03windows/logs/jul24/media/bathy.html

Figure 4-11. Seabeam survey of the northeastern side of the Blake Ridge. Source: Image by C. Ruppel. in NOAA Ocean Explorer.

The location of DSV Alvin dive 3908 (Figure 4-11), conducted on 25 July 2003 to explore the geology of this area and to search for signs of past or ongoing methane seepage is also shown.

Table 4-4. Coordinates for the proposed Blake Ridge Diapir CHAPC (Source: FWRI/SAFMC).

DiapirCHAPC.xls 7/8/2008

FID	LatDegMinSec	LongDegMinSec	LATDD	LONGDD
0	**32° 32' 28"**	**76° 13' 16"**	32.54111111111	-76.22111111111
1	**32° 32' 21"**	**76° 11' 13"**	32.53916666667	-76.18694444444
2	**32° 30' 37"**	**76° 11' 21"**	32.51027777778	-76.18916666667
3	**32° 30' 44"**	**76° 13' 24"**	32.51222222222	-76.22333333333

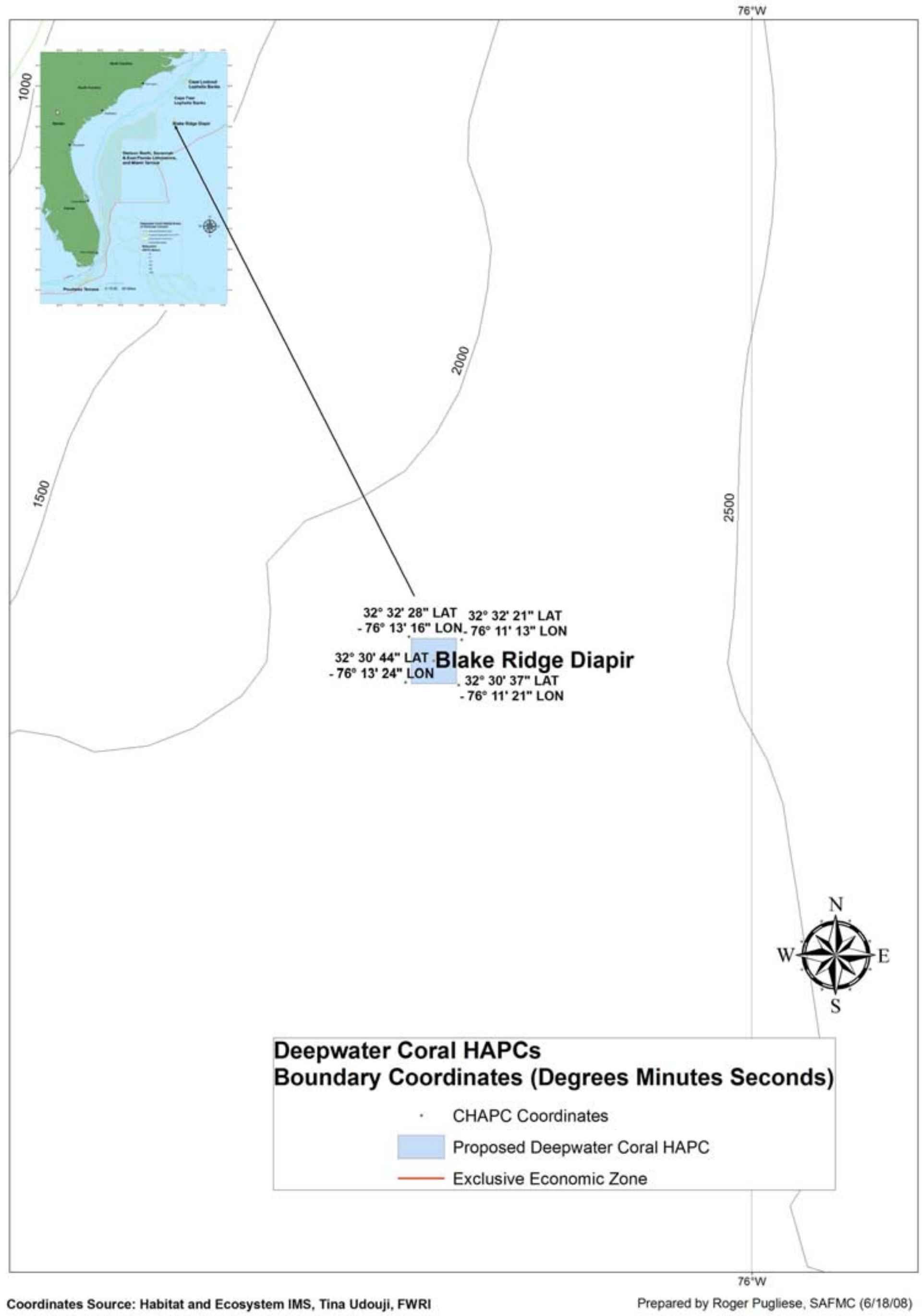


Figure 4-12. Location chart for proposed Blake Ridge Diapir CHAPC.

4.1.1 Biological Effects of Establishing Deepwater Coral HAPCs

The Council is proposing to establish deepwater coral HAPC s (Figure 4-1) and prohibit the use of bottom longlines, trawls (mid-water and bottom), dredge, pots or traps; use of anchor and chain, or use of grapple and chain by all fishing vessels; and possession of any species regulated by the coral FMP. In addition, golden crab fishing will be limited to allowable gear areas in the proposed deepwater C-HAPCs. Establishing **Sub-Alternative 2a**, the Cape Lookout Lophelia Banks CHAPC and **Sub-Alternative 2b**, the Cape Fear Lophelia Banks CHAPC will protect the known distribution of deepwater coral habitat occurring in offshore waters off North Carolina. While smaller in size, the areas encompass unique habitat complexes and species assemblages relative to areas south. Establishing **Sub-Alternative 2c**, the Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC will protect the largest area encompassing a variety of deepwater habitats varying from the deepwater reef complexes occurring on the Blake Plateau, lithoherms with a vast network of coral pinnacles occurring off Georgia through north Florida and the Miami Terrace. Protection of the Miami Terrace habitat will protect recently verified areas of wreckfish aggregation and spawning areas. While the least explored, creation of **Sub-Alternative 2d**, the Pourtales Terrace CHAPC will protect the most southern and most dynamic of deepwater coral ecosystems under the jurisdiction of the Council. The conservation of this area is not only important to benthic species but also is thought to serve pelagic species using the high profile habitats and dynamic currents for navigation, feeding and migration. In establishing **Sub-Alternative 2e**, the Blake Ridge Diapir Methane Seep CHAPC, the Council is intending to protect a unique benthic habitat occurring nowhere else in the region. In developing the proposal, members of the Habitat Advisory Panel highlighted the most probable unique genetic characteristics of species that will be found in this habitat oasis in the deep ocean. In combination, these provisions are intended to protect deepwater coral and live/hard bottom habitat, and to maximize the likelihood essential fishery habitat will be protected. Use of bottom tending gear and anchoring on top of coral and coral reef systems can disrupt and destroy reef communities. Coral, coral reefs, and live/hard bottom are non-mobile habitats which cannot escape stress and are susceptible to the damage inflicted when fishing vessels deploy anchors, chains, and grapples. With the occurrence of coral pinnacles in the proposed CHAPCs, the Council is taking a precautionary approach in prohibiting the use of mid-water trawls. Modified mid-water trawls (Figure 4-20) were responsible for significant habitat damage when fished on tops of seamounts in other parts of the world (Auster, P.J. pers. Comm. 2005.)

The prohibition on the use of anchors, grapples and chains is similar to existing regulations which prohibit the take of fish with damaging fishing gear. The use of a gear that results in killing or damaging coral, a managed resource, even if the resource is not landed is therefore prohibited. Coral and attached marine organisms associated with deepwater coral reefs and live/hard bottom are considered fish under the Magnuson Act, and under existing regulations, their taking is prohibited. It is reasonable to expect that when a fishing vessel uses bottom tending gear, anchors or uses grapples and chains in the deepwater coral HAPCs, that it will result in a taking/killing of prohibited coral or live rock. Corals covered by the coral management plan are considered to be non-renewable resources. Bottom tending gear and anchors, grapples and chains can break fragile corals, dislodge reef framework, and scar corals, opening lesions for infection. Impacts of gear damage are not limited to direct crushing of live coral but also include effects of the attached chains which will abrade and denude coral structures. Stress related with abrasion may cause a decline in health or stability of the reef or live bottom system. In shallow water, coral will respond through polyp retraction, altered physiology or behavior, and when sheered by anchor chains provide a point for infection. It is thought that deepwater corals may respond similarly (John Reed HBOI pers. comm. 2007). Damage inflicted by bottom tending gear, anchors, chains and grapples is not limited to living coral and hard bottom resources but extends to disruption of the balanced and highly productive nature of the coral and live/hard bottom ecosystems. Subsequently, bottom tending gears, anchors, chains and grapples deployed by fishing vessels will degrade the functional characteristics of these complex deepwater coral ecosystems. The alternatives described will prevent fishing activities from impacting deepwater coral ecosystems. Alternative 1, taking no action will provide no additional protection for these complex deepwater ecosystems.

4.1.2 Economic Effects of Establishing Deepwater Coral HAPCs

This action will protect coral, coral reefs and live/hard bottom habitat by creating deepwater coral HAPCs. Taking of coral, hard bottom, etc., is already prohibited. This action does not prevent vessels from transiting through the area as long as they observe the regulations.

Commercial Fishery

With regards to the commercial fishery, the Wreckfish fishery is not expected to be impacted by the prohibition of the fishing methods and gears proposed by this alternative. Fishing with suspended longline has been deemed previously to not impact bottom habitat. Bottom tending gear or the use of bottom longlines are prohibited from use in this fishery.

The golden crab fishery is expected to experience negative economic impacts as a result of implementation of the proposed Coral HAPCs. The golden crab fishery operates in the area proposed as the Stetson-Miami Terrace CHAPC and in a small portion of the proposed Pourtales CHAPC. While fishing in the Southern Zone occurs east and west of the Pourtales CHAPC, all harvest in the Middle Zone occurs in the mud, sand, shell areas in the Stetson-Miami CHAPC. Fishing operations are verified in the Middle Golden Crab Zone, the Northern Golden Crab Zone and the Southern Golden Crab Zone based on trap set data provided by industry. It is expected that the Coral HAPCs proposed in Action 1 will protect habitat for golden crab, royal red shrimp, and wreckfish, among other species. In the long term, in the case of golden crab, this would benefit fishermen if the species' populations expanded beyond the boundaries of the CHAPC and fishermen were able to fish these areas. As discussed, the proposed CHAPCs encompass almost all of the traditional fishing grounds for golden crab. As a result, in the short term golden crab fishermen are not likely to benefit economically from the proposed CHAPCs.

There are expected to be significant negative economic impacts on the golden crab fishery but these can be offset with provisions for allowable gear areas or "Allowable Golden Crab Fishing Areas" in the proposed CHAPCs (see Action 2). Input provided by the Golden Crab Advisory Panel and other affected fishermen indicated that the proposed CHAPCs would eliminate the golden crab fishery because so much of their fishing grounds are included in these areas (see Figures 4-17a, 4-17b, and 4-17c in Appendix K for depictions of traditional golden crab fishing grounds). To assess the economic impact that this action would have on the golden crab fishery, catch by ACCSP statistical grid was examined (Figure 4-27 and Figure 4-28). However, the grid areas were too large to be used for quantitative analysis and are included here for informational purposes only. To provide the reader with information about the economic value of the golden crab fishery that would be lost due to adoption of Alternative 2 under Action 1 exclusive of Alternative 2 or 3 under Action 2, historic logbook data was analyzed. The logbook data indicates that the golden crab fishery caught 510,000 pounds on average over the period 2005-2007. In the absence of establishment of "Allowable Golden Crab Fishing Areas", the fishery, consisting of 7 commercial golden crab vessels that landed golden crab between 2005 and 2007, would likely lose almost all of these landings estimated at approximately $714,000 ex-vessel value annually. This estimate assumes that fishermen receive $1.40 per pound on average for golden crab landings (personal communication, 2008).

The royal red shrimp fishery operates almost exclusively inshore of the 400 meter contour, which is the western boundary of the deepwater habitat being protected by the proposed CHAPCs. NMFS SEFSC provided the Council with the analyses presented below of vessel monitoring data required for participation in the rock shrimp fishery but used by vessels when fishing for royal red shrimp. Less than 1% of all collected VMS data points identified as potential royal red fishing occurred in the proposed deepwater CHAPCs between 2003 and 2007 (Figures 4-13 and 4-15). There are expected to be minor negative economic impacts on the deepwater shrimp (royal red shrimp) fishery. These impacts are not able to be quantified because it is unknown as to what landings were associated with those data points. However, these minor negative impacts can be offset with provisions for "Shrimp Fishery Access Areas" in the proposed CHAPCs (Action 3). To assess the economic impacts that this action will have on the royal red shrimp fishery, catch by ACCSP statistical grid was examined (Figure 4-19). However, the grid areas were too large to be used for quantitative analysis and are included here for informational purposes only.

The commercial fishery is expected to benefit in the long-term from an overall healthier ecosystem rsulting from protection of corals and habitat and from increased stock levels resulting from protected habitat.

Recreational Fishery

With regard to recreational fisheries, the anchoring prohibition would not impact fishing activities for the fisheries that do not anchor (e.g., troll fishery for billfish, dolphin, wahoo, tuna etc.) and impacts on these recreational activities would be minimal. Most fishing vessels would not be able to anchor effectively in depths greater than 300 meters anyway which is the depth of the proposed C-HAPCs. However, the action would act as a deterrent to vessels anchoring on the tops of the hundreds of existing pinnacles, where all observations to date indicate thriving undisturbed complex coral ecosystems exist. Thus, the action of establishing the C-HAPCs and prohibiting anchoring of fishing vessels in the deepwater coral HAPCs would have no significant negative impact on recreational fisheries.

The recreational fishery is expected to benefit in the long-term from an overall healthier ecosystem rsulting from protection of corals and habitat and from increased stock levels resulting from protected habitat.

Non-Use Value

Protecting this habitat described in Action 2 is expected to result in overall positive net economic benefits to society. Specifically, society is expected to benefit from the possible availability of new information resulting from avoiding the loss of coral species that could be used to benefit society, an increase in bequest value, and an increase in existence value (see Chapter 3 for an explanation of these terms). The full suite of benefits the species that the proposed CHAPCs would protect are unknown but could include medicinal and environmental benefits.

Analyses of Vessel Monitoring System Data (Source: Carlos Rivero, NMFS SEFSC)

Data depicting Vessel Monitoring System (VMS) locations for the Rock Shrimp/Royal Red Shrimp fishing industry were analyzed to determine the relationship between vessel speed and fishing activity. Frequency distributions were created from the average speeds of over 1.6 million VMS locations. This information showed three distinct speed distributions for each vessel (0 – 2 knots, 2 – 4 knots, and 4 – 10 knots) (Figure 4-14). For this project we were specifically interested in trawling behavior and realized that the 0 – 2 knot category was too slow for trawling and the 4 – 10 knot category was too fast. Therefore, the 2 – 4 knot category seemed to characterize trawling behavior in the data. This was later confirmed by industry fishers.

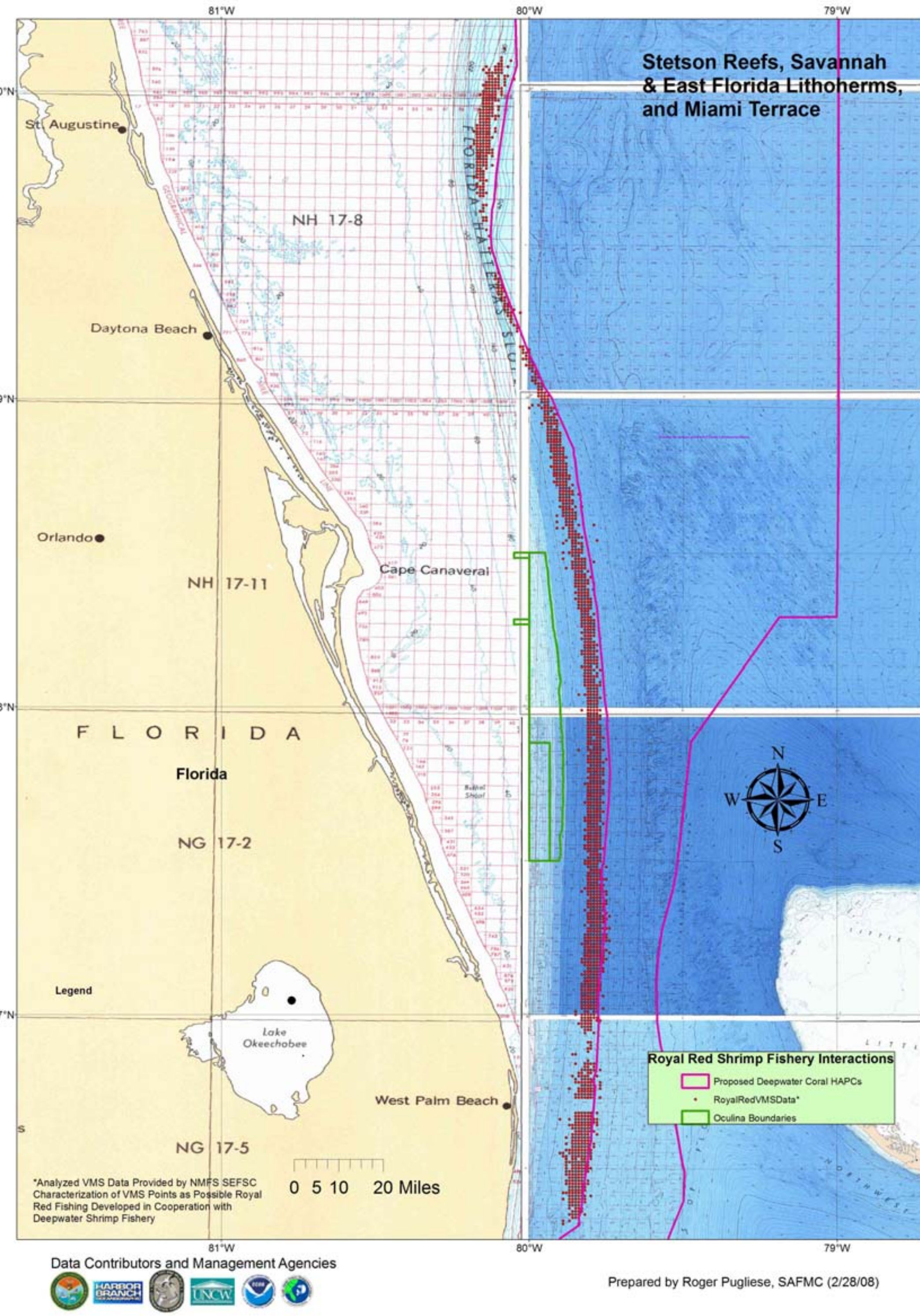


Figure 4-13. Royal red shrimp fishing trips as shown by Vessel Monitoring System (VMS) data. Source: NMFS SEFSC; Roger Pugliese.

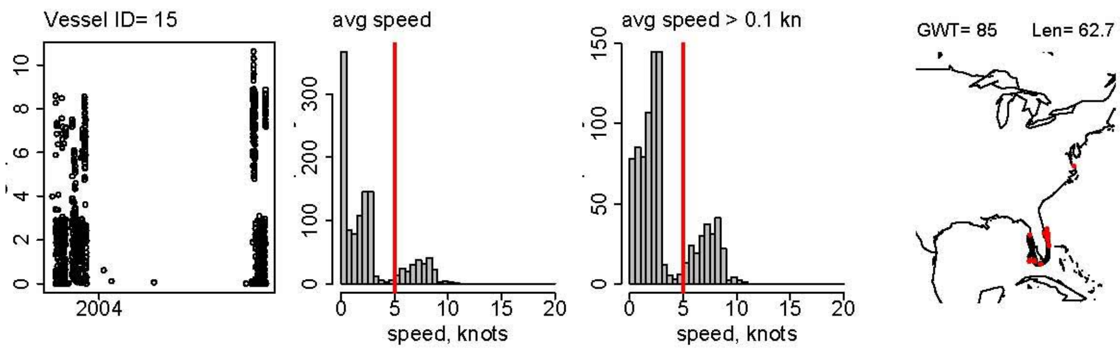


Figure 4-14. Frequency distribution of average speed for vessel 15.

Using this information, we plotted the distribution of VMS locations with average speeds between 2 and 4 knots over the proposed Habitat of Particular Concern (HAPC) boundary. The first iteration of the proposed area overlapped considerably with the VMS locations where 25% of the VMS points were located within the proposed HAPC (Figure 4-15).

The proposed boundary of the HAPC was refined using high resolution bathymetry to more accurately follow the 400 m isobath and a new plot was created to determine the amount of overlap. The revised boundary contained less than 1% of the VMS locations (Figure 4-15). Although the map shows a ‘trawling’ point 5nm east of the main concentration of points, it was determined that the point was part of the track showing the vessel in transit and not associated with trawling (Figure 4-16).

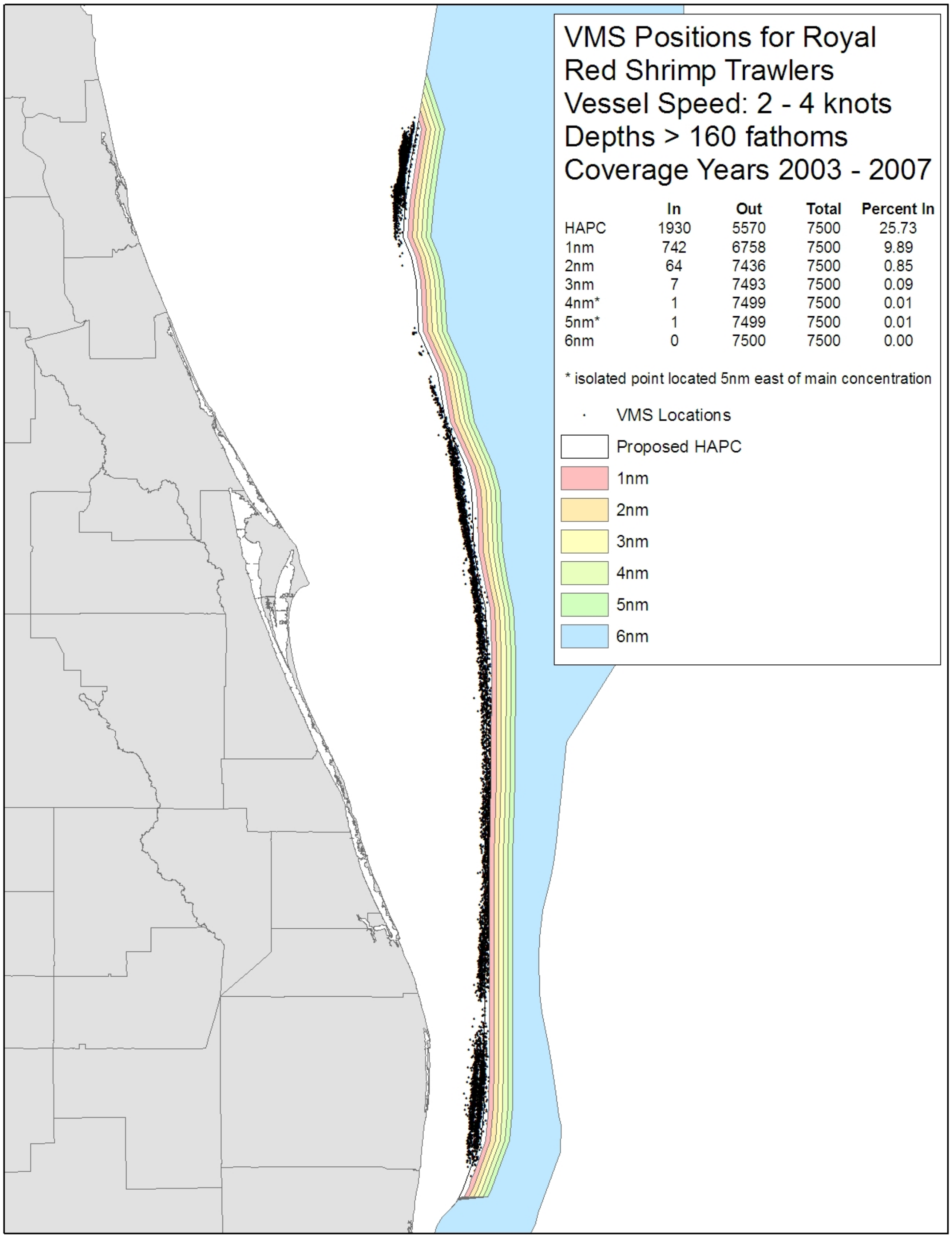


Figure 4-14. Comparison of overlap between the VMS locations and the original version of the proposed HAPC.

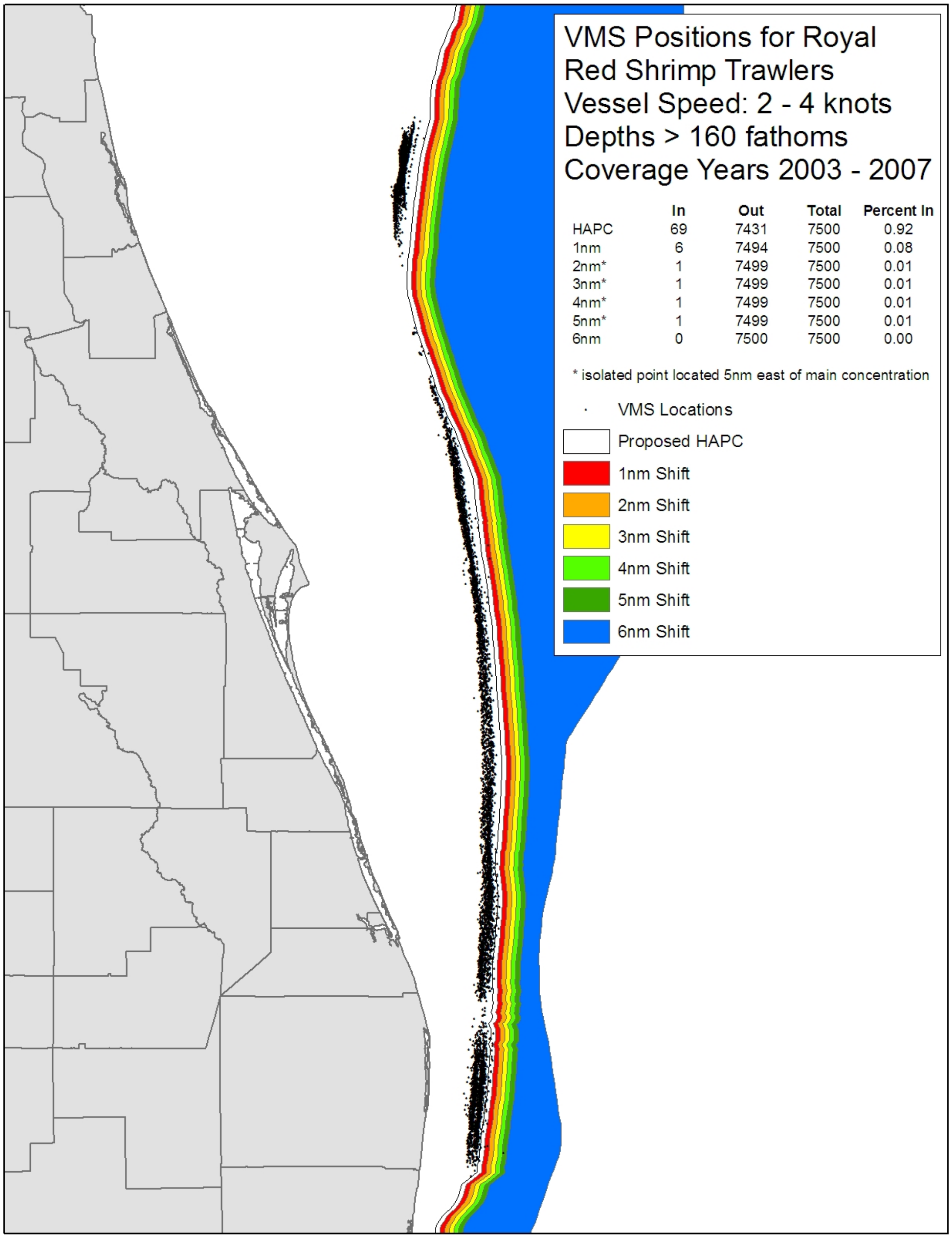


Figure 4-15. Comparison of overlap between the VMS locations and the revised version of the proposed HAPC.

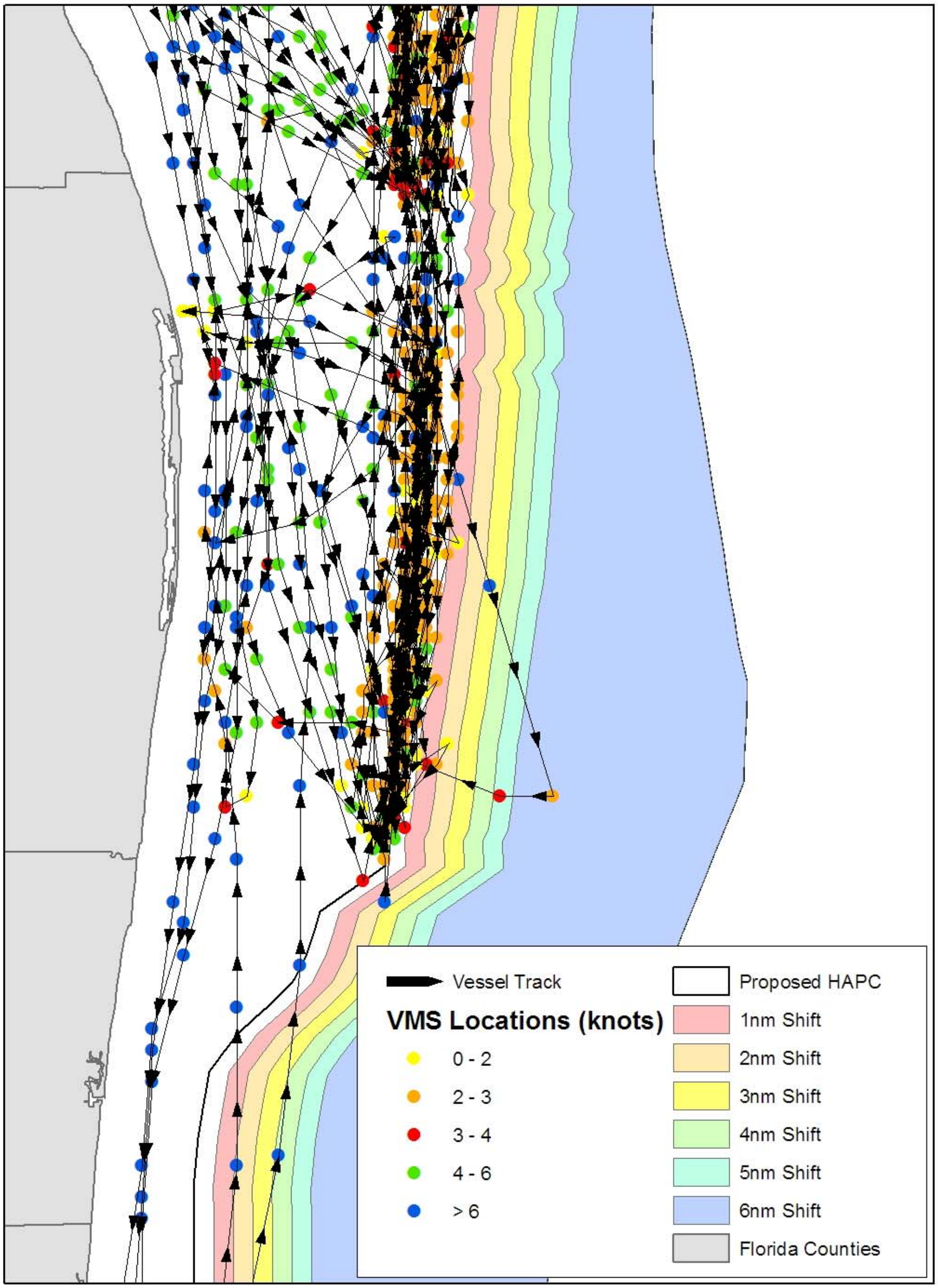
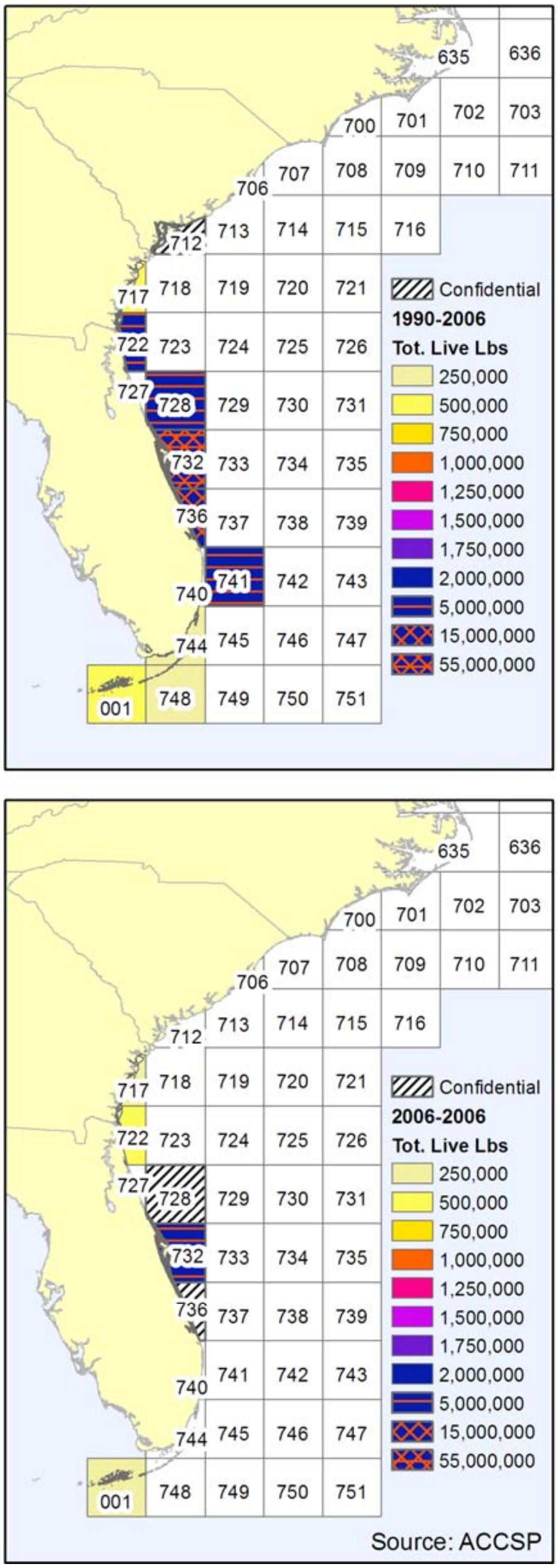
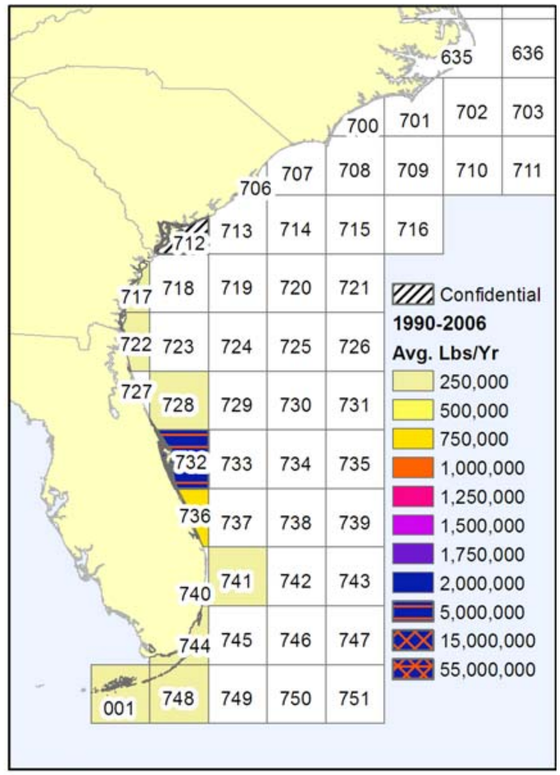


Figure 4-16. Track showing the behavior associated with the 'trawling' point 5nm east of the main concentration of trawling activity.

Rock shrimp shows some overlap in terms of catch by grid (Figure 4-17). However, all catches of rock shrimp occur in water more shallow than the western boundary of the C-HAPC.



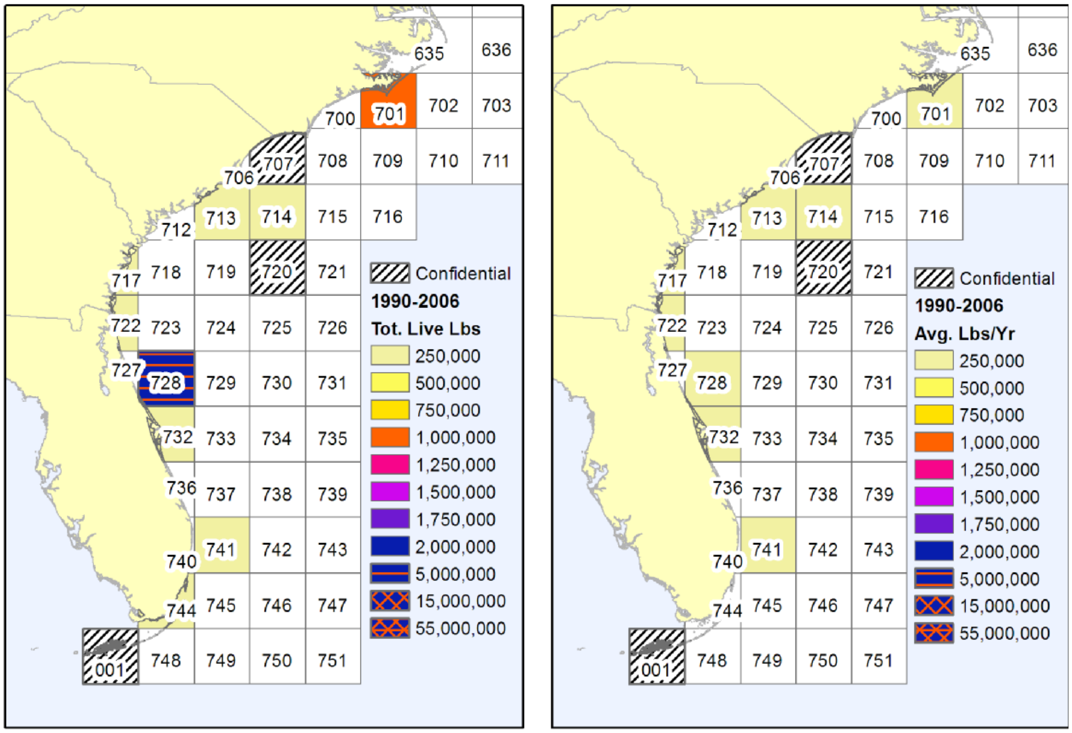


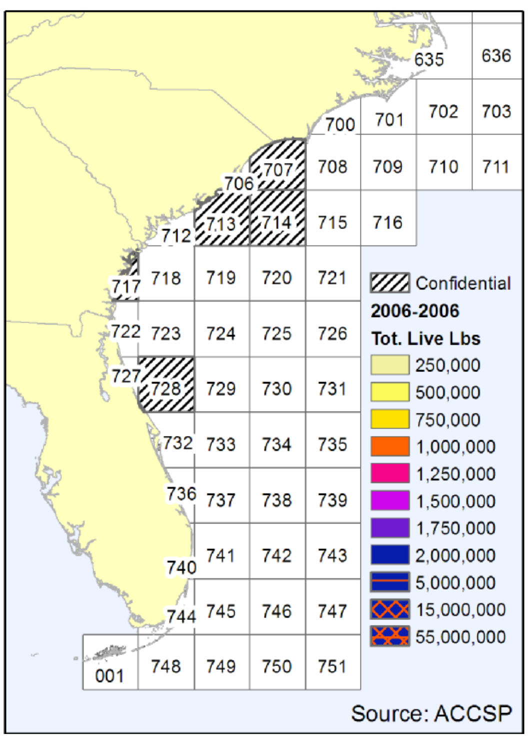
ACCSP Catch: SHRIMP, ROCK
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	360.59	21.21	13.12
712	Conf.	Conf.	0.00
717	266.45	15.67	155.34
722	2,427.36	142.79	445.66
728	2,143.15	126.07	Conf.
732	50,286.93	2,958.05	2,307.82
736	11,121.82	654.22	Conf.
741	2,776.69	163.33	0.00
744	10.81	0.64	0.00
748	76.03	4.47	0.00

Figure 4-17. Rock shrimp catch by statistical grid (Data Source: ACCSP).

Wreckfish show some overlap in terms of catch by grid (Figure 4-18). However, the wreckfish fishery will not be affected by the proposed action because bottom impacting gear (e.g., longlines) are not used to target wreckfish.



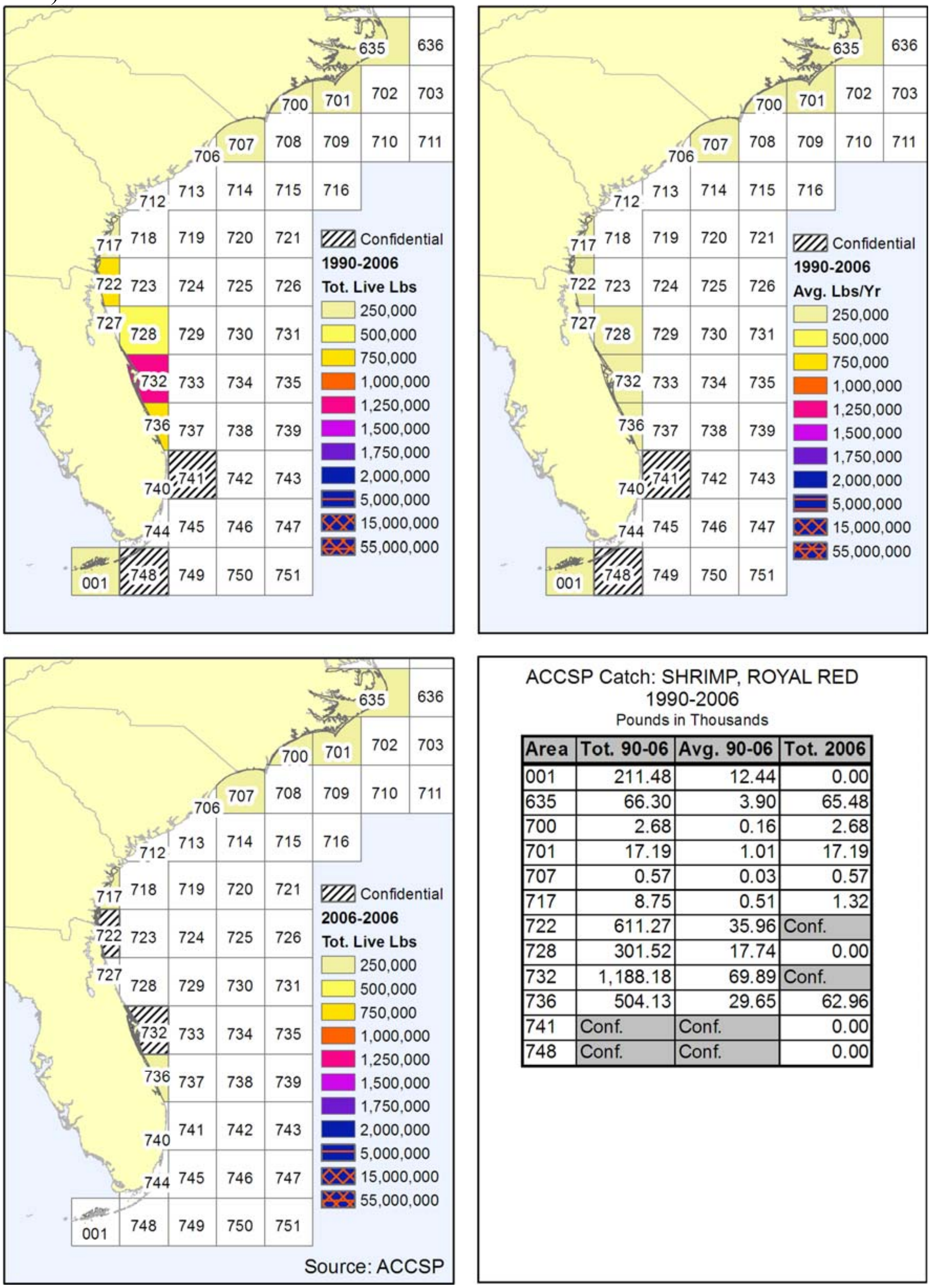


ACCSP Catch: WRECKFISH
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	Conf.	Conf.	0.00
701	926.54	54.50	0.00
707	Conf.	Conf.	Conf.
713	100.41	5.91	Conf.
714	122.07	7.18	Conf.
717	96.52	5.68	Conf.
720	Conf.	Conf.	0.00
722	241.88	14.23	0.00
728	2,295.81	135.05	Conf.
732	33.00	1.94	0.00
741	0.22	0.01	0.00
744	0.03	0.00	0.00

Figure 4-18. Wreckfish catch by statistical grid (Data Source: ACCSP).

Royal red shrimp show some overlap in terms of catch by grid (Figure 4-19). However, further examination of detailed bathymetry and VMS data indicate little to no overlap (Figure 4-15).



Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	211.48	12.44	0.00
635	66.30	3.90	65.48
700	2.68	0.16	2.68
701	17.19	1.01	17.19
707	0.57	0.03	0.57
717	8.75	0.51	1.32
722	611.27	35.96	Conf.
728	301.52	17.74	0.00
732	1,188.18	69.89	Conf.
736	504.13	29.65	62.96
741	Conf.	Conf.	0.00
748	Conf.	Conf.	0.00

Figure 4-19. Royal red shrimp catch by statistical grid (Data Source: ACCSP).

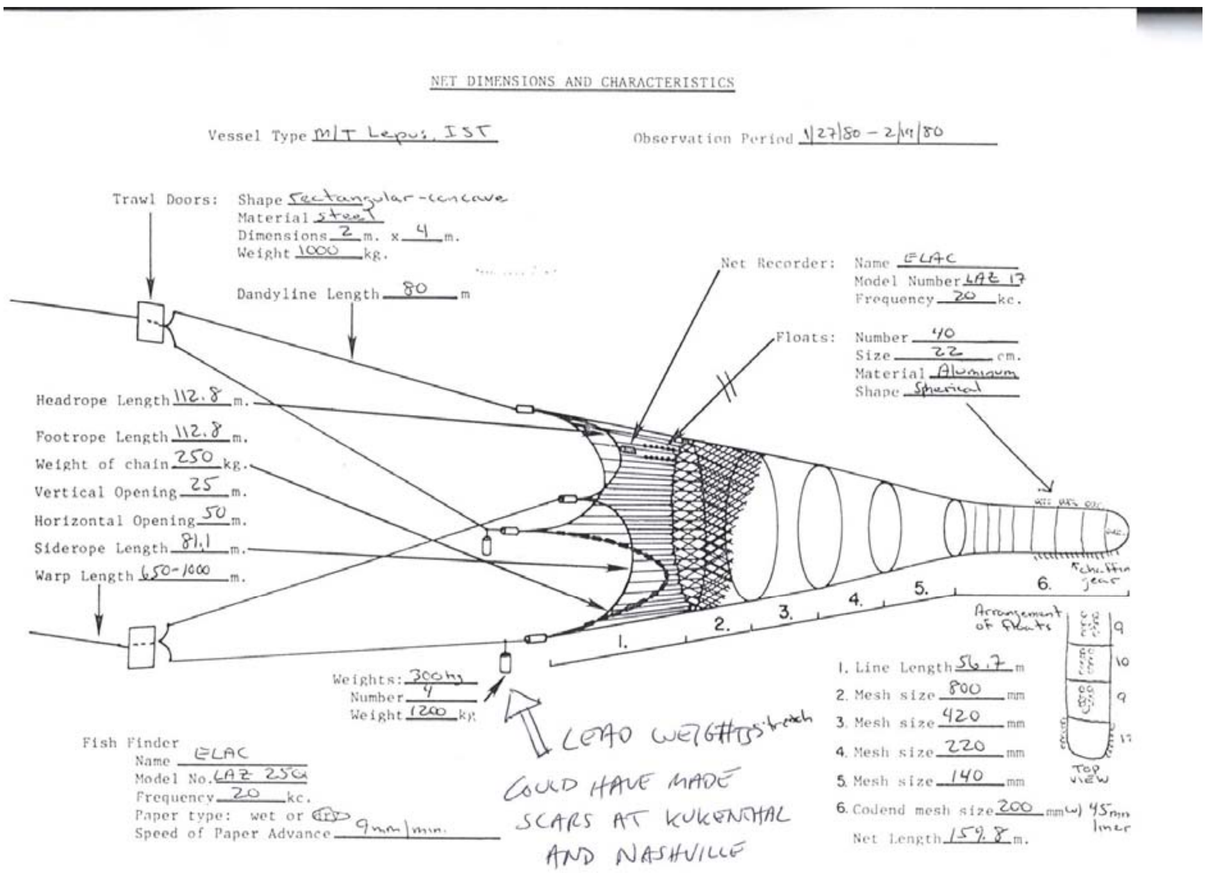


Figure 4-20. Weighted mid-water trawl gear configuration used in Pacific seamount fisheries (Source: Auster, P.J. pers. Comm. 2005).

4.1.3 Social Effects of Establishing a Network of Deepwater Coral HAPCs

There are expected to be significant negative social impacts on the golden crab fishery from establishing a network of deepwater coral HAPCs but these can be offset with provisions for allowable gear areas or "Allowable Golden Crab Fishing Areas" (Action 2) in the proposed C-HAPCs. There are expected to be minor negative social impacts on the deepwater shrimp (royal red shrimp) fishery but these can be offset with provisions for "Shrimp Fishery Access Areas" (Action 3) in the proposed C-HAPCs. If offsetting actions are not undertaken, it is possible that the golden crab fishery will cease to exist. The social impacts on the families involved in the golden crab fishery will be significant since it may not be possible for golden crab vessels to be converted from crab fishing to fishing for other species, given the specialized nature of the vessel required for this fishery. As a result, the financial stress and other problems that result from financial stress and unemployment would ensue. These could include an increase in transfer payments and stress, depression, and other mental health problems.

4.1.4 Administrative Effects of Establishing Deepwater Coral HAPCs

The establishment of deepwater Coral HAPCs would require more law enforcement resources. However, with the deepwater shrimp fishery being monitored by VMS and the proposal to require monitoring of the golden crab fishery, most enforcement will be achievable with reduced on water costs.

4.1.5 Conclusion

The Council approved adding the proposed deepwater C-HAPCs to the CEA to protect deepwater coral and live bottom resources in the HAPCs while accommodating traditional fishery gear where deepwater habitat is not impacted. Fishing gear including bottom longlines, dredges, pots and traps, anchors, chain and grapples, all contact the bottom and would impact the *Lophelia* and *Enallopsamnia* corals and associated complex habitats encompassed by the deepwater coral ecosystems in the HAPCs. The Council adopted revised industry recommendations and approved preferred alternatives for a second round of public hearings. This action would also eliminate damage from mid-water trawls, which if configured with trailing weights as was done in Pacific Seamount fisheries (Auster pers comm.) (Figure 4-20) can be trawled over pinnacles or seamounts causing damage to the bottom habitat.

Alternative 1, the no action alternative, would not protect the *Lophelia* coral and live/hard bottom habitat or maximize the likelihood that the essential fish habitat contained in the HAPCs will be protected. Alternative 2, the preferred alternative, best addresses the objective of this action to protect deepwater HAPCs from fishing gear which directly or indirectly takes coral or live/hard bottom reducing habitat essential to species utilizing the area. This action reduces the impact of deepwater shrimp fisheries and golden crab fisheries on live/hard bottom and coral habitat by prohibiting their use in the deepwater C-HAPC. However, Alternative 2 eliminates usage of virtually all golden crab traditional fishing grounds by the golden crab fishery. As a result, under Alternative 2, the golden crab fishery would not be able to continue.

The Council's intent is to establish deepwater C-HAPCs while considering industry proposals that allow fishing which will not impact deepwater habitat in the proposed deepwater C-HAPCs. Subsequently, Action 2 for the Golden Crab fishery and Action 3 for the Deepwater Shrimp (royal red shrimp) fishery are being proposed are being proposed to allow traditional fishing in areas that do not impact deepwater coral habitat.

4.2 *Action 2: Amend the Coral, Coral Reefs and Live/Hard Bottom Habitat FMP to Create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries*

Alternative 1. No Action. Do not create "Allowable Golden Crab Fishing Areas" within the proposed Coral HAPC boundaries.

Preferred Alternative 2. . Create an "Allowable Golden Crab Fishing Area" in the Coral HAPC boundaries

- **Sub-Alternative 2a. Create an "Allowable Golden Crab Fishing Area" in the Northern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries;**
- **Sub-Alternative 2b. Create an "Allowable Golden Crab Fishing Area" in the Middle Golden Crab Fishing Zone within the proposed Coral HAPC boundaries;**
- **Sub-Alternative 2c. Create an "Allowable Golden Crab Fishing Area" in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; and**

Alternative 3. Move the western boundary of the proposed Northern and Middle Zone Allowable Golden Crab Fishing Areas west to include the proposed Shrimp Fishery Access Areas.

Discussion

The Golden Crab Advisory Panel met formally and informally between January and March 2008 to develop proposals for Council consideration that would allow the fishery to continue to operate while avoiding damaging deepwater coral habitat. The Council approved bringing the alternatives developed by the Advisory Panel to public hearing to collect additional information and input on the proposals. The Advisory Panel chairman clarified at the March 2008 Council meeting that the Panel was recommending the establishment of allowable gear areas for golden crab fishing which lie within the deepwater C-HAPC versus moving the boundaries. The Council requested comment on the industry proposal to establish fishing areas where the traditional fishery has operated can continue to operate without impacting deepwater coral habitat. The Advisory Panel provided a revised recommendation at public hearing (see Appendix J). Panel members collaborated with Council staff to further refine those proposals to focus operation areas on traditional fishing grounds and areas which would not impact deepwater coral habitat. In order to maximize the likelihood of success, a requirement for electronic monitoring of permitted golden crab fishing vessels (e.g., require Vessel Monitoring System) is proposed as a provision to fish in the allowable golden crab fishing areas. The Council adopted these alternatives as preferred. The Council, at the request of industry, added a new alternative for public hearing. This alternative (Alternative 3) considers allowing fishing for golden crab in the Shrimp Fishery Access Areas.

The preferred alternative (Alternative 2) proposes creation of Allowable Golden Crab Fishing Areas which will support traditional fishing operations in the Northern, Middle and Southern zones while protecting deepwater coral habitats in the deepwater CHAPC (Figures 4-21, 4-22, 4-23). Alternative 2 is based on the latest recommendations of the Golden Crab Advisory Panel. Alternative 2 was developed in response to public hearing and through input provided at the June SAFMC meeting in Orlando, Florida, July 2008. The Advisory Panel also requested the Council consider Alternative 3 which extends the Middle Zone to include the proposed Shrimp Fishery Access Areas based on preliminary comments that the shrimp fishery would not be impacted. Previous alternatives/recommendations provided by the Advisory Panel are included in detail on Appendix K.

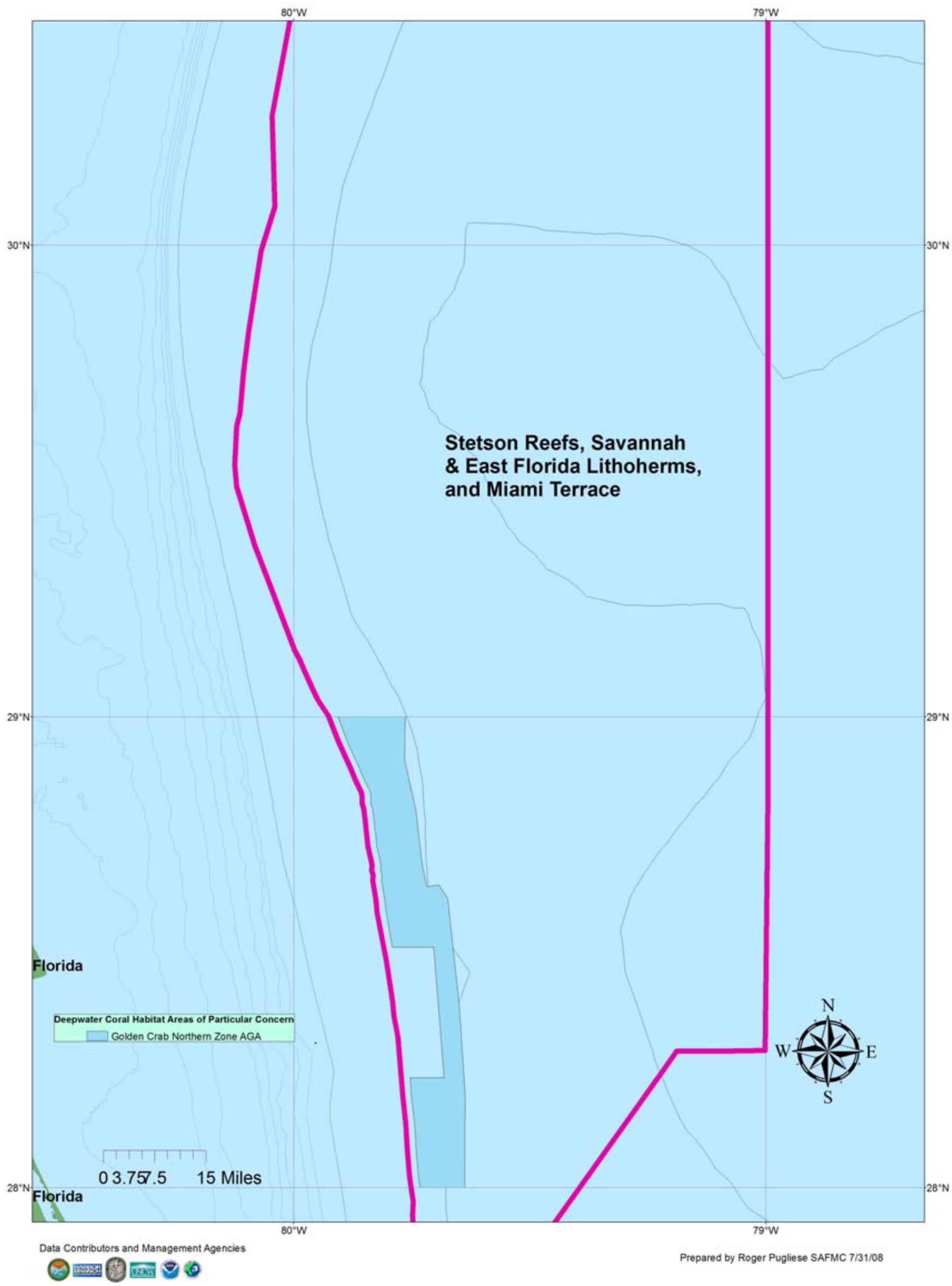


Figure 4-21. Golden Crab Allowable Fishing Area for the Northern Zone (Note: Points on map, developed in cooperation with Golden Crab Advisory Panel, correspond to Table 4-5) (Prepared by Roger Pugliese SAFMC).

Table 4-5. Location points for Allowable Golden Crab Fishing Area for the Northern Zone (Source: GC Fishermen/FWRI/SAFMC Staff).

FID	Shape *	FID_	LatDegMinS	LongDegMin	LATDD	LONGDD
1	Point	1	26° 3' 37.897"	79° 48' 16.499"	26.060527	-79.804583
2	Point	2	26° 3' 34.927"	79° 46' 8.988"	26.059702	-79.769163
3	Point	3	25° 58' 32.737"	79° 46' 8.495"	25.97576	-79.769026
4	Point	4	25° 54' 27.088"	79° 45' 36.661"	25.907524	-79.760184
5	Point	5	25° 46' 54.752"	79° 44' 14.461"	25.781876	-79.73735
6	Point	6	25° 38' 4.069"	79° 45' 57.567"	25.634464	-79.765991
7	Point	7	25° 38' 4.678"	79° 42' 20.103"	25.634633	-79.705584
8	Point	8	25° 40' 35.888"	79° 42' 26.151"	25.676636	-79.707264
9	Point	9	25° 43' 41.372"	79° 42' 59.082"	25.728159	-79.716412
10	Point	10	25° 46' 20.698"	79° 42' 44.833"	25.772416	-79.712454
11	Point	11	25° 48' 14.7"	79° 42' 24.313"	25.804083	-79.706754
12	Point	12	25° 50' 24.659"	79° 42' 11.308"	25.840183	-79.703141
13	Point	13	25° 53' 12.271"	79° 41' 48.423"	25.886742	-79.696784
14	Point	14	25° 55' 34.834"	79° 41' 16.262"	25.926343	-79.687851
15	Point	15	26° 07' 8.87"	79° 36' 6.648"	26.119131	-79.601847
16	Point	16	26° 17' 36.086"	79° 36' 6.041"	26.293357	-79.601678
17	Point	17	26° 21' 18.462"	79° 38' 4.349"	26.355128	-79.634541
18	Point	18	26° 50' 40.369"	79° 33' 44.762"	26.844547	-79.562434
19	Point	19	26° 50' 40.369"	79° 36' 30.273"	26.844547	-79.608409
20	Point	20	26° 50' 46.071"	79° 35' 12.479"	26.846131	-79.5868
21	Point	21	26° 58' 43.568"	79° 35' 4.003"	26.978769	-79.584445
22	Point	22	27° 0' 39.075"	79° 36' 26.475"	27.010854	-79.607354
23	Point	23	27° 7' 55.275"	79° 37' 52.134"	27.132021	-79.631148
24	Point	24	27° 14' 51.519"	79° 37' 9.369"	27.247644	-79.619269
25	Point	25	27° 29' 21.068"	79° 37' 15.071"	27.489186	-79.620853
26	Point	26	28° 00' 00"	79° 38' 16.489"	28	-79.637914
27	Point	27	27° 58' 13.209"	79° 43' 42.529"	27.970336	-79.72848
28	Point	28	27° 56' 23.119"	79° 43' 45.075"	27.939755	-79.729187
29	Point	29	27° 49' 40.304"	79° 43' 17.075"	27.827862	-79.72141
30	Point	30	27° 46' 27.488"	79° 43' 13.893"	27.774302	-79.720526
31	Point	31	27° 41' 59.581"	79° 43' 25.348"	27.699884	-79.723708
32	Point	32	27° 36' 7.675"	79° 43' 50.166"	27.602132	-79.730602
33	Point	33	27° 30' 00"	79° 44' 21.828"	27.5	-79.739397
34	Point	34	27° 30' 00"	79° 43' 48.257"	27.5	-79.730071
35	Point	35	27° 29' 4.496"	79° 44' 6.075"	27.484582	-79.735021
36	Point	36	27° 27' 5.497"	79° 44' 11.802"	27.451527	-79.736612
37	Point	37	27° 25' 46.598"	79° 44' 14.984"	27.429611	-79.737496
38	Point	38	27° 19' 46.41"	79° 43' 32.984"	27.329558	-79.725829
39	Point	39	27° 17' 53.774"	79° 43' 31.075"	27.298271	-79.725299
40	Point	40	27° 12' 27.959"	79° 43' 18.978"	27.207766	-79.721938
41	Point	41	27° 7' 45.415"	79° 44' 26.1"	27.129282	-79.740583
42	Point	42	27° 4' 46.599"	79° 44' 48.374"	27.079611	-79.746771
43	Point	43	27° 00' 42.873"	79° 44' 58.127"	27.011909	-79.74948
44	Point	44	26° 58' 42.602"	79° 44' 47.143"	26.978501	-79.746429
45	Point	45	26° 57' 06"	79° 44' 51.525"	26.951667	-79.747646
46	Point	46	26° 57' 06"	79° 42' 34.118"	26.951667	-79.709477
47	Point	47	26° 49' 58"	79° 42' 34.118"	26.832778	-79.709477
48	Point	48	26° 49' 58"	79° 45' 13.211"	26.832778	-79.75367
49	Point	49	26° 48' 57.788"	79° 45' 15.438"	26.816052	-79.754288
50	Point	50	26° 47' 1.334"	79° 46' 1.256"	26.783704	-79.767016
51	Point	51	26° 46' 4.062"	79° 45' 28.165"	26.767795	-79.757824
52	Point	52	26° 35' 9.249"	79° 46' 20"	26.585903	-79.772222
53	Point	53	26° 33' 36.977"	79° 46' 39.786"	26.560271	-79.777718
54	Point	54	26° 27' 55.512"	79° 47' 28.784"	26.46542	-79.791329
55	Point	55	26° 25' 54.609"	79° 47' 49.147"	26.431836	-79.796985
56	Point	56	26° 21' 5.078"	79° 48' 7.6"	26.351411	-79.802111
57	Point	57	26° 20' 30.079"	79° 48' 39.817"	26.341689	-79.81106
58	Point	58	26° 18' 56"	79° 48' 36.525"	26.315556	-79.810146

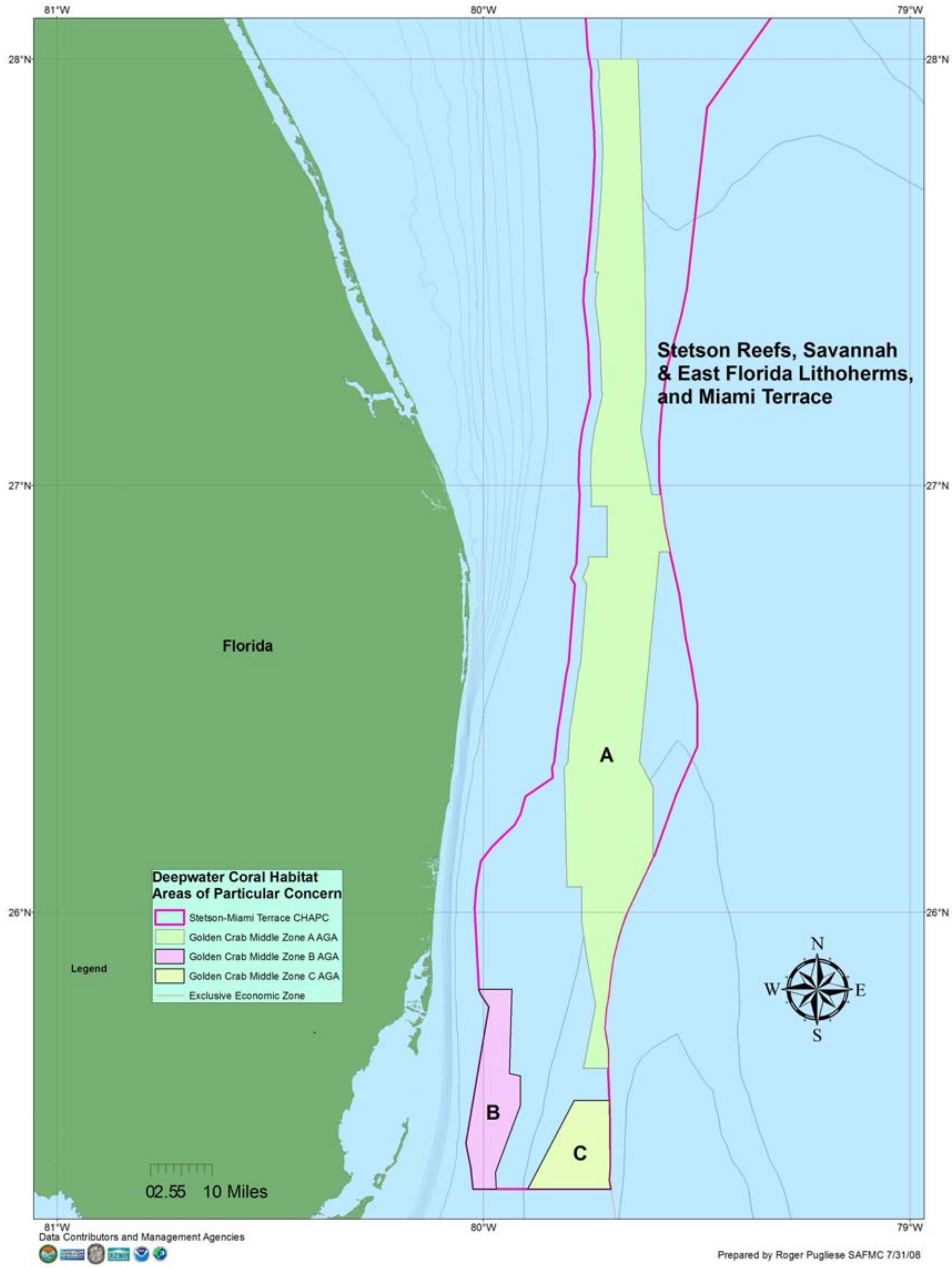


Figure 4-22. Allowable Golden Crab Fishing Areas for the Middle Zone A-C (Note: Points on map, developed in cooperation with Golden Crab Advisory Panel, correspond to Table 4-6 - Prepared by Roger Pugliese SAFMC).

Table 4-6a. Location points for Allowable Golden Crab Fishing Area Middle Zone A (Source: GC Fishermen/SAFMC Staff).

FID	Shape *	FID_	LatDegMinS	LongDegMin	LATDD	LONGDD	FID_1
1	Point	1	26° 3' 37.897"	79° 48' 16.499"	26.060527	-79.804583	1
2	Point	2	26° 3' 34.927"	79° 46' 8.988"	26.059702	-79.769163	2
3	Point	3	25° 58' 32.737"	79° 46' 8.495"	25.97576	-79.769026	3
4	Point	4	25° 54' 27.088"	79° 45' 36.661"	25.907524	-79.760184	4
5	Point	5	25° 46' 54.752"	79° 44' 14.461"	25.781876	-79.73735	5
6	Point	6	25° 38' 4.069"	79° 45' 57.567"	25.634464	-79.765991	6
7	Point	7	25° 38' 4.678"	79° 42' 20.103"	25.634633	-79.705584	7
8	Point	8	25° 40' 35.888"	79° 42' 26.151"	25.676636	-79.707264	8
9	Point	9	25° 43' 41.372"	79° 42' 59.082"	25.728159	-79.716412	9
10	Point	10	25° 46' 20.698"	79° 42' 44.833"	25.772416	-79.712454	10
11	Point	11	25° 48' 14.7"	79° 42' 24.313"	25.804083	-79.706754	11
12	Point	12	25° 50' 24.659"	79° 42' 11.308"	25.840183	-79.703141	12
13	Point	13	25° 53' 12.271"	79° 41' 48.423"	25.886742	-79.696784	13
14	Point	14	25° 55' 34.834"	79° 41' 16.262"	25.926343	-79.687851	14
15	Point	15	26° 07' 8.87"	79° 36' 6.648"	26.119131	-79.601847	15
16	Point	16	26° 17' 36.086"	79° 36' 6.041"	26.293357	-79.601678	16
17	Point	17	26° 21' 18.462"	79° 38' 4.349"	26.355128	-79.634541	17
18	Point	18	26° 50' 40.369"	79° 33' 44.762"	26.844547	-79.562434	18
19	Point	19	26° 50' 40.369"	79° 36' 30.273"	26.844547	-79.608409	19
20	Point	20	26° 50' 46.071"	79° 35' 12.479"	26.846131	-79.5868	20
21	Point	21	26° 58' 43.568"	79° 35' 4.003"	26.978769	-79.584445	21
22	Point	22	27° 0' 39.075"	79° 36' 26.475"	27.010854	-79.607354	22
23	Point	23	27° 7' 55.275"	79° 37' 52.134"	27.132021	-79.631148	23
24	Point	24	27° 14' 51.519"	79° 37' 9.369"	27.247644	-79.619269	24
25	Point	25	27° 29' 21.068"	79° 37' 15.071"	27.489186	-79.620853	25
26	Point	26	28° 00' 00"	79° 38' 16.489"	28	-79.637914	26
27	Point	27	27° 58' 13.209"	79° 43' 42.529"	27.970336	-79.72848	27
28	Point	28	27° 56' 23.119"	79° 43' 45.075"	27.939755	-79.729187	28
29	Point	29	27° 49' 40.304"	79° 43' 17.075"	27.827862	-79.72141	29
30	Point	30	27° 46' 27.488"	79° 43' 13.893"	27.774302	-79.720526	30
31	Point	31	27° 41' 59.581"	79° 43' 25.348"	27.699884	-79.723708	31
32	Point	32	27° 36' 7.675"	79° 43' 50.166"	27.602132	-79.730602	32
33	Point	33	27° 30' 00"	79° 44' 21.828"	27.5	-79.739397	33
34	Point	34	27° 30' 00"	79° 43' 48.257"	27.5	-79.730071	34
35	Point	35	27° 29' 4.496"	79° 44' 6.075"	27.484582	-79.735021	35
36	Point	36	27° 27' 5.497"	79° 44' 11.802"	27.451527	-79.736612	36
37	Point	37	27° 25' 46.598"	79° 44' 14.984"	27.429611	-79.737496	37
38	Point	38	27° 19' 46.41"	79° 43' 32.984"	27.329558	-79.725829	38
39	Point	39	27° 17' 53.774"	79° 43' 31.075"	27.298271	-79.725299	39
40	Point	40	27° 12' 27.959"	79° 43' 18.978"	27.207766	-79.721938	40
41	Point	41	27° 7' 45.415"	79° 44' 26.1"	27.129282	-79.740583	41
42	Point	42	27° 4' 46.599"	79° 44' 48.374"	27.079611	-79.746771	42
43	Point	43	27° 00' 42.873"	79° 44' 58.127"	27.011909	-79.74948	43
44	Point	44	26° 58' 42.602"	79° 44' 47.143"	26.978501	-79.746429	44
45	Point	45	26° 57' 06"	79° 44' 51.525"	26.951667	-79.747646	45
46	Point	46	26° 57' 06"	79° 42' 34.118"	26.951667	-79.709477	46
47	Point	47	26° 49' 58"	79° 42' 34.118"	26.832778	-79.709477	47
48	Point	48	26° 49' 58"	79° 45' 13.211"	26.832778	-79.75367	48
49	Point	49	26° 48' 57.788"	79° 45' 15.438"	26.816052	-79.754288	49
50	Point	50	26° 47' 1.334"	79° 46' 1.256"	26.783704	-79.767016	50
51	Point	51	26° 46' 4.062"	79° 45' 28.165"	26.767795	-79.757824	51
52	Point	52	26° 35' 9.249"	79° 46' 20"	26.585903	-79.772222	52
53	Point	53	26° 33' 36.977"	79° 46' 39.786"	26.560271	-79.777718	53
54	Point	54	26° 27' 55.512"	79° 47' 28.784"	26.46542	-79.791329	54
55	Point	55	26° 25' 54.609"	79° 47' 49.147"	26.431836	-79.796985	55
56	Point	56	26° 21' 5.078"	79° 48' 7.6"	26.351411	-79.802111	56
57	Point	57	26° 20' 30.079"	79° 48' 39.817"	26.341689	-79.81106	57
58	Point	58	26° 18' 56"	79° 48' 36.525"	26.315556	-79.810146	58

Table 4-6b. Location points for Allowable Golden Crab Fishing Area Middle Zone B (Source: GC Fishermen/SAFMC Staff).

FID	Shape *	F1	LatDegMinS	LongDegMin	LATDD	LONGDD
0	Point	0	25° 49' 11.199"	79° 56' 0.496"	25.819778	-79.933471
1	Point	1	25° 37' 19.879"	79° 56' 20.453"	25.622189	-79.939015
2	Point	2	25° 36' 58.497"	79° 54' 46.371"	25.616249	-79.912881
3	Point	3	25° 32' 51.887"	79° 54' 47.796"	25.547746	-79.913277
4	Point	4	25° 23' 24.541"	79° 58' 18.769"	25.39015	-79.97188
5	Point	5	25° 21' 04.00"	79° 58' 11.642"	25.351111	-79.969901
6	Point	6	25° 21' 04.00"	80° 01' 26.934"	25.351111	-80.024148
7	Point	7	25° 24' 5.881"	80° 01' 44.04"	25.401634	-80.0289
8	Point	8	25° 27' 28.3"	80° 02' 26.102"	25.457861	-80.040584
9	Point	9	25° 46' 41.552"	79° 59' 14.363"	25.778209	-79.987323
10	Point	10	25° 48' 29.86"	80° 00' 22.787"	25.808294	-80.00633
11	Point	11	25° 49' 9.773"	80° 00' 38.467"	25.819381	-80.010685

Table 4-6c. Location points for Allowable Golden Crab Fishing Area Middle Zone C (Source: GC Fishermen/SAFMC Staff).

FID	Shape *	LatDegMinS	LongDegMin	LATDD	LONGDD
0	Point	25° 33' 32.247"	79° 47' 14.49"	25.558958	-79.787358
1	Point	25° 33' 32.247"	79° 42' 8.01"	25.558958	-79.702225
2	Point	25° 21' 04"	79° 42' 17"	25.351111	-79.704722
3	Point	25° 21' 04"	79° 53' 45.075"	25.351111	-79.895854

Table 4-7. Location points for Allowable Golden Crab Fishing Area Southern Zone (Source: GC Fishermen/SAFMC Staff).

FID	Shape *	LatDegMinS	LongDegMin	LATDD	LONGDD
0	Point	24° 13' 45.73"	81° 04' 54"	24.229369	-81.081667
1	Point	24° 14' 7.25"	80° 53' 26.48"	24.235347	-80.890689
2	Point	24° 10' 58"	80° 58' 16"	24.182778	-80.971111

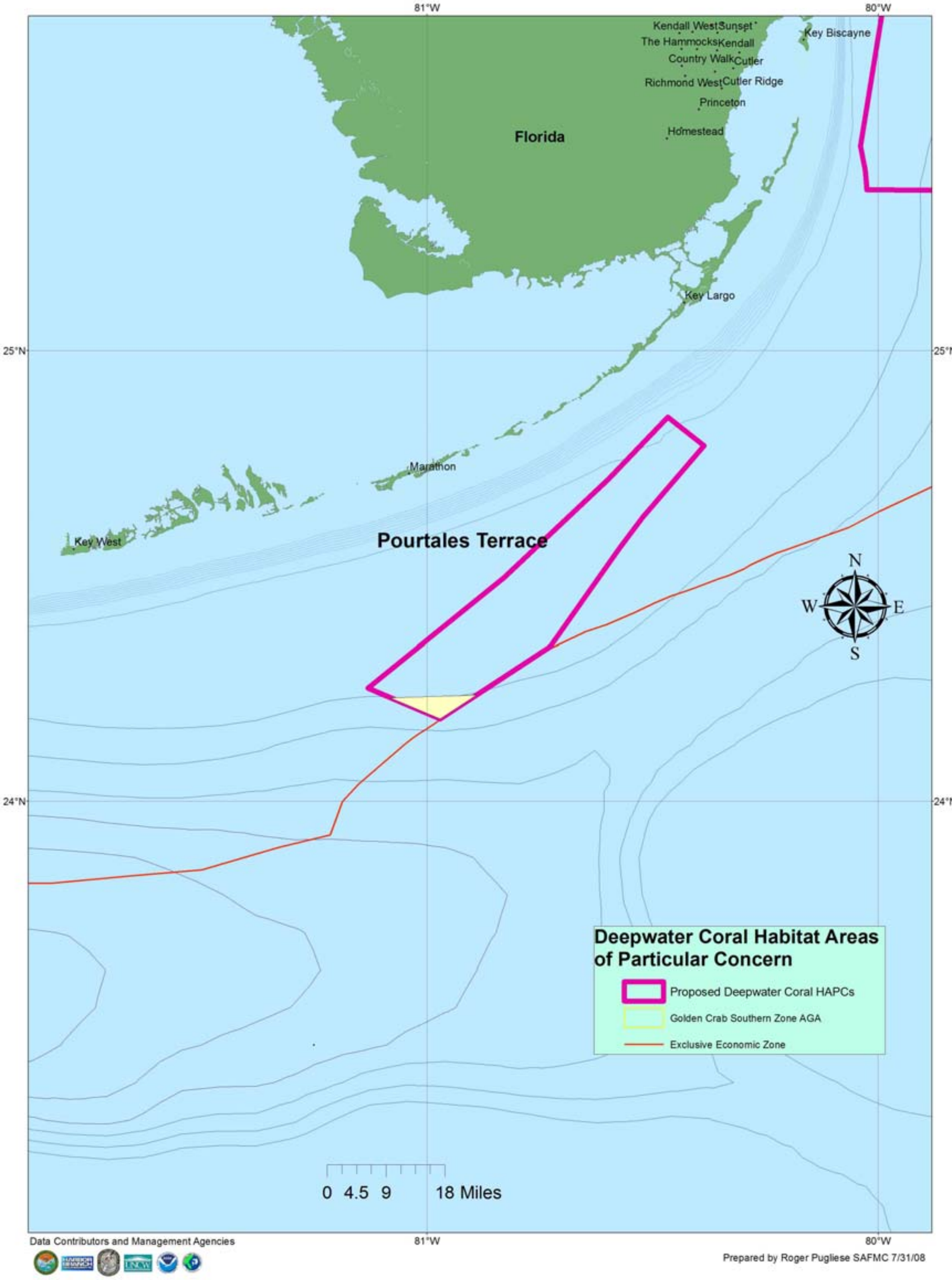


Figure 4-23. Golden Crab Southern Zone Allowable Gear Area (Note: Map, developed in cooperation with Golden Crab Advisory Panel, corresponds to Table 4-7 (Prepared by Roger Pugliese SAFMC).

4.2.1 Biological Effects of Establishing Allowable Golden Crab Fishing Areas

Alternative 1 does not create Allowable Golden Crab Fishing Areas within the proposed C-HAPC boundaries. All impacts from golden crab fishing gear would be eliminated with this alternative, however the Golden Crab Advisory Panel and other affected fishermen indicated that while they do not intentionally set or impact deepwater coral habitat, the proposed CHAPCs would eliminate the golden crab fishery because the majority of their fishing grounds are included in these areas. Therefore, Alternative 1 would have the greatest positive biological benefit as compared to Alternatives 2 and 3. **Preferred Alternative 2** proposes to establish Allowable Golden Crab Fishing Areas in the three golden crab fishing zones (Northern Zone – north of 28 degrees N. latitude, the Middle Zone between 28 degrees N. latitude and 25 degrees N. latitude and the Southern Zone- south of 25 degrees N. latitude). Sub-Alternative 2a, Sub-Alternative 2b and Sub-Alternative 2c would not impact Action 1 Sub-Alternative 2a, establishing the Cape Lookout Lophelia Banks CHAPC and Action 1 Sub-Alternative 2b, establishing the Cape Fear Lophelia Banks CHAPC. These Sub-Alternatives would not impact the protection of the known distribution of deepwater coral habitat occurring in offshore waters off North Carolina with its unique habitat complexes and species assemblages relative to areas south. **Sub-Alternative 2a** creates an Allowable Golden Crab Fishing Area in the Northern Golden Crab Fishing Zone within the Stetson-Miami CHAPC boundaries. This alternative was developed to avoid potential gear impacts to existing and potential deepwater habitat north of 28 degrees N. Latitude. This Sub-Alternative will restrict the fishery to traditional grounds that do not impact habitat and will not compromise establishing Action 1 Sub-Alternative 2c, the Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC which protects the largest area encompassing a variety of deepwater habitats varying from the deepwater reef complexes occurring on the Blake Plateau, lithoherms with a vast network of coral pinnacles occurring off Georgia through north Florida and the Miami Terrace. **Sub-Alternative 2b** creates an Allowable Golden Crab Fishing Area in the Middle Golden Crab Fishing Zone within the proposed Stetson-Miami Coral HAPC boundaries. Therefore, this sub-alternative includes three sub-areas A, B and C, developed to restrict the fishery to traditional grounds and not impact deepwater habitat. It will subsequently enhance establishing Action 1 Sub-Alternative 2c, the Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC which protects the largest area encompassing a variety of deepwater habitats varying from the deepwater reef complexes occurring on the Blake Plateau, lithoherms with a vast network of coral pinnacles occurring off Georgia through north Florida and the Miami Terrace. This sub-alternative allows fishing on the Miami Terrace but is structure to avoid habitat. **Sub-Alternative 2c** creates an “Allowable Golden Crab Fishing Area” in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries.

Alternative 2 provides the golden crab fishery an opportunity to continue fishing in most of their active fishing grounds in areas where the fishery will not impact deepwater habitat. Establishment of allowable fishing areas under the existing industry proposals (Figures 4-21, 4-22, 4-23) for Northern Golden Crab Zone, the Middle Golden Crab Zone and the Southern Golden Crab Zone are based on trap set data provided by industry. The industry developed these proposals to capture current fishing operations and avoid high profile deepwater coral habitat. Figures 4-24, 4-25 and 4-26 show the proposals in combination of the most recent deepwater habitat data including both direct observation and interpreted data.

While the least explored, creation of Sub-Alternative 2d, the Pourtales Terrace CHAPC will protect the most southern and most dynamic of deepwater coral ecosystems under the jurisdiction of the Council. The conservation of this area is not only important to benthic species but also is thought to serve pelagic species using the high profile habitats and dynamic currents for navigation, feeding and migration. In establishing Sub-Alternative 2e, the Blake Ridge Diapir Methane Seep CHAPC, the Council is intending to protect a unique benthic habitat occurring nowhere else in the region. In developing the proposal, members of the Habitat Advisory Panel highlighted the most probable unique genetic characteristics of species that will be found in this habitat oasis in the deep ocean.

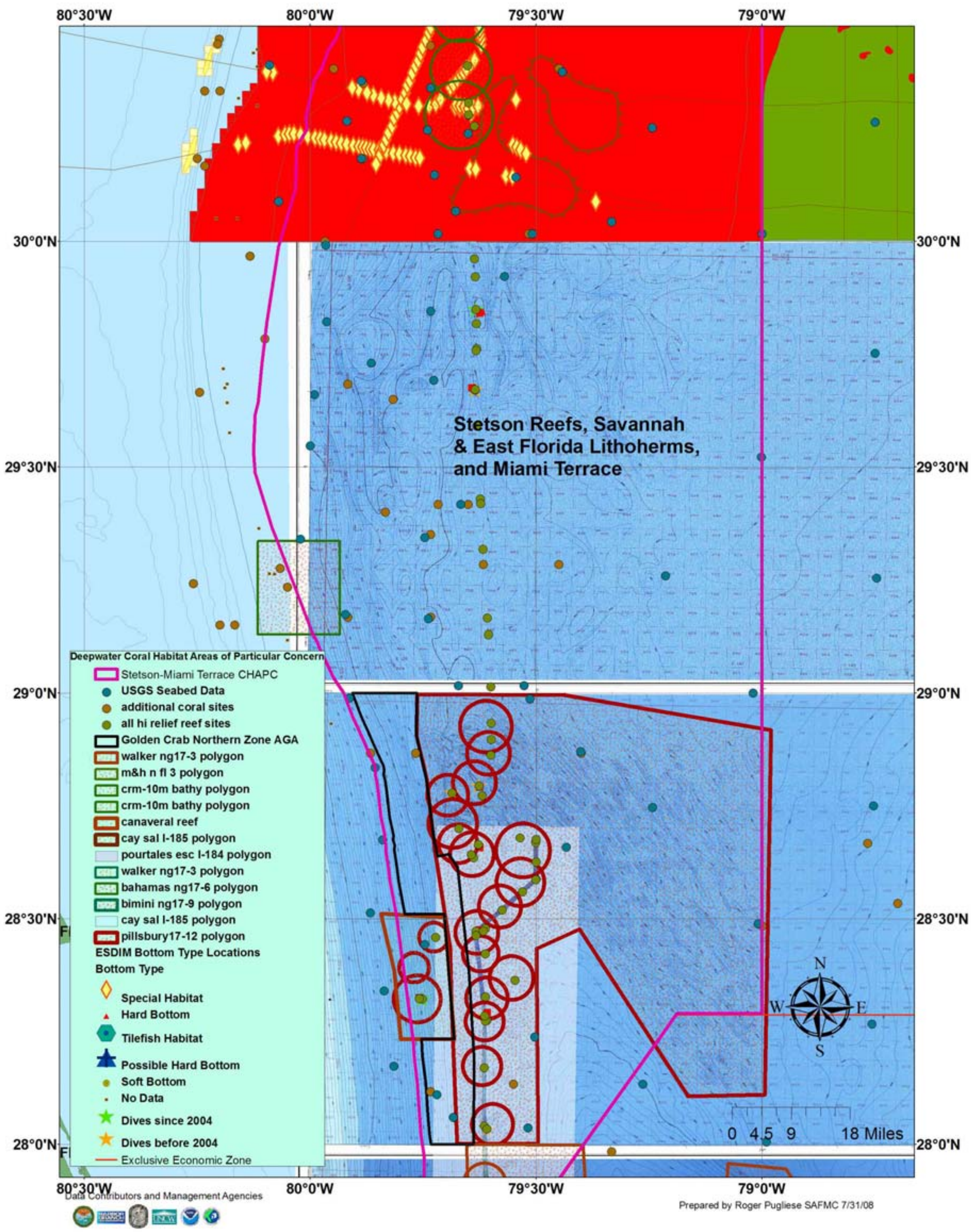


Figure 4-24. Deepwater Habitat in Proposed CHAPC in relationship to Golden Crab Northern Zone Allowable Fishing Areas (Prepared by Roger Pugliese, SAFMC)...

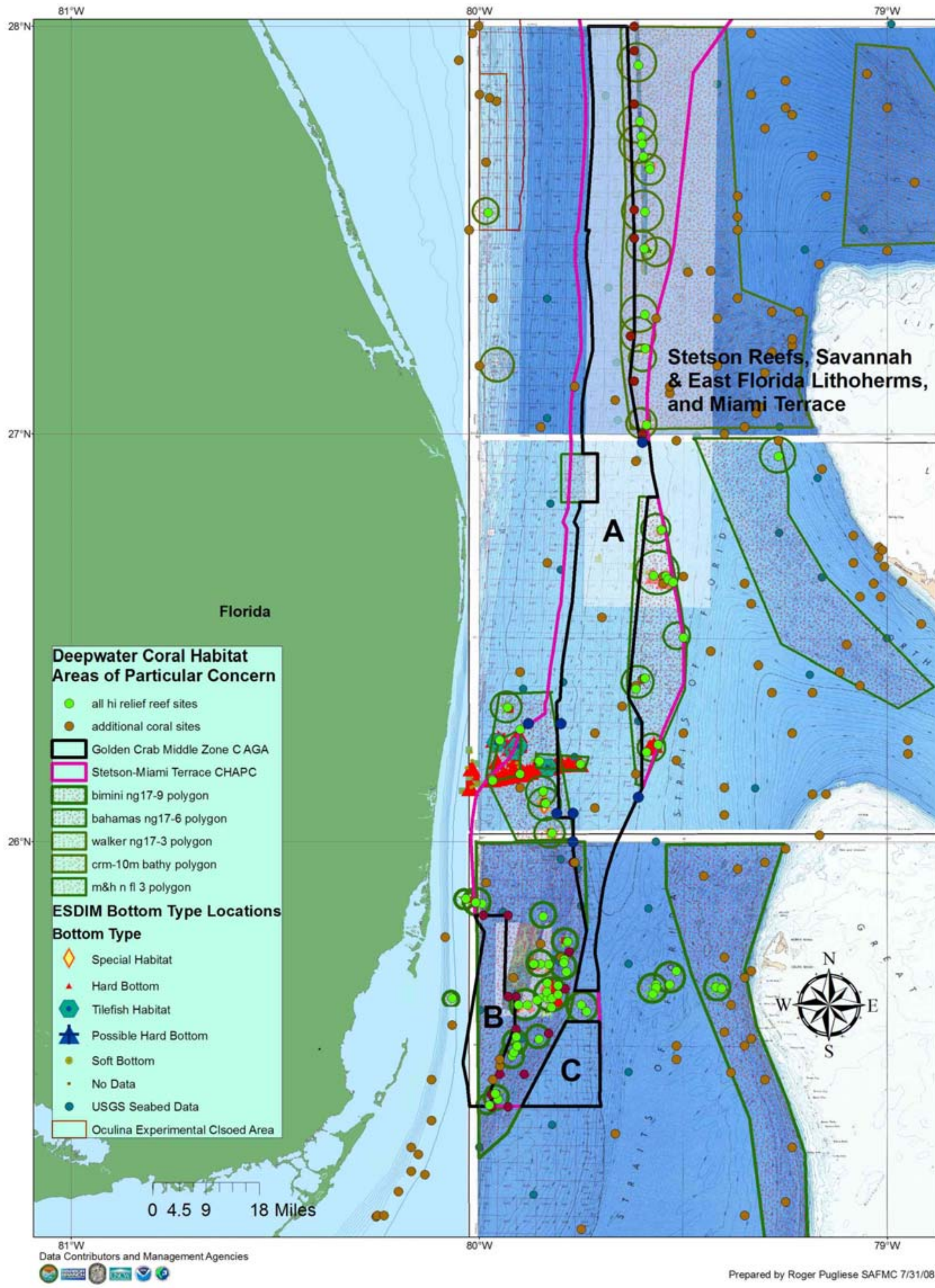


Figure 4-25. Deepwater Habitat in Stetson-Miami CHAPC in relationship to Golden Crab Middle Zone A, B, and C Allowable Fishing Areas (Prepared by Roger Pugliese, SAFMC).

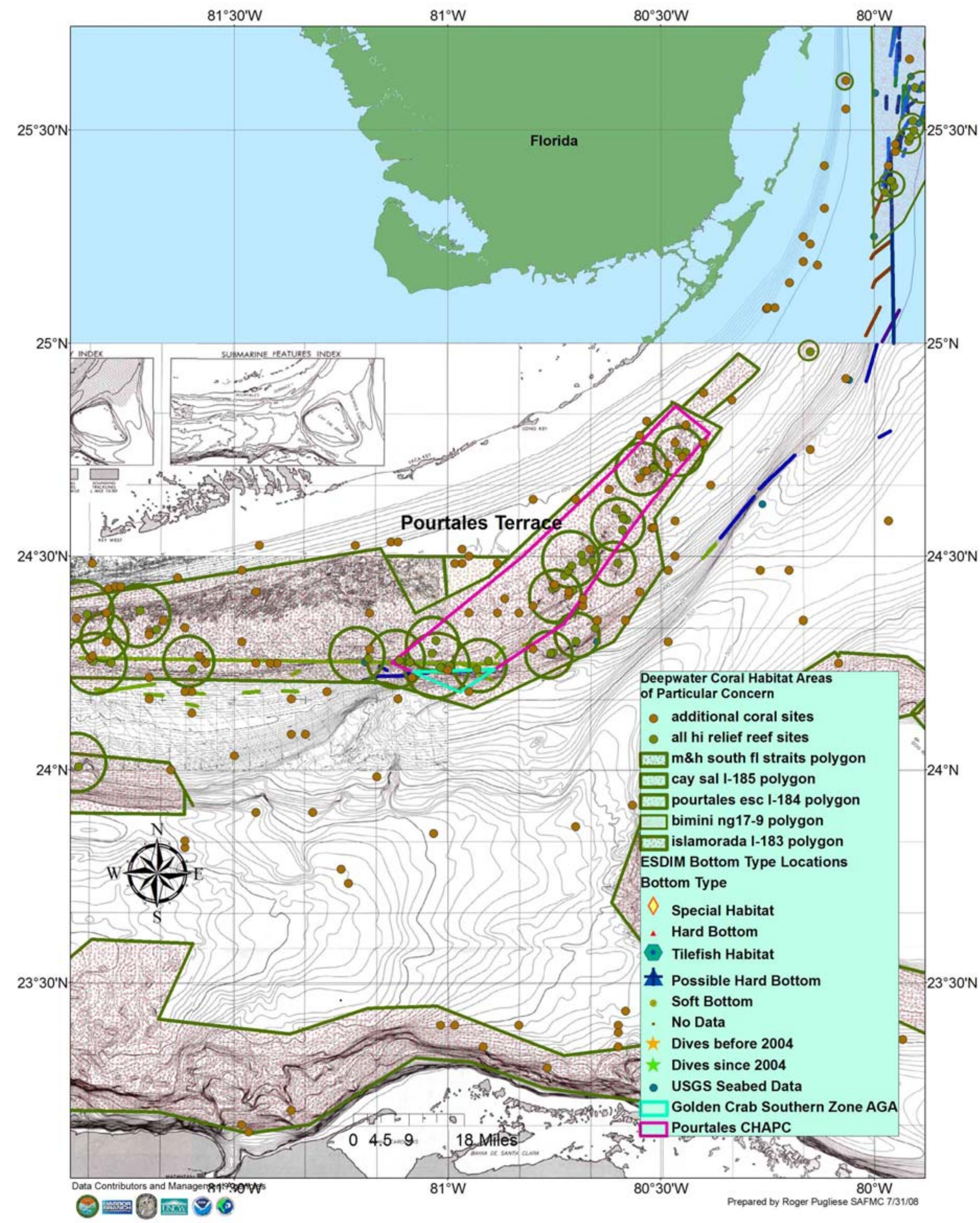


Figure 4-26. Deepwater Habitat in Pourtales CHAPC in relationship to Golden Crab Allowable Fishing Area for the Southern Zone (Prepared by Roger Pugliese, SAFMC).

4.2.2 Economic Effects of Establishing Allowable Golden Crab Fishing Areas

Alternative 1. Alternative 1 does not create "Allowable Golden Crab Fishing Areas" within the proposed C- HAPC boundaries. Input provided by the Golden Crab Advisory Panel and other affected fishermen indicated that the proposed C-HAPCs would eliminate the golden crab fishery because the majority of their fishing grounds are included in these areas (see Figures 4-17a, 4-17b, and 4-17c in Appendix K for depictions of traditional golden crab fishing grounds). Therefore, Alternative 1 would significantly negatively impact the golden crab fishery and the fishing communities that depend on income generated by golden crab landings compared to Alternatives 2 and 3.

Preferred Alternative 2. Preferred Alternative 2 and sub-alternatives would create Allowable Golden Crab Fishing Areas in the Northern, Middle and Southern Golden Crab Fishing Zones within the proposed C-HAPC boundaries. Alternative 2 and sub-alternatives would mitigate against the impacts caused by Action 1 by providing the golden crab fishery an opportunity to continue fishing in their traditional fishing grounds in areas where the fishery will not impact deepwater habitat. Establishment of allowable gear areas under the existing industry proposals (Figures 4-21, 4-22, 4-23) for each of the Middle Golden Crab Zone, the Northern Golden Crab Zone and the Southern Golden Crab Zone are based on trap set data provided by industry (see Figures 4-17a, 4-17b, and 4-17c in Appendix K). The industry developed the proposals depicted in Figures 4-21, 4-22, and 4-23 to capture fishing operations and avoid high profile deepwater coral habitat. To assess the beneficial impact that this action will have on the golden crab fishery compared to Alternative 1, catch by ACCSP statistical grid was examined (Figure 4-27 and Figure 4-28). However, the grid areas were too large to be used for quantitative analysis and are included here for informational purposes only. In the absence of quantitative data of this kind, an assessment of the impacts of Allowable Golden Crab Fishing Areas relies on a visual comparison between traditional fishing grounds, shown in Figures 4-17a, 4-17b, and 4-17c in Appendix K, and the areas identified in the Sub-Alternatives. A visual comparison shows that the areas identified in the sub-alternatives encompass the overwhelming majority of trawl lines in Figures 4-17a, 4-17b, and 4-17c in Appendix K. Therefore, the sub-alternatives are expected to provide positive economic impacts to the golden crab fishery compared to Alternative 1, under which, if the Coral HAPC boundaries were approved, the golden crab vessels would not be able to fish.

The logbook data indicates that the golden crab fishery caught 510,000 pounds on average over the period 2005-2007. In the absence of establishment of "Allowable Golden Crab Fishing Areas", the fishery, consisting of 7 commercial golden crab vessels that landed golden crab between 2005 and 2007, would likely lose almost all of these landings estimated at approximately $714,000 ex-vessel value annually. This estimate assumes that fishermen receive $1.40 per pound on average for golden crab landings (personal communication, 2008).

The non-use value to the general public of the knowledge that corals are protected will not change with adoption of Preferred Alternative 2 compared to the No Action Alternative.

Alternative 3. Alternative 3 proposes to move the western boundary of the proposed Northern and Middle Zone Allowable Golden Crab Fishing Areas west to include the proposed Shrimp Fishery Access Areas. Assuming C-HAPCs are implemented, a potential benefit of implementing Alternative 3 compared to Alternative 2 is that it provides the golden crab vessels with additional areas to explore in the future. While the additional areas encompassed in Alternative 3 are not part of the golden crab traditional fishing grounds, they are adjacent to those traditional fishing areas and may provide yields in the future that the golden crab vessels would want to harvest.

As stated under Alternative 2, the logbook data indicates that the golden crab fishery caught 510,000 pounds on average over the period 2005-2007. In the absence of establishment of "Allowable Golden Crab Fishing Areas", the fishery, consisting of 7 commercial golden crab vessels that landed golden crab between 2005 and 2007, would likely lose almost all of these landings estimated at approximately $714,000 ex-vessel value annually. This estimate assumes that fishermen receive $1.40 per pound on average for golden crab landings (personal communication, 2008). This may be an underestimate if the additional areas encompassed in Alternative 3 are fished successfully.

Assuming coral HAPCs are implemented, the non-use value to the general public of allowing golden crab fishing in certain areas will not change with adoption of the Sub-Alternatives compared to Alternative 1 under Action 1. That is, protecting this special habitat through Preferred Alternative 2 in Action 1 and Preferrred Alternative 2 or Alternative 3 in Action 2 is expected to result in overall positive net economic benefits to society. Specifically, society is expected to benefit from the possible availability of new information resulting from avoiding the loss of coral species that could be used to benefit society, an increase in bequest value, and an increase in existence value (see Chapter 3 for an explanation of these terms). The full suite of benefits the species that the proposed CHAPCs would protect are unknown but could include medicinal and environmental benefits.

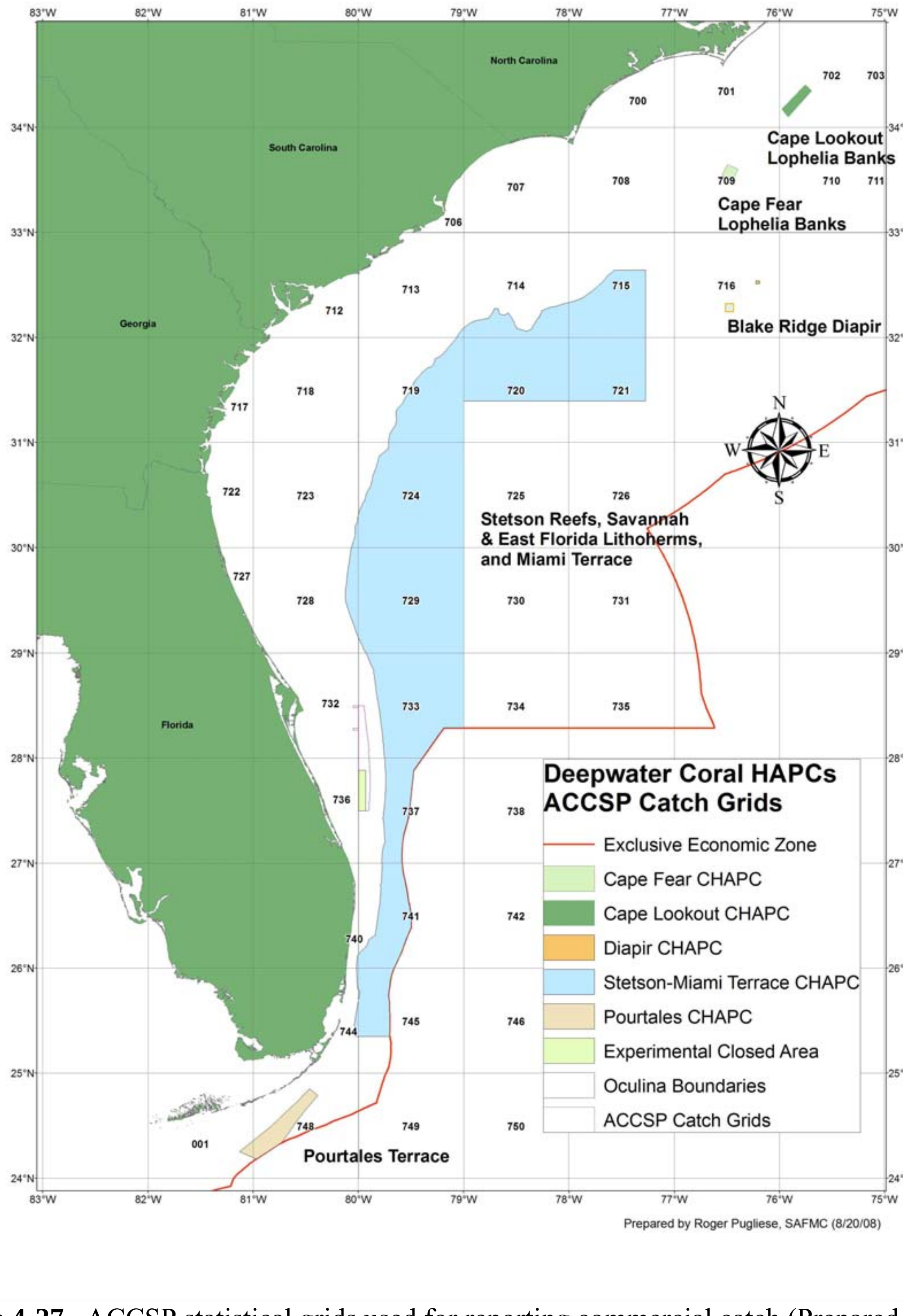
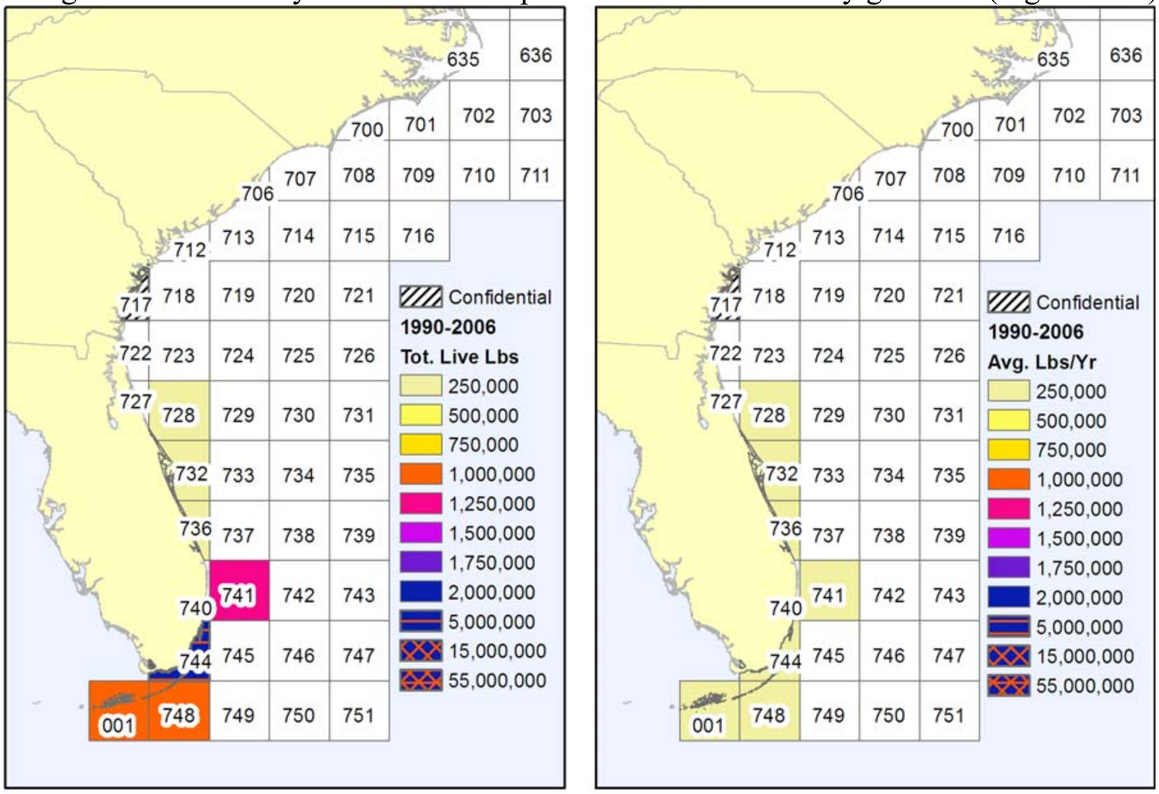
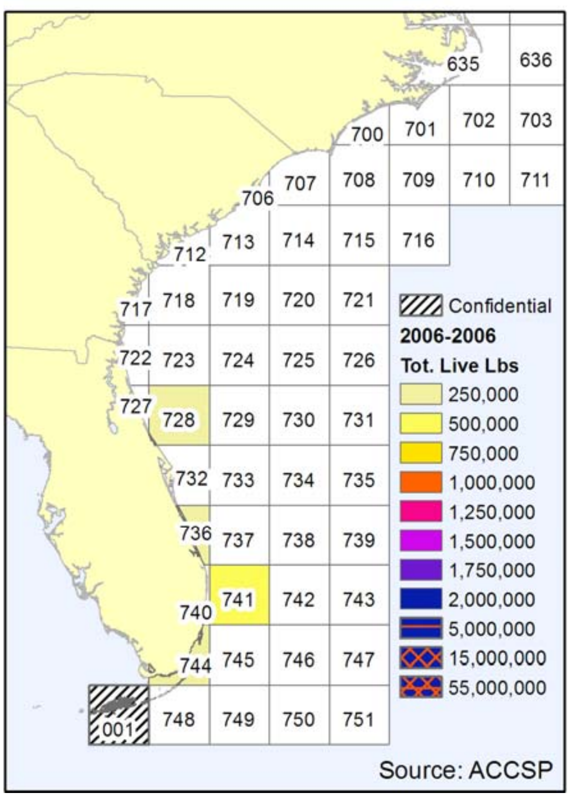


Figure 4-27. ACCSP statistical grids used for reporting commercial catch (Prepared by Roger Pugliese, SAFMC). .

The golden crab fishery has more overlap as shown in the catch by grid data (Figure 4-16).





ACCSP Catch: CRAB, GOLDEN DEEPSEA
1990-2006
Pounds in Thousands

Area	Tot. 90-06	Avg. 90-06	Tot. 2006
001	957.21	56.31	Conf.
717	Conf.	Conf.	0.00
728	36.81	2.17	5.15
732	74.75	4.40	0.00
736	21.08	1.24	21.08
741	1,178.92	69.35	259.31
744	3,164.60	186.15	212.75
748	945.07	55.59	0.00

Figure 4-28. Golden crab catch by statistical grid (Data Source: ACCSP).

4.2.3 Social Effects of Establishing Allowable Golden Crab Fishing Areas

Establishing Allowable Golden Crab Fishing Areas under Preferred Alternative 2 and Alternative 3 are both expected to have positive social impacts on the golden crab fishery compared to Alternative 1, under which, if the coral HAPC areas were approved, the golden crab vessels would not be able to fish. Under Alternative 1, five to seven vessels would likely have to be sold or be refitted for participation in another fishery. Under Alternative 1, it is possible that the golden crab fishery will cease to exist. The social impacts on the families involved in the golden crab fishery will be significant since it may not be possible for golden crab vessels to be converted from crab fishing to fishing for other species, given the specialized nature of the vessel required for this fishery. As a result, the financial stress and other problems that result from financial stress and unemployment would ensue. These could include an increase in transfer payments and stress, depression, and other mental health problems.

Positive social benefits would accrue from the expected positive economic benefits under Alternatives 2 and 3 compared to Alternative 1.

4.2.4 Administrative Effects of Establishing Allowable Golden Crab Fishing Areas

The establishment of deepwater Coral HAPCs would require more law enforcement resources to monitor the golden crab fishery. However, with the deepwater shrimp fishery being monitored by VMS and the proposal to require monitoring of the golden crab fishery (see Action 4), most enforcement will be achievable with minimized on water costs.

4.2.5 Conclusion

The Council approved including alternatives in the CEA to protect deepwater coral and live bottom resources in the proposed HAPCs. Fishing gear including bottom longlines, dredges, pots and traps, anchors, chain and grapples, all contact the bottom and would have negative impacts on the *Lophelia* and *Enallopsamnia* corals and associated complex habitats encompassed by the deepwater coral ecosystems in the HAPCs. This action would also eliminate damage from mid-water trawls, which if configured with trailing weights as was done in Pacific Seamount fisheries (Figure 4-20) can be trawled over pinnacles or seamounts and cause damage to the habitat (Peter Auster pers. comm.).

Alternative 1, the no action alternative, would not protect the *Lophelia* coral and live/hard bottom habitat or maximize the likelihood that the essential fish habitat contained in the HAPCs will be protected. Alternative 2, the preferred alternative, best addresses the objective of the management plan to protect deepwater HAPCs from damaging fishing gear which directly or indirectly takes coral or live/hard bottom reducing habitat essential to species utilizing the area. This alternative reduces the impact of deepwater shrimp and golden crab fisheries on live/hard bottom and coral habitat by prohibiting their use in the deepwater C-HAPC.

Alternative 3 from the Golden Crab Advisory Panel and Alternative 4 from the Deepwater Shrimp Advisory Panel are all included for public hearing. The Council's intent is to establish deepwater C-HAPCs while considering industry proposals that allow fishing which will not impact deepwater habitat in the proposed deepwater C-HAPCs.

4.3 *ACTION 3: Amend the Coral FMP to Create a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace C-HAPC boundaries.*

Alternative 1. No Action. Do not create a "Shrimp Fishery Access Areas" within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace boundaries .

Preferred Alternative 2. Create a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace C-HAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS).

The SFAA is located as follows: The western boundary is the western boundary of the CHAPC. The northern boundary of the SFAA is at latitude 30° 12' N. The southern boundary is at latitude 26° 18' 56" N.

From the northern boundary extending southward to latitude 27° 30' N, the eastern boundary is 1.0 nm due east of the western boundary of the HAPC, except between latitudes 29° 20' 25" N. and 29° 8' N., and between latitudes 28° 30' 37" N. and 28° 14' N., where shrimping is not allowed within the CHAPC.

From the southern boundary extending northward to latitude 27° 30' N, the eastern boundary is 1.5 nm due east of the western boundary of the HAPC, except between latitudes 26° 57' 6" N. and 26° 49' 58" N., where shrimping is not allowed within the C-HAPC.

Alternative 3. Move the west boundary of the proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds.

4.3.1 Biological Effects of Creating a Shrimp Fishery Access Area

Alternative 1 would not create a "Shrimp Fishery Access Areas" within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace boundaries. The biological impacts of this alternative would be positive in that it would prohibit offshore of what is agreed to be the beginning of the deepwater ecosystem north of the Miami Terrace. However, the benefits of not allowing continued fishing in areas where if habitat existed is now impacted is limited. **Preferred Alternative 2** proposes the creation of a Shrimp Fishery

Access Area (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace C-HAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS). Creation of the four part area will have positive biological effects through limiting the fishery to traditional grounds and ensuring no expansion into know low relief and high relief deepwater habitat in the proposed Stetson-Miami Terrace CHAPC. The royal red shrimp fishery operates almost exclusively inshore of the 400 meter contour, which is the western boundary of the deepwater habitat distribution being protected by the proposed CHAPCs north of the Miami Terrace. NMFS SEFSC provided the Council with analyses of VMS data required in the rock shrimp fishery but used by vessels in the royal red shrimp fishery. Less than 1% of all collected points between 2003 and 2007 identified as potential royal red fishing activity, occurred in the proposed deepwater CHAPCs. However, comments received during public hearing proposed an additional small area associated with the western boundary to cover the areas identified in VMS as well as address operational characteristics of the fishery. The Council reviewed comments (Appendices N, O and P) received during the first round of public hearings and evaluated the proposals developed. The Council subsequently recommended moving alternatives proposing the movement of the CHAPC boundary to the alternatives considered but rejected (Appendix K). The Council reviewed and adopted Preferred Alternative 2 which was developed as a follow-up to an industry recommendation provided at public hearing. The alternative, developed through cooperation with industry, representatives of the Habitat and Coral Advisory Panels and Council staff, was developed to both address fishery operation concerns and the fact that a small portion of historic traditional grounds based on VMS points and industry provided royal red shrimp trawl tracks, occurred close to the western edge of the Stetson Reefs, Savannah and East Florida Lithoherms and Miami Terrace CHAPC. At the June Council meeting in Orlando Florida, Alternative 2 was adopted as the preferred alternative for this action. **Alternative 3** would have the greatest biological effect and impact on deepwater coral habitat because it proposes to change the boundary of the Stetson-Miami Terrace CHAPC to allow deepwater trawlers to fish in depths deeper than the traditional fishery has operated. The Habitat and Coral Advisory Panels and deepwater researchers have concluded that the best scientific information indicates the deepwater coral ecosystem, north of the Miami Terrace starts at a depth of 400 meters and in some cases extends to the eastern boundary of the US EEZ. Alternative 3 would allow trawling and the use of all other damaging gear including bottom longlines, anchoring and grappling up to 6 miles seaward of the proposed Stetson Miami CHAPC. In addition, this alternative would allow trawling and use of other bottom tending gear in the main golden crab habitat and fishing grounds which produced over 400,000 pounds of crab in 2007. Alternative 3 also would eliminate a significant part of deepwater habitat from being considered important as a CHAPC when permit or policy review addresses the need to avoid the impact of non-fishing activities including oil and gas exploration, pipeline and transmission placement. The Council, at their June meeting in Orlando, reviewed the alternatives brought to public hearing and determined not to propose changing the CHAPC boundary and selected Alternative 2 as a preferred alternative.

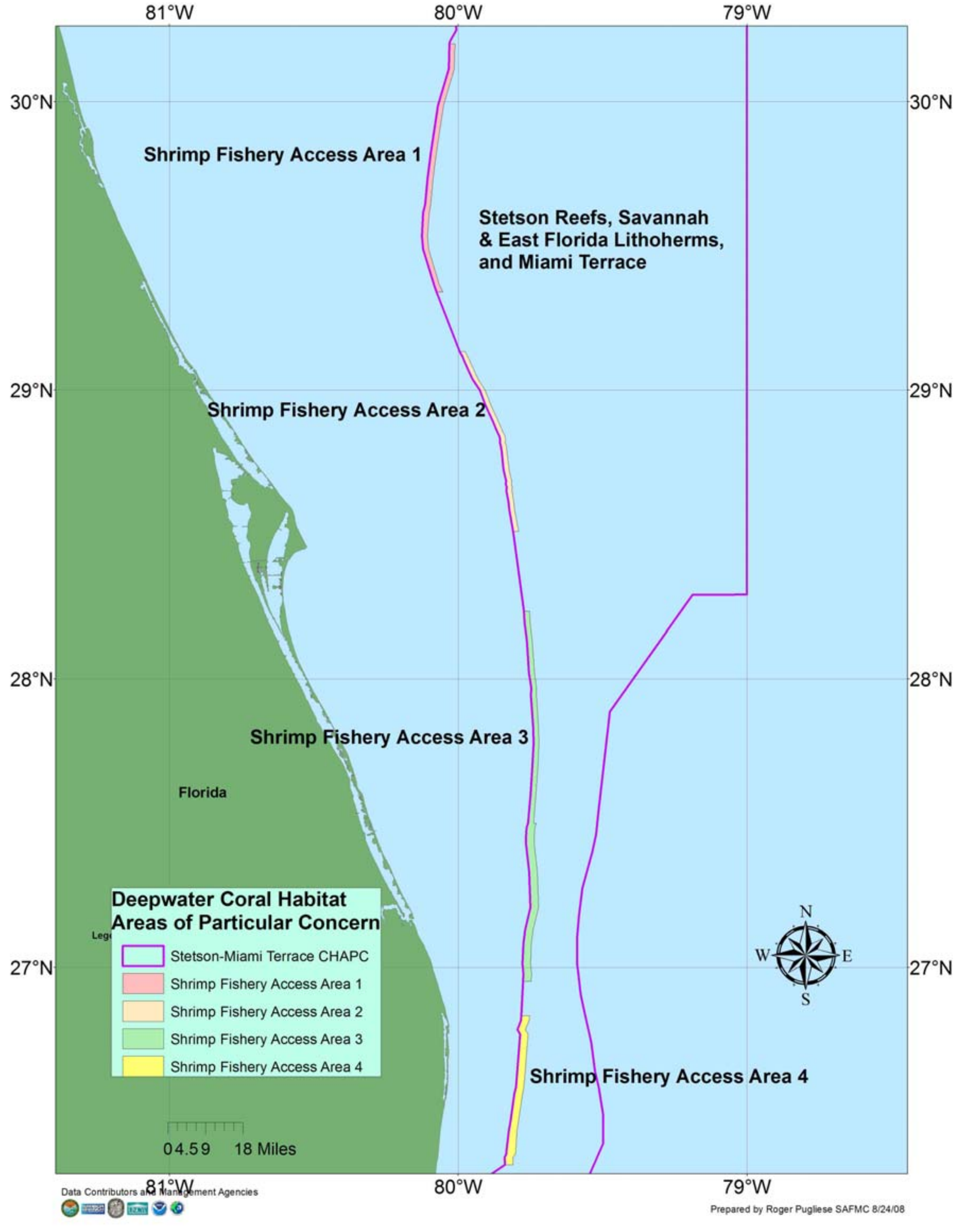


Figure 4-29. Shrimp Fishery Access Areas (SFAA) (Note: Table 4-8 presents location points for SFAAs) (Prepared by Roger Pugliese SAFMC).

Table 4-8. Location points for Golden SFAA1, SFAA2, SFAA3 and SFAA4 (Source: GC Fishermen/FWRI/SAFMC Staff).

Shrimp Fishery Access Area 1

FID	Shape *	F1	LatDegMinS	LongDegMin	LATDD	LONGDD
0	Point	0	30° 12' 00"	80° 01' 48.799"	30.2	-80.030222
1	Point	1	30° 06' 52.473"	80° 01' 57.709"	30.114576	-80.032697
2	Point	2	29° 59' 16.226"	80° 04' 10.959"	29.987841	-80.069711
3	Point	3	29° 49' 11.913"	80° 05' 43.758"	29.819976	-80.095488
4	Point	4	29° 43' 59.363"	80° 06' 23.848"	29.733156	-80.106624
5	Point	5	29° 38' 37.162"	80° 06' 52.802"	29.643656	-80.114667
6	Point	6	29° 36' 53.968"	80° 07' 18.043"	29.614991	-80.121679
7	Point	7	29° 31' 59.236"	80° 07' 32.149"	29.533121	-80.125597
8	Point	8	29° 29' 14.423"	80° 07' 18.043"	29.48734	-80.121679
9	Point	9	29° 21' 48.241"	80° 05' 1.442"	29.3634	-80.083734
10	Point	10	29° 20' 25"	80° 04' 28.776"	29.340278	-80.07466
11	Point	11	29° 20' 25"	80° 03' 10.737"	29.340278	-80.052982
12	Point	12	29° 21' 48.241"	80° 03' 52.403"	29.3634	-80.064556
13	Point	13	29° 29' 14.423"	80° 06' 7.522"	29.48734	-80.102089
14	Point	14	29° 31' 59.236"	80° 06' 23.112"	29.533121	-80.10642
15	Point	15	29° 36' 53.968"	80° 06' 0.006"	29.614991	-80.100002
16	Point	16	29° 38' 37.162"	80° 05' 43.022"	29.643656	-80.095284
17	Point	17	29° 43' 59.363"	80° 05' 14.068"	29.733156	-80.087241
18	Point	18	29° 49' 11.913"	80° 04' 34.72"	29.819976	-80.076311
19	Point	19	29° 59' 16.226"	80° 03' 1.177"	29.987841	-80.050327
20	Point	20	30° 06' 52.473"	80° 00' 46.434"	30.114576	-80.012898
21	Point	21	30° 12' 00"	80° 00' 41.979"	30.2	-80.011661

Shrimp Fishery Access Area 2

FID	Shape *	FID_	LatDegMinS	LongDegMin	LATDD	LONGDD
0	Point	0	29° 08' 00"	79° 59' 42.582"	29.133333	-79.995162
1	Point	1	29° 06' 55.877"	79° 59' 7.317"	29.115521	-79.985366
2	Point	2	29° 05' 59.455"	79° 58' 43.560"	29.099849	-79.978767
3	Point	3	29° 03' 33.944"	79° 57' 37.487"	29.059429	-79.960413
4	Point	4	29° 02' 10.77"	79° 56' 58.614"	29.036325	-79.949615
5	Point	5	29° 00' 00"	79° 55' 30.658"	29	-79.925183
6	Point	6	28° 56' 54.619"	79° 54' 22.357"	28.948505	-79.90621
7	Point	7	28° 55' 0.088"	79° 53' 30.658"	28.916691	-79.891849
8	Point	8	28° 53' 34.512"	79° 52' 51.123"	28.89292	-79.880867
9	Point	9	28° 51' 47.463"	79° 52' 06.722"	28.863184	-79.868534
10	Point	10	28° 50' 24.744"	79° 51' 26.579"	28.840207	-79.857383
11	Point	11	28° 49' 52.508"	79° 51' 20.497"	28.831252	-79.855694
12	Point	12	28° 49' 01.417"	79° 51' 20.497"	28.81706	-79.855694
13	Point	13	28° 48' 18.841"	79° 51' 09.548"	28.805234	-79.852652
14	Point	14	28° 47' 13.152"	79° 50' 59.209"	28.786987	-79.84978
15	Point	15	28° 43' 29.932"	79° 50' 36.096"	28.724981	-79.84336
16	Point	16	28° 41' 05.173"	79° 50' 04.468"	28.68477	-79.834574
17	Point	17	28° 40' 27.463"	79° 50' 06.901"	28.674295	-79.83525
18	Point	18	28° 39' 49.753"	79° 49' 55.953"	28.66382	-79.832209
19	Point	19	28° 39' 04.136"	79° 49' 58.386"	28.651149	-79.832885
20	Point	20	28° 36' 43.027"	79° 49' 35.273"	28.611952	-79.826465
21	Point	21	28° 35' 0.844"	79° 49' 24.325"	28.583568	-79.823424
22	Point	22	28° 30' 37"	79° 48' 35.058"	28.510278	-79.809738
23	Point	23	28° 30' 37"	79° 47' 27.181"	28.510278	-79.790884
24	Point	24	28° 35' 0.844"	79° 48' 15.881"	28.583568	-79.804411
25	Point	25	28° 36' 43.027"	79° 48' 27.016"	28.611952	-79.807504
26	Point	26	28° 39' 04.136"	79° 48' 50.03"	28.651149	-79.813897
27	Point	27	28° 39' 49.753"	79° 48' 47.803"	28.66382	-79.813279
28	Point	28	28° 40' 27.463"	79° 48' 58.196"	28.674295	-79.816166
29	Point	29	28° 41' 05.173"	79° 48' 55.502"	28.68477	-79.815417
30	Point	30	28° 43' 29.932"	79° 49' 27.574"	28.724981	-79.824326
31	Point	31	28° 47' 13.152"	79° 49' 50.737"	28.786987	-79.83076
32	Point	32	28° 48' 18.841"	79° 50' 01.200"	28.805234	-79.833667
33	Point	33	28° 49' 01.417"	79° 50' 13.009"	28.81706	-79.836947
34	Point	34	28° 49' 52.508"	79° 50' 12.118"	28.831252	-79.836699
35	Point	35	28° 50' 24.744"	79° 50' 17.464"	28.840207	-79.838184
36	Point	36	28° 51' 47.463"	79° 50' 58.444"	28.863184	-79.849568
37	Point	37	28° 53' 34.512"	79° 51' 42.989"	28.89292	-79.861941
38	Point	38	28° 55' 0.088"	79° 52' 22.188"	28.916691	-79.87283
39	Point	39	28° 56' 54.619"	79° 53' 13.859"	28.948505	-79.887183
40	Point	40	29° 00' 00"	79° 54' 24.239"	29	-79.906733
41	Point	41	29° 02' 10.77"	79° 55' 49.764"	29.036325	-79.93049
42	Point	42	29° 03' 33.944"	79° 56' 28.963"	29.059429	-79.941379
43	Point	43	29° 05' 59.455"	79° 57' 34.888"	29.099849	-79.959691
44	Point	44	29° 06' 55.877"	79° 57' 58.942"	29.115521	-79.966373
45	Point	45	29° 08' 00"	79° 58' 33.538"	29.133333	-79.975983

Shrimp Fishery Access Area 3

FID_1	LATDEGMINS	LONGDEGMIN	LATDD	LONGDD
0	28° 14' 00"	79° 46' 20.006"	28.233333	-79.772224
1	28° 11' 40.965"	79° 46' 12.228"	28.194713	-79.770063
2	28° 08' 01.964"	79° 45' 45.461"	28.133879	-79.762628
3	28° 04' 42.025"	79° 45' 33.256"	28.078340	-79.759238
4	28° 01' 20.327"	79° 45' 19.55"	28.022313	-79.755431
5	27° 58' 13.209"	79° 44' 50.62"	27.970336	-79.747394
6	27° 56' 23.119"	79° 44' 53.165"	27.939755	-79.748101
7	27° 49' 40.304"	79° 44' 25.165"	27.827862	-79.740324
8	27° 46' 27.488"	79° 44' 21.984"	27.774302	-79.739440
9	27° 41' 59.581"	79° 44' 33.438"	27.699884	-79.742622
10	27° 36' 7.675"	79° 44' 58.256"	27.602132	-79.749516
11	27° 30' 00"	79° 45' 29.438"	27.500000	-79.758177
12	27° 29' 4.496"	79° 45' 47.256"	27.484582	-79.763127
13	27° 27' 5.497"	79° 45' 53.619"	27.451527	-79.764894
14	27° 25' 46.598"	79° 45' 56.6165"	27.429611	-79.765727
15	27° 19' 46.41"	79° 45' 14.165"	27.329558	-79.753935
16	27° 17' 53.774"	79° 45' 12.256"	27.298271	-79.753404
17	27° 12' 27.959"	79° 45' 0.074"	27.207766	-79.750021
18	27° 7' 45.415"	79° 46' 6.983"	27.129282	-79.768606
19	27° 4' 46.599"	79° 46' 29.255"	27.079611	-79.774793
20	27° 00' 42.873"	79° 46' 38.801"	27.011909	-79.777445
21	26° 58' 42.602"	79° 46' 27.983"	26.978501	-79.774440
22	26° 57' 06"	79° 46' 32.437"	26.951667	-79.775677
23	26° 57' 06"	79° 44' 51.525"	26.951667	-79.747646
24	26° 58' 42.602"	79° 44' 47.143"	26.978501	-79.746429
25	27° 00' 42.873"	79° 44' 58.127"	27.011909	-79.749480
26	27° 4' 46.599"	79° 44' 48.374"	27.079611	-79.746771
27	27° 7' 45.415"	79° 44' 26.1"	27.129282	-79.740583
28	27° 12' 27.959"	79░43' 18.978"	27.207766	-79.721938
29	27° 17' 53.774"	79° 43' 31.075"	27.298271	-79.725299
30	27° 19' 46.41"	79° 43' 32.984"	27.329558	-79.725829
31	27° 25' 46.598"	79° 44' 14.984"	27.429611	-79.737496
32	27° 27' 5.497"	79° 44' 11.802"	27.451527	-79.736612
33	27° 29' 4.496"	79° 44' 6.075"	27.484582	-79.735021
34	27° 30' 00"	79° 43' 48.257"	27.500000	-79.730071
35	27° 30' 00"	79° 44' 21.828"	27.500000	-79.739397
36	27° 36' 7.675"	79° 43' 50.166"	27.602132	-79.730602
37	27° 41' 59.581"	79° 43' 25.348"	27.699884	-79.723708
38	27° 46' 27.488"	79° 43' 13.893"	27.774302	-79.720526
39	27° 49' 40.304"	79° 43' 17.075"	27.827862	-79.721410
40	27° 56' 23.119"	79° 43' 45.075"	27.939755	-79.729188
41	27° 58' 13.209"	79° 43' 42.529"	27.970336	-79.728480
42	28° 01' 20.327"	79° 44' 10.529"	28.022313	-79.736258
43	28° 04' 42.025"	79° 44' 25.165"	28.078340	-79.740324
44	28° 08' 01.964"	79° 44' 37.256"	28.133879	-79.743682
45	28° 11' 40.965"	79° 45' 04.147"	28.194713	-79.751152
46	28° 14' 00"	79° 45' 11.735"	28.233333	-79.753260

Shrimp Fishery Access Area 4

FID	Shape *	F1	LatDegMinS	LongDegMin	LATDD	LONGDD
0	Point	0	26° 49' 58"	79° 46' 54.073"	26.832778	-79.781687
1	Point	1	26° 48' 57.788"	79° 46' 55.982"	26.816052	-79.782217
2	Point	2	26° 47' 1.334"	79° 47' 41.8"	26.783704	-79.794944
3	Point	3	26° 46' 4.062"	79° 47' 8.71"	26.767795	-79.785753
4	Point	4	26° 35' 9.249"	79° 48' 0.891"	26.585903	-79.800247
5	Point	5	26° 33' 36.977"	79° 48' 21.254"	26.560271	-79.805904
6	Point	6	26° 27' 55.512"	79° 49' 9.324"	26.46542	-79.819257
7	Point	7	26° 25' 54.609"	79° 49' 29.687"	26.431836	-79.824913
8	Point	8	26° 21' 5.078"	79° 50' 3.413"	26.351411	-79.834281
9	Point	9	26° 20' 30.079"	79° 50' 19.957"	26.341689	-79.838877
10	Point	10	26° 18' 56"	79° 50' 16.776"	26.315556	-79.837993
11	Point	11	26° 18' 56"	79° 48' 36.525"	26.315556	-79.810146
12	Point	12	26° 20' 30.079"	79° 48' 39.817"	26.341689	-79.81106
13	Point	13	26° 21' 5.078"	79° 48' 7.6"	26.351411	-79.802111
14	Point	14	26° 25' 54.609"	79° 47' 49.147"	26.431836	-79.796985
15	Point	15	26° 27' 55.512"	79° 47' 28.784"	26.46542	-79.791329
16	Point	16	26° 33' 36.977"	79° 46' 39.786"	26.560271	-79.777718
17	Point	17	26° 35' 9.249"	79° 46' 20"	26.585903	-79.772222
18	Point	18	26° 46' 4.062"	79° 45' 28.165"	26.767795	-79.757824
19	Point	19	26° 47' 1.334"	79° 46' 1.256"	26.783704	-79.767016
20	Point	20	26° 48' 57.788"	79° 45' 15.438"	26.816052	-79.754288
21	Point	21	26° 49' 58"	79° 45' 13.211"	26.832778	-79.75367

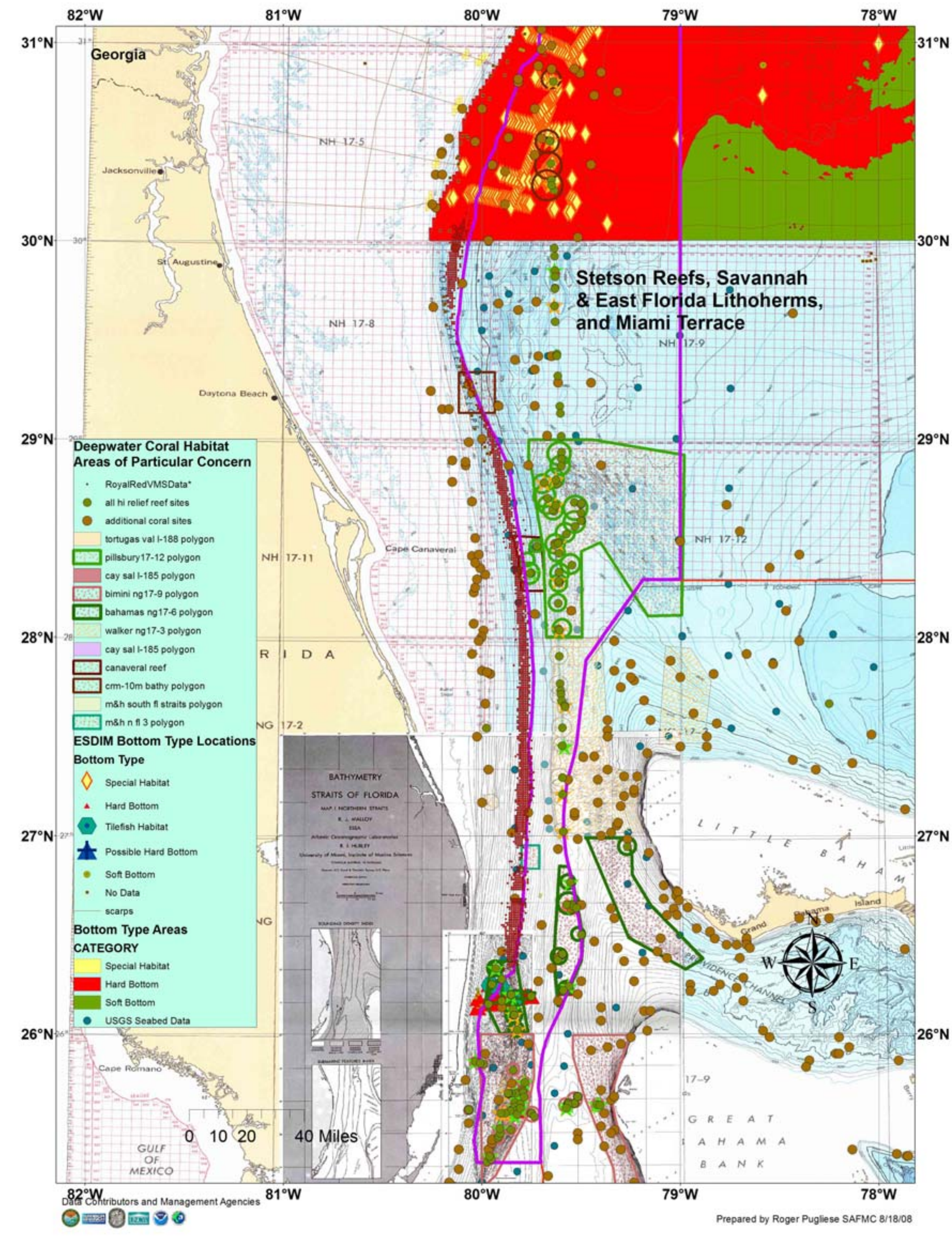


Figure 4-30. Deepwater Habitat in Proposed C-HAPC in relationship to Royal Red Fishing operations derived from VMS.

4.3.2 Economic Effects of Creating a Shrimp Fishery Access Area

Alternative 1 would not create a "Shrimp Fishery Access Areas" within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace boundaries. This is expected to result in small negative economic impacts for the shrimp fishery. As discussed above, analysis of VMS data indicated that less than 1% of all collected VMS points identified as potential royal red shrimp fishing occurred in the proposed deepwater CHAPCs between 2003 and 2007 (Figures 4-13 and 4-15).

Preferred Alterative 2 creates a "Shrimp Fishery Access Area" (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace C-HAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved VMS. NMFS SEFSC provided the Council with analyses of VMS data required for participation in the rock shrimp fishery but used by vessels when fishing for royal red shrimp. Less than 1% of VMS points collected between 2003 and 2007 identified as potential royal red fishing occurred in the proposed deepwater CHAPCs. Establishing Shrimp Fishery Access Areas under preferred Alternative 2 would essentially eliminate any negative economic impacts on the fishery that might occur under Alternative 1. Therefore, the creation of Shrimp Fishery Access Areas within the Coral HAPCs is expected to have small positive economic benefits for the shrimp fishery compared to the No Action Alternative.

The non-use value to the general public of the knowledge that corals are protected will not change with adoption of Preferred Alternative 2 compared to the No Action Alternative.

Alternative 3 moves the west boundary of the proposed C-HAPC 6 nmto the east. While this area is not a traditional fishing ground for the royal red shrimp fishery and may not result in trawling in these areas, it allows shrimp vessels to drift when needed without entering the proposed C-HAPC. If this area is not harvested, there are no expected economic impacts to the shrimp fleet. There is the potential for this area to provide new fishing oppurtunites for the shrimp fleet which would have positive economic impacts to the fleet.

4.3.3 Social Effects of Creating a Shrimp Fishery Access Area

Establishing Shrimp Fishery Access Areas under preferred Alternative 2 would essentially eliminate any small negative economic impacts on the fishery that might occur under the No Action Alternative. Therefore, creation of Shrimp Fishery Access Areas within the Coral HAPCs are expected to have small positive social benefits for the shrimp fishery compared to the Alternative 1.

4.3.4 Administrative Effects of Creating a Shrimp Fishery Access Area

The deepwater shrimp fishery is already being monitored by VMS allowing most enforcement to be achievable with reduced on water costs.

4.3.5 Conclusion

The Council approved as a preferred Alternative the creation of Shrimp Fishery Access Areas. The Council's intent is to establish deepwater C-HAPCs while considering industry proposals that allow fishing which will not impact deepwater habitat in the proposed deepwater C-HAPCs.

Alternative 1 (No-action) would not meet the objectives of the Amendment and have adverse biological effects. Of all the alternatives considered, Alternative 2 would be expected to produce the most beneficial direct effects on the socioeconomic environment by providing for traditional fishing operations given the knife-edge characteristics of the fishery along the west of the proposed Stetson-Miami CHAPC. Alternative 3 was one of four proposed by the deepwater Advisory Panel and brought to Public Hearings in May 2008. It was rejected as not meeting the objective of the amendment because it overlaps significant known and highly probable low and high relief deepwater coral habitats, allows the fishery to expand into non-traditional fishing grounds and would create gear conflict by allowing trawling within the major golden crab fishing area in the Middle Zone.

Table 4-9. Positive and Negative Impacts for Alternatives for Action 3.

Action 3. Amend the Coral FMP to Create a Shrimp Fishery Access Area within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC	**Biological Effects**	**Economic, Social, and Administrative Effects**
Alternative 1. No Action.	Would not prevent fishing on both high and low profile deepwater coral habitat.	
Preferred Alternative 2. Create a Shrimp Fishery Access Area within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel with a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS).	Would prevent fishing on both high and low profile deepwater coral habitat associated with Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries.	Would eliminate the minimal impact to the fishery. Analysis provided by NMFS SEFSC of VMS data indicates that monitoring between 2003 and 2007 shows less than 1 % of all individual points occurred inside the boundaries of the proposed Stetson-Miami Terrace CHAPC.
Alternative 3. Move the west boundary of the Stetson-Miami proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds N.	Would allow the fishery to expand and operate in areas of both high and low profile deepwater coral habitat.	Would eliminate the minimal impact to the fishery but would allow fishing on known high and low profile deepwater coral habitat.

4.4 *Action 4: Amend the Golden Crab FMP to Require Vessel Monitoring*

Alternative 1. No action. This alternative would not require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit.

Alternative 2. Require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit and approved crustacean traps fishing for golden crab within designated areas in the Stetson-Miami Terrace HAPC and Pourtales Terrace HAPC where fishing has occurred historically and does not impact deepwater coral habitats.

Alternative 3. Require use of an approved vessel monitoring system (VMS) by any vessel fishing with a limited access golden crab permit in the South Atlantic Council's area of jurisdiction.

The following are the NMFS system requirements for the proposed Golden Crab VMS:

NMFS Vessel Monitoring System Requirements

(a) *Approval*. The NMFS Office for Law Enforcement will annually approve Vessel Monitoring Systems (VMS) that meet the minimum performance criteria specified in paragraph (b) of this section. Any changes to the performance criteria will be published annually in the Federal Register and a list of approved VMS units and communication providers will be published in the Federal Register upon addition or deletion of a VMS from the list. In the event that a VMS unit is removed from the approved list by NMFS, vessel owners that purchased and installed a VMS unit that was previously published as an approved unit, will be considered to be in compliance with the requirement to have an approved unit, unless otherwise notified by the NMFS Office for Law Enforcement.

(b) *Minimum VMS performance criteria.* The basic required features of the VMS are as follows:

(1) The VMS shall be tamper proof, i.e., shall not permit the input of false positions; furthermore, if a system uses satellites to determine position, satellite selection should be automatic to provide an optimal fix and should not be capable of being manually overridden by any person aboard a fishing vessel or by the vessel owner.

(2) The VMS shall be fully automatic and operational at all times, regardless of weather and environmental conditions, unless exempted under paragraph (c)(2) of this section.

(3) The VMS shall be capable of tracking vessels in the Atlantic (including the Gulf of Mexico) and shall provide position accuracy to within 100 m (300 ft).

(4) The VMS shall be capable of transmitting and storing information including vessel identification, date, time, latitude/longitude, course and speed.

(5) The VMS shall provide accurate hourly position transmissions every day of the year unless otherwise required under paragraph (c) (1) (ii) of this section, or unless exempted under paragraph (c) (2) of this section. In addition, the VMS shall allow polling of individual vessels or any set of vessels at any time, and receive position reports in real time. For the purposes of this specification, “real time” shall constitute data that reflect a delay of 15 minutes or less between the displayed information and the vessel's actual position.

(6) The VMS shall be required to provide two-way message communications between the vessel and shore. The VMS shall be required to allow NMFS to initiate communications or data transfer at any time. The VMS shall be required to forward trip declarations for fishing activity and gear onboard the vessel to comply with requirements specified in section (g) of this document.

(7) The VMS vendor shall be capable of transmitting position data to a NMFS-designated computer system via email, TCP/IP or FTP connections. Transmission shall be in a file format acceptable to NMFS.

(8) The VMS shall be capable of providing vessel position relative to international boundaries and fishery management areas.

(9) The billing and email records for individual VMS units shall be made available by each approved vendor to NMFS upon request by each vendor approved.

(c) *Operating requirements for all vessels.*

(1) Except as provided in paragraph §622.9(a) and 635.69(a), and paragraph (c)(2) of this section, or unless otherwise required by §622.9(a) and 635.69(a), or paragraphs (c)(1)(ii) or (c)(1)(iii) of this section, all required VMS units must transmit a signal indicating the vessel's accurate position, as specified under paragraph (c)(1)(i) of this section.

(i) At least once an hour, 24 hours a day, seven days a week, throughout the year.

(ii) NMFS defined buffer zones of one nautical mile around areas with fishing restrictions will be implemented after concurrence with South Atlantic Fishery Management Council staff and Southeast Region fishery plan managers, Office for Law Enforcement, and Office of General Counsel. Once a vessel enters a defined buffer zone, the VMS unit reporting rate will be increased to every 15 minutes at the vessel owner’s expense. If the vessel then departs the buffer zone and enters the restricted area, the VMS unit reporting rate will be increased to every 10 minutes until it departs the restricted area and/or the buffer zone. Once the vessel departs that buffer zone and or restricted area, the VMS unit reporting rate will then resume hourly reporting. Additional area restrictions may be implemented in the future, and any future areas may also have buffer zones at which time the coordinates for the defined buffer zones will be made available for publication in the Federal Register.

(iii) NMFS may initiate at its discretion and expense, the transmission of a signal indicating the vessel's accurate position, at least six times per hour, 24 hours a day, for all vessels that elect to fish or that are required to have a VMS as specified in 50 C.F.R. §622.9 or §635.69 or other federal regulations that require VMS.

(2) *Power down exemption.*

(i) Any vessel required to transmit the vessel's location at all times, as required in paragraph (c)(1) of this section, is exempt from this requirement if it meets one or more of the following conditions and requirements:

(A) The vessel will be continuously out of the water for more than 72 consecutive hours, the vessel signs out of the VMS program by obtaining a valid letter of exemption pursuant to paragraph (c)(2)(ii) of this section, and the vessel complies with all conditions and requirements of said letter;

(B) For vessels fishing with a valid Golden Crab Commercial permit, the vessel owner signs out of the VMS program for a minimum period of 1 calendar month by obtaining a valid letter of exemption pursuant to paragraph (c)(2)(ii) of this section, the vessel does not embark on any trip until the VMS unit is turned back on and that consistent position reports are verified by NMFS VMS personnel, and the vessel complies with all conditions and requirements of said letter.

(ii) *Letter of exemption*—

(A) *Application.* A vessel owner may apply for a letter of exemption from the VMS transmitting requirements specified in paragraph (c)(1) of this section for his/her vessel by sending a written request to the NMFS Office for Law Enforcement and providing the following: (1) The location of the vessel during the time an exemption is sought; (2) the exact time period for which an exemption is needed (*i.e.,* the time the VMS signal will be turned off and turned on again); and, (3) in the case of a vessel meeting the conditions of paragraph (c)(2)(i)(A) of this section, documentation from independent sources (such as estimated storage at drydock, or estimates for repair by marine vendors) in support of the written request for the vessel to be out of the water for more than 72 continuous hours. The letter of exemption must be on board the vessel at all times, and the vessel may not turn off the VMS signal until the letter of exemption has been received.

(B) *Issuance.* Upon receipt of an application, the NMFS Office for Law Enforcement may issue a letter of exemption to the vessel if it is determined that the vessel owner provided sufficient supporting documentation as required under paragraph (c)(2) of this section. Upon written request, the NMFS Office for Law Enforcement may change the time period for which the exemption is granted.

(C) *Presumption.* If a VMS unit fails to transmit a report of a vessel's position once every hour, the vessel shall be deemed to have reporting deficiencies for as long as the unit fails to transmit a report, unless a preponderance of evidence shows that the failure to transmit was due to an unavoidable malfunction or disruption of the transmission (i.e., Antenna Blockage while in port) that occurred while the vessel was not at sea.

(D) *Replacement.* Should a VMS unit require replacement, a vessel owner must submit documentation to the NMFS Office for Law Enforcement prior to the vessel's next trip, within 3 days of installation and by verifying with NMFS VMS personnel that the new VMS unit is an operational, approved system as described under paragraph (a) of this section.

(E) *Repair or Inspection for Deficient Reporting.* Should a VMS unit require repair due to reporting deficiencies identified verbally or in writing by NMFS Office for Law Enforcement VMS program personnel, a vessel owner must submit a copy of the vendor's documentation to the NMFS Office for Law Enforcement. Prior to the vessel's next trip, within 3 days of repair by the authorized vendor, or after inspection of the power source by a qualified marine electrician, verification that the VMS unit was inspected or repaired and that the power source was inspected or repaired must be provided to NMFS VMS program personnel to confirm that the unit is an operational, approved system as described under paragraph (a) of this section.

(F) *Access.* As a condition for obtaining a permit for the Reef Fish Fishery of the Gulf of Mexico, or prior to obtaining a renewal for a Reef Fish Commercial and/or Charter/Headboat permit, a vessel owner or operator subject to the requirements for a VMS in this section must allow NMFS, the USCG, and their authorized officers and designees, access to position data obtained from the vessel's VMS unit.

(G) *Tampering.* Tampering with a VMS, a VMS unit, or a VMS signal, is prohibited. Tampering includes any activity that is likely to affect the unit's ability to operate properly, signal, or accuracy of computing the vessel's position fix.

(d) *Installing and activating the VMS.* Only a VMS that has been approved by NMFS for use in the Golden Crab (or Rock Shrimp?) Fishery may be used, and it must be installed by a qualified marine electrician. When installing and activating the NMFS approved VMS, or when reinstalling and reactivating such VMS, the vessel owner or operator must:

(1) Follow procedures indicated on an installation and activation checklist, which is available from NMFS, Office for Law Enforcement, Southeast Region, St. Petersburg, FL; phone: 727–824–5347; and

(2) Submit to NMFS, Office for Law Enforcement, Southeast Region, St. Petersburg, FL, a statement certifying compliance with the checklist, as prescribed on the checklist.

(3) Submit to NMFS, Office for Law Enforcement, Southeast Region, St. Petersburg, FL, a vendor-completed installation certification checklist, which is available from NMFS, Office for Law Enforcement, Southeast Region, St. Petersburg, FL; phone: 727-824-5347.

(e) *Transferring a VMS.* Only a VMS that has been approved by NMFS for use in the Reef Fish Fishery of the Gulf of Mexico may be used, and it must be properly registered and activated with an approved communications provider for the new vessel. Additionally, it must be installed by a qualified marine electrician. When reinstalling and reactivating the NMFS approved VMS, the new vessel owner or operator must:

(1) Follow procedures indicated on an installation and activation checklist, which is available from NMFS, Office for Law Enforcement, Southeast Region, St. Petersburg, FL; phone: 727–824–5347; and

(2) Submit to NMFS, Office for Law Enforcement, Southeast Region, St. Petersburg, FL, a statement certifying compliance with the checklist, as prescribed on the checklist.

(3) Submit to NMFS, Office for Law Enforcement, Southeast Region, St. Petersburg, FL, a vendor-completed installation certification checklist, which is available from NMFS, Office for Law Enforcement, Southeast Region, St. Petersburg, FL; phone: 727-824-5347.

(f) *Permit Issuance on VMS Required Vessels.* In order to be considered a complete application for issuance of a permit or for renewal of a permit, proof of VMS purchase, installation, and activation must be provided, along with verification of the unit's operational status from NMFS VMS personnel.

(g) *Declaration of Fishing Activity and Gear Type*. Prior to departure for each trip, each vessel owner or operator must report their fishing activity (including but not limited to Golden Crab, Rock and Royal Red Shrimp, Shark, Swordfish, Tuna, etc.), and the gear onboard the vessel (including but not limited to Pelagic longline, bottom longline, gillnet, etc.). These NMFS-defined codes for the declaration can be sent via an attached VMS terminal, via a NMFS website, through a NMFS call-in system or using a NMFS interactive voice response system (IVR) to NMFS VMS personnel.

4.4.1 Biological Effects of Requiring Monitoring of Golden Crab Vessels

Alternative 1, or No Action, could result in damage to bottom habitat in the deepwater coral HAPCs and would not address Coral FMP management objective to improve enforcement of fishery management regulations. Without requiring VMS, vessels could fish in areas which gear will impact deepwater coral habitat. Habitat damage could occur outside the proposed Golden Crab Fishing Areas and on extensive habitat in the CHAPC proposed for conservation. **Alternative 2** would require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit and approved crustacean traps fishing for golden crab within Golden Crab Fishing Areas in the Stetson-Miami Terrace HAPC and Pourtales Terrace HAPC where fishing has occurred historically and does not impact deepwater coral habitats. The majority of the Golden Crab Fishery in the Northern and Middle Zone occur in the two CHAPCs therefore, if vessels fish accordingly most habitat impacts are eliminated. If vessels fishing in the Southern zone did not fish in the small portion of Pourtales Terrace they could fish unmonitored and potentially impact habitats thoughout the proposed CHAPC. **Alternative 3** would indirectly protect the greatest habitat by requiring use of an approved vessel monitoring system by any vessel fishing with a limited access golden crab permit in the South Atlantic Council's area of jurisdiction. With all vessels monitored, there would be a greater likelyhood of protecting deepwater habitat occurring in the Northern, Middle and Southern Golden Crab fishing zones encompassed by the proposed deepwater CHAPCs.

4.4.2 Economic Effects of Requiring Golden Crab Vessel Monitoring

Alternative 1 would not require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit. Assuming that Coral HAPCs under Action 1 and Allowable Golden Crab Fishing Areas under Action 2 are approved, Alternative 1 would have no expected economic impact to golden crab fishermen. However, Alternative 1 could result in a failure to deter fishing outside the Allowable Golden Crab Fishing Areas which might result in damage to corals and habitat that could result in a negative long-term economic impact to fishermen and the general public. The negative long-term economic impact would result from destruction of species that provide known and yet unknown value to the health of the ecosystem and various sectors of the economy including the medical sector. Negative long-term economic impacts could also result from a decrease in existence value, bequest value, and the value from diversity of corals or other habitat if damaged. However, the probability that fishing will occur outside the Allowable Golden Crab Fishing Areas may be low given that the Allowable Golden Crab Fishing Areas encompass almost all traditional fishing grounds.

Alternative 2 would require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit and approved crustacean traps fishing for golden crab within designated areas in the Stetson-Miami Terrace HAPC and Pourtales Terrace HAPC where fishing has occurred historically and does not impact deepwater coral habitats. Assuming that Coral HAPCs under Action 1 and Allowable Golden Crab Fishing Areas under Action 2 are approved, Alternative 2 would result in increased costs to golden crab fishermen that fish in these areas unless government funding was used to subsidize the costs of VMS unit purchase. 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 to cover the costs of VMS units, there would still be ongoing costs associated with maintenance and operation of the VMS units. The proposed Stetson-Miami Terrace and the Pourtales Terrace HAPCs encompass almost all of the traditional fishing grounds of the golden crab fishery. There are eleven currently active permits in the golden crab fishery. Of these, seven permits have landed at least 1000 pounds golden crab sometime between 2005 and 2007. Therefore, if those permits remained active and continued to fish, seven permits would require installalation 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 4-10.

Table 4-10. NMFS Approved VMS Units and Costs.

Brand and Model	**Cost**
Boatracs FMCT-G	$3095
Thrane and Thrane TT-3026D	$3595
Faria Watchdog KTW304	$3295
Skymate 250	$

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

The current reimbursement amount from NMFS for the HMS and rock shrimp fisheries for purchase of a VMS unit is $3100.

The VMS regulations changed in 2008 and now only authorizes the purchase of EMTU or Enhanced Mobile Transmitting Units. These are VMS units that have a computer screen which enables the fishermen to submit any forms. Previous HMS and Rock Shrimp vessels were able to purchase "pingers" only which were half the cost of the newer units. All fisheries are now required to comply with the new EMTU requirements and those estimated costs are provided above in Table 4-11.

If all seven vessels purchased VMS units, the total cost of unit purchase to the fishery would range from $21,665-$25,165. If reimbursements were issued, the aggregate cost of unit purchase to the fishery to the fishery would be $0-$3,465. Individually, this calculates into $0-$495 per vessel. The cost to management would be $21,700. 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. Table 4-11 provides communication costs for each of the models which average from $30-$80 per month.

Table 4-11. 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 24X7 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.

5. Orbcomm (for Skymate units) - (still awaiting updated costs for new unit)

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

Table 4-12 summarizes the annual costs of implementing VMS under Alternatives 2 and 3. This table indicates aggregate costs for the fishery assuming management does not help subsidize for the cost of the VMS units. Table 4-13 summarizes the annual costs of implementing VMS under Alternatives 2 and 3. This table indicates aggregate costs for the fishery assuming management does help subsidize for the cost of the VMS units.

Table 4-12. Summary of Annual Costs of Implementing Alternatives 2 and 3 assuming VMS Unit Cost is not Subsidized[1].

Alternatives	Number of People Potentially Impacted	Unit Cost	Implementation of Unit	Unit Maintenance	Communication Costs	Total Cost[2]
Alternative 2	**7**					
First year		$21,665-$25,165	$2,100	Unknown	$2,520-$6,720	$26,285-$33,985
Susequent year		NA	NA	Unknown	$2,520-$6,720	$2,520-$6,720
Alternative 3	**11**					
First year		$34,045-$39,545	$3,300	Unknown	$3,960-$10,560	$41,305-$53,405
Subsequent year		NA	NA	Unknown	$3,960-$10,560	$3,960-$10,560

Note 1: This table assumes that the VMS unit cost is not subsidized by management.
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 4-13. Summary of Annual Costs of Implementing Alternatives 2 and 3 assuming VMS Unit Cost is Subsidized[1].

Alternatives	Number of People Potentially Impacted	Unit Cost (fishermen/ management)	Implementation of Unit (fishermen)	Unit Maintenance (fishermen)	Communication Costs (fishermen)	Total Cost (fishermen/ management)[2]
Alternative 2	**7**					
First year		($0-$3,465)/ ($21,700)	$2,100	Unknown	$2,520-$6,720	($4,620-$12,285)/ ($21,700)
Susequent year		NA	NA	Unknown	$2,520-$6,720	($2,520-$6,720)/$0)[3]
Alternative 3	**11**					
First year		($0-$5,445) ($34,100)	$3,300	Unknown	$3,960-$10,560	($7,260-$13,860)/ ($34,100)
Subsequent year		NA	NA	Unknown	$3,960-$10,560	($3,960-$10,560)/($0)[3]

Note 1: This table assumes that the VMS unit cost is subsidized by management.
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, 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 NMFS pays for the cost of the VMS it would not change producer surplus, because transfer payments are excluded from the calculation.

Alternative 3. Alternative 3 would require use of an approved vessel monitoring system (VMS) by any vessel fishing with a limited access golden crab permit in the South Atlantic Council's area of jurisdiction. Assuming that Coral HAPCs and Allowable Golden Crab Fishing Areas are approved, Alternative 3 would result in increased costs to the all golden crab fishermen unless government funding was used to subsidize those costs. There are eleven currently active permits in the golden crab fishery. Under Alternative 3, all eleven vessels would be required to install VMS units on their vessels to remain active even if they did not fish in the areas where C-HAPCs are located.

Table 4-13 summarizes the costs of implementing VMS under Alternatives 2 and 3. If all eleven vessels purchased VMS units, the cost would range from $34,045-$39,545. If reimbursements were issued, the aggregate cost to the fishery would be $0-$5,445. 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. Table 4-31 provides communication costs for each of the models.

4.4.3 Social Effects of Requiring Golden Crab Vessel Monitoring

Alternative 1 would not require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit. Assuming that Coral HAPCs and Allowable Golden Crab Fishing Areas are approved, Alternative 1 would have no expected social impacts to the golden crab fishermen.

Alternative 2 would require use of an approved vessel monitoring system (VMS) by any vessel with a limited access golden crab permit and approved crustacean traps fishing for golden crab within designated areas in the Stetson-Miami Terrace HAPC and Pourtales Terrace HAPC where fishing has occurred historically and does not impact deepwater coral habitats. Assuming that Coral HAPCs and Allowable Golden Crab Fishing Areas are approved, Alternative 2 would result in increased costs to golden crab fishermen that fish in these areas unless government funding was used to subsidize those costs. If government funds were made available to cover the costs of VMS units, there would still be ongoing costs associated with maintenance and operation of the VMS units. Any increase in costs of fishery operations places increased stress on fishermen and their families. Seven vessels have participated in the fishery between 2005 and 2007.

In addition to the emotional stress associated with increased costs, it is expected that fishermen will have negative emotions associated with "being watched" via VMS monitoring. While many fishermen favor increased enforcement, for some, VMS monitoring will increase the distrust they have for fisheries managers since VMS regulations are considered because of the belief that not all fishermen are compliant.

Social benefits may include improved data collection by the fishermen for personal usage and improved communications between fishermen and the outside world.

Alternative 3 would require use of an approved vessel monitoring system (VMS) by any vessel fishing with a limited access golden crab permit in the South Atlantic Council's area of jurisdiction. Assuming that Coral HAPCs and Allowable Golden Crab Fishing Areas are approved, Alternative 3 would have the same results as Alternative 2 but include four additional vessels with active permits. However, these four permits have not been fished for at least 3 years and therefore the permit owners may opt to let their permits expire.

4.4.4 Administrative Effects of Requiring Golden Crab Vessel Monitoring

Requiring VMS in the fishery will increase administrative burden in monitoring the fishery.

4.4.5 Conclusion

The Council is proposing using a NMFS approved vessel monitoring system to ensure that vessels that fish in the proposed golden crab allowable gear areas within the proposed C-HAPCs stay within the open fishing area. Requiring permitted vessels fishing for golden crab to carry an approved VMS unit will allow the industry to demonstrate they are fishing outside the deepwater coral HAPCs or in designated areas in the Stetson-Miami HAPC or Pourtales HAPC which were historically fished, do not impact directly or are closely associated with deepwater coral habitats. At public hearings on the rock shrimp VMS proposal, attendees raised the issue of data confidentiality and the additional operational and fixed cost from the use of VMS systems. As with the rock shrimp VMS data, golden crab VMS data will be treated in the same way as all confidential data that the National Marine Fisheries Service collects and analyzes. Only personnel who are allowed to review confidential information will be given access to this data, and data deemed confidential cannot be released to the public.

Currently, there is a low probability of detection of fishing in the proposed HAPC given the distance from shore and the frequency of Coast Guard patrols in this area. The U.S. Coast Guard and the NMFS Division of Law Enforcement are faced with increasing and more complex fishery management regulations to enforce. At the same time these agencies have to cope with dwindling assets and law enforcement personnel, as budgets do not keep pace with these requirements. Vessel Monitoring System technology as applied to the golden crab fleet will improve the detection of fishery violations in the deepwater coral HAPCs. The Council has determined that improvement in enforceability of "closed area" regulations is critical and the VMS proposed for the golden crab fishery will provide increased enforcement. At the same time, the Council understands that installation of VMS units onto golden crab vessels, operation, and maintenance of the units could increase costs to fishermen (if the costs are not covered by government funds) who are already experiencing profit decreases due to diesel price increases, management regulations, and other factors. While some fishermen are willing to carry VMS units in order to continue fishing, cost is a major factor and will impact their ability to continue fishing.

4.5 *Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern*

A non regulatory aspect of CEA 1 is to highlight the availability of the comprehensive spatial presentation of Council designated Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern as directed by the Final Rule for EFH. The following presents a descrption of the Councils habitat conservation (EFH) mandates, a summary of the existing EFH and EFH-HAPC designations for managed species which maps have been created and are being served through the Councils' Habitat and Ecosystem Internet Map Server.

The EFH Mandate and EFH Final Rule

Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Act as "all waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." Regional Fishery Management Councils are directed to describe and identify EFH for each federally managed species, attempt to minimize the extent of adverse effects on habitat caused by fishing and non-fishing activities, and identify actions to encourage conservation and enhancement of those habitats. It is required that EFH be based on the best available scientific information.

The definition for EFH may include habitat for an individual species or an assemblage of species, whichever is appropriate within each FMP. For the purpose of interpreting the definition of EFH: "waters" includes aquatic areas and their associated physical, chemical, and biological properties that are utilized by fish. When appropriate this may include areas used historically. Water quality, including but not limited to nutrient levels, oxygen concentration and turbidity levels is also considered to be a component of this definition. Examples of "waters" that may be considered EFH, include open waters, wetlands, estuarine habitats, riverine habitats, and wetlands hydrologically connected to productive water bodies.

"Necessary", relative to the definition of EFH, means the habitat required to support a sustainable fishery and a healthy ecosystem, while "spawning, breeding, feeding, or growth to maturity" covers a species full life cycle. In the context of this definition the term "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities. These communities could encompass mangroves, tidal marshes, mussel beds, cobble with attached fauna, mud and clay burrows, coral reefs and submerged aquatic vegetation. Migratory routes such as rivers and passes serving as passageways to and from anadromous fish spawning grounds should also be considered EFH. Included in the interpretation of "substrate" are artificial reefs and shipwrecks (if providing EFH), and partially or entirely submerged structures such as jetties.

The National Marine Fisheries Service (NMFS) assists Councils in implementing EFH by assessing the quality of available data in a four-level system:

Level 1: species distribution data for all or part of its geographic range
Level 2: data on habitat-related densities or relative abundance of the species

Level 3: data on growth, reproduction and survival rates within habitats
Level 4: production rates by habitat

In addition to EFH the Councils must identify EFH - Habitat Areas of Particular Concern (HAPCs) within EFH. In determining which areas should be designated as HAPCs the area must meet one or more of the following criteria:

1) Ecological function provided by the habitat is important
2) Habitat is sensitive to human-induced environmental degradation
3) Development activities are or will be stressing the habitat type
4) Habitat type is rare

4.5.1 Introduction

This section presents a summary of Council habitat responsibilities pursuant to the Magnuson-Stevens Act and the approved designations of EFH and EFH-HAPCs for Council managed species.

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

The Magnuson-Stevens Fishery Conservation and Management Act, Public Law 104-208 reflects the new Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of essential fishery habitat. Section 305 (b) Fish Habitat, indicates the Secretary (through NMFS) shall, within 6 months of the date of enactment of the Sustainable Fisheries Act, establish by regulation guidelines to assist the Councils in the description and identification of EFH in fishery management plans (including adverse impacts on such habitat) and in the consideration of actions to ensure the conservation and enhancement of such habitat. In addition, the Secretary (through NMFS) shall: set forth a schedule for the amendment of fishery management plans to include the identification of EFH and for the review and updating of such identifications based on new scientific evidence or other relevant information; in consultation with participants in the fishery, shall provide each Council with recommendations and information regarding each fishery under that Council's authority to assist it in the identification of EFH, the adverse impacts on that habitat, and the actions that should be considered to ensure the conservation and enhancement of that habitat; review programs administered by the Department of Commerce and ensure that any relevant programs further the conservation and enhancement of EFH; and the Secretary shall coordinate with and provide information to other Federal agencies to further the conservation and enhancement of EFH.

The Act specifies that each Federal agency shall consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH identified under this Act. Additional provisions specify that each Council: may comment on and make recommendations to the Secretary and any Federal or State agency concerning any activity authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by any Federal or State agency that, in the view of the Council, may affect the habitat, including EFH, of a fishery resource under its authority; and shall comment on and make recommendations to the Secretary and any Federal or State agency concerning any such activity that, in the view of the Council, is likely to substantially affect the habitat, including EFH, of an anadromous fishery resource under its authority. If the Secretary receives information from a Council or Federal or State agency or determines from other sources that an action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by any State or Federal agency would adversely affect any EFH identified under this Act, the Secretary shall recommend to such agency measures that can be taken by such agency to conserve such habitat. Within 30 days after receiving a recommendation, a Federal agency shall provide a detailed response in writing to any Council commenting and the Secretary regarding the matter. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on such habitat. In the case of a response that is inconsistent with the recommendations of the Secretary, the Federal agency shall explain its reasons for not following the recommendations.

The Council's current process for reviewing and commenting on projects is described in the Appendix A of the Habitat Plan (SAFMC 1998a).

On December 19, 1997, an interim final rule was published in the Federal Register (citation) to implement the EFH provisions of the Magnuson-Stevens Act. This rule establishes guidelines to assist the Regional Fishery Management Councils (Councils) and the Secretary of Commerce (Secretary) in the description and identification of EFH in fishery management plans (FMPs), including identification of adverse impacts from both fishing and non-fishing activities on EFH, and identification of actions required to conserve and enhance EFH. The regulations also detailed procedures the Secretary (acting through NMFS), other Federal agencies, state agencies, and the Councils will use to coordinate, consult, or provide recommendations on Federal and state activities that may adversely affect EFH. The intended effect of the rule was to promote the protection, conservation, and enhancement of EFH. On January 17, 2002, the Final Rule for EFH was published with an effective date of February 19, 2002. This rule supersedes the interim final rule with the main changes being in the procedures for consultation, coordination and recommendations on permit activities and guidelines for EFH information in FMPs. The final rule provides clearer guidelines for prioritizing and analyzing habitat effects for managed species. The rule retains the four tiered level for data division applied in identifying EFH. The rule provides more flexibility in designating EFH when information is limited and allows Councils to use available distribution information as well as presence absence data. It also allows informed decision based on similar species and other life stages.

The Fishery Ecosystem Plan (SAFMC 2008a) updates EFH information in the Habitat Plan (SAFMC 1998a) and presents refined information on habitat requirements (by life stage where information exists) for species managed by the Council. Available information on environmental and habitat variables that control or limit distribution, abundance, reproduction, growth, survival, and productivity of the managed species is included.

The Council, in working with the Habitat and Coral Advisory Panels and through a series of workshops identified available environmental and fisheries data sources relevant to the managed species that would be useful in describing and identifying EFH. The EFH workshop process utilized habitat experts, at the State, Federal, and regional level, to participate in the description and identification of EFH in the South Atlantic region.

In assessing the relative value of habitats the Council is taking a risk-averse approach. This approach will ensure that adequate areas are protected as EFH of managed species. The Council used the best scientific information available to describe and identify EFH in the South Atlantic. Habitat loss and degradation may be contributing to species being identified as overfished, therefore all habitats used by these species are considered essential.

Based on the ecological relationships of species and relationships between species and their habitat the Council took an ecosystem approach in designating EFH in the Habitat Plan and Comprehensive Ecosystem Amendment 1 and in refining the information presented in the FEP (SAFMC 2008a) for managed species and species assemblages. This approach is consistent with NMFS guidelines and broader goals for ecosystem management. Through the existing habitat policy, the Council directs the protection of EFH types and the enhancement and restoration of their quality and quantity.

The EFH Final Rule

The Final EFH Rule requires FMPs to include maps that display, within the constraints of available information, the geographic locations of EFH or the geographic boundaries within which EFH for each species and life stage is found. Maps should identify the different types of habitat designated as EFH to the extent possible. Maps should explicitly distinguish EFH from non-EFH areas and should be incorporated into a geographic information system (GIS) to facilitate analysis and presentation. While GIS, in combination with models that examine habitat requirements, can be used as a tool for designating EFH, data availability does not support such use at this time for the South Atlantic. Instead, the best use of GIS within the South Atlantic is visualizing where EFH occurs within the constraints of available information.

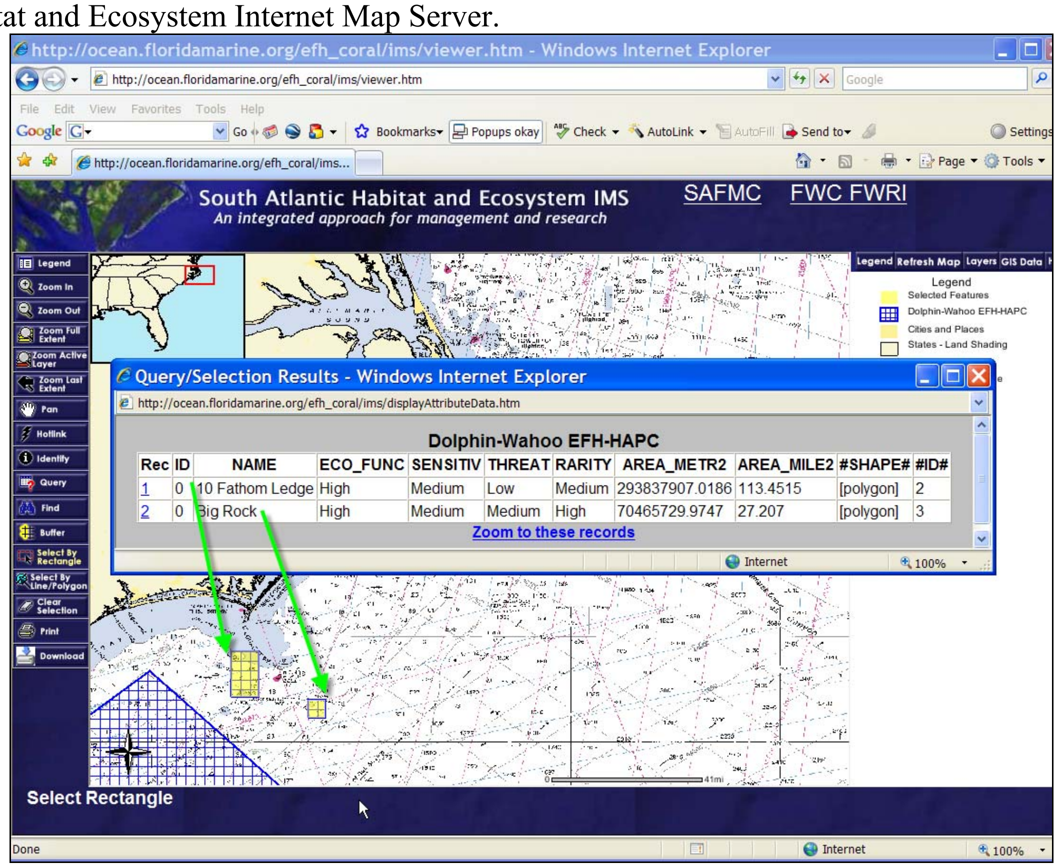
Mapping efforts require accuracy standards for location and thematic content as well as designation of minimum mapping units (i.e., the smallest area that the map will depict for a thematic category, such as seagrass). Mapping standards for EFH have not yet been set. While technological improvements within the surveying and remote sensing communities are rapidly increasing location and thematic accuracy, designation of minimum mapping units for EFH has not progressed similarly since enactment of the EFH Final Rule. Within the South Atlantic, especially for estuaries, the data available for mapping the locations of EFH is not at a geographic scale suitable for use in most EFH consultations. For example, data on the location of salt marshes that have a minimum mapping unit of one acre usually will not show fringe marshes, which are the subject of many EFH consultations. As additional information becomes available, it is advisable to develop minimum mapping units for the specific habitat types that are designated as EFH. These standards also might be tiered to account for geographic realm (e.g., riverine, estuarine, coastal, and offshore areas), life stages, data rich versus data poor species, and number of species within a FMP.

Maps of EFH and EFH-HAPCs

The Council has developed an Internet Map Server (IMS) for displaying EFH and HAPCs within the constraints of available data. To the extent practicable with the data and technology, the IMS shows the distribution and geographic limits of EFH by life history stage (see Figure 4-31 as an example). The IMS is largely based on information developed by the Council, Florida Fish & Wildlife Research Institute, NOAA NMFS Southeast Fisheries Science Center, North Carolina Division of Marine Fisheries, and South Carolina Department of Natural Resources. The datasets provided vary in accuracy, scale, completeness, extent of coverage, and origin. Many were consolidated and homogenized from other sources. The Council encourages use of these data and urges users to thoroughly review the metadata and original source documentation prior to interpreting the data. It is the user's responsibility to ensure data are used in a manner consistent with their intended purpose and within stated limitations.

As new data become available, the Council will update the IMS to ensure the public has the best available map-based depictions of the EFH designated by text within the Comprehensive Amendment (SAFMC 1988b) or future Comprehensive Ecosystem Amendments. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions within SAFMC (1988b) are ultimately determinative of the limits of EFH and HAPCs. The IMS can be found at: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm.

Figure 4-31. Sample screen shot of spatial presentation of EFH-HAPCs on South Atlantic Habitat and Ecosystem Internet Map Server.



The Habitat Plan (SAFMC 1998a) and Fishery Ecosystem Plan (SAFMC 2008a) present information on adverse effects from fishing and describes management measures the Council has implemented to minimize adverse effects on EFH from fishing. The conservation and enhancement measures implemented by the Council to date may include ones that eliminate or minimize physical, chemical, or biological alterations of the substrate, and loss of, or injury to, benthic organisms, prey species and their habitat, and other components of the ecosystem. The Council has implemented restrictions on fisheries to the extent that no significant activities were identified in the review of gear impact conducted for the NMFS by Auster and Langton (1998) that presented available information on adverse effects of all fishing equipment types used in waters described as EFH. The Council has already prevented, mitigated, or minimized most adverse effects from most fisheries prosecuted in the south Atlantic EEZ.

The Council is considering evidence that some fishing practices may have an identifiable adverse effect on habitat, and are addressing those pertaining to deepwater coral ecosystems in this first Comprehensive Ecosystem Amendment. The Council, as indicated in the previous section, has already used many of the options recommended in the guidelines for managing adverse effects from fishing including: fishing equipment restrictions; seasonal and aerial restrictions on the use of specified gear; equipment modifications to allow the escape of particular species or particular life stages (e.g., juveniles); prohibitions on the use of explosives and chemicals; prohibitions on anchoring or setting equipment in sensitive areas; prohibitions on fishing activities that cause significant physical damage in EFH; time/area closures including closing areas to all fishing or specific equipment types during spawning, migration, foraging, and nursery activities; designating zones for use as marine protected areas to limit adverse effects of fishing practices on certain vulnerable or rare areas/species/life history stages, such as those areas designated as habitat areas of particular concern; and harvest limits.

The Fishery Ecosystem Plan (SAFMC 2008a) identifies non-fishing related activities that have the potential to adversely affect EFH quantity or quality. Examples of theses activities are dredging, fill, excavation, mining, impoundment, discharge, water diversions, thermal additions, actions that contribute to non-point source pollution and sedimentation, introduction of potentially hazardous materials, introduction of exotic species, and the conversion of aquatic habitat that may eliminate, diminish, or disrupt the functions of EFH. Included in this document is an analysis of how fishing and non-fishing activities influence habitat function on an ecosystem or watershed scale. This information presents available information describing the ecosystem or watershed and the dependence of managed species on the ecosystem or watershed. An assessment of the cumulative and synergistic effects of multiple threats, including the effects of natural stresses (such as storm damage or climate-based environmental shifts), and an assessment of the ecological risks resulting from the impact of those threats on the managed species' habitat is included.

General conservation and enhancement recommendations are included in Volume IV of the FEP and this CEA. These include but are not limited to recommending the enhancement of rivers, streams, and coastal areas, protection of water quality and quantity, recommendations to local and state organizations to minimize destruction/degradation of wetlands, restore and maintain the ecological health of watersheds, and replace lost or degraded EFH.

The Council will periodically review and update EFH information and revise the Fishery Ecosystem Plan as new information becomes available. NMFS should provide some of this information as part of the annual Stock Assessment and Fishery Evaluation (SAFE) report. A complete update of the FEP and assessment of EFH information will also be conducted as recommended in the guidelines in no longer than 5 years.

The Council established a framework procedure whereby additional EFH and EFH-HAPCs designations would be accomplished. This is described in Section 4.2.8 of the EFH Comprehensive Amendment (SAFMC 1998b).

4.5.2 Penaeid and deepwater shrimp

4.5.2.1 Essential Fish Habitat

Penaeid Shrimp

For penaeid shrimp, EFH includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies as described in the SAFMC Habitat Plan (SAFMC 1998a). Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes); tidal palustrine forested areas; mangroves; tidal freshwater, estuarine, and marine submerged aquatic vegetation (e.g., seagrass); and subtidal and intertidal non-vegetated flats. This applies from North Carolina through the Florida Keys.

Rock Shrimp

For rock shrimp, EFH consists of offshore terrigenous and biogenic sand bottom habitats from 18 to 182 meters in depth with highest concentrations occurring between 34 and 55 meters. This applies for all areas from North Carolina through the Florida Keys. EFH includes the shelf current systems near Cape Canaveral, Florida which provide major transport mechanisms affecting planktonic larval rock shrimp. These currents keep larvae on the Florida Shelf and may transport them inshore in spring. In addition the Gulf Stream is an EFH because it provides a mechanism to disperse rock shrimp larvae.

The bottom habitat on which rock shrimp thrive is thought to be limited. Kennedy *et al.* (1977) determined that the deepwater limit of rock shrimp was most likely due to the decrease of suitable bottom habitat rather than to other physical parameters including salinity and temperature. Cobb *et al.* (1973) found the inshore distribution of rock shrimp to be associated with terrigenous and biogenic sand substrates and only sporadically on mud. Rock shrimp also utilize hard bottom and coral or more specifically Oculina coral habitat areas. This was confirmed with research trawls capturing large amounts of rock shrimp in and around the Oculina Bank HAPC prior to its designation.

Royal Red Shrimp

EFH for royal red shrimp include the upper regions of the continental slope from 180 meters (590 feet) to about 730 meters (2,395 feet), with concentrations found at depths of between 250 meters (820 feet) and 475 meters (1,558 feet) over blue/black mud, sand, muddy sand, or white calcareous mud. In addition the Gulf Stream is an EFH because it provides a mechanism to disperse royal red shrimp larvae.

4.5.2.2 Essential Fish Habitat-Habitat Areas of Particular Concern

Penaeid Shrimp

Areas which meet the criteria for EFH-habitat areas of particular concern (EFH-HAPCs) for penaeid shrimp include all coastal inlets, all state-designated nursery habitats of particular importance to shrimp (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas), and state-identified overwintering areas.

Estuarine tidal creeks and salt marshes that serve as nursery grounds are perhaps the most important habitats occupied by penaeid shrimp. The major factor controlling shrimp growth and production is the availability of nursery habitat. Remaining wetland habitat must be protected if present production levels are to be maintained. In addition, impacted habitats must be restored if future production is to be increased. Other areas of specific concern are the barrier islands since these land masses are vital to the maintenance of estuarine conditions needed by shrimp during their juvenile stage. Passes between barrier islands into estuaries also are important since the slow mixing of sea water and fresh water are also of prime importance to estuarine productivity.

In North Carolina, EFH-HAPCs include estuarine shoreline habitats since juveniles congregate here. Seagrass beds, prevalent in the sounds and bays of North Carolina and Florida, are particularly critical areas. Core Sound and eastern Pamlico Sound, based on a preliminary aerial survey funded through the Albemarle-Pamlico Estuarine Study, have approximately 200,000 acres of seagrass beds making North Carolina second only to Florida in abundance of this type of habitat (Department of Commerce 1988b). In subtropical and tropical regions shrimp and spiny lobster postlarvae recruit into grass beds from distant offshore spawning grounds (Fonseca et al. 1992).

South Carolina and Georgia lack seagrass beds. Here, the nursery habitat of shrimp is the high marsh areas with shell hash and mud bottoms. In addition, there is seasonal movement out of the marsh into deep holes and creek channels adjoining the marsh system during winter. Therefore, the area of particular concern for early growth and development encompasses the entire estuarine system from the lower salinity portions of the river systems through the inlet mouths.

Section 600.815 (a) (8) of the final rule on EFH determinations recognizes that subunits of EFH may be of particular concern. The following is a summary evaluation of the EFH-HAPC as it relates to the criteria (Table 4-14):

Table 4-14. Summary evaluation of the EFH-HAPC for shrimp as it relates to the criteria.

EFH-HAPC and Criteria Evaluation	Ecological Function	Sensitivity to Environmental Degradation	Threat from Development Activities	Rarity of Habitat
Coastal inlets	High	Low	Medium	Medium
State-designated nursery habitats	High	High	Medium	High
State-identified overwintering habitats	Medium	Low	Medium	Medium
Barrier islands				
Passes between barrier islands and inlets	Medium	Low	Medium	Medium
Estuarine shoreline habitats in NC	High	Medium	Low	Medium
Seagrass beds in NC and FL	High	High	Medium	High
High marsh areas with shell hash and mud bottom in SC and GA	High	Medium	Medium	Medium
Estuarine systems from low salinity portions of rivers to inlet mouths	Medium	High	High	Medium

Rock Shrimp

No EFH areas of particular concern have been identified for rock shrimp; however, deep water habitat (e.g., the rock shrimp closed area/proposed expanded Oculina Bank HAPC) may serve as nursery habitat and protect the stock by providing a refuge for rock shrimp.

Royal Red Shrimp

Although no EFH-HAPCs have been identified specifically for royal red shrimp, they are caught in association with deepwater corals on the continental slope. Deepwater corals support high levels of marine biodiversity by providing habitat for numerous benthic species. As structure-forming animals, deep sea corals enhance habitat complexity by growing in the form of "reefs", fans, stalks, and "bushes". The *Enallopsamia* reefs off South Carolina, the *Oculina* habitat off Florida, and the *Lophelia* reefs from North Carolina to Florida may be important in the life history of royal red shrimp. Bottom impacting mobile gear such as trawls will likely impact these important habitats.

4.5.2.3 GIS for Shrimp Fishery Management Plan EFH and EFH-HAPCs

The Council has mapped the locations of EFH and HAPCs for shrimp within the constraints of available information. To obtain copies of these maps, please visit the Council's Habitat and Ecosystem Internet Map Server at www.safmc.net. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions are ultimately determinative of the limits of EFH and HAPCs.

4.5.3 Snapper Grouper

4.5.3.1 Essential Fish Habitat

Essential Fish Habitat (EFH) utilized by snapper grouper species in this region includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 183 meters [600 feet (but to at least 2,000 feet for wreckfish)] where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical fish complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for survival of larvae and growth up to and including settlement. In addition, the Gulf Stream is also EFH because it provides a mechanism to disperse snapper grouper larvae.

For specific life stages of estuarine dependent and near shore snapper grouper species, EFH includes areas inshore of the 30 meters (100-foot) contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom habitats.

4.5.3.2 Essential Fish Habitat-Habitat Areas of Particular Concern

Areas which meet the criteria for essential fish habitat-habitat areas of particular concern (EFH-HAPCs) for species in the snapper grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; near shore hard bottom areas; The Point, The Ten Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump (South Carolina); mangrove habitat; seagrass habitat; oyster/shell habitat; all coastal inlets; all state-designated nursery habitats of particular importance to snapper grouper (e.g., Primary and Secondary Nursery Areas designated in North Carolina); pelagic and benthic Sargassum; Hoyt Hills for wreckfish; the Oculina Bank Habitat Area of Particular Concern; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; and Council-designated Artificial Reef Special Management Zones (SMZs).

Areas that meet the criteria for designating EFH-HAPCs include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages).

The following is a summary evaluation of the EFH-HAPC as it relates to the criteria (Table 4-15):

Table 4-15. Summary evaluation of the EFH-HAPC for snapper grouper as it relates to the criteria.

EFH-HAPC and Criteria Evaluation	Ecological Function	Sensitivity to Environmental Degradation	Threat from Development Activities	Rarity of Habitat
The Point, NC	Medium	Low	Medium	High

The Ten Fathom Ledge, NC	High	Low	Low	High
Big Rock, NC	High	Low	Medium	High
Charleston Bump, SC	High	Low	Medium	High
Mangrove habitat	High	High	High	High
Seagrass habitat	High	High	High	High
Oyster/shell habitat	High	Medium	High	High
All coastal inlets	Medium	Low	Medium	Medium
All state-designated nursery habitats	High	High	High	Hugh
Pelagic and benthic Sargassum	High	Low	Low	High
Hoyt Hills (wreckfish)	High	Low	Medium	High
Oculina HAPC, FL	High	Medium	Low	High
All hermatypic coral habitats and reefs	High	High	Low	High
Manganese outcroppings of the Blake Plateau	High	Low	Medium	High
Artificial reef SMZs	Medium	Low	Low	High

4.5.3.3 GIS for Snapper Grouper Fishery Management Plan EFH and EFH-HAPCs

The Council has mapped the locations of EFH and HAPCs for snapper grouper species within the constraints of available information. To obtain copies of these maps, please visit the Council's Habitat and Ecosystem Internet Map Server at www.safmc.net. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions are ultimately determinative of the limits of EFH and HAPCs.

4.5.4 Coastal Migratory Pelagics

4.5.4.1 Essential Fish Habitat

EFH for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf stream shoreward, including Sargassum. In addition, all coastal inlets, all state-designated nursery habitats of particular importance to coastal migratory pelagics (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas).

For Cobia EFH also includes high salinity bays, estuaries, and seagrass habitat. In addition, the Gulf Stream is an EFH because it provides a mechanism to disperse coastal migratory pelagic larvae.
For king and Spanish mackerel and cobia EFH occurs in the South Atlantic and Mid-Atlantic Bights.

Refer to Fishery Ecosystem Plan of the South Atlantic Region Volume II: Habitat and Species (SAFMC, 2007) for a more detailed description of habitat utilized by the managed species. Also, it should be noted that the Gulf Stream occurs within the EEZ.

4.5.4.2 Essential Fish Habitat-Habitat Areas of Particular Concern

Areas which meet the criteria for Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs) include sandy shoals of Capes Lookout, Cape Fear, and Cape Hatteras from shore to the ends of the respective shoals, but shoreward of the Gulf stream; The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and Hurl Rocks (South Carolina); The Point off Jupiter Inlet (Florida); *Phragmatopoma* (worm reefs) reefs off the central east coast of Florida; nearshore hard bottom south of Cape Canaveral; The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The “Wall” off of the Florida Keys; Pelagic Sargassum; and Atlantic coast estuaries with high numbers of Spanish mackerel and cobia based on abundance data from the ELMR Program. Estuaries meeting this criteria for Spanish mackerel include Bogue Sound and New River, North Carolina: Bogue Sound, North Carolina (Adults May-September salinity >30 ppt); and New River, North Carolina (Adults May-October salinity >30 ppt). For cobia they include Broad River, South Carolina; and Broad River, South Carolina (Adults & juveniles May-July salinity >25ppt).

The following is a summary evaluation of the EFH-HAPC as it relates to the criteria (Table 4-16):

Table 4-16. Summary evaluation of the EFH-HAPC for coastal migratory pelagics as it relates to the criteria.

EFH-HAPC and Criteria Evaluation	Ecological Function	Sensitivity to Environmental Degradation	Threat from Development Activities	Rarity of Habitat
Sandy shoals of Cape Lookout, Cape Fear and Cape Hatteras (from shore to the end of shoals but shoreward from Gulf Stream)	Medium	Low	Medium	Medium
The Point, NC	Medium	Low	Medium	High
The Ten Fathom Ledge, NC	Medium	Low	Medium	Medium
Big Rock, NC	Medium	Low	Low	Medium
Charleston Bump, SC	Medium	Low	Medium	Medium
Hurl Rocks, SC	Medium	Low	Medium	Medium
The Point off Jupiter Inlet, FL	Medium	Low	Low	Low
Phragmatopoma (worm reefs) reefs off central E. coast of FL	High	Medium	Medium	High
nearshore hard bottom south of Cape Canaveral, FL	High	High	High	High
The Hump off Islamorada, FL	Medium	Low	Low	Medium
The Marathon Hump, FL	High	Low	Low	Medium
Hoyt Hills (wreckfish)	Medium		High	Medium
Pelagic Sargassum	High	Low	Low	Medium
Atlantic coast estuaries with high numbers of Spanish mackerel and cobia based on abundance data from the ELMR Program	High	High	High	Medium
Bogue Sound and New River estuaries, NC (Spanish mackerel)	High	High	High	Medium
Broad River, SC (cobia)	High	High	High	Medium

4.5.4.3 GIS of Coastal Migratory Pelagics Fishery Management Plan EFH and EFH-HAPCs

The Council has mapped the locations of EFH and HAPCs for coastal migratory pelagic species within the constraints of available information. To obtain copies of these maps, please visit the Council's Habitat and Ecosystem Internet Map Server at www.safmc.net. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions are ultimately determinative of the limits of EFH and HAPCs.

4.5.5 Golden Crab

4.5.5.1 Essential Fish Habitat

EFH 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 EFH because it provides a mechanism to disperse golden crab larvae. The detailed description of seven EFH 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 Fishery Ecosystem Plan of the South Atlantic Region Volume II: Habitat and Species (SAFMC 2007) for a more detailed description of habitat utilized by the managed species. Also, it should be noted that the Gulf Stream occurs within the EEZ.

4.5.5.2 Essential Fish Habitat-Habitat Areas of Particular Concern

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

4.5.5.3 GIS for Golden Crab Fishery Management Plan EFH and EFH-HAPCs

The Council has mapped the locations of EFH and HAPCs for golden crab within the constraints of available information. To obtain copies of these maps, please visit the Council's Habitat and Ecosystem Internet Map Server at www.safmc.net. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions are ultimately determinative of the limits of EFH and HAPCs.

4.5.6 Spiny Lobster

4.5.6.1 Essential Fish Habitat

EFH for spiny lobster includes nearshore shelf/oceanic waters; shallow subtidal bottom; seagrass habitat; unconsolidated bottom (soft sediments); coral and live/hard bottom habitat; sponges; algal communities (Laurencia); and mangrove habitat (prop roots). In addition the Gulf Stream is an EFH because it provides a mechanism to disperse spiny lobster larvae.

Refer to Fishery Ecosystem Plan of the South Atlantic Region Volume II: Habitat and Species (SAFMC, 2007) for a more detailed description of habitat utilized by the managed species. Also, it should be noted that the Gulf Stream occurs within the EEZ.

4.5.6.2 Essential Fish Habitat-Habitat Areas of Particular Concern

Areas which meet the criteria for essential fish habitat-habitat areas of particular concern (EFH-HAPCs) for spiny lobster include Florida Bay, Biscayne Bay, Card Sound, and coral/hard bottom habitat from Jupiter Inlet, Florida through the Dry Tortugas, Florida.

Table 4-17. Summary evaluation of the EFH-HAPC for spiny lobster as it relates to the criteria.

EFH-HAPC and Criteria Evaluation	Ecological Function	Sensitivity to Environmental Degradation	Threat from Development Activities	Rarity of Habitat
Florida Bay	High	High	Medium	Medium
Biscayne Bay	High	High	Medium	Medium
Card Sound	High	High	Medium	Medium
Coral/hardbottom habitat from Jupiter Inlet through the Dry Tortugas, FL	High	High	High	High

4.5.6.3 GIS for Spiny Lobster Fishery Management Plan EFH and EFH-HAPCs

The Council has mapped the locations of EFH and HAPCs for spiny lobster within the constraints of available information. To obtain copies of these maps, please visit the Council's Habitat and Ecosystem Internet Map Server at www.safmc.net. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions are ultimately determinative of the limits of EFH and HAPCs.

4.5.7 Coral, Coral Reefs and Live/Hard Bottom Habitat

4.5.7.1 Essential Fish Habitat

EFH for corals (stony corals, octocorals, and black corals) must incorporate habitat for over 200 species. EFH for corals include the following:

A. EFH for hermatypic stony corals includes rough, hard, exposed, stable substrate from Palm Beach County south through the Florida reef tract in subtidal to 30 m depth, subtropical (15°-35° C), oligotrophic waters with high (30 35o/oo) salinity and turbidity levels sufficiently low enough to provide algal symbionts adequate sunlight penetration for photosynthesis. Ahermatypic stony corals are not light restricted and their EFH includes defined hard substrate in subtidal to outer shelf depths throughout the management area.

B. EFH for Antipatharia (black corals) includes rough, hard, exposed, stable substrate, offshore in high (30-35o/oo) salinity waters in depths exceeding 18 meters (54 feet), not restricted by light penetration on the outer shelf throughout the management area.

C. EFH for octocorals excepting the order Pennatulacea (sea pens and sea pansies) includes rough, hard, exposed, stable substrate in subtidal to outer shelf depths within a wide range of salinity and light penetration throughout the management area.

D. EFH for Pennatulacea (sea pens and sea pansies) includes muddy, silty bottoms in subtidal to outer shelf depths within a wide range of salinity and light penetration.

Refer to Fishery Ecosystem Plan of the South Atlantic Region Volume II: Habitat and Species (SAFMC, 2007) for a more detailed description of habitat utilized by the managed species.

4.5.7.2 Essential Fish Habitat-Habitat Areas of Particular Concern

Areas which meet the criteria for essential fish habitat-habitat areas of particular concern (EFH-HAPCs) for coral, coral reefs, and live/hard bottom include The 10-Fathom Ledge, Big Rock, and The Point (North Carolina); Hurl Rocks and The Charleston Bump (South Carolina); Gray's Reef National Marine Sanctuary (Georgia); The *Phragmatopoma* (worm reefs) reefs off the central east coast of Florida; Oculina Banks off the east coast of Florida from Ft. Pierce to Cape Canaveral; nearshore (0-4 meters; 0-12 feet) hard bottom off the east coast of Florida from Cape Canaveral to Broward County; offshore (5-30 meter; 15-90 feet) hard bottom off the east coast of Florida from Palm Beach County to Fowey Rocks; Biscayne Bay, Florida; Biscayne National Park, Florida; and the Florida Keys National Marine Sanctuary.

Table 4-18. Summary evaluation of the EFH-HAPC for coral, coral reefs and live hard bottom habitat as it relates to the criteria.

EFH-HAPC and Criteria Evaluation	Ecological Function	Sensitivity to Environmental Degradation	Threat from Development Activities	Rarity of Habitat
Ten Fathom Ledge, NC	Medium	Low	Medium	Medium
Big Rock, NC	Medium	Low	Medium	Medium
The Point, NC	Medium	Low	Medium	Medium
Hurl Rocks, SC	Medium	High	High	Medium
Charleston Bump, SC	Medium	Low	Medium	Medium
Gray's Reef NMS, GA	High	Low	Low	Medium
Phragmatopoma worm reefs, FL	Medium	High	Medium	High
Oculina Banks from Ft. Pierce	High	Low	Low	High

to Cape Canaveral, FL				
Nearshore hardbottom off from Cape Canaveral to Broward County, FL	High	Medium	High	Medium
Offshore hardbottom from Palm Beach County to Fowey Rocks, FL	High	Low	Medium	Medium
Biscayne Bay, FL	Medium	Low	Medium	Medium
Biscayne National Park, FL	Medium		Medium	Low
Florida Keys NMS, FL	High	High	High	High

4.5.7.3 GIS for Coral, Coral Reefs and Live Hard Bottom Habitat Fishery Management Plan EFH and EFH-HAPCs

The Council has mapped the locations of EFH and HAPCs for coral, coral reefs and live hard bottom habitat within the constraints of available information. To obtain copies of these maps, please visit the Council's Habitat and Ecosystem Internet Map Server at www.safmc.net. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions are ultimately determinative of the limits of EFH and HAPCs.

4.5.8 Dolphin Wahoo

4.5.8.1 Essential Fish Habitat

Essential Fish Habitat (EFH) for dolphin and wahoo is the Gulf Stream, Charleston Gyre, Florida Current, and pelagic Sargassum.

Note: This EFH definition for dolphin was approved by the Secretary of Commerce on June 3, 1999 as a part of the South Atlantic Council's Comprehensive Habitat Amendment (SAFMC, 1998b) (dolphin was included within the Coastal Migratory Pelagics FMP). This definition does not apply to extra-jurisdictional areas. A detailed description of the pelagic habitats used by dolphin and wahoo is presented the Habitat Plan and Volume II of the Fishery Ecosystem Plan.

4.5.8.2 Essential Fish Habitat-Habitat Areas of Particular Concern

Essential Fish Habitat–Habitat Areas of Particular Concern (EFH-HAPCs) for dolphin and wahoo in the Atlantic include The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and The Georgetown Hole (South Carolina); The Point off Jupiter Inlet (Florida); The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The "Wall" off of the Florida Keys; and Pelagic Sargassum.

Note: This EFH-HAPC definition for dolphin was approved by the Secretary of Commerce on June 3, 1999 as a part of the South Atlantic Council's Comprehensive Habitat Amendment (dolphin was included within the Coastal Migratory Pelagics FMP).

The following is a summary evaluation of the EFH-HAPC as it relates to the criteria:

Table 4-16. Summary evaluation of the EFH-HAPC for dolphin and wahoo as it relates to the criteria.

EFH-HAPC and Criteria Evaluation	Ecological Function	Sensitivity to Environmental Degradation	Threat from Development Activities	Rarity of Habitat
The Point	High	Medium	Medium	High
The Ten Fathom Ledge	High	Medium	Low	Medium
Big Rock	High	Medium	Medium	High
The Charleston Bump	High	Low	Medium	High
The Georgetown Hole	High	Low	Low	High
The Point off Jupiter Inlet	High	Medium	Low	High
The Hump off Islamorada	High	Low	Low	High
The Marathon Hump	High	Medium	Low	High
The Wall off of the Florida Keys	Medium	Medium	Low	Medium
Pelagic *Sargassum*	High	Medium	Low	High

The EFH-HAPCs for dolphin and wahoo all meet at least one or more of the above criteria. This action enables the Councils to protect these EFH-HAPCs effectively and take timely actions when necessary. This could prevent further decreases in biological productivity and may lead to possible increases in yield of fish stocks.

This evaluation is based on information presented in the Habitat Plan (SAFMC, 1998a) and Comprehensive Habitat Amendment (SAFMC, 1998b) and further supported by the Fishery Ecosystem Plan (SAFMC, 2007) which in combination describe the characteristics of the unique habitat type and where available specific descriptions of the habitat associated with the designated or proposed EFH-HAPC. In addition, supporting rationale for designation including identified threats from fishing and non-fishing activities is presented in Habitat Plan (SAFMC, 1998a), the Comprehensive Habitat Amendment (SAFMC, 1998b), the Sargassum Fishery Management Plan (SAFMC 2002), Fishery Ecosystem Plan (SAFMC, 2007) and included by reference. The following figures present maps for areas which for dolphin and wahoo ranked high in terms of ecological function, sensitivity, probability of stressor introduction and rarity of habitat (criteria established for designation of EFH-HAPCs). Based on the criteria in Section 600.815 (a) (9), it is concluded that they represent EFH-HAPCs for species managed under the Fishery Management Plan for Dolphin Wahoo of the Atlantic Region.

4.5.8.3 GIS for Dolphin and Wahoo EFH and EFH-HAPCs

The Council has mapped the locations of EFH and HAPCs for dolphin and wahoo within the constraints of available information. To obtain copies of these maps, please visit the Council's Habitat and Ecosystem Internet Map Server at www.safmc.net. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions are ultimately determinative of the limits of EFH and HAPCs.

4.5.9 Red Drum

4.5.9.1 Essential Fish Habitat

For red drum, EFH includes all the following habitats to a depth of 50 meters offshore: tidal freshwater; estuarine emergent vegetated wetlands (flooded saltmarshes, brackish marsh, and tidal creeks); estuarine scrub/shrub (mangrove fringe); submerged rooted vascular plants (sea grasses); oyster reefs and shell banks; unconsolidated bottom (soft sediments); ocean high salinity surf zones; and artificial reefs. The area covered includes Virginia through the Florida Keys. Refer to Fishery Ecosystem Plan of the South Atlantic Region Volume II: Habitat and Species (SAFMC, 2007) for a more detailed description of habitat utilized by the managed species.

4.5.9.2 Essential Fish Habitat-Habitat Areas of Particular Concern

Areas which meet the criteria for essential fish habitat-habitat areas of particular concern (EFH-HAPCs) for red drum include all coastal inlets, all state-designated nursery habitats of particular importance to red drum (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas); documented sites of spawning aggregations in North Carolina, South Carolina, Georgia, and Florida described in the Habitat Plan; other spawning areas identified in the future; and habitats identified for submerged aquatic vegetation.

4.5.9.3 GIS for Red Drum Fishery Management Plan EFH and EFH-HAPCs

The Council has mapped the locations of EFH and HAPCs for red drum within the constraints of available information. To obtain copies of these maps, please visit the Council's Habitat and Ecosystem Internet Map Server at www.safmc.net. While the Council believes map-based depictions of EFH and HAPCs are informative, textural descriptions are ultimately determinative of the limits of EFH and HAPCs.

4.6 *Prey of managed species and use of EFH in the South Atlantic*

While the Council has not designated EFH for prey or prey as EFH, the following species are a significant part of the forage base of the food web of the South Atlantic. In addition, these species depend on many of the habitats which are designated as EFH or EFH-HAPCs for Council managed species.

4.6.1 Atlantic Menhaden

Almost all of the estuarine and nearshore waters along the Atlantic coast from Florida to Nova Scotia, serve as important habitat for juvenile and/or adult Atlantic menhaden. Spawning occurs in oceanic waters along the Continental Shelf, as well as in sounds and bays in the northern extent of their range (Judy and Lewis 1983). Larvae are carried by inshore currents into estuaries from May to October in the New England area, from October to June in the mid-Atlantic area, and from December to May in the south Atlantic area (Reintjes and Pacheco 1966). After entering the estuary, larvae congregate in large concentrations near the upstream limits of the tidal zone, where they undergo metamorphosis into juveniles (June and Chamberlin 1959). The relative densities of juvenile menhaden have been shown to be positively correlated with higher chlorophyll a levels in the lower salinity zones of estuaries (Friedland et al. 1996). As juvenile menhaden grow and develop, they form dense schools and range throughout the lower salinity portions of the estuary, most eventually migrating to the ocean in late fall-winter.

Many factors in the estuarine environment affect the behavior and well-being of menhaden. The combined influence of weather, tides, and river flow can expose estuarine fish to rapid changes in temperature and salinity. It has been reported that salinity affects menhaden temperature tolerance, activity and metabolic levels, and growth (Lewis 1966; Hettler 1976). Factors such as waves, currents, turbidity, and dissolved oxygen levels can impact the suitability of the habitat, as well as the distribution of fish and their feeding behavior (Reintjes and Pacheco 1966). However, the most important factors affecting natural mortality in Atlantic menhaden are considered to be predators, parasites and fluctuating environmental conditions (Reish et al. 1985).

It is clearly evident that estuarine and coastal areas along the Atlantic coast provide essential habitat for most life stages of Atlantic menhaden. However, an increasing number of people live near the coast, which precipitates associated industrial and municipal expansion, thus, accelerating competition for use of the same habitats. Consequently, estuarine and coastal habitats have been significantly reduced and continue to be stressed adversely by dredging, filling, coastal construction, energy plant development, pollution, waste disposal, and other human-related activities.

Estuaries of the mid-Atlantic and south Atlantic states provide almost all of the nursery areas utilized by Atlantic menhaden. Areas such as Chesapeake Bay and the Albemarle-Pamlico system are especially susceptible to pollution because they are generally shallow, have a high total volume relative to freshwater inflow, low tidal exchange, and a long retention time. Most tributaries of these systems originate in the Coastal Plain and have relatively little freshwater flow to remove pollutants. Shorelines of most estuarine areas are becoming increasingly developed, even with existing habitat protection programs. Thus, the specific habitats of greatest long-term importance to the menhaden stock and fishery are increasingly at risk.

4.6.2 Anadromous and Catadromous Species

Alosine species

All habitats described (spawning adult, egg, larval, juvenile, sub-adult, and adult resident and migratory) are deemed essential to the sustainability of anadromous alosine stocks as they presently exist. Nursery habitat for anadromous alosines consists of areas in which the larvae, postlarvae, and juveniles grow and mature. These areas include the spawning grounds and areas through which the larvae and postlarvae drift after hatching, as well as the portions of rivers and adjacent estuaries in which they feed, grow, and mature. Juvenile alosines, which leave the coastal bays and estuaries prior to reaching adulthood also use the nearshore Atlantic Ocean as a nursery area (ASMFC 1999).

Sub-adult and adult habitat for alosines consists of the nearshore Atlantic Ocean from the Bay of Fundy, Canada to Florida; inlets, which provide access to coastal bays and estuaries; and riverine habitat upstream to the spawning grounds (ASMFC 1999). American shad and river herring have similar seasonal distributions, which may be indicative of similar inshore and offshore migratory patterns (Neves 1981). Although the distribution and movements of hickory shad are essentially unknown after they return to the ocean, (Richkus and DiNardo 1984) because they are harvested along the southern New England coast in the summer and fall, (Bigelow and Schroeder 1953) it is assumed that they also follow a migratory pattern similar to American shad (Dadswell et al. 1987).

Klauda et al. (1991) concluded that the critical life history stages for American shad, hickory shad, alewives, and blueback herring are the egg, prolarva (yolk-sac or prefeeding larva), postlarva (feeding larva), and early juvenile (through the first month after transformation). Critical habitat in the state of North Carolina is defined as “The fragile estuarine and marine areas that support juvenile and adult populations of economically important seafood species, as well as forage species important in the food chain.” Among these critical habitats are anadromous fish spawning and anadromous nursery areas, in all coastal fishing waters (NCAC 3I.0101 (20) (NCDEHNR 1997). Although most states have not formally designated essential or critical alosine habitat areas, most states have identified spawning habitat, and some have even identified nursery habitat.

<u>American eel</u>

Habitat types that qualify as Habitat Areas of Particular Concern for American eel include the spawning and hatching area, nursery and juvenile habitat, and adult habitat.

Ocean - The spawning and hatching area for American eel occurs in the oceanic waters of the Sargasso Sea. This is the only suspected location of reproduction for American eel, and therefore, is essential to the survival of the species. Little is known about American eel habitat in the Sargasso Sea, and the exact location of spawning and hatching has not been identified.

Continental Shelf - The Continental shelf waters are important to the American eel because it is final stage of the larval eel migration route, where eels begin entering coastal waters, and is important to larval feeding and growth. It is also where American eel metamorphose into the glass eel stage.

Estuaries/Freshwater Habitat – Estuaries and any upstream freshwater habitat, including rivers, streams, and lakes serve as juvenile, sub-adult, and adult migration corridors, as well as feeding and growth areas for juveniles and sub-adults (ASMFC 2000). After American eel larvae transform into glass eels over the continental shelf, they enter estuaries, and ascend the tidal portions of rivers. Glass eels change into the elver life stage and either continue upstream movements, or cease migrating in the lower saline portions of estuaries and rivers. These estuaries and freshwater habitats serve as the foraging grounds for American eels and are important to the eel growth and maturation. American eels can remain in these systems for up to twenty years before maturing and returning to sea.

While estuarine/riverine habitats have been identified as important for the rearing and growth of American eels, many studies have failed to find specific American eel-habitat associations within them (Huish and Pardue 1978; Meffe and Sheldon 1988; Smogor et al. 1995; Bain et al. 1988; Wiley et al. 2004). Huish and Pardue (1978) found no difference in American eel abundance in relation to width, substrate, flow, and depth in North Carolina streams. Likewise, Bain et al. (1988) found that eel habitat use was not related to specific habitat features including depth, water velocity, and substrate in two Connecticut River tributaries. Wiley et al. (2004) also did not find any eel-stream habitat relations. They found that eel density was correlated with distance from the ocean. Since eels have the ability to survive in a wide variety of habitats, the phase of their lives when they live in estuarine, riverine, stream, and lake habitats are less limited, but water quality is an important factor in their health and survival.

Given the great variation in demographics that occurs across latitudinal and distance-inland gradients, it’s unlikely that all areas contribute equally to eel production/recruitment.

4.7 *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 actions (**Section 4.0**);
II. Which resources, ecosystems, and human communities are affected (**Section 3.0**); and
III. Which effects are important from a cumulative effects perspective (Section 4.7).

2. Establish the geographic scope of the analysis.

The immediate impact area would be the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia and east Florida to Key West. Since the boundaries are solely political in nature and do not prohibit immigration and emigration of fish, and fish larvae, the geographic scope of the CEA must be expanded.
The CEA cannot put geographical boundaries in terms of coordinates, but recognize that the proper geographical boundary to consider effects on the biophysical environment is larger than the entire South Atlantic EEZ. The ranges of affected species are described in Section 3. The most measurable and substantial effects would be limited to the South Atlantic region.

3. Establish the timeframe for the analysis.

Establishing a timeframe for the CEA is important, when the past, present, and reasonably foreseeable future actions are discussed. It would be advantageous to go back to a time when there was a natural, or some modified (but ecologically sustainable) condition.

4. Identify the other actions affecting the resources, ecosystems, and human communities of concern (the cumulative effects to the human communities are discussed in Section 4).
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.

A. Past

The reader is referred to **<u>Section 1.2 History of Management</u>** for past regulatory activity.

B. Present

The proposed actions would:

- Amend the Coral FMP to establish Deepwater Coral Habitat Areas of Particular Concern: Cape Lookout Lophelia Banks HAPC; Cape Fear Lophelia Banks HAPC; Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace HAPC; Pourtales Terrace HAPC; and The Blake Ridge Diapir Methane Seep HAPC.

- Amend the Coral FMP to create a “Shrimp Fishery Access Area” (SFAA) within the proposed Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace CHAPC boundaries, where fishing with a shrimp trawl and/or shrimp possession is allowed by any vessel holding a rock shrimp limited access endorsement and equipped with an approved vessel monitoring system (VMS).

- Amend the Coral FMP to create “Allowable Golden Crab Fishing Areas” within the proposed Coral HAPC boundaries: create an “Allowable Golden Crab Fishing Area” in the Northern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries: create an “Allowable Golden Crab Fishing Area” in the Middle Golden Crab Fishing Zone within the proposed Coral HAPC boundaries; and create an “Allowable Golden Crab Fishing Area” in the Southern Golden Crab Fishing Zone within the proposed Coral HAPC boundaries.

- Amend the Golden Crab Fishery Management Plan to Require Vessel Monitoring.

C. Reasonably Foreseeable Future

II. Non-Council and other non-fishery related actions, including natural events affecting .

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 deepwater coral ecosystems

AFFECTED ENVIRONMENT

5. Characterize the resources, ecosystems, 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 deepwater coral ecosystems 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 trends in the condition of deepwater coral ecosystems is unknown all habitats surveyed to date appear to be essentially pristine.

6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds concern.
This step is important in outlining the current and probable stress factors. The CEA should address whether thresholds could be exceeded because of the contribution of the proposed action to other cumulative activities affecting resources.

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

DETERMINING THE ENVIRONMENTAL CONSEQUENCES OF CUMULATIVE EFFECTS

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
The relationship between human activities and biophysical ecosystems within the context of this CEA is solely related to extractive activities and the installment of regulations as outlined in Table 4-9.

9. Determine the magnitude and significance of cumulative effects.
Management actions in

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.
The cumulative effects on the biophysical environment are expected to be positive. Avoidance, minimization, and mitigation are not applicable.

11. Monitor the cumulative effects of the selected alternative and modify management as necessary.
The effects of the proposed action are, and will continue to be, monitored through collection of data by NMFS, states, stock assessments and stock assessment updates, life history studies, and other scientific observations.

4.8 *Bycatch Practicability Analysis*

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

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

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

Agency guidance provided at 50 CFR §600.350(d)(3)(ii) suggests the Councils adhere to the precautionary approach found in the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (Article 6.5) when faced with uncertainty concerning these ten practicability factors. According to Article 6.5 of the FAO Code of Conduct for Responsible Fisheries, using the absence of adequate scientific information as a reason for postponing or failing to take measures to conserve target species, associated or dependent species, and non-target species and their environment, would not be consistent with a precautionary approach.

4.8.1 Population Effects for the Bycatch Species

4.8.1.1 Background

Actions in this CEA are intended to prohibit damaging gear from operating in deepwater coral habitat. The action will have a positive impact on reducing the potential for bycatch interactions to the degree it reduces interaction of gear, habitat and deepwater species that may be diretly or indirectly affected by habitat damage or unintended capture.

4.8.1.2 Commercial Fishery

There is a likelihood of unitended bycatch being reduced through establishing deepwater CHAPCs by minimizing the interaction of all potentially bottom damaging fishing gear including bottom and midwater trawls, traps, bottom longlines, anchors and grapples.

4.8.2 Ecological Effects Due to Changes in Bycatch

The ecological effects of bycatch mortality are the same as fishing mortality from directed fishing efforts. If not properly managed and accounted for, either form of mortality could potentially reduce stock biomass to an unsustainable level. Therefore, establishment of deepwater coral HAPCs will likely result in positive ecological benefits in the community structure and species diversity of deepwater ecosystems occupied by these species.

4.8.3 Changes in Bycatch of Other Fish Species and Resulting Population and Ecoystem Effects

The establishment of deepwater coral HAPCs will likely result in positive ecological benefits in the community structure and species diversity of deepwater ecosystems occupied by these species.

4.8.4 Effects on Marine Mammals and Birds

Under Section 118 of the Marine Mammal Protection Act (MMPA), NMFS must publish, at least annually, a List of Fisheries (LOF) that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery.

Right and humpback whales may overlap both spatially and temporally with the black sea bass pot fishery. Measures to reduce entanglement risk in pot/trap fisheries for these two species are being addressed under the revised Atlantic Large Whale Take Reduction Plan (70 FR 118; June 21, 2005).

The Bermuda petrel and roseate tern occur within the action area. Bermuda petrels are occasionally seen in the waters of the Gulf Stream off the coasts of North and South Carolina during the summer. Sightings are considered rare and only occurring in low numbers (Alsop 2001). Roseate terns occur widely along the Atlantic coast during the summer but in the southeast region they are found mainly off the Florida Keys (unpublished USFWS data). Interaction with South Atlantic fisheries has not been reported as a concern for either of these species.

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

4.8.6 Changes in Fishing Practices and Behavior of Fishermen

Analyses of the royal red shrimp fishery operations provided by NMFS SEFSC, as represented by the Vessel Monitoring System data, indicates over five years of operations (2003-2007), <1% of all ponts collected have occurred east of the proposed CHAPC boundary. Given the overall low percent of trips fishing deeper than the 400 meter contour, vessels should be able to easily recoup the minimal loss of fishing area by adding as little as 1 trips outside the deepwater CHAPC. The proposed Shrimp Fishery Access Areas will limit operations to traditional fishing areas in the western edge of the CHAPC where they will not impact deepwater coral habitat. Golden Crab fishermen propose limiting their operations to traditional fishing areas in the CHAPC where they will not impact deepwater coral habitat. To validate the operations the Golden Crab fisheremen have recommended monitoring vessels in the fishery. Golden Crab fishermen have indicated a desire to, through copperative research, use technology where available to refine fishing operations and better define golden crab habitat. Action 4 proposed requiring VMS in the golden crab fishery.

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

Bycatch in southeastern shrimp trawl fisheries has been a priority issue for scientists and administrators for a number of years. This focus is likely to continue as the Council addresses future management needs in the fishery.

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

Management measures, including those likely to decrease discards could result in social and/or economic impacts as discussed in Section 4.

The U.S. Congress recognized the need to balance the costs of bycatch reduction with the social and economic benefits provided by the shrimp fishery when it mandated the study of shrimp trawl bycatch (and potential gear modifications) through the 1990 Magnuson-Stevens Act reauthorization. The resulting cooperative bycatch research program identified gear options that could reduce shrimp trawl bycatch with minimum loss of shrimp production.

While BRD and TED requirements certainly present direct costs to participants in the shrimp fishery, they could reduce overall costs by increasing efficiency. Additionally, studies suggest the use of BRDs or similar techniques to reduce finfish capture would not negatively affect shrimp production in the long-term if finfish exhibit even moderate selectivity against shrimp as prey (Nance 1998).

Decreases in bycatch mortality attributed to these technologies are believed to have contributed to the survival and recovery of at least some sea turtle populations and finfish stocks. The societal benefits associated with recovering these species are not easily quantified, but are believed to outweigh any short-term costs to penaeid shrimp fishermen related to the required bycatch reduction technology.

4.8.9 Changes in the Distribution of Benefits and Costs

To be added prior to public hearing.

4.8.10 Social Effects

The Social Effects of all the management measures are described in Section 4.

4.8.11 Conclusion

To be added prior to public hearing

4.9 Unavoidable Adverse Effects

This regulatory actions proposed in CEA 1 would apply primarily to the golden crab and deepwater shrimp (royal red shrimp) fishery prosecuted within the South Atlantic Council's area of jurisdiction. The following summarizes potential short and long-term unavoidable adverse effects of the actions.

There are no expected unavoidable adverse effects, which may result from the implementation of the preferred alternative under this action.

To be expanded prior to public hearing

4.10 Effects of the Fishery on the Environment

4.10.1 Damage to Ocean and Coastal Habitats

The proposed actions are expected to have a positive effect on ocean and coastal habitats. Actions proposed in this amendment are expected to have net positive impacts on EFH or EHH-HAPCs for managed species and the deep water ecosystem in the South Atlantic region. Measures adopted in the Coral, Shrimp and Snapper Grouper FMPs have reduced or eliminated potential adverse impacts of fishing on EFH. The Council's Comprehensive Habitat Amendment (SAFMC 1998b) contained measures that expanded the *Oculina* Bank HAPC and added two additional satellite HAPCs. Any additional impacts of fishing on EFH identified during the public hearing process will be considered, therefore the Council has determined no new measures to address impacts on EFH are necessary at this time. The Council's adopted habitat policies, which may directly affect the area of concern, are available for download through the Habitat/Ecosystem section of the Council's web site at http://www.safmc.net/ecosystem/EcosystemManagement/HabitatProtection/HabitatPolicies/tabid/245/Default.aspx

NOTE: The Final EFH Rule, published on January 17, 2002, replaced the interim Final Rule of December 19, 1997 on which the original EFH and HAPC designations were made. The Final Rule directs the Councils to periodically update EFH and HAPC information and designations within fishery management plans. The Council's Comprehensive Ecosystem Amendment, scheduled for submission to the Secretary in 2008, contains information to address the mandates in the EFH Final Rule. The information in the FEP provides additional detailed information and support for existing EFH and EFH-HAPCs and CEA 1 presents maps based on available information of the distribution of EFH and EFH-HAPCs for managed species.

4.10.2 Public Health and Safety

The proposed actions are not expected to have any substantial adverse impact on public health or safety. Action 4 requiring VMS in the Golden Crab fishery would have secondary positive effects. Coast Guard search and rescue operations would benefit by having vessels monitored and exact vessel location information available.

4.10.3 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*.

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

The Council weighed the short-term impacts upon the fishery against the long-term productivity and stability of this fishery and concluded that the proposed actions would result in net benefits to society. Overall, **Action 1** is expected to benefit society and the fisheries for golden crab, deepwater shrimp and other managed species which use the habitat (e.g., wreckfish).

Action 2 Actions 1 and **2** are expected to perpetuate long-term productivity of the fishery while allowing the resource to be harvested at a sustainable level.

Under the preferred alternative for **Action 3** limited access endorsements lost due to not submitting a complete endorsement renewal application in a timely manner will be reinstated for those who renewed their open access permit in the year in which they failed to renew their endorsement. This could affect 5 vessels in the rock shrimp fishery. In the short-term those affected vessels would be able to participate in the rock shrimp limited access fishery. This action would have a minimal impact on long-term productivity as it will increase fishery participation by a very small percentage.

Action 4 would change the name of the fishing authorization instrument for the rock shrimp fishery. This change is administrative in nature and is not expected effect the relationship between short-term uses of the fishery and its resource, or their long-term productivity.

The proof of operational VMS requirement under **Action 5** could affect short-term uses of the resource if the 21 affected vessels are unable to provide proof that they have on board an operational VMS unit when they apply for renewal, transfer, or reinstatement of a limited access endorsement. Therefore, these endorsements could be permanently lost if they are not transferred to other vessels able to provide proof of an operational VMS unit. The loss of those endorsements could ultimately affect the long-term productivity of the fishery through potentially decreased landings.

The collection of data requirement in this amendment is not expected to affect any short-term uses of the resource or fishery infrastructure. It will however provide vital information for economic analyses that may be used to implement future management measures, which may ultimately result in changes to long-term productivity of the fishery and the resource.

4.12 Irreversible and Irretrievable Commitments of Resources

Action 4 would require an irreversible and irretrievable commitment of resources. NOAA Fisheries Service Permits Office would be responsible for allocating funding for the reprinting of permits with the new name, and mailing them to each fishery participant along with some outreach material explaining the change and the requirement that they also apply for a new limited access permit within one year of the amendment's implementation. They would also be responsible for allocating the time and personnel needed to change the permit codes in the NOAA Fisheries Service Permit database, mail out replacement permits, notify dealers of the name change, and coordinate with the Office of Law Enforcement.

No other preferred alternatives chosen for each of the actions in this amendment would require an irreversible and irretrievable commitment of resources.

4.13 Mitigation Measures

No actions in this amendment require establishing mitigation measures.

5 Regulatory Impact Review

5.1 Introduction

The NOAA Fisheries Service 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 that this action would be expected to have on the commercial deepwater shrimp and golden crab fisheries. Additional details on the expected economic effects of the various alternatives in this action are included in Section 4.0 and are incorporated herein by reference.

5.2 Problems and Objectives

The purpose and need, issues, problems, and objectives of the proposed Amendment are presented in Section 1.0 and are incorporated herein by reference. In summary, the purpose of this amendment is to establish deepwater Coral Habitat Areas of Particular Concern. Management objectives of the Coral, Coral Reefs and Live/Hardbottom Habitat FMP addressed by this amendment include the following: Minimize, as appropriate, adverse human impacts on coral and coral reefs; Provide, where appropriate, special management for Coral Habitat Areas of Particular Concern (CHAPCs); Increase public awareness of the importance and sensitivity of coral and coral reefs; and Provide a coordinated management regime for the conservation of coral and coral reefs.

Management objectives addressed by actions in this amendment include the following: Take a precautionary approach in protecting deepwater coral ecosystems.

EFH management objectives addressed pursuant to the Essential Fish Habitat Final Rule include the following: reduce or eliminate, to the maximum extent practical, the impact of fishing and non-fishing activities on habitat including coral coral reefs and live hard bottom habitat; and refine habitat information supporting existing EFH and EFH-HAPCs and present them in a spatial framework.

5.3 Methodology and Framework for Analysis

This RIR assesses management measures from the standpoint of determining the resulting changes in costs and benefits to society. To the extent practicable, the net effects of the proposed measures are stated in terms of producer and consumer surplus, changes in profits, employment in the direct and support industries, and participation by charter boat fishermen and private anglers. In addition, the public and private costs associated with the process of developing and enforcing regulations on protection of deepwater coral and fishing for golden crab and royal red shrimp in waters of the U.S. South Atlantic are provided.

5.4 Description of the Fishery

A description of the South Atlantic deepwater shrimp fishery and golden crab fishery are contained in Section 3.4 and is incorporated herein by reference.

5.5 Impacts of Management Measures

Details on the economic impacts of all alternatives are included in Section 4.0 and are included herein by reference. The following discussion includes only the expected impacts of the preferred alternatives.

5.6 Public and Private Costs of Regulations

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

Council costs of document preparation, meetings, public hearings, and information dissemination……………………………………………$

NOAA Fisheries administrative costs of document preparation, meetings and review ....$

Annual law enforcement costs ....unknown

TOTAL ....$

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

5.7 Summary of Economic Impacts

To be completed

5.8 Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a 'significant regulatory action' if it is expected to result in: (1) an annual effect of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this executive order.

6 Initial Regulatory Flexibility Analysis

6.1 Introduction

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

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

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

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

The purpose and need, issues, problems, and objectives of the proposed rule are presented in Section 1.0 and are incorporated herein by reference. In summary, the purpose of this amendment is to establish deepwater CHAPCs and formalize a process to move the Council to a new era of ecosystem-based management. While this first CEA focuses on deepwater coral ecosystem conservation and EFH related action, future FMP actions will be addressed by having a full review of management needs to initiate preparation of a new CEA to address all FMP amendment needs in the coming year.

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

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

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

This proposed action is expected to directly impact commercial fishers. 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, finfish fishing) for all its affiliated operations worldwide.

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

6.6 Substantial Number of Small Entities Criterion

To be added after public hearing.

6.7 Significant Economic Impact Criterion

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

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

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

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

6.8 Description of Significant Alternatives

To be added after public hearing.

7 Fishery Impact Statement – Social Impact Assessment

7.1 Introduction

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

Under the Magnuson-Stevens Act, fishery management plans (FMPs) must "…achieve and maintain, on a continuing basis, the optimum yield from each fishery" [Magnuson-Stevens Act section 2 (b) (4)]. When considering "…a system for limiting access to the fishery in order to achieve optimum yield …" the Secretary of Commerce and Regional Fishery Management Councils are to consider both the social and economic impacts of the system (Magnuson-Stevens Act section 303 (b) (6)). The Magnuson-Stevens Act requires that FMPs address the impacts of any management measures on the participants in the affected fishery and those participants in other fisheries that may be affected directly or indirectly through the inclusion of a fishery impact statement [Magnuson-Stevens Act section 303 (a) (9)]. National Standard 8 requires that conservation and management measures shall take into account the importance of fishery resources to fishing communities in order to provide for the sustained participation of such communities, and to the extent practicable, minimize adverse economic impacts in such communities (Magnuson-Stevens Action Section 301(a)(8).

7.2 Problems and Methods

Social impacts are generally the consequences to human populations that follow from some type of public or private action. Those consequences may include alterations to "...the ways in which people live, work or play, relate to one another, organize to meet their needs and generally cope as members of a society..." (Interorganizational Committee on Guidelines and Principles for Social Impact Assessment, 1994). Social impact analyses can be used to determine possible consequences management actions may have on fishing dependent communities. In order to do a full social impact analysis it is necessary to identify community participants who depend upon the fisheries in that area and to identify the amount of dependency they have upon a given fishery. Further it is necessary to understand the other opportunities for employment that exist within the community should fishery management measures become so restrictive that participants must switch their focus to other fisheries or other jobs outside of the fishing industry.

Public hearings and scoping meetings may provide input from those concerned with a particular action, but they do not constitute a full overview of the fishery.

In attempting to assess the social impacts of the proposed amendment it must be noted that there is not enough data at the community level for these analyses to do a comprehensive overview of the fishery; therefore, analyses cannot predict all social impacts. Although research in communities is ongoing, at this time it is still not complete enough to fully describe possible consequences this amendment may have on individual fishing communities.

The information available for evaluating the possible impacts of this amendment is summarized in Section 3.4. There is not enough data on communities that may be dependent on these fisheries to fully describe the impacts of any change in fishing regulations on any one community. However, demographic information based on census data of key communities in the region is included to give some insight into the structure of these communities that operate in the fishery. The social impacts on the processing sector, the consumer, fishing communities, and society as a whole are not fully addressed due to data limitations. Data to define or determine impacts upon fishing communities are still very limited.

7.3 Social Impact Assessment Data Needs

Changes due to development and the increase of tourism infrastructure have been occurring rapidly in coastal communities of the South Atlantic make community descriptions more problematic. Recognizing that defining and understanding the social and economic characteristics of a fishery is critical to good management of the fishery. Therefore, more comprehensive work needs to be done on all of the fisheries in the region.

One of the critical data needs is complete community profiles of fishing communities in the southeast region in order to gain a better understanding of the fishery and those dependent on the fishery. At this time, due to limited staff and resources, NMFS is conducting research in a few Southeast communities which will take several years to complete.

Completion of the community profiles will support more complete descriptions of the impacts that new regulations will have upon fishing communities. For each community chosen for profiling, it will be important to understand the historical background of the community and its involvement with fishing through time. Furthermore, the fishing communities' dependence upon fishing and fishery resources needs to be established. Kitner (2004) suggests that in order to achieve these goals, data needs to be gathered in three or more ways. First, in order to establish both baseline data and to contextualize the information already gathered by survey methods, an in-depth, ethnographic study of the different fishing sectors or subcultures is needed. Second, existing literature on social/cultural analyses of fisheries and other sources in social evaluation research needs to be assessed in order to offer a comparative perspective and to guide the SIAs. Third, socio-economic data need to be collected on a continuing basis for both the commercial and recreational sectors, including the for-hire sector. Methods for doing this would include regular collection of social and economic information in logbooks for the commercial sector, observer data, and dock surveys.

The following is a guideline to the types of data needed:

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

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

3. In order to understand the culture of the communities that are dependent on fishing, research may include but is not necessarily limited to: occupational motivation and satisfaction; attitudes and perceptions concerning management; constituent views of their personal future of fishing; psycho-social well-being; and cultural traditions related to fishing (identity and meaning).

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

5. This list of data needs is not exhaustive or all inclusive, and should be revised periodically in order to better reflect on-going and future research efforts (Kitner 2004).

7.4 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…" However, at this time the Council cannot obtain complete social and community information that will allow the full analysis of social impacts of the proposed action and its alternatives. There are an insufficient number of sociologists or anthropologists employed at this time (2008) and insufficient funds to conduct the community surveys and needed ethnographies that would allow full analysis.

7.5 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 SAFMC conducted a series of scoping meetings and a first round of public hearings for this amendment in which the public was invited to provide input on actions contained therein. A summary of the comments received during public comment can be found in Appendix N of this document. Comments received were considered during the development of the 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.

Section 3.4.5 describes areas in North Carolina, South Carolina, Georgia and Florida where South Atlantic fisheries have a local presence. Communities in Florida were identified as key communities involved in the South Atlantic deepwater shrimp and golden crab fisheries based on fishing permit and employment data. The demographic information reported for these communities were derived from census data. Although the Census Bureau does not supply race or income data at the community level, such data is available for each County in which the fishing communities exist. Based on Census data none of the counties within which any of the subject fishing communities is located has a disproportionately high poverty rate[5], or minority population[6]. The proposed actions would be applied to all participants in the fishery, regardless of their race, color, national origin, or income level, and as a result are not expected to result in adverse or disproportionate environmental or public health impacts. Comments received during scoping did not indicate proposed actions are expected to affect any existing subsistence consumption patterns. Therefore, no environmental justice issues

[5] Following the Office of Management and Budget's (OMB) Statistical Policy Directive 14 if a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps) (U.S. Census, 2008).

[6] A minority population is one either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (U.S. Census, 2008).

are anticipated and no modifications to any proposed actions have been made to address environmental justice issues.

8 Other Applicable Law

8.1 *Administrative Procedures Act*

All federal rulemaking is governed under the provisions of the Administrative Procedure 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.

8.2 *Coastal Zone Management Act*

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

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

8.3 *Endangered Species Act*

The Endangered Species Act (ESA) of 1973 (16 U.S.C. Section 1531 et seq.) requires that federal agencies use their authorities to conserve threatened and endangered species. They must ensure actions they authorize, fund, or carry out are not likely to harm the continued existence of those 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, 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, including a biological opinion, are required when proposed actions may affect and are “likely to adversely affect” threatened or endangered or species adversely modify designated critical habitat. Biological opinions use the best available commercial and scientific data to evaluate the effects of a proposed action on threatened or endangered species. If a biological opinion finds the proposed action is not likely to jeopardize the continued existence of threatened or endangered species, an Incidental Take Statement (ITS) is issued. An ITS specifies the impact, i.e., the amount or extent, of such incidental taking on threatened or endangered species. In conjunction with an ITS, Reasonable and Prudent Measures (RPM) are issued, which are non-discretionary actions, necessary to help minimize the impact of incidental take. Terms and conditions are issued simultaneously with RPMs, and are specific requirements that implement the RPMs. If a biological opinion finds that the proposed action is likely to jeopardize the continued existence of threatened or endangered species, the consulting agency is required to establish Reasonable and Prudent Alternatives (RPA) to the proposed action. RPAs are economically and technology feasible alternatives to the proposed action, that would allow that activity to occur, without jeopardizing threatened or endangered species.

8.4 *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. The affected states have been closely involved in developing the proposed management measures and the principal state officials responsible for fisheries management in their respective states have not expressed federalism related opposition to the proposed action.

8.5 *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.

8.6 *Executive Order 12898: Environmental Justice*

E.O. 12898 requires that Federal agencies conduct their programs, policies and activities in a manner to ensure that individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, Federal agencies are required to collect, maintain and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence.

8.7 *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.

8.8 *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.

8.9 *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".

8.10 *Marine Mammal Protection Act*

The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas. It also prohibits the importing of marine mammals and marine mammal products into the United States. Under the MMPA, the Secretary of Commerce (authority delegated to NOAA Fisheries) 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.

8.11 *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. 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.

8.12 *National Environmental Policy Act*

Concerned with the degree of damages incurred by human activity on the sensitive ecological environment in the United States, Congress passed, and Richard Nixon signed into law, the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. §§ 4321 *et seq.* NEPA sets a mandate and framework for federal agencies to consider all reasonably foreseeable environmental effects of their actions. In addition, it requires disclosure of information regarding the environmental impacts of any federal or federally funded action to public officials and citizens before decisions are made and actions taken. The analysis and results are presented to the public and other agencies through the development of NEPA documentation. Comprehensive Ecosystem Amendment 1 drawing on the Fishery Ecosystem Plan as a source document, amends the Councils' Coral FMP and the Golden Crab FMP and has been written and organized in a manner that meets NEPA requirements, and thus is a consolidated NEPA document, including a draft Environmental Impact Statement, as described in NOAA Administrative Order (NAO) 216-6, Section 6.03.a.2.

Purpose and Need for Action

The purpose and need for this action are described in Section 1.1.

Alternatives

The alternatives for this action are described in Section 2.0.

Affected Environment

The affected environment is described in Section 3.0.

Impacts of the Alternatives

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

8.13 *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 EEZ are Gray's Reef and Florida Keys National Marine Sanctuaries.

8.14 *Paperwork Reduction Act*

The purpose of the Paperwork Reduction Act is to control paperwork requirements imposed on the public by the federal government. The authority to manage information collection and record keeping requirements is vested with the Director of the Office of Management and Budget. This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

The Council is not proposing in this amendment measures that would involve increased paperwork and consideration under this Act.

8.15 *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.

8.16 *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.

8.17 *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.

9 List of Preparers

Name	Title	Agency	Location
Roger Pugliese	Senior Fishery Biologist CEA Coordinator SAFMC Lead	SAFMC	SAFMC
Karla Gore	Fishery Biologist NMFS Co-Lead	NMFS SERO	NMFS SERO
Myra Brouwer	Fishery Scientist	SAFMC	SAFMC
Kate Quigley	Economist	SAFMC	SAFMC
Kate Michie	Fishery Biologist NMFS Co-Lead	NMFS SERO	NMFS SERO
Gregg Waugh	Deputy Director	SAFMC	SAFMC
Carlos Rivero	Physical Scientist	NMFS SEFSC	NMFS SEFSC

Interagency CEA Planning Team/Reviewers

Name	Title	Agency	Location
Roger Pugliese	Senior Fishery Biologist CEA Coordinator SAFMC Lead	SAFMC	SAFMC
Kate Michie	Fishery Biologist NMFS Co-Lead	NMFS SERO	NMFS SERO
Myra Brouwer	Fishery Scientist	SAFMC	SAFMC
Karla Gore	Fishery Biologist NMFS Co-Lead	NMFS SERO	NMFS SERO
Kate Quigley	Economist	SAFMC	SAFMC
Monica Smit-Brunello	Attorney Advisor General	NOAA	SERO
Gregg Waugh	Deputy Director	SAFMC	SAFMC
Janet Miller	Program Specialist	NMFS SERO	NMFS SERO
Denise Johnson	Industry Economist	NMFS SERO	NMFS SERO
Andrew Herndon	Fishery Biologist	NMFS SERO	NMFS SERO
Jack McGovern	Fishery Biologist	NMFS SERO	NMFS SERO
David Dale	NEPA/EFH Specialist	NMFS SERO	NMFS SERO
Pace Wilber	Atlantic Branch Supervisor, Fishery Biologist	NMFS SERO	NMFS SERO
Tom Jamir	Fishery Biologist	NMFS	NMFS

		SEFSC	SEFSC
Carlos Rivero	Physical Scientist	NMFS SEFSC	NMFS SEFSC
Joan Browder	Research Fishery Biologist	NMFS SEFSC	NMFS SEFSC
Michael Burton	Research Fishery Biologist	NMFS SEFSC	NMFS SEFSC
Tracy Dunn	Supervisory Criminal Investigator	NMFS OLE	NMFS SERO
Brad McHale	Fishery Management Specialist	NMFS HMS	NMFS HMS
Chris Rilling	Supervisory Fish Management Officer	NMFS HMS	NMFS HMS

10 Entities Consulted

Responsible Agency

Amendment:
South Atlantic Fishery Management Council
4055 Faber Place Drve, Suite 201
North Charleston, South Carolina 29405
(843) 571-4366 (TEL)
Toll Free: 866-SAFMC-10
(843) 769-4520 (FAX)
safmc@safmc.net

Environmental Impact Statement:
NMFS, Southeast Region
263 13th Avenue South
St. Petersburg, Florida 33701=
(727) 824-5301 (TEL)
(727) 824-5320 (FAX)

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
Golden Crab Advisory Panel
Shrimp Advisory Panel
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

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To be updated after Council meeting

APPENDICES

Note: APPENDIX A. THROUGH APPENDIX J AND APPENDIX N. ARE SEPARATE PDF FILES

APPENDIX K. ALTERNATIVES ELIMINATED FROM DETAILED CONSIDERATION

Alternative 3. Establish six deepwater coral Habitat Areas of Particular Concern; 1) Cape Lookout Lophelia Banks HAPC, 2) Cape Fear Lophelia Banks HAPC, 3) the Stetson Reefs HAPC, 4) Savannah and East Florida Lithoherms HAPC; 5) Miami Terrace HAPC; and 6) Pourtales Terrace HAPC.

In the deepwater coral HAPC, no person may:

1. Use a bottom longline, trawls (mid-water and bottom), dredge, pot or trap.
2. If aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain.
3. Possession of all species regulated by the coral FMP is prohibited.
4. Fish for golden crab in designated areas without an approved VMS.

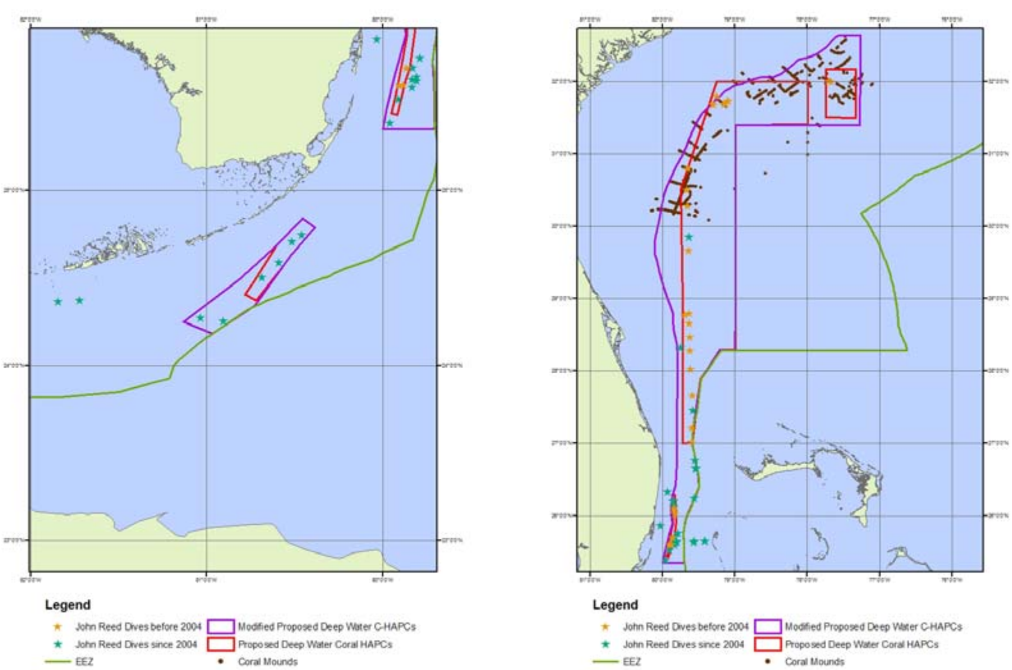
Discussion: This alternative is based on a previously adopted recommendation of the Council submitted by the Habitat and Coral Advisory Panels supported by information in 2004 reports to SAFMC on deepwater coral habitat distribution in the South Atlantic Region.

Allow fishing for golden crab with approved crustacean traps in designated areas in the Stetson-Miami Terrace HAPC and Pourtales Terrace HAPC where fishing has occurred historically and does not impact deepwater coral habitats. Action 4.2 of this document presents alternatives to amend the Golden Crab FMP to require the use of VMS as a provision to fish or have access to designated areas in the deepwater HAPCs.

Rejected Alternative. Establish six deepwater coral Habitat Areas of Particular Concern; 1) Cape Lookout Lophelia Banks HAPC, 2) Cape Fear Lophelia Banks HAPC, 3) the Stetson Reefs HAPC, 4) Savannah and East Florida Lithoherms HAPC; 5) Miami Terrace HAPC; and 6) Pourtales Terrace HAPC.

In the HAPC, no person may: 1.Use a bottom longline, trawls (mid-water and bottom), dredge, pot or trap; 2. If aboard a fishing vessel, anchor, use of an anchor and chain, or use a grapple and chain; 3. Possession of all species regulated by the coral FMP is prohibited; and 4. Fish for golden crab in designated areas without an approved VMS.

Discussion: This alternative is based on a previously adopted recommendation of the Habitat and Coral Advisory Panels supported by information in 2004 reports to SAFMC on deepwater coral habitat distribution in the South Atlantic Region.



(Note: Proposed DWCHAPCs do not include additional AP recommended modifications to use 300 meter contour for Miami Terrace area of CHAPC and extension of western boundary to cover special habitats identified in Popenoe maps).

Figure XX. Maps of Deepwater Coral HAPC proposal revision developed at June 2006 Joint Habitat and Coral Advisory Panel Meeting to reflect habitat driven consolidation of 6 areas into four DWCHAPC proposals.

1.1.1 Amend the Shrimp FMP to Establish Allowable Gear Areas and Regulate Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

Amend the Shrimp FMP to Regulate Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

Alternative 1. No action. Do not regulate fishing for or possession of deepwater shrimp in or from the deepwater coral HAPCs.

Alternative 2. Prohibit fishing for or possession of deepwater shrimp in or from the deepwater coral HAPCs

In the area encompasses by the deepwater coral HAPCs the following additional regulation would apply:

(1) Fishing for or possession of deepwater shrimp (rock shrimp, and royal red shrimp) in or from the HAPCs is prohibited.

Alternative 3. Prohibit fishing for or possession of shrimp in or from the deepwater coral HAPCs.

In the area encompasses by the deepwater coral HAPCs the following additional regulation would apply:

(1) Fishing for or possession of shrimp (white shrimp, brown shrimp, pink shrimp, rock shrimp, and royal red shrimp) in or from the HAPCs is prohibited.

Alternative 4. Others?

4.3 Amend the Shrimp FMP to Establish Allowable Gear Areas and Regulate Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

The Council's Habitat and Coral Advisory Panels in October 2004 developed consensus recommendations on measures to be included in the Comprehensive Ecosystem Amendment. The Panels view the FEP as providing the foundation to develop an allowable trawling area (Allowable Gear Area) for the deepwater trawl fishery noting adequate information should be available to define the fishing area from the VMS system required for the rock shrimp fishery. The consensus was that measure could enhance protection of unique habitat values of deepwater coral/habitat including the proposed deepwater coral HAPCs and deepwater EFH-HAPCs including the Charleston Bump EFH-HAPC.

4.3.1 Amend the Shrimp FMP to Establish Allowable Gear Areas

Alternative 1. No action. Do not establish Allowable Gear Areas for deepwater trawls.

Alternative 2. Establish an Allowable Gear Area for deepwater trawls for the harvest of rock shrimp based on fishing operation area as defined by data from the approved Vessel Monitoring System.

Alternative 3. Establish an Allowable Gear Area for deepwater trawls for the harvest of rock shrimp based on fishing operation area as defined by data from the approved Vessel Monitoring System and historic fishing grounds.

Alternative 4. Establish an Allowable Gear Area for deepwater trawls for the harvest of royal red shrimp based on fishing operation area as defined by data from the approved Vessel Monitoring System.

Alternative 5. Establish an Allowable Gear Area for deepwater trawls for the harvest of royal red shrimp based on fishing operation area as defined by data from the approved Vessel Monitoring System and historic fishing grounds.

Alternative 6. Others?

Biological Effects of Establishing Allowable Gear Areas for Deepwater Trawls
Economic Effects of Establishing Allowable Gear Areas for Deepwater Trawls
Social Effects of Establishing Allowable Gear Areas for Deepwater Trawls
Administrative Effects of Establishing Allowable Gear Areas for Deepwater Trawls
Conclusion

4.3.2 Amend the Shrimp FMP to Regulate Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

Alternative 1. No action. Do not regulate fishing for or possession of deepwater shrimp in or from the deepwater coral HAPCs.

Alternative 2. Prohibit fishing for or possession of deepwater shrimp in or from the deepwater coral HAPCs

In the area encompasses by the deepwater coral HAPCs the following additional regulation would apply:

(1) Fishing for or possession of deepwater shrimp (rock shrimp, and royal red shrimp) in or from the HAPCs is prohibited.

Alternative 3. Prohibit fishing for or possession of shrimp in or from the deepwater coral HAPCs.

In the area encompasses by the deepwater coral HAPCs the following additional regulation would apply:

(1) Fishing for or possession of shrimp (white shrimp, brown shrimp, pink shrimp, rock shrimp, and royal red shrimp) in or from the HAPCs is prohibited.

Alternative 4. Others?

Biological Effects of Regulating Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

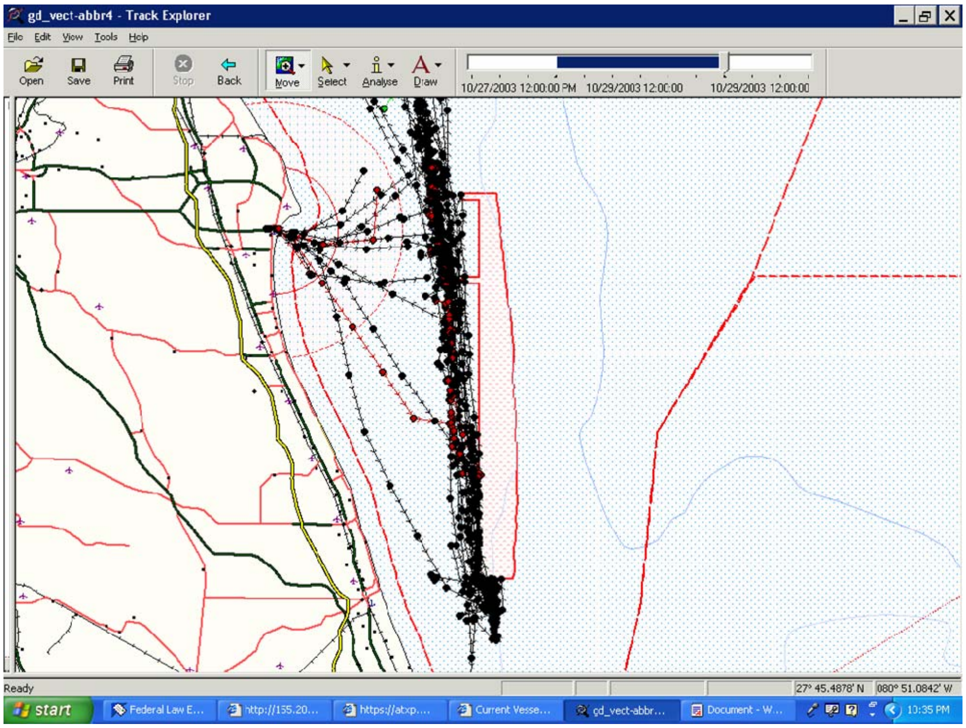


Figure Z. Vessel Monitoring System tracks of rock shrimp vessels fishing fishing along western edge of the Oculina Bank (Source: NMFS Enforcement)

Economic Effects of Regulating Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

Social Effects of Regulating Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

Administrative Effects of Regulating Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

Conclusion Regulating Fishing for or Possession of Shrimp in the Deepwater Coral HAPCs

ADDED July 08

Alternative 4. Move the western boundary of the Middle C-HAPC east to exclude royal red fishing areas represented by the Vessel Monitoring System (Alternatives developed by Deepwater Shrimp Advisory Panel):

Sub-Alternative 4a. Move the west boundary of the proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds N. ;

Sub-Alternative 4b. Move the west boundary of the proposed C-HAPC eastward to exclude all VMS points from the C-HAPC;

Sub-Alternative 4c. Move the west boundary of the proposed C-HAPC eastward 5 nautical miles from the eastern boundary of the polygon from Alternative 2; and

Sub-Alternative 4d. Move the west boundary of the proposed C-HAPC eastward 6 nautical miles from the eastern boundary of the polygon from Alternative 2.

<u>Discussion</u>

The Deepwater Shrimp Advisory Panel met formally and informally between January and March 2008 to develop proposals for Council consideration that would allow the fishery to continue to operate while avoiding damaging deepwater coral habitat. The Council approved bringing the alternatives developed by the Advisory Panel to public hearing to collect additional information and input on the proposals. The Advisory Panel developed alternatives to move the western boundary of the Stetson Reefs, Savannah and East Florida Lithoherms and Miami Terrace HAPC.

Alternative 4. Modify Deepwater C-HAPCs to reduce impact on Royal Red Shrimp Fishery.	All alternatives move western boundary deeper than 400 meters which is identified as the inshore bound of the deepwater coral ecosystem north of the Miami Terrace.	Analysis provided by NMFS SEFSC of VMS data indicates that over four years of monitoring less than 1 % of all trips occurred inside of the proposed Stetson-Miami Terrace CHAPC.
Alternative 4a. Move the west boundary of the Stetson-Miami proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds N.	Would allow the fishery to expand and operate in areas of both high and low profile deepwater coral habitat.	Would eliminate the minimal impact to the fishery but would potentially allow fishing on known deepwater habitat.
Alternative 4b. Move the west boundary of the proposed Stetson-Miami C-HAPC eastward to exclude all VMS points from the C-HAPC.	Would allow the fishery to expand and operate in areas of both high and low profile deepwater coral habitat.	Would eliminate the minimal impact to the fishery but would potentially allow fishing on known high relief deepwater habitat.
Alternative 4c. Move the west boundary of the proposed Stetson-Miami C-HAPC eastward 5 nautical miles from the eastern boundary of the polygon from Alternative 2.	Would allow the fishery to expand and operate in areas of both high and low profile deepwater coral habitat.	Would eliminate the minimal impact to the fishery but would potentially allow fishing on known high relief deepwater habitat.
Alternative 4d. Move the west boundary of the proposed Stetson Miami C-HAPC eastward 6 nautical miles from	Would allow the fishery to expand and operate in areas of both high and low profile deepwater coral habitat.	Would eliminate the minimal impact to the fishery but would potentially allow fishing on known high relief deepwater habitat.

the eastern boundary of the polygon from Alternative 2.		

Added July 08

Alternative 4. Require monitoring of golden crab vessels using acoustic monitoring. The monitoring of vessels and/or trap sets using acoustics was discussed with the Advisory Panel recommending it be considered for public hearing.

Table 2-4. Summary of alternatives under consideration for Action 4.

	Biological Effects	Economic, Social, and Administrative Effects
Alternative 4. Require monitoring of golden crab vessels using acoustic monitoring.	Will provide enforcement of CHAPC and limit golden crab fishing to areas which did not impact habitat.	Would provide monitoring of vessels and/or traps. However, the network of fixed bouys to hold such monitors and transmission capabilities necessay to monitor the fishery do not exist at this time.

Added July 08

<u>Discussion</u>

This alternative is based on the latest recommendation of the Golden Crab Advisory Panel provided at the March SAFMC meeting in Jekyll Island, Georgia.

Advisory Panel Recommendations:

1. Middle area: Create an "allowable golden crab fishing area" within the proposed Coral HAPC boundaries using the latitude/longitude points provided (Figure 4-17a).

2. Northern area where fishing is taking place – continue the eastern boundary north from the middle area boundary along the 700 meter depth contour up to 28 degrees 38 minutes, then along the 600 meter contour northwards to 29 degrees. Eastern boundary along the 500 meter contour starting at about 79 degrees 41 minutes; 28 degrees moving northwards.

    a. This is a box within a box except that the southernmost boundary must be extended westward to the boundary of the proposed Coral HAPC.

3. Northern Zone – include provision for areas to be designated as "allowable golden crab areas" after research shows habitat allows fishing (e.g., cooperative research projects).

    a. Create an "allowable golden crab fishing area" in the sand/mud zone in the northern zone.

4. Southern Area – the southern boundary along the 1200 foot contour.
    a. Create an "allowable golden crab fishing area" within the proposed Coral HAPC boundaries.
5. Require VMS on golden crab vessels; equipment provided by NMFS at no cost to fishermen, however, monthly monitoring charges paid by fishermen. Explore use of some type of "pinger" on each end of the trap trawl line. Suggest a 6-month "break-in" period for industry and law enforcement to understand where vessels are and where gear is and how the system works prior to initiation of law enforcement actions.
6. Explore cooperative research with scientists to integrate logbook, VMS to refine fishing operations and habitat characteristics. Use of this information to guide cooperative research in northern zone.

The modifications proposed by the golden crab fishermen are shown in Figures 4-17a, 4-17b & 4-17c.

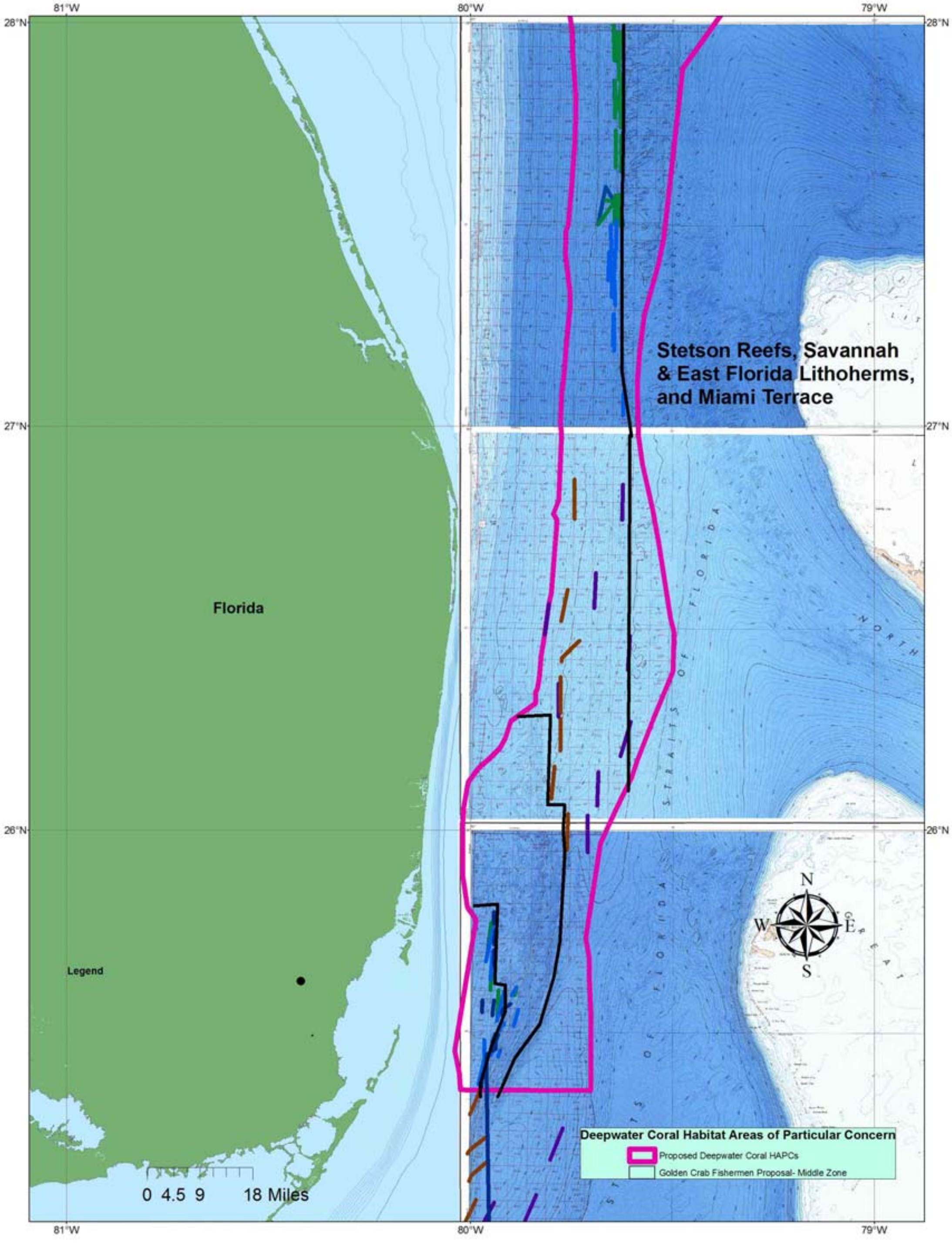


Figure 4-17a. Fishing areas and industry proposals for allowable gear areas for golden crab fishing in the Coral HAPC in the Middle Zone (Data Source: Traps set locations represented by short colored lines, were provided by Golden Crab Fishermen).

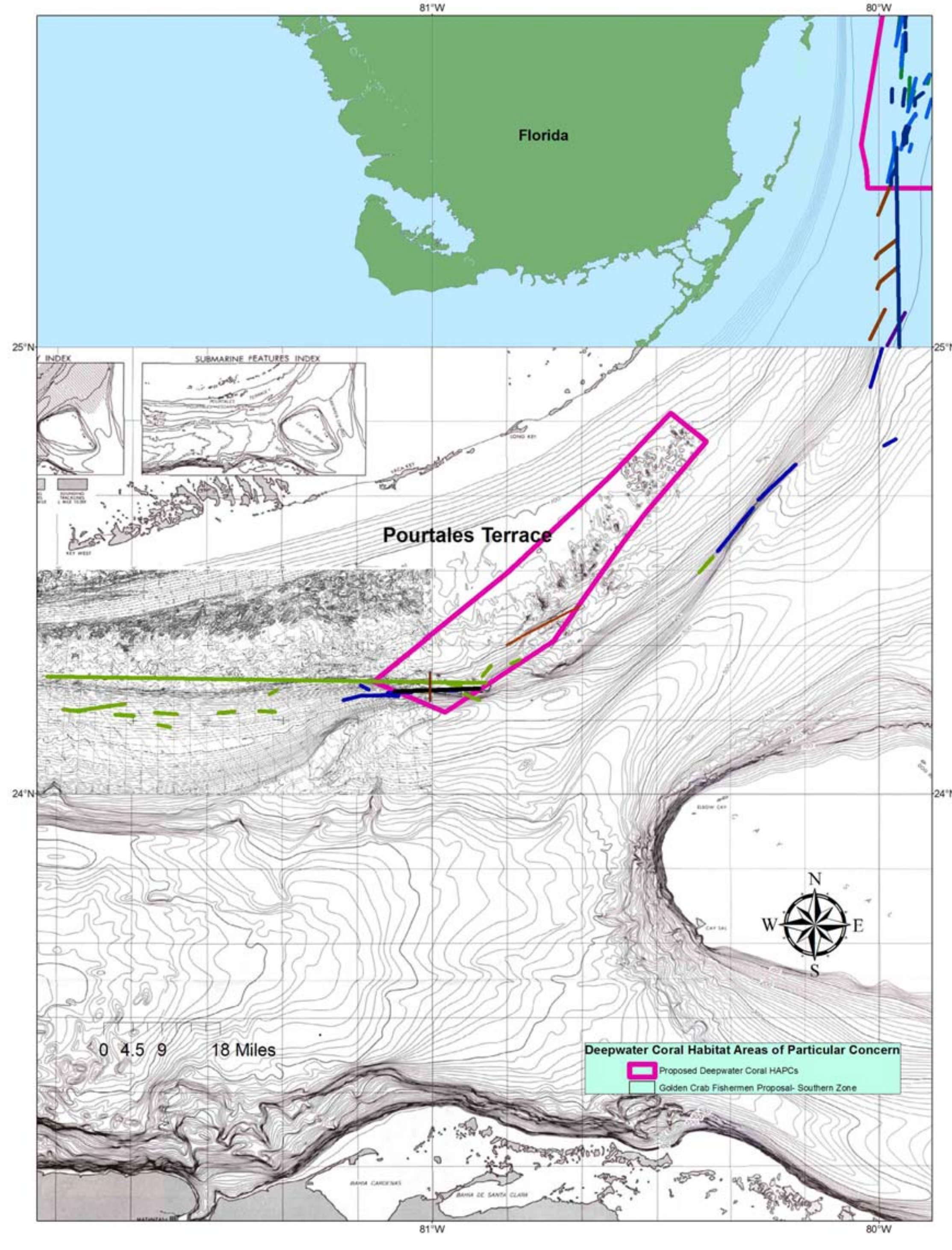


Figure 4-17b. Fishing areas industry proposal for allowable gear area for golden crab fishing in the Coral HAPC in the Southern Zone (Data Source: Traps set locations represented by short colored lines, were provided by Golden Crab Fishermen).

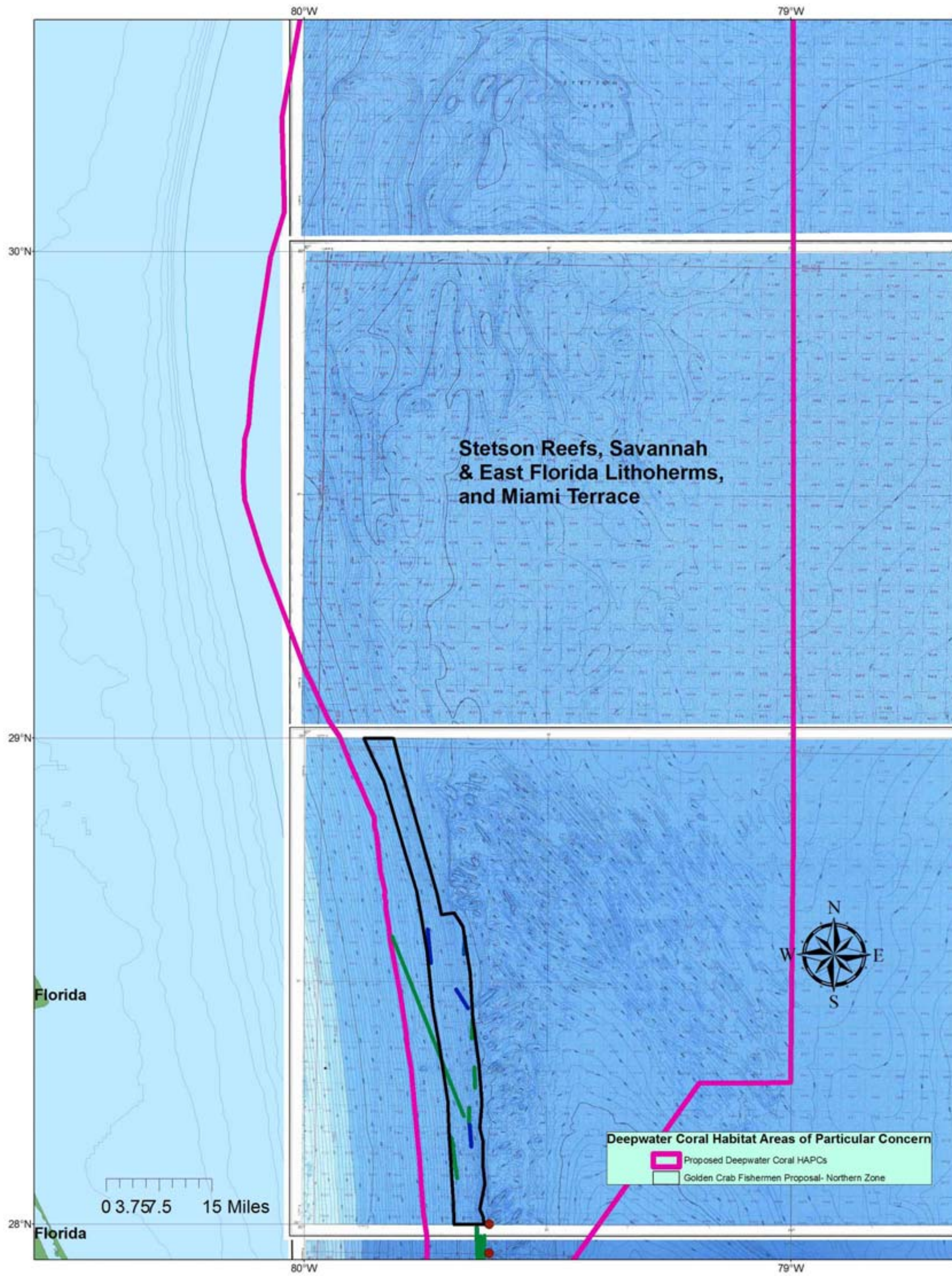


Figure 4-17c. Fishing areas and industry proposal for allowable gear area for golden crab fishing in the Coral HAPC in the Northern Zone (Data Source: Traps set locations represented by short colored lines, were provided by Golden Crab Fishermen).

Preliminary Advisory Panel Recommendations:
January 2008

Previously the AP met on January 27-28, 2008 to review the proposed Coral HAPCs and a summary of initial comments and recommendations follows:

Alternatives resulting from the Golden Crab AP meeting that are to be developed for the March Council meeting:

1. No golden crab fishing within all the Coral HAPC areas. This alternative would prohibit any fishing for golden crab within the proposed Coral HAPC areas. The Golden Crab AP has indicated that this alternative would eliminate the golden crab industry.

- Establish a network of deepwater coral Habitat Areas of Particular Concern (C-HAPC). In the deepwater coral HAPCs, no person may:
    a) Use a bottom longline, trawls (mid-water and bottom), dredge, pot or trap;
    b) If aboard a fishing vessel, anchor, use of an anchor and chain, or use a grapple and chain;
    c) Possess any species regulated by the coral FMP; and
    d) Fish for golden crab in designated areas without an approved VMS.

2. Create some allowable areas for golden crab fishing within the HAPCs with required use of VMS. This alternative would establish the proposed C-HAPCs but would create a number of areas within these areas where golden crab fishing would be allowed. All golden crab vessels would be required to use VMS on all trips. Council staff will plot all the fishing location information on the charts showing detail bathymetric data, all habitat/coral data, all dive locations, etc. Council staff will provide this information on a CD to golden crab fishermen prior to meeting with them to assist in identifying allowable golden crab areas. This information is to be completed in time to provide to the Council by their March 3-7, 2008 meeting.

   VMS would be required and enforcement actions could be taken if the vessel is fishing outside of the allowable areas.

3. All HAPC areas open with required use of VMS. This alternative would allow golden crab fishing within all the proposed C-HAPC areas. VMS would be required on all trips and enforcement actions could be taken if the vessel is fishing without the VMS being operational.

February Recommendations:

Council staff met informally with a number of golden crab fishermen, including some AP members, on February 26, 2008. The following recommendations were developed by the fishermen present:

1. Middle area: Move the western boundary towards the east as shown by the latitude/longitude points provided and move the eastern boundary as shown by the latitude/longitude points provided.

    a. Move the proposed Coral HAPC boundaries.

    b. Create an "allowable golden crab fishing area" within the proposed Coral HAPC boundaries.

2. Northern area where fishing is taking place – continue the eastern boundary north from the middle area boundary along the 700 meter depth contour up to 28 degrees 38 minutes, then along the 600 meter contour northwards to 29 degrees. Eastern boundary along the 500 meter contour starting at about 79 degrees 41 minutes; 28 degrees moving northwards.

    c. This is a box within a box except that the southernmost boundary must be extended westward to the boundary of the proposed Coral HAPC.

3. Northern Zone – include provision for areas to be designated as "allowable golden crab areas" after research shows habitat allows fishing (e.g., cooperative research projects).

    d. Create an "allowable golden crab fishing area" in the sand/mud zone in the northern zone.

4. Southern Area – shave the southern boundary along the 1200 foot contour.

    e. Move the proposed Coral HAPC boundaries.

    f. Create an "allowable golden crab fishing area" within the proposed Coral HAPC boundaries.

5. Require VMS on golden crab vessels; equipment provided by NMFS at no cost to fishermen, however, monthly monitoring charges paid by fishermen. Explore use of some type of "pinger" on each end of the trap trawl line. Suggest a 6-month "break-in" period for industry and law enforcement to understand where vessels are and where gear is and how the system works prior to initiation of law enforcement actions.

6. Explore cooperative research with scientists to integrate logbook, VMS to refine fishing operations and habitat characteristics. Use of this information to guide cooperative research in northern zone.

Added July 08

Alternative 4. Move the western boundary of the Middle C-HAPC east to exclude royal red fishing areas represented by the Vessel Monitoring System:

Sub-Alternative 4a. Move the west boundary of the proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds N.;

Sub-Alternative 4b. Move the west boundary of the proposed C-HAPC eastward to exclude all VMS points from the C-HAPC;

Sub-Alternative 4c. Move the west boundary of the proposed C-HAPC eastward 5 nautical miles from the eastern boundary of the polygon from Alternative 2; and

Sub-Alternative 4d. Move the west boundary of the proposed C-HAPC eastward 6 nautical miles from the eastern boundary of the polygon from Alternative 2.

Discussion

This alternative is based on the latest recommendation of the Deepwater Shrimp Advisory Panel at the March SAFMC meeting in Jekyll Island Georgia.

Advisory Panel Recommendations:

The Deepwater Shrimp Advisory Panel (AP) met January 28-29, 2008 and approved the following recommendations regarding the proposed Coral-HAPCs:

1. Move the west boundary of the proposed C-HAPC 6 nautical miles to the east between the following points: (a) 30 degrees 16 minutes 35.354 seconds N and (b) 26 degrees 12 minutes 56.273 seconds N. Moving the line eastward will exclude the fishing grounds from the C-HAPC based on VMS data analyzed and presented by the NMFS SEFSC. The AP pointed out that once the western boundary is corrected to track the 400 meter contour, the actual distance will be less than the 6 nautical miles.

2. Move the west boundary of the proposed C-HAPC eastward to exclude all VMS points from the C-HAPC. The location is based on a polygon drawn by Carlos Rivero of the NMFS SEFSC.

3. Move the west boundary of the proposed C-HAPC eastward 5 nautical miles from the eastern boundary of the polygon from Alternative 2.

4. Move the west boundary of the proposed C-HAPC eastward 6 nautical miles from the eastern boundary of the polygon from Alternative 2.

5. No Action.

The modifications proposed by the Deepwater Shrimp AP are shown in Figures 4-18.

Preliminary Advisory Panel Recommendations:
January 2008

Previously the AP met on January 27-28, 2008 to review the proposed Coral HAPCs and a summary of initial comments and recommendations follows:

Alternatives resulting from the Golden Crab AP meeting that are to be developed for the March Council meeting:

4. No golden crab fishing within all the Coral HAPC areas. This alternative would prohibit any fishing for golden crab within the proposed Coral HAPC areas. The Golden Crab AP has indicated that this alternative would eliminate the golden crab industry.

- Establish a network of deepwater coral Habitat Areas of Particular Concern (C-HAPC). In the deepwater coral HAPCs, no person may:
    - e) Use a bottom longline, trawls (mid-water and bottom), dredge, pot or trap;
    - f) If aboard a fishing vessel, anchor, use of an anchor and chain, or use a grapple and chain;
    - g) Possess any species regulated by the coral FMP; and
    - h) Fish for golden crab in designated areas without an approved VMS.

5. Create some allowable areas for golden crab fishing within the HAPCs with required use of VMS. This alternative would establish the proposed C-HAPCs but would create a number of areas within these areas where golden crab fishing would be allowed. All golden crab vessels would be required to use VMS on all trips. Council staff will plot all the fishing location information on the charts showing detail bathymetric data, all habitat/coral data, all dive locations, etc. Council staff will provide this information on a CD to golden crab fishermen prior to meeting with them to assist in identifying allowable golden crab areas. This information is to be completed in time to provide to the Council by their March 3-7, 2008 meeting.

   VMS would be required and enforcement actions could be taken if the vessel is fishing outside of the allowable areas.

6. All HAPC areas open with required use of VMS. This alternative would allow golden crab fishing within all the proposed C-HAPC areas. VMS would be required

on all trips and enforcement actions could be taken if the vessel is fishing without the VMS being operational.

February Recommendations:

Council staff met informally with a number of golden crab fishermen, including some AP members, on February 26, 2008. The following recommendations were developed by the fishermen present:

7. Middle area: Move the western boundary towards the east as shown by the latitude/longitude points provided and move the eastern boundary as shown by the latitude/longitude points provided.

    g. Move the proposed Coral HAPC boundaries.

    h. Create an "allowable golden crab fishing area" within the proposed Coral HAPC boundaries.

8. Northern area where fishing is taking place – continue the eastern boundary north from the middle area boundary along the 700 meter depth contour up to 28 degrees 38 minutes, then along the 600 meter contour northwards to 29 degrees. Eastern boundary along the 500 meter contour starting at about 79 degrees 41 minutes; 28 degrees moving northwards.

    i. This is a box within a box except that the southernmost boundary must be extended westward to the boundary of the proposed Coral HAPC.

9. Northern Zone – include provision for areas to be designated as "allowable golden crab areas" after research shows habitat allows fishing (e.g., cooperative research projects).

    j. Create an "allowable golden crab fishing area" in the sand/mud zone in the northern zone.

10. Southern Area – shave the southern boundary along the 1200 foot contour.

    k. Move the proposed Coral HAPC boundaries.

    l. Create an "allowable golden crab fishing area" within the proposed Coral HAPC boundaries.

11. Require VMS on golden crab vessels; equipment provided by NMFS at no cost to fishermen, however, monthly monitoring charges paid by fishermen. Explore use of some type of “pinger” on each end of the trap trawl line. Suggest a 6-month “break-in” period for industry and law enforcement to understand where vessels are and where gear is and how the system works prior to initiation of law enforcement actions.

Explore cooperative research with scientists to integrate logbook, VMS to refine fishing operations and habitat characteristics. Use of this information to guide cooperative research in northern zone.

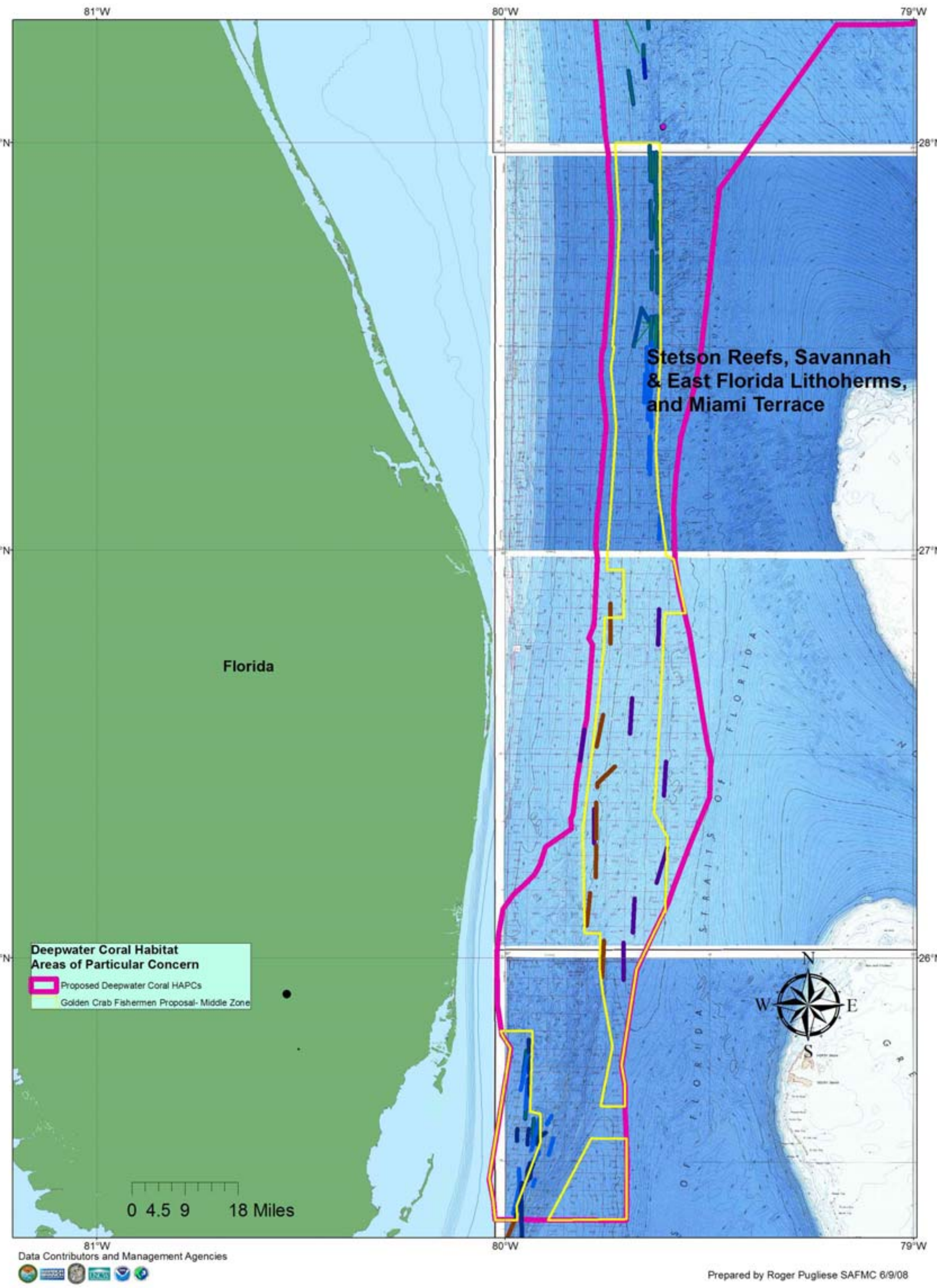


Figure 4-17a. Fishing areas and industry proposals for allowable gear areas for golden crab fishing in the Coral HAPC in the Middle Zone (Data Source: Traps set locations represented by short colored lines, were provided by Golden Crab Fishermen).

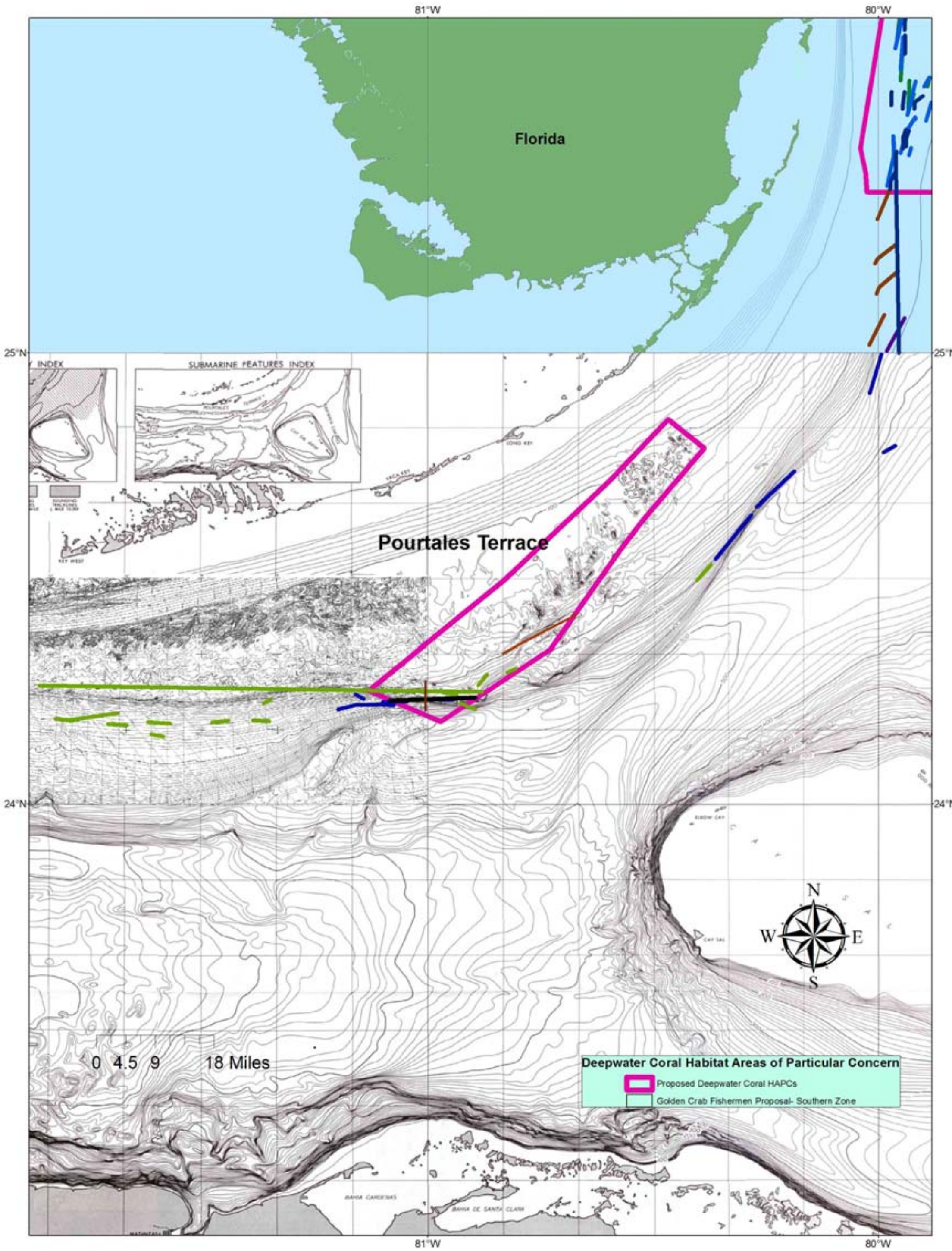


Figure 4-17b. Fishing areas industry proposal for allowable gear area for golden crab fishing in the Coral HAPC in the Southern Zone (Data Source: Traps set locations represented by short colored lines, were provided by Golden Crab Fishermen).

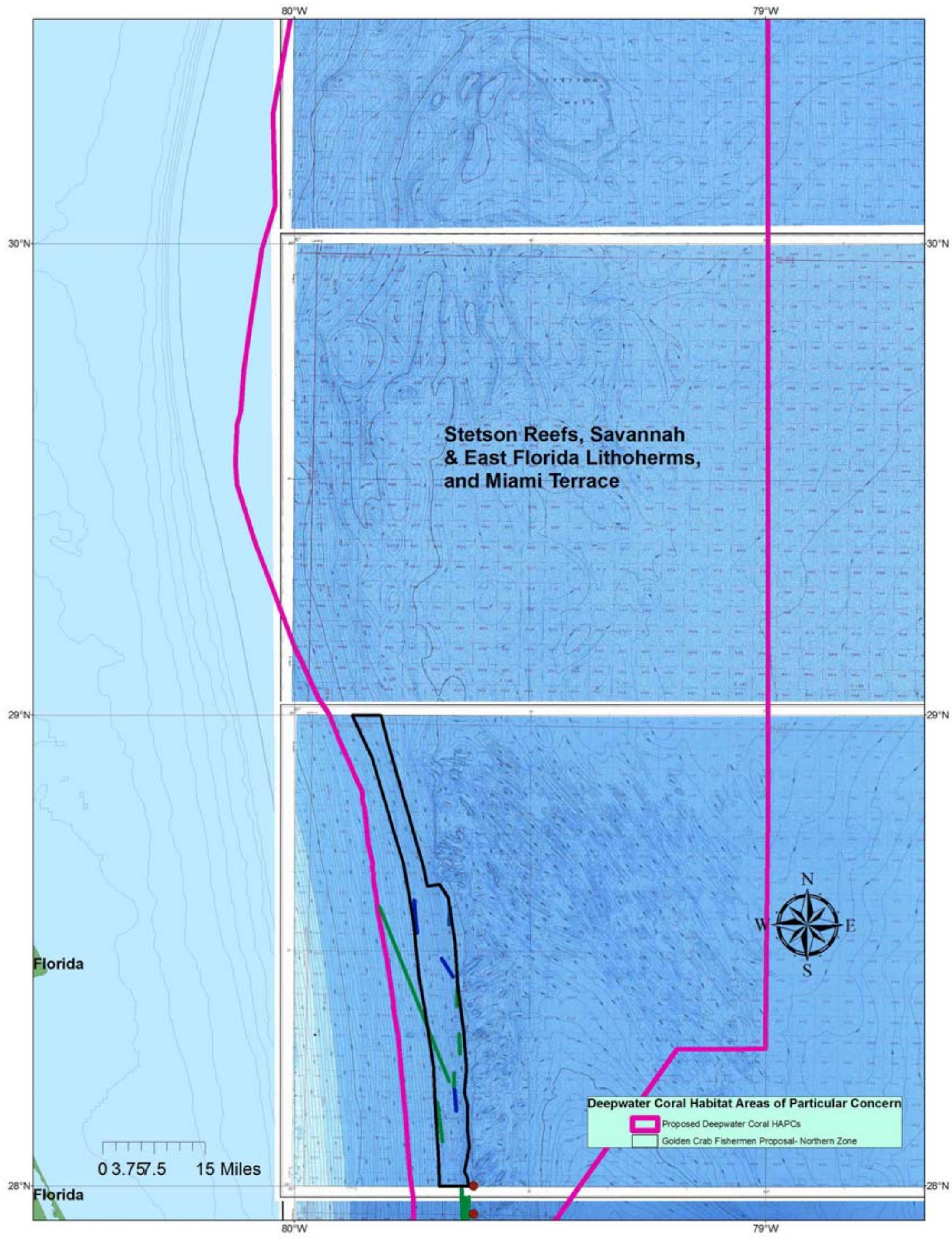


Figure 4-17c. Fishing areas and industry proposal for allowable gear area for golden crab fishing in the Coral HAPC in the Northern Zone (Data Source: Traps set locations represented by short colored lines, were provided by Golden Crab Fishermen).

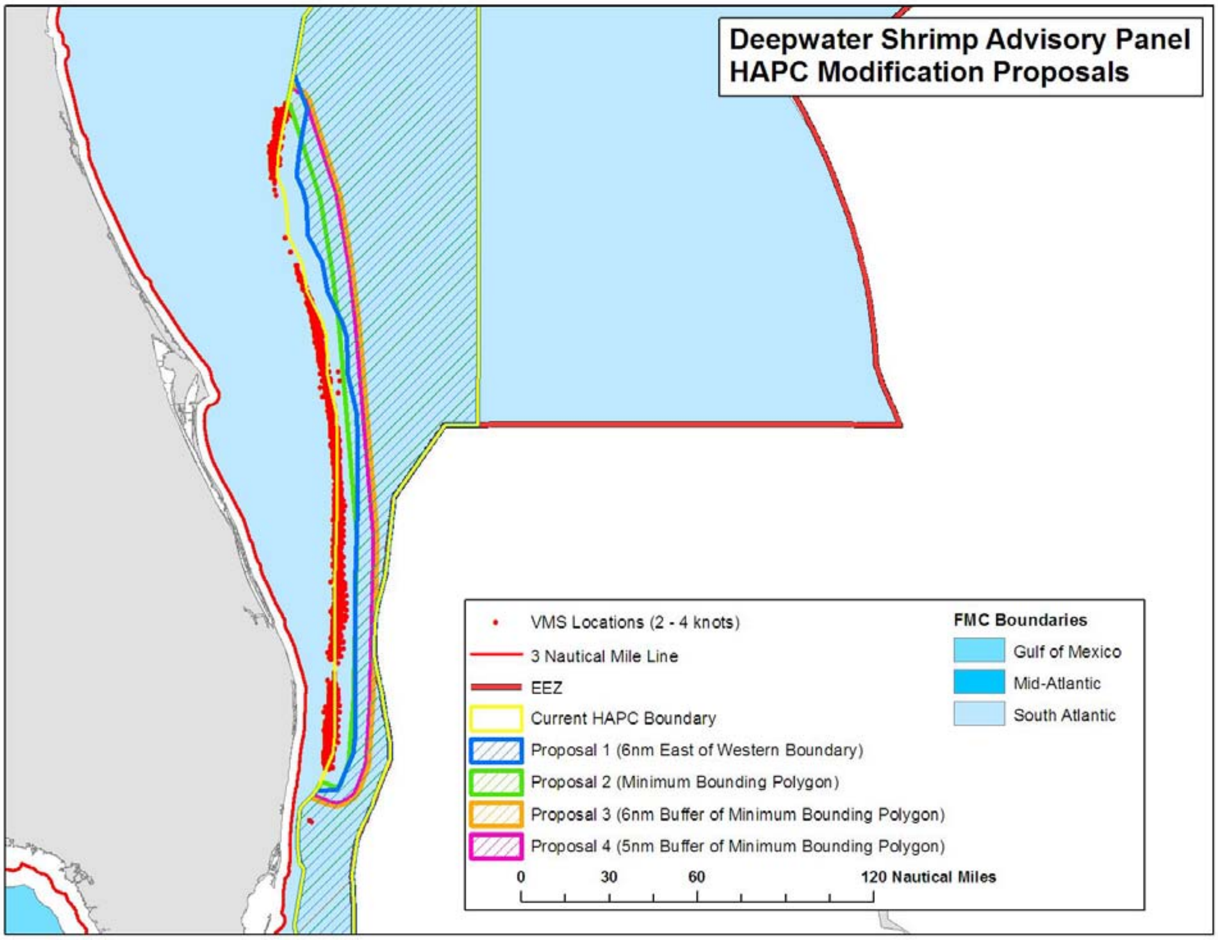


Figure 4-18. Deepwater Shrimp Advisory Panel proposals.

Added July 08

Alternative 4. Require monitoring of golden crab vessels using acoustic monitoring.

The monitoring of vessels and/or trap sets using acoustics was discussed with the Advisory Panel recommending it be considered for public hearing. Present acoustic devices could potentially provide monitoring of vessels and/or traps. However, the network of fixed buoys to hold such monitors and transmission capabilities necessary to monitor the fishery do not exist at this time.

Advisory Panel Recommendations:

1. Middle area: Create an "allowable golden crab fishing area" within the proposed Coral HAPC boundaries using the latitude/longitude points provided (Figure 4-17a).

2. Northern area where fishing is taking place – continue the eastern boundary north from the middle area boundary along the 700 meter depth contour up to 28 degrees 38 minutes, then along the 600 meter contour northwards to 29 degrees. Eastern boundary along the 500 meter contour starting at about 79 degrees 41 minutes; 28 degrees moving northwards.
    a. This is a box within a box except that the southernmost boundary must be extended westward to the boundary of the proposed Coral HAPC.
3. Northern Zone – include provision for areas to be designated as "allowable golden crab areas" after research shows habitat allows fishing (e.g., cooperative research projects).
    a. Create an "allowable golden crab fishing area" in the sand/mud zone in the northern zone.
4. Southern Area – the southern boundary along the 1200 foot contour.
    a. Create an "allowable golden crab fishing area" within the proposed Coral HAPC boundaries.
5. Require VMS on golden crab vessels; equipment provided by NMFS at no cost to fishermen, however, monthly monitoring charges paid by fishermen. Explore use of some type of "pinger" on each end of the trap trawl line. Suggest a 6-month "break-in" period for industry and law enforcement to understand where vessels are and where gear is and how the system works prior to initiation of law enforcement actions.
6. Explore cooperative research with scientists to integrate logbook, VMS to refine fishing operations and habitat characteristics. Use of this information to guide cooperative research in northern zone.

An additional alternative was brought to public hearing considering the use of acoustic monitoring of the trap set and or vessels. However, while sensors may exist to monitor gear and or the vessel, the network of fixed bouys to hold such monitors and transmission capabilities necessary to monitor the fishery do not exist at this time. This was identified as a future research need.

APPENDIX L. DEEPWATER CORAL RESEARCH AND MONITORING PLAN

Deepwater Coral Research and Monitoring Plan for the South Atlantic Region

[Complete Plan available for Download on Ecosystem Section of Council Webpage: http://www.safmc.net/Portals/0/Lophelia/SADWCResMonPlanJuly07-final.pdf]

March 2007

Background and Need to Support Management

The SAFMC manages coral, coral reefs and live/hard bottom habitat, including deepwater corals, through the South Atlantic Coral Fishery Management Plan. Mechanisms exist in the FMP as amended to further protect deepwater coral and live/hard bottom habitats. The SAFMC Habitat and Environmental Protection Advisory Panel and Coral Advisory Panel have supported proactive efforts to identify and protect deepwater coral ecosystems in the South Atlantic region. The Council has endorsed the Panels' recommendation for designation of new deepwater Coral Habitat Areas of Particular Concern under the Federal Coral FMP. New deepwater coral HAPCs will be designated through the Fishery Ecosystem Plan Comprehensive Amendment.

Scope

The **Deepwater Coral Research and Monitoring Plan for the South Atlantic Region** constitutes the regional research component of the implementation plan that will be a part of the NOAA Deep-Sea Coral and Sponge Conservation and Management Strategy. The purpose of the plan is to guide deepwater coral ecosystem research and monitoring efforts conducted by NOAA and partners through grants and contracts in the South Atlantic region. Additional components will address needs to expand partnerships, identify funding needs and implement deliverables.

In developing this plan, the South Atlantic Fishery Management Council is responding to recent amendments to the Magnuson-Stevens Act and NOAA's determination that an agency strategy is needed to effectively and efficiently address deepwater coral ecosystems issues. The primary goal of this Research and Monitoring Plan is to support conservation and management of deepwater coral ecosystems in the South Atlantic region while addressing NOAA's strategy to balance long-term uses of the marine ecosystem with maintenance of biodiversity. The Plan will also assist in meeting the new mandates of the Magnuson-Stevens Act..

APPENDIX M. The Governors' South Atlantic Alliance: A Call To Action Framework

A Call to Action

Florida, Georgia, South Carolina and North Carolina share an extraordinarily rich array of ocean and coastal resources that provide enormous economic, environmental and social benefits for each state. However, those resources face significant and growing stress. Pollution, declining fishery resources, degraded coastal habitats, vulnerability to natural hazards and rapid population growth and development are primary examples of serious challenges to the sustainability of coastal resources in the region. Furthermore, the similarity of issues and habitats plus the connectivity of ocean resources such as coastal watersheds, fisheries and ocean currents across state jurisdictions calls for collective action. For instance, many coastal watersheds involve multiple states, while fish populations migrate seasonally throughout the four-state region.

Recently, two national ocean commissions and the President's United States Ocean Action Plan called for meaningful collaboration at all levels of ocean and coastal research and actions to restore and maintain our ocean resources. Several major regional alliances (e.g., West Coast, Gulf of Mexico, and Northeast) have been established and have successfully leveraged resources to meet common goals. This regional alliance framework is in response to that collective call for action.

Regional Context

Changes in economics, culture, environmental quality, resource use and growth have occurred in the Southeast at an accelerated pace. The resulting pressures placed on the Southeast's natural, environmental, economic, and cultural resources, as well as national defense are increasing exponentially on a regional scale. The complexity of multiple and interdependent resource issues undergoing rapid change creates new challenges and an urgent need for new responses. Our growing understanding of the relationship of humans with the marine environment is leading us to explore new ecosystem-based approaches to coastal management that engages multiple state jurisdictions. The urgency of the situation calls for developing coordinated regional actions by the states in conjunction with supporting partners and leveraging multiple resources to help address critical issues in sustaining our coastal and ocean ecosystems.

Improved coordination among state governments and effective engagement of federal and local governments, academia and coastal and ocean stakeholders is critical to this effort. An integrated regional action is needed to guide research, planning, and management activities that address critical ocean and coastal issues facing all four states. In the following sections, we outline the framework and basis for a regional alliance among the four states, including a structure and process for stakeholders' involvement. Through this alliance, we seek to advance the member states' mutual interests in initial priority South Atlantic coastal and marine issue areas needing attention and action while jointly engaging federal agencies and regional constituencies on significant regional coastal and ocean issues that warrant their support.

Governors' South Atlantic Alliance Framework Continued

The South Atlantic Alliance

The South Atlantic Alliance (Alliance) will complement existing regional arrangements. Most importantly, the Alliance will serve as a conduit for collectively finding, acting on, and regionally implementing science-based actions to sustain the coastal and ocean ecosystems. The Alliance will provide a method for more efficiently and effectively balancing and sustaining ecological capacity, economic vitality, quality of life, public safety and national security mission requirements. The Alliance will provide a partnership of state leaders, supported by federal and local governments, with private and public assistance.

South Atlantic Regional Priority Issues

The following initial priority issues have been identified as being timely and of mutual importance to the sustainability of the South Atlantic region's resources. None of these issues are limited by state boundaries.

Healthy Ecosystems

The South Atlantic supports a diverse array of coastal, estuarine, nearshore and offshore ecosystems, including seagrass beds, wetlands and marshes, mangroves, barrier islands, sand dunes, coral reefs and other "live bottom" formations, maritime forests, streams and rivers. These ecosystems provide ecological and economic benefits including improved water quality, nurseries for fish, wildlife habitat, hurricane and flood buffers, erosion prevention, stabilized shorelines, tourism, jobs, recreation, and support for national defense and homeland security activities. The ecosystems include a range of recreationally and commercially important species, and federally and state protected species. Further, many species and habitats are facing a variety of threats including invasive non-native species, habitat alterations, fishing pressures, population growth in coastal areas, climate change and degraded water quality. Most importantly, all of these pressures are linked.

There are opportunities to enhance and support ecosystem-based management efforts within the region. The objective of these efforts is to improve ecosystem structure and function; improve economic, social and cultural benefits from resources; and improve biological, economic, and cultural diversity in the South Atlantic region. Achieving these goals requires a more thorough understanding of the scope, scale and distribution of resources within the region. Less than five percent of the coastal ocean region of the southeastern United States has been mapped. A significant need exists for standardized, integrated, and accessible spatial and temporal data for the management of coastal marine resources in our region. The Alliance will enhance collaboration necessary to address region-wide ecosystem issues.

Governors' South Atlantic Alliance Framework Continued

Working Waterfronts

Working waterfronts require direct access to coastal public trust waters and submerged lands. The term, working waterfronts, includes water-dependent facilities and related shore-side infrastructure that offer access or support facilities for recreation, commerce, research, and other public uses including military operations (Coast Guard, Navy, etc.). Examples of these facilities include: seafood harvesters and processors; public wet and dry marinas; boat construction and repair facilities; recreational fishing facilities, including fishing piers and for-hire vessel operations; aquaculture facilities; marine transportation (e.g., ferries and cruise ships) and ports for seaborne commerce. It is important to address these issues in a timely manner because there are limited remaining areas suitable as working waterfronts.

Working waterfronts face a number of challenges and high among them is the future of our ports and other water access points. Growth, environmental degradation and displacement are some of the issues facing traditional working waterfront communities. Homeland security requires better control of our coastal facilities both for protection as well as for military operations. Finally, climate change and associated environmental factors such as storm intensity and sea-level changes are emerging issues.

While the southeastern United States is one of the least developed in the nation, according to the Census Bureau, our four southeastern states contain one-third of the nation's 100 fastest-growing counties. The projected percent change in population from 2000 to 2030 in North Carolina, South Carolina, Georgia and Florida is an increase of 51.9 percent, 28.3 percent, 46.8 percent, and 79.5 percent, respectively. Much of the growth is concentrated in coastal counties, and is outpacing our ability to understand, react, and plan for changes in environmental, social, and economic conditions. Sustaining robust waterfront cultural traditions, commerce, adequate access and use of public trust waters, and infrastructure in the face of this growth is crucial.

Major port complexes in the South Atlantic are of vital economic importance to the nation's vast international trade and the region's link to global commerce. Ships are increasing in size, requiring deeper and wider channels. Competition for vital water frontage will increase as the number of larger and faster vessels calling on regional ports increases.

Other water dependent businesses (e.g., recreational and commercial fishing, diving, eco-tours, and water sports) as well as national defense readiness needs are threatened by the conversion of working waterfronts to private residences, condominiums, and marinas. The increase in these waterfront usages results in additional impervious surfaces, and the resulting stormwater runoff causes further degradation of water quality. Coastal and land use planning tools, effective incentives to preserve and enhance the region's coastal waterfront heritage and protect access to the public trust resources of the South Atlantic are examples of such tools. The Alliance will strive to more effectively manage these changes, by striking a balance among new development, historic uses, port expansion, and sustaining resources for the future.

Governors' South Atlantic Alliance Framework Continued

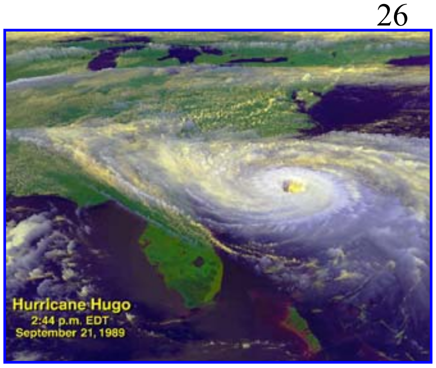
Clean Coastal and Ocean Waters

Significant impacts to estuarine water quality, and coastal ecosystem health are predicted as a result of increasing coastal urbanization. Growth and development are already placing enormous pressures on coastal resources and the adjacent coastal ocean. At the same time, climate change is influencing salinity levels, saltwater intrusion and rise in ocean levels. Both point and non-point discharges from land-based and atmospheric sources are affecting our ground water, rivers, estuaries and the oceans' water column.

Impacts are also evidenced by the increased number of advisories and closures caused by high bacteria levels and harmful algal blooms implicated in fish kills and human health dangers. Variable loads of sediment, nutrients, and pollutants interact with the coastal ocean to influence processes. The Alliance will view the impacts in a state and regional context to enhance managers' ability to effectively target prevention, enforcement, response, mitigation activities, and integrate coastal and ocean observing systems in the South Atlantic.

Disaster-Resilient Communities

Both short-term and long-term changes in weather and climate are major concerns in the southeastern United States. These changes threaten our coastal communities, a multi-billion dollar tourism industry, coastal and watershed development and infrastructure, and local fishing industries. There is a solid history of cooperation among state and private responders in times of emergency. Building upon that, we can share best practices as we prepare for the next emergency to minimize losses and accelerate recovery. Coastal storms account for 71 percent of recent U.S. disaster losses annually. Each event costs roughly $500 million. Hurricanes Hugo, Andrew, Rita, Isabel and Wilma have reinforced the need for the region to better prepare our communities through risk reduction and damage prevention, mitigation, response, and recovery strategies.

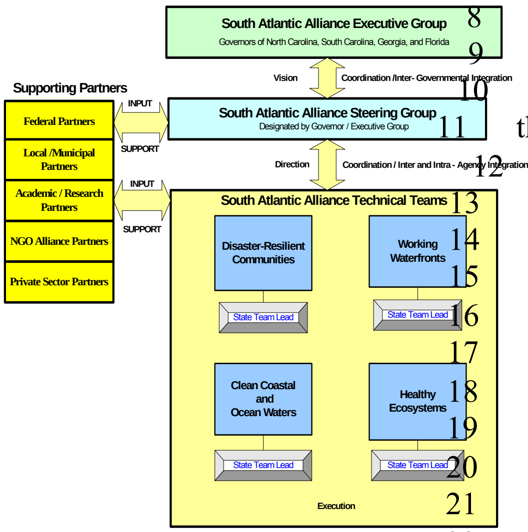


Understanding our vulnerability to, and the impacts of, storms and climate change will enable coastal and natural resource managers and community decision-makers to adapt their management strategies, improve planning and preparedness, and develop mitigation strategies to address impacts to public safety, shoreline change, coastal infrastructure, habitat loss, and species migration and natural resources. Emergency responders and community planners must also develop and implement new strategies to minimize risk to property and industries located in our coastal counties. Long-term climate change and accelerated sea level rise have also emerged as important issues for our region. The Alliance will work to greatly enhance our understanding of ocean and weather dynamics and improve prediction, observation and forecasting capabilities.

Governors' South Atlantic Alliance Framework Continued

Alliance Framework and Outcomes

The Alliance organization will function based on rules that optimize the ability to develop and sustain an effective working relationship among the partners to identify and seize opportunities for mutual gain.



The Alliance structure and framework will provide the foundation for key outcomes supporting the vitality of the region in a balanced manner. Furthermore, it is our intent that the Alliance will provide:

- An organizational structure and forum for collaboration, coordination and a clearing house for information supporting cooperative activities and coastal and ocean decision making;
- Regional sustainability of resources that supports individual state requirements;
- Better regional alignment of decisions resulting in mutual mission accomplishment.
- Cooperative planning and leveraging of resources to produce multiple state and regional benefits;
- Integrated research, observation and mapping of the South Atlantic region leading to common and coordinated data and information to enhance science-based decision making;
- Integrated solutions that benefit all systems' requirements (i.e., ecosystems, economic systems, and national defense systems) at state, federal and local levels; and
- Increase the level of awareness of policymakers and the public to the challenges facing the South Atlantic region.

Southeast Atlantic Alliance Executive Planning Team Members

Chris Russo, Organizational Effectiveness Director, N.C. Department of Environment and Natural Resources
Carolyn Boltin, Commissioner, South Carolina Ocean and Coastal Resource Management
Robert Boyles, Director, South Carolina Marine Resources
Stephanie Bailenson, Director, Florida Coastal and Aquatic Management
Louis Daniel, Director, Division of North Carolina Marine Fisheries
Jim Gregson, Director, Division of North Carolina Coastal Management
Susan Shipman, Director, Georgia Coastal Resources Division
Ken Haddad, Executive Director, Florida Fish and Wildlife Conservation Commission
Gil McRae, Director, Florida Marine Research Institute (FMRI)
Rick DeVoe, Executive Director, South Carolina Sea Grant Consortium (SCSGC)
Harvey Seim, Southeast Coastal Ocean Observing Regional Association (SECOORA)
Roger Pugliese, Senior Fishery Biologist, South Atlantic Fishery Management Council

Governors' South Atlantic Alliance Framework Continued

Camille Destafney, Regional Environmental Director, Navy Region Southeast
Paul Friday, Community Planning and Liaison Coordinator, USMC Installations East
Ginny Fay, senior policy analyst, National Oceanic and Atmospheric Administration
James Leutze, Chancellor Emeritus, University of North Carolina-Wilmington
Bob Barnes, National Military Support Coordinator, The Nature Conservancy
Mary Conley, Southeast Coordinator, The Nature Conservancy, Southeast Region
Ron Baird, research professor, University of North Carolina-Wilmington Center of Marine Science