UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

DEC 15 2011

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act (NEPA), an environmental review has been performed on the following action.

TITLE: Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2)
RIN: 0648-BB26

LOCATION: South Atlantic Region

SUMMARY: CE-BA 2 proposes the following actions in the South Atlantic Region:

Modify Management of Octocorals in the South Atlantic
CE-BA 2 proposes to specify the annual catch limit (ACL) for octocorals in the South Atlantic region. The South Atlantic Fishery Management Council (Council) would remove octocorals off Florida from the fishery management unit (FMU) under the Fishery Management Plan (FMP) for Coral, Coral Reefs, and Live/Hardbottom Habitats of the South Atlantic Region (Coral FMP) and indicate that octocorals are included in the FMU off North Carolina, South Carolina, and Georgia. The ACL for octocorals would be set at zero. CE-BA 2 would make no changes to management of other coral species in the FMU, including protected species of *Acropora*; harvest of these species would continue to be prohibited.

Modify Management in the Special Management Zones (SMZs) off South Carolina
CE-BA 2 would amend the FMP for the Snapper-Grouper Fishery of the South Atlantic Region (Snapper-Grouper FMP) and the FMP for Coastal Migratory Pelagic Resources in the Atlantic and Gulf of Mexico to require harvest (with the use of all non-prohibited fishing gear) and possession of managed species in South Carolina SMZs to be limited to the recreational bag limit for snapper-grouper and coastal migratory pelagic species. Commercial fishing in the SMZs could still occur but would be limited to the recreational bag limit. This action responds to concern from the recreational sector about the potential for commercial exploitation of South Carolina SMZs.

Modify Sea Turtle Release Gear Requirements
An action to modify sea turtle release gear requirements for the snapper-grouper fishery is also included in CE-BA 2. Fishermen have expressed concern that the current sea turtle handling and release gear requirements are intended for larger longline vessels using heavy tackle and are ineffective and unwieldy for smaller snapper-grouper hook-and-line vessels.

Designate Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concern (EFH-HAPCs)

CE-BA 2 would amend Council FMPs as needed to designate new or modify existing EFH and EFH-HAPCs. CE-BA 2 would amend the Snapper-Grouper FMP and the Coral FMP to designate additional EFH-HAPCs. To meet the Magnuson-Stevens Fishery Conservation and Management Act requirement that all managed species have designated EFH, CE-BA 2 amends the FMP for the Pelagic *Sargassum* Habitat of the South Atlantic Region.

RESPONSIBLE OFFICIAL:

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The environmental review process led us to conclude that this action will not have a significant impact on the environment. Therefore, an environmental impact statement was not prepared. A copy of the finding of no significant impact (FONSI), including the environmental assessment (EA), is enclosed for your information.

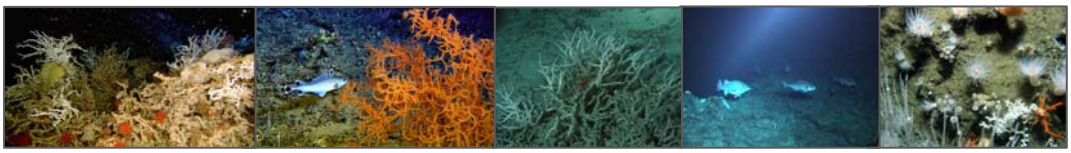
Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the Responsible Official named above.

Sincerely,

Patricia A. Montanio
NOAA NEPA Coordinator

Enclosure

COMPREHENSIVE ECOSYSTEM-BASED AMENDMENT 2 FOR THE SOUTH ATLANTIC REGION



AMENDMENT 7 TO THE FISHERY MANAGEMENT PLAN FOR CORAL, CORAL REEFS, AND LIVE/HARDBOTTOM HABITATS OF THE SOUTH ATLANTIC REGION
AMENDMENT 23 TO THE FISHERY MANAGEMENT PLAN FOR THE SNAPPER GROUPER FISHERY OF THE SOUTH ATLANTIC REGION
AMENDMENT 21 TO THE FISHERY MANAGEMENT PLAN FOR THE COASTAL MIGRATORY PELAGIC RESOURCES IN THE ATLANTIC AND GULF OF MEXICO
AMENDMENT 1 TO THE FISHERY MANAGEMENT PLAN FOR PELAGIC *SARGASSUM* HABITAT OF THE SOUTH ATLANTIC REGION

July 2011

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This is a publication of the South Atlantic Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award No. FNA05NMF4410004

ABBREVIATIONS AND ACRONYMS

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

MARMAP	Marine Resources Monitoring Assessment and Prediction Program
MARFIN	Marine Fisheries Initiative
MBTA	Migratory Bird Treaty Act
MFMT	Maximum Fishing Mortality Threshold
MMPA	Marine Mammal Protection Act of 1973
MRFSS	Marine Recreational Fisheries Statistics Survey
MSA	Magnuson-Stevens Act
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
NEPA	National Environmental Policy Act of 1969
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuary Act
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
OFL	Overfishing Level
OY	Optimum Yield
POC	Pew Oceans Commission
R	Recruitment
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation Report
SAFMC	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-BASED AMENDMENT 2 FOR THE SOUTH ATLANTIC REGION

INCLUDING A DRAFT ENVIRONMENTAL ASSESSMENT AND DRAFT SOCIAL IMPACT ASSESSMENT/FISHERY IMPACT STATEMENT

Proposed actions:

- Modify management of octocorals in the South Atlantic
- Extend the South Atlantic Council's management unit for octocorals into the Gulf of Mexico Council's area of jurisdiction
- Modify the ACL for octocorals in the South Atlantic
- Modify management of SMZs off South Carolina
- Modify sea turtle release gear requirements for the snapper grouper fishery
- Amend the following FMPs to designate EFH and EFH-HAPCs: Snapper Grouper FMP; Coral FMP; *Sargassum* FMP

Lead agency:

FMP Amendments – South Atlantic Fishery Management Council
EA - NOAA Fisheries Service

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Scoping meetings held:

January 26, 2009 (Charleston, SC)
January 27, 2009 (New Bern, NC)
February 3, 2009 (Key Largo, FL)
February 4, 2009 (Cocoa Beach, FL)
February 5, 2009 (Pooler, GA)

Public Hearing meetings held:

January 24th, 2011 (New Bern, NC)
January 26th, 2011 (North Charleston, SC)
January 27th, 2011 (Pooler, GA)
January 31st, 2011 (Jacksonville, FL)
February 1st, 2011 (Cocoa Beach, FL)
February 3rd, 2011 (Key Largo, FL)

ABSTRACT

This Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2) consists of actions related to management of the octocoral fishery, modification of management of Special Management Zones (SMZs) off South Carolina, modification of sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery and non-regulatory actions that designate new essential fish habitat (EFH) and EFH-habitat areas of particular concern (EFH-HAPCs). The South Atlantic Fishery Management Council (South Atlantic Council) developed the actions in the amendment consistent with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

CE-BA 2 proposes to specify the annual catch limit (ACL) for octocorals in the South Atlantic region. The South Atlantic Council is considering modifying the fishery management unit (FMU) for octocorals under the Fishery Management Plan for Coral, Coral Reefs, Live/Hardbottom Habitats of the South Atlantic Region (Coral FMP) to specify that octocorals are included in the exclusive economic zone off of North Carolina, South Carolina, and Georgia. As a result of potentially reducing the management unit for octocorals, the South Atlantic Council is also considering an action to set the ACL at zero.

CE-BA 2 would amend the Snapper Grouper FMP and FMP for the Coastal Migratory Pelagic Resources in the Atlantic and Gulf of Mexico to require that harvest (with the use of all non-prohibited fishing gear) and possession of snapper grouper and coastal migratory pelagic managed species in the SMZs off South Carolina be limited to the recreational bag limit. This action responds to concern from fishermen about potential user conflicts in the SMZs off South Carolina.

An action to modify sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery is also included in CE-BA 2. Fishermen have expressed concern that the current sea turtle and smalltooth sawfish handling and release gear requirements are intended for "heavier duty" gear used in longline fisheries and are unwieldy and less effective when used with the lighter tackle employed in the non-longline, hook-and-line component of the fishery.

This amendment would amend the South Atlantic Council FMPs as needed to designate new or modify existing EFH and EFH-HAPCs. CE-BA 2 would amend the FMP for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) and the Coral FMP to designate additional EFH-HAPCs. To meet the Magnuson-Stevens Act requirement that all managed species have EFH designated, CE-BA 2 amends the FMP for Pelagic *Sargassum* Habitat FMP of the South Atlantic Region (*Sargassum* FMP) to designate EFH.

CE-BA 2 proposes actions that would:

- Modify management of octocorals in the South Atlantic

- Extend the South Atlantic Council's management unit for octocorals into the Gulf of Mexico Council's area of jurisdiction
- Modify the ACL for octocorals in the South Atlantic
- Modify management of SMZs off South Carolina
- Modify sea turtle release gear requirements for the snapper grouper fishery
- Amend the following FMPs to designate EFH and EFH-HAPCs: Snapper Grouper FMP; Coral FMP; *Sargassum* FMP

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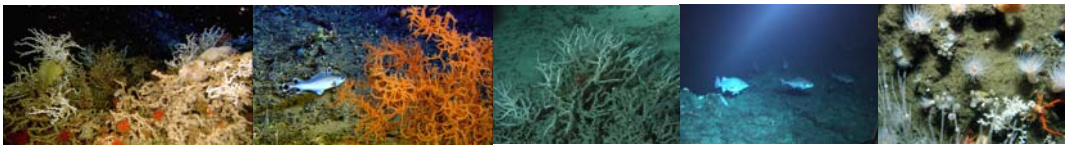


The South Atlantic Fishery Management Council (South Atlantic Council) is developing various management measures in order to address additional criteria for Fishery Management Plans required by the reauthorized Magnuson-Stevens Fishery Conservation and Management Act (2006). In the Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2), actions are being proposed related to management of the octocoral fishery, modifying management of Special Management Zones off South Carolina, and modifying sea turtle and smalltooth sawfish release gear requirements in the Snapper Grouper Fishery. Additionally, non-regulatory actions are being proposed that would designate essential fish habitat (EFH) as well as essential fish habitat-habitat areas of particular concern (EFH-HAPCs) in specific Fishery Management Plans (FMPs) to ensure conservation and enhancement of habitat.

This document is intended to serve as a SUMMARY for all the actions and alternatives in CE-BA 2. It also includes a summary of the expected biological and socio-economic effects from the management measures.

Purpose and Need of the Proposed Actions

The *purpose* of CE-BA 2 is to amend Fishery Management Plans (FMPs) as needed to respond to ecosystem issues that may go across fisheries as opposed to single species management for these issues. CE-BA 2 intends to modify management of octocorals in the South Atlantic through the establishment of an annual catch limit (ACL), modify how Special Management Zones (SMZs) off South Carolina are managed, revise sea turtle release and smalltooth sawfish gear requirements for the snapper grouper fishery, and designate Essential Fish Habitat (EFH) and Essential Fish Habitat – Habitat Areas of Particular Concern (EFH-HAPC) in the South Atlantic.

The *need* of the action is to ensure overfishing does not occur and to allow the stocks to increase in biomass, when necessary, in order to maximize their reproductive potential so that populations may produce optimum yield (OY). OY, the ultimate goal of any fishery, is to allow for harvest of a portion of the fish stock that provides the greatest economic, social, and ecological benefit to the nation. The actions in CE-BA 2 are needed to remain in compliance with the Magnuson-Stevens Fishery Management and Conservation Act (Magnuson-Stevens Act), and to respond to concern from fishermen.

List of Management Actions

There are 8 actions in CE-BA 2 that will accomplish the Purpose and Need:

1. Modify management of octocorals in the South Atlantic
2. Extend the South Atlantic Fishery Management Council's (South Atlantic Council) management unit for octocorals into the Gulf of Mexico Fishery Management Council's (Gulf of Mexico Council) area of jurisdiction
3. Modify the ACL for octocorals in the South Atlantic
4. Modify management of SMZs off South Carolina
5. Modify sea turtle release gear requirements for the snapper grouper fishery
6. Amend the Snapper Grouper FMP to designate new EFH-HAPCs
7. Amend the Coral FMP to designate new EFH-HAPCs
8. Amend the FMP for Pelagic *Sargassum* habitat to designate new EFH

Each *action* has a range of *alternatives* in order to accomplish the purpose and need. Alternatives are developed for Council members and the public to weigh biological, economic and social impacts. The public is given the opportunity to comment on the alternatives as well. The range must include at least the no action (to do nothing) and preferred (the Council's choice) alternatives.

Background

The Octocoral Fishery

Octocorals, designated as Essential Fish Habitat, are commercially collected and sold live to wholesale and retail dealers and aquarium owners. The South Atlantic Council, along with the Gulf of Mexico Council, first described the fishery in their 1982 joint Coral Fishery Management Plan (Coral FMP). Amendment 1 of the Coral FMP specified the joint commercial quota for the harvest of allowable octocorals in Gulf and South Atlantic federal waters as 50,000 colonies per year. Amendment 3 of the Coral FMP prohibited harvest of octocorals north of Cape Canaveral, FL, where they constitute a significant portion of the live/ hardbottom habitat. Octocorals are primarily found in the Florida Keys region, where the majority are harvested in Florida state waters primarily for the aquarium industry. They are included under Florida Fish and Wildlife Conservation Commission's Marine Life Fishery Program, and managed through a limit on the number of commercial harvesters allowed (currently there are ~100-140 fishers) and also a recreational daily bag limit. Florida rules state that harvest of allowable octocorals will close in state waters when the adjacent federal quota has been met. To date, this fishery has never closed.

What are Octocorals?

Octocorals consist primarily of gorgonians as well as soft corals, horny corals, sea fans, sea whips, and sea pens. They contribute greatly to coral reef diversity, providing habitat for an array of managed fishery species and organisms. Similar to stony corals, octocorals are colonial animals with a polyp as the individual building unit. They have both sexual and asexual reproductive modes. Octocorals are sedentary and derive energy from sunlight, consumption of zooplankton, detritus and dissolved organics.

As a result of existing management mechanisms in place for octocorals, in Florida state waters, the South Atlantic Council is considering modifying the management unit for octocorals under the Coral FMP to maintain protection in federal waters off of North Carolina, South Carolina and Georgia. Protection for octocorals will remain in place in Florida state waters under their existing management program, Florida's Marine Life Fishery Program and Florida could extend management from state waters into federal waters off Florida. They are also considering the implications of other management measures for this fishery.

Regulations for SMZs off South Carolina

- **Use of a powerhead to take South Atlantic snapper grouper is prohibited**
- **Fishing may only be conducted with handline, rod and reel, and spearfishing gear**
- **Use of a sea bass pot or bottom longline is prohibited**

Special Management Zones off South Carolina

Artificial reefs in South Carolina waters are built and managed by South Carolina Department of Natural Resources (SCDNR) to promote recreational fishing opportunities. Construction is funded mostly by the recreational community through the South Carolina Saltwater Fishing License Program and federal Aid in Sportfish Restoration Program. Under the Snapper Grouper FMP, SCDNR may request the South Atlantic Council designate an artificial reef as a Special Management Zone (SMZ) (artificial reef and surrounding area) in order to prohibit or restrain the use of specific types of fishing gear. Currently 29 SMZs have been designated in federal waters offshore of South Carolina. The South Atlantic Council is concerned over reports of

commercial vessels operating on SMZs, a practice not keeping with the intended purpose of the SMZs. The Snapper Grouper FMP states that fishing gear offering "exceptional advantages" over other gear types may significantly reduce improved fishing opportunities and thus eliminate any incentive for establishing SMZs. An action has been developed to limit the harvest of certain species in the SMZs to the recreational bag limit.

Sea Turtle Release Gear Requirements

Current sea turtle release gear requirements were established in Amendment 15B to the Snapper Grouper FMP and include the same dehooking and disentanglement gear as required in the pelagic longline fishery. Since Amendment 15B's approval and implementation, concerns have been raised regarding the appropriateness of several required gear for smaller vessels carrying much lighter tackle than the pelagic longline fishery. An action has been developed to address these concerns and modify requirements for vessels in the snapper grouper fishery.

Designating Essential Fish Habitat

The Magnuson-Stevens Act directs the Councils to describe and identify essential fish habitat (EFH) for each federally managed species, to minimize the extent of adverse effects on habitat caused by fishing and non-fishing activities, and to identify actions to encourage conservation and enhancement of those habitats. Councils may also identify EFH-Habitat Areas of Particular Concern (EFH-HAPC). The South Atlantic Council is considering amending additional EFH-HAPC areas in the Snapper Grouper FMP, Coral FMP, as well as designating new EFH areas in the Pelagic *Sargassum* FMP.

Actions Addressing Octocorals

❖ Action 1. Modify Management of Octocorals in the South Atlantic

Alternative 1. No Action. Do not remove octocorals from the fishery management unit (FMU) under the South Atlantic Coral FMP.

Alternative 2. Remove octocorals from the FMU.

Preferred Alternative 3. Modify the FMU to indicate that octocorals are included in the EEZ off NC, SC and GA.

Impacts from Action 1

Biological

Under **Alternative 1 (No Action),** octocorals would continue to be managed under the Coral FMP and would be subject to a harvest level of 50,000 colonies combined for the Gulf and South Atlantic exclusive economic zone. Octocorals are considered a data-poor stock, with no stock assessment and limited landings information. Fishery-independent survey data indicate there is relatively high octocoral abundance in the historically known distribution area (the Florida Keys). The fishery is also managed in state waters under other management measures overseen by Florida Fish and Wildlife Conservation Commission (FWC; because the fishery largely exists in Florida state waters) including commercial permits, reporting requirements, and a six-colony recreational bag limit for octocorals.

Alternative 2 would remove octocorals from the Coral FMP and eliminate current management measures for octocorals in the South Atlantic. Under this alternative, octocorals would not be protected through a commercial quota, commercial permit, or reporting requirements in federal waters. Harvest of octocorals would be allowed in the five Deepwater Coral HAPCs, designated in CE-BA 1, and the *Oculina* Bank HAPC. **Alternative 2** may result in a significant increase in the harvest of octocorals however market demand for this species is limited and would likely be the driving factor in an increase in effort.

Preferred Alternative 3 would revise the fishery management unit to include octocorals off of Georgia, North Carolina, and South Carolina. Octocorals off of Florida would be removed from the Coral FMP and would result in no federal management by the South Atlantic Council. Although octocoral harvest is managed under the Coral FMP, the FWC is responsible for most of the management, implementation and enforcement of regulations because the majority of harvest occurs in state waters. **Preferred Alternative 3** should result in the same biological protection to the resource as is currently implemented.

Socio-economic

If the state of Florida extends their jurisdiction into federal waters, Florida waters can be protected and no short or long-term changes would be expected with regard to economic effects in Florida

waters. If Florida does not extend their jurisdiction into federal waters, landings would be allowed to increase in federal waters, although, as stated above, the market for octocorals would limit harvest. In this case, due to the possible increased risk of overfishing octocorals under **Alternative 2**, long-term economic benefits would be expected to decrease compared to **Alternative 1**. Short-term economic benefits could increase if the market demand for octocorals increases.

Without federal management in waters north of Florida (under **Alternative 2**), long-term economic effects would be expected to decline under **Alternative 2** compared to **Alternative 1**.

Under **Preferred Alternative 3**, if Florida extends their jurisdiction into federal waters, as they are expected to do, no short or long-term changes would be expected with regard to economic effects resulting from this action.

❖ Action 2. Extend the SAFMC's Fishery Management Unit (FMU) for Octocorals into the Gulf of Mexico Fishery Management Council's Area of Jurisdiction

Preferred Alternative 1. No Action. Do not extend the FMU for octocorals into the Gulf Council's jurisdiction.

Alternative 2. Extend the management boundaries for all octocorals species in the Coral FMP to include the Gulf Council's jurisdiction.

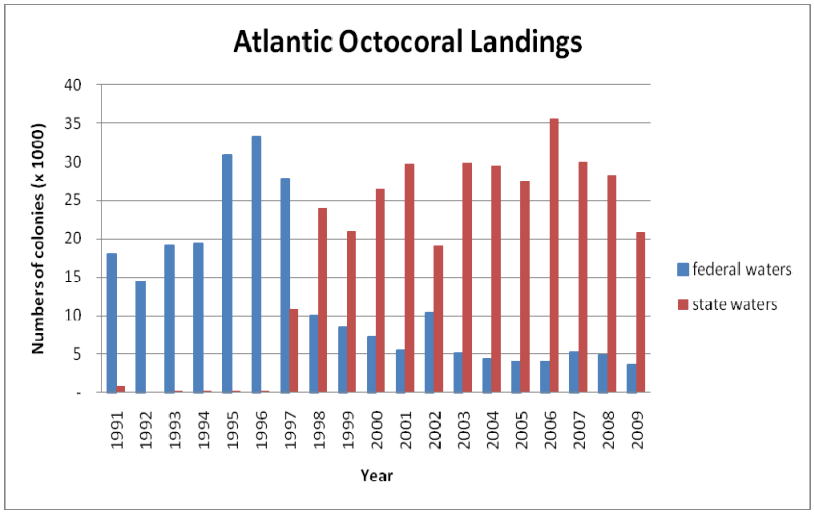


Figure 1 – Octocoral harvest in South Atlantic Federal and State waters for the period 1991-2009 (Source: FL FWC, FWRI)

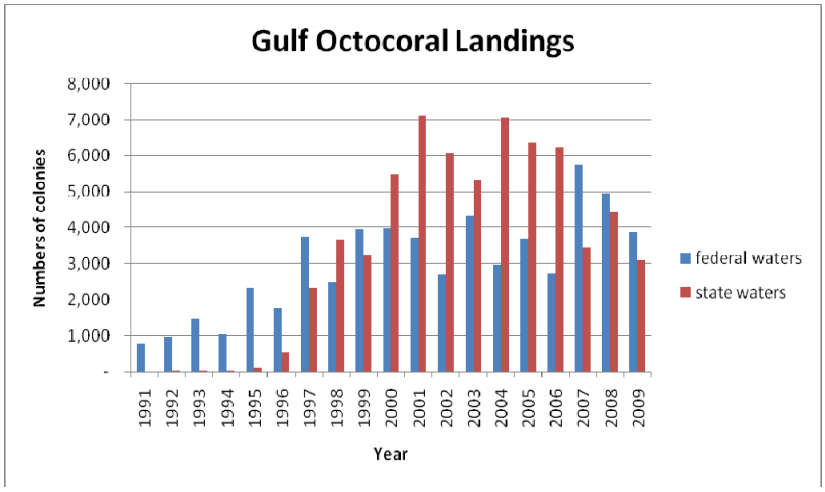


Figure 2 – Octocoral harvest in Gulf of Mexico Federal and State waters for the period 1991-2009 (Source: FL FWC, FWRI)

Impacts from Action 2

Biological

Currently, the quota for octocorals is 50,000 colonies combined in the Gulf and South Atlantic exclusive economic zone. **Preferred Alternative 1 (No Action)** would maintain the current biological impacts to the resource. **Alternative 2** would extend management jurisdiction of octocorals to include the Gulf Council's area of jurisdiction. Under both alternatives, the 50,000 colony quota applies to octocoral harvest in the Gulf of Mexico and the South Atlantic, combined, and would not result in increased biological impacts to the resource. **Preferred Alternative 1** and **Alternative 2** refer only to who manages the fishery and would not change the quota or the management mechanism currently in place.

Socio-economic

Extension of the FMU (**Alternative 2**) for octocorals into the Gulf Council's jurisdiction is largely an administrative action and there are no direct economic effects. There are no expected changes to long-term economic effects as a result of **Alternative 2** compared to **Preferred Alternative 1** since both protect octocorals to the same degree. As stated above, **Preferred Alternative 1** and **Alternative 2** refer only to who manages the fishery and would not change the quota or the management mechanisms currently in place.

❖ Action 3. Modify the Annual Catch Limit (ACL) for Octocorals in the South Atlantic

Alternative 1. No Action. Do not modify the existing ACL for octocorals in the South Atlantic (ACL=current 50,000 colony quota for South Atlantic and Gulf of Mexico EEZ).

Alternative 2. Modify the existing ACL in the South Atlantic and Gulf of Mexico (ACL=current 50,000 colony quota for South Atlantic and Gulf of Mexico EEZ) to include State waters.

Preferred Alternative 3. ACL = 0 for octocorals in the EEZ off NC, SC, and GA.

Annual Catch Limits (ACL)

The level of annual catch (pounds or numbers) that triggers accountability measures to ensure that overfishing is not occurring.

Year	*Combined South Atlantic and Gulf State Landings*	*Combined South Atlantic and Gulf federal Landings*	*Total Landings*
2000	31,847	11,253	43,100
2001	36,734	9,160	45,894
2002	25,024	13,114	38,138
2003	35,104	9,380	44,484
2004	36,406	7,352	43,758
2005	33,752	7,700	41,452
2006	41,822	6,745	48,567
2007	33,275	10,997	44,272
2008	32,651	9,841	42,492
2009	23,887	7,372	31,259

Table 1 - Landings of octocorals in both South Atlantic and Gulf Federal and State waters (Source: Landings data FL FWC, FWRI)

Impacts from Action 3

Biological

Alternative 1 (No Action) would continue to manage octocorals with the 50,000 colony quota and would not account for landings in state waters. Florida has implemented compatible regulations, which allow the state octocoral fishery to close when the federal quota is met, however, that quota has never been reached and the state fishery for octocorals has never been closed.

Alternative 2 would modify the existing annual catch limit (ACL) for octocorals to include landings from Gulf and South Atlantic state waters in addition to landings in the exclusive economic zone (EEZ). The majority of octocoral harvest occurs in the state waters off Florida. The landings off states in the Gulf and South Atlantic have not exceeded the 50,000 colony quota but have come fairly close. In November 2010, the South Atlantic Council's Scientific and Statistical Committee (SSC) recommended an acceptable biological catch (ABC) level of 50,000 colonies annually, including the Gulf and South Atlantic EEZ and state waters. (Councils review the SSC recommendations for ABC and set the ACL.) Combined landings for state and federal waters in the Gulf and South Atlantic have not reached the 50,000 colony quota but may in the future. **Alternative 2** would allow greater protection to the resource than **Alternative 1** by considering state landings towards the quota.

Preferred Alternative 3 would establish an ACL equal to 0 for the octocoral fishery but this action is dependent on the alternatives in Action 1. **Preferred Alternative 3** would result in no harvest of octocorals in the South Atlantic, and would only apply to octocoral harvest north of Florida. Currently, there is a prohibition of octocoral harvest and possession north of Florida, and this would continue under this alternative. The biological impacts to the resource would remain the same as the status quo.

Socio-economic

Landings in state and federal waters have never exceeded the **Alternative 2** proposed ACL, and therefore, there are no expected short-term economic losses to fishermen of implementation of the 50,000 quota as the ACL. However, there could be an economic loss suffered by fishermen who have made investments toward expanding harvest operations in the future. Also, in the case where state and federal landings of octocorals are underreported, economic losses could occur. However, this cannot be quantified because there is no record that this is occurring.

Because there are no landings of octocorals occurring in federal waters north of Florida, and harvest of octocorals is prohibited north of Cape Canaveral, FL, the **Preferred Alternative 3** (ACL = 0) is not expected to result in any negative economic effects.

Actions Addressing SMZs and Sea Turtle Gear Requirements

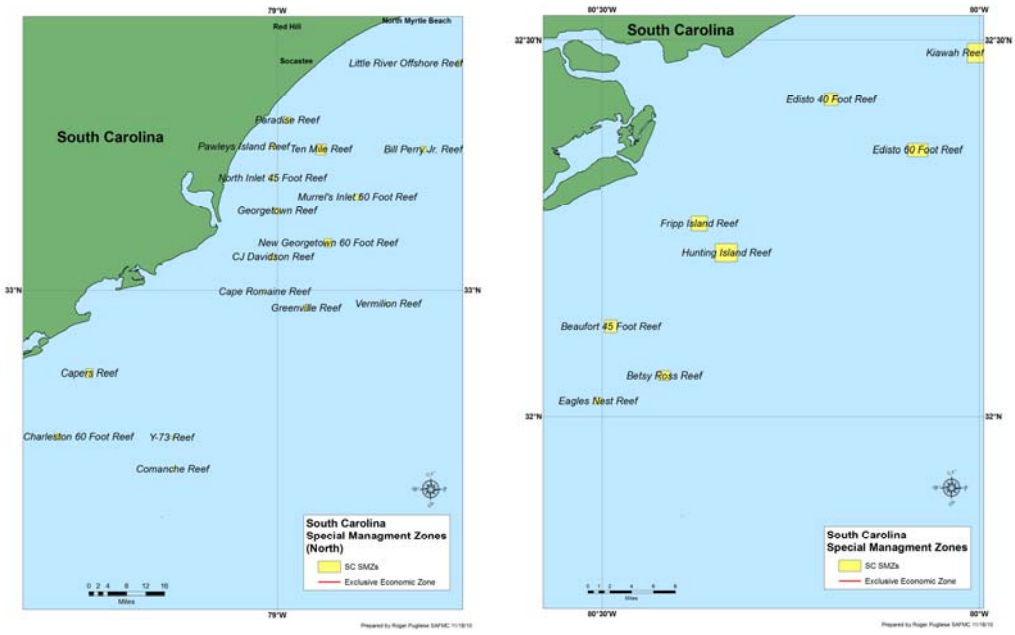
❖ Action 4. Modify Management of Special Management Zones (SMZs) off South Carolina

Alternative 1. No Action. Do not modify the current management of SMZs off South Carolina.

Preferred Alternative 2. Limit harvest and possession of snapper grouper species (with the use of all non-prohibited fishing gear) in SMZs off South Carolina to the recreational bag limit.

Preferred Alternative 3. Limit harvest and possession of coastal migratory pelagic species (with the use of all non-prohibited fishing gear) in SMZs off South Carolina to the recreational bag limit.

Alternative 4. Prohibit use of hand spear and spear guns in SMZs off South Carolina.



Figures 3 and 4 – Special Management Zones off South Carolina, North and South geographic areas

Impacts from Action 4

The intended purpose behind the designation of an artificial reef as an SMZ is to "prohibit or restrain the use of specific types of fishing gear that are not compatible with the intent of the permittee for the artificial reef." Designating an artificial reef as an SMZ preserves the fishing opportunities artificial reefs provide and serves as an incentive to establish them. Fishing gear that offers "exceptional advantages" over other gear types may significantly reduce the improved fishing opportunities, and eliminate the incentive for developing an artificial reef, which would prevent improved fishing opportunities that would not otherwise exist (Snapper Grouper FMP, SAFMC 1983).

Biological

Modifying management of the SMZs to restrict commercial fishing effort to the bag limit could possibly reduce the amount of harvest and have a positive biological impact on the species regularly targeted. However, there is little information on the amount of commercial harvest in the SMZs and any commercial effort is expected to be small. In general, given that an expected decrease in commercial harvest could occur, long-term biological benefits are expected as a result of **Preferred Alternative 2** and **Preferred Alternative 3,** and also **Alternative 4**.

Socio-economic

South Carolina artificial reef users in 2006 represented an economic impact (i.e., economic importance) of approximately $83 million in total sales (output) that generated approximately 1,000 jobs (Rhodes and Pan, 2007). One of the goals of implementing the SMZ structures was to maintain intended socioeconomic benefits of the SMZs to recreational anglers.

Commercial landings of species caught on these artificial reefs cannot be quantified due to the way that logbook landings are recorded. Both **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in small reductions in ex-vessel revenues to commercial fishermen, although some mitigation of these reductions could occur as a result of fishing in other areas. At the same time, **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in increased economic benefits to recreational fishermen as a result of allocation of the harvest that would otherwise be taken by commercial fishermen.

The effect of **Alternative 4** on the recreational fishery of South Carolina is expected to be significant. Any estimate of losses due to **Alternative 4** would likely be an overestimate of actual losses.

❖ Action 5. Modify Sea Turtle Release Gear Requirements for the Snapper Grouper Fishery

Alternative 1. No Action. Maintain current sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery in federal waters of the South Atlantic. Currently, required gear (regardless of freeboard height) includes:

- a long-handled line clipper or cutter,
- a long-handled dehooker for ingested hooks,
- a long-handled dehooker for external hooks,
- a long-handled device to pull an "inverted V",
- a dipnet,
- a tire (or other comparable cushioned, elevated surface that immobilizes boated sea turtles),
- a short-handled dehooker for ingested hooks,
- a short-handled dehooker for external hooks,
- long-nose or needle-nose pliers,
- bolt cutters,
- monofilament line cutters, and
- at least two types of mouth openers/mouth gags

This equipment must meet the specifications described in 50 CFR 635.21(c)(5)(i)(A-L) with the following modification: any other comparable, cushioned, elevated surface that allows boated sea turtles to be immobilized, may be used as an alternative to the requirement in 50 CFR 635.21(c)(5)(i)(F) to have a tire on board.

Alternative 2. Require all federally-permitted hook-and-line vessels with no longline gear onboard to have and use a tool capable of cutting the fishing line and a tool capable of removing a hook from a sea turtle or smalltooth sawfish. Fishermen would still be required to comply with all current sea turtle and smalltooth sawfish release guidelines.

Alternative 3. Require all sea turtle release and smalltooth sawfish gear listed under Alternative 1 (No Action) for federally-permitted snapper grouper vessels using longline gear, and require [insert specific sea turtle release gear] for federally-permitted vessels fishing with hook-and-line gear.

Preferred Alternative 4. Modify sea turtle and smalltooth sawfish release gear based on freeboard height. Fishermen would still be required to comply with all current sea turtle and smalltooth sawfish release guidelines. The design specifications of required gear and the handling and release techniques employed must comply with those described in the NOAA Fisheries Service document entitled "Careful Release Protocols for Sea Turtle Release with Minimal Injury."
NOTE: **Preferred Alternative 4** is recommended by the Southeast Regional Office of Protected Resources Division as the minimum requirement necessary to remain in compliance with the biological opinion.

Sub-Alternative 4a. Vessels with freeboard height of 4 feet or less would be required to carry and use:

- a short-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,

- long-nose or needle-nose pliers,
- bolt-cutters,
- mono-filament line cutters,
- cushion/support device (i.e., boat cushion),
- a dipnet,
- at least two types of mouth openers/mouth gags

Sub-Alternative 4b. Vessels with freeboard height greater than 4 feet (and/or using longline gear) would be required to carry and use:

- a long-handled line cutter,
- a long-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,
- a long-handled device to pull an "inverted V",
- a dipnet,
- cushion/support device (i.e., boat cushion),
- a short-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,
- long-nose or needle-nose pliers,
- bolt cutters,
- monofilament line cutters, and
- at least two types of mouth openers/mouth gags

Alternative 5. Modify the design specifications of the current sea turtle release and smalltooth sawfish gear equipment for all federally-permitted non-longline snapper grouper vessels with hook-and-line gear on board to match the specifications described in the NOAA Fisheries Service document entitled "Careful Release Protocols for Sea Turtle Release with Minimal Injury." (See **Appendix K**)

South Atlantic Council may select one or more sub-alternatives. Choosing additional sub-alternatives would be especially beneficial for species conservation, but not required to remain in compliance with the biological opinion.

Sub-Alternative 5a. Require all federally-permitted non-longline snapper grouper vessels with hook-and-line gear on board:

- a short-handled dehooker for ingested hooks, or a short-handled dehooker for external hooks,
- cushion/support device (i.e., standard automobile tire or boat cushion),
- long-nose or needle-nose pliers,
- bolt-cutters,
- mono-filament line cutters,
- a dipnet,
- at least two types of mouth openers/mouth gags

Sub-Alternative 5b. Also require:

- a long-handled dehooker for ingested hooks, or a long-handled dehooker for external hooks

Sub-Alternative 5c. Also require:

- a long-handled line clipper or cutter

Sub-Alternative 5d. Also require:

- a long-handled device to pull an "inverted V"

Impacts from Action 5

Biological

Alternative 1 (No Action) would maintain the current sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery. The dehookers, line cutters, and bolt cutters specified under current regulations were designed for and are required in the highly migratory species pelagic longline and shark bottom longline fisheries. Utilizing specialized dehooking and disentanglement gear has been shown to reduce hooking mortality in sea turtles; however, there is some concern that using sea turtle dehooking equipment not designed for the lighter tackle typically used by snapper grouper fishermen could in fact harm sea turtles or smalltooth sawfish during the dehooking process. If the heavier-duty dehooking gear required under **Alternative 1 (No Action)** is causing harm, or is less effective than gear designed for lighter tackle, the benefits of using the current gear may not be as great as could be achieved under other alternatives.

Alternatives 2 and **3** modify the sea turtle and smalltooth sawfish release gear specifications for vessels carrying hook-and-line gear on board that is not longline gear. Under these alternatives, all vessels with longline gear on board will be required to continue carrying all the dehooking and disentanglement gears outlined in **Alternative 1**. Under **Alternative 2**, the only tools that would be required for vessels carrying non-longline, hook-and-line gear are a tool capable of cutting fishing line, such as a knife, and a tool capable of removing a hook from a sea turtle, such as a pair of pliers. Because of the requirements of the biological opinion outlining how sea turtle and smalltooth sawfish release equipment should be implemented, **Alternative 2** would not be in compliance with the biological opinion.

Alternative 3 differs from **Alternative 2** by identifying specific types of sea turtle and smalltooth sawfish release equipment for snapper grouper vessels carrying hook-and-line gear onboard. **Alternative 3** also maintains the status quo requirement for snapper grouper vessels carrying longline gear onboard. The compliance of this alternative with the biological opinion would depend on which specific types of sea turtle and smalltooth sawfish release equipment were ultimately required.

Preferred Alternative 4 would require different lengths and types of dehooking tools dependent upon the freeboard height of the vessel, which tracks the sea turtle release gear regulations in the Gulf of Mexico. **Preferred Alternative 4** also offers the option of tailoring sea turtle and smalltooth sawfish release gear specifications to increase effectiveness when used with lighter tackle in the snapper grouper fishery. The biological benefits of **Preferred Alternative 4** are likely to be similar to Alternative 1. **Preferred Alternative 4** and its sub-alternatives reference the updated release gear design specifications that now include a wider range of gear design parameters. These new parameters should be appropriate for the lighter tackle used in the snapper grouper fishery.

Alternative 5 would modify the design specifications of the current sea turtle release gear requirements for all federally-permitted non-longline snapper grouper vessels with hook-and-line gear on board. **Sub-alternative 5a** would require a minimum set of release equipment more appropriate for the smaller tackle used in the snapper grouper hook-and-line fishery. The biological benefit of **sub-alternative 5a** would likely be similar to **Alternative 1**. The changes in design specifications to the required equipment could make them more effective in releasing hooked or disentangled sea turtles or smalltooth sawfish. Under these circumstances the biological benefits

from **sub-alternative 5a** may be greater than **Alternative 1**. Since each piece of equipment has new design criteria, each piece is likely to be more effective at dehooking and disentangling the lighter tackle used in the fishery. Selecting all four sub-alternatives is likely to have the greatest biological benefit of the all the proposed alternatives. This would ensure that both short- and long-handled release equipment are on board, and that those gears are designed to handle lighter tackle.

Socio-economic

Under **Alternative 1 (No Action)**, expenses totaled $617-$1,115 (2006 dollars) per vessel as estimated in Snapper Grouper Amendment 15B.

Alternatives 2 and **3** attempt to better match gear with the vessel and are likely to yield greater biological and economic benefits than **Alternative 1**. While **Alternative 2** and the other alternatives may result in increased economic benefits resulting from increased long-term biological benefits compared to **Alternative 1 (No Action)** because more appropriate release gear is being used, effectiveness is difficult to estimate and enforcement may be difficult since success relies heavily on how well sea turtle release guidelines are adhered to.

Alternative 3 is expected to yield slightly higher long-term economic benefits than **Alternatives 1** and **2**. Appropriate cutting and de-hooking gear is assumed to already be on board all vessels, so no additional gear costs would be expected to be incurred under **Alternatives 2** and **3**.

Out-of-pocket release gear expenses per *new entrant* for **Preferred Alternatives 4a** and **4b** are estimated to range from $324-$490 for vessels with less than 4 feet freeboard and from $564-$987 for vessels with more than 4 feet freeboard. There are no release gear expenses for those already participating in the fishery since all of the gear required under **Preferred Alternatives 4a** and **4b** is already required under **Alternative 1 (No Action)**.

No negative economic effects would be expected as a result of the **Alternative 5** sub-alternatives unless fishermen purchased the smaller gears identified in the sub-alternatives.

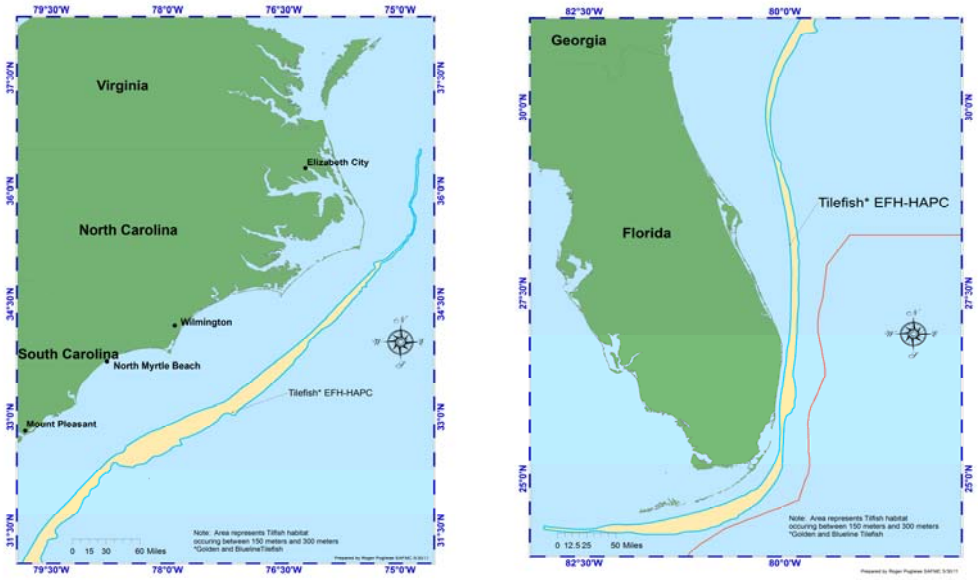
❖ Action 6. Amend the Snapper Grouper FMP to designate new EFH-HAPCs

Alternative 1. No Action. Do not amend the Snapper Grouper FMP to designate new Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs).

Preferred Alternative 2. Amend the Snapper Grouper FMP to designate one or more of the following EFH-HAPCs:

Sub-alternative 2a. Designate EFH-HAPCs for golden tilefish to include irregular bottom comprised of troughs and terraces inter-mingled with sand, mud, or shell hash bottom. Mud-clay bottoms in depths of 150-300 meters are HAPC. Golden tilefish are generally found in 80-540 meters, but most commonly found in 200-meter depths.

Sub-alternative 2b. Designate EFH-HAPC for blueline tilefish to include irregular bottom habitats along the shelf edge in 45-65 meters depth; shelf break; or upper slope along the 100-fathom contour (150-225 meters); hardbottom habitats characterized as rock overhangs, rock outcrops, manganese-phosphorite rock slab formations, or rocky reefs in the South Atlantic Bight; and the Georgetown Hole (Charleston Lumps) off Georgetown, SC.



Figures 5 and 6 – Tilefish Essential Fish Habitat - HAPC

Preferred Alternative 3. Designate EFH-HAPCs for the snapper grouper complex to include the following deepwater Marine Protected Areas (MPAs) as designated in Snapper Grouper Amendment 14:

- Snowy Grouper Wreck MPA
- Northern South Carolina MPA
- Edisto MPA
- Charleston Deep Artificial Reef MPA
- Georgia MPA
- North Florida MPA
- St. Lucie Hump MPA
- East Hump MPA

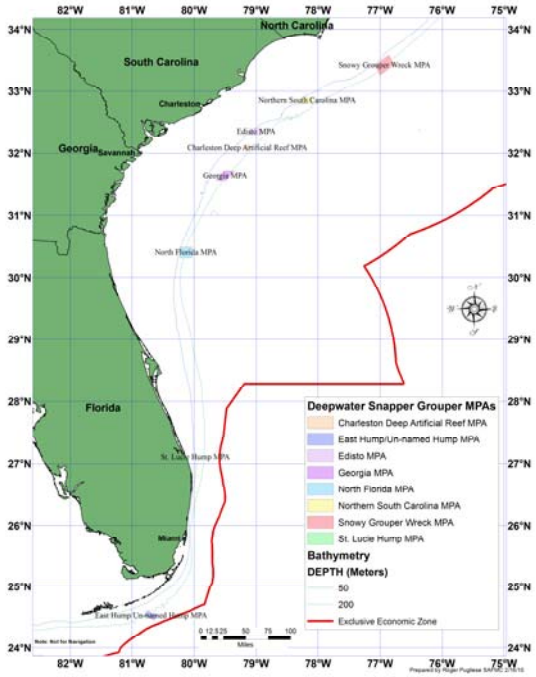


Figure 7 - Deepwater Snapper Grouper MPAs

Impacts from Action 6

Biological

Alternative 1 (No Action) would not add an area highlighting the importance of golden tilefish and blueline tilefish, or an area emphasizing the value of the habitat in the MPAs (established in Snapper Grouper Amendment 14). **Preferred Alternative 2** addresses an oversight in the initial designation of snapper grouper EFH through Amendment 10 to the Snapper Grouper FMP in the Comprehensive EFH Amendment, and while considered EFH, the area was not included in the proposed list of EFH-HAPCs. **Preferred Alternative 2a** for golden tilefish and **Preferred Alternative 2b** for blueline tilefish propose detailed descriptions for EFH-HAPCs. **Preferred Alternative 3** would designate previously specified deepwater MPAs as EFH-HAPCs. This alternative is intended to protect these MPAs as a unique habitat complex and require enhanced EFH consultations pertaining to non-fishing activities that could potentially impact these protected habitats.

EFH-HAPC designation would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect surface waters from non-fishing activities which are undertaken, authorized, or funded by federal agencies.

Socio-economic

Designation of additional EFH-HAPCs will require the South Atlantic Council to consider all operations or actions that might interact with or affect the EFH-HAPC, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a lengthy regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Assuming the areas are appropriate to the resource, both **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits.

❖ Action 7. Amend the Coral Fishery Management Plan to designate new EFH – Habitat Areas of Particular Concern (EFH-HAPCs)

Alternative 1. No Action. Do not amend the Coral FMP to designate new Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs).

Preferred Alternative 2. Amend the Coral FMP to designate the following Deepwater Coral HAPCs as designated in Comprehensive Ecosystem-Based Amendment 1 as EFH-HAPCs: Cape Lookout Coral HAPC, Cape Fear Coral HAPC, Blake Ridge Diapir Coral HAPC, Stetson-Miami Terrace Coral HAPC, Pourtalés Terrace Coral HAPC.

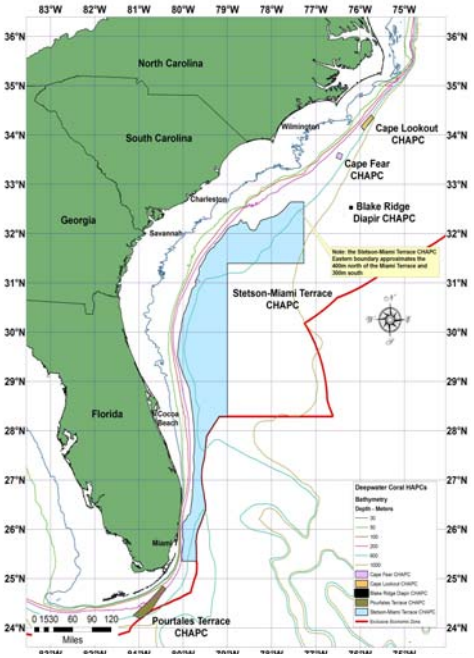


Figure 8 - Deepwater Coral HAPCs

Impacts from Action 7

Biological

Alternative 1 (No Action) would not propose additional EFH-HAPCs intended to aid in the conservation of coral and live bottom habitat, especially when addressing policy or permit activities associated with non-fishing activities.

Preferred Alternative 2 proposes to further emphasize the importance of these protected deepwater ecosystems by designating them as EFH-HAPCs. The EFH-HAPC designation under this option would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect habitat from non-fishing activities which are undertaken authorized, or funded by federal agencies.

Socio-economic

Designation of EFH-HAPC will require the South Atlantic Council to consider all operations or actions that might interact with or affect the EFH-HAPC, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a lengthy regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Assuming the area is appropriate to the resource, **Preferred Alternative 2** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits over **Alternative 1 (No Action)**.

❖ Action 8. Amend the Fishery Management Plan for Pelagic *Sargassum* Habitat to Designate EFH

Alternative 1. No Action. Do not amend the *Sargassum* FMP to designate Essential Fish Habitat (EFH). The South Atlantic Council must designate EFH for all managed species including Pelagic *Sargassum* Habitat.

Alternative 2. Amend the *Sargassum* FMP to designate the top 10 meters of the water column in the South Atlantic EEZ as EFH for Pelagic *Sargassum*.

Preferred Alternative 3. Amend the *Sargassum* FMP to designate the top 10 meters of the water column in the South Atlantic EEZ bounded by the Gulfstream, as EFH for pelagic *Sargassum*.

Impacts from Action 8

Biological

Alternative 1 (No Action) would not specify EFH for *Sargassum* and would not be in compliance with the EFH final rule. **Alternative 2** proposes an EFH designation that includes the top ten meters of the water column where it occurs in the South Atlantic. **Preferred Alternative 3** proposes a smaller EFH designation than **Alternative 2** that includes the top ten meters of the water column in the South Atlantic with the bounds of the Gulf Stream being the most eastern boundary. The Gulf Stream is the most significant oceanographic feature supporting *Sargassum* species occurrence, distribution and transport.

Limiting the EFH identification to the upper 10 meters of the surface as bounded by the Gulf Stream was recommended by NOAA Fisheries Service in the development of the Final Environmental Impact Statement for the Pelagic *Sargassum* Habitat FMP. The identification of essential habitat for pelagic *Sargassum* enables the South Atlantic Council to protect EFH more effectively and take timely actions when necessary. Identifying and describing EFH is the first step in preventing decreases in biological productivity of pelagic *Sargassum* and other managed or prey species dependent on pelagic *Sargassum*.

Socio-economic

The identification of EFH for pelagic *Sargassum* will not have any direct economic impacts. However, this measure will enable the South Atlantic Council to protect EFH effectively and take timely actions when necessary which could lead to increased net economic benefits to society. Assuming the area is appropriate to the resource, **Preferred Alternative 3** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and **Alternative 2** and is expected to increase long-term economic benefits compared **Alternative 1 (No Action)** and **Alternative 2**.

1 Introduction

1.1 Background

The South Atlantic Fishery Management Council (South Atlantic Council) manages the snapper grouper, coastal migratory pelagic fisheries, coral and coral reefs and *Sargassum* fisheries in the South Atlantic exclusive economic zone (EEZ) (**Figure 1-1**) under their respective Fishery Management Plans (FMPs). The FMPs and their amendments are developed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), other applicable federal laws, and executive orders. The species managed under the FMPs addressed in this amendment are listed in **Table 1-1**.

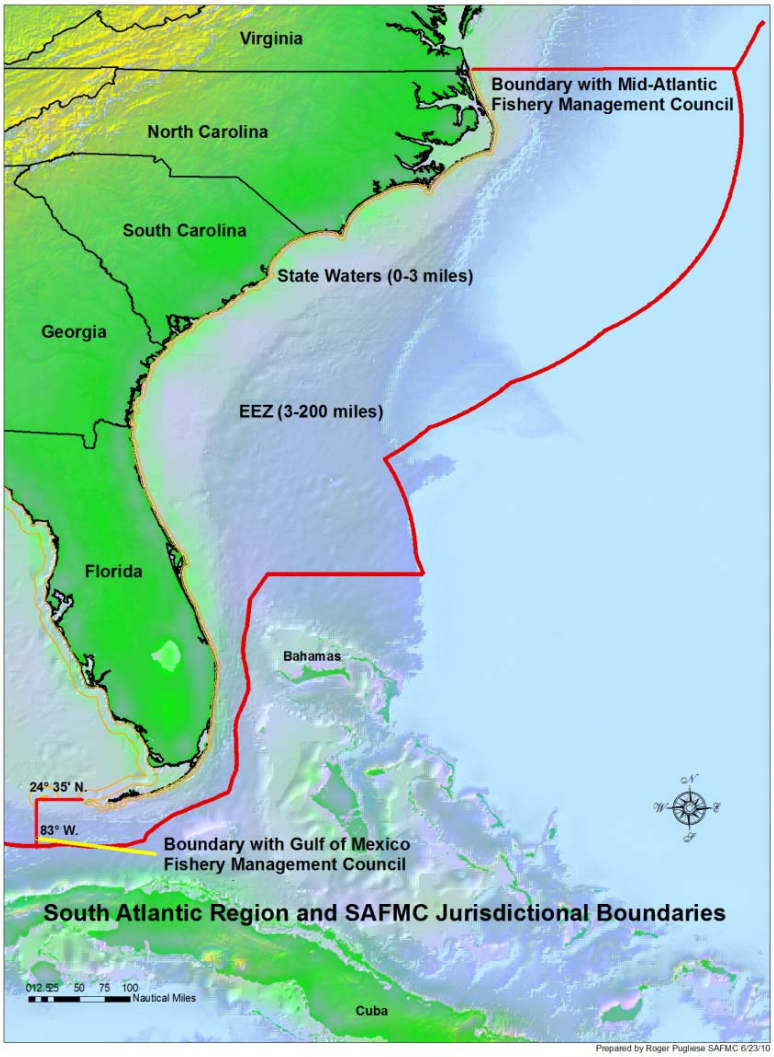


Figure 1-1. Jurisdictional boundaries of the South Atlantic Fishery Management Council.

Table 1-1. Species in the FMUs for Snapper Grouper, Coastal Migratory Pelagic, Coral and *Sargassum*.

Snapper Grouper FMU

Almaco jack, *Seriola rivoliana*
Atlantic spadefish, *Chaetodipterus faber*
Banded rudderfish, *Seriola zonata*
Bank sea bass, *Centropristis ocyurus*
Bar jack, *Carangoides ruber*
Black grouper, *Mycteroperca bonaci*
Black margate, *Anisotremus surinamensis*
Black Sea Bass, *Centropristis striata*
Black snapper, *Apsilus dentatus*
Blackfin snapper, *Lutjanus buccanella*
Blue runner, *Caranx crysos*
Blueline tilefish, *Caulolatilus microps*
Bluestriped grunt, *Haemulon sciurus*
Coney, *Cephalopholis fulva*
Cottonwick, *Haemulon melanurum*
Crevalle jack, *Caranx hippos*
Cubera snapper, *Lutjanus cyanopterus*
Dog snapper, *Lutjanus jocu*
French grunt, *Haemulon flavolineatum*
Gag, *Mycteroperca microlepis*
Golden tilefish, *Lopholatilus chamaeleonticeps*
Goliath grouper, *Epinephelus itajara*
Grass porgy, *Calamus arctifrons*
Gray (mangrove) snapper, *Lutjanus griseus*
Gray triggerfish, *Balistes capriscus*
Graysby, *Cephalopholis cruentata*
Greater amberjack, *Seriola dumerili*
Hogfish, *Lachnolaimus maximus*
Jolthead porgy, *Calamus bajonado*
Knobbed porgy, *Calamus nodosus*
Lane snapper, *Lutjanus synagris*
Lesser amberjack, *Seriola fasciata*
Longspine porgy, *Stenotomus caprinus*
Mahogany snapper, *Lutjanus mahogoni*
Margate, *Haemulon album*
Misty grouper, *Epinephelus mystacinus*
Mutton snapper, *Lutjanus analis*
Nassau grouper, *Epinephelus striatus*
Ocean triggerfish, *Canthidermis sufflamen*
Porkfish, *Anisotremus virginicus*
Puddingwife, *Halichoeres radiatus*
Queen snapper, *Etelis oculatus*
Queen triggerfish, *Balistes vetula*
Red grouper, *Epinephelus morio*
Red hind, *Epinephelus guttatus*
Red porgy, *Pagrus pagrus*
Red snapper, *Lutjanus campechanus*
Rock hind, *Epinephelus adscensionis*
Rock Sea Bass, *Centropristis philadelphica*
Sailors choice, *Haemulon parra*
Sand tilefish, *Malacanthus plumieri*
Saucereye porgy, *Calamus calamus*
Scamp, *Mycteroperca phenax*
Schoolmaster, *Lutjanus apodus*
Scup, *Stenotomus chrysops*
Sheepshead, *Archosargus probatocephalus*
Silk snapper, *Lutjanus vivanus*
Smallmouth grunt, *Haemulon chrysargyreum*
Snowy Grouper, *Epinephelus niveatus*
Spanish grunt, *Haemulon macrostomum*
Speckled hind, *Epinephelus drummondhayi*
Tiger grouper, *Mycteroperca tigris*
Tomtate, *Haemulon aurolineatum*
Yellow jack, *Carangoides bartholomaei*
Yellowedge grouper, *Epinephelus flavolimbatus*
Yellowfin grouper, *Mycteroperca venenosa*
Yellowmouth grouper, *Mycteroperca interstitialis*
Yellowtail snapper, *Ocyurus chrysurus*
Vermilion snapper, *Rhomboplites aurorubens*
Warsaw grouper, *Epinephelus nigritus*
White grunt, *Haemulon plumierii*
Whitebone porgy, *Calamus leucosteus*
Wreckfish, *Polyprion americanu*

Coastal Migratory Pelagic FMU
Cero *Scomberomous regalis*
Cobia *Rachycentron canadum*
King mackerel *Scomberomous cavalla*
Spanish mackerel *Scomberomorus maculates*
Little tunny *Euthynnus alleterattus*

Coral Reefs and Live Hard Bottom Habitat FMU
Coral belonging to the Class Hydrozoa (fire corals and hydrocorals) and coral belonging to the Class Anthozoa (sea fans, whips, precious corals, sea pens and stony corals).

Stony Corals – species belonging to Class Hydrozoa, Class Anthozoa, Subclass Zoantharia
Octocorals – Class Anthozoa, Subclass Octocorallia (including sea fans, *Gorgonia ventalina*, *Gorgonia flabellum*)

Coral reefs constitute hardbottoms, deepwater banks, patch reefs and outer bank reefs as defined in the Coral, Coral Reefs and Live/Hardbottom Habitat FMP (SAFMC 1995).
In addition, live rock comprises living marine organisms, or an assemblage thereof, attached to a hard substrate, including dead coral or rock (but excluding individual mollusk shells).

***Sargassum* FMU**
Sargassum fluitans
Sargassum natans

1.2 Purpose of the Proposed Action

The purpose of Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2) is to modify management of octocorals through the establishment of an annual catch limit (ACL); modify management of Special Management Zones (SMZs) off South Carolina; revise sea turtle release gear requirements for the snapper grouper fishery; and designate new essential fish habitat (EFH) and EFH-habitat areas of particular concern (EFH-HAPCs) in the South Atlantic. These actions are needed to remain in compliance with the Magnuson-Stevens Act, and to respond to concern from fishermen.

This amendment proposes to specify the ACL for octocorals in the South Atlantic region. The South Atlantic Council is considering modifying the fishery management unit (FMU) for octocorals under the Fishery Management Plan for Coral, Coral Reefs, and Live/Hardbottom Habitats (Coral FMP) to indicate that octocorals are included in the exclusive economic zone (EEZ) off of North Carolina, South Carolina, and Georgia. As such, the South Atlantic Council is also considering an action to set the ACL for octocorals at zero. Alternatively, this amendment also includes an action that considers extending the management unit for octocorals into the Gulf of Mexico Fishery Management Council's area of jurisdiction.

CE-BA 2 would amend the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) and FMP for the Coastal Migratory Pelagic Resources in the Atlantic and Gulf of Mexico (Coastal Migratory FMP) to require harvest (with the use of all non-prohibited fishing gear) and possession of managed species in SMZs off South Carolina to be limited to the recreational bag limit for snapper grouper and coastal migratory pelagic species. This action responds to concern from fishermen about potential user conflicts in SMZs off South Carolina.

An action to modify sea turtle release gear requirements for the snapper grouper fishery is also included in CE-BA 2. Fishermen have expressed concern that the current sea turtle handling and release gear requirements are intended for larger longline vessels using heavy tackle and are ineffective and unwieldy for smaller snapper grouper hook-and-line vessels.

This amendment would amend South Atlantic Council FMPs as needed to designate new or modify existing EFH and EFH-HAPCs. CE-BA 2 would amend the Snapper Grouper FMP and the Coral FMP to designate additional EFH-HAPCs. To meet the Magnuson-Stevens Act requirement that all managed species have EFH designated, CE-BA 2 amends the Pelagic *Sargassum* Habitat of the South Atlantic Region (*Sargassum* FMP) to designate EFH.

1.3 Need for the Proposed Action

The actions in CE-BA 2 are *needed* to remain in compliance with the Magnuson-Stevens Act, and to respond to concern from fishermen.

1.4 Management Objectives

Management objectives of the Coral 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;
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 of the Snapper Grouper FMP addressed by this amendment include the following:

1. Prevent overfishing.
2. Collect necessary data.
3. Promote orderly utilization of the resource.
4. Provide for a flexible management system.
5. Minimize habitat damage.
6. Promote public compliance and enforcement.
7. Mechanism to vest participants.
8. Promote stability and facilitate future planning.
9. Create market-driven harvest pace and increase product continuity.
10. Minimize gear and area conflicts among fishermen.
11. Decrease incentives for overcapitalization.
12. Prevent continual dissipation of returns from fishing through open access.
13. Evaluate and minimize localized depletion of snapper grouper species.
14. End overfishing of snapper grouper stocks undergoing overfishing.
15. Rebuild stocks declared overfished.

Management objectives of the Coastal Migratory Pelagic FMP addressed by this amendment include the following:

<u>King Mackerel</u>

1. Institute management measures necessary to prevent exceeding the maximum sustainable yield (MSY).
2. Minimize gear and user group conflicts.

<u>Spanish Mackerel</u>

1. Institute management measures to prevent exceeding MSY.
2. Minimize gear and user group conflicts in the event they arise.
3. Promote the maximum use of the resource up to the OY estimate.

<u>Cobia</u>

1. Institute management measures necessary to increase yield per recruit and average size and to prevent overfishing.

Management objectives of the *Sargassum* FMP addressed by this amendment include the following:

1. Establish a management structure to regulate pelagic *Sargassum* habitat.
2. Reduce the impact of the pelagic *Sargassum* fishery on essential fish habitat.

3. Reduce the potential for conflict.
4. As a federally-managed species/habitat, direct needed research to better determine distribution, production, and ecology of pelagic *Sargassum* habitat.

1.5 History of Management

A summary of the history of management for Coral, Snapper Grouper, Coastal Migratory Pelagics and *Sargassum* FMPs can be found in **Appendix G**. More information on the history of management can be found online at: **www.safmc.net**.

2 Management Alternatives

This section outlines the proposed actions and alternatives considered by the South Atlantic Fishery Management Council (South Atlantic Council). A complete analysis of these alternatives can be found in **Section 4.0.** These alternatives were identified and developed through multiple processes, including the scoping meetings and public hearings conducted for the Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2), meetings of the South Atlantic Council, the South Atlantic Council's Habitat and Ecosystem Committees, Habitat and Environmental Protection Advisory Panel, Coral Advisory Panel, and Scientific and Statistical Committee (SSC).

Alternatives the South Atlantic Council considered during the development of this amendment but eliminated from further detailed study are described in **Appendix F**.

The Magnuson-Stevens Fishery Management and Conservation Act (Magnuson-Stevens Act) requires specification of overfishing limits (OFLs), annual catch limits (ACLs) and accountability measures (AMs). The Magnuson-Stevens Act also requires that for species undergoing overfishing, ACLs must be established at a level that prevents overfishing by the end of 2010. The Magnuson-Stevens Act also requires AMs, which are management controls to prevent ACLs from being exceeded; and include corrective measures if overages occur.

ACLs and AMs must be established for all other species managed by the South Atlantic Council (with the exception of species with an annual life cycle) by the end of 2011. ACLs and AMs for octocorals are being addressed in this amendment.

The final National Standard 1(NS1) guidelines recognize that existing fishery management plans (FMPs) may use terms and values that are similar to, associated with, or may be equivalent to OFL, ABC, ACLs, annual catch targets, and AMs. As such, the South Atlantic Council has removed actions from this document establishing the maximum sustainable yield (MSY), OFL, ABC, and AMs as existing values have been specified within previous amendments to the FMP for Coral, Coral Reefs, and Live/Hardbottom Habitats of the South Atlantic Region (Coral FMP) that are equivalent to the required values under the Magnuson-Stevens Act.

These actions include:

Establishing MSY for Octocorals in the South Atlantic

The Coral FMP (SAFMC 1990) cited lack of sufficient data on biomass and mortality, and the absence of a fishery from which catch and effort data may be obtained, as factors preventing any calculation of MSY from the entire management area for the octocoral fishery. When the South Atlantic Council revisited this issue during the development of the Comprehensive Sustainable Fishery Act Amendment (SAFMC 1998c), the same conclusions were drawn and no estimate of MSY was provided.

An estimate of MSY has been determined for several coral species at specific reefs in the Florida reef tract, but cannot be expanded to other corals due to great differences in species, densities, growth rates, and other factors. The South Atlantic Council's SSC indicated at their August 2010 meeting that although the MSY value is unknown, it is estimated to be some value higher than the 50,000 colony status quo quota. The SSC believes that overfishing is not occurring because the octocoral fishery is small and effort and participation in Florida waters (where most of the harvest occurs) is capped by a limited entry program; there are no signs of local depletion in areas where the fishery operates; and there are no indications that the fishery has been operating at unsustainable levels.

Establish an Overfishing Level (OFL) for Octocorals in the South Atlantic

Amendment 5 to the Coral FMP included in the Comprehensive SFA Amendment (SAFMC 1998c) defines overfishing as the level of harvest that exceeds Optimum Yield (OY). OY for allowable octocorals in the South Atlantic and Gulf exclusive economic zone (EEZ) is not to exceed 50,000 colonies per year and fishing for octocorals in the EEZ will cease when the quota is reached (Coral FMP, Amendment 1 1990). The level of harvest in the South Atlantic and Gulf of Mexico EEZ has never exceeded OY and the fishery has never been closed in federal waters, thus overfishing has not occurred.

At their August 2010 meeting, the SSC discussed the lack of a stock assessment for octocorals and limited landings information. The SSC determined an estimate of OFL could not be quantified but is considered to be an unknown value above ABC. The South Atlantic Council further discussed the fact that there are no signs of local depletion in areas where the octocoral fishery operates or any other indication that the fishery has been operating at unsustainable levels.

Establish Acceptable Biological Catch (ABC) for Octocorals in the South Atlantic

In April 2010, the SSC met to discuss development of an ABC control rule for data poor stocks, including octocorals. The South Atlantic Council received the proposed data-poor control rule in June 2010. However, some aspects of the proposed ABC control rule and its criteria were considered inappropriate considering guidance that the rule should account for scientific uncertainty. The SSC was asked to reconvene in August 2010 to reconsider an ABC control rule for data poor stocks, including octocorals. At their August 2010 meeting, the SSC reviewed and discussed background information on octocoral landings, life history, and possible fishery reference points. The SSC discussed the fact that there is no stock assessment for octocorals, landings information is limited, and an estimate of OFL could not be provided but is considered to be an unknown value above ABC. Fishery-independent information is also limited but available survey data (monitoring programs and directed studies conducted by Florida Fish and Wildlife Conservation Commission (FWC), University of North Carolina-Wilmington, and University of Georgia suggests relatively high octocoral abundance in the historically known distribution area (Florida Keys).

The SSC recommended no changes to the current quota and recommended an ABC of 50,000 colonies annually for Gulf of Mexico and South Atlantic EEZ waters, combined. The SSC was asked to clarify their ABC recommendation during their November 2010 meeting. They explained the current quota is set at a value higher than what is historically landed. Based upon the number of licensed participants (100-140 fishers), the magnitude of landings, and the quota never having been met, they clarified it was their intent for the ABC recommendation for octocorals to include Gulf of Mexico and South Atlantic EEZ and state waters. Because the ABC for octocorals is an existing value provided by the SSC, it was removed as an action from the document.

Establish Accountability Measures (AMs) for Octocorals in the South Atlantic

Once the annual octocoral quota of 50,000 colonies in the South Atlantic and Gulf of Mexico EEZ is reached, the federal fishery will close. This provision was established in Coral Amendment 1 to the Coral FMP (SAFMC 1990) and is considered an accountability measure for the fishery. For this reason, an action to specify an additional AM for this fishery does not need to be considered in this amendment.

2.1 Action 1. Modify management of octocorals in the South Atlantic

Alternative 1. No Action. Do not remove octocorals from the fishery management unit (FMU) under the South Atlantic Coral FMP.

Alternative 2. Remove octocorals from the FMU.

Preferred Alternative 3. Modify the FMU to indicate that octocorals are included in the EEZ off NC, SC, and GA.

2.1.1 Comparison of Alternatives

Under **Alternative 1 (No Action),** octocorals would continue to be managed through the South Atlantic Coral FMP and would be subject to a harvest level of 50,000 colonies combined for the Gulf of Mexico and South Atlantic EEZ. Octocorals are considered to be data-poor with no stock assessment and limited landings information. Fishery-independent survey data indicate there is relatively high octocoral abundance in the historically known distribution area (Florida Keys). The fishery is also managed under other management measures including commercial permits, reporting requirements, and a six-colony recreational bag limit for octocorals. The FWC is responsible for most of the management, implementation and enforcement of the regulations because most of the effort in the fishery occurs in state waters. Octocoral harvest off of Georgia, South Carolina, and North Carolina will continue to be prohibited in federal waters.

Alternative 2 would remove octocorals from the Fishery Management Plan (FMP) for Coral, Coral Reefs, and Live/Hardbottom Habitats of the South Atlantic Region (Coral FMP) and

would eliminate current management measures for octocorals in the South Atlantic. Although the FWC could extend their management to octocorals in federal waters off Florida, there would be no protection of the resource in federal waters off Georgia, South Carolina and North Carolina. Additionally, during their October 2010 meeting, the Gulf of Mexico Fishery Management Council (Gulf Council) selected a preferred alternative to remove octocorals from their Fishery Management Plan for Corals and Coral Reefs of the Gulf of Mexico (Gulf Coral FMP) as a result of FWC expressing an interest in managing the fishery in the Gulf EEZ off FL. However, currently the only harvest of octocorals in the Gulf of Mexico is off of Florida and this fishery is monitored and enforced by the FWC. Thus, development of a fishery off other Gulf states seems unlikely.

The biological benefits of **Alternative 2** would be expected to be less than **Alternative 1 (No Action)**. Furthermore, adoption of **Alternative 2** would be contrary to the South Atlantic Council's intent stated in Amendment 3 to the Coral FMP of preventing expansion of octocoral harvest and ensuring essential fish habitat in the EEZ is protected. Essential Fish Habitat (EFH) is designated for octocorals, a designation that would be withdrawn if they are removed from the management unit.

Current management of the octocoral fishery by FWC would be expected to continue and while there could be an increase in the harvest of octocorals, it would be unlikely. The market for octocorals is demand driven and there is not likely to be a significant increase in demand. Although the FWC could adopt management of octocorals off of Florida, under **Alternative 2** there would be no protection of the resource in federal waters off of Georgia, South Carolina, and North Carolina.

Preferred Alternative 3 would revise the fishery management unit to include octocorals only off Georgia, North Carolina, and South Carolina. Octocorals off of Florida would be removed from the FMP and would result in no federal management. As explained in the description of **Alternative 1**, although octocoral harvest is managed under the South Atlantic Council's Coral FMP and subsequent amendments, the FWC is responsible for most of the management, implementation and enforcement of regulations because the majority of the harvest occurs in state waters. In a letter dated, April 11, 2011, the FWC describes management measures it will implement with regards to octocorals if the South Atlantic Council proceeds with **Preferred Alternative 3** (**Appendix M**). The FWC intends to extend Florida octocoral regulations into federal waters off of Florida, establish an annual quota for allowable octocoral harvest in state and federal waters off of Florida, and prohibit harvest of octocorals north of Cape Canaveral, Florida and in the Coral habitat areas of particular concern (HAPC) adjacent to Florida waters.

National Standard 3 (NS 3) of the Magnuson-Stevens Act states that, "To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination." The NS 3 guidelines provide the basis for a fishery management unit to be identified around a geographic area (50 C.F.R. § 600.320(d)(2)). In the case of **Preferred Alternative 3**, alternative management exists in under FWC's Marine Life Fishery Program, and the state

has indicated via letter of intent (**Appendix M**) additional management measures they plan to implement for the octocoral fishery in Florida. **Preferred Alternative 3** would allow the South Atlantic Council to remove management for octocorals off Florida where management already exists, a modification that also considers efficiency in the utilization of resources (50 C.F.R. National Standard 5). National Standard 5 (NS 5) guidelines state: "Given a set of objectives for the fishery, an FMP should contain management measures that result in as efficient a fishery as is practicable or desirable (50 C.F.R. § 600.330 (b))."

The economic and social impacts of the action alternatives are expected to be similar. Due to the increased risk of overfishing octocorals under **Alternative 2**, long-term economic and social benefits are expected to decrease slightly compared to **Alternative 1**. Short-term economic and social benefits could increase if the market demand for octocorals increased. With regards to administrative impacts, neither alternative is expected to result in an increase in impacts. **Alternative 2** and **Preferred Alternative 3** would lessen the administrative burden on the agency as management of these species would either no longer be necessary or would be reduced. However, if the need for federal management of octocorals were to arise in the future, the administrative burden of including them in the FMU could result in a significant administrative burden. Under **Preferred Alternative 3**, if the FWC extends their jurisdiction to cover both state and federal waters, as they are expected to do, no short or long-term changes would be expected with regard to economic effects resulting from this action since Florida would take over management of these areas.

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

	Alternative 1	**Alternative 2**	**Alternative 3**
Biological	No new impacts	Slightly negative impacts on the resource in Florida. Negative impacts in Georgia, North Carolina and South Carolina.	No new impacts for octocorals in North Carolina, South Carolina, and Georgia.
Economic	No new impacts	Short-term positive	No new impacts
Social	No new impacts	Short-term positive Long-term negative	Little to no new impacts
Administrative	No new impacts	Reduce administrative burden	Reduce administrative burden

2.2 Action 2. Extend the SAFMC's Fishery Management Unit for octocorals into the Gulf of Mexico Fishery Management Council's area of jurisdiction

Preferred Alternative 1. No Action. Do not extend the FMU for octocorals into the GMFMC's jurisdiction.

Alternative 2. Extend the management boundaries for all octocorals species in the Coral FMP to include the GMFMC jurisdiction.

2.2.1 Comparison of Alternatives

Currently, the quota for octocorals is 50,000 colonies combined in the Gulf of Mexico and South Atlantic EEZ. Harvest of octocorals is prohibited north of Cape Canaveral, Florida. At its October 2010 meeting, the Gulf Council selected a preferred alternative to remove octocorals from their Gulf Coral FMP. This management measure lies within their Generic ACL Amendment. The preferred alternative was selected based upon FWC expressing an interest in managing the fishery in the Gulf EEZ off Florida.

The only harvest of octocorals in the Gulf of Mexico is off of Florida and this fishery is monitored and enforced by FWC. Under **Preferred Alternative 1**, the South Atlantic Council would continue to manage octocorals in the South Atlantic but management of octocorals in the Gulf of Mexico would fall to Florida in state waters and federal waters if they extend their jurisdiction. The preferred alternative under Action 1 would allow the FWC to monitor the octocoral quota in state and federal waters off Florida. This could relieve any difficulties in monitoring and enforcing the joint South Atlantic and Gulf of Mexico federal quota. Under **Preferred Alternative 1**, harvest in any of the other Gulf states could not be controlled if a fishery were to develop, leaving octocoral populations vulnerable to overexploitation. However, octocorals are not as abundant in the other Gulf states as in the Florida Keys (SAFMC & GMFMC 1982). Therefore, development of a fishery for octocorals in other Gulf states does seem unlikely.

Alternative 2 would extend management jurisdiction of octocorals to include the Gulf Council's area of jurisdiction. Under this alternative, the 50,000 colony quota would still apply to octocoral harvest in the Gulf of Mexico and the South Atlantic and would not result in increased negative biological impacts to the resource. However, failure to adopt **Alternative 2** could increase harvest of octocorals if a fishery were to develop in the EEZ outside Florida. Therefore, adoption of **Alternative 2** could prevent negative biological effects from occurring in the future if there is an expansion of octocoral harvest in Gulf states besides Florida. However, as stated previously, development of a fishery for octocorals in other Gulf states does seem unlikely.

Given that there are no impacts on the current harvest of octocoral species as a result of **Preferred Alternatives 1** and **2**, economic and social effects are not expected to change. However, adoption of **Alternative 2** would prevent future exploitation of octocoral species in the EEZ of other Gulf states and therefore, could reduce future economic opportunities. The administrative impacts of **Alternative 2** would increase slightly from those of **Preferred Alternative 1** due to revising regulations, outreach and education.

It is expected that under either alternative the FWC would continue to collect data and monitor the octocoral fishery. **Alternative 2** would allow for octocorals to continue to be managed throughout their range and would allow for future management of octocorals in the Gulf states if the need arises. **Alternative 2** addresses jurisdictional issues but may provide a positive biological impact to the resource by allowing for management throughout their range.

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

	Alternative 1	Alternative 2
Biological	Slightly negative impacts	Slightly positive impacts
Economic	Slightly positive impacts	Slightly negative impacts
Social	Slightly positive impacts	Slightly negative impacts
Administrative	No impact	Slight increase in impacts

2.3 Action 3. Modify the Annual Catch Limit (ACL) for octocorals in the South Atlantic

Alternative 1. No Action. Do not modify the existing ACL for octocorals in the South Atlantic (ACL=current 50,000 colony quota for South Atlantic and Gulf of Mexico EEZ).

Alternative 2. Modify the existing ACL in the South Atlantic and Gulf of Mexico (ACL=current 50,000 colony quota for South Atlantic and Gulf of Mexico EEZ) to include State waters.

Preferred Alternative 3. ACL = 0 for octocorals in the EEZ off of NC, SC, and GA.

2.3.1 Comparison of Alternatives

Alternative 1 (No Action) would continue to manage octocorals with the 50,000 colony quota for the EEZ and would not account for landings in state waters. The FWC has implemented compatible regulations and closes the state octocoral fishery when the federal quota is met, however, that quota has never been reached and the state fishery for octocorals has never been closed.

Alternative 2 would include harvest from state waters in the 50,000 colony quota. The quota for the octocoral fishery was implemented in 1990 (Coral FMP; SAFMC & GMFMC 1990) and reporting mechanisms have been established. **Alternative 2** would result in a slightly higher administrative burden due to outreach and education, increased monitoring, and enforcement.

Under **Preferred Alternative 3**, the South Atlantic Council would set the ACL for octocorals in the revised FMU (Action 1) equal to zero. Functionally, this would not have any impact on the active octocoral harvesters as there has been a prohibition on octocoral harvest north of Florida for 16 years. Under this alternative, management of octocorals off Florida would continue to be managed by the FWC. Because there are no landings of octocorals occurring in federal waters north of Florida, and harvest of octocorals are

prohibited north of Cape Canaveral, FL, the **Preferred Alternative 3** (ACL = 0) is not expected to result in any negative economic effects.

Landings in state and federal waters have never exceeded the **Alternative 2** proposed ACL of 50,000 colonies and therefore there are no expected short-term economic losses to fishermen related to implementation of the 50,000 quota as the ACL. However, there could be an economic loss suffered by fishermen who have made investments toward expanding harvest operations in the future. Because there are no landings of octocorals occurring in federal waters north of Florida, and harvest of octocorals are prohibited north of Cape Canaveral, Florida, the **Preferred Alternative 3** (ACL = 0) is not expected to result in any negative economic effects.

In regards to Florida, **Alternative 1**, **Alternative 2**, and **Preferred Alternative 3** would have little or no social effects as long as the FWC assumes management of octocorals and continues the same level of octocoral protection. For Georgia, South Carolina, and North Carolina, which under Action 1 would be the EEZs subject to the ACL set in this action, **Alternative 1**, **Alternative 2** and **Preferred Alternative 3** would likely result in no negative social impacts on harvesters (and affiliated dealers, communities, and consumers) because octocoral harvest is prohibited north of Cape Canaveral, Florida. Overall, **Preferred Alternative 3** would likely lead to long-term social benefits due to maximum protection (ACL=0) of octocorals in the EEZs of Georgia, South Carolina, and North Carolina.

Specifying an ACL alone would not increase the administrative burden over the status-quo. However, the monitoring and documentation needed to track the ACL can potentially result in a need for additional cost and personnel resources if a monitoring mechanism is not already in place.

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

	Alternative 1	**Alternative 2**	**Alternative 3**
Biological	No impact	Positive impact to the resource	No impact from status quo
Economic	No impact	Long-term positive impacts	No impact
Social	No impact	Long-term positive impacts	No impact
Administrative	No impact	Slight increase in impacts	No impact

2.4 Action 4. Modify management of Special Management Zones (SMZs) off South Carolina

Alternative 1. No Action. Do not modify the current management of SMZs off South Carolina.

Preferred Alternative 2. Limit harvest and possession of snapper grouper species (with the use of all non-prohibited fishing gear) in SMZs off South Carolina to the recreational bag limit.

Preferred Alternative 3. Limit harvest and possession of coastal migratory pelagic species (with the use of all non-prohibited fishing gear) in SMZs off South Carolina to the recreational bag limit.

Alternative 4. Prohibit use of hand spear and spear guns in SMZs off South Carolina.

2.4.1 Comparison of Alternatives

In the EEZ off South Carolina, almost all of the artificial reefs (**Figure 4-2**, and **Figure 4-3**) are managed as special management zones (SMZs) under the Snapper Grouper FMP to protect these relatively small reef communities from the effects of overly-efficient fishing practices. The South Atlantic Council has designated SMZs as Essential Fish Habitat – Habitat Areas of Particular Concern (EFH-HAPC) (Comprehensive EFH Amendment, 1998b).

Recreational constituents and the South Carolina Department of Natural Resources (SCDNR) have voiced concerns over the presence of commercial snapper grouper and coastal migratory pelagic fishing vessels operating on SMZs (**Appendix H**). Specifically, SCDNR indicates the use of conventional spearguns by commercial fishermen to harvest fish on these sites might be harmful to the reef fish populations and is not in keeping with the intended purpose of the SMZs outlined in Snapper Grouper Regulatory Amendment 7.

Alternative 4 would prohibit the use of spearfishing gear within the SMZs, which may provide a slight positive impact to the resource. Spearfishing allows fishermen to more effectively select for larger individuals within target species populations (Sadovy 1994; Meyer 2007; Lloret et al. 2008). Spearfishing is considered to be an efficient harvesting activity that can significantly alter abundance and size structure of target species toward fewer and smaller fish by selective removal of larger individual fish. The removal of larger individual fish of the target species leaves behind smaller individuals to spawn. Over time this can decrease the size and age at sexual maturity and decrease the average size of the population (Sluka and Sullivan 1998; Chapman and Kramer 1999; Matos-Caraballo et al. 2006; Lloret et al. 2008).

The major recreational species targeted in the SMZs include Atlantic spadefish, black sea bass, flounder, king mackerel, sharks, and Spanish mackerel. However, little information on the level of commercial fishing exists in the SMZs off South Carolina and therefore, the

economic effects of **Preferred Alternative 2** and **Preferred Alternative 3** cannot be quantified at this time. It is expected that modifying management of the SMZs to restrict commercial fishing effort to the bag limit could possibly reduce the amount of harvest in the area and may have a positive biological impact on the species regularly targeted by commercial fishermen.

Both **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in small reductions in ex-vessel revenues to commercial fishermen, though some mitigation of these reductions could occur as a result of fishing in other areas. At the same time, **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in increased economic benefits to recreational fishermen as a result of allocation of the harvest that would otherwise be taken by commercial fishermen to recreational fishermen. Additional economic benefits would be expected to result from healthier and more sustainable populations at these sites over the long term. The economic effect of **Alternative 4** on the recreational fishery of South Carolina would be expected to be significant. However, the expected adverse economic effects cannot be quantified with available data. Also, if **Alternative 4** is implemented, recreational divers may decide to use other gear in the SMZs or fish outside the SMZs. Therefore, any estimate of losses due to **Alternative 4** would likely be an over estimate of actual losses.

Preferred Alternative 2 and **Preferred Alternative 3** would "level the playing field" for recreational and commercial fishermen. **Alternative 4** could negatively impact the recreational dive experience, and cause a decline in charter dive trips.

Under the **No Action Alternative**, the administrative impacts will not increase. Administrative impacts associated with **Alternatives 2-4** are expected to increase. Administrative impacts may take the form of preparation of regulations, education and outreach materials, and law enforcement.

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

	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Biological	Possible negative impact	Possible positive impact	Possible positive impact	Possible positive impact
Economic	Possible negative impact	Long-term positive impacts	Long-term positive impacts	Long-term positive impacts
Social	Possible negative impact	Long-term positive impacts	Long-term positive impacts	Long-term positive impacts
Administrative	No impact	Slight increase in impacts	Slight increase in impacts	Slight increase in impacts

2.5 Action 5. Modify Sea Turtle Release Gear Requirements for the Snapper Grouper Fishery

Alternative 1. No Action. Maintain current sea turtle and smalltooth sawfish release gear requirements for the Snapper grouper fishery in federal waters of the South Atlantic. Currently, required gear (regardless of freeboard height) includes:

- a long-handled line clipper or cutter,
- a long-handled dehooker for ingested hooks,
- a long-handled dehooker for external hooks,
- a long-handled device to pull an "inverted V",
- a dipnet,
- a tire (or other comparable cushioned, elevated surface that immobilizes boated sea turtles),
- a short-handled dehooker for ingested hooks,
- a short-handled dehooker for external hooks,
- long-nose or needle-nose pliers,
- bolt cutters,
- monofilament line cutters, and
- at least two types of mouth openers/mouth gags.

This equipment must meet the specifications described in 50 CFR 635.21(c)(5)(i)(A-L) with the following modification: any other comparable, cushioned, elevated surface that allows boated sea turtles to be immobilized, may be used as an alternative to the requirement in 50 CFR 635.21(c)(5)(i)(F) to have a tire on board.

Alternative 2. Require all federally-permitted hook-and-line vessels with no longline gear onboard to have and use a tool capable of cutting the fishing line and a tool capable of removing a hook from a sea turtle or smalltooth sawfish. Fishermen would still be required to comply with all current sea turtle and smalltooth sawfish release guidelines.

Alternative 3. Require all sea turtle and smalltooth sawfish release gear listed under **Alternative 1 (No Action)** for federally-permitted snapper grouper vessels using longline gear, and require [insert specific sea turtle release gear] for federally- permitted vessels fishing with hook-and-line gear.

Preferred Alternative 4. Modify sea turtle and smalltooth sawfish release gear based on freeboard height. Fishermen would still be required to comply with all current sea turtle and smalltooth sawfish release guidelines. The design specifications of required gear and the handling and release techniques employed must comply with those described in the NOAA Fisheries Service document entitled "Careful Release Protocols for Sea Turtle Release with Minimal Injury." NOTE: **Preferred Alternative 4** is recommended by the Southeast Region's Office of Protected Resources Division as the minimum requirement necessary to remain in compliance with the biological opinion.

Preferred Sub-Alternative 4a. Vessels with freeboard height of 4 feet or less would be required to carry and use:

- a short-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,
- long-nose or needle-nose pliers,
- bolt-cutters,
- mono-filament line cutters,
- cushion/support device (i.e., boat cushion),
- a dipnet,
- at least two types of mouth openers/mouth gags

Preferred Sub-Alternative 4b. Vessels with freeboard height greater than 4 feet (and/or using longline gear) would be required to carry and use:

- a long-handled line cutter,
- a long-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,
- a long-handled device to pull an "inverted V",
- a dipnet,
- cushion/support device (i.e., boat cushion),
- a short-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,
- long-nose or needle-nose pliers,
- bolt cutters,
- monofilament line cutters, and
- at least two types of mouth openers/mouth gags.

Alternative 5. Modify the design specifications of the current sea turtle and smalltooth sawfish release gear equipment for all federally-permitted, non-longline, snapper grouper vessels with hook-and-line gear on board to match the specifications described in the NOAA Fisheries Service document entitled "Careful Release Protocols for Sea Turtle Release with Minimal Injury." (See **Appendix K**)

South Atlantic Council may select one or more sub-alternatives. Choosing additional sub-alternatives would be especially beneficial for species conservation, but not required to remain in compliance with the biological opinion.

Sub-Alternative 5a. Require all federally permitted non-longline snapper grouper vessels with hook-and-line gear on board (see **Appendix K**) for specification on each gear type):

- a short-handled dehooker for ingested hooks, or a short-handled dehooker for external hooks,
- cushion/support device (i.e., standard automobile tire or boat cushion)
- long-nose or needle-nose pliers,
- bolt-cutters,
- mono-filament line cutters,
- a dipnet,

- at least two types of mouth openers/mouth gags.

Sub-Alternative 5b. Also require:

- a long-handled dehooker for ingested hooks, or a long-handled dehooker for external hooks,

Sub-Alternative 5c. Also require:

- a long-handled line clipper or cutter,

Sub-Alternative 5d. Also require:

- a long-handled device to pull an "inverted V"

2.5.1 Comparison of Alternatives

The current sea turtle and smalltooth sawfish release gear requirements in Amendment 15B were developed to satisfy requirements of the Endangered Species Act (ESA) biological opinion on the snapper grouper fishery. The biological opinion directed the South Atlantic Council to implement sea turtle and smalltooth sawfish release gear requirements, and required the implementation of safe handling protocols for sea turtles and smalltooth sawfish, among other things. The biological opinion required that the South Atlantic Council consider the sea turtle and smalltooth sawfish release gear requirements in place for the Highly Migratory Species (HMS) fisheries, and at a minimum, implement sea turtle and smalltooth sawfish release gear requirements similar to those for the Gulf of Mexico reef fish fishery (NMFS, 2006). The Gulf of Mexico reef fish fishery requires the dehooking and disentanglement gear currently used in the HMS longline fisheries for vessels with freeboard heights greater than 4 feet (**Appendix J**). Vessels with freeboard heights of 4 feet or less are also required the carry HMS dehooking and disentanglement gears, with the exception that only short-handled equipment is mandatory. The South Atlantic Council ultimately chose to require the same sea turtle and smalltooth sawfish release gear required in the HMS fisheries, making no distinction for vessel freeboard height.

The HMS pelagic longline fishery was the first to require sea turtle and smalltooth sawfish release gear in the Atlantic, and the release equipment developed was originally designed to handle the heavier tackle used in this fishery. As snapper grouper fishermen began using the dehooking and disentanglement gears required in Amendment 15B, the effectiveness and necessity of using these "heavy-duty" tools with lighter snapper grouper tackle was called into question. Therefore, the South Atlantic Council has been asked to consider developing an action that would re-address and possibly modify sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery.

Alternative 1 (No Action) would maintain the current sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery. Regardless of freeboard height, all vessels using hook-and-line gear would be required to carry the gear listed under **Alternative 1 (No Action)**. The current sea turtle and smalltooth sawfish release gear requirements were established through Snapper Grouper Amendment 15B (SAFMC, 2009) and require all vessels having a South Atlantic Unlimited Snapper grouper Permit, a South Atlantic 225 lb Trip Limit Snapper grouper Permit, or a South Atlantic Charter/Headboat Permit for Snapper grouper, and carrying hook-and-line gear onboard to: (1) post the *Sea Turtle Handling/Release Guidelines* placard inside the wheelhouse, or in any easily viewable area,

if there is no wheelhouse; (2) have a copy of the "Careful Release Protocols for Sea Turtle Release with Minimal Injury" (Protocols) posted inside the wheelhouse, or within a waterproof case in a readily accessible area, and; (3) possess and use sea turtle handling and release gear consistent with the Protocols.

Alternatives 2 and **3** address the concerns raised regarding the modification of sea turtle and smalltooth sawfish release gear specifications for vessels carrying non-longline, hook-and-line gear on board. Under these alternatives, all vessels with longline gear on board will be required to continue carrying all the dehooking and disentanglement gears outlined in **Alternative 1**. Under **Alternative 2** the only tools that would be required for vessels carrying hook-and-line gear that is not longline gear, is a tool capable of cutting fishing line, such as a knife, and tool capable of removing a hook from a sea turtle, such as a pair of pliers. The dehooking and line cutting capabilities of any tool onboard a vessel are subjective, and would therefore be difficult to enforce. **Alternative 2** is similar to regulations currently in place in the Western Pacific (**Appendix L**). This alternative would likely achieve the goal of implementing sea turtle and smalltooth sawfish release equipment more appropriate for the lighter tackle commonly used in the snapper grouper fishery. The potential biological effects are difficult to predict under **Alternative 2** because effectiveness of only certain sea turtle release tools has been tested for longline vessels. However, if the sea turtle release guidelines are followed, and hooks or entangling line are safely removed, there would likely be a biological benefit to the sea turtle. However, because of the requirements of the biological opinion outlining what the South Atlantic Council must consider when implementing sea turtle and smalltooth sawfish release equipment requirements, **Alternative 2** would not be in compliance with the current biological opinion. Selecting **Alternative 2** may require re-initiation of ESA section 7 consultation.

Alternative 3 differs from **Alternative 2** by identifying specific types of sea turtle and smalltooth sawfish release equipment for snapper grouper vessels carrying hook-and-line gear onboard that is not longline gear. **Alternative 3** also maintains the status quo requirement for snapper grouper vessels carrying longline gear onboard. This requirement ensures that vessels with heavier tackle are adequately equipped to release sea turtles that become hooked or entangled in fishing gear.

Preferred Alternative 4 would require different lengths and types of dehooking tools dependent upon the freeboard height of the vessel, which tracks the sea turtle release gear regulations in the Gulf of Mexico reef fishery (**Appendix J**). **Preferred Alternative 4** also offers the option (through **Sub-Alternatives 4a** and **4b**) of tailoring sea turtle and smalltooth sawfish release gear specifications to be more appropriate for use with the lighter tackle of the snapper grouper fishery. **Preferred Sub-Alternatives 4a** and **4b** would allow gear specifications to be changed for vessels with freeboard heights of 4 feet or less, and for vessels with freeboard heights greater than 4 feet. The sea turtle and smalltooth sawfish release equipment requirements for the Gulf of Mexico reef fish fishery allow vessels with freeboard heights of 4 feet or less to carry a truncated suite of equipment. Those vessels are only required to carry short-handled tools, not both short- and long-handled equipment. However, the Gulf of Mexico reef fish fishery regulations still require the use of release

equipment with design specifications that match those originally developed for use in the HMS longline fisheries. **Preferred Alternative 4** references the sea turtle release gear design specifications currently found in the NOAA Fisheries Service document entitled "Careful Release Protocols for Sea Turtle Release with Minimal Injury" (**Appendix K**). Those specifications now include a wider range of design parameters, which should be appropriate for the lighter tackle used in the snapper grouper fishery.

Alternative 5 would modify the gear types currently required for all federally-permitted non-longline snapper grouper vessels with hook-and-line gear on board, without consideration of vessel freeboard height. As with **Preferred Alternative 4** and its sub-alternatives, all the sea turtle release gear discussed in this alternative would be required to meet the new design specifications outlined in the NOAA Fisheries Service document entitled "Careful Release Protocols for Sea Turtle Release with Minimal Injury (**Appendix K**).

The alternatives of this action have been developed to address the concern that heavy duty tools are ineffective and unnecessary, while ensuring the fishery remains in compliance with the biological opinion. **Sub-alternative 5a** would require a minimum set of release equipment more appropriate for the smaller tackle used in the snapper grouper hook-and-line fishery. The pieces of equipment listed were selected to match those currently required by the Gulf of Mexico reef fish fishery for vessels with freeboard heights of 4 feet or less. The equipment in this alternative ensures that even if a minimum suite of equipment is selected, the fishery will remain in compliance with the biological opinion. Choosing additional sub-alternatives (i.e., in addition to **Sub-Alternative 5a**) would be especially beneficial for species conservation, but is not required to remain in compliance with the biological opinion.

Biological gains may be realized with the use of release gear more appropriate to the vessel. **Alternatives 2** and **3** attempt to better match gear with the vessel and are likely to yield greater biological and economic benefits than **Alternative 1**. There are no release gear expenses for those already participating in the fishery since all of the gear required under **Preferred Alternatives 4a** and **4b** is already required under **Alternative 1 (No Action)**. However, under **Preferred Alternatives 4a** and **4b**, vessels will be required to carry less gear. This will free up more space onboard the vessels.

Alternative 5 would modify the gear requirements under **Alternative 1**. **Alternatives 5a-5d** would require gear already possessed by fishermen and listed under **Alternative 1**, but smaller sizes of the same required gear. Therefore, no negative economic effects would be expected as a result of the **Alternative 5** sub-alternatives unless fishermen purchased the smaller gears identified in the sub-alternatives.

Alternative 2, Alternative 3, Preferred Alternative 4, and **Alternative 5** allow for variation in release gear requirements depending on vessel size and fishing gear. The more appropriately matched the release gear requirements, the lower the additional costs for smaller operations. This would be expected to result in positive social benefits by minimizing costs for release gear for new entrants.

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

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biological	Neutral impacts	Not in compliance with current biological opinion	Varying compliance with biological opinion	Overall positive impacts	Overall positive impacts
Economic	Overall positive impacts	Overall positive impacts	Overall positive impacts	Long-term positive impacts	Long-term positive impacts
Social	Overall negative impacts	Overall positive impacts	Overall positive impacts	Overall positive impacts	Overall positive impacts
Administrative	No impact	Slight increase in impacts	Slight increase in impacts	Slight increase in impacts	Slight increase in impacts

2.6 Action 6. Amend the Snapper Grouper Fishery Management Plan (FMP) to designate new EFH-HAPCs

Alternative 1. No Action. Do not amend the Snapper Grouper FMP to designate new Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs).

Preferred Alternative 2. Amend the Snapper Grouper FMP to designate one or more of the following as EFH-HAPCs.

Sub-alternative 2a. Designate EFH-HAPCs for golden tilefish to include irregular bottom comprised of troughs and terraces inter-mingled with sand, mud, or shell hash bottom. Mud-clay bottoms in depths of 150-300 meters are HAPC. Golden tilefish are generally found in 80-540 meters, but most commonly found in 200 meter depths.

Sub-alternative 2b. Designate EFH-HAPC for blueline tilefish to include irregular bottom habitats along the shelf edge in 45-65 meters depth; shelf break; or upper slope along the 100-fathom contour (150-225 meters); hardbottom habitats characterized as rock overhangs, rock outcrops, manganese-phosphorite rock slab formations, or rocky reefs in the South Atlantic Bight; and the Georgetown Hole (Charleston Lumps) off Georgetown, SC.

Preferred Alternative 3. Designate EFH-HAPCs for the snapper grouper complex to include the following deepwater marine protected areas (MPAs) as designated in Snapper Grouper Amendment 14:

- Snowy Grouper Wreck MPA
- Northern South Carolina MPA
- Edisto MPA
- Charleston Deep Artificial Reef MPA
- Georgia MPA
- North Florida MPA

- St. Lucie Hump MPA
- East Hump MPA

2.6.1 Comparison of Alternatives

EFH and EFH-HAPCs were established for snapper grouper through Amendment 10 to the Snapper Grouper FMP as part of the Comprehensive EFH Amendment (SAFMC 1998b) and are presented in Section 3.4.2. **Alternative 1 (No Action)** would not add an area highlighting the importance of golden tilefish and blueline tilefish or the value of emphasizing the value of the habitat in the deepwater MPAs established in Snapper Grouper Amendment 14 (SAFMC 2007). **Preferred Alternative 2** addresses an oversight in the initial designation of Snapper Grouper EFH through the Comprehensive EFH Amendment (SAFMC 1998b) where the Habitat Plan describes in detail tilefish habitat and proposes the general distribution between 100 and 300 meters as an area considered to be an EFH-HAPC for tilefish. While considered EFH, the area was not included in the proposed list of EFH-HAPCs. **Alternative 2a** for golden tilefish and **Alternative 2b** for blueline tilefish propose respective detailed descriptions for EFH-HAPCs. **Preferred Alternative 3** would designate previously specified (Snapper Grouper Amendment 14) deepwater MPAs as EFH-HAPCs. This alternative is intended to protect these MPAs as a unique habitat complex and require enhanced EFH consultations pertaining to non-fishing activities that could potentially impact these protected habitats.

The designation of additional EFH-HAPCs for snapper grouper species would not result in direct impacts to the biological resources of the west-central Atlantic Ocean. Rather, the EFH-HAPC designation under this action would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect surface waters from non-fishing activities which are undertaken, authorized, or funded by federal agencies. Similarly, designation of additional snapper grouper EFH-HAPCs would require federal agencies to consult with NOAA Fisheries Service on activities which may adversely affect that habitat. Designation of additional EFH-HAPCs will require the South Atlantic Council to consider all operations or actions that might interact with or affect the EFH-HAPC, and may trigger a consultation for any activity that may affect the habitat. This consultation process associated with EFH-HAPCs may result in increased economic, social and administrative impacts. The direct effects of additional regulatory consideration would be the financial costs of a lengthy regulatory process. The nature and extent of those impacts are unknown and will undoubtedly vary depending upon the individual and/or agency and the actions to be taken within the designated EFH-HAPCs.

Assuming the areas are appropriate to the resource, both **Preferred Alternatives 2** and **3** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits. There will be few social impacts from establishing EFH-HAPCs and would most likely come from future actions that are associated with such designations. Designation of new EFH and EFH-HAPC will require consideration of all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat.

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

	Alternative 1	Alternative 2a	Alternative 2b	Alternative 3
Biological	Overall negative impacts	Overall positive impacts	Overall positive impacts	Overall positive impacts
Economic	Neutral impacts	Overall positive impacts	Overall positive impacts	Overall positive impacts
Social	Overall negative impacts	Overall positive impacts	Overall positive impacts	Overall positive impacts
Administrative	Neutral impacts	Overall negative impacts	Overall negative impacts	Overall negative impacts

2.7 Action 7. Amend the Coral, Coral Reefs and Live/Hardbottom Habitat Fishery Management Plan (Coral FMP) to designate new EFH-HAPCs

Alternative 1. No Action. Do not amend the Coral FMP to designate new Essential Fish Habitat – Habitat Areas of Particular Concern (EFH-HAPCs).

Preferred Alternative 2. Amend the Coral FMP to designate the following Deepwater Coral HAPCs as designated in Comprehensive Ecosystem-Based Amendment 1 as EFH-HAPCs: Cape Lookout Coral HAPC, Cape Fear Coral HAPC, Blake Ridge Diapir Coral HAPC, Stetson-Miami Terrace Coral HAPC, Pourtalés Terrace Coral HAPC.

2.7.1 Comparison of Alternatives

EFH and EFH-HAPCs for corals were established through Amendment 4 to the Coral FMP as part of the Comprehensive EFH Amendment (SAFMC 1998b) and are presented in Section 3.4.1. **Alternative 1 (No Action)** would not propose additional EFH-HAPCs intended to aid in the conservation of coral and live bottom habitat especially when addressing policy or permit activities associated with non-fishing activities. However, in July 2010, a final rule was published establishing deepwater Coral HAPCs in the South Atlantic region which offers protection from bottom damaging fishing activities (SAFMC 2009b). **Preferred Alternative 2** proposes to further emphasize the importance of these protected deepwater coral ecosystems by designating them as EFH-HAPCs. While habitats within the boundaries of the coral HAPCs are essential fish habitat for other managed species, designation of the entire area as an EFH-HAPC would require enhanced EFH consultation pertaining to non-fishing activities that may negatively impact the deepwater Coral HAPCs.

The designation of additional EFH-HAPCs for the Coral FMP would not result in direct impacts to the biological resources of the South Atlantic. Rather, the EFH-HAPC designation under this action would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect surface waters from non-fishing activities which are undertaken, authorized, or funded by federal agencies. Similarly, designation of additional EFH-HAPCs would require federal agencies to consult with NMFS on activities which may adversely affect that habitat. Designation of EFH-HAPCs will

require the South Atlantic Council to consider all operations or actions that might interact with or affect the EFH-HAPC, and may trigger a consultation for any activity that may affect the habitat. This consultation process associated with EFH-HAPCs may result in increased economic, social and administrative impacts. The direct effects of additional regulatory consideration would be the financial costs of a lengthy regulatory process. The nature and extent of those impacts are unknown and will undoubtedly vary depending upon the individual and/or agency and the actions to be taken within the designated EFH-HAPCs.

Assuming the area is appropriate to the resource, **Preferred Alternative 2** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits over **Alternative 1 (No Action)**. There will be few social impacts from establishing EFH-HAPCs and would most likely come from future actions that are associated with such designations. Designation of new EFH and EFH-HAPC would require consideration of all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat.

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

	Alternative 1	**Alternative 2**
Biological	Overall negative impacts	Overall positive impacts
Economic	Neutral impacts	Overall positive impacts
Social	Overall negative impacts	Overall positive impacts
Administrative	Neutral impacts	Overall negative impacts

2.8 Action 8. Amend the Fishery Management Plan (FMP) for Pelagic *Sargassum* Habitat to designate EFH

Alternative 1. No Action. Do not amend the *Sargassum* FMP to designate Essential Fish Habitat (EFH).

Alternative 2. Amend the *Sargassum* FMP to designate the top ten meters of the water column in the South Atlantic EEZ as EFH for pelagic *Sargassum*.

Preferred Alternative 3. Amend the *Sargassum* FMP to designate the top ten meters of the water column in the South Atlantic EEZ bounded by the Gulfstream, as EFH for pelagic *Sargassum*.

2.8.1 Comparison of Alternatives

The FMP for Pelagic *Sargassum* Habitat of the South Atlantic Region (SAFMC 2002b) was approved in 2003. However, the provisions proposing the designation of EFH and EFH-HAPCs for pelagic *Sargassum* were disapproved because they did not meet the definition of

EFH and EFH-HAPCs. Pursuant to the Magnuson-Stevens Act, all managed species must have EFH designated and where information exists consider establishment of EFH-HAPCs. In addition, actions to reduce the impact of fishing on EFH must be evaluated and if needed, non-fishing threats identified. Regulations in the *Sargassum* FMP prohibit harvest in the majority of the South Atlantic waters and establish a restrictive 5,000 annual quota, address the need to reduce or eliminate the impact of fishing activities on *Sargassum.*

Alternative 1 (No Action) would not specify EFH for *Sargassum* and would not be in compliance with the EFH Final Rule. **Alternative 2** proposes an EFH designation that includes the top ten meters of the water column where it occurs in the South Atlantic. **Preferred Alternative 3** proposes a smaller EFH designation and includes the top ten meters of the water column in the South Atlantic with the bounds of the Gulf Stream being the most Eastern boundary. The Gulf Stream is the most significant oceanographic feature supporting *Sargassum* species occurrence, distribution and transport. The Gulf Stream is already designated as EFH for dolphin and wahoo, coastal migratory pelagics, spiny lobster, rock shrimp and golden crab.

The EFH designation under this action would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect surface waters from non-fishing activities which are undertaken, authorized, or funded by federal agencies. Similarly, designation of *Sargassum* EFH would require federal agencies to consult with NOAA Fisheries Service on activities which may adversely affect that habitat. Designation of EFH will require the South Atlantic Council to consider all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat. This consultation process associated with EFH may result in increased economic, social and administrative impacts. The direct effects of additional regulatory consideration would be the financial costs of a lengthy regulatory process. The nature and extent of those impacts are unknown and will undoubtedly vary depending upon the individual and/or agency and the actions to be taken and expected impacts on designated EFH. However, considering the Gulf Stream is already EFH for a number of managed species, it is likely that *Sargassum* would be included as one of the potentially impacted species and administrative burden associated with EFH consultation would not be anticipated to increase.

Assuming the area is appropriate to the resource, **Preferred Alternative 3** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and **Alternative 2** and is expected to increase long-term economic benefits compared **Alternative 1 (No Action)** and **Alternative 2**. There would be few social impacts from establishing EFH-HAPCs and would most likely come from future actions that are associated with such designations. Designation of new EFH and EFH-HAPC would require consideration of all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat.

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

	Alternative 1	Alternative 2	Alternative 3
Biological	Overall negative impacts	Overall positive impacts	Overall positive impacts
Economic	Overall negative impacts	Neutral impacts	Overall positive impacts
Social	Overall negative impacts	Overall positive impacts	Overall positive impacts
Administrative	Overall positive impacts	Overall negative impacts	Neutral impacts

3 Affected Environment

3.1 Habitat

3.1.1 Description and distribution of Coral, Coral Reefs and Live Hard Bottom Habitat

It is commonly known that stony corals are the main builders of the reef framework in tropical reefs and also major occupiers of space in such habitats. However, in certain coral reef habitats, non-stony coral anthozoans, typically zooanthids and octocorals, occupy comparable expanses of substratum and are functionally comparable to reef-building corals (Fautin 1988). Coral reef environments also have vast expanses of solid substrata heavily populated by epibiotic micro- and algoflora (Sorokin 1973). The physical and biological characteristics of a habitat are fundamental to determining which organisms live there. Octocorals are functionally as important as stony corals for habitat topographic complexity.

North Carolina to Cape Canaveral

Coral communities on the outer continental shelf proper are characterized by patches of low-relief hard bottoms also referred to as "live bottom" habitats. Perkins et al. (1997) estimated the distribution and areal amount of hardbottom for the Florida/Georgia border to Jupiter Inlet. These hardbottom habitats are often dominated by octocorals. Bayer (1961) stated that the shelf octocoral fauna from the East Coast of Florida north of Cape Canaveral is indistinguishable from the fauna from Georgia and the Carolinas. Reports from North Carolina (Menzies et al. 1966; Cerame-Vivas and Gray 1966), South Carolina (Powles and Barans 1979), and Georgia (Reed 1978, personal communication) appear to confirm this conclusion for both octocorals and scleractinians.

Southeast Florida Coast (Palm Beach to Fowey Rocks)

South of 27° North latitude to near Miami, the continental shelf narrows to 3 to 5 km (1.6 to 2.7 nm) and the warm waters of the Florida current become the most dominant hydrographic feature (Lee and McGuire 1972). Thus, in the vicinity of Palm Beach, Florida, a diverse reef community develops. The coral communities in the southeast Florida region are tropical in character, zoogeographically similar to that of the Florida Keys but less well developed than the majority of the Florida reef tract.

Much of the underlying substrate in this region is a Holocene elkhorn coral, *Acropora palmata*, and staghorn coral, *A. cervicornis*, relic reef which lies 15 to 30 m (50 to 100 ft.) below present sea level. The reef has not been actively accreting for the last 8,000 years (Lighty et al. 1977; Banks et al. 2007). The system of coral communities from Palm Beach County to Miami-Dade County can be characterized as a series of discontinuous reef lines that parallel the shoreline. As an example, in Broward County there are generally three lines of reef (terraces); inner reef crests in 3 to 5 m, middle reef crests in 7 to 9 m, and the outer reef in16 to 23 m water depths (Banks et al. 2007; Walker et al. 2008). Nearshore of the Inner Reef is a series of nearshore ridges (Moyer 2003; Banks et al. 2007; Walker et al. 2008.

The coral community found within this region is generally dominated by gorgonian corals (Order Alcyonacea). A number of earlier studies have provided limited descriptions of the reef community in this region. Goldberg (1973a and b) has characterized the deeper zones of this community (20 to 30 m; 66 to 100 ft) by the presence of the gorgonian *Iciligorgia schrammi*. Wheaton and Jaap (1976) and Courtenay et al. (1975) discussed reef zonation off Palm Beach and Miami Beach, respectively. Wheaton described the octocoral fauna on the offshore reef terrace from Palm Beach County to Looe Key (Wheaton 1987). Blair and Flynn (1989) observed coral community structure off Miami. Goldberg (1973a) reported an average octocoral density off Palm Beach County of 25 colonies/m^2.

Coral, coral reefs, and coral community habitat status is mostly recorded as part of monitoring efforts (Gilliam et al. 2007a, b) originated as impact and mitigation studies from adverse environmental impacts to specific sites (dredge insults, ship groundings, pipeline and cable deployments, and beach renourishment). Beginning in 1997, in response to beach renourishment efforts in Broward County, annual collection of environmental data (sedimentation quantities and rates and limited temperature measurements), and coral (stony corals and gorgonians), sponge, and fish abundance/cover data was conducted at 18 sites. In 2000 five new sites were added and in 2003 two additional sites were added for a total 25 sites (Gilliam et al. 2007a). In 2003, the Florida Department of Environmental Protection (FDEP) was awarded funding for a coral reef monitoring along the southeast Florida coast. Florida DEP contracted this work *en toto* to the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWC-FWRI) who is working with Nova Southeastern University's National Coral Reef Institute. Ten sites were installed: three in Miami-Dade County, four in Broward County, and three in Palm Beach County (Gilliam et al. 2007b). Three additional sites were installed in Martin County in 2006. The Southeast Florida Coral Reef Evaluation and Monitoring Project (SECREMP) is an extension of the Florida Keys Coral Reef Evaluation and Monitoring Project (CREMP) which utilizes the same methods (Gilliam et al. 2006).

Octocorals are more abundant that stony corals in this region. Density can approach 20 colonies/m^2 (Gilliam et al. 2007a) with coverage of 20% (Gilliam et al. 2007b). Much less data exist on the species richness due to the difficulty of field identification, but common species include several *Eunicea* species, *Plexaura flexuosa*, *Pseudopterogorgia americana*, and *Muricea muricata*.

Monitoring data have shown that, although some differences were determined between years at some sites, in general stony coral cover on the reefs off Broward County (Gilliam et al. 2007a) has been stable. Regional data collected by the SECREMP project has also shown stability in stony coral and octocoral cover (Gilliam et al. 2007b). SECREMP and CREMP data indicate that southeast Florida reefs generally have reduced stony coral species richness and stony coral cover than the Dry Tortugas or Florida Keys coral reefs. Benthic cover by octocorals is, interestingly, very similar throughout the Florida reef system while southeast Florida reefs appear to have reduced macroalgae cover compared to reefs in the Dry Tortugas and the Florida Keys (Gilliam et al. 2006, Gilliam et al. 2007b).

Florida Keys (Fowey Rocks to the Dry Tortugas)

Coral reefs and coral communities are common within the south Florida coastal ecosystem. Well developed coral reefs similar to those found in the Bahamas and Caribbean occur from Fowey Rocks to Tortugas Banks: 25° 40' – 24° 30'N latitude, 80° 30' – 82° 40'W longitude (Jaap 1984; Jaap and Hallock 1990). The diversity and abundance of octocorals tends to be greatest in patch reefs and offshore deep reefs. Functionally, coral reefs enhance the abundance and variety of life, provide a living breakwater that protects the coast from storm waves, provide economic benefit from fisheries and tourism, and are important education and research resources. Quantitative information dealing with distribution and abundance of gorgonians is available for several back reef areas in the Florida Keys. Opresko (1973) has analyzed gorgonian data for Boca Chita Pass, Soldier Key, and Red Reef. Bagby (1978) studied three sites off Key Largo, Florida, chosen to provide a view of the influence of increasing oceanic conditions. Bagby (1978) found that *Pseudopterogorgia americana* and *P. acerosa* were the most widespread species. In agreement with the conclusions of Opresko (1973), *P. acerosa* was most common inshore, while *P. americana* was more dominant at offshore patch reefs. Equally widespread, but numerically less dominant, were the species double-forked *Plexaurella* (*Plexaurella dichotoma*) and *Plexaura flexuosa*. Two species, *Eunicea succinea* and *Pterogorgia citrina*, were distributed in abundance at both Soldier Key and Nine Kilometer Reef, but not in intermediate areas. *Pseudoplexaura porosa* was dominant on Five Kilometer Reef and black sea rod (*Plexaura homomalla*) was of considerable importance on Red Reef, but neither was prominent elsewhere in the areas studied. *Plexaura flexuosa* and *Pseudopterogorgia americana* dominated the shallow reefs at Long Key, Dry Tortugas (Wheaton, unpublished). Thus, any or all of these species can be found prominently on inshore or offshore reefs, in shallow water or on outer reefs at depths up to 20 m (66 ft). Their relative abundance on a given reef must therefore be interpreted with caution. Shallow patch reefs near the outer reef tract display a number of clear-water indicator species. *Gorgonia ventalina*, *Muriceopsis flavida*, *Briareum asbestinum*, and *Pseudopterogorgia bipinnata* all fall in this category, in decreasing order of consistency (Opresko 1973, Bagby 1978). At four pairs of reefs in Biscayne National Park Wheaton (unpublished) surveyed octocoral abundance and density by transect, species count, and photographic analysts. Octocoral colonies usually comprised more than half of the total coral colonies. The five most abundant species (53.9 percent of total octocorals) were *Plexaura flexuosa*, *P. homomalla*, *Gorgonia ventalina*, *Eunicea succinea*, and *Pseudopterogorgia americana*. Mean numbers of octocoral colonies counted along a 20 m (66 ft) transect of the eight reefs were 102.81 and 155.17 (Wheaton unpublished).

Description and Distribution of Marine Water Column

The following is a description of marine water column habitats presented in the Fishery Ecosystem Plan (SAFMC 2009a). Specific habitats in the water column can best be defined in terms of gradients and physical and biological characteristics, such as temperature, salinity, density, nutrients, light and depth. These "structural" components of the water column environment (Peters and Cross 1985) are not static but change both in time and space. Therefore, there are numerous potentially distinct water column habitats for a broad array of species and life-stages within species.

Winds are important in all layers of the marine water column. Wind stress can alter or reverse the generally southern pattern of flow in the coastal frontal zone, CFZ (Blanton et al. 1999). Winds can also mix and move water masses inshore. In the mid-Atlantic, waters from Gulf Stream intrusions move across the shelf at a rate of approximately 2-3 miles/day (3-5 km/day), and parallel to the coast at a rate of approximately 3-9 miles/day (5-15 km/day) (Hare et al. 1999). Georgian shelf waters flow into the North Carolina Capes region during periods of persistent southwesterly winds, while Virginian coastal waters flow south across Diamond, and occasionally Lookout, shoals during periods of persistent northerly winds (Pietrafesa 1989). Current and wind patterns will have a strong effect on the recruitment and retention of various fish larvae from different offshore areas.

The continental shelf off the southeastern U.S., extending from the Dry Tortugas to Cape Hatteras, encompasses an area in excess of 100,000 km^2 (Menzel 1993). Based on physical oceanography and geomorphology, this environment can be divided into two regions: Dry Tortugas to Cape Canaveral and Cape Canaveral to Cape Hatteras. The break between these two regions is not precise and ranges from West Palm Beach to the Florida-Georgia border depending on the specific data considered. The shelf from the Dry Tortugas to Miami is ~25 km wide and narrows to approximately 5 km off Palm Beach. The shelf then broadens to approximately 120 km off of Georgia and South Carolina before narrowing to 30 km off Cape Hatteras. The Florida Current/Gulf Stream flows along the shelf edge throughout the region. In the southern region, this boundary current dominates the physics of the entire shelf (Lee et al. 1992, 1994). In the northern region, additional physical processes are important and the shelf environment can be subdivided into three oceanographic zones (Atkinson et al. 1985; Menzel 1993). The outer shelf (40-75 m) is influenced primarily by the Gulf Stream and secondarily by winds and tides. On the mid-shelf (20-40 m), the Gulf Stream, winds, and tides almost equally affect the water column. Freshwater runoff, winds, tides and bottom friction influence inner shelf waters (0-20 m).

Several water masses are present in the region. From the Dry Tortugas to Cape Canaveral, the three water types are: Florida Current Water (FCW), waters originating in Florida Bay, and shelf water. Shelf waters off the Florida Keys are an admixture of FCW and waters from Florida Bay (Lee et al. 1992, 1994). From Cape Canaveral to Cape Hatteras, four water masses are found: Gulf Stream Water (GSW), Carolina Capes Water (CCW), Georgia Water (GW) and Virginia Coastal Water (VCW). Virginia Coastal Water enters the region from north of Cape Hatteras. Carolina Capes Water and GW are admixtures of freshwater runoff and GSW (Pietrafesa et al. 1986).

Spatial and temporal variation in the position of the western boundary current has dramatic affects on water column habitats. Variation in the path of the Florida Current near the Dry Tortugas induces formation of the Tortugas Gyre (Lee et al. 1992, 1994). This cyclonic eddy has horizontal dimensions on the order of 100 km and may persist in the vicinity of the Florida Keys for several months. The Pourtalés Gyre, which has been found to the east, is formed when the Tortugas Gyres moves eastward along the shelf. Upwelling occurs in the center of these gyres, thereby adding nutrients to the near surface (<100 m) water column.

Wind and input of Florida Bay water also influence the water column structure on the shelf off the Florida Keys (Smith 1994; Wang et al. 1994).

Similarly, further downstream, the Gulf Stream encounters the Charleston Bump, a topographic rise on the upper Blake Ridge. Here the current is often deflected offshore, again resulting in the formation a cold, quasi-permanent cyclonic gyre, and associated upwelling (Brooks and Bane 1978). Along the entire length of the Florida Current and Gulf Stream, cold cyclonic eddies are imbedded in meanders along the western front. Three areas of eddy amplification are known: Downstream of Dry Tortugas, downstream of Jupiter Inlet (27°N to 30°N latitude) ("The Point" or "Amberjack Hole"), and downstream of the Charleston Bump (32°N to 34°N latitude) ("The Charleston Gyre"). Meanders propagate northward (i.e., downstream) as waves. The crests and troughs represent the onshore and offshore positions of the Gulf Stream front. Cross-shelf amplitudes of these waves are on the order 10 to 100 km. Upwelling within meander troughs is the dominant source of "new" nutrients to the southeastern U.S. shelf and supports primary, secondary, and ultimately fisheries production (Yoder 1985; Menzel 1993). Off Cape Hatteras the Gulf Stream turns offshore to the northeast. Here, the confluence of the Gulf Stream, the Western Boundary Under-Current (WBUC), Mid-Atlantic Shelf Water (MASW), Slope Sea Water (SSW), CCW, and VCW create a dynamic and highly productive environment, known as the "Hatteras Corner" or "The Point".

On the continental shelf, offshore projecting shoals at Cape Fear, Cape Lookout and Cape Hatteras affect longshore coastal currents and interact with Gulf Stream intrusions to produce local upwelling (Blanton et al. 1981; Janowitz and Pietrafesa 1982). Shoreward of the Gulf Stream, seasonal horizontal temperature and salinity gradients define the mid-shelf and inner-shelf fronts. In coastal waters, river discharge and estuarine tidal plumes contribute to the water column structure.

3.2 Biological/Ecological Environment

3.2.1 Species Most Impacted by this Amendment

3.2.1.1 Octocorals

Octocorallia (sea fans, sea whips, etc.)
For the purpose of this plan, includes species belonging to the Class Anthozoa, Subclass Octocorallia (soft corals and gorgonians), Order Alcyonacea. Similar to stony corals, octocorals are colonial animals with a polyp as the individual building unit and may contain endosymbiotic algae (zooxanthellae). Unlike stony coral, octocorals do not secret a calcium carbonate skeleton but have a axial skeleton mainly composed of collagen fibers in a proteinaceous matrix. Although octocorals do not contribute to reef framework, they do contribute greatly to reef complexity and diversity.

The hardbottom, coral reef, and coral community habitats within the management area contain a considerable diversity of octocorals. **Table 3-1** lists the distribution of the common octocorals within the management area and includes possible endemic species.

Cairns (1977) published a field guide to the more common gorgonians of the Gulf of Mexico, Caribbean, and Florida. Sanchez and Wirshing (2005) published a field guide to western tropical Atlantic octocorals. Wheaton described the octocoral fauna off southeast Florida in 20-50 meter zones (1987), off Key Largo, in 27-57 m depths (1981), at Looe Key (1988), and at Dry Tortugas (1975, 1989). DeVictor and Morton (2007) recently produced a shallow water octocoral guide for the South Atlantic Bight from Cape Hatteras, NC to Cape Canaveral, FL.

Table 3-1. Common octocoral species from the shallow-water continental shelf regions (less than 200 meter or 660 ft) of the southern United States.

Order	Suborder	Family	Genus species	Distribution
Alcyonacea				
	Scleraxonia			
		Briareidae		
			Briarium asbestinum	2,3,4
		Anthothelidae		
			Icilogorgia schrammi	1,2,3,4
			Anthothela tropicalis	1
			Erythropodium caribaeorum	2,3,4
			**Titanideum frauenteldii*	1,2
	Holaxonia			
		Plexauridae		
			Plexaura homomalla	2,3,4
			Plexaura flexuosa	2,3,4
			Plexaura kuna	2,3,4
			Pseudoplexaura porosa	2,3,4
			Pseudoplexaura flagellosa	3,4
			Pseudoplexaura wagenaari	2,3,4
			**Eunicea palmeri*	3
			Eunicea mammosa	2,3,4
			Eunicea succinea	2,3,4
			Eunicea fusca	1,2,3,4
			Eunicea laciniata	3,4
			Eunicea tourneforti	2,3,4
			Eunicea asperula	2,3,4
			Eunicea clavigera	2,3,4
			**Eunicea knighti*	3
			Eunicea calyculata	2,3,4
			Muriceopsis flavida	2,3,4
			Muriceopsis petila	1,2,3,4
			Plexaurella dichotoma	2,3,4
			Plexaurella nutans	2,3,4
			Plexaurella fusifera	2,3,4
			Plexaurella grisea	3,4
			Muricea muricata	2,3,4
			Muricea atlantica	2,3,4
			Muricea laxa	2,3,4
			Muricea elongata	2,3,4
			**Muricea pendula*	1,2,3,4
	Holaxonia			
		Gorgoniidae		
			**Leptogorgia cardinalis*	2,3,4
			Leptogorgia hebes	1

			Leptogorgia virgulata	1
			Leptogorgia setacea	1
			Leptogorgia eurale	1
			Pseudopterogorgia bipinnata	3,4
			Pseudopterogorgia acerosa	2,3,4
			Pseudopterogorgia elisabethae	3
			Pseudopterogorgia americana	2,3,4
			Pseudopterogorgia rigida	2,3,4
			Pseudopterogorgia kallos	3,4
			Gorgonia ventalina	2,3,4
			Gorgonia flabellum	3,4
			Pterogorgia citrina	2,3,4
			Pterogorgia anceps	2,3,4
			Pterogorgia guadalupensis	3,4

Note: The distribution zones are divided as follows: (1) Atlantic Coast to NE. Florida (South Atlantic Bight); (2) SE. Florida; (3) Florida Keys; (4) Dry Tortugas. * Indicates species with principal distribution within study area (possibly endemic).

Reproduction

Octocorals have both sexual and asexual reproductive modes. The addition of new polyps to a colony occurs through budding of existing polyps. In this way, colonies grow in size through an asexual means of reproduction. In addition, many coral species, particularly branching ones, are also highly clonal in that they can reproduce asexually by fragmentation. That is, individual branches, when broken off from the parent colony, can re-attach to the substrate and form a new, distinct colony. These characteristics greatly complicate the population biology of corals, particularly branching species.

Corals also reproduce sexually, with sperm fertilizing egg, followed by a process of embryonic development into a planula larva. The larvae may survive long periods (i.e., one to a few weeks) floating in the water currents until they settle and metamorphose into a sessile polyp on some hard substrate. Different coral species display different sexual reproduction strategies. Some species have separate sexes while others are hermaphroditic. Some have internal fertilization and retain the developing embryos inside the mother colony to a relatively late stage of development (brooders) while others (broadcast spawners) release their gametes into the water column so that fertilization and the entire larval development phase occurs in an oceanic, highly diluting environment. Among octocorals, another reproductive strategy is surface brooding, where eggs are released passively onto the surface of the colony (Benayahu and Loya 1983, Brazeau and Lasker 1990, Guitiérrez-Rodríguez and Lasker 2004). While sampling female colonies of *Pseudopterogorgia elisabethae*, Guitiérrez-Rodríguez and Lasker (2004) did not find developing embryos or planula inside the polyps, and they suggested that fertilization occurred either internally immediately before the eggs were released or externally on the surface of the maternal colony.

Brooded larvae are often able to settle shortly after release (hence higher recruitment success and lower average dispersal than broadcast spawning species). An advantage of brooding is that the eggs avoid the risk of being advected off of the reef and away from sperm of potential mates (Lasker 2006). Generally, broadcast spawning stony coral species tend to have high longevity, lower recruitment, larger maximum colony size (i.e., K-selected life

history traits). Brooding stony corals are generally more weedy species which do not attain large colony size and hence have limited contribution to reef accretion (Szmant 1986). Such inter-specific differences in the mechanisms of fertilization, dispersal, recruitment, and mortality are likely important in determining the species composition of reef corals in different environments. Such differences reflect the differential allocation of energy to the basic life history functions of growth (rate and density of the skeleton), reproduction (fecundity, mode of larval dispersal, recruitment success), and colony maintenance (intra- and interspecific interactions, competitive ability, regeneration) (Connell 1973, Lang 1973, Bak and Engel 1979, Szmant 1986).

Most broadcast spawning corals release gametes only on a few nights per year. In southeast Florida, most species spawn over a few nights clustered around the full moon in late summer. Spawning synchrony is crucial in order for sessile organisms to accomplish external fertilization. Also, in the context of declining population density as is being observed for many shallow reef corals in the region, fertilization may constitute the major life-history bottleneck as dilution between colonies even few to tens of meters distant may be prohibitive.

Brooding species often release larvae on a lunar cycle over several months or year round. *Porites astreoides*, a brooding stony coral species, releases larvae around the new moon, primarily from April to June in the Florida Keys (McGuire and Szmant1997). However, the brooding season has been reported to be from January to September farther south in Puerto Rico (Szmant 1986). *Favia fragum*, another brooding species, releases larvae monthly year-round (Szmant 1986). Surface brooding has been reported in a few octocoral species found in the management area, including *Briaerium asbestinum* and *Pseudopterogorgia elisabethae* (Guitiérrez-Rodríguez and Lasker 2004).

In either mode of larval development, planula larvae presumably experience considerable mortality (up to 90% or more) from predation or other factors prior to settlement and metamorphosis (Goreau et al. 1981). The selection of appropriate settlement substrate is not well-understood, but for several coral species, chemical cues from crustose coralline algae and microbial biofilms have been shown to induce settlement and metamorphosis (Morse et al. 1994, Morse and Morse 1996, Webster et al. 2004). Settled larvae undergo metamorphosis by generating a calcium carbonate skeleton. The mouth is situated at the upper end, and a ring of tentacles develops around the mouth. After metamorphosis onto appropriate hard substrata, metabolic energy is diverted to colony growth and maintenance. Because newly settled corals barely protrude above the substratum, juveniles need to reach a certain size to reduce damage or mortality from impacts such as grazing, sediment burial, and algal overgrowth (Bak and Elgershuizen 1976, Birkeland 1977, Sammarco 1985). Cary (1914) points out the obvious advantage of young octocorals over stony coral recruits in that their most rapid growth is perpendicular to the substratum, keeping the most active growing part of the colony in a favorable position for resource allocation. Recent studies examining early survivorship of lab cultured *A. palmata* settled onto experimental limestone plates and placed in the field indicate that survivorship is substantially higher than for *Montastraea faveolata*, another broadcast spawner, and similar to brooding species over the first 9 months

after settlement (Szmant and Miller 2006). This pattern corresponds to the size of planulae; *A. palmata* eggs and larvae are much larger than those of *Montastraea* spp.

Development and growth

Most corals are colonial in that they are composed of individual units called polyps. Each polyp is an individual: it captures food, has independent digestive, nervous, respiration, and reproductive systems. A large coral colony has thousands of polyps working semi-independently to sustain the colony. Coral colonies grow via the addition (budding) of new polyps. By the same token, colonies can exhibit partial mortality whereby a subset of the polyps in a colony die, but the colony persists.

For most gorgonian genera, the major axial skeleton component is gorgonian, which is mainly composed of collagen fibers in a proteinaceous matrix (Leversee 1969). Gorgonin is deposited in concentric layers extracellularly around a central, hollow chambered canal, seldom exceeding a diameter of 100 μm. The axis functions as a mechanical support system facilitating the passive suspension feeding by octocorals (Lewis et al. 1992). The axis must be rigid enough to withstand the total water velocities for the particular habitat while supporting the polyps off the substratum (Muzik and Wainwright 1977). Lowenstam (1964) explains that the flexibility of the axial skeleton of gorgonians can apparently be modulated by sclerotization of the collagen within the axial skeleton. Gorgonian axes can be stiffened by the extracellular deposition of carbonates within the collagen interstitial spaces (Jeyasuria and Lewis 1987). Lewis et al. (1992) suggests that this process may be a mechanism for dealing with different hydrodynamic forces encountered at various depths.

Many gorgonian species can be characterized by a distinct colony form and a maximum colony size, indicating determinate growth, which suggests that growth is constrained in some way (Lasker et al. 2003). In two studies on *Pseudopterogorgia elisabethae*, the developmental cycle showed a rapid growth rate after settlement which then decreased dramatically with age, suggesting an age-dependent decrease in growth rate (Lasker et al. 2003, Goffredo and Lasker 2006). This size- or age-dependent decrease in growth rates may be due to interactions between the gorgonian colony and its environment (i.e., the balance between nutrient uptake and metabolic rates) instead of a genetically determined developmental plan (Lasker et al. 2003). A common method to determine growth rates of octocorals is by taking linear height measurements of a tagged colony over a period of time, the results usually varying between species. The most accurate method of estimating the age of a colony is counting growth rings seen within the axial skeleton rather than basing it on growth rates. However, counting growth rings usually requires the collection of the colony. Using both methods, height-age equations can be derived for a species (Grigg 1974).

Growth rates can vary dramatically within a species and between different species. Lasker et al. (2003) studied determinate growth in *Pseudopterogorgia elisabethae*. The resulting branch growth rates varied, ranging from negative values (branch loss) to 17.8 cm per year. A later study on this species performed by Goffredo and Lasker (2006) showed growth rates that decreased as a function of height. Colonies that were 0-10 cm in height had a growth rate of 3.5 cm per year; 20-30 cm colonies had a growth rate of 2.6cm per year; and 40-50

cm colonies had a growth rate of 0.5 cm per year. Yoshioka (1979) studied the ecology of *Pseudopterogorgia americana* and *Pseudopterogorgia acerosa*, calculating their linear growth rates to be about 5 cm per year for *P. americana* and 6 cm per year for *P. acerosa*.

Growth rates were higher for colonies exposed to higher light levels, showing that environmental factors affect the growth of a colony. Reproduction was delayed for 3–5 years until colonies were mature, ranging 15-30 cm respectively. Growth rates of *Pseudoplexaura porosa* branches can exceed 15cm per year (Lasker unpublished data). Due to these variations in growth rates, calculations determining the accurate age of a given colony should be based on growth rings and colony height (not solely on height).

Ecological Relationships

Octocorals derive energy from several sources including from sunlight through their photosynthetic, symbiotic zooxanthellae (algae living in the coral tissue), from consumption of zooplankton, from bacteria (which act as biochemical recycling agents), from consumption of detritus, and perhaps even directly from dissolved organics.

Corals are subject to the ecological pressures of predation (by fish and invertebrates), competition for space, and other interactions with associated organisms. In some instances, such as the symbiotic relationship of corals to zooxanthellae, the association is mutually beneficial. At the other end of the spectrum, however, are predatory pressures such as those applied by certain reef fishes and invertebrates that eat corals.

The importance of coral ecosystems and associated habitats has been well documented by numerous studies, reviews, and symposia (e.g., Jones and Endean 1973; Bright and Pequegnat 1974; Taylor 1977; Bright et al. 1981; Jaap 1984; Jaap and Hallock 1990; Chiappone 1996). Many of those documents emphasize the complex structure of coral ecosystems, the importance of coral for habitat, the sedentary lifestyle and its implications, the wide geographic and bathymetric distributions, and the many behavioral, physiological, ecological, and physical associations that combine to yield an exceedingly complex biological community. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) recognizes these values and lists several corals as continental shelf fishery resources subject to exclusive U.S. use beyond the EEZ.

Ecosystems which include coral (hardbottoms, coral reefs, and coral communities) often represent unique arrays of plants and animals in an integrated ecosystem. The key to many of these systems, if there can be one most important link, is often coral itself, since the corals provide habitat and/or food for most of the other members of the ecosystem. Connell (1973) and Grassle (1973) have studied aspects of population ecology and diversity within coral reefs. Individual biotic components have also been studied -- among them, microbes (DiSalvo 1973), algae (Cribb 1973), holothurians (Bakus 1973), shrimps and prawns (Bruce 1976), echinoderms (Clark 1976), fishes (Goldman and Talbot 1976), and others. The resultant coral community is exceedingly complex and productive. Helfrich and Townsley (1965), Odum (1971), DiSalvo (1973), Sorokin (1973), and others have attempted to quantify

and qualify the productivity of corals and their associated biota (e.g., microorganisms) compared to other marine and terrestrial communities.

Because of their vast species diversity, trophic complexity, and productivity, mature coral communities possess numerous mechanisms that past researchers believed may enable them to resist normal disturbances, especially those biological in nature (Endean 1976). However, coral reefs have declined throughout the Caribbean including off the Florida coast over the past several decades. Numerous factors play major roles in coral health and may potentially threaten the continued viability of domestic corals. These factors include water quality, algal blooms, increased water temperatures, physical impacts from ship groundings and marine construction activities, sedimentation, pollution, nutrient enrichment, diver/snorkeler damage, disease, and over-fishing. Most of the coral reefs and coral communities in the management area may be degraded to such a degree that self-regulating mechanisms are no longer functional.

The special nature of corals as a fishery is further highlighted by their sedentary attached (not mobile) existence, which separates them from the subjects of many other fishery plans. Protection via escape or camouflage is limited by the design of coral skeletons and polyps. Although some protection is afforded by polyp withdrawal, strict energy budgets restrict the use of such behavior. Hence, in the midst of persistent adversity, (e.g., water pollution, extreme temperatures, sedimentation), corals appear precariously susceptible. The life history of the octocorallian and scleractinian corals is similar to the other invertebrate species. The fruits of coral sexual reproduction are planulae larvae; the larvae are free living (planktonic or benthic). The larvae select settlement sites through chemoreceptors, settle, and undergo metamorphosis to juvenile, sessile corals. Because of their vulnerability to environmental conditions, continued survival of corals will be dependent on management strategies that incorporate more of an ecosystem approach and tackle large scale issues such as water quality.

3.2.1.2 Snapper Grouper Complex

A detailed description of the 73 species included in the Snapper Grouper fishery management unit (FMU) is presented in Section 4.1.2 of the Fishery Ecosystem Plan (SAFMC 2009a). A description of the habitats occupied by snapper grouper species, their abundance and the current status of the stocks is also included in this section.

3.2.1.1 Coastal Migratory Pelagics

A detailed description of the coastal migratory pelagic species, their abundance and the current status of the stocks and the habitats they occupy is presented in Section 4.1.3 of the Fishery Ecosystem Plan (SAFMC 2009a).

3.2.1.2 Pelagic *Sargassum*

A detailed description of Pelagic *Sargassum* is presented in Section 4.1.7 of the Fishery Ecosystem Plan (SAFMC 2009a). A description of the oceanographic habitats occupied by pelagic *Sargassum* is presented in Section 3.1.2 of this Amendment.

3.2.2 Protected Species

There are 31 different species of marine mammals that may occur in the South Atlantic region. All marine mammal species are protected under the Marine Mammal Protection Act and six are also listed as endangered under the ESA (i.e., sperm, sei, fin, blue, humpback, and North Atlantic right whales). Other species listed under the ESA that occur in the South Atlantic include five species of sea turtle, a species of marine fish, and two coral species. Designated critical habitat for some of these species also occurs in the South Atlantic region. A discussion of these species and their critical habitat is below.

3.2.2.1 Endangered Species Act (ESA)-Listed Species

Species and Designated Critical Habitat in the Action Area Under NOAA Fisheries' Purview

Endangered	
Blue whale	*Balaenoptera musculus*
Humpback whale	*Megaptera novaeangliae*
Fin whale	*Balaenoptera physalus*
North Atlantic right whale	*Eubalaena glacialis*
Sei whale	*Balaenoptera borealis*
Sperm whale	*Physeter macrocephalus*
Leatherback sea turtle	*Dermochelys coriacea*
Hawksbill sea turtle	*Eretmochelys imbricata*
Kemp's Ridley turtle	*Lepidochelys kempii*
Green turtle*	*Chelonia mydas*
Smalltooth sawfish**	*Pristis pectinata*
Threatened	
Loggerhead turtle	*Caretta caretta*
Elkhorn coral	*Acropora palmata*
Staghorn coral	*A. cervicornis*
Proposed Species	
Atlantic sturgeon***	*Acipenser oxyrinchus oxyrinchus*

*Green turtles in U.S. waters are listed as threatened except the Florida breeding population, which is listed as endangered.
**U.S. distinct population segment (DPS)
*** North Carolina and South Carolina DPS

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

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

Critical habitat includes one specific area of the Atlantic Ocean offshore of Palm Beach, Broward, Miami-Dade, and Monroe counties, Florida, and three specific areas of the Atlantic Ocean and Caribbean Sea offshore of the U.S. Territories of Puerto Rico and the U.S. Virgin Islands. The boundaries of specific critical habitat area within the South Atlantic EEZ are described below. Except as specified below, the seaward boundary is the 30-meter (98-foot) depth contour and the shoreward boundary is the line of mean low water (MLW; 33 CFR 2.20). Within these boundaries, discrete areas of water deeper than 30 meters (98 feet) are not included.

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

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

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

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

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.

3.2.2.1.1 ESA-Listed Sea Turtles

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

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

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

Kemp's ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987; Ogren 1989). Once the juveniles reach approximately 20 centimeters (8 inches) carapace length they move to relatively shallow (less than 50 meters; 164 feet.) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridleys feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridleys ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or from discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp's ridleys most routinely make dives of 50

m or less (Soma 1985; Byles 1988). Their maximum diving range is unknown. Depending on the life stage Kemp's ridleys may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985; Mendonca and Pritchard 1986; Byles 1988). Kemp's ridleys may also spend as much as 96% of their time underwater (Soma 1985; Byles 1988).

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

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

3.2.2.1.2 ESA-Listed Marine Fish

The historical range of the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. In the South Atlantic region, they are most commonly found in Florida, primarily off the Florida Keys (Simpfendorfer and Wiley 2004). Only two smalltooth sawfish have been recorded north of Florida since 1963 (the first was captured off North Carolina in 1999 (Schwartz 2003) and the other off Georgia 2002 [Burgess unpublished data]). Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 meters (Bigelow and Schroeder 1953; Adams and Wilson 1995), while mature animals occur in waters in excess of 100 meters (Simpfendorfer, pers. communication). Smalltooth sawfish feed primarily on

fish. Mullet, jacks, and ladyfish are believed to be their primary food resources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1938; Bigelow and Schroeder 1953).

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

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

3.2.2.1.3 ESA-Listed Marine Invertebrates

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

Elkhorn and **staghorn** corals are two of the major reef-building corals in the wider Caribbean. In the South Atlantic region, they are found most commonly in the Florida Keys; staghorn coral occurs the furthest north with colonies documented off Palm Beach, Florida (26°3'N). The depth range for these species ranges from <1 meter (3 feet) to 60 meters (197 feet). The optimal depth range for elkhorn is considered to be 1 to 5 meters (3-16 feet) depth (Goreau and Wells 1967), while staghorn corals are found slightly deeper, 5 to 15 meters (16-49 feet) (Goreau and Goreau 1973).

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

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

3.2.2.2 Species of Concern

NOAA Fisheries Service has created a list of Species of Concern (SOC) as a publicly available list identifying other species of concern. These are species about which NOAA Fisheries Service has some concerns regarding status and threats. NOAA Fisheries Service uses the list to draw proactive attention and conservation action to these species. No federal mandate protects species of concern under the ESA although voluntary protection of these species is urged. NOAA Fisheries Service recently received petitions to list five SOC species (denoted below). NOAA Fisheries Service is currently reviewing those petitions to determine if further investigation into whether these species should be listed under the ESA is warranted.

List of Marine Species of Concern in the Southeastern United States

Dusky shark	*Carcharhinus obscurus*	
Sand tiger shark	*Odontaspis taurus*	
Mangrove rivulus	*Rivulus mamoratus*	
Opossum pipefish	*Microphis barchyurus lineatus*	
Key silverside	*Menidia conchorum*	
Speckled hind	*Epinephelus drummondhayi*	(petition pending)
Warsaw grouper	*Epinephelus nigritus*	(petition pending)
Nassau grouper	*Epinephelus striatus*	(petition pending)
Ivory Tree Coral	*Oculina varicose*	
Saltmarsh Topminnow	*Fundulus jenkinsi*	(petition pending)
Striped Croaker	*Bairdiella sanctaeluciae*	
Alabama Shad	*Alosa alabamae*	(petition pending)

3.3 Essential Fish Habitat (EFH)

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

The Magnuson-Stevens Act defines EFH as "all waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." The Magnuson-Stevens Act directs Regional Fishery Management Councils to describe and identify EFH for each federally managed species, to minimize the extent of adverse effects on habitat caused by fishing and non-fishing activities, and to identify actions to encourage conservation and enhancement of those habitats. It is required that EFH designations be based on the best available scientific information.

EFH designations may include habitat for an individual species or an assemblage of species, whichever is appropriate within a particular Fishery Management Plan. Under 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.
- "Necessary" means the habitat required to support a sustainable fishery and a healthy ecosystem, while "spawning, breeding, feeding, or growth to maturity" covers the full life cycle of a species.
- "Substrate" includes sediment, hardbottom, structures underlying the waters, and associated biological communities.

Councils should obtain information to describe and identify EFH from the best available sources. Information should be analyzed and organized as follows, striving to describe habitat based on their highest level of detail:

- 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; and
- Level 4: production rates by habitat

In addition to EFH, the Councils may identify EFH- HAPCs as a subset of EFH. In determining which areas should be designated as HAPCs, the area must meet one or more of the following criteria:

- Importance of the ecological function provided by the habitat;
- Extent to which the habitat is sensitive to human-induced environmental degradation;
- Whether, and to what extent, development activities are, or will be, stressing the habitat type; and
- Rarity of the habitat type

Council Habitat Responsibilities as Defined in the Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Act provides for authorities and responsibilities of the Secretary of Commerce and Fishery Management Council for the protection of EFH. Section 305 (b) Fish Habitat, requires the Secretary (through NOAA Fisheries Service) 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 NOAA Fisheries Service) was required to: 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, 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 coordinate with and provide information to other federal agencies to further the conservation and enhancement of EFH.

The Magnuson-Stevens 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 the Magnuson-Stevens 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 the Act, the Secretary shall recommend to such agency measures that can be taken 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 South Atlantic Council's current process for reviewing and commenting on projects is described in Appendix A of the Habitat Plan (SAFMC 1998a).

On December 19, 1997, an interim final rule was published in the *Federal Register* to implement the EFH provisions of the Magnuson-Stevens Act. This rule established guidelines to assist the Councils and the Secretary of Commerce in the description and identification of EFH in fishery management plans, 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 NOAA Fisheries Service), other federal agencies, state agencies,

and the Councils can use to coordinate, consult, or provide recommendations on federal and State activities that may adversely affect EFH. The intended effect of the rule is 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 fishery management plans. The final rule provides more clear guidelines for prioritizing and analyzing habitat effects for managed species. The final rule retains the four-level system for assessing the data applied in identifying EFH. The final 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 Habitat Plan (SAFMC 1998a) was the initial synthesis of technical information for the EFH designated in the Comprehensive EFH Amendment to the Fishery Management Plans of the South Atlantic Region (SAFMC 1998b). The Fishery Ecosystem Plan (SAFMC 2009a) updates that technical information and presents refined information on habitat requirements (by life stage where information exists) for species managed by the South Atlantic Council, including information on environmental and habitat variables that control or limit distribution, abundance, reproduction, growth, survival, and productivity of the managed species.

The South Atlantic Council, in working with its Habitat and Environmental Protection and Coral Advisory Panels and through a series of workshops, reviewed the Fishery Ecosystem Plan (SAFMC 2009a) to identify available environmental and fisheries data useful in describing and identifying EFH. In addition to the members of these Advisory Panels, the workshops included relevant experts from state, federal, and regional levels.

The review continued the South Atlantic Council's ecosystem approach to designating EFH and is consistent with NOAA Fisheries Service guidelines and broader goals for ecosystem management. The South Atlantic Council further pursues this ecosystem approach via a set of formal, published habitat policies that are tailored to specific management issues.

Maps of EFH and EFH-HAPCs under the Final EFH Rule

The Final EFH Rule requires Fishery Management Plans 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. To the extent practicable, maps should identify the different types of habitat designated as EFH, explicitly distinguish EFH from non-EFH areas, and 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, current data availability do not support such use at this time for the South Atlantic at fine spatial scales. Instead, the best use of GIS within the South Atlantic is visualizing where EFH occurs at coarse spatial scales.

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 are 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 fishery management plan (FMP).

While remaining mindful of the above caveats, the South Atlantic Council has developed an Internet Map Server (IMS), and an EFH Arc Service for displaying EFH and EFH-HAPCs within the constraints of available data and technology. The IMS and EFH Arc Service contain GIS layers showing the general distribution and geographic limits of EFH by life history stage (Figure 3-1). The IMS is largely based on information developed by the South Atlantic Council, Florida Fish & Wildlife Research Institute, NOAA Fisheries Service 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. Several data layers were derived from other sources and this processing can affect the fidelity of the underlying data. While the South Atlantic Council encourages use of these GIS data, users are urged to thoroughly review the metadata and original source documentation prior to interpreting the GIS data. It is the user's responsibility to ensure data are used in a manner consistent with stated limitations.

As new data become available, the South Atlantic Council will update the IMS and EFH Arc Service to ensure the public has the best available spatial depictions of EFH descriptions. While the South Atlantic Council believes spatial depictions of EFH and EFH-HAPCs are informative, textual descriptions within the Comprehensive EFH Amendment (SAFMC 1988b) are the ultimate source for determining the limits of EFH and EFH-HAPCs. The IMS can be found at: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm. The EFH Arc Service can be found at: http://ocean.floridamarine.org/SAFMC_EFH/ .

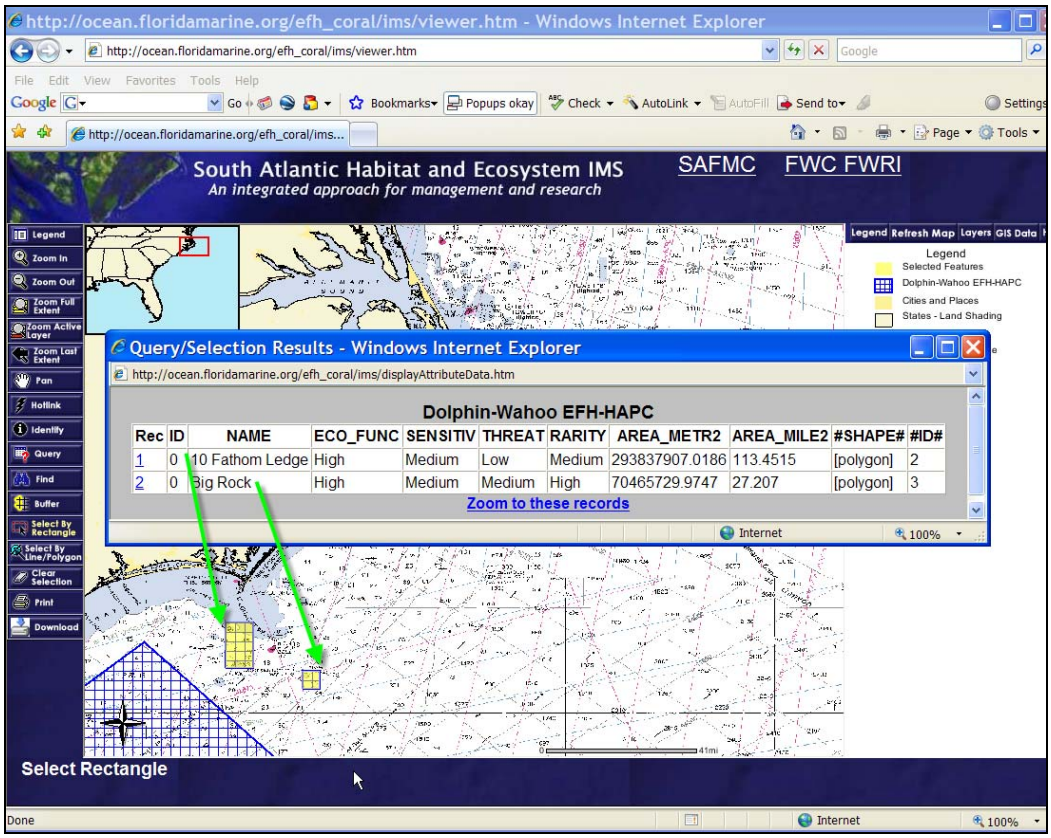


Figure 3-1. Sample screen shot of spatial presentation of EFH-HAPCs on South Atlantic Habitat and Ecosystem IMS.

EFH 5-Year Review

The Final EFH Rule requires EFH designations to be reviewed every 5 years. Activities associated with this first 5-year review included the South Atlantic Council updating and expanding the Habitat Plan (SAFMC 1998a) into the Fishery Ecosystem Plan (SAFMC 2009a). Actions recommended by the 5-year review for the South Atlantic Council to take include those described in CE-BA 1 (SAFMC 2009b) and CE-BA 2. NOAA Fisheries Service in March 2011, provided the South Atlantic Council with a summary report highlighting these activities as part of its requirement to document and approve the first 5-year EFH review. A few key elements of the South Atlantic Council's review are summarized below.

The Fishery Ecosystem Plan (SAFMC 2009a) presents information on adverse effects from fishing and describes management measures the South Atlantic Council has implemented to minimize adverse effects on EFH from fishing. The conservation and enhancement measures implemented by the South Atlantic 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 South Atlantic Council has implemented restrictions on fisheries to the extent that no significant activities were identified in the review of gear impact conducted for the NOAA Fisheries Service by Auster and Langton (1998) that presented available information on

adverse effects of all fishing equipment types used in waters described as EFH. The South Atlantic Council has already prevented, mitigated, or minimized most adverse effects from most fisheries prosecuted in the South Atlantic EEZ.

The South Atlantic Council considered evidence that some fishing practices may have an identifiable adverse effect on habitat and addressed those pertaining to deepwater coral ecosystems in CE-BA 1 (SAFMC 2009b). The South Atlantic Council has already used many of the options recommended in the guidelines for managing adverse effects from fishing including: fishing equipment restrictions; seasonal and areal 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 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 EFH-HAPCs; and harvest limits.

The Fishery Ecosystem Plan (SAFMC 2009a) identifies non-fishing related activities that have the potential to adversely affect EFH quantity or quality. Examples of these activities are dredging, filling, mining, impounding or diverting waters altering thermal regimes, 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 the Fishery Ecosystem Plan is an analysis of how fishing and non-fishing activities influence habitat function. 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 Fishery Ecosystem Plan (SAFMC 2009a). These include recommending the enhancement of rivers, streams, and coastal areas; protection of water quality and quantity; and 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 South Atlantic Council will periodically review and update EFH information and revise the Fishery Ecosystem Plan (SAFMC 2009a) as new information becomes available. NOAA Fisheries Service will provide some of this information to the South Atlantic Council as part of the annual Stock Assessment and Fishery Evaluation report. A complete update of and assessment of EFH information will also be conducted at least every 5 years. Amendments to EFH or EFH-HAPCs will occur, when appropriate via the South Atlantic Council

established framework described in Section 4.2.8 of the Comprehensive EFH Amendment (SAFMC 1998b) or by future Comprehensive Ecosystem-Based Amendments.

Proposed List of New EFH and EFH-HAPC:
The South Atlantic Council designated EFH-HAPCs to emphasize subsets of EFH that warrant special protection. EFH-HAPCs on their own do not carry regulatory authority; however, the FMPs under which they were designated may include regulations that protect habitat from fishing impacts. EFH-HAPCs include general habitat types (e.g., submerged aquatic vegetation) and geographic locations (e.g., Charleston Bump).

The EFH Final Rule identifies four criteria to be used to select candidate habitats or locations for EFH-HAPC designation:

1. Importance of the ecological function provided by the habitat (E)
2. Extent to which the habitat is sensitive to human-induced environmental degradation (S)
3. Whether, and to what extent, development activities are, or will be, stressing the habitat type (ES); and
4. Rarity of the habitat type (R).

After careful consideration of the Fishery Ecosystem Plan (SAFMC 2009a) and input from the South Atlantic Council Advisory Panels and other experts, the following new EFH-HAPCs are proposed along with their respective FMP(s) and EFH-HAPC criteria:

- Golden tilefish habitat and blueline tilefish habitat (Snapper Grouper) R, S, E
- Deepwater MPAs (Snapper Grouper – deepwater species/snowy grouper, golden tilefish) R, E
- The Gulfstream, Charleston Bump and the Point (*Sargassum*) R, E
- Deepwater Coral HAPCs (Coral) R, E

After similar consideration, the top 10 meters of the water column in the South Atlantic EEZ are proposed as EFH under the *Sargassum* FMP; as noted below, the FMP for *Sargassum* currently does not include an EFH designation.

3.4 Current EFH Designations

The Comprehensive EFH Amendment (SAFMC 1998b) and the FMP for the Dolphin Wahoo Fishery of the Atlantic provide the South Atlantic Council's current EFH and EFH-HAPC designations. Since CE-BA 2 only proposes amending designations made under the FMP for the Snapper Grouper Fishery of the South Atlantic (Snapper Grouper FMP) and the FMP for the Coral, Coral Reefs, and Live/Hardbottom Habitats of the South Atlantic Region (Coral FMP), only those EFH and EFH-HAPC designations are listed below.

3.4.1 Coral and Coral Reef FMP

Coral and Coral Reef EFH

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 meters (98 feet) depth, subtropical (15-35°C; 59-95°F), oligotrophic waters with high (30-35 ppt) 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 (30-35 ppt) 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 Volume II of the FEP: Habitat and Species (SAFMC in prep.) for a more detailed description of habitat utilized by the managed species.

Coral and Coral Reef EFH-HAPCs

Existing EFH-HAPCs for coral, coral reefs, and live/hardbottom 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) hardbottom off the east coast of Florida from Cape Canaveral to Broward County; offshore (5-30 meters; 15-90 feet) hardbottom 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.

3.4.2 Snapper Grouper EFH and EFH-HAPCs

Snapper Grouper EFH

EFH for snapper grouper species includes coral reefs, live/hardbottom, 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-meter (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/hardbottom habitats.

Snapper Grouper EFH-HAPC
Existing EFH-HAPCs for species in the snapper grouper management unit include medium to high profile offshore hardbottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; near shore hardbottom 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 South Atlantic Council-designated Artificial Reef Special Management Zones (SMZs).

3.4.3 International Consideration of EFH

A resolution to protect pelagic *Sargassum* as essential fish habitat for highly migratory species, drafted by the National Coalition for Marine Conservation, was submitted by the US delegation at ICCAT's 2005 meeting in Seville, Spain. This represents a first action by ICCAT to address habitat and ecosystem concerns.

3.5 Administrative Environment

3.5.1 The Fishery Management Process and Applicable Laws

3.5.1.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the U.S. 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 (Secretary) and eight regional fishery management councils that

represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for collecting and providing the data necessary for the councils to prepare fishery management plans and for promulgating regulations to implement proposed plans and amendments after ensuring that management measures are consistent with the Magnuson-Stevens Act and with other applicable laws summarized in **Appendix E**. In most cases, the Secretary has delegated this authority to NOAA Fisheries Service.

The South Atlantic 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 South Atlantic 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. 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. South Atlantic 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 South Atlantic Council uses a Scientific and Statistical Committee (SSC) 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.

3.5.1.2 State Fishery Management

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

The South Atlantic states are also involved through the ASMFC in management of marine fisheries. This commission was created to coordinate state regulations and develop management plans for interstate fisheries. It has significant authority, through the Atlantic Striped Bass Conservation Act and the Atlantic Coastal Fisheries Cooperative Management Act, to compel adoption of consistent state regulations to conserve coastal species. The ASMFC 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.

3.5.2 Enforcement

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

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

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

3.6 Human Environment

3.6.1 Description of the Fisheries

3.6.1.1 Octocoral Fishery Description

3.6.1.1.1 History of the Commercial Fishery

The commercial live octocoral fishery probably dates back to the late 1950s or early 1960s when salt water aquariums first started to become popular and the supply of marine specimens began to appear in major cities in the United States. In the early days, filtration systems tended to be crude and the average marine aquarist stocked his aquarium with fish and a few common invertebrates such as crabs, shrimp, and starfish. As the hobby grew and filtration systems improved, more and more aquarists began to stock their aquariums with difficult-to-keep invertebrates such as clams, snails, stony corals, and octocorals. By 1980, the octocoral fishery was becoming well established, and a handful of the hardier octocoral species collected off the Florida coasts could be found in most large marine aquarium stores throughout the U.S. The demand for Florida octocorals has continued to grow, as has the list of species harvested and successfully kept in the average marine aquarium. Florida-collected octocorals dominate the U.S. market as well as some of the European and Asian markets.

The South Atlantic Council, together with the Gulf of Mexico Fishery Management Council, became the first fishery management councils to describe the octocoral fishery in 1982 in the original Coral FMP (SAFMC 1982). Amendment 1 to the Coral FMP, developed in 1990 set an annual harvest limit of 50,000 octocoral colonies from federal waters, allowed for a minimal bycatch of substrate around the holdfast, set allowable gear types, and defined the area where harvest was permitted. The FWC then ruled that octocoral harvest in Florida waters would be unlimited. If the EEZ yearly quota was reached before September 30, then harvest would be closed in state waters until the following October.

Over the years, there has been occasional interest in collecting octocorals for use in biomedical research. Past work has mostly focused on sampling a wide variety of species and searching for chemical compounds that might be of interest to this type of research. Compounds of interest were eventually synthesized in the lab, eliminating the need to continue harvesting specific octocoral species for their extraction (Ken Nedimeyer, pers. communication). No large-scale harvest of octocorals for biomedical purposes is presently taking place in the South Atlantic EEZ (Ken Nedimeyer, pers. communication).

Although octocoral harvest in the South Atlantic EEZ is legal in almost all areas from south of Cape Canaveral, the overwhelming bulk of the commercial octocoral harvest is located primarily in the Florida Keys. Harvest of octocorals from state waters occurs as far north as Jupiter Inlet, but it is also mostly a Florida Keys based fishery. Octocoral landings since 1991 indicate that the majority of the harvest has occurred on the east coast of Florida **(Figures 3-2 & 3-3)** and almost exclusively in the Florida Keys (Ken Nedimeyer, pers. communication). In this area, the shelf is narrower and water clarity is greater than off the west coast of Florida. Consequently, a greater variety of octocoral species is found in the

waters off the Florida Keys. In addition, conditions in the field are favorable to harvesting octocorals. Harvest data from 2000-2009 show that 84% of annual landings originate in state waters (**Table 3-2**). This trend has been anecdotally corroborated by the SAFMC Coral Advisory Panel.

3.6.1.1.2 Licenses and Permits

Commercial harvest of octocorals in federal waters is restricted to individuals or corporations holding a federal octocoral permit or a valid Florida Saltwater Products License (SPL) with a marine life (ML) endorsement issued by NOAA Fisheries Service. Saltwater products licenses from FWC are unrestricted, but the ML endorsement necessary to land commercial quantities of any organism designated as a "marine life" species, which includes all octocorals, is restricted. The commercial marine life fishery in Florida waters and the adjacent federal waters is managed by a limited entry program administered by the FWC, and only a limited number of the licenses currently issued are transferable and valid for harvesting octocorals. NOAA Fisheries Service has no record of issuance of a federal octocoral permit since 2004. FWC data from 2010 indicates there are 161 active ML endorsement licenses, including 108 ML transferable dive endorsements (MLD), 38 ML endorsements (MLB), and 22 ML non-transferable dive endorsements (MLN). Commercial harvesters must have an SPL, an MLD or an MLN, and a restricted species endorsement to collect. Since only MLD and MLN endorsements can be used to dive to collect octocorals, then only 130 possible harvesters could be collecting based on 2010 data.

In 2005, a three-tiered limited entry system was implemented by FWC with the industry recommendation, under which issuance of one of the types of endorsements was based how much income from ML sales that the applicant reported during at least one of the four qualifying harvest seasons (1999-2000, 2000-01, 2001-02, 2002-03). Issuance of a MLB or MLD endorsement required income reports of $1-$4,999 during at least one of the qualifying periods; a transferable MLD endorsement was issued to applicants with more than $5,000 from ML landings during on the years. Holders of transferable MLD endorsements are also allowed to hold multiple endorsements if they reported more than $10,000 in income during the qualifying periods.

No additional endorsements will be issued for the ML fishery, and as of 2010, only 4 MLNs have been forfeited to the State. Some endorsements are no activated each year, but a new rule starting 2011 requires annual 'requalification' for endorsement holders under the age of 62.

The FWC also has a Special Activities License (SAL) that can be issued to researchers, public aquariums, and educational institutions, which allows the harvest of octocorals in state and federal waters. The permit holder must state in the application the number and species of octocorals they wish to harvest, and the request is reviewed by FWC staff before being issued. Requests for any substantial amounts of octocoral harvest in federal waters are referred to NOAA Fisheries for review and approval. The SAL permit may have additional requirements or exemptions that are issued by the FWC on a case-by-case basis.

Recreational harvest of octocorals is permitted with a Florida Saltwater Fishing License (SFL) and is restricted to six specimens per day, and the harvest is considered part of the aggregate recreational bag limit of marine life, which is no more than a total of 20 marine specimens per license-holder per day. This permit must adhere to the most stringent of federal or state criteria.

3.6.1.1.3 Reporting requirements

All octocorals harvested commercially by ML fishermen must be reported monthly to the Florida Fish and Wildlife Research Institute (FWRI). Landings are reported on trip tickets that were originally designed to report landings of lobster and other marine resources. Landings must be identified as coming from specific zones along the coast, and within each zone it must be specified as coming from state or federal waters. On the trip ticket, however, an octocoral harvester cannot specifically report landings originating in different areas. Due to demand from the aquarium trade, harvesters often seek particular species in a certain size range; therefore, several areas may be harvested in one trip. This may have resulted in inadequate reporting of octocoral landings over the years.

3.6.1.1.4 Harvest Methods

Almost all commercial harvest of octocorals is done by marine life fishermen for the live aquarium trade; therefore, harvest is by hand and is done in small numbers on any given day. Because octocorals are listed as a marine life species by the FWC, fishermen harvesting them using a Florida SPL with ML endorsement must transport and land them in a live and healthy condition.

As many as 50 different species of octocorals are harvested off the east and west coasts of Florida, but only about a dozen species make up the majority of the harvest. In a typical day, a harvester may visit from six to eight sites to collect specimens; between 50 and 200 colonies are thus collected once every two or three weeks. Water depth ranges from 5 to 150 feet, but most specimens from federal waters are photosynthetic specimens from shallow waters (less than 80 feet). Sea fans, *Gorgonia ventalina*, and *G. flabellum* as well as all black corals of the genus *Antipathes* are protected in state and federal waters and there is no allowable harvest.

The aquarium trade has specific size and shape requirements, which force marine life fishermen to be very selective in their harvest. For the most part, small specimens are not selected by harvesters, and few specimens larger than about 20 inches are collected because they are too big for most aquariums and are difficult to ship. The standard shipping box has an inside dimension of 15 x 15 inches, so although a 20-inch specimen could fit diagonally in a standard box or could be bent, most wholesale shippers and purchasers prefer specimens less than 15 inches long. Shape and quality are other factors that fishermen must consider when selecting specimens. The ideal specimen is one that has several lateral branches and no dead spots or odd growths.

The Coral FMP states that harvest by non-powered hand tools is permitted. Most corals are harvested with a dive knife, a mason's hammer, or a hammer and wood chisel. The Coral

FMP allows for the harvest of a minimal amount of substrate (1 inch around the base of the octocoral), and most harvesters harvest much less than this amount. Allowing the substrate around the holdfast to be harvested reduces the chance of injuring the specimen and also makes it easier for the final consumer, the aquarist, to attach it to a rock in their aquarium or place it upright in the sand.

Most marine life fishing vessels are open, equipped with outboard motors, and less than 25 feet long. Fishermen either work alone or with one other person on the boat. Most divers use SCUBA gear, but a few use boat-mounted surface supplied air systems. Marine life vessels must have a continuously circulating live well or aeration or oxygenation system aboard the vessel of adequate size and capacity to maintain harvested organisms in a healthy condition (68B-42 of the Florida Administrative Code).

Recreational harvest is carried out similarly to the commercial harvest and uses the same types of vessels and gear. Recreational harvesters are not required to aerate their catch, but the catch must be landed live.

Allowable gear

Hand harvest is the only allowable method. A toxic chemical may not be used or possessed in a coral area in the EEZ. A power-assisted tool may not be used to take prohibited coral, allowable octocoral or live rock. Possession in the EEZ of coral resources harvested with a power-assisted tool is prohibited.

3.6.1.1.5 Economic description

The FWRI collects and maintains fishery harvest data for this fishery. However, the total economic value of the catch increases as the product moves from the harvester to the final consumer. The traditional chain of possession of the product is harvester to wholesaler to pet shop to aquarist, and traditionally the price is at least doubled at each step of the process. Therefore, a $4 octocoral reported to the FWRI will sell for at least $16 to the final aquarist, and could be much more than that. Most of this income comes into Florida from the rest of the United States and from other parts of the world (primarily Europe).

Octocoral harvest differs markedly between the South Atlantic and Gulf federal waters, with total harvest for 2000 through 2009 reported at 54,232 and 38,682 colonies, respectively (**Tables 3-2 & 3-3**). Similarly, harvest in South Atlantic federal waters versus state waters varies widely with a substantial majority of the landings in east Florida occurring in state waters (**Figure 3-2**). For the period 2000 through 2009, total harvest for South Atlantic federal and state waters was 54,232 and 275,882 colonies, respectively. Mean landings for the same time period were 5,423 and 27,588 colonies for federal and state waters, respectively. Total 2009 ex-vessel values for the same time period were $142,790 and $799,383 for South Atlantic federal and state waters, respectively (**Table 3-2**). Harvest levels have fluctuated over the last several years, with 2006 showing the highest landings (**Figure 3-2**). Total harvest levels in 2004 and 2005 were lower than those for 2003, most likely reflecting the disruptive impacts of hurricanes on the ability of the fishermen to harvest (**Table 3-2**). Re-growth of corals in an area scoured by hurricanes to a level that will sustain

a harvest varies from two to four years, depending on the habitat type and the targeted species. FWRI data indicate there were 26 fishermen reporting harvest from the South Atlantic EEZ from 2002 to 2006, and 103 fishermen reporting state harvest during that same time period (Ken Nedimeyer, pers. communication).

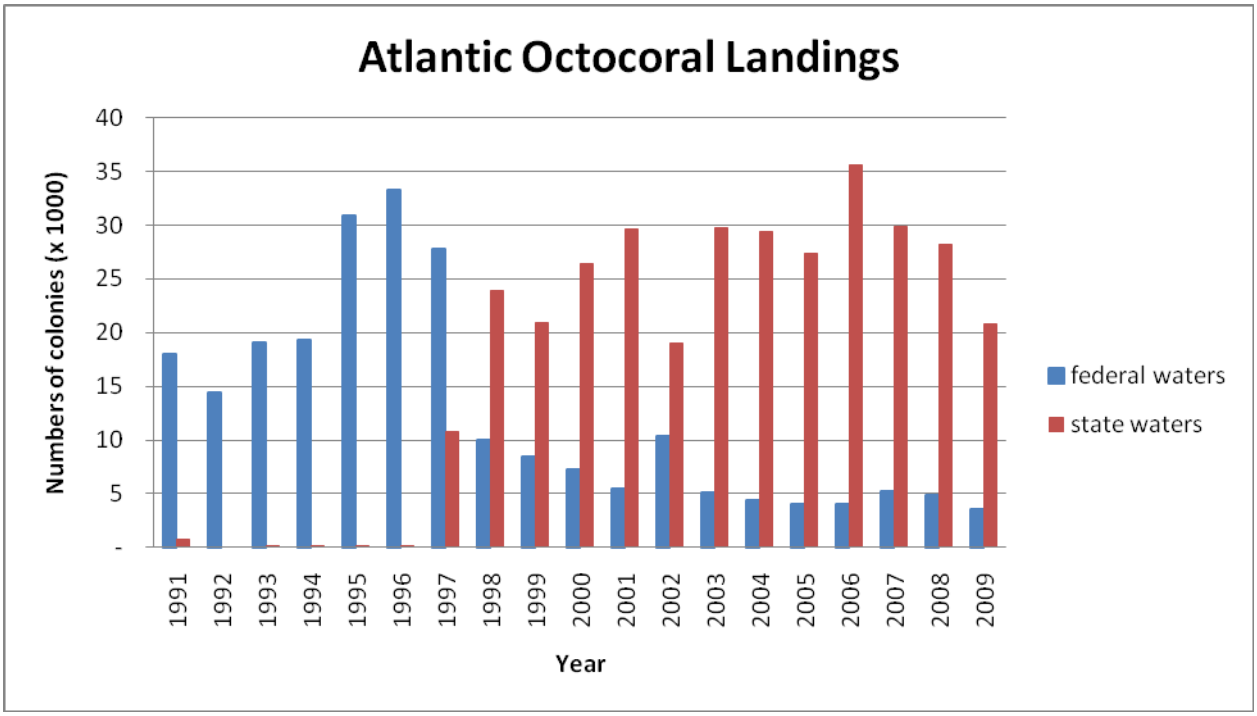


Figure 3-2. Octocoral harvest in South Atlantic Federal and State waters for the period 1991-2009 (Source: Florida Fish and Wildlife Research Institute).

Table 3-2. Octocoral harvest (in numbers of colonies) and 2009 ex-vessel value for South Atlantic Federal and State waters for the period 2000-2009.

Year	State/Fed Waters	Numbers of colonies	Ex-vessel Value 2009 ($)
2000	Federal	7,278	18,858
2001	Federal	5,432	12,998
2002	Federal	10,407	32,007
2003	Federal	5,049	15,275
2004	Federal	4,386	13,520
2005	Federal	4,007	12,928
2006	Federal	4,024	12,138
2007	Federal	5,250	16,332
2008	Federal	4,890	15,671
2009	Federal	3,509	10,396
TOTAL		**54,232**	**160,122**

2000	State	26,355	87,397
2001	State	29,624	95,429
2002	State	18,968	52,065
2003	State	29,768	88,201
2004	State	29,339	88,968
2005	State	27,401	86,739
2006	State	35,589	114,620
2007	State	29,824	99,956
2008	State	28,230	98,859
2009	State	20,784	70,281
TOTAL		**275,882**	**882,515**

(Source: Landings data provided by Florida Fish and Wildlife Research Institute).

In the Gulf of Mexico, total octocoral harvest in 2000-2009 was 38,682 and 54,620 colonies in federal and state waters, respectively (**Table 3-3**; **Figure 3-3**). As in the South Atlantic, harvest of octocorals in the Gulf of Mexico occurs mainly in state waters but mean landings over the period 2000-2009 were more similar than in South Atlantic waters at 3,868.20 and 5,462 colonies in federal and state waters, respectively.

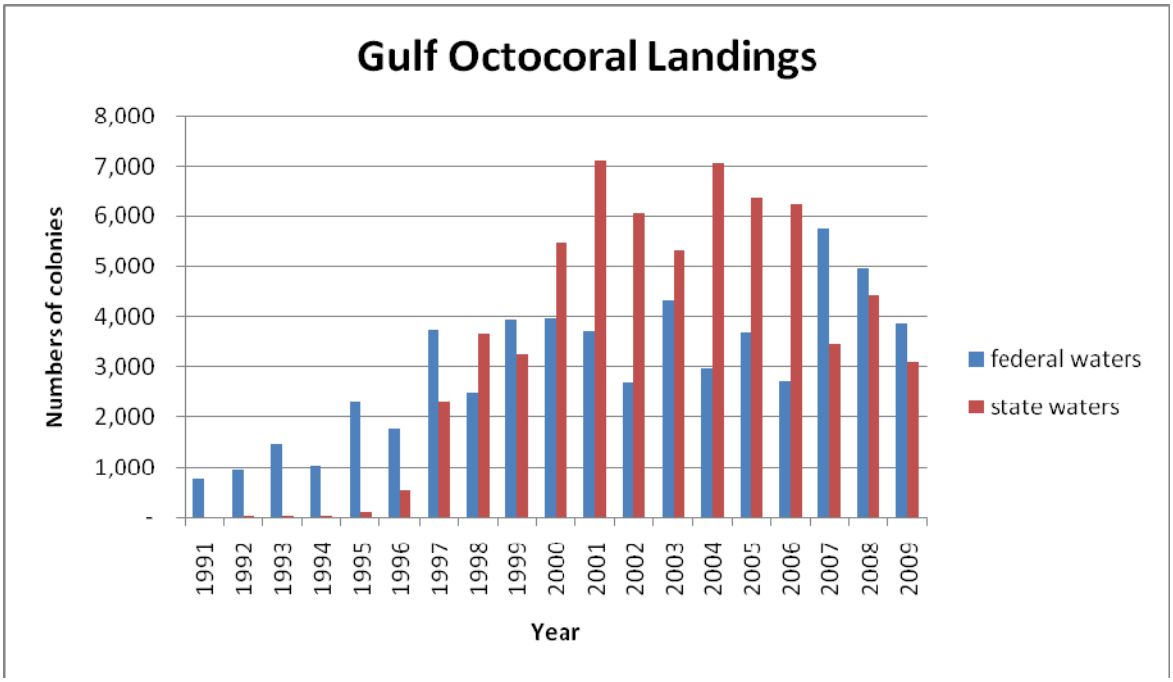


Figure 3-3. Octocoral harvest in Gulf of Mexico federal and state waters for the period 1991-2009 (Source: Florida Fish and Wildlife Research Institute).

Table 3-3. Octocoral harvest (in numbers of colonies) and 2009 ex-vessel value for Gulf of Mexico federal and state waters for the period 2000-2009.

Year	State/Fed	Numbers of colonies	Ex-vessel value 2009 ($)
2000	Federal	3,975	12,926
2001	Federal	3,728	9,085
2002	Federal	2,707	7,500
2003	Federal	4,331	14,936
2004	Federal	2,966	10,757
2005	Federal	3,693	15,509
2006	Federal	2,721	9,934
2007	Federal	5,747	22,301
2008	Federal	4,951	10,061
2009	Federal	3,863	15,504
TOTAL		**38,682**	**128,513**
2000	State	5,492	15,278
2001	State	7,110	26,965
2002	State	6,056	22,635
2003	State	5,336	18,148
2004	State	7,067	23,051
2005	State	6,351	16,053
2006	State	6,233	16,033
2007	State	3,451	12,269
2008	State	4,421	17,544
2009	State	3,103	13,235
TOTAL		**54,620**	**181,210**

(Source: Florida Fish and Wildlife Research Institute).

3.6.1.1.6 Social and cultural environment

In the 2010-11 harvest season there are 170 individuals or entities that hold the Florida Marine Life endorsement (108 MLD; 22 MLN; 40 MLB). Although the area where octocoral harvest is permitted extends from the Florida Keys to Cape Canaveral, the entire harvest from the South Atlantic EEZ is from the Florida Keys with most of the harvesters either living in the Florida Keys or in Southeast Florida. Based on addresses associated with ML endorsements, the majority of the ML endorsement holders live in the Florida Keys, mostly in the Lower Keys (**Figure 3-4**). There are five MLDs listed as aquarium shops, and one as a bait and tackle shop. Two of the MLB endorsement holders are fish houses on the West Coast, and one MLN endorsement is an aquarium shop. Within the Florida Keys, there is no harvest in Key Largo National Marine Sanctuary or in Biscayne National Park, and within the Florida Keys National Marine Sanctuary there are several closed areas where all consumptive harvest is prohibited.

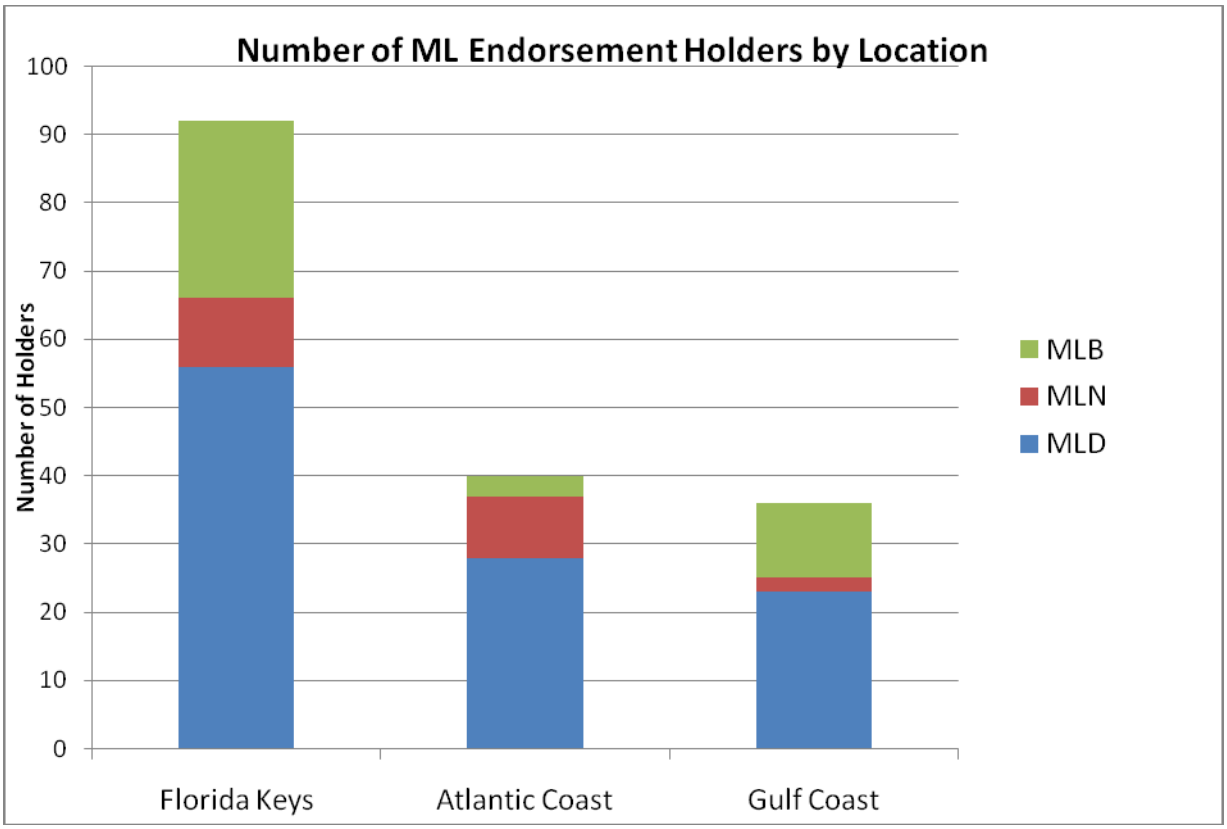


Figure 3-4. Geographic distribution of ML endorsement holders (source: FWC).

Octocorals are just one type of specimen that commercial ML harvesters target, and do not make up a significant portion of all ML landings. Additionally, there are daily harvest limits per endorsement on several ML finfish, invertebrates, and coral specimens. Because trips include collection of multiple species, of which some have daily limit, holders of MLD endorsements are permitted to 'stack' multiple endorsements on a SPL if they meet income requirements specified in the rule (>$10,000 of income from ML landings). It is common for a ML endorsement holder to have multiple SPLs and/or multiple vessels.

Of the 108 individuals or entities that hold MLD endorsements, 43 have single endorsements; 59 have two endorsements; 5 hold three; and one individual holds 4 MLD endorsements (**Figure 3-5**). The purpose of holding multiple endorsements is to increase the harvest limit, or to use MLD endorsements on multiple vessels at the same time. In general, MLD endorsement holders have participated in the ML fishery for ten or more years. Over half (56 holders) live in the Florida Keys and the rest are nearly evenly split on the southeast and west coasts of Florida.

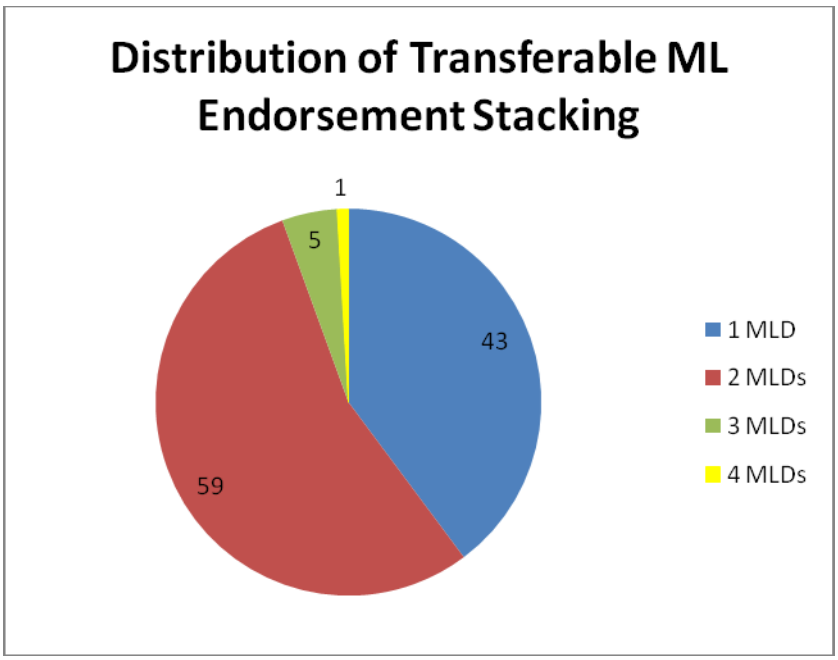


Figure 3-5. Number of MLD endorsement holders with multiple MLDs.

Of the 22 MLN endorsement holders, only ten are listed with addresses in the Florida Keys. The 43 MLB endorsement holders are primarily bait shrimpers and lobster/crab trap fishermen; most are listed with Florida Keys addresses, but 11 are on the west coast of Florida.

Marine Life endorsement holders can sell to local wholesalers, stores throughout the U.S. and Europe, or to another ML collector who also holds a wholesaler license. Most stores are outside of Florida, although some local aquarium shops hold their own MLD or MLN endorsements. Over the last few decades, demand has been fairly stable throughout the year and the fishery generally does not experience seasonal fluctuations. It is common for a ML collector to maintain established relationships with some buyers.

Monroe County

Monroe County had a total population of 79,589 in 2000, but this dropped slightly to an estimated 73,165 by 2009. The majority of residents identified themselves as White (92.0%) in 2000, and Hispanics made up 16% of the Keys population. In 2009, estimates suggest that the proportion of white residents is 91.1% while the Hispanic population increased to 19.6% of the population, a slight variation from statewide estimates of 21.5% (Hispanic) and 79.4% (White).

In general, residents of Monroe County are a little older (median age in 2009 = 45.4 years) than the statewide median age of 39.7 years. The percentage of persons below the poverty level is estimated at 10.4%, which was below the 13.3% for Florida overall during 2009. In the past few years, the owner-occupied housing rate for Monroe County dropped from 71.2% (2007) to 66.6% (2009); the statewide owner-occupied housing rate is estimated at 69.7% for

2009, a slight drop from the 2007 estimate of 70.3 percent. Cost of living in Monroe County has increased drastically over the past few decades and specifically, housing prices doubled from 2000 to 2007 (Shivlani 2009). An estimated 2.7% of the population in Monroe County are unemployed, about half that of the statewide unemployment estimate of 4.6 percent. Tourism is the most economically important industry in the Florida Keys and directly employs at least 19% of civilian workers (reported in 2009 Census estimate under "Arts, Entertainment and Recreation, and Accommodation Food Services").

The current fishery management unit extends through the EEZ of all South Atlantic states. However, the proposed actions in this amendment that pertain to octocorals primarily apply to the Florida Keys, where almost all harvest of octocorals occur. Information about communities in the rest of the South Atlantic can be found in (Jepson et al. 2005).

3.6.1.1.7 Bycatch

Because the octocorals are almost exclusively harvested one at a time by divers, there is very little bycatch. However, all octocorals most likely have communities of invertebrates living on them that may be specially adapted to each of the different species of octocorals. These invertebrates may include different types of shrimp, amphipods, nudibranchs, and starfish. Some of these organisms are occasionally seen on the specimens (in the field) or at the bottom of containers used to transport freshly harvested specimens, but the amount per colony is generally very small. Accurate bycatch species identification and counts can only be done in a laboratory, and it is unlikely that this information is available for most of the species harvested by marine life fishermen.

There is no visible bycatch among most of the shallow water, photosynthetic species of octocorals. There may be an occasional macro-alga or sponge attached to the substrate that surrounds the base of the octocorals. Experienced harvesters usually collect octocorals in areas where the target species are abundant and they can quickly and easily remove a specimen without damaging any surrounding benthic communities.

Bycatch is slightly more common on some of the deepwater, non-photosynthetic specimens, very little of which are collected in the federal waters of the Florida Keys. Most deepwater octocorals are collected off Broward and Palm Beach counties in state waters. Bycatch associated with deepwater octocorals usually consists of small brittle stars and basket stars, and the number and species composition varies greatly by species, location, and season.

The impact of harvesting octocorals is most likely not discernable. Few fish feed directly on octocorals, and the selective nature of the harvest has very little impact on the overall community. Also, due to the rapid growth of octocorals and their short natural lifespan, there is a rapid population replacement cycle in hardbottom habitats.

3.6.1.2 Special Management Zones (SMZ) off South Carolina

3.6.1.2.1 Economic Description

Commercial
An estimate of commercial effort, ex-vessel values, and trip costs to SMZs off South Carolina is not available due to the relatively large scale used to identify landings in logbook data. However, a description of the commercial snapper grouper and coastal migratory pelagic fisheries off of South Carolina is incorporated by reference from the Comprehensive ACL Amendment (SAFMC in prep) and Amendment 18 to the FMP for the Coastal Migratory Pelagic Resources in the Atlantic and Gulf of Mexico (CMP Amendment 18) (SAFMC & GMFMC in prep), respectively.

Recreational
An estimate of recreational trips and associated expenditures to SMZs off South Carolina is not available. However, a description of the recreational snapper grouper and coastal migratory pelagic fisheries off of South Carolina is incorporated by reference from the Comprehensive ACL Amendment (SAFMC in prep) and CMP Amendment 18 (SAFMC in prep), respectively.

An Economic Impact and Use Survey of South Carolina Artificial Reef Users (**Appendix I**) (Rhodes and Pan 2007) contains relatively recent information on the importance of artificial reefs to South Carolina fishermen. Rhodes and Pan (2007) estimated the total (aggregate) South Carolina private boat fishing trips involving SC permitted marine artificial reef sites by South Carolina licensees during 2006. The projected total number of South Carolina private boat saltwater fishing trips involving permitted marine artificial reefs in 2006 was ~203,400 trips. This estimated number of trips constituted about 49% of all 2006 ocean South Carolina fishing trips presented by the Marine Recreational Fisheries Statistics Survey (MRFSS). Estimates of total annual trips to artificial reefs approximately tripled between 1992 and 2006 while the number of permitted artificial reef areas only doubled during the same time period. Based on primary data collected on charter divers, a total of 3,571 divers participated in charted South Carolina offshore dive trips during 2006 with 53% of these charter divers (1,902 divers) making one or more dives on structures within South Carolina permitted artificial reef sites.

The estimating of economic impacts and economic importance of anglers and charter divers related to the use of South Carolina permitted marine artificial reef sites was predicated upon estimating total (aggregate) annual trip expenditures for each user group (i.e., anglers and charter divers) using their daily trip expenditure averages (means) by major license regions and overnight trips in the South Carolina coastal counties. All of the following values are in 2006 dollars. The mean total daily trip expenditures by private boat anglers making a fishing trip to an South Carolina artificial reef site during a sampled month ranged from $548 for non-coastal anglers staying overnight to about $255 for South Carolina coastal anglers not making overnight trips, and the total mean daily expenditures by non-coastal charter divers staying overnight were $381. The estimated total (aggregate) trip expenditures by private boat anglers and charter divers making trips to artificial reef sites were $28.7 million and $0.6 million, respectively, during 2006. These artificial reef users in 2006 represented an economic impact (i.e. economic importance) of approximately $83 million in total sales (output) that generated approximately 1,000 jobs. It is readily apparent that the South

Carolina marine artificial reef system, as developed and managed by the SCDNR, is a significant component of the entire South Carolina coastal economy. In addition, the man-made structures within South Carolina permitted artificial reef areas, as recreational outdoor "destinations," are an important component of the economic impacts generated by a special group or subset of tourists, i.e. anglers and scuba divers.

3.6.1.2.2 Social and Cultural Environment

Background on Special Management Zones off South Carolina

Development of marine artificial reefs along the South Carolina coast began in the early 1960s, with initial state involvement in reef construction and management beginning in 1967 through the efforts of the South Carolina Wildlife Resources Department (now the South Carolina Department of Natural Resources) with assistance from federal and private sector funding (Bell et al. 1989). In 1973 a Marine Artificial Reef Program within the Recreational Fisheries Section of the Marine Resources Division was established. The program was designed to oversee the continued development and maintenance of a system of artificial reefs constructed for the express purpose of improving saltwater recreational fishing opportunities in South Carolina's coastal and offshore waters.

A detailed survey of saltwater recreational boat anglers conducted in 1977 (Liao and Cupka 1979) determined that the total economic impact of the state's marine artificial reef program was $10.4 million annually, with a direct expenditure by artificial reef fishermen in 1977 alone of $4.94 million. Not only were artificial reefs an effective means of improving fishing success for thousands of sport fishermen, but they were also a sound economic investment with the potential of substantial long-term economic benefit to the state.

In 1983, implementation of the Snapper Grouper FMP (SAFMC 1983) allowed for the eventual establishment of protective regulations for the state's reefs. Management Measure #17 in the Snapper Grouper FMP states:

"Upon request to the Council from the permittee (possessor of a Corps of Engineers permit) for any artificial reef or fish attraction device (or other modification of habitat for the purpose of fishing) the modified area and an appropriate surrounding area may be designated as a Special Management Zone (SMZ) that prohibits or restrains the use of specific types of fishing gear that are not compatible with the intent of the permittee for the artificial reef or fish attraction device. This will be done by regulatory amendment similar to adding or changing minimum sizes (Section 10.2.3)".

Furthermore, the FMP states: "The intent of a SMZ is to provide incentive to create artificial reefs and fish attraction devices that will increase biological production and/or create fishing opportunities that would not otherwise exist. The drawback to investing in artificial reefs or fish attraction devices is that they are costly and have limited advantages that can be rapidly dissipated by certain types of fishing gear (e.g., traps harvesting black sea bass from artificial reefs). Fishing gear that offers 'exceptional advantages' over other gear to the point of

eliminating the incentive for artificial reef and fish attraction devices for users with other types of fishing gear prevent improved fishing opportunities that would otherwise not exist."

The frequency of reported or detected evidence of the use of restricted gear types on South Carolina's SMZs decreased to an insignificant degree by late 1989. However, a new problem arose with recreational anglers using SCUBA gear and powerheads, or "bang-sticks" to harvest large quantities of snapper grouper species, primarily amberjacks, on many of the offshore sites. The South Atlantic Council acted to add powerheads to the list of restricted gears and regulations to this effect were implemented in 1992. Since then, no evidence of large-scale harvesting of amberjack by divers has been reported or encountered.

However, during 2008 and 2009, representatives of South Carolina's recreational fishing community expressed concerns over commercial snapper grouper fishing vessels allegedly operating on several permitted offshore artificial reef sites. Specifically, these recreational constituents felt that the use of conventional spearguns by commercial fishermen to harvest fish on these sites might be harmful to the reef fish populations and was not in keeping with the intended purpose of the reefs. While South Carolina's marine artificial reefs had from the very beginning, due to their size and especially their funding sources, been intended for use by saltwater recreational fishermen only (i.e. hand-held rod and reel anglers), there was a small but growing use of the reefs by commercial fishing interests (particularly black sea bass trap fishermen) since no regulations prohibited this activity.

User Groups

The primary activity in the SMZs is recreational fishing, including both private anglers and for-hire vessels. As mentioned above, South Carolina requires a saltwater recreational license for all recreational fishermen on private boats in the SMZs (licenses are not required for people fishing on charter boats). There are no direct data on recreational fishing in the SMZs so this description will use information from SC saltwater recreational license data. The number of saltwater anglers has more than doubled from 1999 to 2008 (**Figure 3-6**). The number of in-state residents with licenses has increased for both coastal and non-coastal residents, while out-of-state license holders have made up the largest proportion over the period (**Figure 3-6**). Recreational fishing is a growing sector, and is an important part of coastal tourism. Recreational fishing in the SMZs occurs throughout the year with peak activity from May through November.

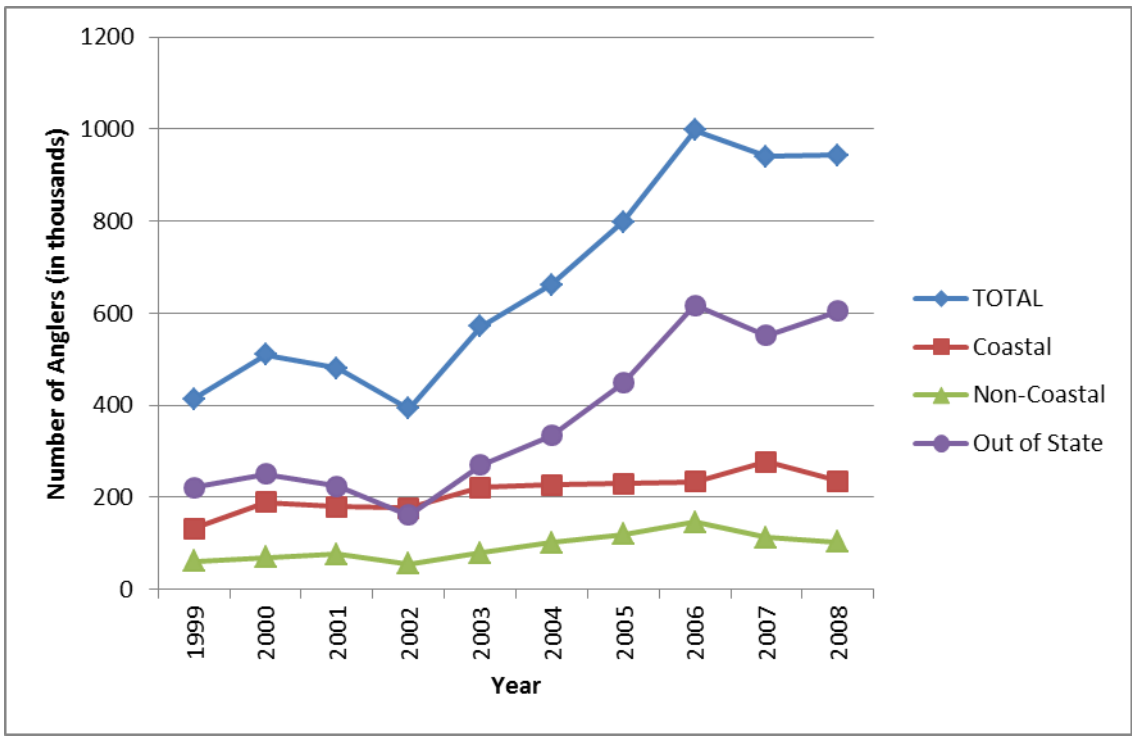


Figure 3-6. South Carolina recreational saltwater license holders by region.

Recreational SCUBA diving is also an important activity in the SMZs, particularly during peak months of May to October. Diving activities include underwater photography, videography, shell collecting, spear fishing and sight- seeing.

Commercial fishing in the SMZs is a small but growing use of the reefs, including black sea bass trap fishermen and, more recently, commercial snapper grouper fishermen harvesting with spear guns. There is little information about commercial fishing within the SMZs. However, members of the recreational fishing community have expressed concern that commercial fishing in the SMZs removes a disproportionate share of the standing fish populations from artificial reefs through the use of commercial-type gear, and would negatively impact overall success and intended purpose of the SMZs.

Communities

Recreational and commercial fishermen target reef fish and pelagic species in the SMZs and this section will focus on communities that are associated with dependence on recreational and commercial fishing from these stocks. More detailed information can be found in Amendment 17B to the Snapper Grouper FMP (SAFMC 2010b) and CMP Amendment 18 (SAFMC & GMFMC in prep). In general, South Carolina coastal communities will be the most directly affected by actions pertaining to SMZs because they represent the private anglers; charter providers; businesses linked to recreational fishing and coastal tourism; and

some commercial fishermen who may fish in the SMZs. More information about other communities in the South Atlantic is available in Jepson et al. (2005).

Available information commercial and for-hire recreational sectors indicate that Murrell's Inlet, Little River, Charleston, and North Myrtle Beach are important fishing communities. Currently there are 100 federal pelagic charter/headboat permits registered in South Carolina and 95 federal snapper grouper charter/headboat permits. Most (88%) vessels with a registered pelagic charter permit also have a snapper grouper charter permit. Of these vessels, over half are registered in four cities: Murrells Inlet, Charleston, Little River, and North Myrtle Beach (**Figure 3-7**).

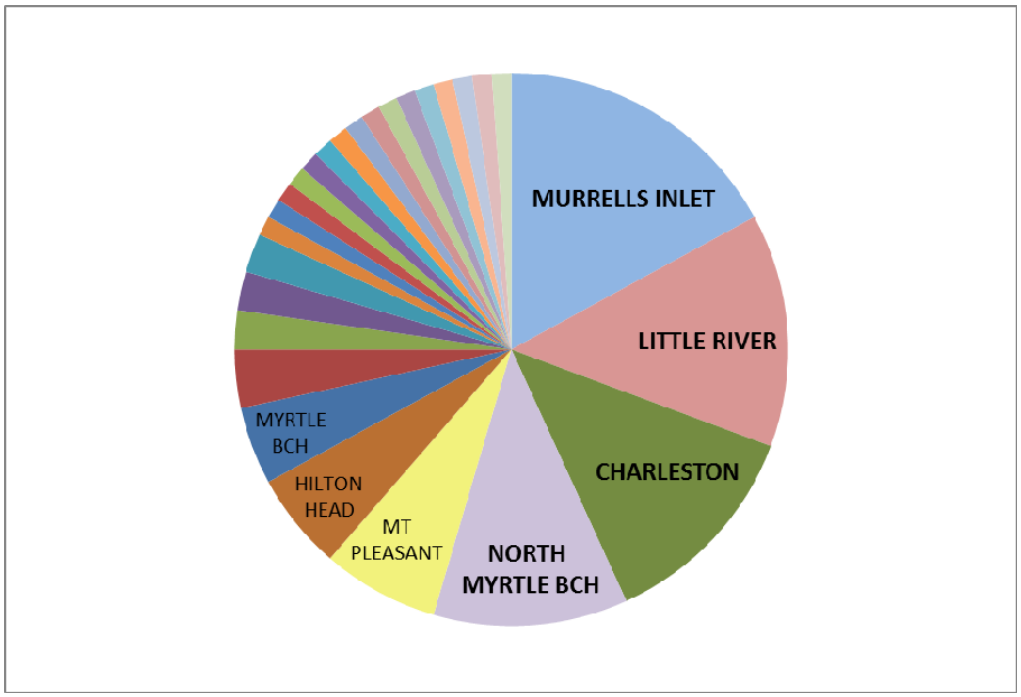


Figure 3-7. Distribution of South Carolina Vessels with both Pelagic and Snapper Grouper federal charter permits.

While pockets of commercial fishing activities remain in the state, most are being displaced by the development forces and associated changes in demographics. Similar to important for-hire recreational communities, commercial activity is concentrated mostly in Little River and Murrell's Inlet, with some commercial fishermen in Charleston and Myrtle Beach. Currently there are 37 vessels with federal commercial permits (snapper grouper, Spanish mackerel, king mackerel), with a majority concentrated in Little River (18) and Murrells Inlet (13). Most vessels have at least two permits and nearly all vessels from Little River and Murrells Inlet have commercial permits for snapper grouper (unlimited), Spanish Mackerel, and King Mackerel. Additionally there are 20 snapper grouper federal dealer permits in South Carolina, with most registered in Little River and Murrells Inlet.

4 Environmental Effects

4.1 Action 1. Modify management of octocorals in the South Atlantic

Alternative 1. No Action. Do not remove octocorals from the fishery management unit (FMU) under the South Atlantic Coral FMP.

Alternative 2. Remove octocorals from the FMU.

Preferred Alternative 3. Modify the FMU to indicate that octocorals are included in the EEZ off NC, SC, and GA.

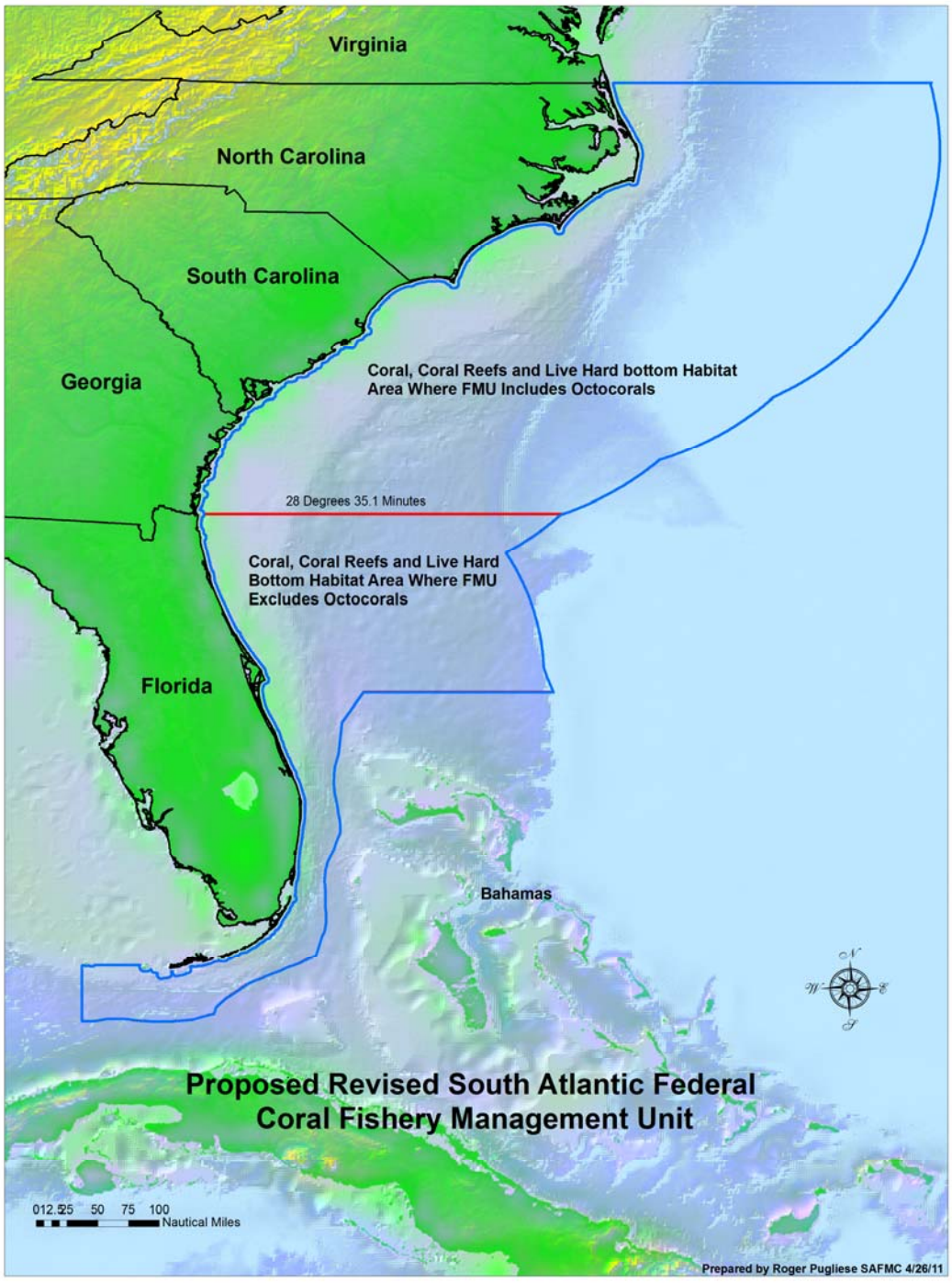


Figure 4-1. Proposed Revised South Atlantic Federal Coral Fishery Management Unit.

4.1.1 Biological Effects

Alternative 1 (No Action) would not remove octocorals from the South Atlantic Coral FMU. Although octocoral harvest is managed under the South Atlantic Fishery Management Council's (South Atlantic Council) Fishery Management Plan (FMP) for Coral, Coral Reefs, and Live/Hardbottom Habitats of the South Atlantic (Coral FMP), the Florida Fish and Wildlife Commission (FWC) is responsible for most of the management, implementation and enforcement of regulations because the majority of the harvest occurs in state waters. In 1990, Amendment 1 to the Coral FMP (SAFMC & GMFMC 1990) established a total allowable harvest for commercial harvesters of octocorals as 50,000 colonies annually. It also established commercial permits, reporting requirements, and a six-colony recreational bag limit for octocorals. These regulations were consistent with regulations adopted in Florida waters. Currently, there is a prohibition of harvest of octocorals off Georgia, South Carolina, and North Carolina.

Octocorals are included in Florida's Marine Life Fishery which consists of the commercial and recreational harvest of more than 600 species of live saltwater fish, invertebrates, and plants. These organisms are collected primarily for aquaria. Commercially, organisms are collected and sold live to wholesalers, retailers, and aquarium owners. It is estimated that 800,000 U.S. households maintain marine fish in aquariums as pets. The commercial marine life fishery also supplies public and private marine aquariums, which are important in promoting marine conservation and education, especially about coral reefs and their associated species. The domestic collection of many of these species is limited to Florida, Hawaii, and California. Unlike many of the other marine fisheries that FWC manages, there are no stock assessments and very little biological information available for many marine life species.

Florida's management strategy for this fishery is to limit the number of harvesters in the commercial fishery and use an aggregate daily bag limit for the recreational harvesters. For species that need additional protection, more stringent bag limits, vessel limits, size limits, gear restrictions, substrate restrictions, etc. are applied. Soft corals, except for the common sea fan (*Gorgonia flavellum*) and Venus sea fan (*G. ventalina*), are designated as a restricted species in the FWC's marine life rule (68B-42 of the Florida Administrative Code). This means that commercial harvesters must hold a valid restricted species endorsement (in addition to a saltwater products license and marine life endorsement) to harvest octocorals. In Florida waters, one of two marine life endorsements is required to be able to dive to harvest octocorals, a marine life transferable dive endorsement, or a marine life non-transferable dive endorsement. As of 2010 data, there are 130 active ML dive endorsement licenses (Florida FWC, Division of Marine Fisheries Management Office). Octocorals are defined in the FWC marine life rule as any erect, nonencrusting species of the Subclass Octocorallia, except for the common sea fan and Venus sea fan. Harvest of these sea fans is prohibited in Florida waters. There are no commercial limits for octocorals in Florida waters. However, FWC rules state that the commercial harvest of octocorals shall close in state waters if the harvest of octocorals in adjacent federal waters is closed. Harvest of substrate within one inch of the perimeter of the holdfast at the base of the octocoral is allowed as long

as the substrate remains attached to the octocoral. All commercial marine life landings in Florida are required to be recorded using Florida's commercial trip ticket system.

Trip tickets allow the FWC to monitor commercial harvest and effort through time and by location. Each trip ticket contains detailed information about the harvest including the date and location, types and quantities of organisms harvested, gear used, and the price of each organism. A trip ticket must be filled out by a wholesale dealer every time a marine life collector lands their harvest, and in many cases, marine life collectors also serve as their own wholesale dealer. Landings of marine life species are recorded on trip tickets using a list of codes unique to a particular species, genus, or taxonomic group. Nearly 400 different codes are used by the FWC for reporting marine life landings. The FWC provides a special trip ticket form to collectors and wholesale dealers for recording marine life landings, but collectors may also create their own trip ticket forms. Such forms must be approved by the FWC before they are used to record landings. The location from which organisms are harvested is reported on each trip ticket using a "fishing area code." For reporting purposes, the waters off Florida are divided into several "fishing areas." Each fishing area has separate codes for sub-regions within the area such as bays, offshore waters, and federal waters. For example there are ten different fishing area codes for the Florida Keys and nine different fishing area codes for waters off Miami-Dade County. Reporting harvest locations accurately is important, especially when regulations or quotas differ by region (e.g., state waters vs. federal waters). As such, octocoral harvests from separate locations on the same day should be reported on separate trip tickets, but this does not always happen. Such misreporting results in less reliable information about harvest locations and could affect region-specific quotas.

There are at least 40 different species of octocorals found off Florida and three trip ticket codes for reporting octocorals. Individual octocoral species do not have unique codes; however, the codes used are based on species commonly or historically harvested and trade demand. Many octocoral species are difficult to distinguish from each other, so creating unique codes for each species could result in misreporting and make reporting too cumbersome for marine life collectors.

Alternative 2 would remove octocorals from the FMU, eliminating any existing management measures in federal waters such as a permit and quota. Although the FWC may adopt the management of octocorals off of Florida, there would be no protection of the resource in federal waters outside of Florida. **Alternative 2** would result in the elimination of the current prohibition of octocoral harvest off Georgia, South Carolina and North Carolina. Additionally, during their October 2010 meeting, the Gulf of Mexico Fishery Management Council (Gulf Council) selected a preferred alternative to remove octocorals from their Fishery Management Plan for Corals and Coral Reefs of the Gulf of Mexico (Gulf Coral FMP) as a result of FWC expressing an interest in managing the fishery in the Gulf EEZ off FL. However, currently the only harvest of octocorals in the Gulf of Mexico is off of Florida and this fishery is monitored and enforced by the FWC. Thus, development of a fishery off other Gulf states seems unlikely.

Furthermore, Essential Fish Habitat (EFH) was designated for octocorals, a designation that would be withdrawn if they are removed from the management unit. Under **Alternative 2**, harvest of octocorals would be allowed in the five deepwater coral habitat areas of particular concern (HAPC) designated in CE-BA 1 (SAFMC 2010), and the *Oculina* Bank HAPC.

Preferred Alternative 3 would revise the FMU to include octocorals off Georgia, North Carolina and South Carolina (**Figure 4-1**). Octocorals in federal waters off Florida would be removed from the Coral FMP and would result in no federal management. As explained in the description of **Alternative 1**, although octocoral harvest is managed under the South Atlantic Council's Coral FMP and subsequent amendments, the FWC is responsible for most of the management, implementation and enforcement of regulations because the majority of the harvest occurs in state waters. In a letter dated, April 11, 2011, the FWC describes management measures it will implement with regards to octocorals if the South Atlantic Council proceeds with **Preferred Alternative 3** (**Appendix M**). FWC intends to extend Florida octocoral regulations into federal waters off of Florida, establish an annual quota for allowable octocoral harvest in state and federal waters off Florida, and prohibit harvest of octocorals north of Cape Canaveral and in the Coral HAPCs adjacent to Florida waters. **Action 1, Preferred Alternative 3** combined with **Action 3, Preferred Alternative 3** will result in the same biological protection to the resource as is currently implemented.

National Standard 3 (NS 3) of the Magnuson-Stevens Fishery Conservation and Management Act states: "To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination." The guidelines provide basis for a fishery management unit to be identified around a geographic area (50 C.F.R. § 600.320(d)(2)). In the case of **Preferred Alternative 3**, alternative management exists under FWC's Marine Life Fishery Program, and the state has indicated via letter dated April 11, 2011, of their intent to extend management measures for the octocoral fishery into federal waters off Florida (**Appendix M**). **Preferred Alternative 3** would allow the South Atlantic Council to remove management for octocorals off Florida where management by the state of Florida will exist, a modification that also considers efficiency in the utilization of resources (Magnuson-Stevens Act, National Standard 5). National Standard 5 guidelines state: "Given a set of objectives for the fishery, an FMP should contain management measures that result in as efficient a fishery as is practicable or desirable (C.F.R. § 600.330 (b))."

4.1.2 Economic Effects

Under **Alternative 2**, octocorals would not be protected in federal waters by commercial or recreational management measures such as a permit or quota unless Florida extends their jurisdiction into federal waters. If the FWC extends their jurisdiction, Florida waters can be protected and no short or long-term changes will be expected with regard to economic effects in Florida waters. If Florida does not extend their jurisdiction into federal waters, landings would be allowed to increase in federal waters, although, as stated above, the market for octocorals would limit harvest. In this case, due to the possible increased risk of overfishing octocorals under **Alternative 2**, long-term economic benefits would be expected to decrease

compared to **Alternative 1**. Short-term economic benefits could increase if the market demand for octocorals increases.

However, if Florida does extend their jurisdiction into federal waters, concerns would only exist for federal waters north of Florida. However, the species of concern are not generally harvested in waters north of Florida. Regardless, without federal management in waters north of Florida, long-term economic effects would be expected to decline under **Alternative 2** compared to **Alternative 1**.

Under **Preferred Alternative 3**, octocorals will be partially removed from the South Atlantic FMP and would therefore not be protected in federal waters off of Florida (**Figure 4-1**) while harvest of octocorals in waters off of the other South Atlantic states would remain within the South Atlantic FMP. If the FWC extends their jurisdiction to cover both state and federal waters, as they are expected to do, no short or long-term changes would be expected with regard to economic effects resulting from this action since Florida would take over management of these areas. Management measures would be expected to be equivalent to or exceed current management measures in place.

4.1.3 Social Effects

The social effects from removal of octocorals from the FMP are mostly indirect, and pertain to the potential costs and benefits of removing federal management. The costs would likely stem from the risk that federal management would not be replaced with management from a state or other agency. In this case, there could be long-term negative social effects (from harvesters to consumers to the general public) if the stock declined. The beneficial social effects would include more local management and streamlined decision-making.

The social effects from **Alternative 1**, which makes no changes to the FMP and maintains the South Atlantic Council management of octocorals, will result from the subsequent requirement for the South Atlantic Council to set an ACL for octocoral harvest. The ACL would require federal monitoring, an additional burden to management. **Alternative 1** will have little or no impact on Georgia, South Carolina, and North Carolina because there are no harvesters in these areas (harvesting is prohibited north of Cape Canaveral, Florida).

Alternative 2 removes all present and future management measures to octocorals, and social effects are different for Florida than for Georgia, South Carolina, and North Carolina. For Florida, implications for this alternative mostly depend on the FWC extending management into the EEZ. If Florida does not assume management or does not maintain current measures, there may be long-term negative effects for individuals and communities affiliated with harvesting if octocorals decline. If Florida takes over management of octocorals, the streamlined, more localized management will produce long-term social benefits and is not expected to have negative short-term effects on harvesters (and affiliated dealers, communities, and consumers). In regards to Georgia, South Carolina, and North Carolina, removal of federal management for protection of octocorals in **Alternative 2** may cause long-term negative social impacts if the stock declines due to lack of regulations.

Maintaining federal management of octocorals in the EEZs of only Georgia, South Carolina, and North Carolina in the FMP (**Preferred Alternative 3**) will also have different social effects in Florida than in Georgia, South Carolina, and North Carolina. The alternative removes octocorals in the Florida EEZ from the FMP, which will result in similar effects as in **Alternative 2**: long-term social benefits as long as Florida assumes management and provides the same level of protection. For Georgia, South Carolina, and North Carolina, **Preferred Alternative 3** will have similar outcomes as in **Alternative 2**, in that federal management measures will remain in place including establishment of an ACL for octocorals, and have little or no social effects on these areas.

4.1.4 Administrative Effects

Alternative 1 would not result in increased administrative impacts from the status quo. The octocoral fishery is currently operating under a 50,000 colony quota, which would close in the quota is reached in federal waters. This quota and associated closure are the ACL and AM for the fishery. The quota was implemented in Coral Amendment 1 (1990) and mechanisms for reporting, monitoring and enforcement have been established. **Alternative 1** is not expected to result in an increased administrative burden. **Alternative 2** would lessen the administrative burden on the agency as management of these species would no longer be necessary. However, if the need for federal management of octocorals were to arise in the future, the administrative burden of including them in the FMU could result in a significant administrative burden. **Preferred Alternative 3** combined with **Action 3, Preferred Alternative 3**, would essentially result in the same management situation as the status quo but would be a more direct management strategy.

4.1.5 Conclusion

The Coral Advisory Panel reviewed CE-BA 2 during February 2011. Comments were received indicating the Coral AP's interest in keeping octocorals in the management unit, and concern about lack of protection for octocorals if removed from the FMU under the Coral FMP. **Alternative 3** was developed and voted as the South Atlantic Council's preferred alternative during the March 2011 meeting. Following the March 2011 South Atlantic Council meeting, the Coral AP was mailed a revised version of CE-BA 2 and a few comments were received in support of **Preferred Alternative 3**.

The Habitat Advisory Panel reviewed CE-BA 2 during their November 2010 meeting and expressed concern about implications to habitat in areas north of Florida if octocorals were removed entirely from the Coral Fishery Management Plan (FMP). They recommended the South Atlantic Council maintain a level of protection for octocorals under the Coral FMP.

The Law Enforcement Advisory Panel reviewed CE-BA 2 during their August 2009 and March 2011 meetings, and did not provide a specific recommendation for this action.

The SSC reviewed CE-BA 2 during their November, 2010 and April 2011 meeting, and did not provide a specific recommendation for this action.

During the September 2010 South Atlantic Council meeting, this action was restructured from the previous action to transfer management authority of the octocoral fishery to Florida. Florida Fish and Wildlife Conservation Commission (FWC) has expressed an interest in managing the octocoral fishery under their already existing program in place in Florida State waters (FWC's Marine Life Fishery Program), however Florida has not been interested in a transfer of management which would carry requirements under the Magnuson-Stevens Act.

During the December 2010 South Atlantic Council meeting, based upon input from the Coral and Habitat Advisory Panels, Alternative 1 was selected as preferred, to continue current protections for octocorals under the Coral FMP. The South Atlantic Council was concerned that **Alternative 2** would eliminate all protections in place for octocorals in areas north of Florida, where octocorals comprise a more significant component of the live/hardbottom habitat.

NOAA General Counsel advised during the March 2011 South Atlantic Council meeting that the management unit for octocorals could likely be shortened to include the EEZ off North Carolina, South Carolina, and Georgia. Therefore, **Alternative 3** was developed and selected as preferred. Modifying the management unit for octocorals allows the South Atlantic Council to maintain current protections under the South Atlantic Coral FMP in EEZ waters off North Carolina, South Carolina, and Georgia. Under this alternative, management of octocorals in Florida EEZ waters will be removed, thus allowing the FWC to solely manage the fishery through their existing management program. FWC has expressed intentions to extend state regulations under their Marine Life Fishery Program into federal waters off of Florida (for vessels registered in Florida and vessels landing octocorals in Florida) (**Appendix M**).

Based upon National Standards 3 and 5 of the Reauthorized Magnuson-Stevens Act and the associated guidelines (50 C.F.R. § 600.320, § 600.330), the South Atlantic Council concluded that **Preferred Alternative 3** best meets the objectives for management of the octocoral fishery as specified in the Coral FMP while minimizing, to the extent practicable, adverse social and economic effects and is a reasonable alternative for this action.

4.2 Action 2. Extend the SAFMC's Fishery Management Unit for octocorals into the Gulf of Mexico Fishery Management Council's area of jurisdiction

Preferred Alternative 1. No Action. Do not extend the FMU for octocorals into the GMFMC's jurisdiction.

Alternative 2. Extend the management boundaries for all octocorals species in the Coral FMP to include the GMFMC jurisdiction.

4.2.1 Biological Effects

Currently, the quota for octocorals is 50,000 colonies combined in the Gulf of Mexico and South Atlantic EEZ. Harvest of octocorals is prohibited north of Cape Canaveral, Florida.

Preferred Alternative 1 (No Action) would continue this quota and would maintain the current biological impacts to the resource. At its October 2010 meeting, the Gulf Council selected as a preferred alternative to remove octocorals from their Fishery Management Plan for Corals and Coral Reefs of the Gulf of Mexico (Gulf Coral FMP). Currently, the only harvest of octocorals in the Gulf of Mexico is off of Florida and this fishery is monitored and enforced by the FWC. The preferred alternative under Action 1 would allow the FWC to monitor the octocoral quota in state and federal waters off Florida. This could relieve any difficulties in monitoring and enforcing the joint South Atlantic and Gulf of Mexico federal quota under **Preferred Alternative 1**. Under **Preferred Alternative 1**, harvest in any of the other Gulf states could not be controlled if a fishery were to develop leaving populations vulnerable to overexploitation. Therefore, adoption of **Preferred Alternative 1 (No Action)** could have negative biological effects on the octocoral resource. However, octocorals are not as abundant in the other Gulf states as in the Florida Keys (SAFMC & GMFMC 1982). Therefore, development of a fishery for octocorals in other Gulf states does seem unlikely.

Under **Alternative 2**, the South Atlantic Council's management jurisdiction of octocorals would extend throughout the EEZ in the Gulf of Mexico. Under this alternative, the 50,000 colony quota would still apply to octocoral harvest in the Gulf of Mexico and the South Atlantic EEZ and would not result in increased negative biological impacts to the resource. Furthermore, **Alternative 2** would allow for the collection of data including harvest level, development of monitoring programs, a more accurate description of the magnitude of octocoral populations, and better enforcement in federal waters of the Gulf of Mexico, if necessary. **Preferred Alternative 1** and **Alternative 2** refer only to who manages the fishery and would not change the quota or the management mechanism currently in place.

4.2.2 Economic Effects

Given the **Preferred Alternative 3** under **Action 1** to shorten the management unit to encompass North Carolina, South Carolina, and Georgia federal waters only, **Alternative 1 (Preferred)** under this action has been chosen as preferred, which allows Florida to manage Atlantic and Gulf federal waters off of Florida. It is presumed that Florida will extend their management jurisdiction to include federal waters off of Florida and that the management measures implemented by Florida would presumably mirror those already in place or improve upon them. Extension of the FMU (**Alternative 2**) for octocorals into the Gulf Council's jurisdiction is largely an administrative action and there are no direct economic effects. There are no expected changes to long-term economic effects as a result of **Alternative 2** compared to **Preferred Alternative 1** since both protect octocorals to the same degree. As stated above, **Preferred Alternative 1** and **Alternative 2** refer only to who manages the fishery and would not change the quota or the management mechanism currently in place.

4.2.3 Social Effects

Because the preferred alternative in Action 1 removes octocorals in the Florida EEZ from the South Atlantic Council's Coral FMP, the alternatives in Action 2 are linked and presumably have the same outcome: the FWC would extend management of octocorals into federal

waters on the South Atlantic and Gulf sides of the state. There would be no expected direct social costs or benefits to **Preferred Alternative 1 (No Action)** or **Alternative 2**. Either alternative would ultimately allow Florida to assume octocoral management, which likely would produce long-term social benefits as discussed in Section 4.1.3.

4.2.4 Administrative Effects

The administrative impacts of **Preferred Alternative 1** would not change from the status quo. Under **Alternative 2**, the South Atlantic Council must first remove octocorals from their Coral FMP and request the Secretary of Commerce to designate management of octocorals to the South Atlantic Council. The administrative impacts of **Alternative 2** would be increase slightly from those of **Preferred Alternative 1.**

4.2.5 Conclusion

The Coral Advisory Panel reviewed this Action during February 2011. Comments were received from several members in support of **Alternative 2** as preferred. The Coral AP was also mailed a revised version of CE-BA 2 after **Alternative 1** was selected as the South Atlantic Council's preferred in March 2011 (as a result of this action being linked to the South Atlantic Council's decisions with the previous action and alternatives), and no specific recommendations were received.

The Habitat Advisory Panel reviewed CE-BA 2 during their November 2010 meeting. Based upon limited analysis at the time of their meeting, the Habitat AP recommended **Alternative 1** as preferred.

The Law Enforcement Advisory Panel reviewed CE-BA 2 during their March 2011 meeting, and did not provide a specific recommendation for this action.

In February 2010, the Gulf of Mexico Council submitted a letter to Florida Fish and Wildlife Conservation Commission (FWC) indicating potential changes to how they manage the octocoral fishery under the Gulf Coral FMP. They requested Florida to consider a transfer of management of the octocoral fishery from the Gulf Coral FMP. Under the Gulf of Mexico Council's Generic ACL Amendment, various alternatives are being considered: remove octocorals from the Gulf Coral FMP, transfer management of the Gulf octocoral fishery to the FWC, or remove octocorals from the Gulf Coral FMU and request the Secretary of Commerce to designate the South Atlantic Council as the responsible Council for managing the fishery. FWC responded to the Gulf of Mexico Council's request in March 2010, indicating their interest in possibly managing the octocoral fishery. They responded again to the Gulf of Mexico Council in August 2010 stating they were prepared to manage the fishery in state waters and federal waters adjacent to Florida. In the Generic ACL Amendment, the Gulf of Mexico Council has selected as a preferred alternative to remove octocorals from the Gulf Coral FMP as a result of FWC's interest in managing the fishery.

At the June 2010 South Atlantic Council meeting, this management measure was adopted as an action in CE-BA 2 based upon the alternatives included in the Gulf of Mexico Council's

Generic ACL Amendment. In December 2010, the South Atlantic Council selected **Alternative 2** as preferred as a result of the Gulf of Mexico Council's plans to remove octocorals from the Gulf Coral FMP. The South Atlantic Council also discussed an interest in maintaining some level of protection for octocorals in the Gulf EEZ under the South Atlantic Coral FMP. During the March 2011 meeting, based upon the FWC's interest in solely managing the fishery in Florida state and adjacent federal waters, and the South Atlantic Council moving towards modifying the management unit for octocorals to include them in the EEZ off North Carolina, South Carolina, and Georgia as described in Action 1, **Preferred Alternative 3**, the South Atlantic Council selected **Alternative 1** as their preferred. **Preferred Alternative 1** best meets the objectives of the Coral Fishery Management Plan, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

4.3 Action 3. Modify the Annual Catch Limit (ACL) for octocorals in the South Atlantic

Alternative 1. No Action. Do not modify the existing ACL for octocorals in the South Atlantic (ACL=current 50,000 colony quota for South Atlantic and Gulf of Mexico EEZ).

Alternative 2. Modify the existing ACL in the South Atlantic and Gulf of Mexico (ACL=current 50,000 colony quota for South Atlantic and Gulf of Mexico EEZ) to include State waters.

Preferred Alternative 3. ACL = 0 for octocorals in EEZ off NC, SC, and GA.

4.3.1 Biological Effects

At their August 2010 meeting, the South Atlantic Council's SSC reviewed and discussed background information on octocoral landings, life history, and possible fishery reference points. The SSC recommended no changes to the current quota of 50,000 colonies annually for the Gulf of Mexico and South Atlantic EEZ because: the fishery is small and effort/participation in Florida waters is capped by a limited entry program; there are no signs of local depletion in areas where the fishery operates; and there are no other indications that the fishery has been operating at unsustainable levels. During their November 2010 meeting, the SSC revisited their ABC recommendation for octocorals and clarified their intent for the value to include Gulf of Mexico and South Atlantic EEZ and state waters combined, annually.

Alternative 1 (No Action) would continue to manage octocorals with the 50,000 colony quota and would not account for landings in state waters. The FWC has implemented compatible regulations which closes the state octocoral fishery when the federal quota is met, however, that quota has never been reached and the state fishery for octocorals has never been closed (**Tables 4-1** and **4-2**).

Table 4-1. Landings (colonies) of octocorals in the Gulf and South Atlantic EEZ.

Year	*Gulf Landings*	*South Atlantic Landings*	*Total Landings*
2000	3,975	7,278	11,253
2001	3,728	5,432	9,160
2002	2,707	10,407	13,114
2003	4,331	5,049	9,380
2004	2,966	4,386	7,352
2005	3,693	4,007	7,700
2006	2,721	4,024	6,745
2007	5,747	5,250	10,997
2008	4,951	4,890	9,841
2009	3,863	3,509	7,372

Source: Landings data FL FWC, FWRI

Alternative 2 would modify the existing ACL for octocorals to include landings from the Gulf of Mexico and South Atlantic EEZ as well as landings in state waters. The majority of the octocoral harvest occurs in state waters off of Florida. Landings off states in the Gulf of Mexico and South Atlantic have not exceeded the 50,000 colony quota but have come fairly close to meeting that quota (**Table 4-1**). Under **Alternative 2**, the octocoral fishery in federal waters would close when harvest of octocorals in state and federal waters reached 50,000 colonies. Harvest of octocorals in state waters would close upon reaching the ACL if the FWC adopted compatible regulations. There is currently minimal harvest of octocorals in state waters off of any other Gulf state (other than Florida state waters) (**Table 4-2**), and harvest of octocorals in the South Atlantic is prohibited north of Cape Canaveral, Florida.

Table 4-2. Landings (colonies) of octocorals in State waters.

Year	*Gulf Landings*	*South Atlantic Landings*	*Total Landings*
2000	5,492	26,355	31,847
2001	7,110	29,624	36,734
2002	6,056	18,968	25,024
2003	5,336	29,768	35,104
2004	7,067	29,339	36,406
2005	6,351	27,401	33,752
2006	6,233	35,589	41,822
2007	3,451	29,824	33,275
2008	4,421	28,230	32,651
2009	3,103	20,784	23,887

Source: Landings data FL FWC, FWRI

The biological effect of **Alternative 2** would be greater than **Alternative 1** since there would be greater assurance that the ACL would not be exceeded and overfishing would not occur.

Combined landings for state and federal waters in the Gulf of Mexico and South Atlantic have not reached the 50,000 colony quota but may in the future (**Table 4-3**). **Alternative 2** would allow more protection to the resource by considering state landings towards the quota.

Table 4-3. Landings (colonies) of octocorals in both Federal and State waters.

Year	*Combined State Landings*	*Combined Federal Landings*	*Total Landings*
2000	31,847	11,253	43,100
2001	36,734	9,160	45,894
2002	25,024	13,114	38,138
2003	35,104	9,380	44,484
2004	36,406	7,352	43,758
2005	33,752	7,700	41,452
2006	41,822	6,745	48,567
2007	33,275	10,997	44,272
2008	32,651	9,841	42,492
2009	23,887	7,372	31,259

Source: Landings data FL FWC, FWRI

Preferred Alternative 3 would establish an ACL equal to 0 for the octocoral fishery. This action is dependent on the alternatives in Action 1. If **Action 1, Alternative 1** is selected, **Preferred Alternative 3** would result in no harvest of octocorals in the South Atlantic. The current 50,000 colony quota would be eliminated. This would eliminate the fishery for octocorals in the South Atlantic and would provide an increase in biological benefits to the stock. If **Action 1, Alternative 2** is selected, **Preferred Alternative 3** would have no relevance. **Action 1, Alternative 2** would remove octocorals from the FMU and once removed the species would not be subject to federal management. Specification of an ACL would be a moot point. If **Preferred Alternative 3**, under Action 1 is selected, the ACL=0 would only apply to octocoral harvest north of Florida. Currently, there is a prohibition of harvest north of Florida and this would continue under this alternative. The biological impacts to the resource would remain the same as the status quo. It is expected the FWC would continue to manage octocorals in Florida and would continue to implement the 50,000 colony quota in State waters.

Neither **Alternative 1**, **Alternative 2,** or **Preferred Alternative 3** is expected to have any impacts on protected species in the area.

4.3.2 Economic Effects

Landings in state and federal waters have never exceeded the **Alternative 2** proposed ACL of 50,000 colonies and therefore, there are no expected short-term economic losses to fishermen of implementation of the 50,000 quota as the ACL. However, there could be an economic loss suffered by fishermen who have made investments toward expanding harvest operations in the future. Also, in the case where state and federal landings of octocorals are

underreported, economic losses could occur. However, this cannot be quantified because there is no record that this is occurring.

Because there are no landings of octocorals occurring in federal waters north of Florida, and harvest of octocorals is prohibited north of Cape Canaveral, Florida, the **Preferred Alternative 3** (ACL = 0) is not expected to result in any negative economic effects.

4.3.3 Social Effects

In general, a more restrictive ACL would result in short-term negative impacts on octocoral collectors if harvest is reduced or stopped once an ACL is met or projected to be met. However, similar to the last two actions, Action 3 would have different outcomes for Florida than for other regions; is linked to preferred alternatives of Actions 1 and 2; and is contingent on Florida assuming management of octocorals.

In regards to Florida, **Alternative 1, Alternative 2,** and **Preferred Alternative 3** would have little or no social effects as long as Florida assumes management of octocorals and continues the same level of octocoral protection. For Georgia, South Carolina, and North Carolina, which under Action 1 would be the EEZs subject to the ACL set in this action, **Alternative 1**, **Alternative 2** and **Preferred Alternative 3** would likely result in no negative social impacts on harvesters (and affiliated dealers, communities, and consumers) because octocoral harvest is prohibited north of Cape Canaveral, Florida. Overall, **Preferred Alternative 3** would likely lead to long-term social benefits due to maximum protection (ACL=0) of octocorals in the EEZ off of Georgia, South Carolina, and North Carolina.

4.3.4 Administrative Effects

Specifying an ACL alone will not increase the administrative burden over the status-quo. However, the monitoring and documentation needed to track the ACL can potentially result in a need for additional cost and personnel resources if a monitoring mechanism is not already in place. The quota for the octocoral fishery was implemented in 1990 (Coral FMP Amendment 1; GMFMC & SAFMC 1990) and reporting mechanisms have been established. Under **Alternative 2**, it is more likely that harvest will come close to reaching the ACL than **Alternative 1** and the fishery may be closed as a result. This could result in a higher administrative burden due to outreach and education, increased monitoring and enforcement.

4.3.5 Conclusion

The Coral Advisory Panel reviewed CE-BA 2 during their September 2009 meeting. They provided a number of recommendations for specifying ABC, OFL, and ACL based upon existing levels of harvest. Their recommendations to the Council were based upon different options under MSY established at 50,000 colonies; 11,000 colonies; 49,170 colonies; and 30,000 colonies. The South Atlantic Council removed the actions specifying MSY, OFL, ABC, and AMs from the document as a result of existing values within previous Coral FMP amendments found to be equivalent to the required values under the Magnuson-Stevens Act. These actions were subsequently placed within the Considered but Eliminated Appendix

(**Appendix F**). The Coral AP reviewed a revised CE-BA 2 in February 2011 and comments were received from several AP members supporting the inclusion of state waters in the federal quota (ACL) for the octocoral fishery. The Coral AP was also mailed a version of CE-BA 2 in March 2011 after the South Atlantic Council developed **Alternative 3** and selected it as preferred. Comments were received in support of **Alternative 3**, contingent upon Florida Fish and Wildlife Conservation Commission (FWC) maintaining the same biological level of protection to the octocoral fishery in FL state and adjacent federal waters.

The Habitat Advisory Panel reviewed CE-BA 2 during their November 2010 meeting, and agreed with the SSC's recommended ABC value.

In August 2010, the SSC met to further develop ABC recommendations for data-poor stocks, including octocorals. They discussed the fact that there is no stock assessment for octocorals, and landings information for this fishery is limited. Based upon the number of licensed fishery participants, and the magnitude of landings, they considered the fishery to be 'small' and recommended an ABC value of 50,000 colonies, annually, that is also consistent with the octocoral quota. The SSC clarified during their November 2010 meeting the ABC recommendation for octocorals included landings in the Gulf of Mexico and South Atlantic EEZ and state waters, combined. In April 2011, the SSC reviewed new alternatives developed during the March 2011 South Atlantic Council meeting, including **Alternative 3**, to set the ACL equal to 0 for octocorals in the EEZ off North Carolina, South Carolina, and Georgia. Based upon the South Atlantic Council's interest to shorten the management unit for octocorals to include them in the South Atlantic Coral FMP in the EEZ off North Carolina, South Carolina, and Georgia, the SSC had no objections to setting the ACL equal to 0 in the geographic area where harvest of octocorals is already prohibited.

At the September 2010 meeting, the South Atlantic Council approved a motion to develop **Alternative 2** to include state landings in the federal quota for octocorals. The South Atlantic Council discussed that octocorals are predominantly harvested in Florida state waters, and thus landings should be accounted for in the annual quota for the fishery. However, after receiving legal guidance during the March 2011 South Atlantic Council meeting that the octocoral FMU under the South Atlantic Coral FMP might be shortened to include EEZ waters off North Carolina, South Carolina, and Georgia, the Council developed **Alternative 3** and selected this as preferred. Under the South Atlantic Coral FMP, there is a prohibition of harvest of octocorals north of Cape Canaveral, Florida. Shortening the management unit keeps protections in place for octocorals under the Coral FMP in the South Atlantic where harvest is prohibited. Thus, based upon the rationale for selecting **Alternative 3** in Action 1 as preferred, the South Atlantic Council selected **Alternative 3** as preferred for this action. **Preferred Alternative 3** also best meets the objectives of the Coral Fishery Management Plan, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

4.4 Action 4. Modify management of Special Management Zones (SMZs) off South Carolina

Alternative 1. No Action. Do not modify the current management of SMZs off South Carolina.

Preferred Alternative 2. Limit harvest and possession of snapper grouper species (with the use of all non-prohibited fishing gear) in SMZs off South Carolina to the recreational bag limit.

Preferred Alternative 3. Limit harvest and possession of coastal migratory pelagic species (with the use of all non-prohibited fishing gear) in SMZs off South Carolina to the recreational bag limit.

Alternative 4. Prohibit use of hand spear and spear guns in SMZs off South Carolina.

4.4.1 Biological Effects

The Army Corps of Engineers permits the South Carolina Department of Natural Resources (SCDNR) to construct, maintain and manage the state's artificial reefs (**Figure 4-2**, and **Figure 4-3**). Artificial reefs off South Carolina are located on an expansive shelf area largely devoid of any hard or live bottom. The artificial reefs were built to promote recreational fishing and were not sited on live bottom in order to avoid any impact to commercial fisheries. The artificial reefs have been promoted since their original construction as recreational fishing areas (SAFMC Snapper Grouper Monitoring Team Report #5,1992) and the South Carolina Marine Artificial Reef Program is financially supported primarily by the recreational community through South Carolina's Saltwater Recreational Fishing License Program and the Federal Aid in Sportfish Restoration Program (**Appendix H).**

In the EEZ off South Carolina, almost all of the artificial reefs (**Figure 4-2**, and **Figure 4-3**) are managed as special management zones (SMZs) under the FMP for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) to protect these relatively small reef communities from the effects of overly-efficient fishing practices. The South Atlantic Council has designated SMZs as Essential Fish Habitat – Habitat Areas of Particular Concern (EFH-HAPC). The development and protection of these habitats from gear impacts and excessive harvest by highly efficient gear types promotes conservation and enhances protection of EFH and EFH-HAPCs in the South Atlantic region (Snapper Grouper Regulatory Amendment 8, SAFMC 2000).

The use of certain types of fishing gear within the boundaries of the SMZ reefs is prohibited. Regulatory Amendment 7 to the Snapper Grouper FMP restricted fishing on the SMZs to handline, rod and reel, and spearfishing gear (excluding powerheads), and prohibited the use of black sea bass pots and bottom longlines on SMZs off South Carolina. This prohibition was the result of evidence that use of efficient fishing gear, such as black sea bass pots, does not allow for equitable utilization of the reefs by a larger number of fishermen, and results in

a rapid decline in resident finfish populations on the reefs (Snapper Grouper Regulatory Amendment 7, SAFMC 1998). The use of bangsticks (powerheads) by divers to harvest snapper grouper species is prohibited on the SMZs off South Carolina, a regulation that went into place after the Snapper Grouper Monitoring Team Report 5 evaluation concluded that some of the designated SMZ sites had received considerable fishing pressure from commercial fishing activities utilizing bang sticks and fish traps. The report included findings provided by SCDNR Marine Resources Division staff that the practice of bangsticking on the state's offshore artificial reefs had created a condition of overfishing on a localized basis. Specifically, SCDNR Marine Division staff found evidence during routine examinations of several offshore reef sites of spent shell casings, in some instances up to 50 casings in an area, and a visible lack of greater amberjack at a time when the long-term seasonal residents had been largely present on the offshore reefs (Snapper Grouper Monitoring Team Report 5, 1992). Currently, there are no restrictions on the use of conventional spearguns or hand spears, which are considered additional types of efficient fishing gear. Regulations allow permitted commercial snapper grouper fishermen to use spearguns or hand spears to harvest commercially allowable quantities of these species within the SMZs.

Recreational constituents have voiced concerns over the presence of commercial snapper grouper and coastal migratory pelagic fishing vessels operating on SMZs. Specifically, these recreational constituents feel the use of conventional spearguns by commercial fishermen to harvest fish on these sites may be harmful to the reef fish populations on SMZs. In an August 2009 letter to the South Atlantic Council (**Appendix H**), the SCDNR expressed concern over reports of commercially viable quantities of snapper grouper species being removed from the SMZs, a practice not keeping with the intended purpose for which the sites were established. SCDNR requested that the South Atlantic Council consider restricting all recreational, for-hire, and commercial users of SMZs off of South Carolina to the recreational bag limit (**Appendix H**).

An objective of designating an artificial reef an SMZ as described in Management Measure #17 of the Snapper Grouper FMP: "Upon request to the South Atlantic Council from the permittee (possessor of a Corps of Engineers permit) for any artificial reef or fish attraction device (or other modification of habitat for the purpose of fishing) the modified area and an appropriate surrounding area may be designated as a Special Management Zone (SMZ) that prohibits or restrains the use of specific types of fishing gear that are not compatible with the intent of the permittee for the artificial reef or fish attraction device," (Snapper Grouper FMP, SAFMC 1983). In an August 2009 letter to South Atlantic Council Chairman D. Harris, SCDNR states that harvest of commercially viable quantities of species on SMZs off of South Carolina is not a sustainable practice for these relatively small areas originally designated to improve recreational fishing opportunities and to protect the reef communities from overly-efficient fishing practices, SCDNR's primary objectives in their construction (**Appendix H**). Designating an artificial reef as an SMZ preserves the fishing opportunities artificial reefs provide and serves as an incentive to establish them. Fishing gear that offers "exceptional advantages" over other gear types may significantly reduce the improved fishing opportunities, and eliminate the incentive for developing an artificial reef, which would prevent improved fishing opportunities that would not otherwise exist (Snapper

Grouper FMP, SAFMC 1983). Furthermore, the initial designation of the SMZs was to promote orderly use of the fishery resources on and around the artificial reefs, to reduce potential user group conflicts, and to maintain the intended socioeconomic benefits of the artificial reefs to the maximum extent practicable (Snapper Grouper Regulatory Amendment 1, SAFMC 1987).

The following 29 SMZs (artificial reefs and surrounding areas) have been established in the EEZ offshore South Carolina (**Tables 4-4 and 4-5; Figures 4-2 and 4-3**).

Table 4-4. Special Management Zone (South Carolina) Northeast and Southwest coordinates.

	Latitude	Longitude
Paradise Reef	Northern boundary 33°31.59' N. Southern boundary 33°30.51' N.	Eastern boundary 78°57.55' W. Western boundary 78°58.85' W.
Ten Mile Reef	Northern boundary 33°26.65' N. Southern boundary 33°24.80' N.	Eastern boundary 78°51.08' W. Western boundary 78°52.97' W.
Pawleys Island Reef	Northern boundary 33°26.58' N. Southern boundary 33°25.76' N.	Eastern boundary 79°00.29' W. Western boundary 79°01.24' W.
Georgetown Reef	Northern boundary 33°14.90' N. Southern boundary 33°13.85' N.	Eastern boundary 78°59.45' W. Western boundary 79°00.65' W.
Capers Reef	Northern boundary 32°45.45' N. Southern boundary 32°43.91' N.	Eastern boundary 79°33.81' W. Western boundary 79°35.10' W.
Kiawah Reef	Northern boundary 32°29.78' N. Southern boundary 32°28.25' N.	Eastern boundary 79°59.00' W. Western boundary 80°00.95' W.
Edisto Offshore Reef	Northern boundary 32°15.30' N. Southern boundary 32°13.90' N.	Eastern boundary 79°50.25' W. Western boundary 79°51.45' W.
Hunting Island Reef	Northern boundary 32°13.72' N. Southern boundary 32°12.30' N.	Eastern boundary 80°19.23' W. Western boundary 80°21.00' W.
Fripp Island Reef	Northern boundary 32°15.92' N. Southern boundary 32°14.75' N.	Eastern boundary 80°21.62' W. Western boundary 80°22.90' W.
Besty Ross Reef	Northern boundary 32°03.60' N. Southern boundary 32°02.88' N.	Eastern boundary 80°24.57' W. Western boundary 80°25.50' W.
Hilton Head Reef (Artificial Reef - T)	Northern boundary 32°00.71' N. Southern boundary 31°59.42' N.	Eastern boundary 80°35.23' W. Western boundary 80°36.37' W.
Little River Offshore Reef	Northern boundary 33°42.10' N. Southern boundary 33°41.10' N.	Eastern boundary 78°26.40' W. Western boundary 78°27.10' W.
BP-25 Reef	Northern boundary 33°21.70' N. Southern boundary 33°20.70' N.	Eastern boundary 78°24.80' W. Western boundary 78°25.60' W.
Vermilion Reef	Northern boundary 32°57.80' N. Southern boundary 32°57.30' N.	Eastern boundary 78°39.30' W. Western boundary 78°40.10' W.
Cape Romaine Reef	Northern boundary 33°00.00' N. Southern boundary 32°59.50' N.	Eastern boundary 79°02.01' W. Western boundary 79°02.62' W.
Y-73 Reef	Northern boundary 32°33.20' N. Southern boundary 32°32.70' N.	Eastern boundary 79°19.10' W. Western boundary 79°19.70' W.

Eagles Nest Reef	Northern boundary 32°01.48' N. Southern boundary 32°00.98' N.	Eastern boundary 80°30.00' W. Western boundary 80°30.65' W.
Bill Perry Jr. Reef	Northern boundary 33°26.20' N. Southern boundary 33°25.20' N.	Eastern boundary 78°32.70' W. Western boundary 78°33.80' W.
Comanche Reef	Northern boundary 32°27.40' N. Southern boundary 32°26.90' N.	Eastern boundary 79°18.80' W. Western boundary 79°19.60' W.
Murrells Inlet 60 Foot Reef	Northern boundary 33°17.50' N. Southern boundary 33°16.50' N.	Eastern boundary 78°44.67' W. Western boundary 78°45.98' W.
Georgetown 95 Foot Reef	Northern boundary 33°11.75' N. Southern boundary 33°10.75' N.	Eastern boundary 78°24.10' W. Western boundary 78°25.63' W.
New Georgetown 60 Foot Reef	Northern boundary 33°09.25' N. Southern boundary 33°07.75' N.	Eastern boundary 78°49.95' W. Western boundary 78°51.45' W.
North Inlet 45 Foot Reef	Northern boundary 33°21.03' N. Southern boundary 33°20.03' N.	Eastern boundary 79°00.31' W. Western boundary 79°01.51' W.
CJ Davidson Reef	Northern boundary 33°06.48' N. Southern boundary 33°05.48' N.	Eastern boundary 79°00.27' W. Western boundary 79°01.39' W.
Greenville Reef	Northern boundary 32°57.25' N. Southern boundary 32°56.25' N.	Eastern boundary 78°54.25' W. Western boundary 78°55.25' W.
Charleston 60 Foot Reef	Northern boundary 32°33.60' N. Southern boundary 32°32.60' N.	Eastern boundary 79°39.70' W. Western boundary 79°40.90' W.
Edisto 60 Foot Reef	Northern boundary 32°21.75' N. Southern boundary 32°20.75' N.	Eastern boundary 80°04.10' W. Western boundary 80°05.70' W.
Edisto 40 Foot Reef	Northern boundary 32°25.78' N. Southern boundary 32°24.78' N.	Eastern boundary 80°11.24' W. Western boundary 80°12.32' W.
Beaufort 45 Foot Reef	Northern boundary 32°07.65' N. Southern boundary 32°06.65' N.	Eastern boundary 80°28.80' W. Western boundary 80°29.80' W.

Table 4-5. Area of Special Management Zones off South Carolina.

SC SMZ	Area (Square Miles)	% of EEZ off SC
Little River Offshore Reef	0.77	0.003%
Paradise Reef	1.55	0.006%
Ten Mile Reef	3.87	0.014%
Pawleys Island Reef	0.86	0.003%
Bill Perry Jr. Reef	1.22	0.005%
BP-25 Reef	0.89	0.003%
North Inlet 45 Foot Reef	1.33	0.005%
Murrel's Inlet 60 Foot Reef	1.45	0.005%
Georgetown Reef	1.40	0.005%
Georgetown 95 Foot Reef	1.70	0.006%
New Georgetown 60 Foot Reef	2.50	0.009%
CJ Davidson Reef	1.24	0.005%
Cape Romaine Reef	0.34	0.001%
Vermilion Reef	0.44	0.002%
Greenville Reef	1.11	0.004%
Capers Reef	2.21	0.008%
Charleston 60 Foot Reef	1.34	0.005%
Y-73 Reef	0.34	0.001%
Kiawah Reef	3.34	0.012%
Comanche Reef	0.45	0.002%
Edisto 40 Foot Reef	1.21	0.005%
Edisto 60 Foot Reef	1.79	0.007%
Fripp Island Reef	1.68	0.006%
Edisto Offshore Reef	1.88	0.007%
Hunting Island Reef	2.82	0.011%
Beaufort 45 Foot Reef	1.12	0.004%
Betsy Ross Reef	0.75	0.003%
Eagles Nest Reef	0.37	0.001%
Hilton Head Reef/Artificial Reef-T	1.65	0.006%
Total Area	**41.61**	**0.155%**

Restrictions in SMZs off South Carolina include the following:

- The use of a powerhead to take South Atlantic snapper grouper is prohibited. Possession of a powerhead and a mutilated South Atlantic snapper grouper in, or after having fished in, one of these SMZs constitutes prima facie evidence that such fish was taken with a powerhead in the SMZ.
- Fishing may only be conducted with handline, rod and reel, and spearfishing gear.
- Use of a sea bass pot or bottom longline is prohibited.

The major species targeted in the SMZs include Atlantic spadefish, black sea bass, flounder, king mackerel, sharks, and Spanish mackerel. However, little information exists on commercial fishing in the South Carolina SMZs and therefore, the biological impacts of **Preferred Alternative 2** and **Preferred Alternative 3** cannot be quantified at this time.

Any commercial effort is expected to be small. It is expected that modifying management of the SMZs to restrict commercial fishing effort to the bag limit could possibly reduce the amount of harvest in the area and have a positive biological impact on the species regularly targeted.

Alternative 4 would prohibit the use of spearfishing gear within the SMZs, which may provide a slight positive impact to the resource. Spearfishing allows fishermen to more effectively select for larger individuals within target species populations (Sadovy 1994; Meyer 2007; Lloret et al. 2008). Spearfishing is considered to be an efficient harvesting activity that can significantly alter abundance and size structure of target species toward fewer and smaller fish by selective removal of larger individual fish. The removal of larger individual fish of the target species leaves behind smaller individuals to spawn. Over time this can decrease the size and age at sexual maturity and decrease the average size of the population (Sluka and Sullivan 1998; Chapman and Kramer 1999; Matos-Caraballo et al. 2006; Lloret et al. 2008).

Meyer (2007) reported spearfishing can remove a greater biomass of reef fishes than rod and reel fishing. Frisch et al. (2008) found that free-diving (diving without SCUBA) spear fishermen removed larger fish than rod and reel fishermen. Spearfishing can also impact ecosystem health by altering the composition of the overall natural communities of species (Lloret et al. 2008). Reduction in the larger predatory fishes can have a "top-down" effect on fish assemblages by allowing other fish populations to increase, altering the composition of the overall natural community of species, including invertebrates (Lloret et al. 2008). The largest fish are important as predators in maintaining a balanced and complete ecosystem; their selective removal may cause ecological imbalance (McClanahan and Muthiga 1988; Dulvy et al. 2002).

Spearfishing has been found to alter fish behavior (Schroeder and Parrish 2005) and may cause fish to move to different habitats (Jouvenel and Pollard 2001). These habitats may be less favorable for growth and reproduction. Frisch et al. (2008) and Harper et al. (2000) indicate a small percentage of fish speared are discarded. Frisch et al. (2008) also found that some percentage of fish also escape with spear-induced injuries. There is also little marine debris associated with spearfishing activities compared to rod and reel fishing.

4.4.2 Economic Effects

As discussed in **Section 3.6.1.2**, Rhodes and Pan (2007) provide results of a survey of private boat anglers and charter divers fishing on artificial reefs (see **Appendix I**). As stated in Chapter 3, the estimated total (aggregate) trip expenditures by private boat anglers and charter divers making trips to artificial reef sites, including SMZs off South Carolina, were $28.7 million and $0.6 million, respectively, during 2006. These artificial reef users in 2006 represented an economic impact (i.e., economic importance) of approximately $83 million in total sales (output) that generated approximately 1,000 jobs. The South Carolina marine artificial reef system, as developed and managed by the SCDNR, is a significant component of the entire South Carolina coastal economy. In addition, the man-made structures within South Carolina permitted artificial reef areas, as recreational outdoor "destinations," are an

important component of the economic impacts generated by a special group or subset of tourists, (i.e., anglers and scuba divers). One of the goals of implementing the SMZ structures was to maintain intended socioeconomic benefits of the SMZs to recreational anglers.

Commercial landings of species caught on these artificial reefs cannot be quantified due to the way that logbook landings are recorded. The level of detail of reporting where fish are caught is insufficient to allow for harvest on the SMZs to be broken out from harvest made in the fishing zones the SMZs lie in; data are reported in 60 nautical miles square areas. Therefore, the loss associated with a ban on harvest above the recreational bag limit by commercial fishermen cannot be quantified with available data. Both **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in small reductions in ex-vessel revenues to commercial fishermen, though some mitigation of these reductions could occur as a result of fishing in other areas. At the same time, **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in increased economic benefits to recreational fishermen as a result of allocation of the harvest that would otherwise be taken by commercial fishermen to recreational fishermen. Additional economic benefits would be expected to result from healthier and more sustainable populations at these sites over the long term.

As stated above, based on data collected from charter divers, a total of 3,571 divers participated in charted SC offshore dive trips during 2006 with 53% of these charter divers (1,902 divers) making one or more dives on structures within South Carolina permitted artificial reef sites. The effect of **Alternative 4** on the recreational fishery of South Carolina is expected to be significant. However, the expected adverse economic effects cannot be quantified with available data. Also, if **Alternative 4** is implemented, recreational divers may decide to use other gear in the SMZs or fish outside the SMZs. Therefore, any estimate of losses due to **Alternative 4** would likely be an overestimate of actual losses.

4.4.3 Social Effects

Artificial reefs create unique fishing destinations. Because of this, congestion and user conflicts between recreational users and commercial fishermen may increase under **Alternative 1 (No Action)**. Additionally, because commercial harvest is a relatively recent activity in the SMZs, long-term recreational anglers will bear more of the social costs of additional congestion. However, **Alternative 1 (No Action)** allows for continued commercial harvest and opportunities to expand the commercial fishery to create jobs and provide local seafood.

Preferred Alternative 2 and **Preferred Alternative 3** would "level the playing field" for recreational and commercial fishermen. This may result in a decline or cessation of all commercial harvest within the SMZs because other areas with fewer restrictions may be better options for commercial fishermen. However, commercial harvesters would no longer be able to fully utilize the unique opportunities of these artificial reef habitats. Reduced commercial fishing in the SMZs could lead to reduced congestion issues, less competition between recreational and commercial fishermen, and decreased user conflict.

Additionally, **Preferred Alternative 2** and **Preferred Alternative 3** are more aligned with the overall purposes and goals for the SMZs. Funding to support construction and maintenance for South Carolina's artificial reefs derives mostly from state and federal sources associated with recreational fishing, and also private recreational donations. A percentage of sales of South Carolina's recreational fishing licenses funds the Marine Artificial Reef Program to support construction and maintenance of the state's artificial reefs. The Federal Aid in Sportfish Restoration Program administered by the U.S. Fish and Wildlife Service provides funding to support artificial reefs in South Carolina and can only be used for projects and programs that impact or enhance recreational fishing. Recreational fishing clubs and other entities tied to recreational fishing interests also contribute to South Carolina's Marine Artificial Reef Program through private donations. Since the artificial reef program's inception in 1973, over $7.7 million has been contributed from these 3 primary funding sources (Mel Bell, SCDNR Office of Fisheries Management, personal communication).

Alternative 4 could negatively impact the recreational dive experience, and cause a decline in charter dive trips. Without a suitable alternative gear that provides the same level of satisfaction, prohibition of hand spears and spear guns would cause decreased opportunities for recreational spearfishers. The impact on recreational anglers using other gear types would be positive due to the possibility of more fish available if these highly effective gear types were no longer allowed.

4.4.4 Administrative Effects

Under the **No Action Alternative**, the administrative impacts will not increase. Administrative impacts associated with **Alternatives 2-4** are expected to increase. Administrative impacts may take the form of preparation of regulations, education and outreach materials and law enforcement.

Figure 4-2. Special Management Zones off South Carolina, North geographic area.

Figure 4-3. Special Management Zones off South Carolina, South geographic area.

4.4.5 Conclusion

The Law Enforcement Advisory Panel reviewed CE-BA 2 during their August 2009 and March 2011 meetings, but had no specific recommendations for this action.

The South Carolina Department of Natural Resources (SCDNR) sent a letter to the South Atlantic Council in August 2009 expressing concern over reports of commercial snapper grouper vessels operating on offshore artificial reefs removing commercially viable quantities of species using conventional spear guns. The SCDNR requested the South Atlantic Council consider restricting harvest and possession within South Carolina SMZs to the recreational bag limit for all users.

Because of the limited data on the amount of commercial harvest occurring in SMZs off South Carolina, the South Atlantic Council advised that the intent of designating an artificial reef as an SMZ be captured in the action's discussion. The Snapper Grouper FMP states in Management Measure #17: "Upon request to the South Atlantic Council from the permittee, the artificial reef and surrounding area may be designated an SMZ that prohibits or restrains the use of specific types of fishing gear not compatible with the intent of the permittee (Snapper Grouper FMP, SAFMC 1983)." The SCDNR promotes artificial reefs as recreational fishing areas and the program in South Carolina is funded primarily by the recreational community. The South Atlantic Council selected **Preferred Alternatives 2 and 3** during their December 2010 meeting in order to address the concerns that South Carolina delegates brought forward (**Appendix H**) regarding commercial exploitation of these areas.

The South Atlantic Council concluded **Preferred Alternatives 2 and 3** best address the objective to minimize conflicts and prevent localized overfishing as specified in the Snapper Grouper FMP (Management Measure #17). There is no intent, by this action, to alter any existing prohibition in SMZs other than to include this modification to limit all users to the recreational bag limit in SMZs off South Carolina.

4.5 Action 5. Modify Sea Turtle Release Gear Requirements for the Snapper Grouper Fishery

Alternative 1. No Action. Maintain current sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery in federal waters of the South Atlantic. Currently, required gear (regardless of freeboard height) includes:

- a long-handled line clipper or cutter,
- a long-handled dehooker for ingested hooks,
- a long-handled dehooker for external hooks,
- a long-handled device to pull an "inverted V",
- a dipnet,
- a tire (or other comparable cushioned, elevated surface that immobilizes boated sea turtles),
- a short-handled dehooker for ingested hooks,
- a short-handled dehooker for external hooks,
- long-nose or needle-nose pliers,

- bolt cutters,
- monofilament line cutters, and
- at least two types of mouth openers/mouth gags

This equipment must meet the specifications described in 50 CFR 635.21(c)(5)(i)(A-L) with the following modification: any other comparable, cushioned, elevated surface that allows boated sea turtles to be immobilized, may be used as an alternative to the requirement in 50 CFR 635.21(c)(5)(i)(F) to have a tire on board.

Alternative 2. Require all federally-permitted hook and line vessels with no longline gear onboard to have and use a tool capable of cutting the fishing line and a tool capable of removing a hook from a sea turtle or smalltooth sawfish. Require fishermen to follow the sea turtle handling and release guidelines.

Alternative 3. Require all sea turtle and smalltooth sawfish release gear listed under **Alternative 1 (No Action)** for federally- permitted snapper grouper vessels using longline gear, and require [insert specific sea turtle release gear] for federally-permitted vessels fishing with hook-and-line gear.

Preferred Alternative 4. Modify sea turtle and smalltooth sawfish release gear based on freeboard height. Fishermen would still be required to comply with all current sea turtle and smalltooth sawfish release guidelines. The design specifications of required gear and the handling and release techniques employed must comply with those described in the NOAA Fisheries Service document entitled "Careful Release Protocols for Sea Turtle Release with Minimal Injury." NOTE: **Preferred Alternative 4** is recommended by the Southeast Region's Office of Protected Resources Division as the minimum requirement necessary to remain in compliance with the biological opinion.

> **Preferred Sub-Alternative 4a.** Vessels with freeboard height of 4 feet or less would be required to carry and use:
>
> - a short-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,
> - long-nose or needle-nose pliers,
> - bolt-cutters,
> - mono-filament line cutters,
> - cushion/support device (i.e., boat cushion)
> - a dipnet,
> - at least two types of mouth openers/mouth gags
>
> **Preferred Sub-Alternative 4b.** Vessels with freeboard height greater than 4 feet (and/or using longline gear) would be required to carry and use:
>
> - a long-handled line cutter,
> - a long-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,
> - a long-handled device to pull an "inverted V",
> - a dipnet,

- cushion/support device (i.e., boat cushion),
- a short-handled dehooker for ingested hooks; or a dehooker for ingested and a dehooker for external hooks,
- long-nose or needle-nose pliers,
- bolt cutters,
- monofilament line cutters, and
- at least two types of mouth openers/mouth gags

Alternative 5. Modify the design specifications of the current sea turtle and smalltooth sawfish release gear equipment for all federally-permitted, non-longline, snapper grouper vessels with hook-and-line gear on board to match the specifications described in the NOAA Fisheries Service document entitled "Careful Release Protocols for Sea Turtle Release with Minimal Injury." (see **Appendix K**)

South Atlantic Council may select one or more sub-alternatives. Choosing additional sub-alternatives would be especially beneficial for species conservation, but not required to remain in compliance with the biological opinion.

Sub-Alternative 5a. Require all federally- permitted non-longline snapper grouper vessels with hook-and-line gear on board (see **Appendix K**) for specification on each gear type):

- a short-handled dehooker for ingested hooks, or a short-handled dehooker for external hooks,
- cushion/support device (i.e., standard automobile tire or boat cushion)
- long-nose or needle-nose pliers,
- bolt-cutters,
- mono-filament line cutters,
- a dipnet,
- at least two types of mouth openers/mouth gags

Sub-Alternative 5b. Also require:

- a long-handled dehooker for ingested hooks, or a long-handled dehooker for external hooks,

Sub-Alternative 5c. Also require:

- a long-handled line clipper or cutter,

Sub-Alternative 5d. Also require:

- a long-handled device to pull an "inverted V"

4.5.1 Biological Effects

The current sea turtle and smalltooth sawfish release gear requirements in Snapper Grouper Amendment 15B were developed to satisfy requirements of the Endangered Species Act (ESA) biological opinion on the snapper grouper fishery. The biological opinion directed the South Atlantic Council to implement sea turtle and smalltooth sawfish release gear requirements, and required the implementation of safe handling protocols for sea turtles and smalltooth sawfish, among other things. The biological opinion required that the South Atlantic Council consider the sea turtle and smalltooth sawfish release gear requirements in place for the Highly Migratory Species (HMS) fisheries, and at a minimum, implement sea

turtle and smalltooth sawfish release gear requirements similar to those for the Gulf of Mexico reef fish fishery (NMFS 2006). The Gulf of Mexico reef fish fishery requires the same dehooking and disentanglement gear currently used in the HMS longline fisheries for vessels with freeboard heights greater than 4 feet. Vessels with freeboard heights of 4 feet or less are also required the carry HMS dehooking and disentanglement gears, with the exception that only short-handled equipment is mandatory. In Snapper Grouper 15B, the South Atlantic Council ultimately chose to require the same sea turtle and smalltooth sawfish release gears required in the HMS fisheries, making no distinction for vessel freeboard height.

The HMS pelagic longline fishery was the first fishery to require sea turtle and smalltooth sawfish release gear in the Atlantic, and the release equipment developed was originally designed to handle the heavier tackle used in this fishery. As snapper grouper fishermen began using the dehooking and disentanglement gear required in Snapper Grouper Amendment 15B, the effectiveness and necessity of using these "heavy-duty" tools with lighter snapper grouper tackle was called into question. Therefore, the South Atlantic Council has been asked to consider developing an action that would re-address and possibly modify sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery.

Alternative 1 (No Action) would maintain the current sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery. Regardless of freeboard height, all vessels with hook-and-line (non longline and longline) gear on board would continue to be required to carry the gear listed under **Alternative 1 (No Action)**. The current sea turtle and smalltooth sawfish release gear requirements were established through Snapper Grouper Amendment 15B (SAFMC 2009) and require all vessels having a South Atlantic Unlimited Snapper grouper Permit, a South Atlantic 225 lb Trip Limit Snapper grouper Permit, or a South Atlantic Charter/Headboat Permit for Snapper grouper, and carrying hook-and-line gear onboard to: (1) post the *Sea Turtle Handling/Release Guidelines* placard inside the wheelhouse, or in any easily viewable area, if there is no wheelhouse; (2) have a copy of the "Careful Release Protocols for Sea Turtle Release with Minimal Injury" (Protocols) posted inside the wheelhouse, or within a waterproof case in a readily accessible area, and; (3) possess and use sea turtle handling and release gear consistent with the Protocols. The dehookers, line cutters, and bolt cutters specified under current regulations were designed for and are required in the HMS longline fisheries. Utilizing specialized dehooking and disentanglement gear has been shown to reduce hooking mortality in sea turtles; however, there is some concern that using sea turtle dehooking equipment not designed for the lighter tackle typically used by snapper grouper fishermen could in fact harm sea turtles or smalltooth sawfish during the dehooking process. However, if the heavier-duty dehooking gear required under **Alternative 1** (**No Action**) is causing harm, or is less effective than gear designed for lighter tackle, the benefits of using the current gear may not be as great as could be achieved under other alternatives.

Alternatives 2 and **3** modify the sea turtle and smalltooth sawfish release gear specifications for vessels carrying non-longline hook-and-line gear. Under these alternatives, all vessels with longline gear on board would be required to continue carrying all the dehooking and

disentanglement gear outlined in **Alternative 1**. Under **Alternative 2,** non-longline vessels would be required to carry a tool for cutting the fishing line and a tool for removing an external hook from a sea turtle. **Alternative 2** is similar to sea turtle take mitigation measures currently in place in the Western Pacific (**Appendix L**). Examples of these tools may be a knife and a pair of pliers. Under **Alternative 2**, the fishermen would be required to follow safe sea turtle handling and release guidelines for sea turtles incidentally hooked. The potential biological effects are difficult to predict under **Alternative 2**. Research indicates that the amount of gear remaining on an animal at the time of release plays a large role in determining whether the animal survives the encounter. If lines are cut and no additional effort is made to remove any remaining line or imbedded hooks, the likelihood of post-release mortality increases. The dehooking and disentanglement gear currently required in the fishery has been specifically designed to effectively remove most, if not all, hook-and-line gear. Each piece of required gear is meant to address a number of potential dehooking/disentanglement scenarios (i.e., hooked and entangled, only entangled, only hooked, etc.). If, as proposed under **Alternative 2**, less release equipment is required, it is possible that even fishermen following the safe handling and release guidelines would encounter a hooking/entanglement scenario they could not effectively address with this truncated suite of gear. Such a scenario would likely result in a reduced biological benefit to sea turtles. However, if the sea turtle release guidelines are followed, and hooks or entangling line are safely removed, there would likely be a biological benefit to sea turtles.

Depending upon which tools were selected, and what their design specifications were, the requirement to have tools onboard that are capable of ridding a sea turtle or smalltooth sawfish of fishing gear would be biologically preferable to not requiring any such tools at all, and may in fact result in greater or equal biological benefit relative to **Alternative 1 (No Action)** since possible injury inflicted on a sea turtle or smalltooth sawfish from use of inappropriate release gear could be avoided.

However, because the requirements of the biological opinion outlined what the South Atlantic Council must consider when implementing sea turtle and smalltooth sawfish release gear requirements, **Alternative 2** would not be in compliance with the current biological opinion. Selecting **Alternative 2** may require re-initiation of ESA section 7 consultation.

Alternative 3 differs from **Alternative 2** by identifying specific types of sea turtle and smalltooth sawfish release equipment for snapper grouper vessels carrying non-longline gear. **Alternative 3** also maintains the status quo sea turtle release gear requirements for snapper grouper vessels carrying longline gear onboard. This requirement ensures that vessels with heavier tackle are adequately equipped to release sea turtles that become hooked or entangled in fishing gear. **Alternative 3** may have a slightly greater positive biological impact than **Alternative 2** since the risk of fishermen not having adequate gear onboard to safely release a hooked or entangled sea turtle or smalltooth sawfish would be minimized through the specification of required tools.

Preferred Alternative 4 would require different lengths and types of dehooking tools dependent upon the freeboard height of the vessel, which tracks the sea turtle release gear regulations in the Gulf of Mexico reef fish fishery (see **Appendix J**). **Preferred Alternative**

4 also offers the option (through **sub-alternatives 4a** and **4b**) of tailoring sea turtle and smalltooth sawfish release gear specifications to increase effectiveness when used with lighter tackle in the snapper grouper fishery. The biological benefits of **Preferred Alternative 4** are likely to be very similar to **Alternative 1 (No Action). Preferred Alternative 4** and its sub-alternatives reference the updated release gear design specifications that now include a wider range of gear design parameters. These new parameters should be appropriate for the lighter tackle used in the snapper grouper fishery. The alternative and its sub-alternatives would also change the sea turtle release gear requirements based on the size of the vessels. For the safety of the crew and the animal, all incidentally caught sea turtles are recommended to be brought on board when working to disentangle/dehook them, regardless of a vessel's freeboard height. When an animal is on board, long-handled dehooking gear is likely unnecessary because of the close proximity of the animal. In the event an animal is unable to be brought on board, it is unlikely that disentanglement/dehooking efforts can be effective without long-handled dehooking gear for vessels with freeboard heights of greater than 4 feet, because of the distance between the gunwale and the surface of the water. In contrast, vessels with a freeboard height of 4 feet or less are unlikely to need the long-handled release equipment, because of how close the gunwale is to the surface of the water. For vessels with shorter freeboard height, disentanglement/dehooking efforts can take place at the side of the vessel. In these scenarios, long-handled dehooking gear is likely unnecessary. Since the long-handled dehooking gear is unlikely to play a role in disentanglement/dehooking activities for vessels with shorter freeboard heights, removing the requirement to carry long-handled gear for these vessels (**Preferred sub-Alternative 4a**) is unlikely to have any negative biological effects. Since vessels with freeboard heights of greater than 4 feet would still be required to carry long-handled equipment, **Preferred sub-Alternative 4b** is also unlikely to have negative biological effects.

Alternative 5 would modify the current sea turtle release gear requirements (noted in **Alternative 1**) for all federally-permitted non-longline snapper grouper vessels with hook-and-line gear on board. **Sub-alternative 5a** would require a minimum set of release equipment more appropriate for the smaller tackle used in the snapper grouper hook-and-line fishery. The biological benefit of **sub-alternative 5a** would likely be similar to **Alternative 1**. Since **sub-alternative 5a** requires less release equipment than **Alternative 1**, it is possible a fisher would be unable to safely release a sea turtle or smalltooth sawfish due to a lack of long-handled release equipment. In such a case the biological benefits of **sub-alternative 5a** may be less than **Alternative 1**. However, the changes in design specifications to the required equipment could make them more effective in releasing hooked or disentangled sea turtles or smalltooth sawfish. Under these circumstances the biological benefits from **sub-alternative 5a** may be greater than **Alternative 1.** With each additional sub-alternative selected, the overall biological benefit from the action is likely to increase. Since each piece of equipment has new design criteria, each piece is likely to be more effective at dehooking and disentangling the lighter tackle used in the fishery. Selecting all four sub-alternatives is likely to have the greatest biological benefit of all the proposed alternatives. This would ensure that both short- and long-handled release equipment is on board, and that those gear are designed to handle lighter tackle.

4.5.2 Economic Effects

Under **Alternative 1 (No Action)**, expenses totaled $617-$1,115 (2006 dollars) per vessel as estimated in Snapper Grouper Amendment 15B. Additional expenses were incurred in onboard storage requirements of the gear. When analyzing **Alternatives 2-5**, it was assumed that all vessels participating in the snapper grouper fishery already carry the release gear under **Alternative 1 (No Action)**.

As suggested above, biological gains may be realized with the use of release gear more appropriate to the vessel. **Alternatives 2** and **3** attempt to better match gear with the vessel and are likely to yield greater biological and economic benefits than **Alternative 1**. Under **Alternative 2**, no specific gear is listed. While **Alternative 2** and the other alternatives may result in increased economic benefits resulting from increased long-term biological benefits compared to **Alternative 1 (No Action)** because more appropriate release gear is being used, effectiveness is difficult to estimate and enforcement may be difficult since success relies heavily on how well sea turtle release guidelines are adhered to.

Alternative 3 differs slightly from **Alternative 2** in that specific gear is identified for vessels using light tackle. Therefore, no enforcement issues should arise and all vessels would be carrying appropriate gear. For this reason, **Alternative 3** is expected to yield slightly higher long-term economic benefits than **Alternatives 1** and **2**. Appropriate cutting and de-hooking gear is assumed to already be on board all vessels, so no additional gear costs would be expected to be incurred under **Alternatives 2** and **3**.

Out-of-pocket release gear expenses per *new entrant* for **Preferred Alternatives 4a** and **4b** are estimated to range from $324-$490 for vessels with less than 4 feet freeboard and from $564-$987 for vessels with more than 4 feet freeboard. There are no release gear expenses for those already participating in the fishery since all of the gear required under **Preferred Alternatives 4a** and **4b** is already required under **Alternative 1 (No Action)**. However, under **Preferred Alternatives 4a** and **4b**, vessels will be required to carry less gear. This will free up more space onboard the vessels.

Alternative 5 would modify the gear requirements under **Alternative 1**. **Alternatives 5a-5d** would require gear already possessed by fishermen and listed under **Alternative 1**, but smaller sizes of the same required gear. Therefore, no negative economic effects would be expected as a result of the **Alternative 5** sub-alternatives unless fishermen purchased the smaller gears identified in the sub-alternatives.

4.5.3 Social Effects

Making no change to the requirements (**Alternative 1)** requires the same bycatch gear for all vessels, regardless of size. The cost per vessel could represent a prohibitive additional operational cost for new entrants, which may result in decreased opportunities for next-generation fishermen. However, all vessels currently participating would be expected to incur little or no social impacts because it is assumed that active fishermen already carry the release gear under **Alternative 1**.

As discussed in the previous section (4.5.2) **Alternative 2, Alternative 3, Preferred Alternative 4**, and **Alternative 5** allow for variation in release gear requirements depending on vessel size and fishing gear. The more appropriately matched the release gear requirements, the lower the additional costs for smaller operations. This would be expected to result in positive social benefits by minimizing costs for release gear for new entrants.

4.5.4 Administrative Effects

Alternative 1 (No Action) would not result in an increase in administrative impacts. These requirements were implemented in 2008 and fishermen are aware of the requirements. **Alternative 2** and **Alternative 3** would require education and outreach to ensure fishermen understand the proper sea turtle handling techniques. These alternatives are expected to have the highest rate of voluntary compliance due to the ease of the regulations so the enforcement burden is expected to be lower than the other alternatives. **Preferred Alternative 4** and associated **sub-alternatives** would increase the administrative burden related to education, outreach and enforcement because there would be different requirements for vessels with differing freeboard heights. **Alternative 5** and associated **sub-alternatives 5a-5d** would increase the administrative burden in the form of education, outreach and monitoring and enforcement.

4.5.5 Conclusion

The Snapper Grouper Advisory Panel reviewed this action during February 2011, and comments were received in support of modifying gear requirements (for vessels carrying lighter tackle) from the current regulations implemented under Snapper Grouper Amendment 15B. Comments were received from several members that requested the South Atlantic Council look into other options than what is currently effective in the Gulf of Mexico snapper grouper commercial fishery. The comments indicated that the Gulf of Mexico regulations do not adequately address modifying gear requirements for vessels carrying lighter tackle, thus problem gears for the commercial fishery remain.

The Law Enforcement Advisory Panel reviewed CE-BA 2 during their March 2011 meeting and recommended the South Atlantic Council consider modifying gear requirements in the South Atlantic that are compatible with regulations in the Gulf of Mexico for enforcement purposes. They recommended that determination of freeboard height be defined in the regulations upon implementation of new gear requirements for the snapper grouper fishery.

This action was relocated into CE-BA 2 from Snapper Grouper Regulatory Amendment 9 during the September 2010 South Atlantic Council meeting.

In March, 2011, the South Atlantic Council reviewed revised alternatives based upon input from the NOAA Fisheries Service Protected Resources Division and Southeast Fishery Science Center. The South Atlantic Council was advised that a re-initiation of a section 7 consultation under the biological opinion requirement of the ESA would be triggered when an agency action is modified that causes an effect on the listed species not previously

considered. A re-initiated section 7 consultation of the entire snapper grouper fishery may result in additional gear requirements if regulations similar to the Gulf fishery are not considered in the South Atlantic. The South Atlantic Council was advised if they chose a preferred alternative less restrictive than **Alternative 4** or **Alternative 5**, a re-initiation of section 7 will likely occur. Protected Resources Division endorses **Alternative 4** for this action. Thus, the South Atlantic Council selected **Alternative 4** as preferred during the March 2011 meeting in order to modify current gear requirements to address lighter tackle, while remaining in compliance with the current biological opinion requirement. The preferred alternative also best meets the objectives of the Snapper Grouper Fishery Management Plan, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

4.6 Action 6. Amend the Snapper Grouper FMP to designate new EFH-HAPCs

Alternative 1. No Action. Do not amend the Snapper Grouper FMP to designate new Essential Fish Habitat – Habitat Areas of Particular Concern (EFH-HAPCs).

Preferred Alternative 2. Amend the Snapper Grouper FMP to designate one or more of the following EFH-HAPCs.

Sub-alternative 2a. Designate EFH-HAPCs for golden tilefish to include irregular bottom comprised of troughs and terraces inter-mingled with sand, mud, or shell hash bottom. Mud-clay bottoms in depths of 150-300 meters are HAPC. Golden tilefish are generally found in 80-540 meters, but most commonly found in 200-meter depths.

Sub-alternative 2b. Designate EFH-HAPC for blueline tilefish to include irregular bottom habitats along the shelf edge in 45-65 meters depth; shelf break; or upper slope along the 100-fathom contour (150-225 meters); hardbottom habitats characterized as rock overhangs, rock outcrops, manganese-phosphorite rock slab formations, or rocky reefs in the South Atlantic Bight; and the Georgetown Hole (Charleston Lumps) off Georgetown, SC.

Preferred Alternative 3. Designate EFH-HAPCs for the snapper grouper complex to include the following Deepwater Marine Protected Areas (MPAs) as designated in Snapper Grouper Amendment 14:

- Snowy Grouper Wreck MPA
- Northern South Carolina MPA
- Edisto MPA
- Charleston Deep Artificial Reef MPA
- Georgia MPA
- North Florida MPA
- St. Lucie Hump MPA
- East Hump MPA

Figure 4-4. Spatial Presentation of Northern Portion of Tilefish EFH-HAPC.

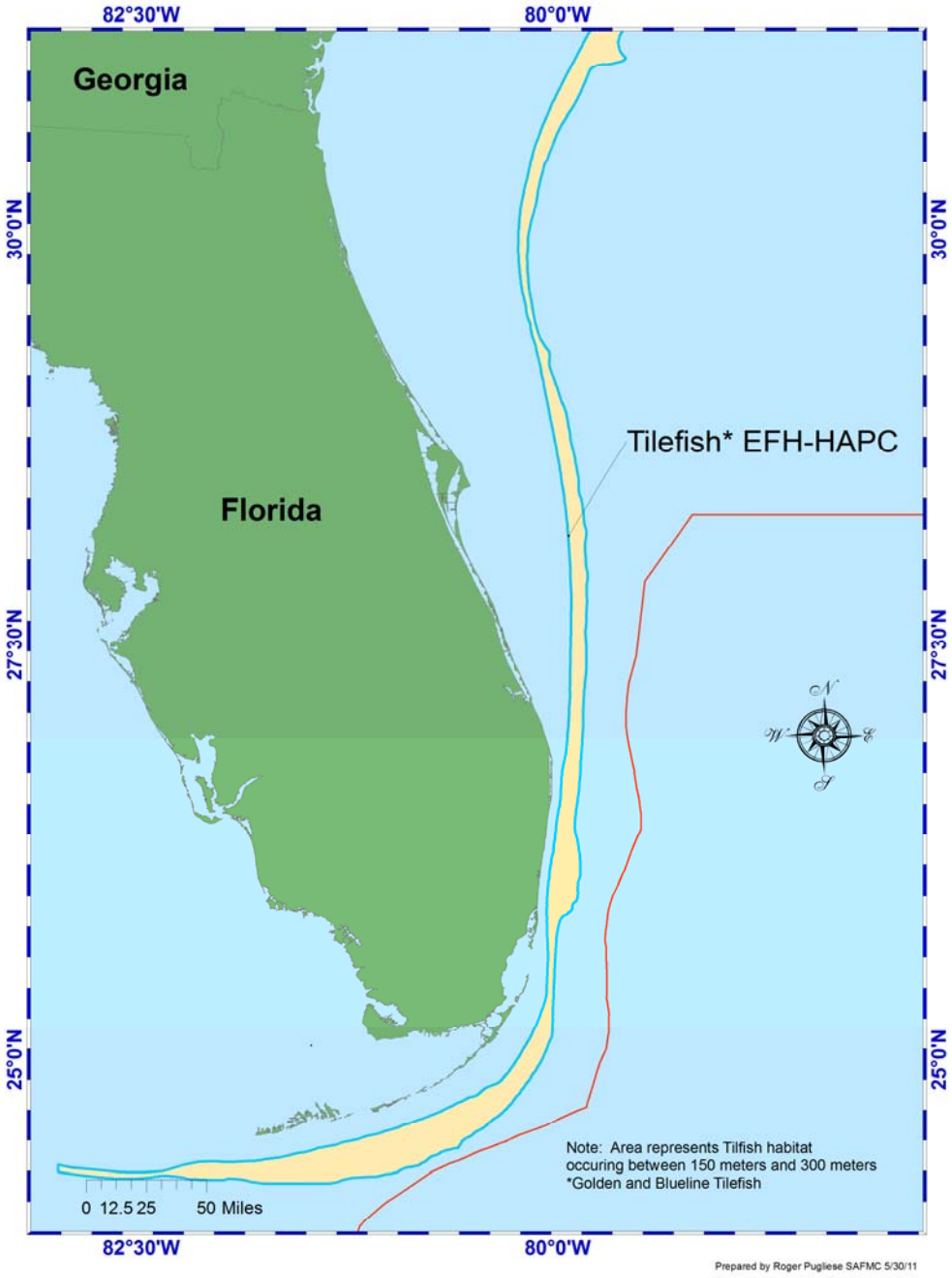


Figure 4-5. Spatial Presentation of Southern Portion of Tilefish EFH-HAPC.

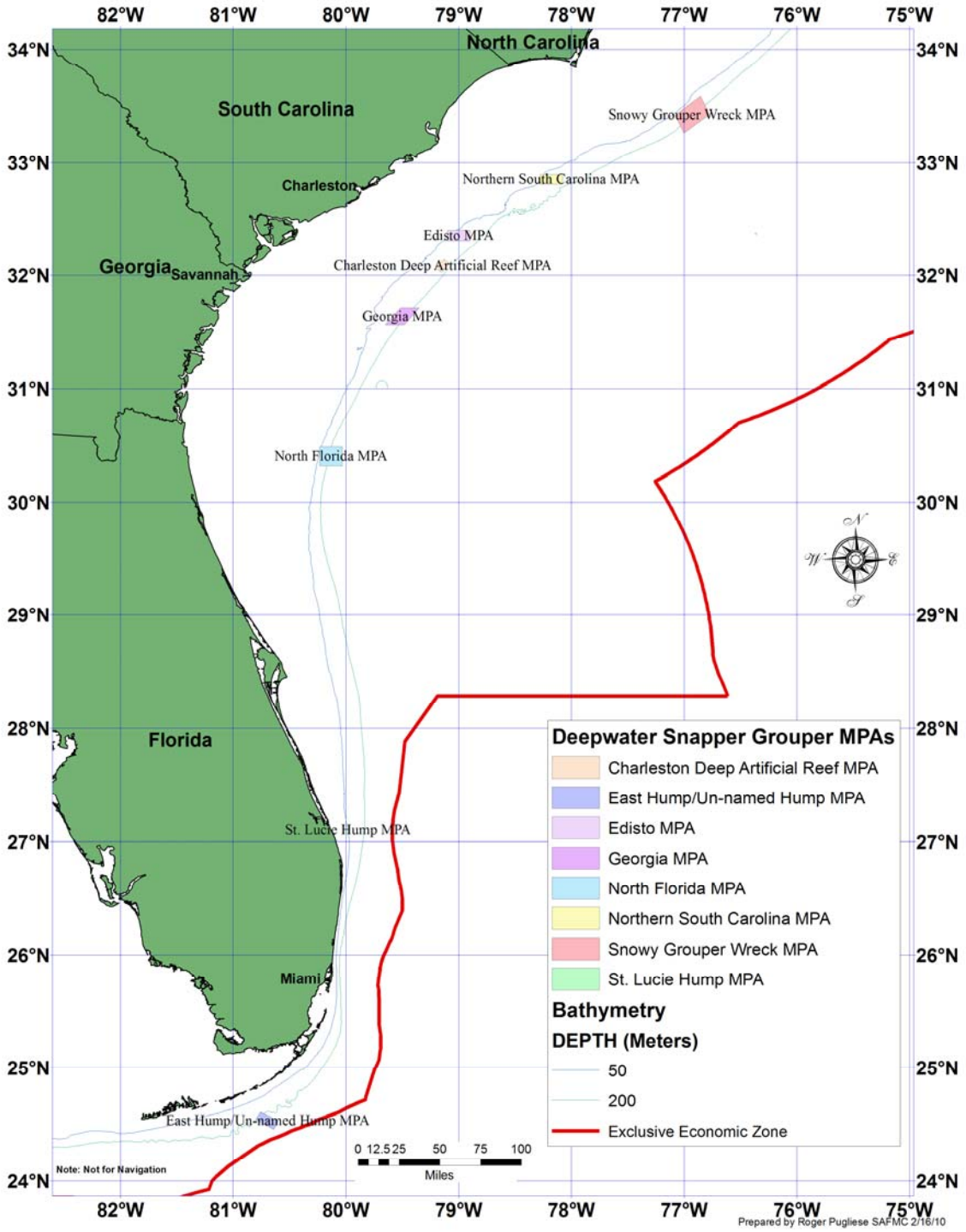


Figure 4-6. Deepwater Snapper Grouper Marine Protected Areas.

4.6.1 Biological Effects

Essential Fish Habitat and EFH-HAPCs were established as Amendment 10 to the Snapper Grouper FMP as part of the Comprehensive EFH Amendment (SAFMC 1998b) and are presented in **Section 3.4.2** and **Table 4-6**.

Alternative 1 (No Action) would not add an area highlighting the importance of golden tilefish and blueline tilefish (**Figure 4-4, 4-5**) or the value of emphasizing the habitat in the deepwater MPAs (**Figure 4-6)** established in Amendment 14 to the Snapper Grouper FMP (SAFMC 2007). **Preferred Alternative 2** addresses an oversight in the initial designation of Snapper Grouper EFH through the Comprehensive EFH Amendment (SAFMC 1998b) where the habitat plan describes in detail tilefish habitat and proposes the general distribution between 100 and 300 meters as an area considered to be EFH-HAPC for tilefish. While considered EFH, the area was not included in the proposed list of EFH-HAPCs. **Alternative 2a** for golden tilefish and **Alternative 2b** for blueline tilefish propose respective detailed descriptions for EFH-HAPCs. The additional specification of the MPAs for deepwater species as EFH-HAPCs (**Preferred Alternative 3**) is intended to protect the entire area as a unique habitat complex and enhance EFH consultations pertaining to non-fishing activities that could potentially impact these protected habitats.

Table 4-6. Summary evaluation of the existing and proposed 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	High
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
Golden Tilefish Habitat	High	Low	Medium	High
Blueline Tilefish Habitat	High	Low	Medium	High
Deepwater Marine Protected Areas	High	Low	Medium	Medium

The designation of additional EFH-HAPCs for snapper grouper species would not result in direct impacts to the biological resources of the west-central Atlantic Ocean. Rather, the EFH-HAPC designation under this option would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect surface waters from non-fishing activities which are undertaken, authorized, or funded by federal agencies.

4.6.2 Economic Effects

Designation of additional EFH-HAPCs would require the South Atlantic Council to consider all operations or actions that might interact with or affect the EFH-HAPC, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a protracted regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Since any restrictions that may subsequently be placed on these activities are unknown at this time, it is not possible to explicitly describe their effects. However, designation of additional EFH-HAPCs is expected to increase the likelihood that long-term resource goals are met due to increased protection through consultation requirements. A healthy, sustainable resource is presumed to result in increased long-term economic benefits relative to less protection. Assuming the areas are appropriate to the resource, both **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits.

4.6.3 Social Effects

There will be few social impacts from establishing EFH-HAPCs and would most likely come from future actions that are associated with such designations. In some cases, protection of habitat as in **Preferred Alternative 2** and **Alternative 3** could later lead to harvesting restrictions in areas where harvesting presently takes place or other actions which may impose similar constraints on penaeid shrimp fishermen or processors. **Alternative 1** would be less likely to result in negative short-term impacts on harvesters and processors than **Preferred Alternative 2** or **Preferred Alternative 3**, which may decrease ability to harvest shrimp. Overall, better protection (**Preferred Alternative 2** and **Preferred Alternative 3**) of EFH-HAPC is expected to result in increased long-term benefits to society.

4.6.4 Administrative Effects

Designation of new EFH and EFH-HAPC would require consideration of all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a protracted regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Since any restrictions that may subsequently be placed

on these activities are unknown at this time, it is not possible to explicitly describe their effects.

It is worth noting that identification of EFH will alter the process by which permits for activities which impact EFH and EFH-HAPCs are issued. The potential for increased restrictions, mitigation, and permitting requirements may have impacts upon the behavior of individuals and agencies seeking permits. The nature and extent of those impacts are unknown and will undoubtedly vary depending upon the individual and/or agency.

4.6.5 Conclusion

In reviewing the South Atlantic Council's existing EFH-HAPC designations, South Atlantic Council staff and NOAA Fisheries Service Habitat Conservation staff determined that while the original Habitat Plan highlighted the unique characteristics of tilefish habitat as potential EFH-HAPC, the wording was not included in the final designation for the snapper grouper FMP. In addition, the Ecosystem Committee, at their meeting in June 2010, indicated a desire to designate the deepwater MPAs for snapper grouper species as EFH-HAPCs to enhance protection of the habitat complex contained in the MPAs. In September 2010, NOAA Fisheries Service engaged regional deepwater fishery scientists in the development of definitions of EFH-HAPC for blueline tilefish and golden tilefish.

The Habitat Advisory Panel, in November 2010, recommended inclusion of the tilefish definitions and the Deepwater MPAs in CE-BA 2 as EFH-HAPCs under the Snapper Grouper FMP. The South Atlantic Council approved CE-BA 2 for public hearing in December 2010. Hearings were held in February 2011 and the South Atlantic Council adopted **Alternative 2, sub-Alternatives 2a** and **2b,** and **Alternative 3** as preferred in March 2011. The preferred alternatives also best meet the objectives of the Snapper Grouper Fishery Management Plan, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

4.7 Action 7. Amend the Coral, Coral Reefs and Live/Hardbottom Habitat Fishery Management Plan (Coral FMP) to designate new Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs)

Alternative 1. No Action. Do not amend the Coral FMP to designate new Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs).

Preferred Alternative 2. Amend the Coral FMP to designate the following Deepwater Coral HAPCs as designated in Comprehensive Ecosystem-Based Amendment 1 as EFH-HAPCs: Cape Lookout Coral HAPC, Cape Fear Coral HAPC, Blake Ridge Diapir Coral HAPC, Stetson-Miami Terrace Coral HAPC, Pourtalés Terrace Coral HAPC.

4.7.1 Biological Effects

EFH and EFH-HAPCs for corals were established through Amendment 4 to the Coral FMP as part of the Comprehensive EFH Amendment (SAFMC 1998b) and are presented in **Section 3.4.1**. **Alternative 1 (No Action)** would not propose additional EFH-HAPCs intended to aid in the conservation of coral and live bottom habitat, especially when addressing policy or permit activities associated with non-fishing activities. In July 2010, a final rule was published establishing deepwater Coral HAPCs in the South Atlantic region. **Preferred Alternative 2** proposes to further emphasize the importance of these protected deepwater ecosystems by designating them as EFH-HAPCs (**Figure 4-7**). While habitats within the boundaries of the coral HAPCs are essential fish habitat for other managed species, designation of the entire area as an EFH-HAPC would in policy and permit review, support consideration of conservation of the contiguous habitats found in this unique deepwater ecosystem. The Deepwater Coral HAPCs designated in CE-BA1 are being proposed as EFH-HAPCs to highlight the value of this unique deepwater ecosystem and facilitate more effective EFH conservation. A brief description of the CHAPCs contained in CE-BA1 follows.

The Cape Lookout *Lophelia* Banks Coral HAPC encompasses two areas. The northernmost area contains the most extensive coral mounds off of North Carolina. The main mound system rises vertically nearly 80 meters (262 feet) over a distance of about one kilometer (0.62 miles). Sides and tops of these mounds are covered with extensive *Lophelia pertusa*. The second area contains mounds that rise at least 53 meters (174 feet) over a distance of about 0.4 kilometers (0.2 miles). 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 54 fish species have been observed along these banks. In addition, these areas support a well-developed invertebrate fauna.

The Cape Fear *Lophelia* Coral HAPC, which occupies 135 square kilometers (52 square miles), encompasses mounds rising nearly 80 meters (262 feet) over a distance of about 0.4 kilometers (0.2 miles) and exhibits some of the most rugged habitat and vertical excursion of any area sampled. The mounds appear to be of the same general construction as those in the Cape Lookout Banks, built of coral rubble matrix with trapped sediments. Extensive fields of coral rubble surround the area and 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. Of the 12 species, commercially important species includes red bream and wreckfish. This is the only area off North Carolina where wreckfish have been observed. Of species commonly taken, only blackbelly rosefish were reported.

The Stetson-Miami Terrace Coral HAPC is the largest of the deepwater Coral HAPCs and encompasses areas off the coasts of South Carolina, Georgia, and East Florida to the Miami Terrace off of Biscayne Bay. Below are descriptions of the main areas encompassed by this proposed Coral HAPC.

Stetson Reef is characterized by hundreds of pinnacles along the eastern Blake Plateau offshore South Carolina and over 200 coral mounds. This area supports a 152 meter-tall (500

feet) pinnacle in 822 meters (2,697 feet) 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.

The Savannah and East Florida Lithoherms site is characterized by numerous lithoherms at depths of 550 meters (1,804 feet) with relief up to 60 meters (197 feet) that provide live-bottom habitat. Submersible dives found that these lithoherms 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% 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 (138-mile) stretch off northeastern and central Florida (depth 700-800 meters; 2,297-2,625 feet) mapped nearly 300 coral mounds from 8 to 168 meters tall (26-551 feet).

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 (1,969 feet) 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.

Like the Miami Terrace, the Pourtalés Terrace Coral HAPC is a Miocene-age terrace. It is located off the Florida Reef Tract and includes 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 known. A total of 26 fish taxa were identified from the sinkhole and bioherm sites. In contrast to the Coral HAPCs, the Pourtalés Terrace is in depths of 200 to 450 meters (656-1,476 feet) and a number of deepwater snapper grouper species have been observed in the area. Observed species include tilefish, sharks, speckled hind, yellowedge grouper, warsaw grouper, snowy grouper, blackbelly rosefish, red porgy, drum, scorpion fish, amberjack and phycid hakes. One of the Type 2 Marine Protected Areas (MPAs) identified in Amendment 14 to the Snapper Grouper FMP, East Hump/Un-named Hump MPA, is located within the Pourtalés Terrace Coral HAPC. The MPA is located approximately 27 kilometers (13 nm) southeast of Long Key, Florida.

A summary evaluation of the existing and proposed EFH-HAPC as it relates to the criteria is in **Table 4-7.**

Table 4-7. Summary evaluation of the EFH-HAPC for coral, coral reefs and live hardbottom 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 to Cape Canaveral, FL	High	Low	Low	High
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
Deepwater Marine Protected Areas	High	Low	Medium	Medium

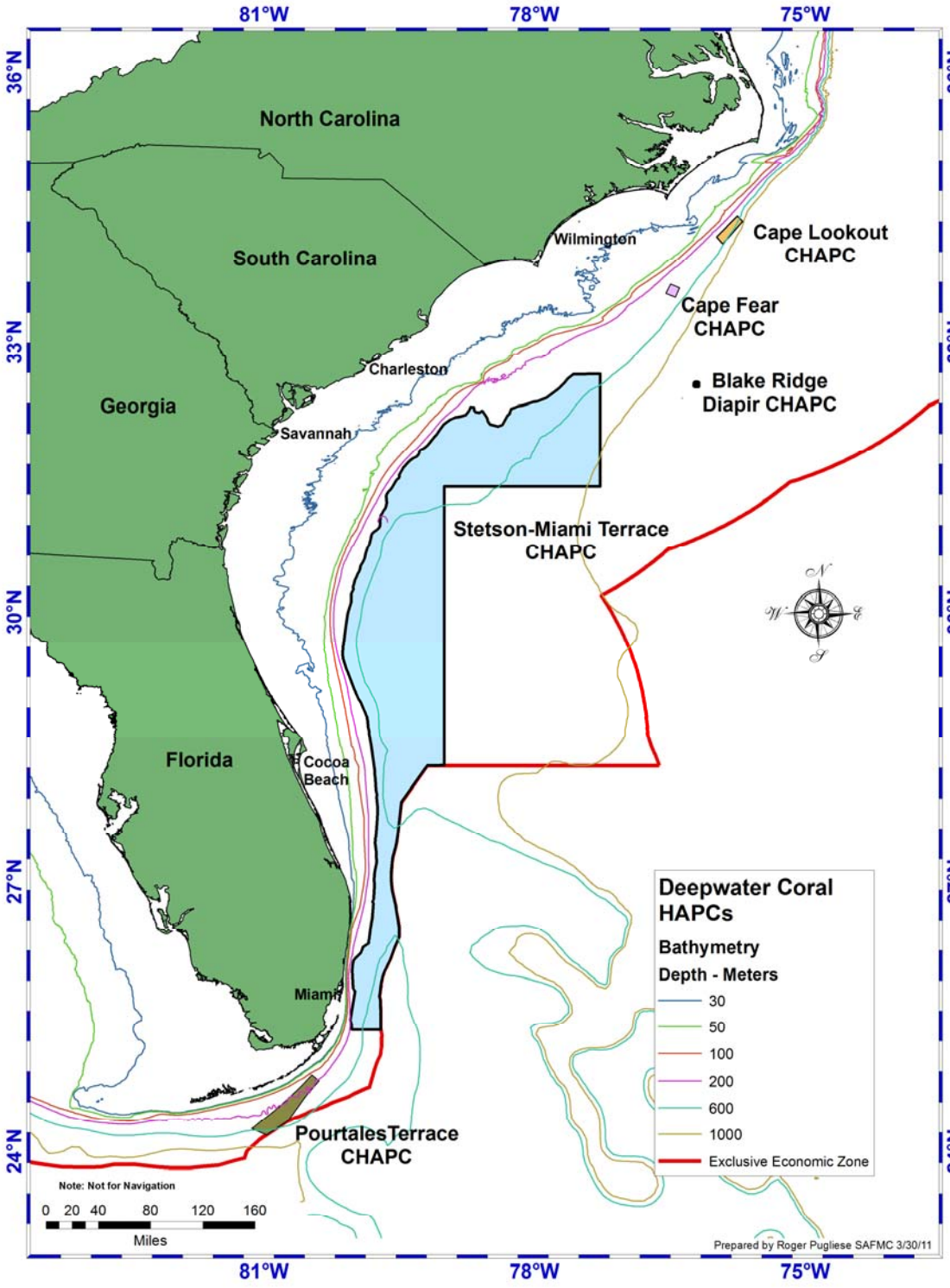


Figure 4-7. Deepwater Coral Habitat Areas of Particular Concern (SAFMC 2009a).

The designation of additional EFH-HAPCs for coral would not result in direct impacts to the biological resources of the west-central Atlantic Ocean. Rather, the EFH-HAPC designation under this option would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect habitat from non-fishing activities which are undertaken, authorized, or funded by federal agencies.

4.7.2 Economic Effects

Designation of EFH-HAPC would require the South Atlantic Council to consider all operations or actions that might interact with or affect the EFH-HAPC, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a protracted regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Since any restrictions that may subsequently be placed on these activities are unknown at this time, it is not possible to explicitly describe their effects. However, designation of additional EFH-HAPCs is expected to increase the likelihood that long-term resource goals are met due to increased protection through consultation requirements. A healthy, sustainable resource is presumed to result in increased long-term economic benefits relative to less protection. Assuming the area is appropriate to the resource, **Preferred Alternative 2** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits over **Alternative 1 (No Action)**.

4.7.3 Social Effects

There will be few social impacts from establishing EFH-HAPCs and would most likely come from future actions that are associated with such designations. There will be no short-term negative impacts on fishing activities because bottom-fishing practices were prohibited in CE-BA1. Overall, better protection (**Preferred Alternative 2**) of EFH-HAPC is expected to result in increased long-term social benefits.

4.7.4 Administrative Effects

Designation of new EFH and EFH-HAPC would require consideration of all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a protracted regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Since any restrictions that may subsequently be placed on these activities are unknown at this time, it is not possible to explicitly describe their effects.

It is worth noting that identification of EFH will alter the process by which permits for activities which impact EFH and EFH-HAPCs are issued. The potential for increased restrictions, mitigation, and permitting requirements may have impacts upon the behavior of individuals and agencies seeking permits. The nature and extent of those impacts are unknown and will undoubtedly vary depending upon the individual and/or agency.

4.7.5 Conclusion

The proposal to designate the deepwater Coral HAPCS as EFH-HAPCs was presented to the Habitat Advisory Panel in November 2010, and they recommended their inclusion into CE-BA 2. CE-BA 2 was approved for public hearing with the proposed EFH-HAPC designation by the South Atlantic Council in December 2010. Hearings were held in February 2011 and the South Atlantic Council adopted **Preferred Alternative 2** in March 2011 to further emphasize the importance of these protected deepwater coral ecosystems.

While habitats within the boundaries of the coral HAPCs are essential fish habitat for other managed species, designation of the entire area as an EFH-HAPC would require enhanced EFH consultation pertaining to non-fishing activities that may negatively impact the deepwater Coral HAPCs. The South Atlantic Council concluded the preferred alternative also best meets the objectives of the Coral Fishery Management Plan, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

4.8 Action 8. Amend the Fishery Management Plan (FMP) for Pelagic *Sargassum* Habitat to designate EFH

Alternative 1. No Action. Do not amend the *Sargassum* FMP to designate Essential Fish Habitat (EFH). The South Atlantic Council must designate EFH for all managed species including Pelagic *Sargassum* Habitat.

Alternative 2. Amend the *Sargassum* FMP to designate the top 10 meters of the water column in the South Atlantic EEZ as EFH for Pelagic *Sargassum*.

Preferred Alternative 3. Amend the *Sargassum* FMP to designate the top 10 meters of the water column in the South Atlantic EEZ bounded by the Gulfstream, as EFH for pelagic *Sargassum*.

4.8.1 Biological Effects

The identification of essential habitat for pelagic *Sargassum* enables the South Atlantic Council to protect EFH more effectively and take timely actions when necessary. Identifying and describing essential fish habitat is the first step in preventing decreases in biological productivity of pelagic *Sargassum* and other managed or prey species dependent on pelagic *Sargassum*.

The FMP for Pelagic *Sargassum* Habitat of the South Atlantic Region (*Sargassum* FMP) and the Fishery Ecosystem Plan highlight the productivity of pelagic *Sargassum* as being directly dependent on the larval fish utilizing this habitat. Species using pelagic *Sargassum* provide a primary source of nitrogen in an otherwise nutrient poor water column environment. In addition, the relationship between fishes and pelagic *Sargassum* is mutualistic and more important than previously thought. Therefore, the productivity of pelagic *Sargassum* is tightly coupled to associated fish schools and explains how pelagic *Sargassum* sustains growth in oligotrophic (low nutrient) oceanic waters often devoid of dissolved nutrients.

In consideration of conditions limiting growth and survival of *Sargassum* and the known utilization of large rafts of *Sargassum* by early life stages of federally managed fisheries and other marine species, this alternative EFH designation would only encompass the uppermost 10 meters (m) of the marine water column. This area considered for designation as EFH for pelagic *Sargassum* has already been specified as EFH for one or more of the various South Atlantic Council and NOAA Fisheries Service managed fisheries: shrimp, snapper grouper, dolphin and wahoo, coastal migratory pelagics, and highly migratory species.

Preferred Alternative 3 limits the EFH designation to the upper 10 m of the surface as bounded by the Gulf Stream, an alternative developed by NOAA Fisheries Service in the development of the FEIS (NMFS 2002) for the Pelagic *Sargassum* Habitat FMP. The FEIS notes that "This alternative provides the most specific spatial reference to *Sargassum* EFH, insofar as it would limit the EFH to include only those surface waters in the area where *Sargassum* most commonly occurs and where densities are often the highest." In addition, it is also noted that the "Near surface waters represent the primary depth range for *Sargassum* photosynthesis, growth and reproduction." This area is the upper 10 m of the surface of the area shown in **Figure 4-8**. This area represents the same spatial presentation of the Gulf Stream used for existing EFH designations and defined in the associated metadata: (http://ocean.floridamarine.org/efh_coral/dbGroupTOC/metadata/dolphin-wahoo%20efh-hapc.htm).

Designation of near-surface oceanic and nearshore habitats as EFH for pelagic *Sargassum*, as an action independent of any others, would not impact the biological quality of those habitats. However, designation would provide an additional mechanism by which the Council could manage or influence activities which could cause or lead to the degradation of *Sargassum* EFH.

The action alternatives proposed in Action 8 would not result in direct impacts to the biological resources of the west-central Atlantic Ocean. Rather, EFH designation under this option would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect surface waters from non-fishing activities which are undertaken, authorized, or funded by federal agencies. Similarly, designation of pelagic *Sargassum* EFH would require federal agencies to consult with NOAA Fisheries Service on activities which may adversely affect that habitat.

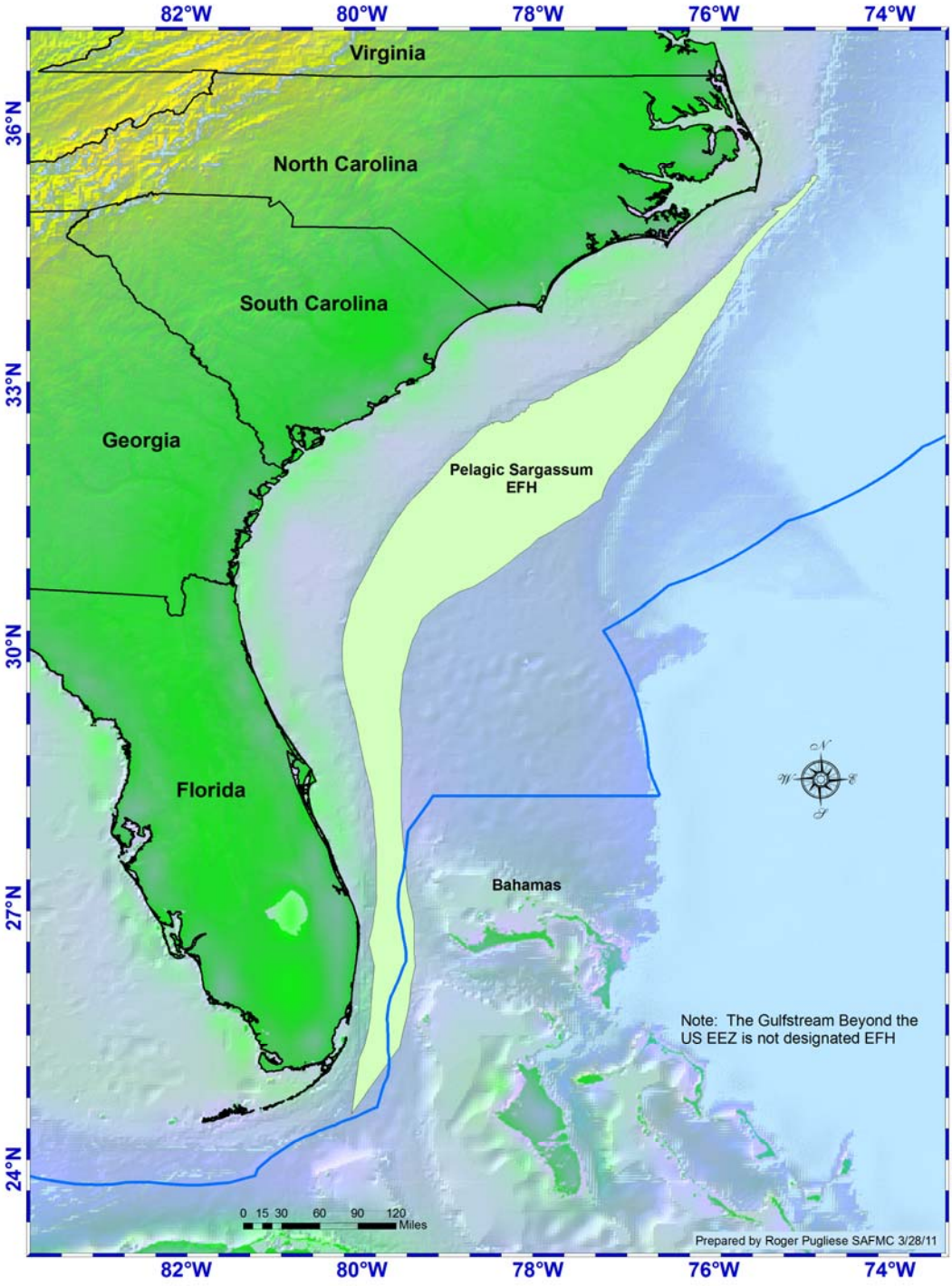


Figure 4-8. Proposed EFH for Pelagic *Sargassum*.

4.8.2 Economic Effects

The identification of EFH is a mandated requirement of an FMP. Therefore, the No Action Alternative would not allow the full implementation of the *Sargassum* FMP and establishment of a platform for future management actions. Also, the South Atlantic Council would be limited in the future in terms of protecting pelagic *Sargassum* habitat and minimizing any possible habitat damage from occurring. This could result in reduced net economic benefits to society in the long-term.

The identification of EFH for pelagic *Sargassum* will not have any direct economic impacts. However, this measure will enable the South Atlantic Council to protect essential fish habitat effectively and take timely actions when necessary which could lead to increased net economic benefits to society. Identification of EFH will require the South Atlantic Council to consider all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a protracted regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Since any restrictions that may subsequently be placed on these activities are unknown at this time, it is not possible to explicitly describe their effects. However, designation of EFH is expected to increase the likelihood that long-term resource goals are met due to increased protection through consultation requirements. A healthy, sustainable resource is presumed to result in increased long-term economic benefits relative to less protection. Assuming the area is appropriate to the resource, **Preferred Alternative 3** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and **Alternative 2** and is expected to increase long-term economic benefits compared **Alternative 1 (No Action)** and **Alternative 2**.

4.8.3 Social Effects

Alternative 1 would not meet Magnuson-Stevens Act mandates to identify EFH. Although there would be few social impacts from no action, it is in the best interest of the South Atlantic Council and fishermen to identify this habitat. Designation of essential pelagic *Sargassum* habitat (**Alternative 2** and **Preferred Alternative 3)** can facilitate expeditious South Atlantic Council action in the future to protect habitat, and is expected to result in long-term social benefits.

There would be few additional social impacts expected from identifying EFH for pelagic *Sargassum*. In some cases, protection of habitat as in **Alternative 2** and **Preferred Alternative 3** could later lead to harvesting restrictions in areas where harvesting normally takes place. **Alternative 1** would be less likely to result in negative short-term impacts on harvesters and processors than **Alternative 2** or **Preferred Alternative 3**.

4.8.4 Administrative Effects

Designation of new EFH and EFH-HAPC would require consideration of all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a protracted regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Since any restrictions that may subsequently be placed on these activities are unknown at this time, it is not possible to explicitly describe their effects. The Gulf Stream is already designated as EFH for dolphin and wahoo, coastal migratory pelagics, spiny lobster, rock shrimp, and golden crab.

It is worth noting that identification of EFH could alter the process by which permits for activities which impact EFH are issued. The potential for increased restrictions, mitigation, and permitting requirements may have impacts upon the behavior of individuals and agencies seeking permits. The nature and extent of those impacts are unknown and will undoubtedly vary depending upon the individual and/or agency. However, considering the Gulf Stream is already EFH for a number of managed species, it is likely that *Sargassum* would be included as one of potentially affected species and the administrative burden associated with EFH consultation would not be anticipated to increase.

4.8.5 Conclusion

The proposal to designate EFH for pelagic *Sargassum* was presented to the Habitat Advisory Panel in November 2010 and recommended for inclusion into CE-BA 2. CE-BA 2 was approved for public hearings with two proposed definitions for EFH-HAPC by the South Atlantic Council in December 2010. Public hearings were held in January and February 2011. In March 2011, the South Atlantic Council selected **Alternative 3** as preferred, the most significant oceanographic feature supporting *Sargassum* species occurrence, distribution, and transport.

Preferred Alternative 3 also best meets the objectives of the Fishery Management Plan for pelagic *Sargassum* habitat, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

4.9 Cumulative Effects

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

The magnitude and significance of environmental consequences of the proposed federal actions are analyzed in the context of the cumulative effects of other past, present, and reasonably foreseeable future actions. Verifying the cumulative environmental consequences of the proposed federal actions requires delineating the relationship between multiple actions and the resources, ecosystems, and human communities of concern. The cumulative effects of the alternatives are analyzed by combining (a) the direct effects of the alternatives and (b) the indirect effects of the alternatives with (c) the effects of exogenous factors, as modified by (b). The cumulative effects on the physical, social and economic environments, habitat, protected species and the resources are described below.

4.9.1 Physical Environment

The immediate impact area of this rule is the federal 200-nautical 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 cumulative effects analysis must be expanded.

In light of the available information, the extent of the boundaries would depend upon the degree of fish immigration/emigration and larval transport, whichever has the greatest geographical range. The cumulative effect analysis cannot establish geographical boundaries in terms of coordinates, but recognizes 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 3.2. The most measurable and substantial effects would be limited to the South Atlantic region.

Past management of the octocoral, snapper grouper, *Sargassum*, and coastal migratory pelagic fishery, this proposed action, and potential future management of these fisheries is not likely to have negative impacts on the physical environment. The snapper grouper, coastal migratory pelagic, and *Sargassum* fisheries have little interaction with the bottom habitat and are believed to have minimal impact and would not result in long term modification of the physical environment. The octocoral fishery interacts with the bottom

habitat as octocorals are removed from the bottom. However, this fishery is a hand harvested, hand selected fishery and it is expected to result in minimal modification to the physical environment. The proposed actions in this amendment (related to octocorals) would limit the amount of octocoral harvest in the EEZ which will ensure that any modification is minimal.

4.9.2 Habitat and EFH

Reductions in overall fishing effort, as a result of past and current fishery management actions are thought to have had a positive impact on habitat and EFH. Past and future management measures implemented in the Comprehensive EFH Amendment, Amendment 14 to the Snapper Grouper FMP, Amendment 16 to the Snapper Grouper FMP, Amendment 17A to the Snapper Grouper FMP, Amendment 17B Snapper Grouper FMP, CE-BA 1, and those proposed in the CE-BA 2, Comprehensive ACL Amendment, Amendment 10 to the Fishery Management Plan for the Spiny Lobster Fishery of the South Atlantic, Amendment 18 to the Fishery Management Plan for the Coastal Migratory Pelagic Resources in the Atlantic and Gulf of Mexico are also expected to reduce effort in the South Atlantic fisheries.

The CE-BA 2 proposes designation of EFH for *Sargassum* and golden tilefish and the creation of EFH-HAPCs for golden tilefish. These will provide a direct positive impact to EFH.

4.9.3 Fishery Resources

Past and future fishery management actions taken through the FMP process are thought to have had a positive effect on the managed resources. It is anticipated that future management actions could result in additional indirect positive effects on the managed species through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services.

The actions proposed in this amendment designate ACLs and AMs for the octocoral fishery, ensuring the fishery will not undergo overfishing. Action 4 will reduce the impact of fishing on the snapper grouper and coastal migratory pelagic fisheries in the SMZs. All other actions in this amendment are not expected to have an impact on the fishery resources in the South Atlantic as they pertain to EFH and EFH-HAPCs.

4.9.4 Protected Resources

A description of the protected resources in the action area and the effects determinations can be found in Section 3.2.3. Of the actions proposed by this amendment, Action 5 may impact protected sea turtles in the action area. A 2006 ESA consultation for the snapper grouper fishery determined that the snapper grouper fishery is not likely to adversely affect protected species (NMFS 2006). The Office of Protected Resources has concluded the preferred alternatives under Action 5 would comply with the original Biological Opinion and is not likely to adversely impact protected species. Past and future fishery management actions related to the snapper grouper fishery taken through the FMP process are thought to have had

a positive effect on the protected species as they tend to reduce fishing effort in the area which would reduce any chance for interaction with fishing gear.

Management measures proposed for the octocoral fishery will not be modified in such a way that will be functionally different from the status quo. Therefore, any effects on protected coral species is expected to remain the same.

Management measures proposed for the coastal migratory pelagics fishery will not be modified in such a way that will be functionally different from the status quo. Therefore, any effects on protected species are expected to remain the same.

4.9.5 Social and Economic Environment

The snapper grouper fishery is a highly regulated fishery and continues to be the subject of new management measures from NOAA Fisheries Service. **Appendix G** describes amendments to the snapper grouper FMP under development, which could impact the social and economic environments of the snapper grouper fishery and communities. However, the action proposed in this environmental assessment would modify the existing sea turtle release gear requirements for the snapper grouper fishery and would reduce the social and economic impacts on the fishery.

The actions proposed for the octocoral fishery are expected to have minimal impact on the social and economic environment as it would not reduce or increase the amount of harvest in the fishery from the status quo. Essential Fish Habitat and EFH-HAPC actions are not expected to have impact on the social and economic environment. These specifications may result in better management and oversight of EFH in the future.

4.9.6 Summary of Cumulative Impacts

The proposed federal actions are not expected to compound the cumulative effects on the physical, social and economic environments, habitat, protected species or the fishery resource. Therefore, there are no foreseeable significant additive or interactive effects as a result of the proposed federal actions.

In terms of context and intensity, the proposed federal actions are not anticipated to have any significant effects on the subject marine ecosystem, marine species or human community involved for the following reasons:

1) Management measures proposed for the octocoral fishery will not be modified in such a way that will be functionally different from the status quo.
2) Management measures proposed for the snapper grouper fishery will only modify current gear required for sea turtle handling. The modification will not be functionally different from the status quo and will not increase impacts to protected species. These actions will increase the social and economic benefits to the fishery by reducing the scope of the regulations.

3) Management measures proposed for the snapper grouper and coastal migratory pelagic fishery would reduce potential user conflicts in the SMZs off South Carolina.
4) Specification of EFH and EFH-HAPCs will not have any significant impact on the ecosystem or human community. These specifications may result in better management and oversight of EFH in the future.

The proposed federal actions require no long-term restrictions or operational adjustments to the fisheries in question and, as such, are not anticipated to have any significant impacts that combine with previous impacts.

When combined with the past and potential future management efforts, the overall direct and indirect effects of the proposed federal actions do not produce significant cumulative impacts in the biological, administration and enforcement, economic, social, and cultural environments of the octocoral, snapper grouper, coastal migratory pelagic and *Sargassum* fisheries.

4.10 Unavoidable Adverse Effects

The regulatory actions proposed in CE-BA 2 would apply primarily to the octocoral, snapper grouper coastal migratory pelagic, and *Sargassum* fisheries of the South Atlantic. There are no unavoidable adverse effects expected through the implementation of these actions.

4.11 Effects of the Fishery on the Environment

The biological impacts of the proposed actions are described in **Section 4.0**, including impacts on habitat. No actions proposed by this amendment are expected to have any adverse impacts on EFH or EFH-HAPCs for managed species. This CE-BA 2 designates new EFH for snapper grouper, golden tilefish and *Sargassum*. This CE-BA 2 also creates EFH-HAPCs for snapper grouper species.

4.11.1 Effects on Ocean and Coastal Habitats

The biological impacts of the proposed actions are described in Section 4.1.1; 4.2.1; 4.3.1; 4.4.1; 4.5.1; 4.6.1; 4.7.1; 4.8.1; 4.9.1, including impacts on ocean and coastal habitats. The alternatives proposed by this amendment are not expected to have any adverse effect on the ocean and coastal habitat.

4.11.1.1 Public Health and Safety

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

4.11.2 Endangered Species and Marine Mammals

The biological impacts of the proposed actions are described in 4.1.1; 4.2.1; 4.3.1; 4.4.1; 4.5.1; 4.6.1; 4.7.1; 4.8.1; 4.9.1, including impacts on 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.

4.12 Irreversible and Irretrievable Commitments of Resources

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

4.13 Monitoring and Mitigation Measures

The proposed actions would have an immediate affect, short-term net revenues of some commercial snapper grouper and coastal migratory pelagics fishermen in the South Atlantic. However, it is not expected that this affect will be significant.

Establishing an ACL for octocorals will require monitoring and enforcement. However, the monitoring programs are not new and have been in operation for some time and will continue. The current monitoring program is described in detail in Section 4.1.1.

4.14 Effects of the Fishery Associated with Climate Change

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

4.15 Unavailable or Incomplete Information

The Council on Environmental Quality, in its implementing regulations for the National Environmental Policy Act, addressed incomplete of unavailable information at 40 CFR 1502.22 (a) and (b). That direction has been considered. There are two tests to be applied: (1) does the incomplete or unavailable information involve "reasonable foreseeable adverse effects…" and (2) is the information about these effects "essential to a reasoned choice among alternatives…"

Stock assessments have not been conducted on octocorals. Status determinations for these species were derived through review of data by the South Atlantic Council and the SSC and the octocoral estimate is considered the best available information.

5 List of Preparers

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6 List of Agencies and Persons Consulted

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SAFMC Habitat and Environmental Protection Panel
SAFMC Coral Advisory Panel
SAFMC Scientific and Statistical Committee
SAFMC Law Enforcement Advisory Panel
SAFMC Snapper Grouper Advisory Panel
SAFMC Golden Crab Advisory Panel
SAFMC Shrimp Advisory Panel
SAFMC Deepwater Shrimp Advisory Panel
North Carolina Coastal Zone Management Program
South Carolina Coastal Zone Management Program
Georgia Coastal Zone Management Program
Florida Coastal Zone Management Program
Florida Fish and Wildlife Conservation Commission
Georgia Department of Natural Resources
South Carolina Department of Natural Resources
North Carolina Division of Marine Fisheries
North Carolina Sea Grant
South Carolina Sea Grant
Georgia Sea Grant
Florida Sea Grant
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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Appendix A. Regulatory Impact Review

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 and recreational snapper grouper fisheries. Additional details on the expected economic effects of the various alternatives in this action are included in **Section 4.0**.

2 Problems and Objectives

The purpose and need, issues, problems, and objectives of the proposed amendment are presented in **Section 1.2**. In summary, the purpose of this amendment is to modify management of octocorals through the establishment of an annual catch limit (ACL); modify management of Special Management Zones (SMZs) off South Carolina; revise sea turtle release gear requirements for the snapper grouper fishery; and designate new essential fish habitat (EFH) and EFH-habitat areas of particular concern (EFH-HAPCs) in the South Atlantic. These actions are needed to remain in compliance with the Magnuson Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), and to respond to concern from fishermen.

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 fishing for species in the waters of the U.S. South Atlantic are provided.

4 Description of the Fishery

Descriptions of the South Atlantic and Gulf of Mexico octocoral fishery and Special Management Zones off South Carolina are contained in **Section 3.6**.

a. Impacts of Management Measures

Details on the economic impacts of all alternatives are included in **Section 4**. The following discussion includes only the expected impacts of the preferred alternatives.

i. Modify management of octocorals in the South Atlantic

Under **Preferred Alternative 3**, octocorals will be removed from the South Atlantic Coral FMP and would therefore not be protected in Federal waters off of Florida while harvest of octocorals in waters off of the other South Atlantic states would remain within the South Atlantic Coral FMP. If the State of Florida extends their jurisdiction to cover both state and federal waters, as they are expected to do, no short or long-term changes would be expected with regard to economic effects resulting from this action since Florida would take over management of these areas. Management measures would be expected to be equivalent to or exceed current management measures in place.

ii. Extend the SAFMC's Fishery Management Unit for octocorals into the Gulf of Mexico Fishery Management Council's area of jurisdiction

Given the **Preferred Alternative 3** under **Action 1** to shorten the management unit to encompass North Carolina, South Carolina, and Georgia federal waters only, **Preferred Alternative 1** under this action has been chosen as preferred, which allows Florida to manage Atlantic and Gulf federal waters off of Florida. It is presumed that Florida will extend their management jurisdiction to include federal waters off of Florida and that the management measures implemented by Florida would presumably mirror those already in place or improve upon them. Extension of the FMU (**Alternative 2**) for octocorals into the GMFMC's jurisdiction is largely an administrative action and there are no direct economic effects. There are no expected changes to long-term economic effects as a result of **Alternative 2** compared to **Preferred Alternative 1** since both protect octocorals to the same degree. As stated above, **Preferred Alternative 1** and **Alternative 2** refer only to who manages the fishery and would not change the quota or the management mechanism currently in place.

iii. Modify the Annual Catch Limit (ACL) for octocorals in the South Atlantic

Because there are no landings of octocorals occurring in federal waters north of Florida, and harvest of octocorals are prohibited north of Cape Canaveral, FL, **Preferred Alternative 3** (ACL = 0) is not expected to result in any negative economic effects. In addition, the only areas left to manage after **Actions 1 and 2** occur would be the federal waters off of Georgia, South Carolina,

and North Carolina, where harvest of octocorals is prohibited because they constitute a significant portion of the limited live/ hardbottom habitat in these areas.

iv. Modify management of Special Management Zones (SMZs) off South Carolina

Commercial landings of species caught on the artificial reef sites referred to in **Preferred Alternatives 2 and 3** are not able to be quantified due to the way that logbook landings are recorded. The level of detail of reporting where fish are caught is insufficient to allow for harvest on the SMZs to be broken out from harvest made in the fishing zones the SMZs lie in, which are 60 nautical miles square. Therefore, the loss associated with a ban on harvest above the recreational bag limit by commercial fishermen is not able to be quantified. Both **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in reductions in ex-vessel revenues to commercial fishermen, though some mitigation of these reductions could occur as a result of fishing in other areas. At the same time, **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in increased economic benefits to recreational fishermen as a result of allocation of the harvest that would otherwise be taken by commercial fishermen. Additional economic benefits would be expected to result in healthier and more sustainable populations at these sites.

v. Modify Sea Turtle Release Gear Requirements for the Snapper Grouper Fishery

Out-of-pocket release gear expenses per *new entrant* for **Preferred Alternatives 4a and 4b** are estimated to range from $324-$490 for vessels with less than 4 feet freeboard and from $564-$987 for vessels with more than 4 feet freeboard. There are no release gear expenses for those already participating in the fishery since all of the gear required under **Preferred Alternatives 4a and 4b** is already required under **Alternative 1 (No Action)**. However, under **Preferred Alternatives 4a and 4b**, vessels will be required to carry less gear. This will free up more space onboard the vessels. If there were costs to be estimated, this could not be done because there is no information collected on how many vessels have more or less than or more than 4 feet freeboard in the South Atlantic.

vi. Amend the Snapper Grouper FMP to Designate New EFH-HAPCs

Designation of additional EFH-HAPCs is expected to increase the likelihood that long-term resource goals are met due to increased protection through consultation requirements. A healthy, sustainable resource is presumed to result in increased long-term economic benefits relative to less protection. Assuming the areas are appropriate to the resource, both **Preferred Alternatives 2 and 3** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits.

vii. Amend the Coral, Coral Reefs and Live/Hardbottom Habitat Fishery Management Plan (Coral FMP) to designate new Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs)

Designation of additional EFH-HAPCs is expected to increase the likelihood that long-term resource goals are met due to increased protection through consultation requirements. A healthy, sustainable resource is presumed to result in increased long-term economic benefits relative to less protection. Assuming the area is appropriate to the resource, **Preferred Alternative 2** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits over **Alternative 1 (No Action)**.

viii. Amend the Fishery Management Plan (FMP) for Pelagic *Sargassum* Habitat to designate EFH

Designation of EFH is expected to increase the likelihood that long-term resource goals are met due to increased protection through consultation requirements. A healthy, sustainable resource is presumed to result in increased long-term economic benefits relative to less protection. Assuming the area is appropriate to the resource, **Preferred Alternative 3** would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and **Alternative 2** and is expected to increase long-term economic benefits compared **Alternative 1 (No Action)** and **Alternative 2**.

5 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……..…….. $200,000

NOAA Fisheries administrative costs of document preparation, meetings and review $200,000

Annual law enforcement costs .....unknown

TOTAL $400,000

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 components of this action. In practice, some enhanced enforcement activity might initially occur while the fishery becomes familiar with the new regulations. However, the costs of such enhancements cannot be forecast. Thus, no specific law enforcement costs can be identified.

a. Summary of Economic Impacts

Under **Action 1, Preferred Alternative 3**, if the State of Florida extends their jurisdiction to cover both state and federal waters, no short or long-term changes would be expected with regard to economic effects from this action since Florida would take over management of these areas. Under **Action 2, Preferred Alternative 1**, there are no expected changes to long-term economic effects compared to the other alternative since both protect octocorals to the same degree. Because there are no landings of octocorals occurring in federal waters north of Cape Canaveral (where harvest is prohibited), the **Preferred Alternative 3** under **Action 3** is not expected to result in any negative economic effects. With regard to modifying management of Special Management Zones off South Carolina (**Action 4**), **Preferred Alternatives 2 and 3** would be expected to increase economic benefits to recreational fishermen as a result in an indirect shift in allocation between commercial and recreational fishermen. Both preferred alternatives are expected to result in decreases in ex-vessel revenues for commercial fishermen, although some mitigation could occur as a result of fishing in other areas. Consideration of modifications to sea turtle release gear requirements (**Action 5**) **Preferred Alternatives 4a and 4b** are expected to benefit fishermen because they will be required to carry less gear on their vessels. This will free up more space onboard. Amending the Snapper Grouper FMP to designate new EFH-HAPCs (**Action 6**) **Preferred Alternatives 2 and 3** would be expected to result in greater protection of the resource and provide for increased long-term benefits. Amending the Coral FMP to designate new EFH-HAPCs (**Action 7**) **Preferred Alternative 2** would be expected to result in increased protection of the resource and provide for long-term economic benefits. Amending the FMP for Pelagic *Sargassum* to designate EFH (**Action 8**) **Preferred Alternative 3** is expected to increase long-term economic benefits given greater protection of the resource.

b. 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. Based on the information provided above, this regulatory action was determined to not be economically significant for the purposes of E.O. 12866.

Appendix B.
Initial Regulatory Flexibility Analysis

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 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 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 an initial regulatory flexibility analysis (IRFA) for each proposed rule. The IRFA 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. An IRFA is conducted to primarily determine whether the proposed action would have a "significant economic impact on a substantial number of small entities." In addition to analyses conducted for the RIR, the IRFA provides: 1) A description 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; and, 5) an identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule.

2 Statement of the need for, objectives of, and legal basis for the rule

A discussion of the need for and objectives of this action is provided in Section 1.2 of this document. The Magnuson-Stevens Act provides the statutory basis for this proposed rule.

3 Description and estimate of the number of small entities to which the proposed action would apply

This proposed action would apply to commercial vessels that harvest octocorals in Federal waters, harvest snapper grouper in Federal waters throughout the South Atlantic, or harvest snapper grouper or coastal migratory pelagic (CMP) species in Special Management Zones (SMZs) off South Carolina. A Federal permit is required to harvest octocorals and snapper

grouper in Federal waters. There are two types of Federal commercial snapper grouper permits, an unlimited permit, which is transferable and allows the harvest of unlimited quantities of snapper grouper species, unless constrained by single species trip limits, and a limited permit, which is not transferable and limits vessels to 225 lbs of snapper grouper per trip. For the species included in the CMP fishery, a Federal permit is required to harvest commercial quantities of king mackerel and Spanish mackerel (separate permits for each species).

No entities have the Federal permit required to harvest octocorals in Federal waters.

On March 29, 2011, there were 598 non-expired or renewable unlimited snapper grouper commercial permits and 138 limited snapper grouper permits, or a total of 736 snapper grouper commercial permits. Although unlimited permits are transferable, potentially resulting in more vessels operating in the fishery than the number of permits, the number of permits is assumed to represent the number of full-time equivalent vessels operating in the fishery. As a result, the number of permits is assumed equivalent to the number of vessels and the vessel is assumed to be the representative unit for an entity.

Similar information is not available for permits associated with vessels with home ports in South Carolina. However, over the period 2005-2009, the average annual number of vessels with home ports in South Carolina that possessed the appropriate Federal commercial permit was 38 vessels for king mackerel, 15 vessels for Spanish mackerel, and 72 vessels for snapper grouper (unlimited and limited permits combined). Additional vessels from other states may also harvest finfish in SMZs off South Carolina and may be affected by the proposed action but, for the purpose of this analysis, the majority of vessels that fish in SMZs off South Carolina are assumed to come from South Carolina ports.

For the period 2005-2009, the total average annual ex-vessel revenues from all snapper grouper harvests was approximately $13.8 million (2009 dollars), or approximately $16,000 per vessel (averaged over 847 vessels, which was the average annual number of vessels with snapper grouper permits over this period; if averaged over the current number of permits, 736, based on the assumption that average annual revenues have been maintained despite declining participation in the fishery, the average per vessel increases to approximately $19,000). These totals do not include revenues from other species harvested by these vessels, but snapper grouper are assumed to be the primary species harvested by these vessels. Although more recent data is not available, over the period 2003-2007, snapper grouper accounted for approximately 61 percent of total revenues by vessels with snapper grouper harvests. If this percentage is used to adjust the per-vessel averages of snapper grouper revenues provided above to account for revenues from other species, the resultant averages increase to approximately $26,000 (847 vessels) and $31,000 (736 vessels).

Revenue information for vessels that fish in the South Atlantic SMZs is unknown. However, for the period 2005-2009, the total average annual ex-vessel revenues from all snapper grouper harvests landed in South Carolina was approximately $3.6 million (2009 dollars), or

approximately $50,000 per vessel (averaged over 72 vessels). Similar to the information on snapper grouper harvests for the entire South Atlantic, these totals do not include revenues from other species harvested by these vessels, but snapper grouper are assumed to be the primary species harvested by these vessels. If the average revenue per vessel is adjusted to account for revenues from other species using the percentage used in the previous paragraph (61 percent), then the average ex-vessel revenue per vessel would increase to approximately $82,000.

Similar information for South Carolina vessels harvesting CMP species is not available. However, for the entire South Atlantic, over approximately the same period (2004-2009; the king mackerel and Spanish mackerel fishing years do not follow the calendar year, so the data covered the fishing years 2004-2005 through 2008-2009, thereby encompassing part of 2004 and only part of 2009), the total average annual ex-vessel revenues from all species for vessels harvesting king mackerel was approximately $23.3 million (2009 dollars), or approximately $32,000 per vessel, while the total average annual ex-vessel value was approximately $9.7 million (2009 dollars), or approximately $28,000 per vessel, for vessels harvesting Spanish mackerel. Unlike in the snapper grouper fishery, in which snapper grouper are the primary species harvested by fishermen who harvest snapper grouper, fishermen who harvest king mackerel or Spanish mackerel derived, on average during the years examined, less than 20 percent of their total fishing revenues from king mackerel or Spanish mackerel.

The Small Business Administration 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. Based on the average revenue estimates provided above, all commercial vessels expected to be directly affected by this proposed rule are determined for the purpose of this analysis to be small business entities.

4 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

This proposed rule would not establish any new reporting, record-keeping, or other compliance requirements.

5 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 Significance of economic impacts on small entities

Substantial number criterion

This proposed rule, if implemented, would apply to all vessels with Federal commercial snapper grouper permits that fish anywhere in the South Atlantic, and all vessels with Federal snapper grouper, king mackerel, or Spanish mackerel permits that fish in SMZs off South Carolina. Any expected direct effects on vessels with snapper grouper permits that do not fish in the SMZs off South Carolina would be limited to the effects of the proposed regulations that would modify the protected species release gear requirements, maintaining current requirements for vessels with more than four feet freeboard height and lessening the requirements for vessels with freeboard height of four feet or less, thereby effectively only changing the requirements for vessels with lower freeboard height. The number of vessels with Federal snapper grouper permits with freeboard height of four feet or less is unknown. Nevertheless, this component of the proposed rule would allow voluntary change, rather than mandate specific change, and no explicit burden would be imposed on any entity. As a result, because of the voluntary nature of the regulation, a substantial number of entities would not be expected to be affected by this component of the proposed rule.

This proposed rule, if implemented, would be expected to most likely directly affect only those entities with the required Federal permit for snapper grouper or CMP species that commercially fish in the SMZs off South Carolina. The majority of such entities are assumed to be entities who own vessels with home ports in South Carolina, though vessels with home ports in other states may also be affected if they fish in SMZs off South Carolina. The number of potentially affected South Carolina vessels is estimated to be 38 vessels with a king mackerel permit, 15 vessels with a Spanish mackerel permit, and 72 vessels with a snapper grouper permit. Although these totals encompass all appropriately permitted vessels with home ports in South Carolina, these totals represent less than three percent of the vessels with home ports in the South Atlantic states (all of Florida, Georgia, South Carolina, and North Carolina) with king mackerel commercial permits, less than one percent of the vessels with Spanish mackerel commercial permits, and less than nine percent of the vessels with snapper grouper permits. The total number of king mackerel and Spanish mackerel vessels with home ports in Florida included vessels in both the Gulf of Mexico and South Atlantic regions. Assuming half of the Florida king mackerel and Spanish mackerel vessels are from home ports in the Gulf of Mexico region and are excluded from the total to produce a more representative South Atlantic total, the number of affected vessels still encompasses only approximately four percent of South Atlantic vessels with king mackerel permits and less than two percent of South Atlantic vessels with Spanish mackerel permits. The number of affected vessels would also decline if not all South Carolina snapper grouper or CMP vessels fish in the SMZs, which is expected to be the case because of congestion issues and the belief that the problem of the harvest of commercial quantities of fish in the SMZs is largely limited to vessels using spear gear (hand spear or spear guns), which is not the dominant gear used by vessels in the snapper grouper fishery. As a result, only a small

number of vessels in the appropriate fleets would be expected to be directly affected by this proposed rule.

Significant economic impacts

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

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

All entities expected to be directly affected by the measures in this proposed rule are determined for the purpose of this analysis to be small business entities, so the issue of disproportionality does not arise in the present case.

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

Because no fishermen possess the required Federal permit needed to harvest octocorals in the EEZ and there are no recorded octocoral harvests from the EEZ off Georgia, South Carolina, or North Carolina, the proposed regulations pertaining to octocoral would not be expected to have any economic affect on any small entities.

It is not possible with available data to determine the amount or value of commercial harvests in excess of the recreational bag limits that would be affected by the proposed regulation. As a result, it is not possible to determine if the proposed regulation would be expected to significantly reduce profits for any small entities. Due to the inability to determine the number of vessels that would be affected by this component of the proposed rule, though the discussion above suggests the number of affected vessels may not be substantial, or the magnitude of expected effects, public comment is solicited on the potential number of affected entities and magnitude of economic effects.

The proposed release gear requirements equate to status quo conditions for vessels in the snapper grouper fishery with more than four feet of freeboard height and a lessening of the requirements for vessels with four feet or less freeboard height. Because all vessels in the snapper grouper fishery are assumed to meet current requirements, no vessel would be compelled to make any new gear purchases. Any change in gear costs would be voluntary, e.g., the replacement of current usable gear, or represent a cost reduction, as in the case of replacement of broken, worn out, or lost gear with cheaper gear meeting the specifications of the reduced requirements. As a result, the proposed release gear requirements would not be expected to significantly reduce profits for any small entities.

7 Description of significant alternatives to the proposed action and discussion of how the alternatives attempt to minimize economic impacts on small entities

The only action in this proposed rule, if implemented, that may be expected to have a significant direct adverse economic effect on the profits of any small entities is the proposed limitations on harvest of snapper grouper and CMP species in SMZs off South Carolina to the recreational bag limit. Two alternatives to the proposed limitations were considered. The first alternative, the no action alternative, would not have placed any new restrictions on commercial harvests in the SMZs and, as a result, would be expected to reduce the economic impacts on small business entities. This alternative would not, however, achieve the Council's objectives of reducing user conflict, improving recreational fishing opportunities, allowing for equitable utilization by a larger number of fishermen, and protecting the reef communities from overly-efficient fishing practices.

The second alternative to the proposed action would have simply prohibited the use of spearfishing gear (hand spears and spear guns) in SMZs off South Carolina. While this alternative, if implemented, would reduce the expected economic effects on commercial vessels that use hand line or rod and reel, the economic effects on vessels that use spearfishing gear would be expected to increase. This alternative would exclude an entire gear sector, affecting both commercial and recreational anglers who use this gear. As a result, while this alternative would be expected to reduce user conflict by reducing fishing pressure, might improve recreational fishing opportunities for hook-and-line anglers, and would be expected to protect the reef communities from efficient gear, it would not achieve the Council's objectives of equitable utilization of the resources by a larger number of fishermen.

Appendix C. Fishery Impact Statement

1 Fishery Impact Statement – Social Impact Assessment

This Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2) consists of regulatory actions that focus on management of the octocoral fishery, modification of management of Special Management Zones (SMZs) off South Carolina, modification of sea turtle and smalltooth sawfish release gear requirements for the snapper grouper fishery and non-regulatory actions that designate new essential fish habitat (EFH) and EFH-habitat areas of particular concern (EFH-HAPCs).

1.1 Summary of Biological Effects

The proposed management measures are summarized in **Section 2.0** of the amendment/EA. The South Atlantic Council has selected **Preferred Alternative 3** under **Action 1** which would revise the fishery management unit to include octocorals off of Georgia, North Carolina and South Carolina (**Figure 4-1**). Octocorals off Florida would be removed from the FMP and would result in no federal management. As explained in the description of the no action alternative, although octocoral harvest is managed under the South Atlantic Council's Coral FMP and subsequent amendments, the Florida Fish and Wildlife Conservation Commission (FWC) is responsible for most of the management, implementation and enforcement of regulations because the majority of the harvest occurs in state waters. In a letter dated, April 11, 2011, the State of Florida describes management measures it will implement with regards to octocorals if the South Atlantic Council proceeds with **Preferred Alternative 3** (**Appendix M**). FWC intends to extend Florida octocoral regulations into federal waters off of Florida, establish an annual quota for allowable octocoral harvest in state and federal waters off of Florida, and prohibit harvest of octocorals north of Cape Canaveral, Florida and in the Coral HAPCs adjacent to Florida waters. **Action 1, Preferred Alternative 3** combined with **Action 3, Preferred Alternative 3** will result in the same biological protection to the resource as is currently implemented.

The South Atlantic Council has selected **Alternative 1, No Action** as the preferred alternative under **Action 2**, which would allow the South Atlantic Council to continue to manage octocorals in the South Atlantic, but management of octocorals in the Gulf of Mexico would fall under the state of Florida. This could provide difficulties in monitoring and enforcing the joint South Atlantic and Gulf of Mexico Federal quota. Under **Preferred Alternative 1**, harvest in any of the other Gulf states could not be controlled if a fishery were to develop leaving populations vulnerable to overexploitation. Therefore, adoption of **Preferred Alternative 1 (No Action)** could have negative biological effects on the octocoral resource.

The South Atlantic Council has selected **Alternative 3** under **Action 3** as preferred. If **Preferred Alternative 3**, under Action 1 is selected, the ACL=0 would only apply to octocoral harvest north of Florida. Currently, there is a prohibition of harvest north of Florida and this would continue under this alternative. The biological impacts to the resource would remain the

same as the status quo. It is expected the State of Florida would continue to manage octocorals in Florida and would continue to implement the 50,000 colony quota in State waters.
The South Atlantic Council has selected **Alternative 2** and **Alternative 3** as Preferred under **Action 4**. The major species targeted in the SMZs include Atlantic spadefish, black sea bass, flounder, king mackerel, sharks, and Spanish mackerel. However, little information exists on commercial fishing in Special Management Zones off South Carolina and therefore the biological impacts of **Preferred Alternative 2** and **Preferred Alternative 3** are difficult to quantify at this time due to minimal data. It is expected that modifying management of the SMZs to restrict commercial fishing effort to the bag limit could possibly reduce the amount of harvest in the area and have a positive biological impact on the species regularly targeted. However, there is little information on the amount of commercial harvest occurring in the SMZs and any commercial effort is expected to be small.

The South Atlantic Council has selected **sub-Alternatives 4a** and **4b** as preferred alternatives under **Action 5** which would modify the sea turtle release gear requirements for the snapper grouper fishery. The biological benefits of **Preferred Alternative 4** are likely to be very similar to **Alternative 1 (No Action). Preferred Alternative 4** and its sub-alternatives reference the updated release gear design specifications that now include a wider range of gear design parameters. These new parameters should be appropriate for the lighter tackle used in the snapper grouper fishery. The alternative and its sub-alternatives would also change the sea turtle release gear requirements based on the size of the vessel. For the safety of the crew and the animal, all incidentally caught sea turtles are recommended to be brought on board when working to disentangle/dehook them, regardless of a vessel's freeboard height. Since vessels with freeboard heights of greater than four feet would still be required to carry long-handled equipment, **Preferred sub-Alternative 4b** is also unlikely to have negative biological effects.

The South Atlantic Council has selected **Alternative 2** and **sub-alternatives 2a** and **2b** and **Alternative 3** under Action 6 as preferred. **Preferred Alternative 2** addresses an oversight in the initial designation of Snapper Grouper EFH through the Comprehensive EFH Amendment (SAFMC 1998b) where the habitat plan describes in detail tilefish habitat and proposes the general distribution between 100 and 300 meters as an area considered to be EFH-HAPC for tilefish. While considered EFH, the area was not included in the proposed list of EFH-HAPCs. **Alternative 2a** for golden tilefish and **Alternative 2b** for blueline tilefish propose respective detailed descriptions for EFH-HAPCs. The additional specification of the MPAs for deepwater species as EFH-HAPCs (**Preferred Alternative 3**) is intended to protect the entire area as a unique habitat complex and enhance EFH consultations pertaining to non-fishing activities that could potentially impact these protected habitats.

In Action 7, the South Atlantic Council has selected **Alternative 2** as preferred. **Preferred Alternative 2** proposes to further emphasize the importance of these protected deepwater ecosystems by designating them as EFH-HAPCs (**Figure 4-7**). While habitats within the boundaries of the coral HAPCs are essential fish habitat for other managed species, designation

of the entire area as an EFH-HAPC would in policy and permit review, support consideration of conservation of the contiguous habitats found in this unique deepwater ecosystem.

Under **Action 8, Preferred Alternative 3** limits the EFH designation to the upper 10 meters of the surface as bounded by the Gulf Stream, an alternative developed by NMFS in the development of the FEIS (NMFS 2002) for the Pelagic *Sargassum* Habitat FMP. The action alternatives proposed in Action 8 would not result in direct impacts to the biological resources of the west-central Atlantic Ocean. Rather, EFH designation under this option would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect surface waters from non-fishing activities which are undertaken, authorized, or funded by Federal agencies.

1.2 Summary of Economic Effects

Under the South Atlantic Council's selected **Action 1**, **Preferred Alternative 3**, octocorals will be partially removed from the South Atlantic FMP and would therefore not be protected in federal waters off of Florida (**Figure 4-1**) while harvest of octocorals in waters off of the other South Atlantic states would remain within the South Atlantic Coral FMP. If the State of Florida extends their jurisdiction to cover both state and federal waters, as they are expected to do, no short or long-term changes would be expected with regard to economic effects resulting from this action since Florida would take over management of these areas. Management measures would be expected to be equivalent to or exceed current management measures in place.

Given the **Preferred Alternative 3** under **Action 1** to shorten the management unit to encompass North Carolina, South Carolina, and Georgia federal waters only, **Alternative 1 (Preferred)** under Action 2 has been chosen as preferred, which allows Florida to manage Atlantic and Gulf federal waters off of Florida. There are no expected changes to long-term economic effects as a result **Preferred Alternative 1**. **Preferred Alternative 1** refers only to who manages the fishery and would not change the quota or the management mechanism currently in place.

The South Atlantic Council has selected **Alternative 3** under **Action 3** as preferred. Because there are no landings of octocorals occurring in federal waters north of Florida, and harvest of octocorals is prohibited north of Cape Canaveral, FL, the **Preferred Alternative 3** (ACL = 0) is not expected to result in any negative economic effects.

The South Atlantic Council has selected both **Alternative 2** and **Alternative 3** as preferred under **Action 4**. Both **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in reductions in ex-vessel revenues to commercial fishermen, though some mitigation of these reductions could occur as a result of fishing in other areas. At the same time, **Preferred Alternative 2** and **Preferred Alternative 3** would be expected to result in increased economic benefits to recreational fishermen as a result of allocation of the harvest that would otherwise be

taken by commercial fishermen to recreational fishermen. Additional economic benefits would be expected to result in healthier and sustainable populations at these sites.

The South Atlantic Council has selected **Alternative 4** and **sub-alternative 4a** and **4b** under **Action 5** as preferred. Out-of-pocket release gear expenses per *new entrant* for **Preferred Alternatives 4a and 4b** are estimated to range from $324-$490 for vessels with less than 4 feet freeboard and from $564-$987 for vessels with more than 4 feet freeboard. There are no release gear expenses for those already participating in the fishery since all of the gear required under **Preferred Alternatives 4a and 4b** is already required under **Alternative 1 (No Action)**. However, under **Preferred Alternatives 4a and 4b**, vessels will be required to carry less gear. This will free up more space onboard the vessels.

For **Actions 6-8**, designation of EFH or EFH-HAPCs for various species the economic impacts are expected to be similar. A healthy, sustainable resource is presumed to result in increased long-term economic benefits relative to less protection. Assuming the areas are appropriate to the resource, the Council's preferred alternatives for these actions would be expected to result in greater protection of the resource than **Alternative 1 (No Action)** and provide for increased long-term economic benefits.

1.3 Summary of Social Effects

The social effects from modifying management of octocorals through measures within the CE-BA 2 are mostly indirect, and pertain to the potential costs and benefits of shortening the management unit for octocorals under the South Atlantic Coral FMP. Most social effects relating to the octocoral fishery are contingent upon Florida Fish and Wildlife Conservation Commission (FWC) assuming management of the fishery in Florida state and federal waters. The beneficial social effects would include more local management and streamlined decision-making. The CE-BA 2 would also address user conflicts on Special Management Zones off South Carolina, and would "level the playing field" for both recreational and commercial fishermen utilizing these areas. Actions taken within the CE-BA 2 would be expected to result in positive social benefits for commercial snapper grouper fishermen by minimizing costs for gear designed to effectively release sea turtle and smalltooth sawfish. Long-term benefits to society are expected with increased protection to areas deemed essential fish habitat (EFH).

1.4 Summary of Administrative Effects

All proposed actions in the CE-BA 2 would require coordination between NOAA Fisheries Service, Office of Law Enforcement, Office of Sustainable Fisheries, and the Office of General Counsel. Public outreach would need to be conducted in order to inform South Atlantic octocoral fishery participants of the annual catch limits and revised management area for the octocoral fishery. However, because the action will be change the way the fishery operates this impact is expected to be minimal. **Action 5** would require education and outreach to the snapper grouper fishermen to explain the revision of the sea turtle handling tools. Regulatory text would need to be developed to include the specifications of the management measures in this document.

The cumulative administrative burden for all actions contained within this amendment is expected to be minimal.

Appendix D.

1 Bycatch Practicability Analysis

1.1 Population Effects for the Bycatch Species

Background

The Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2) includes actions that could modify management of octocorals through the establishment of an annual catch limit (ACL); modify management of Special Management Zones (SMZs) off South Carolina; revise sea turtle release gear requirements for the snapper grouper fishery; and designate new essential fish habitat (EFH) and EFH-habitat areas of particular concern (EFH-HAPCs) in the South Atlantic.

The majority of species in the snapper grouper FMU are taken with hook and line gear (Table 1). Black sea bass are predominantly taken with pots; whereas, longline gear has been the predominant gear type used to capture golden tilefish. In Coastal Migratory Pelagics FMU, most king mackerel and cobia are taken with hook and line gear; however, gillnets and castnets are the predominant gear type used to harvest Spanish mackerel. *Sargassum* is a free floating seaweed that is harvested with nets. Currently, no fishery for *Sargassum* exists. Almost all commercial harvest of octocorals is done by marine life fishermen for the live aquarium trade; therefore, harvest is by hand and is done in small numbers on any given day. Because octocorals are listed as a marine life species by the state of Florida, fishermen harvesting them using a Florida SPL with ML endorsement must transport and land them in a live and healthy condition.

Table 1. Percentage of commercial catch by gear based on data from 2005-2009. H&L = hook and line; L = longline; O = other, gillnet, and castnets; S = spear; and T = black sea bass pots.

Taxon	H&L	L	O	S	T
Amberjack	100%	0%	0%	0%	0%
Greater Amberjack	93%	0%	0%	7%	0%
Lesser Amberjack	96%	2%	0%	2%	0%
Banded Rudderfish	100%	0%	0%	0%	0%
Blue Runner	54%	0%	45%	1%	0%
Crevalle Jack	92%	0%	8%	0%	0%
Graysby	100%	0%	0%	0%	0%
Black Grouper	89%	0%	0%	11%	0%
Gag	80%	0%	0%	20%	0%
Misty Grouper	99%	1%	0%	1%	0%
Red Grouper	98%	0%	0%	2%	0%
Snowy Grouper	81%	19%	0%	0%	0%
Warsaw Grouper	14%	86%	0%	0%	0%
Yellowedge Grouper	69%	30%	0%	1%	0%
Yellowfin Grouper	99%	1%	0%	0%	0%
Yellowmouth grouper	100%	0%	0%	0%	0%
Groupers	100%	0%	0%	0%	0%

Taxon	H&L	L	O	S	T
Bluestriped Grunt	97%	0%	0%	0%	2%
French Grunt	94%	0%	0%	0%	6%
Sailors Choice	0%	0%	0%	0%	100%
Tomtate	100%	0%	0%	0%	0%
White Grunt	30%	0%	0%	0%	70%
Grunts	89%	0%	1%	0%	11%
Red Hind	100%	0%	0%	0%	0%
Rock Hind	99%	0%	0%	0%	0%
Speckled Hind	98%	0%	0%	0%	1%
Hogfish	54%	0%	3%	43%	1%
Yellow Jack	60%	0%	1%	39%	0%
Almaco Jack	96%	0%	0%	4%	0%
Bar Jack	80%	0%	2%	18%	0%
Jacks Unc	16%	0%	84%	0%	0%
Margate	94%	0%	0%	1%	5%
Black Margate	91%	0%	0%	1%	7%
Grass Porgy	100%	0%	0%	0%	0%
Jolthead Porgy	98%	0%	1%	0%	0%
Knobbed Porgy	98%	0%	0%	0%	2%
Longspine Porgy	100%	0%	0%	0%	0%
Red Porgy	99%	0%	0%	0%	1%
Whitebone Porgy	90%	0%	1%	0%	9%
Porkfish	94%	0%	0%	6%	0%
Scamp	95%	0%	0%	5%	0%
Scups or Porgies, Unc	49%	0%	4%	1%	46%
Bank Sea Bass	1%	0%	0%	0%	99%
Rock Sea Bass	7%	0%	0%	0%	93%
Black Sea Bass	11%	0%	0%	0%	89%
Sheepshead	34%	0%	34%	32%	0%
Black Snapper	100%	0%	0%	0%	0%
Blackfin Snapper	29%	70%	1%	0%	0%
Cubera Snapper	74%	6%	0%	19%	0%
Dog Snapper	82%	0%	0%	18%	0%
Gray Snapper	100%	0%	0%	0%	0%
Lane Snapper	99%	0%	0%	0%	0%
Mahogony Snapper	53%	0%	0%	47%	0%
Mangrove Snapper	92%	0%	0%	8%	0%
Mutton Snapper	93%	0%	2%	4%	0%
Queen Snapper	65%	34%	0%	1%	0%
Red Snapper	94%	0%	0%	5%	0%
Schoolmaster Snapper	87%	0%	0%	13%	0%

Taxon	H&L	L	O	S	T
Silk Snapper	61%	39%	0%	0%	0%
Vermilion Snapper	100%	0%	0%	0%	0%
Yellowtail Snapper	100%	0%	0%	0%	0%
Snapper, Unc	86%	14%	0%	0%	0%
Atlantic Spadefish	11%	0%	23%	66%	0%
Tilefish	9%	91%	0%	0%	0%
Blueline Tilefish	46%	52%	0%	0%	1%
Sand Tilefish	100%	0%	0%	0%	0%
Tilefish, Unc	100%	0%	0%	0%	0%
Gray Triggerfish	96%	1%	0%	1%	2%
Ocean Triggerfish	99%	0%	0%	0%	1%
Queen Triggerfish	82%	17%	0%	1%	0%
Triggerfishes	89%	0%	0%	1%	10%
Wreckfish	100%	0%	0%	0%	0%
King mackerel	95%	0%	5%	0%	0%
Spanish mackerel	31%	0%	69%	0%	0%
Cobia	66%	1%	16%	17%	0%

Source: NMFS SEFSC Logbook Program.

Landings during 2005-2009 among species in the snapper grouper FMP were generally dominated by the for-hire and private recreational sectors (Table 2). Catches of deepwater species such as snowy grouper and golden tilefish were dominated by commercial fishermen. Cobia and Spanish mackerel are most often taken by recreational fishermen while landings of king mackerel are dominated by the commercial sector. Octocorals are taken entirely by the commercial sector and there are no landings of *Sargassum*.

Table 2. Percentage of landings among the commercial, for-hire, private recreational sectors during 2005-2009. Landings provided by the Southeast Fisheries Science Center.

Taxon	Commercial	For Hire	Recreational
almaco jack	57%	29%	15%
atlantic spadefish	12%	42%	46%
banded rudderfish	30%	56%	14%
bank sea bass	6%	76%	18%
bar jack	42%	44%	14%
black grouper	52%	10%	38%
black margate	0%	52%	48%
black sea bass	42%	20%	38%
black snapper	100%	0%	0%
blackfin snapper	39%	16%	45%
blue runner	17%	53%	30%
blueline tilefish	50%	34%	16%

Taxon	Commercial	For Hire	Recreational
bluestriped grunt	0%	46%	54%
coney	0%	12%	88%
cottonwick	0%	100%	0%
crevalle jack	27%	53%	20%
cubera snapper	26%	36%	39%
dog snapper	8%	9%	83%
french grunt	0%	5%	95%
gag	54%	14%	32%
goliath grouper	0%	2%	98%
grass porgy	0%	17%	83%
gray snapper	15%	35%	50%
gray triggerfish	43%	24%	33%
graysby	4%	54%	42%
greater amberjack and unc jacks	41%	34%	25%
hogfish	27%	3%	70%
jolthead porgy	6%	47%	48%
knobbed porgy	54%	33%	12%
lane snapper	6%	32%	61%
lesser amberjack	50%	36%	14%
longspine porgy	3%	97%	0%
mahogany snapper	2%	27%	72%
margate	16%	55%	29%
misty grouper	100%	0%	0%
mutton snapper	15%	28%	57%
nassau grouper	0	0	0
ocean triggerfish	0%	17%	83%
porkfish	0%	23%	77%
puddingwife	0%	1%	99%
queen snapper	100%	0%	0%
queen triggerfish	0%	56%	44%
red grouper	46%	9%	46%
red hind	74%	8%	18%
red porgy	51%	36%	13%
red snapper	25%	29%	46%
rock hind	66%	21%	13%
rock sea bass	26%	26%	48%
sailors choice	0%	48%	52%
sand tilefish	20%	22%	58%
saucereye porgy	0%	44%	56%

Taxon	Commercial	For Hire	Recreational
scamp	69%	18%	13%
schoolmaster	3%	12%	84%
scup	0%	95%	5%
sheepshead	13%	18%	70%
silk snapper	75%	24%	1%
snowy grouper	65%	23%	12%
spanish grunt	0%	0%	100%
speckled hind	51%	47%	2%
tilefish	83%	11%	5%
tomtate	0%	54%	46%
vermilion snapper	63%	30%	7%
warsaw grouper	6%	26%	68%
white grunt and unc grunts	32%	41%	26%
whitebone porgy	0%	35%	65%
yellow jack	0%	60%	40%
yellowedge grouper	97%	3%	0%
yellowfin grouper	43%	5%	51%
yellowmouth grouper	0%	43%	57%
yellowtail snapper	69%	12%	19%
King mackerel	45%	13%	42%
Spanish mackerel	15%	33%	51%
Cobia	10%	18%	72%

*Commercial represents unclassified triggerfish.
**Commercial triggerfish landings are not identified to species; however, most triggerfish in landings are likely gray triggerfish.

Commercial Fishery

During 2005 to 2009, approximately 20% of snapper grouper and Coastal Migratory Pelagic permitted vessels from the Gulf of Mexico and South Atlantic were randomly selected to fill out supplementary logbooks. The average number of trips per year during 2005 to 2009 in the South Atlantic was 19,484 (Table 3). Fishermen spent an average of 1.55 days at sea per trip.

Table 3. Snapper grouper and Coastal Migratory Pelagic fishery effort for South Atlantic.

YEAR	Trips	Days	Days per Trip
2005	16,451	25,626	1.56
2006	16,537	26,709	1.62
2007	18,464	28,115	1.52
2008	17,821	28,038	1.57
2009	19,484	30,204	1.55
Mean	17,751	27,738	1.56

Source: NMFS SEFSC Logbook Program.

For species in snapper grouper fishery Coastal Migratory Pelagics fishery management unit (FMU), the number of commercial trips that reported discards was greatest for yellowtail snapper, red porgy, vermilion snapper, scamp, and black sea bass (Table 4). Table 4 indicates many other species not included in the snapper grouper FMU including mackerel species, sharks, dolphin, and others are discarded by fishermen with federal commercial snapper grouper permits.

Table 4. The 70 most commonly discarded species during 2005-2009 for the South Atlantic. Snapper grouper species are highlighted. Note: Represents total of unexpanded data during 2005-2009.

Species	Number of trips reported discarding the species	Number discarded
red porgy, unc	1,449	128,197
vermilion snapper	1,272	89,156
black sea bass, unc	896	69,027
knobbed porgy	503	27,924
yellowtail snapper	2,058	21,420
rough skin dogfish	85	14,807
red snapper	634	11,340
scamp	969	8,703
king mackerel	1,415	7,917
mangrove snapper	416	7,230
spottail pinfish	113	7,194
smooth dogfish	43	5,456
Atlantic sharpnose	204	5,055
menhaden	50	4,880
little tunny	140	4,189
greater amberjack	361	4,163
gag	618	4,045
grunts	181	3,517
dogfish shark	54	3,435
bluefish	77	3,092
red grouper	559	3,045
white grunt	168	2,695
gray triggerfish	233	2,508
scups or porgies, unc	73	2,495
blue runner	303	2,332
triggerfish	168	2,274
blacktip shark	161	2,098
amberjack	262	1,818
sandbar shark	129	1,810

Species	Number of trips reported discarding the species	Number discarded
black grouper	381	1,723
tomtate	22	1,703
tiger shark	115	1,506
mutton snapper	296	1,347
dolphin	214	1,270
unc, finfish for food	86	1,167
Atlantic bonito	218	1,049
speckled hind	122	817
remora	270	815
snappers, unc	36	681
barracuda	75	668
Spanish mackerel	106	651
ballyhoo	18	600
lane snapper	73	582
groupers	67	396
chubs	8	364
caribbean sharpnose	13	361
stingrays	29	335
hake	35	333
rays, unc	46	324
snowy grouper	59	319
margate	17	313
cobia	182	304
needlefish	72	299
cero	98	288
lesser amberjack	12	282
sand tilefish	35	264
spinner shark	33	245
hammerhead shark	69	218
almaco jack	20	203
sheepshead	21	201
sea catfish	69	188
rudderfish	33	181
black margate	3	161
yellowfin tuna	36	161
banded rudderfish	14	159
mahogany snapper	13	133
rock sea bass	11	131
squirrelfish	18	131

Species	Number of trips reported discarding the species	Number discarded
silky shark	13	114
Atlantic spadefish	21	107

According to the bycatch information for mackerel gill nets, menhaden, smooth dogfish sharks, and spiny dogfish sharks were the three most frequently discarded species (SAFMC 2004). There were no interactions of sea turtles or marine mammals reported (Poffenberger 2004). The Southeast Region Current Bycatch Priorities and Implementation Plan FY04 and FY05 reports that 26 species of fish are caught as bycatch in the Gulf king mackerel gillnet fishery. Of these, 34% are reported to be released dead, 59% released alive, and 6% undetermined. Bycatch was not reported for the Gulf Spanish mackerel fishery. The South Atlantic Spanish mackerel fishery has 51 species reported as bycatch with approximately 81% reported as released alive. For the South Atlantic king mackerel fishery 92.7% are reported as released alive with 6% undetermined. Bycatch was not reported separately for gill nets and hook-and-line gear. Additionally, the supplementary discard program to the logbook reporting requirement shows no interactions of gill-net gear with marine mammals or birds.

Because the octocorals are almost exclusively harvested one at a time by divers, there is very little bycatch. However, all octocorals most likely have communities of invertebrates living on them that may be specially adapted to each of the different species of octocorals. These invertebrates may include different types of shrimp, amphipods, nudibranchs, and starfish. Some of these organisms are occasionally seen on the specimens (in the field) or at the bottom of containers used to transport freshly harvested specimens, but the amount per colony is generally very small. Accurate bycatch species identification and counts can only be done in a laboratory, and it is unlikely that this information is available for most of the species harvested by marine life fishermen.

There is no visible bycatch among most of the shallow water, photosynthetic species of octocorals. There may be an occasional macro-alga or sponge attached to the substrate that surrounds the base of the octocorals. Experienced harvesters usually collect octocorals in areas where the target species are abundant and they can quickly and easily remove a specimen without damaging any surrounding benthic communities.

Recreational Fishery

For the recreational fishery, estimates of the number of recreational discards are available from MRFSS and the NMFS headboat survey. The MRFSS system classifies recreational catch into three categories:

- Type A - Fishes that were caught, landed whole, and available for identification and enumeration by the interviewers.

- Type B - Fishes that were caught but were either not kept or not available for identification:
    - Type B1 - Fishes that were caught and filleted, released dead, given away, or disposed of in some way other than Types A or B2.
    - Type B2 - Fishes that were caught and released alive.

For species in FMPs included in CE-BA 2, the number of released fish was greatest for black sea bass, followed by crevalle jack (Table 5).

Table 5. Estimated number of fish released (B2) fish in numbers for the South Atlantic during 2005-2009. Species in Comprehensive ACL Amendment are highlighted.

Species	Year: 2005		Year: 2006		Year: 2007		Year: 2008		Year: 2009	
	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE
BARRACUDAS										
BARRACUDAS	126,721	10.8	180,157	8.7	268,282	9.5	239,534	9.6	204,545	9.8
-- Species Group Subtotal --	126,721	10.8	180,157	8.7	268,282	9.5	239,534	9.6	204,545	9.8
BLUEFISH										
BLUEFISH	3,004,781	6.1	3,707,415	5.7	4,539,620	6	3,440,594	5	2,337,256	5.4
-- Species Group Subtotal --	3,004,781	6.1	3,707,415	5.7	4,539,620	6	3,440,594	5	2,337,256	5.4
CARTILAGINOUS FISHES										
DOGFISH SHARKS	151,502	28.1	91,248	17.4	132,366	42.2	129,161	22.3	92,811	24.9
OTHER SHARKS	2,888,895	5.1	2,770,853	6.8	3,128,079	4.5	2,925,490	4.4	2,638,748	5.5
SKATES/RAYS	1,387,330	6.9	1,059,210	6.7	1,183,040	5.3	1,070,743	6.2	1,431,617	10.8
-- Species Group Subtotal --	4,427,727	4.1	3,921,311	5.1	4,443,485	3.7	4,125,394	3.6	4,163,176	5.1
CATFISHES										
FRESHWATER CATFISHES	64,895	28.1	40,805	30.2	20,552	25.6	45,502	28	12,530	35.4
SALTWATER CATFISHES	1,775,623	6.2	1,362,776	5.8	2,473,885	7.1	1,912,040	6.5	1,016,001	6.6
-- Species Group Subtotal --	1,840,518	6	1,403,581	5.7	2,494,437	7	1,957,542	6.3	1,028,531	6.6
CODS AND HAKES										
OTHER CODS/HAKES	34,531	40.3	5,889	37	9,605	31	7,405	69.3	32,350	39.9
-- Species Group Subtotal --	34,531	40.3	5,889	37	9,605	31	7,405	69.3	32,350	39.9
DOLPHINS										
DOLPHINS	218,931	16.1	231,853	10.8	254,568	17.1	200,879	11.8	75,493	14
-- Species Group Subtotal --	218,931	16.1	231,853	10.8	254,568	17.1	200,879	11.8	75,493	14
DRUMS										
ATLANTIC CROAKER	2,153,037	6.6	3,439,549	6.4	2,540,696	7	2,372,758	5.9	3,113,213	5.5
BLACK DRUM	190,110	11.4	312,415	9.7	820,032	10.2	640,413	7.7	293,214	8.8
KINGFISHES	2,226,960	6.8	3,582,622	7.7	3,309,945	5.9	2,902,539	6.1	2,710,822	6.8
OTHER DRUM	581,461	11	834,383	8.8	1,049,974	10.9	1,173,266	9.5	900,754	12.3
RED DRUM	2,412,470	5.8	2,111,089	5.6	2,070,575	5.6	2,333,096	6.1	1,979,705	5.6
SAND SEATROUT	0	0	9,401	72	11,324	45.8	27,367	42.5	110,534	48.4
SILVER PERCH	480,503	13.2	726,915	11.5	584,828	12.1	491,659	15.6	595,518	15.6

Species	Year: 2005		Year: 2006		Year: 2007		Year: 2008		Year: 2009	
	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE
SPOT	1,728,002	9.9	3,851,795	9.6	1,732,440	9.9	1,713,571	7.6	1,798,841	8.8
SPOTTED SEATROUT	5,336,913	5.3	4,988,541	4.7	6,114,718	5	4,715,679	5.5	3,782,693	5.4
WEAKFISH	438,519	11	538,799	11.4	346,898	14	265,383	14.1	189,614	21.8
-- Species Group Subtotal --	15,547,975	2.8	20,395,509	2.9	18,581,430	2.6	16,635,731	2.5	15,474,908	2.7
EELS										
EELS	51,553	26.3	62,029	25.8	43,847	16.3	41,653	19	27,700	17.3
-- Species Group Subtotal --	51,553	26.3	62,029	25.8	43,847	16.3	41,653	19	27,700	17.3
FLOUNDERS										
GULF FLOUNDER	4,932	64	10,047	58.5	32,472	49.1	6,181	51.8	964	100
OTHER FLOUNDERS	1,214,700	6.3	1,201,665	5.6	1,689,592	5.8	1,900,658	5.9	1,577,521	6.8
SOUTHERN FLOUNDER	131,274	17.9	257,712	13.7	190,340	13	125,290	14.8	104,871	23.9
SUMMER FLOUNDER	83,320	22.4	139,805	20.5	10,815	38.6	5,715	38	35,632	27.3
-- Species Group Subtotal --	1,434,226	5.7	1,609,229	5	1,923,219	5.4	2,037,844	5.6	1,718,988	6.4
GRUNTS										
OTHER GRUNTS	905,462	8.2	790,470	8.4	1,561,407	8.3	903,581	7.7	1,219,001	8.5
PIGFISH	743,829	7.8	553,384	9.6	868,092	10.3	821,930	8.4	841,230	10.1
WHITE GRUNT	195,770	14.8	274,926	15	241,875	11.3	434,040	14.5	148,501	24.3
-- Species Group Subtotal --	1,845,061	5.3	1,618,780	5.8	2,671,374	6	2,159,551	5.4	2,208,732	6.3
HERRINGS										
HERRINGS	1,243,180	17.4	2,640,817	12.5	1,203,718	16.9	512,502	31.7	1,698,306	15.3
-- Species Group Subtotal --	1,243,180	17.4	2,640,817	12.5	1,203,718	16.9	512,502	31.7	1,698,306	15.3
JACKS										
BLUE RUNNER	661,888	9.6	822,370	9.2	1,159,991	11.7	796,058	11.1	705,910	24.5
CREVALLE JACK	1,362,086	6.7	1,264,018	6.5	1,634,661	6	1,097,877	7	1,139,832	7.9
FLORIDA POMPANO	693,755	12.5	1,007,541	20.1	605,621	12	696,269	10.7	345,791	21.5
GREATER AMBERJACK	16,687	25.1	19,234	19.6	30,752	20.8	80,931	19.8	71,802	16.1
OTHER JACKS	332,217	17.4	180,298	14	326,798	15.8	433,050	12.2	352,874	16
-- Species Group Subtotal --	3,066,633	5	3,293,461	7.1	3,757,823	5.1	3,104,185	4.8	2,616,209	8.3
MULLETS										
MULLETS	1,384,536	13.7	1,801,720	11.3	2,263,848	9.4	1,091,237	10.7	1,367,241	11.1

Species	Year: 2005		Year: 2006		Year: 2007		Year: 2008		Year: 2009	
	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE
-- Species Group Subtotal --	1,384,536	13.7	1,801,720	11.3	2,263,848	9.4	1,091,237	10.7	1,367,241	11.1
OTHER FISHES										
OTHER FISHES	2,965,704	4.8	2,882,611	4.7	4,518,284	3.7	2,828,534	4.2	2,751,240	5.7
-- Species Group Subtotal --	2,965,704	4.8	2,882,611	4.7	4,518,284	3.7	2,828,534	4.2	2,751,240	5.7
PORGIES										
OTHER PORGIES	72,379	20.1	150,357	20.4	139,040	21.4	116,266	19.5	65,856	19.2
PINFISHES	3,917,568	5.8	5,056,606	6.2	4,960,818	5.1	5,040,941	6	3,588,516	5.8
RED PORGY	27,514	19.2	16,636	15.8	30,085	19	44,154	30	18,089	55.8
SCUP	1,620	46.5	7,721	44	5,729	30.6	9,755	36	3,293	25.3
SHEEPSHEAD	436,207	9.6	437,836	9.3	603,767	10.7	773,720	8	520,600	9.1
-- Species Group Subtotal --	4,455,288	5.2	5,669,156	5.6	5,739,439	4.5	5,984,836	5.2	4,196,354	5.1
PUFFERS										
PUFFERS	425,264	7.7	635,341	8.5	1,152,418	6.6	1,341,422	6.7	912,983	7.6
-- Species Group Subtotal --	425,264	7.7	635,341	8.5	1,152,418	6.6	1,341,422	6.7	912,983	7.6
SEA BASSES										
BLACK SEA BASS	2,483,947	5.5	2,967,099	5.6	3,764,105	7.3	2,940,795	6.2	2,716,240	6.2
EPINEPHELUS GROUPERS	254,936	9.1	165,261	9.1	107,240	17.6	97,808	11.9	128,065	11.9
MYCTEROPERCA GROUPERS	145,222	11	152,123	10.7	302,398	11.2	252,309	8.9	142,865	10.6
OTHER SEA BASSES	324,893	11.5	797,375	11.3	910,942	8.7	801,710	9.1	499,275	10.4
-- Species Group Subtotal --	3,208,998	4.5	4,081,858	4.6	5,084,685	5.7	4,092,622	4.8	3,486,445	5.1
SEAROBINS										
SEAROBINS	158,366	12.1	300,921	21.5	432,617	11.1	333,166	14.5	123,415	10.5
-- Species Group Subtotal --	158,366	12.1	300,921	21.5	432,617	11.1	333,166	14.5	123,415	10.5
SNAPPERS										
GRAY SNAPPER	1,228,211	7.8	1,457,251	5.9	2,936,755	6	1,839,406	6.5	1,725,889	7.4
LANE SNAPPER	111,276	22.7	137,572	16.8	330,770	14.1	227,775	18.4	157,594	16.6
OTHER SNAPPERS	242,324	10.6	280,948	10.1	426,284	10.4	557,020	10	314,681	10.1
RED SNAPPER	125,739	13.3	134,692	18.5	455,405	12.8	403,244	10.5	210,279	12.4
VERMILION SNAPPER	140,356	13.2	102,219	34.3	293,433	12.9	246,103	14.2	226,125	11.6
YELLOWTAIL SNAPPER	258,606	17.7	344,982	11.7	402,201	12.5	319,239	11.1	221,836	22.6

Species	Year: 2005		Year: 2006		Year: 2007		Year: 2008		Year: 2009	
	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE	TYPE B2	PSE
-- Species Group Subtotal --	2,106,512	5.5	2,457,664	4.5	4,844,848	4.3	3,592,787	4.3	2,856,404	5.2
TEMPERATE BASSES										
STRIPED BASS	136,536	16.3	85,438	19.4	50,735	18.2	86,858	19.6	93,353	21
WHITE PERCH	0	0	46,904	38.1	7,339	56.8	1,397	58.5	0	0
-- Species Group Subtotal --	136,536	16.3	132,342	18.4	58,074	17.5	88,255	19.4	93,353	21
TOADFISHES										
TOADFISHES	477,955	8.3	479,125	9.4	435,924	7.7	691,142	8	405,848	8.2
-- Species Group Subtotal --	477,955	8.3	479,125	9.4	435,924	7.7	691,142	8	405,848	8.2
TRIGGERFISHES/FILEFISHES										
TRIGGERFISHES/FILEFISHES	239,995	10.7	210,123	14.6	228,262	10.1	199,476	10.7	181,503	14
-- Species Group Subtotal --	239,995	10.7	210,123	14.6	228,262	10.1	199,476	10.7	181,503	14
TUNAS AND MACKERELS										
ATLANTIC MACKEREL	67,658	81.9								
KING MACKEREL	207,618	13.7	195,618	9.8	303,008	9.4	166,716	9.7	127,316	13.4
LITTLE TUNNY/ATLANTIC BONITO	288,459	8.5	476,296	7	780,193	8.4	511,878	7.6	585,015	8.3
OTHER TUNAS/MACKERELS	66,422	24.6	43,933	13.7	58,912	16.3	121,352	17.4	93,887	17
SPANISH MACKEREL	704,569	12.9	321,860	11.9	586,722	9.4	994,693	10.4	466,681	9.4
-- Species Group Subtotal --	1,334,726	8.5	1,037,707	5.3	1,728,835	5.3	1,794,639	6.3	1,272,899	5.4
WRASSES										
OTHER WRASSES	2,966	53.3	2,079	50.4	10,386	41.8	13,203	51.5	2,977	42.4
TAUTOG	2,885	100	5,185	52	2,905	60.9	1,755	58.9	1,922	62.6
-- Species Group Subtotal --	5,851	56.2	7,264	39.8	13,291	35.3	14,958	46	4,899	35.6
-- Grand Total --	49,741,568	1.4	58,765,863	1.6	66,691,933	1.3	56,515,888	1.3	49,238,778	1.5

Source: MRFSS Web Site http://www.st.nmfs.noaa.gov/st1/recreational/overview/overview.html.

For species in FMPs addressed by CE-BA 2, black sea bass, vermilion snapper, tomtate, and red snapper were most often discarded by headboat fishermen during 2005-2009 (Table 6).

Table 6. Most commonly discarded species from headboats in South Atlantic. Total fish reported released alive or dead on sampled headboat trips during 2005-2009. Data are not expanded to all trips.

Species	# trips reporting discards	released	sum
black sea bass	17,087	rel_dead	18,316
		rel_live	721,640
vermilion snapper	11,601	rel_dead	19,013
		rel_live	413,854
tomtate	7,801	rel_dead	34,943
		rel_live	243,869
red snapper	9,198	rel_dead	3,214
		rel_live	212,572
red porgy	3,848	rel_dead	2,400
		rel_live	110,940
yellowtail snapper	11,797	rel_dead	3,005
		rel_live	103,625
white grunt	12,917	rel_dead	3,154
		rel_live	91,647
pinfish	3,000	rel_dead	2,850
		rel_live	81,423
sharpnose shark	10,928	rel_dead	477
		rel_live	82,816
spottail pinfish	3,450	rel_dead	199
		rel_live	35,381
red grouper	7,885	rel_dead	317
		rel_live	27,527
gag	9,520	rel_dead	339
		rel_live	20,393
gray triggerfish	14,291	rel_dead	380
		rel_live	18,599
lane snapper	7,506	rel_dead	591
		rel_live	17,561
scamp	4,809	rel_dead	275
		rel_live	16,123
bank sea bass	2,903	rel_dead	763
		rel_live	13,725
gray snapper	10,376	rel_dead	137
		rel_live	13,744

Species	# trips reporting discards	released	sum
		rel_dead	513
mutton snapper	8,907	rel_live	13,030
		rel_dead	155
squirrelfish	3,012	rel_live	9,688
		rel_dead	298
bluerunner	3,958	rel_live	8,439
		rel_dead	865
scup	1,187	rel_live	7,402
		rel_dead	104
greater amberjack	4,438	rel_live	8,155
		rel_dead	31
smooth dogfish	865	rel_live	6,830
		rel_dead	219
little tunny	4,019	rel_live	6,620
		rel_dead	232
king mackerel	10,764	rel_live	5,913
		rel_dead	31
banded rudderfish	2,333	rel_live	5,426
		rel_dead	53
inshore lizardfish	1,126	rel_live	4,804
		rel_dead	154
spanish mackerel	2,117	rel_live	4,380
		rel_dead	65
remora	1,408	rel_live	4,139
		rel_dead	412
bluefish	1,420	rel_live	3,728
		rel_dead	173
bluestriped grunt	2,283	rel_live	3,650
		rel_dead	18
blacktip shark	1,001	rel_live	3,729
		rel_dead	67
porkfish	1,645	rel_live	3,429
		rel_dead	49
black grouper	2,530	rel_live	3,026
		rel_dead	64
nurse shark	1,730	rel_live	2,964
		rel_dead	213
graysby	2,736	rel_live	2,699
cobia	3,925	rel_dead	17

Species	# trips reporting discards	released	sum
		rel_live	2,771
		rel_dead	195
sand perch	1,017	rel_live	2,279
		rel_dead	290
rock hind	1,998	rel_live	1,663
		rel_dead	60
doctorfish	873	rel_live	1,790
		rel_dead	24
almaco jack	2,652	rel_live	1,768
		rel_dead	1
sandbar shark	393	rel_live	1,694
		rel_dead	75
margate	744	rel_live	1,540
		rel_dead	45
dolphin	3,087	rel_live	1,370
		rel_dead	39
bigeye	2,098	rel_live	1,231
		rel_dead	32
whitebone porgy	4,480	rel_live	1,204
		rel_dead	0
spiny dogfish	58	rel_live	1,201
		rel_dead	80
jolthead porgy	3,667	rel_live	1,054
		rel_dead	47
great barracuda	2,085	rel_live	1,079
		rel_dead	11
pigfish	1,072	rel_live	996
		rel_dead	55
rainbow runner	669	rel_live	811
		rel_dead	40
sand tilefish	872	rel_live	823
		rel_dead	0
atlantic croaker	39	rel_live	843
		rel_dead	26
knobbed porgy	3,890	rel_live	554
		rel_dead	0
crevalle jack	265	rel_live	564

Source: NMFS Headboat survey.

Finfish Bycatch Mortality

Release mortality rates are unknown for most managed species. Recent SEDAR assessments include estimates of release mortality rates based on published studies. Stock assessment reports can be found at http://www.sefsc.noaa.gov/sedar/.

SEDAR 17 (2008) recommended a release mortality rate for vermilion snapper of 38% for both the commercial and recreational fisheries. SEDAR 10 (2006) estimated release mortality rates of 40% and 25% for gag taken by commercial and recreational fishermen, respectively. SEDAR 24 (2010) used release mortality rates of 48% commercial; 41% for-hire, and 39% private recreational for red snapper. Release mortality rates were estimated as 20% for black grouper and red grouper in SEDAR 19 (2010). SEDAR 15 (2008) estimated a 20% release mortality rate for greater amberjack. In the Gulf of Mexico, SEDAR 9 (2006) assumes a 0% release mortality rate for gray triggerfish. Snowy grouper are primarily caught in water deeper than 300 feet and golden tilefish are taken at depths greater than 540 feet; therefore, release mortality of the species are probably near 100% (SEDAR 4 2004). Release mortality of black sea bass is considered to be low (15%) (SEDAR 2-SAR 3 2005) indicating minimum size limits are probably an effective management tool for black sea bass. Collins et al. (1999) reported venting of the swim bladder yielded reductions in release mortality of black sea bass, and the benefits of venting increased with capture depth. The same study was analyzed by Wilde (2009) to suggest that venting increased the survival of black sea bass, although this was an exception to the general findings of Wilde's (2009) study.

SEDAR 16 (2009) provided a 20% release mortality to the MRFSS fishery where king mackerel are released alive and a 33% mortality to the headboat fishery where fish were released both dead and alive. For Spanish mackerel, SEDAR 17 (2008) used the following discard mortality rates: gillnets 100%, shrimp trawls 100%, trolling 98%, hook and line 80%, and trolling/hook and line combined 88%.

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

CE-BA 2 includes actions that could modify management of octocorals through the establishment of an ACL; modify management of SMZs off South Carolina; revise sea turtle release gear requirements for the snapper grouper fishery; and designate new EFH and EFH-HAPCs in the South Atlantic.

Because the octocorals are almost exclusively harvested one at a time by divers, there is very little bycatch. However, all octocorals most likely have communities of invertebrates living on them that may be specially adapted to each of the different species of octocorals. These invertebrates may include different types of shrimp, amphipods, nudibranchs, and starfish. Some of these organisms are occasionally seen on the specimens (in the field) or at the bottom of containers used to transport freshly harvested specimens, but the amount per colony is generally very small. Furthermore, regulations require that all incidentally take coral be returned to the water. Almost all commercial harvest of octocorals is done by marine life fishermen for the live

aquarium trade; therefore, harvest is by hand and is done in small numbers on any given day. Because octocorals are listed as a marine life species by the state of Florida, fishermen harvesting them using a Florida SPL with ML endorsement must transport and land them in a live and healthy condition. Actions in CE-BA 2 would not be expected to modify the level of octocoral bycatch.

Tables 2 through 6 list the snapper grouper and coastal migratory pelagic species most commonly discarded by commercial and recreational fishermen. CE-BA 2 includes an action that would limit harvest and possession of snapper grouper and coastal migratory species to the bag limit in SMZs off South Carolina. This action could reduce bycatch of regulatory discards around SMZs by restricting commercial harvest in the area but it would probably have very little effect on the magnitude of overall bycatch of snapper grouper and coastal migratory species in the South Atlantic.

There is currently no fishery for *Sargassum*. As *Sargassum* is a free-floating seaweed, pieces of *Sargassum* is sometimes brought aboard when fishermen reel in lines. However, this is extremely minimal relative to the vast amount of *Sargassum* in the ocean. CE-BA 2 would amend Council FMPs as needed to designate new or modify existing EFH and EFH-HAPCs to meet the Magnuson-Stevens Act requirement that all managed species have EFH designated, CE-BA 2 amends the Pelagic *Sargassum* Habitat FMP to designate EFH. Modifying existing EFH and EFH-HAPCs would not directly affect bycatch of species in the affect FMPs.

Amendment 15B to the Snapper Grouper FMP implemented an action in December 2009 that could reduce the impacts from incidental bycatch of sea turtles and smalltooth sawfish by requiring all vessels with commercial and for-hire snapper grouper vessel permits, carrying hook-and-line gear onboard to: (1) immediately release incidentally caught smalltooth sawfish by following the latest NOAA Fisheries Service approved guidance on smalltooth sawfish release techniques; (2) have a copy of the document, provided by NOAA Fisheries Service, titled "Careful Release Protocols for Sea Turtle Release with Minimal Injury" posted inside the wheelhouse, or within a waterproof case in an readily accessible area; (3) post the NOAA Fisheries Service provided sea turtle handling and release guideline placard inside the wheelhouse, or in an easily viewable area if there is no wheelhouse; and (4) carry the sea turtle release equipment. Reducing the impacts of incidental take on sea turtles and smalltooth sawfish could help increase population biomass, which could have ecological effects on community structure and predator prey relationships. CE-BA 2 includes an action to modify sea turtle release gear requirements for the snapper grouper fishery. Fishermen have expressed concern that the current sea turtle handling and release gear requirements are intended for larger longline vessels using heavy tackle and are ineffective and unwieldy for smaller snapper grouper hook and line vessels. Any modification is not expected to reduce benefits to sea turtles and smalltooth sawfish. Instead, the action is intended to make it easier for fishermen to comply with the requirement.

Other actions have been taken in recently implemented amendments that could reduce the magnitudes of species addressed in CE-BA 2. Snapper Grouper Amendment 13C required the use of 2" mesh in the back panel of black sea bass pots, which has likely reduced the magnitude

of regulatory discards. Snapper Grouper Amendment 16 required the use of dehooking devices, which could help reduce bycatch mortality of vermilion snapper, black sea bass, gag, red grouper, black grouper, and red snapper. Dehooking devices can allow fishermen to remove hooks with greater ease and more quickly from snapper grouper species without removing the fish from the water. If a fish does need to be removed from the water, dehookers could still reduce handling time in removing hooks, thus increasing survival (Cooke et al. 2001). Furthermore, Snapper Grouper Amendment 17A required circle hooks for snapper-grouper species north of 28 degrees latitude, which is expected to reduce bycatch mortality of snapper grouper species.

Action was taken in Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1) that could reduce bycatch as well as protect deepwater coral habitat. CE-BA 1 became effective on July 22, 2010. The CE-BA 1 created allowable gear areas for the golden crab fishery and shrimp fishery access areas for the deepwater shrimp fishery. The establishment of these areas allows for the continuation of these fisheries in their historical fishing grounds with little or no negative impacts to protected deepwater coral habitat.

1.2 Ecological Effects Due to Changes in the 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. Because the octocorals are almost exclusively harvested one at a time by divers, there is currently very little bycatch. Under the current alternatives in CE-BA2, no change in expected in the magnitude of ocotocoral bycatch. There is currently no fishery for *Sargassum* and bycatch is not an issue for this species.

CE-BA 2 includes an action that would limit harvest and possession of snapper grouper and coastal migratory species to the bag limit in SMZs off South Carolina. This action could reduce bycatch of regulatory discards around SMZs by restricting commercial harvest in the area but it would probably have very little effect on the magnitude of overall bycatch of snapper grouper and coastal migratory species in the South Atlantic.

Ecosystem interactions among coastal migratory pelagic species in the marine environment is poorly known. Most species are migratory, interacting in various combinations of species groups at different levels on a seasonal basis. With the current state of knowledge, it is not possible to evaluate the potential ecosystem wide impacts of these species interactions, or the ecosystem impacts from the limited mortality estimated to occur from mackerel fishing effort.

Amendment 15B to the Snapper Grouper FMP implemented an action in December 2009 that could reduce the impacts from incidental bycatch of sea turtles and smalltooth sawfish by requiring all vessels with commercial and for-hire snapper grouper vessel permits, carrying hook-and-line gear onboard to carry sea turtle release equipment. CE-BA 2 includes an action to modify sea turtle release gear requirements for the snapper grouper fishery due to concern that the current sea turtle handling and release gear requirements are intended for larger longline vessels using heavy

tackle and are ineffective and unwieldy for smaller snapper grouper hook and line vessels. Any modification is not expected to reduce benefits to sea turtles and smalltooth sawfish. Instead, the action is intended to make it easier for fishermen to comply with the requirement.

Amendment 18A to the Snapper Grouper FMP, which is under development, includes actions that could reduce bycatch of black sea bass and the potential for interactions protected species. Actions in Amendment 18A could limit the number of participants in the black sea bass pot sector, require fishermen bring pots back to port at the completion of a trip, and limit the number of pots a fishermen can deploy.

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

CE-BA 2 is not expected to affect major changes in bycatch of other fish species. Measures proposed in the CE-BA 2 are intended to prevent overfishing octocoral species, prevent excessive harvest from occurring on SMZs, make sea turtle release gear requirements easier for smaller vessels. There is little bycatch in the octocoral fishery and actions proposed in CE-BA 2 would likely prevent a cap in harvest and any associated bycatch of fish and invertebrate species. These measures would ensure harvest levels of octocorals would not increase above levels that could jeopardize the sustainability of the resource and would help to ensure ecological changes were not a function of overexploitation of octocorals. Preventing commercial harvest of snapper grouper and coastal migratory species on SMZs could prevent localized depletion from occurring. This action could reduce bycatch of other fish species associated with SMZs but would have little effect on overall bycatch changes in the South Atlantic.

The designation of additional EFH-HAPCs for coral and *Sargassum* would not result in direct impacts to the biological resources of the west-central Atlantic Ocean. Rather, the EFH-HAPC designation under this option would provide a future opportunity for the South Atlantic Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect habitat from non-fishing activities which are undertaken, authorized, or funded by Federal agencies.

1.4 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. Of the gear utilized within the snapper grouper fishery, only the black sea bass pot is considered to pose an entanglement risk to marine mammals. The southeast U.S. Atlantic black sea bass pot fishery is included in the grouping of the Atlantic mixed species trap/pot fisheries, which the 2010 proposed LOF classifies as a Category II (74 FR 27739; June 11, 2009). Gear types used in these fisheries are determined to have occasional incidental mortality and serious injury of marine mammals. For the snapper grouper fishery, the best available data on protected species interactions are from the Southeast Fisheries Science Center (SEFSC) Supplementary Discard Data Program (SDDP) initiated in July of 2001 and sub-samples 20% of the vessels with an active permit. Since August 2001, only three interactions with marine mammals have been documented; each was taken by handline gear and each

released alive (McCarthy SEFSC database). The bottom longline/hook-and-line component of the South Atlantic snapper grouper fishery remains a Category III under the LOF.

Although the black sea bass pot fishery can pose an entanglement risk to large whales due to their distribution and occurrence, sperm, fin, sei, and blue whales are unlikely to overlap with the black sea bass pot fishery operated within the snapper grouper fishery since it is executed primarily off North Carolina and South Carolina in waters ranging from 70-120 feet deep (21.3-36.6 meters). There are no known interactions between the black sea bass pot fishery and large whales. NOAA Fisheries Service's biological opinion on the continued operation of the South Atlantic snapper grouper fishery determined the possible adverse effects resulting from the fishery are extremely unlikely. Thus, the continued operation of the snapper grouper fishery in the southeast U.S. Atlantic EEZ is not likely to adversely affect sperm, fin, sei, and blue whales (NMFS 2006).

North Atlantic right and humpback whales may overlap both spatially and temporally with the black sea bass pot fishery. Recent revisions to the Atlantic Large Whale Take Reduction Plan have folded the Atlantic mixed species trap/pot fisheries into the plan (72 FR 193; October 5, 2007). The new requirements will help further reduce the likelihood of North Atlantic right and humpback whale entanglement in black sea bass pot gear.

Of the gear used in the coastal migratory pelagics fishery only the gillnet gear components pose entanglement risks to Northern right, fin, and humpback whales. However, there are no documented interactions between coastal migratory pelagic gillnets and large whales. Large whale entanglements have been documented in other gillnet fisheries. Both the Southeast Atlantic gillnet fishery and the Gulf of Mexico gillnet fishery are listed as category II fisheries (72 FR 14466, March 28, 2007). Neither fishery has any documented interactions with large whales or any other marine mammal species, but NMFS classifies these fisheries as Category I1 based on analogy (is., similar risk to marine mammals) with other gillnet fisheries.

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 Carolina 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 fisheries has not been reported as a concern for either of these species.

Fishing effort reductions have the potential to reduce the amount of interactions between the fishery and marine mammals and birds. Although, the Bermuda petrel and roseate tern occur within the action area, these species are not commonly found and neither has been described as associating with vessels or having had interactions with the snapper grouper fishery. Thus, it is believed that the snapper grouper or coastal migratory pelagic fisheries are not likely to negatively affect the Bermuda petrel and the roseate tern.

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

Actions in CE-BA 2 are not expected to significantly affect the cost of fishing operations. Economic effects of actions proposed in CE-BA 2 are addressed in Section 4 of this document.

1.6 Changes in Fishing Practices and Behavior of Fishermen

Actions proposed in CE-BA 2 are not likely to result in a significant modification of fishing practices by commercial and recreational fishermen and are likely to have little effect on the magnitude of discards. Social effects of actions proposed in CE-BA 2 are addressed in Section 4 of this document.

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

Research and monitoring is needed for proposed measures in CE-BA 2 and other recently implemented amendments in reducing bycatch. Additional work is needed to determine the effectiveness of measures in the Comprehensive ACL Amendment, recently implemented amendments, and by future actions being proposed by the Council to reduce bycatch. Amendment 18A, which proposes to enhance current data collection programs, is being developed by the Council. Some observer information has recently been provided by MARFIN and Cooperative Research Programs but more is needed. Approximately 20% of commercial fishermen are asked to fill out discard information in logbooks; however, a greater percentage of fishermen could be selected with emphasis on individuals that dominate landings. The use of electronic logbooks could be enhanced to enable fishery managers to obtain information on species composition, size distribution, geographic range, disposition, and depth of fishes that are released. Additional administrative and enforcement efforts will be needed to implement and enforce these regulations. NOAA Fisheries Service established the South East Fishery-Independent Survey in 2010 to strengthen fishery-independent sampling efforts in southeast US waters, addressing both immediate and long-term fishery-independent data needs, with an overarching goal of improving fishery-independent data utility for stock assessments. Meeting these data needs is critical to improving scientific advice to the management process, ensuring overfishing does not occur, and successfully rebuilding overfished stocks on schedule.

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

Preferred management measures, and any changes in economic, social, or cultural values are discussed in Section 4.

1.9 Changes in the Distribution of Benefits and Costs

Little change in the distribution of benefits and costs are expected from actions in CE-BA 2. Measures proposed in the CE-BA 2 are intended to prevent overfishing octocoral species, prevent excessive harvest from occurring on SMZs, make sea turtle release gear requirements

easier for smaller vessels. CE-BA 2 also would designate new EFH and EFH-HAPCs in the South Atlantic. These measures would ensure harvest levels of octocorals would not increase above levels that could jeopardize the sustainability of the resource and would help to ensure ecological changes were not a function of overexploitation of octocorals. Preventing commercial harvest of snapper grouper and coastal migratory species on SMZs could result in some negative benefits and costs for commercial fishermen but effects would likely be positive for recreational fishermen (Section 4.4.2).

1.10 Social Effects

The social effects of all the measures are described in **Section 4**.

1.11 Conclusion

This section evaluates the practicability of taking additional action to minimize bycatch and bycatch mortality using the ten factors provided at 50 CFR 600.350(d)(3)(i). In summary, measures proposed in the CE-BA 2 are intended to prevent overfishing octocoral species, prevent excessive harvest from occurring on SMZs off South Carolina, and make sea turtle release gear requirements easier for smaller vessels. CE-BA 2 also would designate new EFH and EFH-HAPCs in the South Atlantic. These measures would ensure that harvest levels of octocorals would not increase above levels that could jeopardize the sustainability of the resource and would help to ensure ecological changes were not a function of overexploitation of octocorals. Preventing commercial harvest of snapper grouper and coastal migratory species on SMZs off South Carolina could prevent localized depletion from occurring but would have little effect on potential ecological changes in the South Atlantic.

The designation of additional EFH-HAPCs for coral and *Sargassum* would not result in direct impacts to the biological resources of the west-central Atlantic Ocean. Rather, the EFH-HAPC designation under this option would provide a future opportunity for the Council to establish regulations to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect habitat from non-fishing activities which are undertaken, authorized, or funded by Federal agencies.

Appendix E.

1 Other Applicable Law

1.1 Administrative Procedure Act

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

1.2 Information Quality Act

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

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

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

1.3 Coastal Zone Management Act

Section 307(c)(1) of the federal Coastal Zone Management Act (CZMA) of 1972 requires that all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. While it is the goal of the South Atlantic Council to have management measures that complement those of the states, Federal and state administrative procedures vary and regulatory changes are unlikely to be fully instituted at

the same time. Based on the analysis of the environmental consequences of the proposed action in Section 4.0, the Council has concluded this amendment would improve Federal management of the coral, snapper grouper, coastal migratory pelagic and *Sargassum* fisheries.

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.

1.4 Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 U.S.C. Section 1531 et seq.) requires that federal agencies ensure actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or the habitat designated as critical to their survival and recovery. The ESA requires NOAA Fisheries Service to consult with the appropriate administrative agency (itself for most marine species and the U.S. Fish and Wildlife Service for all remaining species) when proposing an action that may affect threatened or endangered species or adversely modify critical habitat. ESA section 7 consultations are necessary to determine the potential impacts of the proposed action. They are concluded informally when proposed actions may affect but are "not likely to adversely affect" threatened or endangered species or designated critical habitat. Formal consultations, resulting in a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" threatened or endangered species or adversely modify designated critical habitat.

NOAA Fisheries Service completed ESA consultations on all FMPs to be amended under this amendment. In 2006, a biological opinion evaluating the impacts of the continued authorization of the South Atlantic snapper grouper fishery under the snapper grouper FMP and Amendment 13C (NMFS 2006) on ESA-listed species was completed. The opinion stated the fishery was not likely to adversely affect North Atlantic whale critical habitat, seabirds, or marine mammals (see NMFS 2006 for discussion on these species). However, the opinion did state that the snapper grouper fishery would adversely affect sea turtles and smalltooth sawfish, but would not jeopardize their continued existence. An incidental take statement was issued for green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles, as well as smalltooth sawfish. Reasonable and prudent measures to minimize the impact of these incidental takes were specified, along with terms and conditions to implement them.

NOAA Fisheries Service conducted an informal section 7 consultation on July 9, 2007, evaluating the impacts of the South Atlantic snapper grouper fishery on ESA-listed *Acropora* species. The consultation concluded that the continued operation of the snapper grouper fishery was not likely to adversely affect newly listed *Acropora* species. On November 26, 2008, a *Acropora* critical habitat was designated (effective December 26, 2008). A memo dated December 2, 2008, evaluated the effects of the continued authorization of the South Atlantic snapper grouper fishery on *Acropora* critical habitat pursuant to section 7 of the ESA. The consultation concluded the continued authorization of the fishery is not likely to adversely affect *Acropora* critical habitat.

In a May 18, 2010, ESA consultation memorandum NOAA Fisheries Service determined the continued authorization of the coral fishery will not affect ESA-listed marine mammals. The consultation memorandum also determined that any adverse affects from the continued authorization of coral harvest under the Coral FMP would likely be discountable; therefore, the action was not likely to adversely affect Acropora corals or their designated critical habitat. Additionally, the consultation memorandum determined any effects from the the coral fishery to ESA-listed sea turtles or smalltooth sawfish were likely to be discountable or insignificant; therefore, the action was also not likely to adversely affect these species.

The same memorandum determined the available information on the interactions between ESA-listed sea turtles and the coastal migratory pelagics fishery did not require reinitiation of the existing biological opinion on the fishery. The memorandum also determined that any adverse affects to Acropora or their designated critical habitat would be discountable; therefore, the continued authorization of the fishery was not likely to adversely affect them.

On March 31, 2003, formal consultation was completed on the continued authorization of pelagic *sargassum* harvest (NMFS 2003b). The biological opinion concluded the continued harvest of *sargassum* would not affect ESA-listed marine mammals. The opinion also concluded that interactions between the fishery and sea turtles hatchlings and pelagic immature sea turtles were likely, but those interactions were not likely to jeopardize the continued existence of any listed sea turtle species. The opinion authorized the incidental take of a small number neonatal or pelagic-immature green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles over consecutive 5-year periods.

8.5 Executive Order 12612: Federalism

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

8.6 Executive Order 12866: Regulatory Planning and Review

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

12866 and whether proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the RFA. A regulation is significant if it is likely to result in an annual effect on the economy of at least $100,000,000 or if it has other major economic effects.

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

1.7 Executive Order 12898: Environmental Justice

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

The alternatives being considered in this amendment are not expected to result in any disproportionate adverse human health or environmental effects to minority populations or low-income populations of Florida, North Carolina, South Carolina or Georgia, rather the impacts would be spread across all participants in the coral, snapper grouper, coastal migratory pelagic, and *Sargassum* fishery participants regardless of race or income.

1.8 Executive Order 12962: Recreational Fisheries

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

Resource Conservation Plan - to include a five-year agenda. Finally, the Order requires NMFS and the U.S. Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

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

1.9 Executive Order 13089: Coral Reef Protection

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

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

1.10 Executive Order 13158: Marine Protected Areas

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

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

1.11 Marine Mammal Protection Act

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

Part of the responsibility that NOAA Fisheries Service has under the MMPA involves monitoring populations of marine mammals to ensure they remain 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; and Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities. To legally fish in a Category I and/or II fishery, a fisherman must obtain a marine mammal authorization certificate by registering with the Marine Mammal Authorization Program (50 CFR 229.4), they must accommodate an observer if requested (50 CFR 229.7(c)), and comply with any applicable take reduction plans.

The commercial hook-and-line components of the South Atlantic snapper grouper fishery (i.e., bottom longline, bandit gear, and handline) are listed as a Category III fishery in the 2011 Proposed List of Fisheries (LOF) (75 FR 36318; June 25, 2010) because there have been no documented interactions between these gears and marine mammals. The black sea bass pot component of the South Atlantic snapper grouper fishery is part of the larger Atlantic mixed species trap/pot fishery designation, a Category II fishery, in the 2011 proposed LOF (75 FR 36318; June 25, 2010). The Atlantic mixed species trap/pot fishery designation was created in 2003 (68 FR 41725, July 15, 2003), by combining several separately listed trap/pot fisheries into a single group. This group was designated Category II as a precaution because of known interactions between marine mammals and gears similar to those included in this group. Prior to this consolidation, the black sea bass pot fishery in the South Atlantic was a part of the "U.S. Mid-Atlantic and Southeast U.S. Atlantic Black Sea Bass Trap/Pot" fishery (Category III). There has never been a documented interaction between marine mammals and black sea bass trap/pot gear in the South Atlantic.

The coastal migratory pelagic fishery is considered part of the Southeast Atlantic gillnet fishery (i.e., the Florida East Coast king and Spanish mackerel gillnet fishery and the Southeast U.S. Atlantic coastal shad gillnet fishery) in the 2011 LOF (75 FR 36318; June 25, 2010); a Category II fishery. Multiple different stocks of bottlenose dolphins have been incidentally captured by fisheries in this group. However, the 2011 Proposed LOF does not differentiate which specific fishery has incidentally captured those animals.

The coral reef and pelagic *Sargassum* fisheries in the South Atlantic have not been evaluated under the List of Fisheries for their interactions with marine mammals.

1.12 Migratory Bird Treaty Act and Executive Order 13186

The Migratory Bird Treaty Act (MBTA) implemented several bilateral treaties for bird conservation between the United States and Great Britain, the United States and Mexico, the United States and Japan, and the United States and the former Union of Soviet Socialists

Republics. Under the MBTA, it is unlawful to pursue, hunt, take, capture, kill, possess, trade, or transport any migratory bird, or any part, nest, or egg of a migratory bird, included in treaties between the, except as permitted by regulations issued by the Department of the Interior (16 U.S.C. 703-712). Violations of the MBTA carry criminal penalties. Any equipment and means of transportation used in activities in violation of the MBTA may be seized by the United States government and, upon conviction, must be forfeited to it.

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

An MOU is currently being developed, which will address the incidental take of migratory birds in commercial fisheries under the jurisdiction of NOAA Fisheries Service. NOAA Fisheries Service must monitor, report, and take steps to reduce the incidental take of seabirds that occurs in fishing operations. The United States has already developed the U.S. National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries. Under that plan many potential MOU components are already being implemented.

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

1.13 National Environmental Policy Act

This amendment to the Councils' Coral FMP and the Golden Crab FMP has been written and organized in a manner that meets NEPA requirements, and thus is a consolidated NEPA document, including a final Environmental Assessment, 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.**

1.14 National Marine Sanctuaries Act

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

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

1.15 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act (PRA) is to minimize the burden on the public. The Act is intended to ensure that the information collected under the proposed action is needed and is collected in an efficient manner (44 U.S.C. 3501 (1)). The authority to manage information collection and record keeping requirements is vested with the Director of the Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications. The PRA requires NMFS to obtain approval from the OMB before requesting most types of fishery information from the public.

The proposed actions in this amendment will not trigger the PRA.

1.16 Regulatory Flexibility Act

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

to the RFA in June 1996 enable small entities to seek court review of an agency's compliance with the Act's provisions.

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

1.17 Small Business Act

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

1.18 Public Law 99-659: Vessel Safety

Public Law 99-659 amended the MSFCMA to require that a FMP or FMP amendment must consider, and may provide for, temporary adjustments (after consultation with the U.S. Coast Guard and persons utilizing the fishery) regarding access to a fishery for vessels that would be otherwise prevented from participating in the fishery because of safety concerns related to weather or to other ocean conditions.

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

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

Appendix F. Considered But Eliminated Alternatives

This section describes actions and alternatives that the South Atlantic Council considered in developing this document, but decided not to pursue. The description of each alternative is followed by a summary statement of why it was eliminated from more detailed summary in the document.

Actions and Alternatives relative to the octocoral fishery

Action 1. Establish MSY for Octocorals in the South Atlantic.

The Coral Plan (Coral FMP; SAFMC & GMFMC 1990) cited lack of sufficient data on biomass and mortality, and the absence of a fishery from which catch and effort data may be obtained, as factors preventing any calculation of MSY from the entire management area for the octocoral fishery. When the Council revisited this issue during the development of the Comprehensive Sustainable Fisheries Amendment (SAFMC, 1998), the same conclusion was drawn and no estimate of MSY was provided. An estimate of MSY has been determined for several coral species at specific reefs in the Florida reef tract, but cannot be expanded to other corals due to great differences in species, densities, growth rates, and other factors. The Council's Scientific and Statistical Committee (SSC) indicates that although the MSY value is unknown, it is some value higher than the 50,000 colony status quo quota. Based upon discussions about the unique characteristics of this fishery (organisms are caught and sold live to wholesale and retail dealers and aquarium owners; commercial octocoral collectors only make trips when they have an order to fill for specific organsisms); the fishery is small and effort and participation in Florida waters (where most of the harvest comes from) is capped by a limited entry program; and there are no signs of local depletion in areas where the fishery operates; and there are no indications that the fishery has been operating at unsustainable levels, the Council removed this as an Action during their September 2010 meeting.

Action 2. Establish an Overfishing Level (OFL) for Octocorals in the South Atlantic

Per the Comprehensive Sustainable Fisheries Amendment (SAFMC, 1998), overfishing is defined as the level of harvest that exceeds Optimum Yield (OY). OY for allowable octocorals in the South Atlantic and Gulf exclusive economic zone (EEZ) is not to exceed 50,000 colonies per year and fishing for octocorals in the EEZ will cease when the quota is reached. The level of harvest in the South Atlantic and Gulf EEZ has not exceeded OY and the fishery has not closed in federal waters, thus overfishing has not occurred.

At their August, 2010 meeting, the Council's Science and Statistical Committee (SSC) discussed the fact that there is no stock assessment for octocorals, landings information is limited, and an estimate of OFL could not be provided but is considered to be an unknown value above ABC. The Council further discussed that there are no signs of local depletion in areas where the octocoral fishery operates, or any other indication that the fishery has been operating at unsustainable levels. Thus, the Council removed this Action from consideration during their September 2010 meeting.

Action 3. Establish Acceptable Biological Catch (ABC) for Octocorals in the South Atlantic

In April 2010 the SSC met to discuss development of an ABC control rule for unassessed stocks, including octocorals. The SSC received information on landings and possible reference points for corals in a presentation made at their April 2010 meeting. The Council received the proposed data-poor control rule in June 2010. However, some aspects of the proposed ABC control rule and its criteria were considered inappropriate considering guidance that the rule should account for scientific uncertainty. The SSC was asked to reconvene in August 2010 to reconsider an ABC control rule for unassessed (data-poor) stocks, including octocorals. At their August 2010 meeting, the SSC reviewed and discussed background information on octocoral landings, life history, and possible fishery reference points. The SSC discussed the fact that there is no stock assessment for octocorals, landings information is limited, and an estimate of OFL could not be provided but is considered to be an unknown value above ABC. Fishery-independent information is also limited but available survey data (monitoring programs and directed studies conducted by Florida Fish and Wildlife Commission (FL FWC), University of North Carolina-Wilmington, and University of Georgia suggest relatively high octocoral abundance in the historically known distribution area (Florida Keys). The SSC recommended no changes to the current quota and recommended an ABC of 50,000 colonies annually for Gulf and South Atlantic EEZ waters, combined. The SSC was asked to clarify their ABC recommendation during their November 2010 meeting. They discussed that the current quota is set at a value higher than what is historically landed. Based upon the number of licensed participants (100-140 fishers), the magnitude of landings, and the quota never having been met, they clarified that it was their intent to include Gulf and South Atlantic EEZ and state waters in their ABC recommendation for octocorals. The Council removed this action during their September 2010 meeting because the value is already provided by the SSC and can be placed in the context of a discussion within the document.

Action 4. Establish an Allowable Catch Limit (ACL) for Octocorals in the South Atlantic

Amendment 1 to the Fishery Management Plan for Coral, Coral Reefs and Live/Hardbottom Habitat (Coral FMP; SAFMC & GMFMC 1990) established a 50,000-colony combined quota for octocoral harvest in federal waters of the South Atlantic and Gulf of Mexico. This status quo is the current annual catch limit (ACL) for octocorals in the South Atlantic and Gulf of Mexico EEZ. The ACL also serves as a status quo accountability mechanism (AM), once the federal quota of 50,000 colonies is met, the fishery is closed in federal waters. State regulations correspond to this AM and close state waters to commercial harvest of octocorals when the 50,000 colony quota is met in federal waters. The Council discussed that Amendment 1 of the Coral Plan provides an existing ACL (50,000 colony quota for South Atlantic and Gulf of Mexico EEZ) and therefore removed the action from consideration during their September 2010 meeting. A new ACL action was added to the document to modify the existing ACL to consider including state waters in the 50,000 colony quota.

Action 5. Establish Accountability Measures (AMs) for Octocorals in the South Atlantic

Accountability Measures (AMs) are management controls that prevent ACLs or sector-ACLs from being exceeded, where possible, and correct or mitigate overages if they occur. The

octocoral fishery in federal waters is shut down once the federal quota (50,000 colony quota for South Atlantic and Gulf of Mexico EEZ) is reached and can be considered to be equivalent to an AM. Florida state regulations correspond to this AM and close state waters to commercial harvest of octocorals when the 50,000 colony quota is met in federal waters. The Council removed the action during their September 2010 meeting because of the existing mechanism in place that serves as the AM. Discussion of the AM is placed in the context of a discussion within the document.

Action 6. Modify the existing Live Rock Aquaculture Program to Allow Harvest of Octocorals

The federal live rock aquaculture fishery for the South Atlantic exclusive economic zone (EEZ) takes place exclusively in the Florida Keys, mostly due to the narrow continental shelf off Southeast Florida and unsuitable conditions north of there. Most of the permit holders are also marine life fishermen, and the live rock is one of many products they harvest for the marine ornamental trade. The Council wanted to assess whether octocoral harvest could take place exclusively as part of the live rock aquaculture program and be prohibited elsewhere in Federal waters. However, it was determined that federal live rock sites would likely not support the majority of targeted species. According to the Council's Coral Advisory Panel, nine of the top 10 harvested species in 2008 originated in state waters. In addition, initial seed from wild stock would be required to harvest octocorals within aquacultured sites as there would not be enough natural recruitment. The Coral Advisory Panel suggested allowing transplants/clippings (specify max. size and with no holdfast attached). However, this would have presented an enforcement challenge. Moreover, no modification to the exiting program would have been required to allow harvest of octocorals. Hence the Council voted at their June 2010 meeting to remove this action from further consideration.

Action 8. Allow Harvest of the Exotic Stony Coral *Tubastrea coccinea*

The request for this action originally came from the Council's Coral Advisory Panel to remove the species from the fishery management unit so it could be harvested. A demand for this species exists in the aquarium trade, and this is the primary reason the request was made to the council. At the December 2009 meeting the Council declared its intent not to go against Florida's rationale for not allowing harvest of the exotic stony coral *Tubastrea coccinea* in state waters due to potential law enforcement issues. In state and federal waters there is a prohibition on harvest of any scleractinians. The exotic stony coral *Tubastrea coccinea* is a scleractinian. Concern was expressed by Council members primarily from an enforcement point of view due to the potential harvest of other native forms of scleractinians if harvest of *Tubastrea coccinea* were allowed. Removal of this species from the Council's Coral Fishery Management Plan to allow harvest would not afford any regulatory protection over this species. Considering the above, Council determined it would be more reasonable to keep *Tubastrea coccinea* in the fishery management plan and allow removal only under the current permitting requirements for take of prohibited corals for scientific and educational purposes.

Action 8. Add Two Species of Encrusting Gorgonians (Erythropodium sp. and Briaerum sp.) to the List of Allowable Octocorals.

Amendment 2 to the Coral FMP (SAFMC & GMFMC 1994) redefined allowable octocorals to mean "erect non-encrusting species of the subclass Octocorallia, except the prohibited sea fans *Gorgonia flabellum* and *G. ventalina*, including only the substrate covered by and within one inch (2.54 cm) of the holdfast." If more than 1 inch (2.54 cm) of the substrate is harvested, then this is considered to be live rock and not allowable octocoral (CFR 622 .2). Therefore, harvest of encrusting octocorals is not permitted since this usually entails harvesting the rock on which the colony is growing in its entirety. At the request of the Council's Coral Advisory Panel, the Council considered allowing harvest of the encrusting gorgonian corky seafingers (*Briareum* sp.) and *Erythropodium* sp. The former exhibits an erect morphotype that is easily removed and the latter can easily be peeled off the substrate (Coral AP, 2009).

Florida's Fish and Wildlife Commission (FWC) rule 68B-42, F.A.C. does not allow harvest ("catch") of these two species, therefore the species would not be allowed to be landed in Florida pursuant to 50CFR 622.3(c). The Council's action to allow harvest of these species would be inconsistent with Florida's Marine Life Rule. In addition, in order for regulations to be changed and applied within waters of the Florida Keys National Marine Sanctuary (FKNMS), the rules would have to be approved by the Sanctuary, the FWC, and the Gulf of Mexico Fishery Management Council. Moreover, the State of Florida indicated to the Council that conflicting regulations should be avoided due to difficulties in enforcing rules that are stricter in state waters than in Federal waters.

Alternative 3 (of Action 1). Remove Octocorals from the FMU and Delegate Management of the Octocoral Fishery to the State of Florida.

During their December 2010 meeting, the Council discussed that in order for the delegation management process within the Magnuson-Stevens Act to apply, octocorals would have to be included within the Coral Fishery Management Plan. If octocorals are removed from the fishery management unit, then the Council would not be able to subsequently delegate management of the fishery to the state of Florida. Furthermore, the state of FL has expressed an interest in not managing the fishery if management would be bound by the requirements of the MSA. Thus, the Council removed this as a reasonable alternative to be considered.

Actions relative to management of Special Management Zones

Action 9. Modify Management of Special Management Zones throughout the South Atlantic.

North Carolina has reefs outside of state waters that are currently not designated as special management zones (SMZs). In fall 2009, NC reported having problems in some of these reefs and their inability to control or affect any kind of management measures in those areas. In order to address any problems, NC would have to go through the Council process. Therefore, NC requested that NOAA general counsel look into the feasibility of the Council ceding management of those reef areas to the state. NOAA general counsel reported at the September 2010 Council meeting that transferring management of SMZs off the South Atlantic to the respective states would be difficult to accomplish. Seeing the transfer of management as a

delegation of management, general counsel advised that delegation as defined within the Magnuson-Stevens Act pertains to fisheries, and parsing out a piece of the snapper grouper fishery to address the SMZs and not an entire fishery would be a difficult task. Hence the Council voted at their September 2010 meeting to remove this action from consideration.

Alternatives relative to modification of sea turtle release gear requirements

Alternative 2 (of Action 5). Modify the Approved Specifications for Line Cutters, Bolt Cutters, and Dehookers Required Onboard Federally Permitted Snapper-Grouper Vessels.

Alternative 3 (of Action 5). Modify the Current Gear Specifications Component of the Regulations to Require Dehooking and Disentanglement Gear of an Appropriate Size and Strength Relative to Tackle Deployed for Fishing.

Alternative 2 is very general in that it would allow some type of modification to the gear specifications currently in the regulatory text of the codified federal regulations, but does not specify the specifications that could be changed pertaining to the bolt cutters, and dehookers. Alternative 3 is similar to Alternative 2 because it would also modify the sea turtle dehooking gear specifications; however, it would not limit those modifications to only dehookers and bolt cutters. It would allow modifications to be made to all types of dehooking and disentanglement gear specifications, and simply require gear of an "appropriate size and strength", rather than specifying specific materials of which the required gear must be constructed. The appropriateness of certain sea turtle release gear would be highly subjective. If some fishermen underestimate the size and materials needed for an appropriate dehooking or disentanglement tool, they could risk serious injury or even death of hooked or entangled sea turtles. Because the "appropriateness" of sea turtle release gear is so subjective, and there would be no standard release gear specifications, enforcement of this provision would be very difficult in the fishery. The NMFS' Southeast Regional Office's Protected Resources Division developed a new alternative (Alternative 5) in December 2010 which would comply with the Biological Opinion requirement while also replacing the vague wording included in Alternative 2 and 3. Thus, the Council removed Alternatives 2 and 3 as reasonable for consideration.

Alternatives relative to designating new Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs)

Action 6. Amend the Shrimp Fishery Management Plan (FMP) to Designate New Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs).

Action 7. Amend the Coastal Migratory Pelagics Fishery Management Plan (FMP) to Designate New Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs).

After further evaluation and review NMFS Habitat Conservation Division staff and SAFMC staff determined EFH-HAPC options taken to public scoping for the Coastal Migratory Pelagics FMP and the Shrimp FMP are already included in existing designations. Therefore, Council removed these actions from consideration during the December 2010 meeting.

Action 9. Amend the Fishery Management Plan (FMP) for Pelagic *Sargassum* Habitat to designate EFH-HAPCs.

In March 2011, the South Atlantic Council selected No Action as their preferred alternative for this action, highlighting the fact that areas proposed in the alternative (the Charleston Bump Complex, and The Point, NC) were already designated EFH-HAPCs for Snapper Grouper and the FMP for the Dolphin and Wahoo Fishery of the South Atlantic, and conservation of these specific EFH-HAPCs would be addressed through actions associated with EFH consultations pertaining to existing designations.

Appendix G. History of Management for Fishery Management Plans of the South Atlantic Region Amended through CE-BA 2

The following is a summary of management actions for plans amended through Comprehensive Ecosystem-Based Amendment 2 (Coral, Snapper Grouper, Coastal Migratory Pelagics, and *Sargassum*). Other summaries of Council actions and history of management for other Fishery Management Plans are available online at www.safmc.net.

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

Management of coral resources was originally established with the joint Gulf of Mexico and South Atlantic Coral Fishery Management Plan (FMP) (GMFMC & 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 (CHAPCs); (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 of 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 (GMFMC & SAFMC 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 (GMFMC & 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; and (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 (SAFMC 1995a) 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/hardbottom habitat; and (3) prohibited anchoring of all fishing vessels in the Oculina Bank Habitat Area of Particular Concern (HAPC).

Amendment 4/EIS to the South Atlantic Coral FMP, included in the Comprehensive EFH Amendment (SAFMC 1998b) expanded the Oculina Bank HAPC to an area bounded to the west by 80°W., to the north by 28°30'N., to the south by 27°30'N., 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 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, 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.

Amendment 5 to the Coral FMP included in the Comprehensive SFA Amendment (SAFMC 1998c) extended the OY definition to include harvest allowances under live rock aquaculture permits.

Amendment 6 to the Coral FMP established deepwater Coral HAPCs (CHAPCs), created a "Shrimp Fishery Access Area" within the proposed Stetson-Miami Terrace CHAPC and created

"Allowable Golden Crab Fishing Areas" within the proposed Stetson-Miami Terrace and Pourtalés Terrace CHAPCs.

The South Atlantic Fishery Ecosystem Plan and Ecosystem-Based Management

The Council, working with many other partners, has developed a Fishery Ecosystem Plan (FEP) which identifies and describes the current suite of knowledge on many parameters in the South Atlantic ecosystem. It is the Council's intent to use the information in the FEP to evaluate the biological, economic, and social conditions in the South Atlantic ecosystem. By reviewing the information on a regional basis the Council would be able to evaluate the impacts of future proposed actions across multiple fisheries, thus facilitating development of management regulations that could apply across FMPs.

History of Management of the South Atlantic Snapper Grouper Fishery

The snapper grouper fishery is highly regulated; some of the species included in this amendment have been regulated since 1983. The following table summarizes actions in each of the amendments to the original FMP, as well as some events not covered in amendment actions.

Table1-2. History of Management for the Snapper Grouper Fishery of the South Atlantic Region.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
FMP (1983)	08/31/83	PR: 48 FR 26843 FR: 48 FR 39463	-12" limit – red snapper, yellowtail snapper, red grouper, Nassau grouper -8" limit – black sea bass -4" trawl mesh size -Gear limitations – poisons, explosives, fish traps, trawls -Designated modified habitats or artificial reefs as Special Management Zones (SMZs)
Regulatory Amendment #1 (1986)	03/27/87	PR: 51 FR 43937 FR: 52 FR 9864	-Prohibited fishing in SMZs except with hand-held hook-and-line and spearfishing gear -Prohibited harvest of goliath grouper in SMZs.

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #1 (1988)	01/12/89	PR: 53 FR 42985 FR: 54 FR 1720	-Prohibited trawl gear to harvest fish south of Cape Hatteras, NC and north of Cape Canaveral, FL -Directed fishery defined as vessel with trawl gear and ≥200 lbs s-g on board -Established rebuttable assumption that vessel with s-g on board had harvested such fish in EEZ
Regulatory Amendment #2 (1988)	03/30/89	PR: 53 FR 32412 FR: 54 FR 8342	-Established 2 artificial reefs off Ft. Pierce, FL as SMZs
Notice of Control Date	09/24/90	55 FR 39039	-Anyone entering federal wreckfish fishery in the EEZ off S. Atlantic states after 09/24/90 was not assured of future access if limited entry program developed
Regulatory Amendment #3 (1989)	11/02/90	PR: 55 FR 28066 FR: 55 FR 40394	-Established artificial reef at Key Biscayne, FL as SMZ. Fish trapping, bottom longlining, spear fishing, and harvesting of Goliath grouper prohibited in SMZ
Amendment #2 (1990)	10/30/90	PR: 55 FR 31406 FR: 55 FR 46213	-Prohibited harvest/possession of goliath grouper in or from the EEZ -Defined overfishing for goliath grouper and other species
Emergency Rule	8/3/90	55 FR 32257	-Added wreckfish to the FMU -Fishing year beginning 4/16/90 -Commercial quota of 2 million pounds -Commercial trip limit of 10,000 pounds per trip
Fishery Closure Notice	8/8/90	55 FR 32635	- Fishery closed because the commercial quota of 2 million pounds was reached
Emergency Rule Extension	11/1/90	55 FR 40181	-Extended the measures implemented via emergency rule on 8/3/90
Amendment #3 (1990)	01/31/91	PR: 55 FR 39023 FR: 56 FR 2443	-Added wreckfish to the FMU; -Defined optimum yield and overfishing -Required permit to fish for, land or sell wreckfish; -Required catch and effort reports from selected, permitted vessels; -Established control date of 03/28/90; -Established a fishing year for wreckfish starting

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
			April 16; -Established a process to set annual quota, with initial quota of 2 million pounds; provisions for closure; -Established 10,000 pound trip limit; -Established a spawning season closure for wreckfish from January 15 to April 15; and -Provided for annual adjustments of wreckfish management measures;
Notice of Control Date	07/30/91	56 FR 36052	-Anyone entering federal snapper grouper fishery (other than for wreckfish) in the EEZ off S. Atlantic states after 07/30/91 was not assured of future access if limited entry program developed

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #4 (1991)	01/01/92	PR: 56 FR 29922 FR: 56 FR 56016	-Prohibited gear: fish traps except black sea bass traps north of Cape Canaveral, FL; entanglement nets; longline gear inside 50 fathoms; bottom longlines to harvest wreckfish**; powerheads and bangsticks in designated SMZs off S. Carolina -defined overfishing/overfished and established rebuilding timeframe: red snapper and groupers ≤ 15 years (year 1 = 1991); other snappers, greater amberjack, black sea bass, red porgy ≤ 10 years (year 1 = 1991) -Required permits (commercial & for-hire) and specified data collection regulations -Established an assessment group and annual adjustment procedure (framework) -Permit, gear, and vessel id requirements specified for black sea bass traps -No retention of snapper grouper spp. caught in other fisheries with gear prohibited in snapper grouper fishery if captured snapper grouper had no bag limit or harvest was prohibited. If had a bag limit, could retain only the bag limit -8" limit – lane snapper -10" limit – vermilion snapper (recreational only) -12" limit – red porgy, vermilion snapper (commercial only), gray, yellowtail, mutton, schoolmaster, queen, blackfin, cubera, dog, mahogany, and silk snappers -20" limit – red snapper, gag, and red, black, scamp, yellowfin, and yellowmouth groupers -28" FL limit – greater amberjack (recreational only) -36" FL or 28" core length – greater amberjack (commercial only) -bag limits – 10 vermilion snapper, 3 greater amberjack; aggregate snapper bag limit – 10/pp/day, excluding vermilion snapper and allowing no more than 2 red snappers
			-aggregate grouper bag limit – 5/person/day, excluding Nassau and goliath grouper, for which no retention (recreational & commercial) is allowed -spawning season closure – commercial harvest greater amberjack > 3 fish bag prohibited in April south of Cape Canaveral, FL -spawning season closure – commercial harvest mutton snapper >snapper aggregate prohibited

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #5 (1991)	04/06/92	PR: 56 FR 57302 FR: 57 FR 7886	-Wreckfish: established limited entry system with ITQs; required dealer to have permit; rescinded 10,000 lb. trip limit; required off-loading between 8 am and 5 pm; reduced occasions when 24-hour advance notice of offloading required for off-loading; established procedure for initial distribution of percentage shares of TAC
Emergency Rule	8/31/92	57 FR 39365	-Black Sea Bass (bsb): modified definition of bsb pot; allowed multi-gear trips for bsb; allowed retention of incidentally-caught fish on bsb trips
Emergency Rule Extension	11/30/92	57 FR 56522	-Black Sea Bass: modified definition of bsb pot; allowed multi-gear trips for bsb; allowed retention of incidentally-caught fish on bsb trips
Regulatory Amendment #4 (1992)	07/06/93	FR: 58 FR 36155	-Black Sea Bass: modified definition of bsb pot; allowed multi-gear trips for bsb; allowed retention of incidentally-caught fish on bsb trips
Regulatory Amendment #5 (1992)	07/31/93	PR: 58 FR 13732 FR: 58 FR 35895	-Established 8 SMZs off S. Carolina, where only hand-held, hook-and-line gear and spearfishing (excluding powerheads) was allowed
Amendment #6 (1993)	07/27/94	PR: 59 FR 9721 FR: 59 FR 27242	-commercial quotas for snowy grouper, golden tilefish -commercial trip limits for snowy grouper, golden tilefish, speckled hind, and warsaw grouper -include golden tilefish in grouper recreational aggregate bag limits -prohibited sale of warsaw grouper and speckled hind -100% logbook coverage upon renewal of permit -creation of the *Oculina* Experimental Closed Area -data collection needs specified for evaluation of possible future IFQ system

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #7 (1994)	01/23/95	PR: 59 FR 47833 FR: 59 FR 66270	-12" FL – hogfish -16" TL – mutton snapper -required dealer, charter and headboat federal permits -allowed sale under specified conditions -specified allowable gear and made allowance for experimental gear -allowed multi-gear trips in N. Carolina -added localized overfishing to list of problems and objectives -adjusted bag limit and crew specs. for charter and head boats -modified management unit for scup to apply south of Cape Hatteras, NC -modified framework procedure
Regulatory Amendment #6 (1994)	05/22/95	PR: 60 FR 8620 FR: 60 FR 19683	Established actions which applied only to EEZ off Atlantic coast of FL: Bag limits – 5 hogfish/person/day (recreational only), 2 cubera snapper/person/day > 30" TL; 12" TL – gray triggerfish
Notice of Control Date	04/23/97	62 FR 22995	-Anyone entering federal bsb pot fishery off S. Atlantic states after 04/23/97 was not assured of future access if limited entry program developed

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #8 (1997)	12/14/98	PR: 63 FR 1813 FR: 63 FR 38298	-established program to limit initial eligibility for snapper grouper fishery: Must demonstrate landings of any species in SG FMU in 1993, 1994, 1995 or 1996; and have held valid SG permit between 02/11/96 and 02/11/97 -granted transferable permit with unlimited landings if vessel landed ≥ 1,000 lbs. of snapper grouper spp. in any of the years -granted non-transferable permit with 225 lb. trip limit to all other vessels -modified problems, objectives, OY, and overfishing definitions -expanded Council's habitat responsibility -allowed retention of snapper grouper spp. in excess of bag limit on permitted vessel with a single bait net or cast nets on board -allowed permitted vessels to possess filleted fish harvested in the Bahamas under certain conditions
Regulatory Amendment #7 (1998)	01/29/99	PR: 63 FR 43656 FR: 63 FR 71793	-Established 10 SMZs at artificial reefs off South Carolina
Interim Rule Request	1/16/98		-Council requested all Amendment 9 measures except black sea bass pot construction changes be implemented as an interim request under MSA
Action Suspended	5/14/98		-NMFS informed the Council that action on the interim rule request was suspended
Emergency Rule Request	9/24/98		-Council requested Amendment 9 be implemented via emergency rule
Request not Implemented	1/22/99		-NMFS informed the Council that the final rule for Amendment 9 would be effective 2/24/99; therefore they did not implement the emergency rule

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #9 (1998)	2/24/99	PR: 63 FR 63276 FR: 64 FR 3624	-Red porgy: 14" length (recreational and commercial); 5 fish rec. bag limit; no harvest or possession > bag limit, and no purchase or sale, in March and April. -Black sea bass: 10" length (recreational and commercial); 20 fish rec. bag limit; required escape vents and escape panels with degradable fasteners in bsb pots -Greater amberjack: 1 fish rec. bag limit; no harvest or possession > bag limit, and no purchase or sale, during April; quota = 1,169,931 lbs; began fishing year May 1; prohibited coring -Vermilion snapper: 11" length (recreational) Gag: 24" length (recreational); no commercial harvest or possession > bag limit, and no purchase or sale, during March and April -Black grouper: 24" length (recreational and commercial); no harvest or possession > bag limit, and no purchase or sale, during March and April. -Gag and Black grouper: within 5 fish aggregate grouper bag limit, no more than 2 fish may be gag or black grouper (individually or in combination) -All SG without a bag limit: aggregate recreational bag limit 20 fish/person/day, excluding tomtate and blue runners -Vessels with longline gear aboard may only possess snowy, warsaw, yellowedge, and misty grouper, and golden, blueline and sand tilefish
Amendment #9 (1998) resubmitted	10/13/00	PR: 63 FR 63276 FR: 65 FR 55203	-Commercial trip limit for greater amberjack
Regulatory Amendment #8 (2000)	11/15/00	PR: 65 FR 41041 FR: 65 FR 61114	-Established 12 SMZs at artificial reefs off Georgia; revised boundaries of 7 existing SMZs off Georgia to meet CG permit specs; restricted fishing in new and revised SMZs

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Emergency Interim Rule	09/08/99, expired 08/28/00	64 FR 48324 and 65 FR 10040	-Prohibited harvest or possession of red porgy
Emergency Action	9/3/99	64 FR 48326	-Reopened the Amendment 8 permit application process
Amendment #10 (1998)	07/14/00	PR: 64 FR 37082 and 64 FR 59152 FR: 65 FR 37292	-Identified EFH and established EFH-HAPCs for species in the SG FMU

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #11 (1998d)	12/02/99	PR: 64 FR 27952 FR: 64 FR 59126	-MSY proxy: goliath and Nassau grouper = 40% static SPR; all other species = 30% static SPR -OY: hermaphroditic groupers = 45% static SPR; goliath and Nassau grouper = 50% static SPR; all other species = 40% static SPR -Overfished/overfishing evaluations: BSB: overfished (MSST=3.72 mp, 1995 biomass=1.33 mp); undergoing overfishing (MFMT=0.72, F1991-1995=0.95) Vermilion snapper: overfished (static SPR = 21-27%). Red porgy: overfished (static SPR = 14-19%). Red snapper: overfished (static SPR = 24-32%) Gag: overfished (static SPR = 27%) Scamp: no longer overfished (static SPR = 35%) Speckled hind: overfished (static SPR = 8-13%) Warsaw grouper: overfished (static SPR = 6-14%) Snowy grouper: overfished (static SPR = 5=15%) White grunt: no longer overfished (static SPR = 29-39%) Golden tilefish: overfished (couldn't estimate static SPR) Nassau grouper: overfished (couldn't estimate static SPR) Goliath grouper: overfished (couldn't estimate static SPR) -overfishing level: goliath and Nassau grouper = F>F40% static SPR; all other species: = F>F30% static SPR Approved definitions for overfished and overfishing. MSST = [(1-M) or 0.5 whichever is greater]*B_{MSY}. MFMT = F_{MSY}
Amendment #12	09/22/00	PR: 65 FR	-Red porgy: MSY=4.38 mp; OY=45% static SPR;

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
(2000)		35877 FR: 65 FR 51248	MFMT=0.43; MSST=7.34 mp; rebuilding timeframe=18 years (1999=year 1); no sale during Jan-April; 1 fish bag limit; 50 lb. bycatch comm. trip limit May-December; modified management options and list of possible framework actions
Amendment #13A (2003)	04/26/04	PR: 68 FR 66069 FR: 69 FR 15731	-Extended for an indefinite period the regulation prohibiting fishing for and possessing snapper grouper spp. within the *Oculina* Experimental Closed Area
Notice of Control Date	10/14/05	70 FR 60058	-The Council is considering management measures to further limit participation or effort in the commercial fishery for snapper grouper species (excluding Wreckfish)
Amendment #13C (2006)	10/23/06	PR: 71 FR 28841 FR: 71 FR 55096	- End overfishing of snowy grouper, vermilion snapper, black sea bass, and golden tilefish. Increase allowable catch of red porgy. Year 1 = 2006. 1. Snowy Grouper Commercial: Quota (gutted weight) = 151,000 lbs gw in year 1, 118,000 lbs gw in year 2, and 84,000 lbs gw in year 3 onwards. Trip limit = 275 lbs gw in year 1, 175 lbs gw in year 2, and 100 lbs gw in year 3 onwards Recreational: Limit possession to one snowy grouper in 5 grouper per person/day aggregate bag limit. 2. Golden Tilefish Commercial: Quota of 295,000 lbs gw, 4,000 lbs gw trip limit until 75% of the quota is taken when the trip limit is reduced to 300 lbs gw. Do not adjust the trip limit downwards unless 75% is captured on or before September 1 Recreational: Limit possession to 1 golden tilefish in 5 grouper per person/day aggregate bag limit. 3. Vermilion Snapper Commercial: Quota of 1,100,000 lbs gw Recreational: 12" size limit. 4. Black Sea Bass Commercial: Commercial quota (gutted weight) of 477,000 lbs gw in year 1,

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
			423,000 lbs gw in year 2, and 309,000 lbs gw in year 3 onwards. Require use of at least 2" mesh for the entire back panel of black sea bass pots effective 6 months after publication of the final rule. Require black sea bass pots be removed from the water when the quota is met. Change fishing year from calendar year to June 1 – May 31 Recreational: Recreational allocation of 633,000 lbs gw in year 1, 560,000 lbs gw in year 2, and 409,000 lbs gw in year 3 onwards. Increase minimum size limit from 10" to 11" in year 1 and to 12" in year 2. Reduce recreational bag limit from 20 to 15 per person per day. Change fishing year from the calendar year to June 1 through May 31 5. Red Porgy Commercial and recreational 1. Retain 14" TL size limit and seasonal closure (retention limited to the bag limit); 2. Specify a commercial quota of 127,000 lbs gw and prohibit sale/purchase and prohibit harvest and/or possession beyond the bag limit when quota is taken and/or during January through April; 3. Increase commercial trip limit from 50 lbs ww to 120 red porgy (210 lbs gw) during May through December; 4. Increase recreational bag limit from one to three red porgy per person per day
Notice of Control Date	3/8/07	72 FR 60794	-The Council may consider measures to limit participation in the snapper grouper for-hire fishery
Amendment #14 (2007) Sent to NMFS 7/18/07	2/12/09	PR: 73 FR 32281 FR: 74 FR 1621	-Establish eight deepwater Type II marine protected areas (MPAs) to protect a portion of the population and habitat of long-lived deepwater snapper grouper species
Amendment #15A (2007)	3/14/08	73 FR 14942	- Establish rebuilding plans and SFA parameters for snowy grouper, black sea bass, and red porgy
Amendment	2/15/10	PR: 74 FR	- Prohibit the sale of bag-limit caught snapper

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
#15B (2008b)		30569 FR: 74 FR 58902	grouper species -Reduce the effects of incidental hooking on sea turtles and smalltooth sawfish - Adjust commercial renewal periods and transferability requirements - Implement plan to monitor and assess bycatch - Establish reference points for golden tilefish - Establish allocations for snowy grouper (95% com & 5% rec) and red porgy (50% com & 50% rec)
Amendment #16 (SAFMC 2008c)	7/29/09	PR: 74 FR 6297 FR: 74 FR 30964	-Specify SFA parameters for gag and vermilion snapper -For gag grouper: Specify interim allocations 51% com & 49% rec; rec & com spawning closure January through April; directed com quota=348,440 pounds gutted weight; reduce 5-grouper aggregate to 3-grouper and 2 gag/black to 1 gag/black and exclude captain & crew from possessing bag limit -For vermilion snapper: Specify interim allocations 68% com & 32% rec; directed com quota split Jan-June=168,501 pounds gutted weight and 155,501 pounds July-Dec; reduce bag limit from 10 to 4 and a rec closed season October through May 15. In addition, the NMFS RA will set new regulations based on new stock assessment -Require dehooking tools
Amendment #17A	12/3/10 red snapper closure; circle hooks March 3, 2011	PR: 75 FR 49447 FR: 75 FR 76874	-Specify an ACL and an AM for red snapper with management measures to reduce the probability that catches will exceed the stocks' ACL -Specify a rebuilding plan for red snapper -Specify status determination criteria for red snapper -Specify a monitoring program for red snapper

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
Amendment #17B	1/31/11	PR: 75 FR 62488 FR: 75 FR 82280	-Specify ACLs, ACTs, and AMs, where necessary, for 8 species undergoing overfishing -Modify management measures as needed to limit harvest to the ACL or ACT -Update the framework procedure for specification of total allowable catch
Notice of Control Date	12/4/08	74 FR 7849	Establishes a control date for the golden tilefish fishery of the South Atlantic
Notice of Control Date	12/4/08	74 FR 7848	Establishes control date for black sea bass pot fishery of the South Atlantic
Amendment 18	TBD	TBD	-Limit participation and effort in the golden tilefish fishery -Modifications to management of the black sea bass pot fishery -Change the golden tilefish fishing year -Improve the accuracy, timing, and quantity of fisheries statistics
Amendment 19 Comprehensive Ecosystem-Based Amendment 1	July 22, 2010	PR: 75 FR 14548 FR: 75 FR 35330	-Establish deepwater coral HAPCs
Amendment 20	TBD	TBD	-Update wreckfish ITQ according to reauthorized MSFCMA -Establish ACLs, AMs, and management reference

Document	All Actions Effective By:	Proposed Rule Final Rule	Major Actions. Note that not all details are provided here. Please refer to Proposed and Final Rules for all impacts of listed documents.
			points for wreckfish fishery
Comprehensive ACL Amendment	TBD	TBD	-Establish ABC control rules, establish ABCs, ACTs, and AMs for species not undergoing overfishing -Remove some species from South Atlantic FMUs -Specify allocations among the commercial, recreational, and for-hire sectors for species not undergoing overfishing -Limit the total mortality for federally managed species in the South Atlantic to the ACTs -Address spiny lobster issues

History of Management of Pelagic *Sargassum* Habitat

The Fishery Management Plan for Pelagic *Sargassum* Habitat (SAFMC 2002) was approved in 2003 and established the following restrictions to protect Pelagic *Sargassum* Habitat in the South Atlantic:
(1) harvest and possession of *Sargassum* is prohibited south of the latitude line representing the North Carolina/South Carolina border, (2) all harvest is prohibited within 100 miles of shore between the 34 degrees North latitude line and the line representing the North Carolina/Virginia border, (3) harvest is limited to the months of November through June, (4) official observers are required on any harvesting trip, (5) an annual quota of 5,000 pounds landed wet weight, and (6) nets used to harvest *Sargassum* must be constructed of 4 ft stretch mesh or larger fitted to a frame no larger than 4 X 6 feet.

Other provisions of the plan include: Establishing the management unit for pelagic *Sargassum* throughout the South Atlantic exclusive economic zone (EEZ) and state waters. The management unit is the population of pelagic *Sargassum* occurring within the South Atlantic Council's area of jurisdiction along the U.S. Atlantic coast from the east coast of Florida, including the Atlantic side of the Florida Keys, to the North Carolina/Virginia Border and within state waters of North Carolina, South Carolina, Georgia, and the Florida East Coast. In addition, the following were established for pelagic *Sargassum*; a maximum sustainable yield , an optimum yield for pelagic *Sargassum* as 5,000 pounds wet weight per year and an overfishing level to meet Magnuson-Stevens Act mandate for pelagic *Sargassum*.

The Fishery Management Plan for Coastal Migratory Pelagics in the Atlantic and Gulf of Mexico

The Coastal Migratory Pelagics FMP was approved in 1982 and implemented in February, 1983. Managed species included king mackerel, Spanish mackerel, and cobia. The FMP treated king mackerel and Spanish mackerel as unit stocks in the Atlantic and Gulf of Mexico. The FMP established allocations for the recreational and commercial sectors harvesting these stocks, and the commercial allocations were divided between net and hook-and-line fishermen.

Amendment 1, with environmental impact statement (EIS), implemented in September 1985, provided a framework procedure for pre-season adjustment of total allowable catch (TAC), revised king mackerel maximum sustainable yield (MSY) downward, recognized separate Atlantic and Gulf migratory groups of king mackerel, and established fishing permits and bag limits for king mackerel. Commercial allocations among gear users, except purse seines that were allowed 6% of the commercial allocation of TAC, were eliminated. The Gulf commercial allocation for king mackerel was divided into Eastern and Western Zones for the purpose of regional allocation, with 69% of the remaining allocation provided to the Eastern Zone and 31% to the Western Zone. Amendment 1 also established minimum size limits for Spanish mackerel at 12 inches fork length (FL) or 14 inches total length (TL) and for cobia at 33 inches FL or 37 inches TL.

Amendment 2, with environmental assessment (EA), implemented in July1987, revised Spanish mackerel MSY downward, recognized two migratory groups, established allocations of TAC for the commercial and recreational sectors, and set commercial quotas and bag limits. Charterboat permits were required, and it was clarified that TAC must be set below the upper range of acceptable biological catch (ABC). The use of purse seines on overfished stocks was prohibited, and their allocation of TAC was redistributed under the 69%/31% split.

Amendment 3, with EA, was partially approved in August 1989, revised, resubmitted, and approved in April 1990. It prohibited drift gill nets for coastal pelagics and purse seines for the overfished groups of mackerels.

Amendment 4, with EA, implemented in October 1989, reallocated Spanish mackerel equally between recreational and commercial fishermen on the Atlantic group.

Amendment 5, with EA, implemented in August 1990, made the following changes in the management regime:
· Extended the management area for Atlantic groups of mackerels through the Mid-Atlantic Council's area of jurisdiction;
· Revised problems in the fishery and plan objectives;
· Revised the fishing year for Gulf Spanish mackerel from July-June to April-March;
· Revised the definition of "overfishing";
· Added cobia to the annual stock assessment procedure;

· Provided that the South Atlantic Fishery Management Council will be responsible for pre-season adjustments of TACs and bag limits for the Atlantic migratory groups of mackerels while the Gulf of Mexico Fishery Management Council (GMFMC) will be responsible for Gulf migratory groups;
· Continued to manage the two recognized Gulf migratory groups of king mackerel as one until management measures appropriate to the eastern and western groups can be determined;
· Re-defined recreational bag limits as daily limits;
· Deleted a provision specifying that bag limit catch of mackerel may be sold;
· Provided guidelines for corporate commercial vessel permits;
· Specified that Gulf group king mackerel may be taken only by hook-and-line and run-around gill nets;
· Imposed a bag and possession limit of two cobia per person per day;
· Established a minimum size of 12 inches (30.5 cm.) fork length (FL) or 14 inches (35.6 cm.) total length (TL) for king mackerel and included a definition of "conflict" to provide guidance to the Secretary.

Amendment 6, with EA, implemented in November of 1992, made the following changes:
· Identified additional problems and an objective in the fishery;
· Provided for rebuilding overfished stocks of mackerels within specific periods;
· Provided for biennial assessments and adjustments;
· Provided for more seasonal adjustment actions;
· Allowed for Gulf king mackerel stock identification and allocation when appropriate;
· Provided for commercial Atlantic Spanish mackerel possession limits;
· Changed commercial permit requirements to allow qualification in one of three preceding years;
· Discontinued the reversion of the bag limit to zero when the recreational quota is filled;
· Modified the recreational fishing year to the calendar year; and
· Changed the minimum size limit for king mackerel to 20 inches FL, and changed all size limit measures to fork length only.

Amendment 7, with EA, implemented in November 1994, equally divided the Gulf commercial allocation in the Eastern Zone at the Dade-Monroe County line in Florida. The sub-allocation for the area from Monroe County through Western Florida is equally divided between commercial hook-and-line and net gear users.

Amendment 8, with EA, implemented March 1998, made the following changes to the management regime:
• Clarified ambiguity about allowable gear specifications for the Gulf group king mackerel fishery by allowing only hook-and-line and run-around gill nets. However, catch by permitted, multi-species vessels and bycatch allowances for purse seines were maintained;

• Established allowable gear in the SAFMC and Mid Atlantic Fishery Management Council (MAFMC) areas as well as providing for the RA to authorize the use of experimental gear;
• Established the councils' intent to evaluate the impacts of permanent jurisdictional boundaries between the GMFMC and SAFMC and development of separate FMPs for coastal pelagics in these areas;
• Established a moratorium on commercial king mackerel permits until no later than October 15, 2000, with a qualification date for initial participation of October 16, 1995;
• Increased the income requirement for a king or Spanish mackerel permit to 25% of earned income or $10,000 from commercial sale of catch or charter or head boat fishing in 1 of the 3 previous calendar years, but allowed for a 1-year grace period to qualify under permits that are transferred;
• Legalized retention of up to 5 cut-off (damaged) king mackerel on vessels with commercial trip limits;
• Set an optimum yield OY target at 30% static spawning potential ratio (SPR) for the Gulf and 40% static SPR for the Atlantic;
• Provided the SAFMC with authority to set vessel trip limits, closed seasons or areas, and gear restrictions for Gulf group king mackerel in the North Area of the Eastern Zone (Dade/Monroe to Volusia/Flagler County lines);
• Established various data consideration and reporting requirements under the framework procedure;
• Modified the seasonal framework adjustment measures and specifications (see Appendix I);
• Expanded the management area for cobia through the MAFMC's area of jurisdiction (New York).

Amendment 9, with EA, implemented in April 2000, made the following changes to the management regime:
• Reallocated the percentage of the commercial allocation of TAC for the North Area (Florida east coast) and South/West Area (Florida west coast) of the Eastern Zone to 46.15% North and 53.85% South/West and retained the recreational and commercial allocations of TAC at 68% recreational and 32% commercial;
• Subdivided the commercial hook-and-line king mackerel allocation for the Gulf group, Eastern Zone, South/West Area (Florida west coast) by establishing 2 subzones with a dividing line between the 2 subzones at the Collier/Lee County line;
• Established regional allocations for the west coast of Florida based on the 2 subzones with 7.5% of the Eastern Zone allocation of TAC being allowed from Subzone 2 and the remaining 92.5% being allocated as follows:
50% - Florida east coast
50% - Florida west coast that is further subdivided:
50% - Net Fishery
50% - Hook-and-Line Fishery
• Established a trip limit of 3,000 pounds per vessel per trip for the Western Zone

• Established a moratorium on the issuance of commercial king mackerel gill net endorsements and allow re-issuance of gill net endorsements to only those vessels that: (1) had a commercial mackerel permit with a gill net endorsement on or before the moratorium control date of October 16, 1995 (Amendment 8), and (2) had landings of king mackerel using a gill net in one of the two fishing years 1995-96 or 1996-97 as verified by the National Marine Fisheries Service (NMFS) or trip tickets from the Florida Department of Environmental Protection; allowed transfer of gill net endorsements to immediate family members (son, daughter, father, mother, or spouse) only; and prohibited the use of gill nets or any other net gear for the harvest of Gulf group king mackerel north of an east/west line at the Collier/Lee County line
• Increased the minimum size limit for Gulf group king mackerel from 20 inches to 24 inches FL;
• Allowed the retention and sale of cut-off (damaged), legal-sized king and Spanish mackerel within established trip limits.

Amendment 10, with (Supplemental Environmental Impact Statement (SEIS), approved June 1999, identified essential fish habitat (EFH) and EFH-HAPCs for species in the CMP FMU.

Amendment 11, with SEIS, partially approved in December 1999, included proposals for mackerel in the SAFMC's Comprehensive Amendment Addressing Sustainable Fishery Act Definitions and other Provisions in Fishery Management Plans of the South Atlantic Region.

Amendment 12, with EA, implemented October 2000, extended the commercial king mackerel permit moratorium from its current expiration date of October 15, 2000 to October 15, 2005, or until replaced with a license limitation, limited access, and/or individual fishing quota or individual transferable quota system, whichever occurs earlier.

Amendment 13, with SEIS, implemented August 19, 2002 established two marine reserves in the EEZ of the Gulf in the vicinity of the Dry Tortugas, Florida known as Tortugas North and Tortugas South in which fishing for coastal migratory pelagic species is prohibited. This action complements previous actions taken under the National Marine Sanctuaries Act.

Amendment 14, with EA, implemented July 29, 2002, established a 3-year moratorium on the issuance of charter vessel and head boat Gulf group king mackerel permits in the Gulf unless sooner replaced by a comprehensive effort limitation system. The control date for eligibility was established as March 29, 2001. Also includes other provisions for eligibility, application, appeals, and transferability.

South Carolina Department of
Natural Resources

John E. Frampton
Director
Robert H. Boyles
Deputy Director for
Marine Resources

3 August, 2009

Mr. Duane Harris
Chairman
South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201
North Charleston, SC 29405

Dear ~~Mr. Harris~~ Duane,

Several weeks ago representatives of South Carolina's recreational fishing community brought to our attention concerns over commercial snapper-grouper fishing vessels allegedly operating on several of our permitted offshore artificial reef sites. Specifically, these recreational constituents felt that the use of conventional spearguns by these fishermen to harvest fish on these sites might be harmful to the reef fish populations and was not in keeping with the intended purpose of these manmade reefs.

As you are aware, the majority of South Carolina's permitted offshore artificial reefs have already been designated through past Council actions (per Management Measure #17 of the Snapper-Grouper Management Plan) as Special Management Zones (SMZ), the intent of which is to protect these relatively small reef communities from the effects of overly-efficient fishing practices. For this reason the use of certain types of fishing gear (e.g., bangsticks) within the boundaries of these SMZ reefs has been prohibited for a number of years.

The SC Artificial Reef program is supported almost entirely by the recreational community through the SC Saltwater Recreational Fishing License program and the Federal Aid in Sportfish Restoration program. After a good deal of research it has become apparent to SCDNR staff that a key issue in our recent discussions revolves around a few commercial fishermen who may be legally taking commercially allowable quantities of snapper-grouper species from the state's SMZ reefs. We believe that this practice is not compatible with the purpose for which these sites were established. The Department of Natural Resources is concerned with potential removals of commercially viable quantities of snapper-grouper species from these SMZs, regardless of gear type.

Management Measure #17 of the Snapper Grouper Management Plan allows for a permittee to request the "prohibition" or "restraint" of the use of specific gear types on SMZs. On behalf of the SC Department of Natural Resources, I hereby request that the South Atlantic Fishery Management Council restrict harvest and possession of snapper-grouper species on artificial reefs within Special Management Zones off the South Carolina coast to the recreational bag limit for all recreational, for-hire, and commercial users. Such a measure would not impose a restriction based on intent of

harvesting fish (commercial or recreational) nor on gear type, but rather would impose an easily determined restraint on legal use of gear that is more compatible with the intent for establishing and maintaining these valuable offshore fishing sites.

Thank you in advance for the Council's consideration of this request. Please contact me if I can provide any additional detail or answer any questions related to this request.

Sincerely,

Robert H. Boyles, Jr.
DNR Deputy Director for Marine Resources

cc: Mac Currin, Chairman, Snapper-Grouper Committee
David Cupka
Tom Swatzel
Mel Bell
Bob Martore

Economic Impact and Use Survey of South Carolina Artificial Reef Users: Private Boat Anglers and Charter Divers, 2006

Report Prepared for the South Carolina Department of Natural Resources, Marine Resources Division

By

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June 2007

The views expressed herein are those of the authors and do not necessarily reflect those of their employers or the funding entities.

Table of Contents

EXECUTIVE SUMMARY

The Marine Resources Division of the South Carolina Department of Natural Resources (SCDNR) developed and currently manages a system of 45 marine artificial reef (**AR**) areas or sites off the South Carolina (SC) coast and within SC estuarine (internal) waters (Fig. 1). This vast array or system of artificial reef sites enhances saltwater recreational fishing and diving opportunities while directly mitigating heavy utilization impacts on limited natural hard-bottom area of SC. Although the SCDNR has been responsive to AR user needs, the last comprehensive fishery AR usage-oriented survey was completed more than 13 years ago and is considered outdated because the number and diversity of AR sites has substantially changed, as well as the apparent harvesting capabilities of recreational anglers. Consequently, the purpose of this research was to systematically collect updated information (2006) on AR recreational users (i.e. recreational anglers and charter divers) with an emphasis on estimating management oriented aggregates such as total monthly AR related fishing trips completed by private boat recreational anglers and the economic impacts (e.g. sales, jobs, sales taxes, etc.) on the SC coastal economy associated with the AR system. The results of this research are also expected to provide SCDNR with new insight for enhancing the current and future management of this system, while informing the general public of economic impacts stemming from this diverse array of AR sites managed by the SCDNR.

Angler oriented information on AR related private boat fishing trips during 2006 was collected by random monthly sampling of ~19,200 SC saltwater license holders using mail questionnaires and an equivalent Internet survey instrument from May through November 2006. Information collected from responding licensees that had fished at AR sites included the number of AR related fishing trips during a given recall month, species caught and expenditures associated with their most recent AR fishing trip. Recreational diving information related to AR sites was collected by periodic phone survey of the five SC coastal scuba diving charter businesses offering SC oceanic charter dive trips, conducting a comprehensive census of all oceanic dive trips completed by these businesses and sampling of their dive charter customers during 2006.

Over 6,207 usable mail questionnaires and Internet responses were received from licensees during the 2006 sampling, and the response rate adjusted for undeliverable mail was 35%. In general, 90% of the responding licensees reported recreational saltwater fishing in or off of SC during the last two years with about 85% of the licensees reporting one or more SC saltwater fishing trips using private boats during the past twelve (12) months. In addition, 32% of these active SC saltwater private boat anglers also reported completing one or more trips involving AR sites with SC coastal county licensees having the highest percentage, 34%, of these AR trips. In contrast to these 12-month response percentages, monthly responses indicated that the percentage of licensees completing one or more SC saltwater fishing trips during a given sampled month were about 13% and 11% for SC coastal and SC non-coastal county licensees, respectively, and ~11% for non-residents that were sampled during a four-month period (i.e. May-August, 2006). These monthly and annual (12-month) percentages of sampled licensees making AR trips are consistent with AR sites being among several general fishing areas available for active saltwater anglers.

The 45 SC marine permitted AR areas were grouped into three north to south oriented AR permitted area “clusters”, i.e. “North Cluster,” “Central Cluster” and the “South Cluster.” An analysis of AR trips within license regions indicated that the highest percentage of fishing on AR permitted areas within the SC coastal county licensees occurred in the North and Central Clusters. In addition, within non-resident licenses, the North Cluster of AR sites had the highest percentage of AR trips. These percentages are consistent with the high percentages licensees residing in the SC coastal counties of Berkeley, Charleston, Dorchester, Georgetown and Horry, as well as a high

percentage of North Carolina (non-resident) licensees apparently choosing to fish on AR sites in the North Cluster. Reponses also indicated that approximately 54% of the active AR anglers would make fewer saltwater fishing trips if AR sites were not available, and a regional comparison indicates that this percentage would approach 60% or higher for SC non-coastal AR anglers that fish on AR sites within the Central and South Clusters.

Estimates of total (aggregate) SC private boat fishing trips involving SC permitted marine artificial reef sites by SC licensees during 2006 were extrapolated based on the percentage of respondents who fished on one or more AR sites during a given recall month and the total Fiscal Year 2005-2006 license sales by the three license regions. Major assumptions were also made when estimating total monthly AR trips during months not sampled in 2006 including the conservative assumption that AR related fishing trips during January and February 2006 were not significant. The projected total number SC private boat saltwater fishing trips involving permitted marine AR areas in 2006 was estimated to be **~203,400 trips** and these estimated AR trips were about 49% of all 2006 ocean SC fishing trips estimated by a federal survey. A comparison between the 1992 and the 2006 estimates of annual total AR trips indicates that saltwater fishing trips involving AR sites approximately tripled between 1992 and 2006 while the number of permitted AR areas has only doubled since 1992. Based on primary data collected on charter divers, a total of 3,571 divers participated in charted SC offshore dive trips during 2006 with 53% of these charter divers (1,902 divers) making one or more dives on structures within SC permitted artificial reef sites.

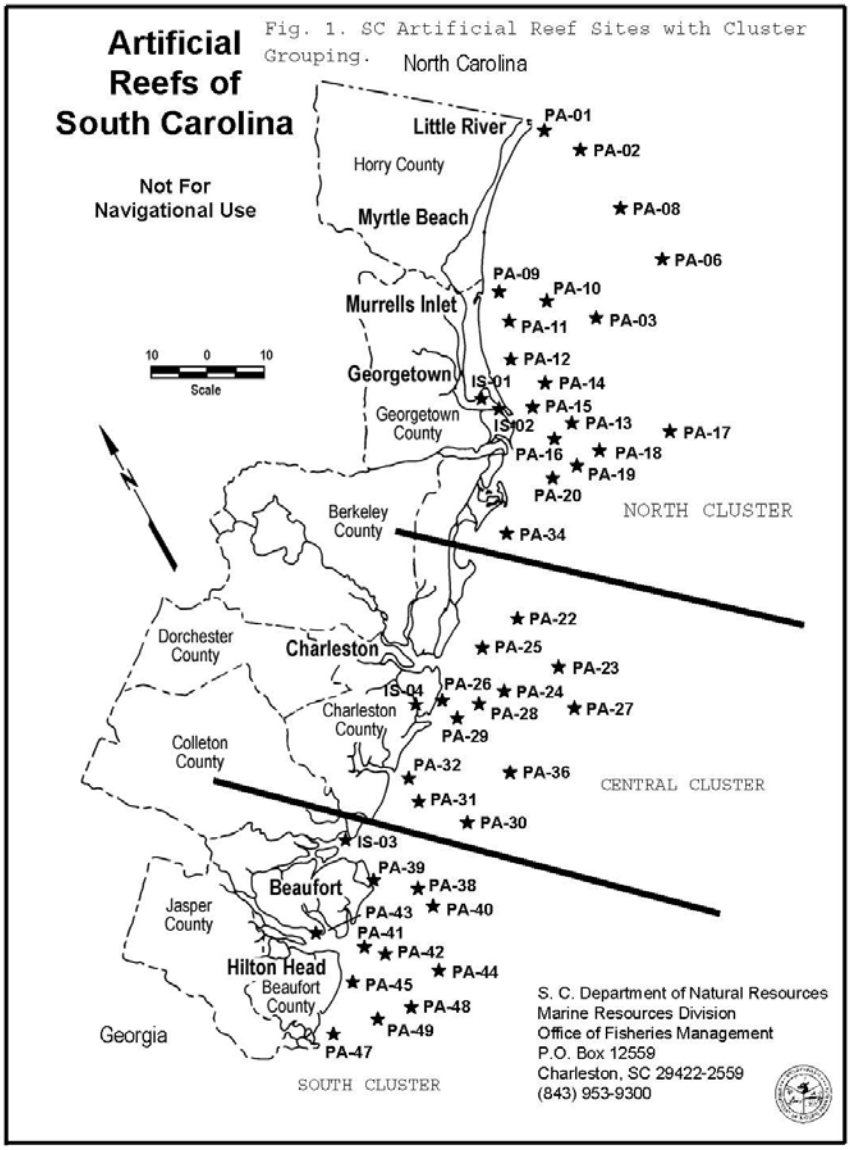
The estimating of economic impacts and economic importance of anglers and charter divers related to the use of SC permitted marine artificial reef sites was predicated upon estimating total (aggregate) annual trip expenditures for each user group (i.e. anglers and charter divers) using their daily trip expenditure averages (means) by major license regions and overnight trips in the SC coastal counties. The mean total daily trip expenditures by private boat anglers making an AR related fishing trip during a sampled month ranged from $548 for non-coastal anglers staying overnight to about $255 for SC coastal anglers not making overnight trips, and the total mean daily expenditures by non-coastal charter divers staying overnight were $381. The estimated total (aggregate) trip expenditures by private boat anglers and charter divers making trips involving AR sites were $28.7 million and $0.6 million, respectively, during 2006. These AR users in 2006 represented an economic impact (i.e. economic importance) of approximately **$83 million** in total sales (output) that generated approximately 1,000 jobs. It is readily apparent that the SC marine artificial reef system, as developed and managed by the SCDNR, is clearly a significant component of the entire SC coastal economy. In addition, the man-made structures within SC permitted artificial reef areas, as recreational outdoor “destinations,” are an important component of the economic impacts generated by a special group or subset of tourists, i.e. anglers and scuba divers.

This report includes recommendations oriented to the socioeconomic aspects of artificial reef usage, evaluation and related management issues. These recommendations include conducting surveys of AR users at least every 5 to 7 years, incorporating tradeoff analysis approaches such as stated preference choice models when surveying AR users regarding their preferences and, if appropriate relative to fishery sustainability concerns, tourism stakeholders should consider the feasibility of “off-season” promotions targeting the AR tourist angler market segments.

INTRODUCTION

According to Seaman and Jensen (2000), "An *artificial reef* is one or more objects of natural or human origin deployed purposefully on the seafloor to influence the physical, biological, or socioeconomic processes related to living marine resources." The system of 45 marine artificial reef areas off of the SC coast and within SC estuarine (internal) waters (Fig. 1) managed by the Marine Resources Division of the SCDNR is definitely congruent with the above Seaman and Jensen (2000) multi-use oriented definition of artificial reefs. Specifically, the SCDNR expansive system of marine artificial reef sites enhances saltwater recreational fishing and diving opportunities, mitigates heavy utilization impacts (i.e. consumptive and non-consumptive use) on the limited natural hard-bottom areas[1] off of SC (SCDNR n.d.), while providing a diverse assortment of inshore and offshore artificial reef (AR) sites accessible by private boater anglers from major SC inlets, sounds (e.g. Port Royal Sound) and other major waterways (e.g. Charleston Harbor) along the SC coast.

Fig. 1. SC Artificial Reef Permitted Areas with Groupings of Areas into Clusters



[1] Off SC much of the continental shelf is covered with several feet of sand, while only 5% to 10% of this shelf area apparently has the appropriate geological composition to facilitate natural reef formation.

Although the SCDNR has been responsive to AR user needs, the last comprehensive fishery management usage-oriented AR user survey was completed more than 13 years ago (Rhodes *et al.* 1993) and is considered outdated because the number of AR sites has doubled from 24 in 1992 to 45 sites (2006) and the total number of SC saltwater anglers has apparently increased more than 70% between 1992 and 2005[2], while the affordability and availability of advanced fishing technology (e.g. GPS based electronics) has apparently expanded the overall harvesting capabilities of recreational anglers. Moreover, the federally sponsored survey, the Marine Recreational Fisheries Statistics Survey (MRFSS), that is used to estimate SC recreational fishing saltwater catch and effort statistics does not routinely collect data specific to SC saltwater fishing trips involving permitted AR areas. Consequently, the purpose of this survey research was to obtain updated information (2006) on AR recreational users (i.e. private boat anglers and charter scuba divers) regarding their use patterns (e.g. number of monthly AR related fishing trips, etc.) and other information (e.g. selected demographics of these users) including AR related trip expenditures. Along with characterizing AR use patterns, primary and secondary (e.g. SCDNR license sales) data collected during this research were also used to estimate and extrapolate management-oriented aggregates such as total monthly AR related fishing trips completed by private boat recreational anglers during 2006 and the economic impacts (e.g. sales, jobs, sales taxes, etc.) of the SC marine artificial reef system on the SC coastal economy. The results of this research are also expected to provide SCDNR with new insight for enhancing the current and future management of this system as well as informing the general public of economic impacts stemming from this diverse array of AR sites.

METHODS

SC Saltwater Recreational Fishing License Data and Address Regions

The primary data collected in this study relating to fishing within permitted areas of the AR system during 2006 was based on the random sampling of the Fiscal Year 2005-06 (FY06) and Fiscal Year 2006-07[3] (FY07) computerized records[4] of SC saltwater recreational licensees as compiled by the SC Department of Natural Resources (SCDNR). Recreational anglers using a private boat (i.e. not permitted as "for-hire" boats) for saltwater fishing in SC waters are required to purchase a SC Saltwater Recreational Fishing License from the SCDNR. There are four types of licenses sold: annual (12-month) resident licenses, annual non-resident licenses, 14-day resident licenses and 14-day non-resident licenses. Data collected from a SC license purchaser include a mailing address, gender, race, and date of birth. SCDNR sold a total of 118,669 SC saltwater recreational fishing licenses during FY06. Based upon the aggregates reported by SCDNR, annual resident licenses comprised 72% of the total sold in FY06, followed by 14-day nonresident licenses, 16%. Due to travel cost considerations and data needed for estimating economic impacts, usable license records were categorized into three regions based on licensee mailing addresses (Fig. 2): the SC coastal (**SCC**) Region, a 17-county region in eastern SC; the SC non-coastal (**SCNC**) Region, 29-county region generally in western SC Region (i.e. all other licensees with SC addresses not in the SCC Region); and a Non-South Carolina (**NSC**) Region, mainly comprised of licensees with North Carolina and Georgia addresses. These Regions are also generally congruent with the license types because licensees in the SCC Region and SCNC Region purchased 93% and 88% of the annual resident licenses, respectively, while individuals in the NSC Region purchased 71% of the 14-day non-resident

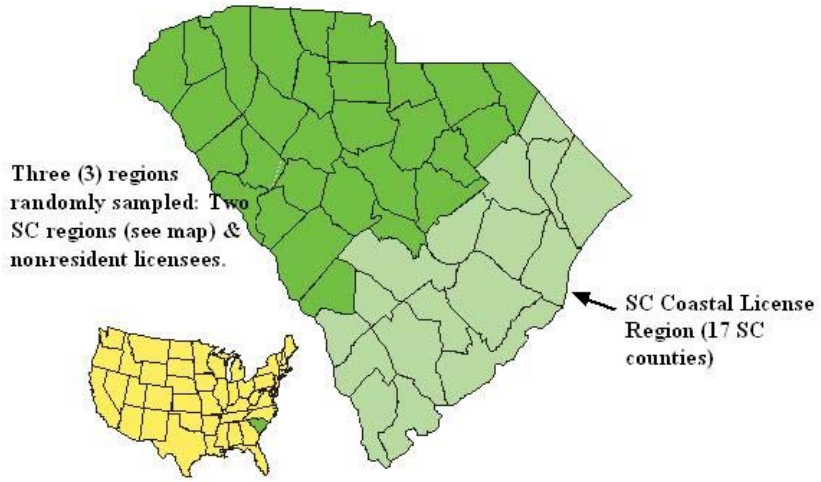
[2]Marine Recreational Fisheries Statistic Survey (MRFSS) estimated that the annual number of SC saltwater fishing participants increased from about 479,400 in 1992 to 831,300 by 2005, a 73% increase (Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division, Silver Spring, MD).

[3]Specifically, the SCDNR FY license cycles were July 1, 2005 to June 30, 2006, and July 1, 2006 to June 30, 2007, respectively. It should also be noted that anglers are allowed to purchase a license for a forthcoming license Fiscal Year starting in May. For example, a FY07 license could have been purchased in May 2006.

[4]Most, 99.6%, of the FY06 licenses sold were manually entered or electronically compiled via on-line sources in the SCDNR license database, a total of 118,242 records. In contrast, 4,563 records, ~4% of all FY06 electronic records were not considered usable for survey purposes. Unusable database records included records with incomplete address data and/or records missing variable data except for the license number and type data.

licenses during FY06. For all FY06 licenses sold, 56% were by purchased by individuals with mailing addresses in the SCC Region, followed by purchasers in the NSC Region, 24%, and about 20% by SCNC Region licensees.

Fig 2. Sampled (2006) South Carolina Regions Based on the Mailing Addresses of the SC Licensees.



Licensee Sampling Procedure

The sampling framework involved randomly selecting a fixed number of licensees, about 1,260 licensees within each Region, every month starting in May 2006. This fixed sample size of ~1,260 licensees per Region and month was based upon pre-test results and professional judgment that a minimum target sample of 30 respondents completing one or more trips involving fishing within AR areas during a given recall month would be needed for statistical purposes. It was assumed that at least 24% of the sampled licensees in a Region would respond and ~10% of these responding licensees would have fished within an AR permitted area during a given recall month (i.e. 30 AR Responses/24%/10% =1250 Sample Mailings Per Region).

The FYO6 sampled license data included licenses purchased as early as May 2005. Monthly mail sampling of FY06 license holders started in May 2006 using computerized license records entered by the SCDNR through April 10, 2006, but before the end of the SCDNR FY06 license year, June 30, 2006. Regardless, most (90%) of all FY06 licenses sold and usable for survey purposes were available for monthly sample mailings starting in May 2006. Once the licensee mail survey was implemented, it became apparent that undeliverable rates for monthly samples drawn from FY06 license records, although not considered substantial (e.g. average ~7%), were still problematic. Moreover, it was judged that using FYO7 computerized license records would significantly decrease the undeliverable rate partially because the FY07 records would include some individuals purchasing licenses as early as May 2006. Therefore, it was decided to stop using FY06 licensee records for sample mailings after the August 2006 mailings and begin random sample mailings to individuals purchasing licenses during FY07, starting with mailings in September 2006 (the August 2006 recall month sampling). The computerized populations of FY07 license records used for sample mailings were also updated during September and October 2006 between monthly mailings with new license purchases before samples randomly generated for the October and November were mailed.

The random mail sampling (without replacement[5]), 1,260 of FY06 licensees in May 2006, with April as the respondent's recall month, was only comprised of SCC Region licensees **(Table A1)**[6] due to budget constraints. After the May mailings, licensees in all three license Regions were sampled during the June, July, August and September 2006 mailings. As previously noted, only FY07 licensees were sampled during the September, October and November 2006 mailings per fishing activities during the recall months of August, September and October, respectively. FY07 licensees in the NSC Region were not sampled during the October and November mailings, and mail sample sizes were reduced to 770 and 713 licensees for the SCC Region and SCNC Region licensees, respectively, for these mailings due to budget constraints. The aggregate (total) of sample mailings represented a substantial percentage (e.g. >5%) of all usable FY06 license records by Region, ranging from 19% of NSC Region licensees to 8% of SCC Region licensees.

Sampling Instruments and Modes for Licensees

The random monthly mailings were generally used to collect primary data from sampled licensees regarding fishing activities during 2006 including the number of trips involving permitted SC marine artificial reef (AR) areas, fishing trip related expenditures (e.g. fuel expenses) as well as selected socioeconomic data (e.g. licensee's years of fishing experience). Pre-testing of mail questionnaires during 2005 and early 2006 indicated that these data could be collected by mailing each selected licensee a self-administered, "paper-pencil" mail questionnaire (See Appendix 1.1) with a cover letter. Pre-testing also indicated that this cover letter could also be effectively used to inform the licensee that he had the option of responding using either the enclosed mail questionnaire or an equivalent Internet based questionnaire. In order to mitigate possible recall concerns, both survey instruments contained selected questions requiring the respondent to only recall fishing related activities in the month (i.e. the recall month) immediately preceding the mailing month (See Appendix 1.1, Mail Questionnaire, Questions B1, B2, B3 and B4). For example, sampled FY06 licensees mailed questionnaires in July 2006 were asked to recall if they went saltwater fishing in and/off of SC during June 2006, the recall month on each questionnaire mailed during July 2006. In addition, first mailings to sampled licensees were usually completed within ten days of the month immediately following a given recall month, and second mailings to licensees were usually completed within 14 days of the first mailing. Moreover, if a respondent completed one or more fishing trips involving an SC AR area in a given recall month, he was asked to only recall trip details related to the most recent AR related trip including trip expenditures (See Appendix 1.1, Mail Questionnaire, Question C10) and the two most abundant species caught while fishing on or near SC AR area(s) during the trip.

Sampled licensees were also informed in the cover letter that their mail questionnaire included a unique ID stamped in the upper right corner of the each questionnaire. This ID served two purposes: it assisted SCDNR with reducing second mailings to licensees responding to the first mailing for a given month via the mail or Internet mode; and it provided a unique ID number for identifying licensees choosing to respond using the Internet mode.

Collecting Charter Diving Data

Since SC coastal dive shops (businesses) sponsoring offshore diving trips include dives on AR sites, sampling of charter divers and a census of all SC oceanic ("offshore)[7] diving trips sponsored by SC coastal dive shops was conducted during 2006. After pre-testing sampling protocols and related instruments in 2005, the random collection of data from individual charter divers started in July and was completed in early October 2006. Charter divers were sampled by intercepting them just before they departed on their oceanic dive trip. These intercepted divers were asked to fill out a self-administered, paper-pencil questionnaire card that included questions regarding the anticipated dive sites, general purpose of the dive

[5] Random sampling without replacement was attempted within a given Fiscal Year in order to avoid sample mailings to a licensee more than once using a given Fiscal Year data set, i.e. a selected (sampled) licensee's record was not returned to the record population to be sampled for future mailings.

[6] All tables with the capital letter "A" preceding the table number can be found in the Appendix 2.

[7] Some of the SC coastal dive shops sponsor river (e.g. Cooper River) diving trips, but data related to these river trips were not collected during this dive shop census.

trip (e.g. recreational, dive training, etc.) and estimates of daily expenses associated with the dive charter trip (See Appendix 1.2). The 2006 census of SC offshore diving trips sponsored by SC coastal dive shops involved weekly phone calls to SC dive shop owners and/or managers sponsoring charter oceanic diving trips off SC. In addition, during January and February 2007, daily charter notes were collected from these SC coastal dive shops regarding all of their offshore dive trips during 2006. For each dive trip date, these dive shop notes included summary information on the number of active divers participating in the dive trip and the general dive sites including sites within permitted AR area. Due to the proprietary nature of the data collected from individual SC dive shops and their intercepted charter customers (divers), and the small number of shops, i.e. five shops, all data collected from divers and dive shops was aggregated at the SC coastal region level and was not reported (summarized) at an individual SC county level.

Estimating Total Marine Artificial Reef Related Fishing Trips, 2006

Estimates of total SC private boat fishing trips involving SC permitted marine artificial reef sites by SC licensees during 2006 were generated based on a simple extrapolation of using the monthly rate (percentage) of fishing trips involving AR sites and the total FY06 license sales by three major licensee mail regions. Specifically, for each of the three license regions, the estimated annual total number of SC private boat trips involving AR sites was extrapolated by summing the number of estimated number of AR related fishing trips for each month within a given license region.

Estimating the Economic Impacts of the SC Marine Artificial Reef System

The trip expenditure patterns of SC saltwater recreational licensees completing fishing trips involving AR sites and the total estimated 2006 AR related trips by these anglers extrapolated from FY06 license data were used to approximate the total economic impacts and importance of these anglers relative to the SC economy. In the context of this study, economic impacts only relate to the effects of anglers in the SCNC and NSC Regions spending within the SCC Region while fishing because their fishing trip expenditures represent "new dollars" to the SCC Region[8]. Expenditures by resident anglers in South Carolina are assumed to generally affect the amount of “local” money available for spending to other sectors of the South Carolina economy. Consequently, it is assumed that a decline in SCC angler expenditures would probably shift angler disposable income to other recreationally oriented sectors. In contrast, economic importance or significance analysis recognizes spending effects of all anglers including SCC anglers. The economic importance analysis is a measure of the significance of AR fishing, not the economic impacts, within the SC economy because it quantifies the magnitude of economic activities associated with recreation fishing activities.

IMPLAN (MIG 1997) data for SC and related software were used to estimate the economic impacts and importance of anglers fishing on AR sites. IMPLAN is based on a static input-output model approach. In general, an input-output (I-O) model is a representation of the flows of economic activity within a region. The model approximates what each business or sector must purchase from every other sector in order to produce a dollar's worth of services or goods. Using an I-O model, flows of economic activity associated with any change in spending may be traced either forwards or backwards (e.g. angler expenditures on meals lead restaurants to buy additional inputs – meal ingredients, utilities, etc.). By quantifying these linkages between sectors, input-output models can approximate secondary effects of spending, usually represented in the form of multipliers.

Secondary effects of expenditures are usually classified as indirect and induced. Indirect effects are the changes in sales, income or jobs in sectors within the region or state that supply services and goods to the various recreational fishing related sectors (e.g. motels, tackle shops, etc.). Induced effects are the increased sales from household spending of the income earned by those employed by the recreational fishing and supporting sectors. These represent induced effects of the visitor spending. In order to reduce

[8]For the sake of simplicity in this report, it was assumed that all of the major fishing trip related expenditures by active SCNC and NSC AR anglers occurred in the SCC Region, but it should be noted that the mean percentage for NSC anglers for spending fishing trip expenses in SC was 83.2% (Median Percentage=100%).

double counting of resident angler expenditures, induced effects of resident anglers were excluded from the economic importance analysis.

RESULTS

Licensee Sampling and Artificial Reef Fishing

Response Rates and Undeliverable Mail

Overall, 6,207 usable mail questionnaires or Internet responses were received from licensees during the 2006 sampling (Table 2.1a). Of the 19,226 questionnaires mailed, 1,268 pieces (6.6%) were not deliverable and returned by the U.S. Postal Service for various reasons including no forwarding address and incomplete address (Table 2.1b). Consequently, about 3% to 10% of mailed survey questionnaires were returned without reaching the licensee selected for sampling

Table 2.1a. Counts of Responses by License Regions and Recall Months during 2006

		SC License Regions		
Recall Month	**Total**	**SCC**	**SCNC**	**NSC**
April	354	354	n.a.	n.a.
May	1,106	364	459	283
June	1,105	357	468	280
July	1,120	335	469	316
August	1,552	428	509	615
September	479	230	249	n.a.
October	491	229	262	n.a.
TOTALS:	**6,207**	**2,297**	**2,416**	**1,494**

Table 2.1b. Counts of Undeliverable (RTSs) Mail by SC License Regions and Recall Months

		SC License Regions		
Month	**Total**	**SCC**	**SCNC**	**NSC**
April	96	96	n.a.	n.a.
May	312	114	68	130
June	254	93	56	105
July	294	108	69	117
August	152	74	44	34
September	66	43	23	n.a.
October	94	70	24	n.a.
TOTALS:	**1,268**	**598**	**284**	**386**

Appendix Table A2.1 details the RTS (Return to Sender) rates for each region and each recall month. When comparing different recall months, August and September have the lowest RTS rates, which is probably due to the use of the newer FY07 license database for sampling starting with mailings in September. Mailings to licensees in the NSC Region (out of state license addresses) had the highest (10.4%) RTS rate before the sampling was switched to the FY07 license records and then lowest (2.7%)

monthly RTS rates after this switch. Although the 14-day non-resident license type dominates the NSC Region licenses records, those purchasing licenses were still required to provide a permanent address even when buying a 14-day license. Perhaps these non-resident licensees are more mobile and therefore change their residence more frequently than SC non-coastal licensees.

It is also unclear why mailings to licensees in the SCC Region had monthly RTS rates greater than 5.0% and an overall RTS rate, 7.7%, the same as the NSC Region's rate (Table A2.1). If 14-day licenses are associated with high RTS rates (e.g. >5%), it does not "explain" the high RTS rate for SCC Region mailings because the SCC Region is predominantly comprised of anglers purchasing annual resident licenses.

The returned responses vary by survey modes (i.e. mail questionnaire versus Internet form responses), months, and recall regions (Table A2.2). These rates were calculated based on mailings, which have not been returned from postal service as return to sender (RTS). In general, mail responses adjusted for RTSs, had 26.0% return rate; online surveys have 8.5%; in total, the study achieved a **34.6%** adjusted response rate. August, the recall month, had the highest response rate, which may have been related to using the newer FY07 license database. Similar to RTS rates, coastal SCC Region and NSC (non-resident) Region have lower response rates, which might be associated with the mobile nature of those anglers. Unadjusted response rates, which includes RTSs, was 29.9%, a little lower than adjusted rates, but still a generally acceptable rate of response for license data sampling (Table A2.3).

Fishing Frequency and Patterns of Licensees

The fishing frequencies and patterns of responding licensees from different regions and different months between survey modes were analyzed. Prior to this analysis, the records of 12 respondents that were probably involved in the "for-hire[9]" sector were excluded from the licensee data analysis since this survey was only focused on private boat recreational anglers. Table 2.2a details the statistics on the questions about fishing activities in the last two years. In general, 90.1% of the responding licensees reported saltwater fishing in or off SC during the last two years. The monthly rates range from around 88% to 93% and did not vary much based on a given recall month. These percentages results generally appear consistent with a recent 2005 telephone survey sponsored by the SCDNR (Responsive Management 2006) of SC Saltwater Recreational Fisheries licensees that indicated that 85% of the respondents had been saltwater fishing in and/or off SC for finfish during the past two years.

A higher percentage of licensees from the SCC and NSC (non-residents) Regions than SCNC Region licensees fished in the last two years; a higher percentage of the anglers who reported through the Internet fished in the last two years than those through mail backs, though the monthly differences were all less than 10% (Table 2.2a).

The licensees were also asked to recall the number and type of private boat SC saltwater fishing trips during the past twelve (12) months, and the percentages of respondents reporting one or more SC saltwater trips (Table 2.2b) are generally consistent with percentages in Table 2.2a, but lower because the likelihood of making a saltwater fishing trip over a 12 month period compared to the past two year period would be lower. In addition, responses indicated that about 32% of those private boat anglers completing one or more SC saltwater fishing trips during the past 12 months also completed one or more trips involving AR sites with SCC licensees having the highest percentage, 34% (Table 2.2b).

[9]Due to concern for possible "outlier effects," respondents indicating involvement in the recreational fishing industry (Question E6) and reporting more than 30 AR related fishing trips during given recall month or more than 200 saltwater fishing trips during the past 12 months were judged to be involved in commercial for-hire related fishing activities (e.g. fishing guides, charter vessel operators, etc.).

Table 2.2a. The Percentage of Respondents Who Fished in the Last Two Years by Region, Recall Month and Survey Modes

Region	SCC Region			SCNC Region			NSC Region			Total
Mode	**Mail**	**Internet**	**Both**	**Mail**	**Internet**	**Both**	**Mail**	**Internet**	**Both**	
April	92.6%	92.8%	92.7%	-	-	-	-	-	-	92.7%
May	91.1%	93.3%	91.7%	84.6%	89.7%	85.8%	97.0%	97.5%	97.2%	90.6%
June	93.5%	94.4%	93.8%	83.2%	92.0%	85.0%	92.8%	94.4%	93.2%	89.9%
July	91.3%	93.9%	91.9%	85.2%	94.9%	87.6%	95.6%	98.9%	96.5%	91.4%
August	91.1%	94.8%	92.1%	83.0%	87.5%	84.3%	91.8%	94.6%	92.3%	89.6%
September	90.6%	97.1%	92.6%	84.9%	85.7%	85.1%	-	-	-	88.7%
October	92.5%	97.1%	93.9%	81.4%	86.2%	82.4%	-	-	-	87.8%
Total	**91.8%**	**94.7%**	**92.6%**	**83.8%**	**89.8%**	**85.2%**	**93.7%**	**96.3%**	**94.3%**	**90.1%**

The percentage of licensees who reported SC saltwater fishing in the current (2006) year (Table 2.3) follows a similar trend as in Table 2.2a. In general, 63.4% of anglers fished in the current year. The monthly rates range from about 50% to 70%, and the latter months of August, September, and October have higher rates. This trend may be indicative of the higher probability of reporting a fishing trip by a licensee in the current year[10] and the effects of summer and fall fishing opportunities and/or conditions. The sampled licensees in the SCC Region have a higher current year fishing rate (71.0%) than those in the NSC and SCNC Regions; the NSC licensees had a higher rate of fishing in the current year (63.3%) than SCNC licensees (56.3%). Moreover, a higher percentage of the licensees responding through the Internet mode fished in the current year than those responding via mail questionnaires, though the differences are small.

Table 2.2b. Percentage of Respondents Reporting SC Saltwater Fishing Trips During the Past Twelve Months and Trips Involving AR Sites by Region

	SCC		SCNC		NSC		All	
SW Trips During Past 12 Months?	N	%	N	%	N	%	N	%
Completed One or More SW Fishing Trips	2036	88.9%	1888	78.2%	1318	88.3%	5244	84.6%
Completed One or More AR Fishing Trips	693	30.3%	577	23.9%	395	26.5%	1666	26.9%
% Within Those SW Fishing Reporting AR Fishing:		**34.0%**		**30.6%**		**30.0%**		**31.8%**
Total Responses	2290	100.0%	2413	100.0%	1492	100.0%	6195	100.0%

[10]In general, the probability of a given licensee reporting one or more saltwater fishing trips during 2006 would generally increase over time within the calendar year. Stated another way, it is expected that the probability of a licensee making one or more SC saltwater fishing trips during 2006 would generally be higher when the licensee was sampled in October compared to April 2006.

Table 2.3. The Percentage of Respondents Who Fished in the Current Year (2006) by Region, Recall Month and Survey Modes

Region	SCC Region			SCNC Region			NSC Region			Total
Mode	Mail	Internet	Both	Mail	Internet	Both	Mail	Internet	Both	
April	56.8%	52.2%	55.9%	-	-	-	-	-	-	55.9%
May	62.4%	64.4%	62.9%	40.6%	42.1%	40.9%	48.3%	48.8%	48.4%	50.0%
June	68.4%	66.7%	68.0%	46.5%	54.0%	48.1%	52.2%	57.7%	53.6%	55.9%
July	69.2%	80.5%	71.9%	57.7%	68.4%	60.3%	60.6%	62.9%	61.3%	64.1%
August	81.2%	87.8%	82.9%	64.3%	66.0%	64.8%	75.7%	75.9%	75.7%	74.1%
September	75.6%	85.7%	78.7%	64.0%	69.8%	65.5%	-	-	-	71.8%
October	79.2%	82.9%	80.3%	64.2%	69.0%	65.3%	-	-	-	72.3%
Total	69.7%	74.9%	71.0%	54.8%	60.8%	56.3%	63.5%	62.8%	63.3%	63.4%

The percentage of licensees that reported fishing in a given recall month (Table 2.4) also followed similar trends as in Table 2.2b and Table 2.3. In general, 38.1% of anglers fished in a given recall month. The monthly rates range from around 32% to 42%, and the months after May have higher rates than the rates in April and May. Again, SCC (coastal) licensees had a higher rate of fishing (50.0%) than SCNC and NSC Region licensees; the NSC licensees had a higher rate of fishing (34.4%) than SCNC licensees (29.1%). With exceptions for responding SCC licensees, generally a higher percentage of the licensees responding via the Internet mode fished in the sampled recall month than those responding with mail questionnaires.

Table 2.4. The Percentage of Respondents Who Fished in the Sampled Recall Month by Region, Recall Month and Survey Modes

Region	SCC Region			SCNC Region			NSC Region			Total
Mode	Mail	Internet	Both	Mail	Internet	Both	Mail	Internet	Both	
April	38.2%	36.2%	37.9%	-	-	-	-	-	-	37.9%
May	43.5%	53.3%	46.0%	22.9%	27.1%	23.9%	28.1%	31.3%	29.0%	32.4%
June	52.1%	46.7%	50.7%	25.5%	29.0%	26.3%	26.3%	43.7%	30.7%	35.2%
July	47.0%	65.9%	51.6%	28.7%	39.3%	31.3%	29.2%	37.1%	31.4%	37.4%
August	54.6%	67.0%	57.9%	31.0%	34.0%	31.9%	37.8%	50.0%	40.1%	42.3%
September	50.0%	54.3%	51.3%	31.2%	31.7%	31.3%	-	-	-	40.9%
October	50.9%	64.3%	55.0%	30.9%	32.8%	31.3%	-	-	-	42.4%
Total	**47.8%**	**56.1%**	**50.0%**	**27.9%**	**32.6%**	**29.1%**	**32.3%**	**41.2%**	**34.4%**	**38.1%**

Table 2.5 shows the monthly percentages of responding licensees by Region that fished in AR sites in the sampled recall month. In general, approximately 11% of the licensees reporting fishing in AR sites in their recall month with percents ranging from around 7% to 12% and the months after May have higher monthly percentages than the April and May percentages (Table 2.5). Regional trends were also similar to those observed for current year fishing percents (See Table 2.4), e.g. SCC Region licensees have a higher fishing percentage at AR sites (13.2%) during their recall months than licensees in the two other Regions. Again, in general a higher percentage of licensees responding through the Internet mode fished on AR sites during their recall month than those responding with mail questionnaires.

Licensees that reported saltwater fishing in SC during the current year (2006) (See Table 2.3) included those fishing on AR sites during a given recall month, and overall, 19%, 16%, and 15% of the responding licensees in the SCC, SCNC and NSC Regions, respectively, fished on AR sites during a given sampled recall month. Also, as previously noted, percentages based upon trips during the past 12 months (See Table 2.2b) suggest that private boat fishing by SC licensees is not uncommon among those that actively saltwater fish. Additionally, the monthly (Table 2.5) and annual (See Table 2.2b) percentages of licensees making AR trips are also consistent with AR sites being among several general fishing areas

available for active saltwater anglers. For example, during 2006, the MRFSS estimated that 63% of all SC saltwater fishing trips occurred within SC internal waters ("inland"), an area with few AR sites compared to open ocean sites mainly due to the challenges of selecting feasible (e.g. stable, etc.) estuarine sites for low profile AR structures.

Table 2.5. The Percentage of Respondents Who Fished at AR Sites by License Region, Recall Month and Survey Modes

Region	SCC Region			SCNC Region			NSC Region			Total
Mode	**Mail**	**Internet**	**Both**	**Mail**	**Internet**	**Both**	**Mail**	**Internet**	**Both**	
April	7.4%	10.1%	7.9%	-	-	-	-	-	-	7.9%
May	8.9%	13.3%	10.0%	5.1%	10.3%	6.3%	5.9%	7.5%	6.4%	7.5%
June	17.5%	18.9%	17.8%	7.9%	10.0%	8.3%	8.1%	14.1%	9.6%	11.7%
July	16.2%	19.5%	17.0%	10.5%	12.0%	10.9%	7.1%	11.2%	8.3%	12.0%
August	11.8%	18.3%	13.6%	8.5%	10.4%	9.1%	11.2%	15.2%	11.9%	11.4%
September	13.8%	14.3%	13.9%	8.6%	11.1%	9.2%	-	-	-	11.5%
October	10.7%	15.7%	12.2%	9.8%	13.8%	10.7%	-	-	-	11.4%
Total	**12.2%**	**16.0%**	**13.2%**	**8.3%**	**11.0%**	**9.0%**	**8.9%**	**12.2%**	**9.7%**	**10.7%**

Fishing Trips by SC Marine Artificial Reef Permitted Area Sites

Sampled licensees were asked to list the number of times they visited major sites within AR permitted areas (See Appendix 1.1, Mail Questionnaire, Question B4) for fishing during a given recall month. Standardized AR trips by Permitted Area (PA) indicated licensees reported fishing trips the most often for the PA-01 off Little River followed by PA-09 and PA-10 off Murrells Inlet (Fig. 3). Moreover, five of the top ten PAs for AR fishing trips were off Georgetown or Horry County, the SC northern coastal area (Fig. 3). Except for PA 44 (e.g. Betsy Ross), nine of the top ten PAs for responding licensees was within or near the 13-fathom line (78 feet). In addition, specific AR sites or structures (e.g., the Charleston 60' Reef, etc.) within these PAs were generally accessible (e.g. less ~2 hours of boat traveling time under normal sea conditions) from major coastal water bodies such as Charleston Harbor, Little River Inlet and Port Royal Sound. The apparent popularity of sites within these PAs is congruent with the SC Artificial Reef Program objective to provide "nearshore" AR sites that are generally accessible by private boat anglers departing from major coastal water bodies (Personal communication, R. Martore, Marine Resources Division, SCDNR).

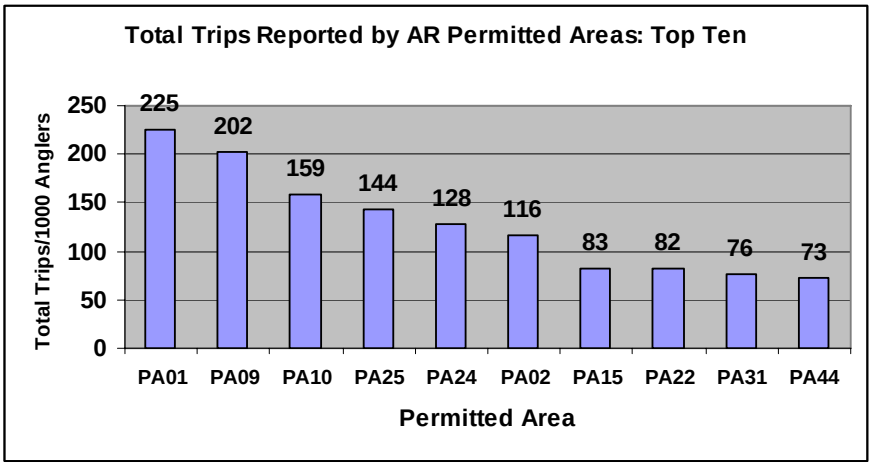
Ranking of total reported fishing trips involving the four SC inshore (estuarine) artificial reefs indicated (See Fig. 1) that the two Winyah Bay reefs (IS-01 and IS-02) were the most popular followed by IS-03 (St. Helena Sound) and IS-04 (Stono River). In addition, more total trips were reported for the two Winyah Bay reefs than 22 other open ocean PAs. Consequently, anglers are apparently utilizing SC inshore artificial reefs although not at levels of effort reported for popular oceanic AR sites. (Summaries of responses by recall month and major sites within Permitted Areas are listed in Appendix 3.)

Fishing Trips by SC Marine Artificial Reef Permitted Area Clusters and License Regions

To consider the possible effects of regional travel corridors and/or major access water bodies such as Murrells Inlet, Charleston Harbor and Port Royal Sound on AR angler use patterns, the 45 SC permitted marine AR areas were grouped into three north to south oriented AR permitted area "clusters" (Personal communication, R. Martore, Marine Resources Division, SCDNR). These AR clusters (See Fig. 2) were labeled the "North Cluster," "Central Cluster" and the "South Cluster" with the approximate major central access water bodies being Murrells Inlet, Charleston Harbor and Port Royal Sound, respectively. Since the intent was to roughly group permitted AR areas based upon a north to south orientation, the number of permitted site areas and related AR structures within a cluster was not considered when selecting clusters. Therefore, the North Cluster has 19 permitted AR areas, the Central Cluster has 14 and the South Cluster has 12 permitted AR areas. The following cluster analysis was also based upon aggregating responses by

Region (e.g. Table 2.6), not recall months, due to the small number of responses by AR sites within a given Region and recall month.

Fig. 3. Top-ten AR Fishing Sites based on Total Trips Reported by Sampled Licensees during 2006



Site Abbreviations Used in Fig. 3 (See above)	Artificial Site Description
PA01	PA-01: Little River, Jim Caudle
PA09	PA-09: Paradise, HP Springs, Grand Strand
PA10	PA-10: Ten Mile, Bruce Rush
PA25	PA-25: Charleston Nearshore Reef
PA24	PA-24: Charleston 60’ Reef
PA02	PA-02: Little River Offshore. Barracuda Alley
PA15	PA-15: Georgetown Reef
PA22	PA-22: Capers Reef, R8
PA31	PA-31: Edisto 40' Reef
PA44	PA-44: Betsy Ross Reef

Table 2.6. Total Numbers of Respondents Who Fished in Different AR Clusters

AR Site Cluster	License SCC Region	License SCNC Region	License NSC Region	Total
North	112	96	84	292
Central	121	77	25	223
South	62	43	26	131
Total Fished in AR Sites	266	182	128	576
Total Responded	2290	2413	1492	6195

Table 2.7 The Percentage of Respondents Who Fished in Different AR Clusters

AR Site Cluster	SCC Region	SCNC Region	NSC Region	Total
North	4.9%	4.0%	5.6%	4.7%
Central	5.3%	3.2%	1.7%	3.6%
South	2.7%	1.8%	1.7%	2.1%
Total	11.6%	7.5%	8.6%	9.3% [11]

Although the total numbers of structures available for fishing vary between clusters, a summary analysis of responses (Table 2.6) within license regions generally appears congruent with the county level distribution of licensees (Table 2.7). Specifically, the highest percentage of fishing on AR permitted areas within the SCC Region, 4.9% and 5.3%, occurred in the North and Central Clusters, respectively (Table 2.7). These percentages appear to be consistent with the high percentages (~68%) of all FY06 licensees in SCC Region residing in the SC coastal counties of Berkeley, Charleston, Dorchester, Georgetown and Horry. In addition, within the NSC Region, 5.6% of the licensees had one or more fishing trips involving AR sites in the North Cluster. This percentage was probably due to North Carolina residents comprising about 45% of all FY06 NSC licensees.

The availability of GPS and other public information on offshore AR sites is often cited as one of the major desirable features of artificial reef systems, so respondents were asked to judge the possible influence of AR sites on the frequency of their saltwater fishing trips if there were no AR sites (See Appendix 1.1, Mail Questionnaire, Question B5). For AR anglers that provided AR site specific responses plus responses on whether the lack of AR sites would reduce their number of saltwater fishing trips (Table 2.8), ~54% of these respondents claimed that they would make fewer saltwater fishing trips if AR sites were not available (Table 2.9). Additionally, SCNC anglers fishing on AR sites within the Central and South Clusters had the highest percentages, perhaps implying that they are more dependent upon AR sites than anglers in other two regions.

Table 2.8. Numbers of Respondents Who Will Take Fewer Fishing Trips without AR Sites

License Region	North Cluster	Central Cluster	South Cluster	Total
SCC	63	63	32	161
SCNC	49	44	29	108
NSC	45	12	13	79
Total	157	119	74	348

[11] These percentages are generally lower than the AR trip percents in Table 2.6 because some respondents did not respond with specific AR site information (Question B4) compared to generally indicating (Question B1) that they completed one or more fishing trips involving AR sites during a given recall month.

Table 2.9 Percentages of Active AR Anglers by Regions and Clusters Who Will Take Fewer Trips without AR Sites among Active AR Anglers

License Region	North Cluster	Central Cluster	South	Total
SSC	56.3%	52.1%	51.6%	50.2%
SCNC	51.0%	**57.1%**	**67.4%**	48.4%
NSC	53.6%	48.0%	50.0%	51.6%
Total	56.1%	55.1%	60.7%	**54.1%**

Number of Fishing Trips by Artificial Reef Anglers by License Regions and Recall Months

Licensees that reported making one or more fishing trips involving AR sites during a given recall month were also asked to recall the total number fishing trips (See Appendix 1.1, Mail Questionnaire, Question B2)[12] in their recall month that involved AR sites (Table 2.10). The mean overall number of trips by Region were 2.56, 2.38 and 2.71, respectively, for SCC, SCNC and NSC AR anglers (Table 2.10) with the lower monthly mean occurring for SCNC anglers, 1.75 trips, during October, and the highest, 3.08 trips, during August for NSC anglers. With the exception of NSC anglers during July, the median number of trips per recall month was 2. For purposes of conservatively extrapolating the total number of trips per month, the median is considered a better statistic than the mean.

[12]In contrast to the previous cluster analysis, this analysis includes all respondents that reported making one or more AR trips including respondents that did not provide AR site response in Question B4.

Table 2.10. Descriptive Statistics for the Numbers of AR Trips by License Region and Recall Month

License Region	Statistics	April	May	June	July	August	September	October	Total
SCC Region	N	28	36	63	57	60	32	28	304
	Mean	2.36	2.72	2.98	2.53	2.13	2.31	2.82	2.56
	Median	2	2	2	2	2	2	2	2
	Std. Deviation	1.91	2.43	2.51	2.00	2.11	1.97	3.30	2.32
	Std. Error of Mean	0.36	0.41	0.32	0.27	0.27	0.35	0.62	0.13
SCNC Region	N	-	29	40	51	46	23	28	217
	Mean	-	2.21	2.43	2.88	2.17	2.57	1.75	2.38
	Median	-	2	2	2	2	2	1	2
	Std. Deviation	-	2.18	2.00	2.35	1.40	2.15	1.32	1.96
	Std. Error of Mean	-	0.40	0.32	0.33	0.21	0.45	0.25	0.13
NSC Region	N	-	18	27	27	73	-	-	145
	Mean	-	2.28	2.81	1.89	3.08	-	-	2.71
	Median	-	2	2	1	2	-	-	2
	Std. Deviation	-	1.49	3.14	1.28	2.89	-	-	2.59
	Std. Error of Mean	-	0.35	0.60	0.25	0.34	-	-	0.22
Total	N	28	83	130	135	179	55	56	666
	Mean	2.36	2.45	2.78	2.53	2.53	2.42	2.29	2.53
	Median	2	2	2	2	2	2	2	2
	Std. Deviation	1.91	2.16	2.51	2.04	2.36	2.03	2.55	2.27
	Std. Error of Mean	0.36	0.24	0.22	0.18	0.18	0.27	0.34	0.09

For each AR cluster, descriptive statistics on the number of trips by AR anglers were prepared by Region and recall months (Tables A2.4, A2.5 and A2.6). The highest monthly median number of trips, 5, for all clusters occurred in June for SCNC anglers fishing on sites in the North AR Cluster (Table A2.4) and in May for SCC anglers visiting sites in the South AR Cluster (Table A2.6). In contrast, the lowest monthly median for fishing trips occurred in October for SCNC anglers in the Central AR Cluster (Table A2.5). The median of AR trips in the North AR cluster by SCNC and NSC anglers during the summer months was generally more than the monthly median trips by SCC anglers (Table A2.4). In addition, four-month (May-August) median (4 trips) and mean (5.74) for the number of trips by NSC anglers fishing on AR sites within the North AR Cluster (Table A2.4) was higher than the four-month medians and means of NSC anglers fishing in the other two AR clusters (Tables A2.5 and A2.6). This relatively high number of trips by NSC anglers fishing on sites in the North AR Cluster also appears consistent with the trends observed in Table 2.7, i.e. NSC anglers could be considered a "high" use group for AR sites off of the SC northern coastal area (Grand Strand).

Overnight Stays in the SC Coastal by Artificial Reef Anglers

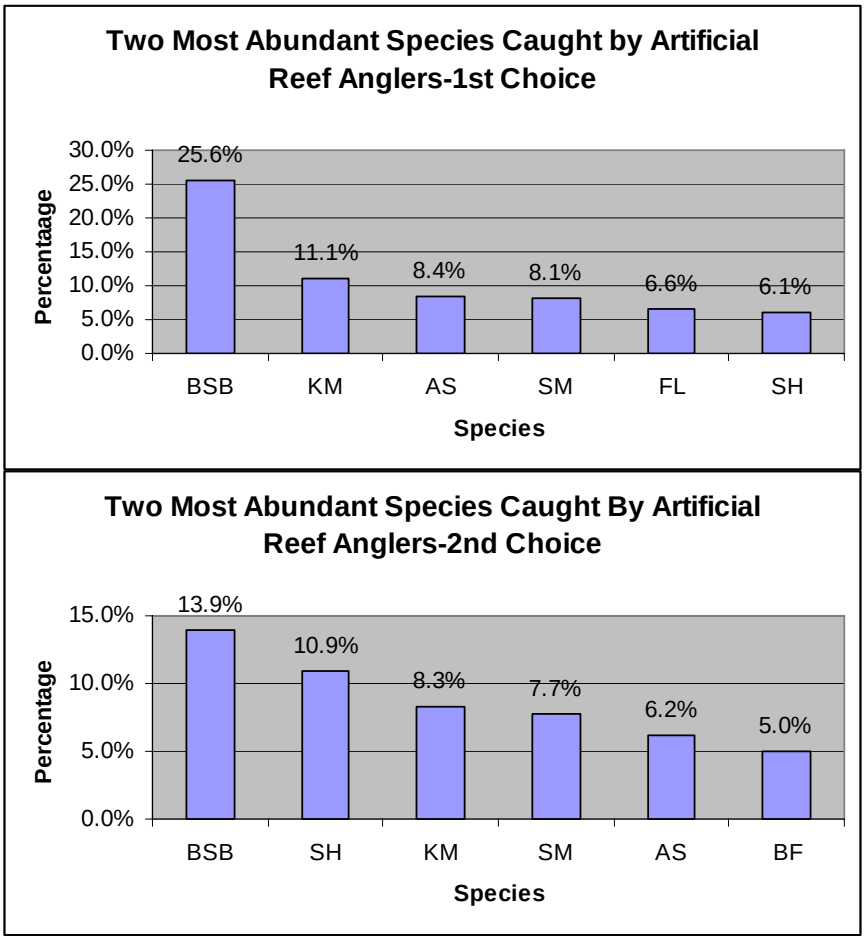
Anglers reporting on their most recent AR trip were also asked to indicate whether they stayed overnight in the SC coastal area during their fishing trip, and, if they stayed overnight, they were asked to recall the total number of nights they stayed overnight during their trip. The statistics for these responses are detailed in Table A2.7. Recognizing that this lodging question was subject to a significant item non-response, the overall regional mean number of nights associated with these AR anglers staying overnight was approximately 1.4, 3.4 and 4.7 for SCC, SCNC and NSC AR anglers, respectively (Table A2.7). The

highest monthly mean and median nights for non-coastal AR anglers occurred during the summer months; these means and medians would be consistent with non-coastal anglers making multi-purpose vacation trips during the summer months. Moreover, the mean number of nights spent by SCNC AR anglers during the fall months of September and October, ~2.5 and 2.6 nights, respectively, were lower than means for the summer months associated with these SCNC anglers. In general, it appears that AR anglers when they stay overnight in the SC coastal region on a trip involving fishing on AR sites will on average spend about 3 nights in the SC coastal area during the summer months.

Fish Species Caught by SC Artificial Reef Anglers

AR anglers were asked to list the two most abundant species they caught during their most recent fishing trip involving an AR site **(**See Appendix 1.1, Mail Questionnaire, Question C12). For a pooling of all responses (Fig. 4), two species that were frequently listed included species that commonly aggregate on AR sites, i.e. Black Sea Bass and Atlantic Spadefish, but it is also interesting that two pelagic species, King and Spanish Mackerel, were ranked in the top six species. These pelagic species are also consistent with anglers using AR sites and/or areas near AR structures for fishing techniques involving trolling gear, "trolling alleys," not just bottom fishing.

Fig. 4. Frequency Percentages for the Two Most Abundant Fish Species Caught (Top Six Species) on or near an SC Artificial Reef during an Angler's Most Recent Fishing, 2006



Species Abbreviation	Common Name
AS	Atlantic Spadefish
BF	Bluefish
BSB	Black Sea Bass
FL	Flounder (Spp.)
KM	King Mackerel
SH	Shark (Spp.)
SM	Spanish Mackerel

As might be expected, a ranking of species listed by AR anglers by license Regions (Table 2.11) also indicated that these anglers often caught Black Sea Bass and Atlantic Spadefish as well as sharks, King and Spanish Mackerel. In contrast, flounder species were in the top five species most frequently caught by NSC anglers but not in the top five for anglers in the other two Regions.

Table 2.11. Ranking* of the Five Top Species Caught by AR Anglers and License Regions

	Overall Ranking By Angler Region		
Species Targeted	**SCC**	**SCNC**	**NSC**
Atlantic Spadefish	5	5	n.r
Black Sea Bass	1	1	1
Flounder (Any Species)	n.r.	n.r.	2
King Mackerel	3	2	3
Sharks (Any Species)	2	4	5
Spanish Mackerel	4	3	4

n.r. – Not ranked (not in top-five within Region)

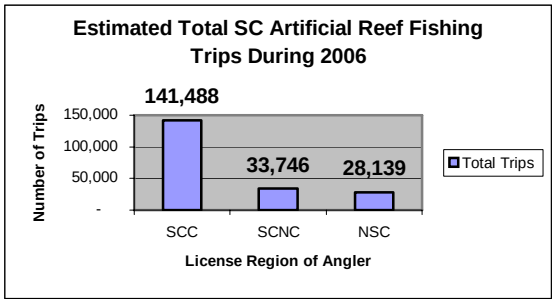
Estimated Artificial Reef Trips and Overnight Stays by Anglers

Estimating Total 2006 SC Artificial Reef Private Boat Fishing Trips

Estimates of total SC private boat fishing trips involving permitted marine artificial reef sites by SC licensees during 2006 were extrapolated based on the percentage of respondents who fished on one or more AR sites during a given recall month (See Table 2.5) and the total FY06 license sales by the three licensee mail regions. Specifically, for each of the three license regions, the estimated annual total number of SC private boat trips involving AR sites was projected by summing the number of estimated number of AR related fishing trips for each month within a given license region. Within a given month and license region, the monthly fishing trips involving AR sites were estimated by multiplying the average percentage (rounded) of AR trips reported by respondents for a given time period such as the summer months (See Table 2.5 for data used for averaging monthly AR trip percentages) by the overall 2006 median number of AR trips by anglers, 2 trips per month (See Table 2.10). For the summer months, the AR trip percentage used for monthly extrapolations was the rounded average of AR trip percentages during the three summer months (i.e. June, July and August) for a given region. In addition, the AR trip percentage used for monthly extrapolations was the rounded midpoint of the AR trip percentages of the two fall months sampled (i.e. September and October), 13% and 10%, for SCC and SCNC Regions, respectively (See Table A3.1). Four major assumptions were also made when estimating total monthly AR trips during given month in 2006:

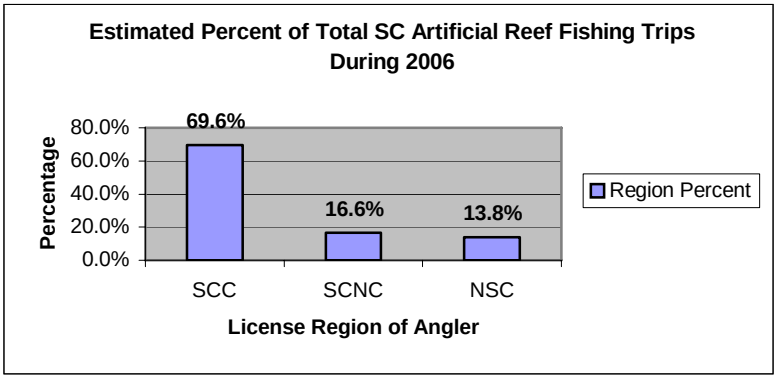
1. It was conservatively assumed that AR related fishing trips during January and February 2006 were not significant[13] partially due to winter sea conditions. This assumption is considered conservative because during short periods of favorable offshore sea conditions in January and February 2006, some SC resident coastal anglers completed AR fishing trips. Moreover, fishing trips involving inshore, estuarine AR sites (e.g. Upper Winyah Bay Inshore Reef) even when winter sea conditions prevented offshore fishing trips were not uncommon during these months.
2. NSC Region (non-residents) licensees were not sampled regarding AR trips during March and April 2006 or trips during the September-December period (See Table 1). Consequently, it was assumed the monthly AR trip percentages by NSC Region licensees during these months were approximately the same as May 2006, i.e. 6%.
3. SCNC licensees were also not sampled regarding AR trips during April 2006 so it was assumed that AR trip percentages were approximated by the May 2006 AR trip percentage rounded to 6%.
4. SCC and SCNC Region licensees were not sampled during March 2006 or during November and December, so it was assumed that monthly AR trip percentages during these months would be approximated based upon responses by SCC (8%) and SCNR (6%) Region licensees during April and May 2006, respectively.

Fig. 5. Estimated Total Artificial Reef Fishing Trips by Private Boat Anglers during 2006



[13] It should also be noted that the current MRFSS protocol for estimating South Carolina recreational saltwater fishing effort and catch statistics does not include sampling tasks during the months of January and February (i.e. MRFSS Wave 1) because past research indicated that recreational fishing activity during Wave 1 was not significant.

Fig. 6. Estimated Percent of Total SC Artificial Reef Fishing Trips by License Region for Private Boat Anglers during 2006



The projected total number SC private boat saltwater fishing trips involving permitted marine AR areas in 2006 was estimated to be about 141,490, 33,750 and 28,140 for SCC, SCNC and NSC anglers (Fig. 5), respectively, a total of ~**203,400 trips** (Fig. 5), with SCC anglers comprising 70% of the total estimated AR trips (Fig 6). Evaluating the overall reasonableness of this estimate (i.e. Is the estimate "in the ballpark?") is difficult because as previously noted the MRFSS does not estimate aggregate catch and effort statistics specifically related to fishing trips involving AR sites. Regardless, the MRFSS estimates of total ocean[14] SC saltwater private boat fishing trips off of SC during 2006 was approximately 412,500 trips (Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division, Silver Spring, MD). Consequently, the total number of 2006 AR related fishing trips estimated from data collected in this survey was about 49% of all 2006 ocean SC fishing trips estimated by the MRFSS. Stated another way, about 1 out of 2 ocean fishing trips during 2006 apparently involved AR sites within the SC marine artificial reef system. This percentage, 49%, generally seems reasonable given that oceanic fishing trips can also be motivated by fishing modes, species targeting (e.g. tuna, etc.) and/or areas (e.g. wrecks, natural hard-bottom areas, etc.) not usually associated with fishing on or near permitted AR sites.

Based upon a quarterly sampling of registered SC recreational boaters during 1992, the total saltwater SC fishing trips involving private boat angler visits to AR sites was estimated to be about 67,000 trips (Rhodes *et al*. 1993). A comparison between the 2006 estimate of total fishing trips by SC anglers involving AR sites, ~203,400 trips, was therefore approximately three times the total estimate for 1992. This means that the annualized rate of increase in AR related trips since 1992 through 2006 was ~14.5% per year. In contrast, the number of permitted AR areas has doubled since 1992 while the number of AR trips, as a rough proxy for nominal fishing effort, has tripled, although the number of AR sites within some new and old permitted areas has generally increased over time, too.

The MRFSS estimated for 1992 about 108,000 ocean SC saltwater private boat fishing trips off of SC (Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division, Silver Spring, MD) and therefore the percentage of 1992 AR trips compared to the 1992 MRFSS estimate of total ocean SC saltwater private boat fishing trips off of SC was 62%. As a percentage of MRFSS estimated ocean trips, the 1992 AR trip percentage, 62%, was higher than the percentage of AR trips in 2006 (49%), but the overall magnitude of both percentages is similar even though different approaches were used to estimate AR trips in 1992 compared to 2006. The 2006 AR trip estimate also suggests that a "rule of thumb" for roughly estimating the annual total AR related fishing trips by SC private boat anglers in the near future (e.g. over the next three to five years) would be to simply multiply the MRFSS annual ocean trips estimate for these anglers by 0.45.

[14] For 2006, the MRFSS estimated 315,521 ocean within three (3) miles or less of the shore and 97,028 ocean trips beyond three miles, a total of **412,549** ocean trips.

Estimated Artificial Reef Trips by Anglers Staying Overnight in the SC Coastal Region

Descriptive statistics on the number of nights anglers stayed overnight in the SC coastal area (e.g. the Grand Strand) based upon usable responses to Question C9 were summarized in Table A2.7. In addition, estimating or projecting the aggregate frequency of overnight stays or lodging in the SC coastal area by AR anglers is essential to estimating impacts associated with these anglers. Since these overnight stay totals are predicated upon estimates of total AR related fishing trips by Region (See Fig. 5), the projection of total overnight stays is presented in this section. Monthly response data on overnight stays during an AR related fishing trip (i.e. excluding item non-responses[15] for Question C9) were pooled and only analyzed by license regions (Table 3.1). In addition, a comparison between the overnight stay percents for SCNC and NSC was not significantly different and therefore, response data for these two regions (i.e. the SCNC and NSC) were also pooled into one region, "Non-SC Coastal Region," (Table 3.1) in order to simplify the estimating total AR trips by overnight stay status for AR private boat anglers and related AR expenditure patterns. The overnight stay percentage for SCCR respondents, 11.8%, was significantly lower ($p < .01$) than the percentages for Non-SC Coastal Region respondents, 68.6% (Table 3.1). In other words, it appears that nearly 70% of these non-coastal anglers stayed overnight in the SC coastal area during 2006 trips involving AR fishing.

Using the total AR trips estimates, total trips by anglers in the SCNC and the NSC Regions were pooled and overnight stay percentages (See Table 3.1) were applied to total estimates of AR trips (See Fig. 5) for each major region in order to estimate annual total trip by overnight stay status (Table 3.2) during 2006. The resulting projections by overnight stay status for the two major license regions indicates that Non-SC Coastal Region anglers that stayed overnight in the SC coastal area comprised about 21% of all AR anglers while SCC Region anglers constituted approximately 61% of all trips not involving overnight stays (Table 3.2). Consequently, the rate of overnight stays (i.e. lodging) by Non-SC Coastal Region anglers is substantial within this group of anglers, nearly 70% (See Table 3.1), as might be expected by anglers not residing in the SC coastal area, but the weighting of this overnight stay percentage by total estimated AR trips indicates that non-coastal anglers using coastal lodging during 2006 probably represent less than 25% of all AR users (Table 3.2).

Table 3.1. Percentage of Respondents Staying Overnight in the SC Coastal Region During Their Most Recent Trip Related to Fishing on a SC Artificial Reef Site(s) During 2006

			Major Regions		
			SC Coastal Region	Non-SC Coastal Region[1]	**Totals**
Stayed Overnight?	**Yes:**	N	27	188	215
		% within Major Region	11.8%	68.6%	42.7%
	No:	N	202	86	288
		% within Major Region	88.2%	31.4%	57.3%
Totals		N	229	274	503
		Percent	100.0%	100.0%	100.0%

[1]For these analyses, response data for two license regions (i.e. the SCNC and NSC) were pooled into one major region, the "Non-SC Coastal Region."

[15] The item non-response rate for Question C9 was 24% (162).

Table 3.2. Estimated Total Annual Artificial Reef (AR) Trips by Overnight Stay Status Based on Fig. 5 (See Appendix Tables A3.1) and Table 3.1.

Responses by Licensees to Question C9.a.			Major Regions: SC Coastal Region	Major Regions: Non-SC Coastal Region1
Stayed Overnight? (See Table 3.1 above)	**Yes**	Percent	11.8%	68.6%
	No	Percent	88.2%	31.4%
			100.0%	100.0%

Estimated Total AR Trips by Overnight Stay Status Using Above Percents:			
Total Estimated AR Trips:	141,488	61,885	203,373
Total AR Trips Involving Overnight Stays:	**16,696**	**42,453**	**59,149**
Percent of Grand Total	**8.2%**	**20.9%**	**29.1%**
Total AR Trips Not Involving Overnight Stays:	**124,792**	**19,432**	**144,224**
Percent of Grand Total	**61.4%**	**9.6%**	**70.9%**
Totals:	**141,488**	**61,885**	**203,373**

South Carolina Ocean Charter Diving Trips and Scuba Divers

The following analysis of 2006 charter dive trip data including specific permitted artificial reef sites data and related intercept sampling of charter divers was aggregated in order to protect the confidentially of proprietary data collected from individual SC coastal dive shops (businesses).

Responses and SC Charter Diver Demographics

From July through early October 2006, ten (10) oceanic dive charter trips sponsored by SC coastal dive shops involving sites off of South Carolina were sampled resulting in a total 102 usable intercept responses[16] by charter divers filling out a short self-administered intercept questionnaire (See Appendix 1.2). The number of responding divers from each sampled charter trip ranged from 5 to 16 divers per trip and averaged about 81% of the divers on given trip filling out a usable questionnaire. SC coastal dive shops completed a total of 284 SC dive charter trips involving oceanic sites during 2006; consequently 3.5% of these trips were randomly sampled during July-October in 2006.

About 72% (n=73) of the responding charter divers were not SC residents and approximately 79% of the SC resident divers (n=29) lived in SC coastal counties of the SCC Region used when sampling SC recreational saltwater fishing licensees (Table A4.1). Among the non-resident divers, the top two US states were North Carolina and Ohio, and five divers provided non-US postal codes. Since three of the four SC dive shops scheduling charter dives are located north of Georgetown in the SC Grand Strand, the contribution of North Carolina and Ohio charter divers is consistent with other Grand Strand visitor statistics. Overall, male recreational scuba divers comprised 73% of all charter divers (Table A4.1) and the mean age[17] of responding divers was 31.8 years and 37.9 years, respectively, for responding female and male divers. The mean age of responding female divers was significantly lower than the mean age of male divers (Table A4.1).

Most of the responding charter divers, 85%, reported that recreational diving (i.e. not training dives) was the type of diving they were planning for the given charter trip and, therefore, 15% reported that formal dive training activities would be part of the their charter trip activities. The mean number of dives (3.60 dives) in the past 12 months by divers involved in training activities during the their charter dives was significantly ($p < .01$) lower than dives (12.20 dives) by divers reporting their charter trip did not involve training activities. The higher number of dives by divers not involved in training activities during a sampled charter trip would be consistent with experienced recreational divers being less likely to be involved in training activities once they are beyond their initial learning/training stage.

Visiting Divers: Primary Trip Purposes and Lodging Characteristics

Divers residing in an SC coastal county in the SCC Region will be described as SC "coastal" charter divers while divers not residing in one of SC coastal counties or visiting from other states/countries will be described as "visiting" divers, but their region is equivalent to the Non-Coastal Region used when analyzing licensee responses. Approximately 73% of all divers reported they were planning to stay one night or more in the SC coastal area during their trip and none of the SC coastal divers, 23% of all responding divers, reported they were planning to stay overnight in a hotel or at other types of visitor lodging in the SC coastal area (Table 4.1).

For responding visiting divers, 33% indicated that diving was the primary purpose[18] for visiting the SC coastal area (Table 4.1). In contrast, 53% of the visiting divers categorize their main purpose for visiting the SC coastal area as "Vacation/Pleasure". The mean number of nights that visiting divers planned to stay overnight in the SC coastal area was 5.90 nights (n=69). Hotel/motels or rental apartments/condos

[16] Actually for the 102 responding divers, 14 respondents were from a July charter trip not involving diving on one or more SC permitted artificial reef areas. The diving expenses, age and other characteristics of these 14 responding divers were not significantly different than charter dive trips including permitted artificial reef areas. Consequently, responses by these 14 divers were combined with all other responses.

[17] These are approximate ages based on the diver's reported year of birth (Base Year=2006).

[18] Divers residing in SC coastal counties were also not asked to categorize the primary purpose of their trip.

represented the major, 70%, type of lodging reported by visiting divers followed by staying at private homes, 25%.

Table 4.1. Count of "Visiting" and SC Coastal Scuba Divers plus Trip Purpose and Overnight Trip Occurrences of Sampled Divers during 2006

Count of Visiting vs. SC Coastal Divers:

Type of Charter Diver:	Count	Percent
SC Coastal Divers:	**23**	**22.5%**
Visiting (Non-coastal Divers):		
Staying Overnight	74	72.5%
Not Staying Overnight	5	4.9%
Total (Visiting Divers)	**79**	**77.5%**
Total Divers Sample:	102	100.0%

Purpose of coastal trip and whether they stayed overnight in coastal South Carolina for visiting (non-coastal) divers (only):

	Visiting Diver Stayed Overnight?			
Purpose of Trip by Visiting Divers:	**No**	**Yes**	**Total**	**% of All Visiting Divers**
Mainly for Charter Diving in SC:	3	23	26	32.9%
Row %	11.5%	88.5%	100.0%	
Vacation/Pleasure:	0	42	42	53.2%
Row %	0.0%	100.0%	100.0%	
Business/Other:	0	5	5	6.3%
Row %	0.0%	100.0%	100.0%	
No Response:	2	4	6	7.6%
Row %	33.3%	66.7%	100.0%	
Total Visiting Divers:	5	74	79	100.0%
Row %	6.3%	93.7%	100.0%	

Total SC Oceanic Charter Diving Trips During 2006

As previously noted, a total of 284 charter dive trips to sites off of SC were completed by SC coastal dive shops during 2006 and 64% (181) of these trips (Table 4.2) were completed during the summer months, i.e. June-August. Trips involving one or more dives on structures within SC permitted artificial reef sites, 166 trips, represented 59% of all SC charter oceanic dive trips during 2006 with 109 (38%) of these trips being completed during the summer months. Consequently, it is apparent that man-made structures within SC permitted artificial reef sites generally benefit SC dive shops by providing desirable offshore diving destinations. Specific uses of these sites on dive trips range from diver training to use by recreational divers interested in recording the variety of fish species observed on these structures.

During 2006, a total of 3,571 divers participated in these SC offshore dive trips with 53% of these divers (1,902 divers) participating in trips involving one or more dives on structures within SC permitted artificial reef sites (Table 4.2). In other words, man-made structures within SC permitted artificial reef areas are important because these structures provide dive sites commonly used for SC diver charter trips. A simple projection (extrapolation) of these charter diver aggregates using diver intercept data (see Table 4.3) indicates that visiting divers, mainly non-residents, staying overnight in the SC coastal area comprised about 73% (2,591) of all SC charter divers (Table 4.2). In addition, visiting divers participating in charter

dive trips with one or more SC artificial reef sites probably represented a substantial portion, ~39% (1,380), of all SC charter divers (Table 4.2) during 2006.

Table 4.2. Total Number of Oceanic Recreational Dive Charter Trips off of South Carolina (SC) and Related Divers by SC Dive Shops during 2006 including Charter Trips Involving One or More Ocean (Open-water) Dives on SC Permitted Marine Artificial Dive Sites

	Time Period					
	Summer Months		Other Months		Both Periods	
Type of Dive Sites	**Count**	**% of All**	**Count**	**% of All**	**Totals**	**% of All**
Trips with dives on one or more SC marine artificial reef sites:						
Total Trips:	**109**	**38.4%**	**57**	**20.1%**	**166**	**58.5%**
Total Number of Divers:	**1,386**	**38.8%**	**516**	**14.4%**	**1,902**	**53.3%**
Trips with no dives on SC marine artificial reef sites:						
Total Trips:	72	25.4%	46	16.2%	118	41.5%
Total Number of Divers:	1,195	33.5%	474	13.3%	1,669	46.7%
All SC Charter Trips and Divers, 2006:						
Total Trips:	181	63.7%	103	36.3%	**284**	**100.0%**
Total Number of Divers:	2,581	72.3%	990	27.7%	**3,571**	**100.0%**

Projected Number of SC Charter Divers by Regions, Overnight Stay and Type of Dive Site:

Projected Number of Divers by Regions and Overnight Lodging:	Time Period					
	Summer Months		Other Months		Both Periods	
SC Artificial Reef Charter Trips:	**Divers**	**% of All**	**Divers**	**% of All**	**Divers**	**% of All**
Visiting Divers Staying Overnight:	1,006	28.2%	374	10.5%	**1,380**	**38.6%**
Visiting Divers Not Staying:	68	1.9%	25	0.7%	**93**	**2.6%**
Visiting (Non-Coastal) Diver Totals:	1,073	30.1%	400	11.2%	**1,473**	**41.3%**
SC Coastal Divers:	313	8.8%	116	3.3%	**429**	**12.0%**
Total:	1,386	38.8%	516	14.4%	**1,902**	**53.3%**
SC Non-Artificial Reef Dive Trips:						
Visiting Divers Staying Overnight:	867	24.3%	344	9.6%	1,211	33.9%
Visiting Divers Not Staying:	59	1.6%	23	0.7%	82	2.3%
Visiting (Non-Coastal) Diver Totals:	926	25.9%	367	10.3%	1,293	36.2%
SC Coastal Divers:	269	7.5%	107	3.0%	376	10.5%
Total:	1,195	33.5%	841	23.6%	2,962	82.9%
All SC Ocean Charter Diving Trips:						
Visiting Divers Staying Overnight:	1,872	52.4%	718	20.1%	2,591	72.5%
Visiting Divers Not Staying:	127	3.5%	49	1.4%	175	4.9%
Visiting (Non-Coastal) Diver Totals:	1,999	56.0%	767	21.5%	2,766	77.5%
SC Coastal Divers:	582	16.3%	223	6.3%	805	22.5%
Total:	**2,581**	**72.3%**	**990**	**27.7%**	**3,571**	**100.0%**

Economic Impacts and Importance of the SC Artificial Reef System

The estimating of economic impacts and importance of private boat anglers and charter divers related to the use of SC permitted marine artificial reef sites was predicated upon estimating total (aggregate) annual trip expenditures for each user group based upon their daily trip expenditures times the total number of estimated trips by major regions and overnight trip status. These projected expenditure aggregates for each user group were then used in an input-output (I-O) model, IMPLAN, which approximated the flows of economic activity within the SC coastal counties comprising the SCC Region.

Daily Trip Expenditures of Artificial Reef Anglers

Respondents completing one or more AR related fishing trips in a sampled recall month in 2006 were asked to recall trip expenditures specific to the most recent trip during a recall month (See Appendix 1.1, Question C10). Based upon analysis of overnight stay status (See previous "Overnight Stays by Anglers" section), expenditure responses were pooled and analyzed by the two major regional license address groups, the SCC Region and combination of the SCNC and NSC Regions (i.e. the Non-Coastal Region). The mean total daily trip expenditures by responding private boat anglers making an AR related fishing trip during a sampled month ranged from $548 for Non-Coastal Region anglers staying overnight to about $255 for SCC Region anglers not staying overnight (Table 5.1). It is apparent from the summarized expenditure patterns (See Appendix 2, Table A5.1) of the AR anglers that fuel/oil, lodging, car/truck fuel, and restaurant expenses contributed to the higher total trip expenditures by anglers staying overnight compared to those who did not.

Table 5.1. Mean Total Daily Trip Expenditures by AR Anglers by Major Regions and Overnight Stay (Lodging) Status During 2006

Major Region	Stayed Overnight?	N	Mean	Std. Error of Mean
SC Coastal Region:	**Yes**	27	456.5767	101.96917
	No	199	254.9296	45.30877
	Total	226	279.0202	41.87204
Non-Coastal Region:	**Yes**	184	548.2511	69.13089
	No	82	277.5122	49.06488
	Total	266	464.7903	50.68247
Total	**Yes**	211	536.5203	61.65151
	No	281	261.5196	35.09502
	Total	492	379.4569	33.70541

Daily Expenditure Patterns of SC Charter Divers

Mean daily trip expenses by both visiting (non-coastal) and SC coastal divers are needed for estimating both the economic impacts and importance of SC charter divers in the SC coastal area. Estimating trip expenses (i.e. diving and non-diving related expenses) using the primary data collected required reviewing estimated daily expenditures by responding divers in order to judge the significance of these expenses. For divers spending one or more nights in the SC coastal area, daily expenses were approximated by dividing the total trip expenses reported for a given non-diving expense category (e.g. lodging) by the number of nights the diver's traveling party expected to spend in the local area.
For specific diving expenses, purchases reported by interviewed divers, mainly charter and gear rental fees charged the by SC dive shops that sponsored the charter trip, were combined. A subsequent comparative analysis of these dive trip expenses by diver type (e.g. SC coastal divers, visiting divers staying overnight, etc.) indicated that diver type means for diving expenses were not statistically different, so a pooled (overall) mean, ~$125, for diving trip expenses was calculated (Table 5.2). In addition, due to the small number of observations (n=5) for resident SC (i.e. SC non-coastal divers) visiting divers not staying overnight as well as the intercept instrument not being designed to collect non-diving trip (e.g. local retail

food store expenditures, etc.) related expenditures by SC coastal divers, the individual expenditures by these two diver types were treated as being insignificant (Table 5.2).

The total mean daily expenditures by visiting (non-coastal) charter divers staying overnight were $381 and diving and daily lodging expenses comprised 33% and 27%, respectively, of this total (Table 5.2) so combined diving and lodging expenses represented about 60% of these visiting charter diver daily expenses. Estimated daily total non-diving expenses for these visiting charter divers, $256, comprise about 67% of all daily expenditures (Table 5.2).

Table 5.2. Mean Daily Expenditures of Responding Intercepted South Carolina Charter Divers during 2006

	Type of Charter Diver					
Daily Expenditure Categories:	**SC Coastal Divers & Visiting Divers Not Staying Overnight[1]**		**Visiting Divers Staying Overnight[3]**		**Visiting Charter Divers: Percent Contribution by Category**	
	Mean	**SE**	**Mean**	**SE**	**All**	**Without Diving Expenses**
Dive Fees & Gear Rental[2]	$ 124.67	4.048	$ 124.67	4.048	32.7%	NA
Lodging			$ 103.68	13.165	27.2%	40.4%
Foodservice			$ 58.69	5.033	15.4%	22.9%
Auto/Truck Fuel & Oil[4]			$ **24.40**	n.a.	6.4%	9.5%
Retail Store Food			$ 23.88	3.006	6.3%	9.3%
Entertainment			$ 22.05	3.238	5.8%	8.6%
Misc. Retail			$ 19.04	2.428	5.0%	7.4%
Other Expenses (e.g. parking)			$ 4.58	1.201	1.2%	1.8%
Totals (Sum of Means):	**$ 124.67**		**$ 381.00**		100.0%	100.0%
Total Without Diving Expenses:			**$ 256.33**			

SE-Standard error of the mean.

[1]Non-diving expenditures by SC coastal divers and visiting charters divers not staying overnight were considered insignificant.

[2] Diving expenses were pooled (n=102) because these expenses were not significantly different between groups ("Type of Diver").

[3]Except for diving expenses and "Lodging" (n=52), the number of sample observations, n, for all other expenses were 59.

[4]There was substantial item non-response to the fuel expense question by responding charter divers. Consequently, the mean auto/truck fuel and oil expenditure for SC inshore anglers was used.

Economic Impacts and Importance of SC Artificial Reef Anglers and Charter Divers

The estimated total (aggregate) trip expenditures by private boat anglers making an AR related fishing trips, $28.7 million, during 2006 had an estimated total sales (output) impact of about $39 million and generated 470 jobs. From an economic importance perspective, all private boat anglers making saltwater fishing trips involving a visit to SC permitted artificial reef sites during 2006 represented an estimated ~$83 million in total sales and 991 jobs (Table 5.3). Total expenditures by non-coastal charter divers making SC charter trips involving one or more dives on an AR site during 2006 generated a total sales impact of approximately $740,000 and about 13 jobs (Table 5.4), and represented ~$802,000 of total sales. Therefore, the combined total estimated expenditures of both AR anglers and charter divers

represented a total economic importance of about $83.3 million and generated over one thousand (1,000) jobs during 2006. Although precisely estimating the total annual economic impacts and importance directly attributable to the SC marine artificial reef system is problematic, it is readily apparent that just the magnitude of AR user trip expenditures should clearly indicate that this system, as developed and managed by the SCDNR, is clearly a significant component of the entire SC coastal economy. In addition, the man-made structures within SC permitted artificial reef areas, as recreational outdoor “destinations,” are a relevant component of the economic impacts generated by a special group or subset of tourists, i.e. anglers and scuba divers.

Table 5.3. Estimated Total Economic Impacts and Importance of Saltwater Recreational Fishing Licensees using Private Boats and making Saltwater Fishing Trips involving SC Permitted Artificial Reef (AR) Areas during 2006

Estimate Sales (Output) Impact in 2006 Dollars Based on AR Angler Daily Trip Expenses						
Region of AR Angler Groups	**Estimated Total Trips[1]**	**Expenditures[2]**	**Direct Effects[3]**	**Indirect Effects[4]**	**Induced Effects[5]**	**Total Effects**
Non-Coastal Anglers	61,885	$28,667,580	$26,128,982	$6,286,167	$6,568,829	**$38,983,978**
SC Coastal Anglers	141,488	$39,435,967	$34,953,169	$8,626,967	n.a.	$43,580,136
Economic Importance	203,373	$68,103,547	$61,082,151	$14,913,134	$6,568,829	**$82,564,114**
		Sales Multiplier[6] Based on Total Expenditures:				**1.212**

Estimate Job[7] Impact Based on Estimated Number of AR Trips, 2006						
Group	**Estimated Total Trips[1]**	**Direct Effects[3]**	**Indirect Effects[4]**	**Induced Effects[5]**	**Total**	
Non-Coastal Anglers	**61,885**	**340**	**54**	**76**	**470**	
SC Coastal Anglers	141,488	448	74	n.a.	521	
Totals	**203,373**	**787**	**128**	**76**	**991**	
		Job Multiplier[8] per 1,000 AR Angler Trip:			**4.87**	**Jobs**

[1]Total estimated fishing trips related to AR sites based upon sampling of SC saltwater recreational licensees during this study.

[2]Total estimated expenditures by AR anglers as estimated in this study.

[3]Immediate effects of angler expenditure plus leakages from the region. For example, angler spending on hotel would contribute to hotel sales & jobs.

[4]Indirect effects are in sales, income or jobs in sectors within the state that supply goods & services to the recreational fishing/tourism sectors.

[5]Induced effects are the sales within the region from household spending of the income earned in the recreational fishing and supporting sectors. Hotel or tackle shop employees spend the income they earn from anglers on housing, utilities, groceries, etc. These represent induced effects of the visiting angler spending.

[6] A sales multiplier calculated by dividing the Total Effects by Total Expenditures by SC coastal and non-coastal AR anglers.

[7]The jobs may not be FTEs, i.e. these jobs could include part-time seasonal jobs.

[8]The job multiplier used in this table is the ratio of jobs generated by expenditures per 1000 trips by AR anglers.

Table 5.4. Estimated Total Economic Impacts and Importance of South Carolina Charter Dive Trips involving SC Permitted Artificial reef (AR) Areas during 2006.

Estimate Sales (Output) Impact in 2006 Dollars Based on AR Diver Trip Expenses						
AR Charter Diver Groups	**Total AR Dive Trips[1]**	**Expenditures[2]**	**Direct Effects[3]**	**Indirect Effects[4]**	**Induced Effects[5]**	**Total Effects**
Visiting (Non-Coastal) Charter Divers	1,473	$537,357	$493,216	$101,646	$145,364	$740,226
SC Coastal Divers	429	$53,469	$50,262	$11,614	n.a.	$61,876
Economic Importance	1,902	$590,826	$543,478	$113,260	$145,364	$802,101
		Sales Multiplier[6] Based on Total Expenditures:				**1.358**

Estimate Job[7] Impact Based on Estimated Number of AR Trips, 2006						
Group	**Estimated Total Trips[1]**	**Direct Effects[3]**	**Indirect Effects[4]**	**Induced Effects[5]**	**Total**	
Non-Coastal Divers	1,473	10.4	1.0	1.6	13.1	
SC Coastal Anglers	429	0.2	0.1	n.a.	0.3	
Totals	1,902	10.6	1.1	1.6	13.3	
		Job Multiplier[8] per 1,000 Charter Divers:			**7.00**	**Jobs**

[1]Total SC charter diving trips related to AR sites during 2006.

[2]Total estimated expenditures by SC charter divers.

[3]Immediate effects of diver expenditures plus leakages from the region. For example, diver spending on hotel would contribute to hotel sales & jobs.

[4]Indirect effects are in sales, income or jobs in sectors within the state that supply goods & services to the recreational fishing/tourism sectors.

[5]Induced effects are the sales within the region from household spending of the income earned in the charter diving and supporting sectors. Hotel or tackle shop employees spend the income they earn from anglers on housing, utilities, groceries, etc.

[6] A sales multiplier calculated by dividing the Total Effects by Total Expenditures for both diver groups.

[7]The jobs may not be FTEs, i.e. these jobs could include part-time seasonal jobs.

[8]The job multiplier used in this table is the ratio of jobs generated from expenditures per 1,000 AR charter divers.

RECOMMENDATIONS

The following recommendations will focus of the socioeconomic aspects of artificial reef usage, evaluation and related management issues. This emphasis is not only consistent with the authors' economic and social research expertise but is also congruent with one of the core purposes of artificial reef systems, i.e. to serve human uses, such as recreational fishing and scuba diving (Milon *et al.* 2000). Moreover, unless the sole purpose of an artificial reef is to mitigate negative environmental impacts or to conduct research, an artificial reef will be viewed by many decision makers based on specific user group benefits (e.g. satisfaction of anglers fishing) and other benefits (e.g. economic impacts on local communities, etc.) associated with the reef.

1. As noted in this report's "Introduction," the last usage-oriented survey of the SC marine artificial reef system was completed in 1992, more than 13 years ago. The use of the SC artificial reefs (AR) by saltwater anglers nearly tripled during this time period and during any given year over 30% of SC licensed active saltwater private boat anglers complete one or more trips involving AR sites. Although the SCDNR will remain responsive to the needs of AR user groups, the continued apparent overall growth of the SC saltwater angler and offshore scuba diver population would generally indicate that systematic surveys of AR anglers should be conducted more often, such as every 5 to 7 years.

2. The major goal of this study was to collect primary data needed to estimate selected statistics and projected aggregates related to the use (e.g. the total number of 2006 saltwater fishing trips involving a visit to one or more AR sites) of the SC artificial reef system and the economic impacts of the AR system. It is also recognized that SCDNR has and will continue to routinely solicit and poll AR users regarding their opinions and preferences regarding the SC artificial reef sites and related issues. Regardless, the authors believe that a comprehensive and systematic preference and opinion oriented survey of AR user groups would also be beneficial to current and future management of the SC artificial reef system along with usage oriented surveys. Moreover, it is recommended that future surveys include the collection of user group preference data needed for methodologies such as stated preference choice models (SPCM)[19].

3. The use of AR sites by SC scuba diving shops and their charter diving clients has been quantitatively documented in this study, and they represent a significant user of the SC artificial reef system. It is also known that SC private boat recreational scuba divers use the SC artificial reef system and during this study pretest work was done to identify and sample this group of divers. The pretest results indicated that identifying, enumerating and randomly sampling the population of these private boat scuba divers is both methodologically challenging and could be very costly relative to the apparent AR use level of these divers. In contrast, even a qualitative oriented understanding of private boat scuba divers would still be beneficial to the current and future management of the SC artificial reef system. Therefore, it is recommended that SCDNR consider more qualitative survey approaches for targeting private boat recreational scuba divers and cost effective survey methods such as Internet questionnaires to collect usage and other management oriented information regarding this scuba diving group.

4. Given that total expenditures by non-resident or "tourist" AR anglers are substantial, it seems almost obligatory to recommend that the promotion of the SC artificial reef system as an "off-season" fishing destination for tourist anglers needs to be considered. It is also recognized that resident SC AR users could be concerned with promotional efforts targeting potential tourist AR users, if they feel it could further intensify capacity oriented problems (e.g. congestion, declines in catch rates of popular fish species, etc.) at their favorite AR sites. Recognizing these and/or other concerns by SC resident anglers, the apparent seasonal nature of AR usage (See Appendix Table A3.1) does suggest that the promotion of AR fishing by tourist anglers during the spring and fall months[20] might be a consideration by coastal tourism interests if

[19] Traditional research designs like angler opinion polls ask respondents to provide their preferences using a series of single-item questions. This traditional single-item approach can result in failure to identify the relative and interacting (conjoint) importance of one attribute to anothers.

[20] The authors acknowledge that this recommendation could also be subject to criticism by SC residents that may prefer to fish and/or dive on their favorite AR sites during these "off-season" months mainly because the level of congestion, fishing pressure and related problems is much lower during these months compared to the summer months.

SCDNR and other appropriate fisheries management agencies believe that the possibility of stimulating additional fishing pressure by AR tourist anglers on popular AR sites will not significantly escalate fishery sustainability risks. Possible off-season “angler friendly” promotional activities targeting the apparent niche market segment of tourist AR and other saltwater anglers by local coastal communities could include encouraging restaurants and motels to have specials and weekday packages for visitors, enlisting local anglers to host contacts with visitors interested in saltwater fishing and/or hosting information sessions with local tourism interests in conjunction with SCDNR. These promotional efforts should also actively include the involvement of local “for-hire” fishing businesses including fishing guides and dive shops. Specifically, this type of promotional efforts should also be sensitive to enhancing the demand for local for-hire fishing services perhaps by highlighting these services as a viable alternative for fishing and/or diving on AR sites for visitors.

5. The analysis presented in this report was by design mainly focused on AR usage statistics and applying these statistics to estimate total AR fishing trips, and then using these trip aggregates along with the expenditure data collected on AR users to estimate the economic impacts of the SC marine artificial reef system. In contrast, the analytical emphasis reflected in this report should not be considered the final use of the primary data collected during this study. The authors encourage the SCDNR staff to consider other approaches to analyzing the primary data collected during this survey, especially the sample data collected from licensees including those respondents that were not active AR users during the time periods sampled. In other words, we encourage the SCDNR to view the data collected as a viable database available for additional and future “data mining” by the SCDNR staff.

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Appendices: Economic Impact and Use Survey of South Carolina Artificial Reef Users: Private Boat Anglers and Charter Divers, 2006

APPENDIX 1.1

Mail Questionnaire Used for Monthly Sampling of South Carolina Saltwater Recreational Fishing Licensees. (This is an example of the questionnaire used on the first to sampled licensees during June 2006 asking for recall regarding SC marine artificial reef trips during May 2006.)

MARINE RESOURCES DIVISION, SCDNR

2006 SC Marine Artificial Reef System Usage & Economic Impact Survey

You have been selected for a survey regarding saltwater fishing in and off South Carolina (**SC**), including fishing on SC marine artificial reef sites. We would greatly appreciate it if you would **complete and return this questionnaire even <u>if you do not normally fish in South Carolina</u>. <u>FREE HAT!</u> The <u>first</u> 60 respondents who return a completed questionnaire will receive a FREE HAT. <u>YOU HAVE TWO EASY WAYS TO RESPOND TO THIS SURVEY:</u> Complete this questionnaire and return it using the enclosed postage-paid envelope <u>OR</u> using a computer, type in the following address in your web browser: http://www.dnr.sc.gov/fishsurvey/ You must use the <u>ID number</u> on your cover letter and your questionnaire if you want to respond via our Internet site.** *At <u>no</u> time will individual responses be linked to the names or specific addresses of the respondents when summarizing the results of this survey.* **Please contact Bob Martore at 843-953-9303, <u>martoreb@.dnr.sc.gov</u>, if you desire more details about this survey.** THANK YOU VERY MUCH!

<u>Section A</u>: Saltwater Fishing in South Carolina

In this section, we ask you about saltwater fishing trips in South Carolina. Saltwater fishing includes fishing in the open ocean or any portion of a sound, bay, river, or creek that has brackish water or saltwater. Unless asked, please do <u>not</u> include information on other fishing party members.

A1. **Have you been saltwater fishing in** South Carolina or off of the South Carolina coast **during** the past two years?

☐ Yes ☐ No

The following questions are about saltwater fishing in or off of South Carolina from a private boat. By a PRIVATE BOAT, we mean a boat owned or co-owned by you or someone you know that is used privately for fishing trips and not for profit nor for chartered fishing trips.

A2. **How often do you saltwater fish** in South Carolina from a private boat**?**
(Please check the one best response.)

☐**Always** ☐ **Often** ☐ **Sometimes** ☐ **Rarely** ☐**Never**

A3. During the past 12 months**, please estimate the number of** fishing trips **in a** PRIVATE BOAT **at any of the following types of** saltwater habitats in/off South Carolina**.** (If you fished at more than one site in a given day, please credit each habitat with a trip.)

(a) Artificial reefs: ☐ # of Trips.
(b) Wrecks: ☐ # of Trips.
(c) Live bottom areas: ☐ # of Trips.
(d) Creeks/bays: ☐ # of Trips.
(e) Ocean inlets/jetties: ☐ # of Trips.
(f) Open Ocean: ☐ # of Trips.

A4**. Have you been saltwater fishing in** South Carolina or off of the South Carolina coast during the current year (2006)?

☐Yes ☐ No ➔ PLEASE GO TO SECTION E (Question E1) ON PAGE 6.

A5. Did you go saltwater fishing in South Carolina or off of the South Carolina coast during MAY 2006 in a private boat? *(i.e.* a *boat owned or co-owned by you or someone you know that is used privately for fishing trips and not for profit nor for chartered fishing trip.)*

☐Yes ☐ No ➔ PLEASE GO TO SECTION E (Question E1) ON PAGE 6.

[PLEASE GO TO <u>QUESTION A6</u> ON THE NEXT PAGE (<u>PAGE 2</u>).]

A6. During your MAY 2006 saltwater fishing trip in &/or off of South Carolina in a **private boat,** please estimate the **number of trips** for **each type** of saltwater fishing in this table. (**Enter 0, if no fishing trips were completed by a given area.**)

Private Boat Fishing Trips during MAY 2006 by Areas	Trips
a) Fishing in **creeks, bays, or sounds (Estuarine sites):**	
b) Near shore **ocean waters**, **but LESS than 3 miles from shore**:	
c) In ocean waters, MORE than 3 miles from shore:	

Section B: Marine Artificial Reef Fishing During MAY 2006

In this section, we want to know about your MAY 2006 private boat saltwater fishing trips that included SC permitted artificial reef sites, if any, and the private boat you used.

B1. During MAY 2006, did you make any private boat fishing trips that involved fishing on or near SC marine artificial reef sites? IF you are not sure of what are SC artificial reef sites, please see list of sites on Page 3 or go to: http://saltwaterfishing.sc.gov/artificialreef.html

☐ Yes ☐ No ➔ PLEASE GO TO SECTION E (Question E1) ON PAGE 6.

⬇

B2. During the month of MAY 2006, approximately how many **private boat fishing trips** did you make where you fished on or near **South Carolina artificial reefs**? ☐ **# of Trips**

B3. Overall, during the months of **MAY 2006,** approximately how many **private boat fishing trips** did you make where you fished **EXCLUSIVELY on or near South Carolina artificial reefs**, **i.e. you did not fish at any other locations on these trips?**

☐ **# of Trips (This number of trips should be less than or equal to your response to Question B2 above.)**

B4. PLEASE GO TO THE NEXT PAGE (Page 3) WITH SC MARINE ARTIFICIAL REEF PERMIT AREA SITES to estimate the total number of trips ("visits") you made to each given site using a PRIVATE BOAT, if any, during the entire month of MAY 2006. If you fished on more than one site in a day during May, please credit each artificial reef site with a "visit" next to the site's name on the list (See page 3). [Here is a hypothetical example: Assume you made 4 SC saltwater fishing trips in MAY 2006 that involved fishing on/near SC artificial reef sites. If you visited 2 different sites during each of these trips, then you would have made 8 different visits to SC artificial reef sites during MAY 2006, i.e. 4 fishing trips TIMES 2 sites per trip = 8 visits.]

B5. Do you think you would have taken fewer saltwater fishing trips in or off of South Carolina during MAY 2006 if there were no artificial reef?: (Please check one.) ☐ No ☐ Yes ☐ Not sure

B6. Do you **personally own or co-own one or more boats** that are ever used **for saltwater recreational fishing**?

☐ **Yes** ☐ **No ➔ PLEASE GO TO QUESTION C1 ON PAGE 4.**

⬇

1) Approximately what **percentage of time are your boats used for saltwater recreational fishing?** ☐ **% [Please estimate the saltwater fishing usage percentage based upon on total days for ALL uses of your boat(s), but NOT for 365 days/year.]**

2) What are the **length and horsepower of the boat you own or co-own and used the most often during the past 12 months for SC artificial reef trips?**

a. **Length**: ☐ **feet.** b. **HP**: ☐ c. **Fuel?** ☐Gas ☐Diesel

3) Did you **purchase this boat** (See previous question above) **during the past 12 months**?

☐**Yes** ☐ **No**

4) Do you generally own or co-own this boat so you can fish on SC marine artificial reef sites?

☐ **No** ☐ **Yes** ☐ **Not sure** (Check One)

[PLEASE GO TO QUESTION C1 ON PAGE 4.]

B4. Please enter the estimated number of your total <u>May</u> 2006 "visits" to the SC artificial reef sites listed.

Permitted Areas &Sites		Permitted Areas &Sites		Permitted Areas &Sites	
PA-01	**Visits**	PA-18	**Visits**	PA-36	**Visits**
Jim Caudle Reef	☐	Greenville Reef	☐	Edisto Offshore Reef	☐
Little River Reef	☐	Ralph H. Skelton Reef	☐		
		PA-19	Visits	PA-38	Visits
PA-02	Visits	Cape Romain Reef	☐	Fripp Island Reef	☐
Little River Offshore Reef	☐				
Barracuda Alley	☐	PA-20	Visits	PA-39	Visits
		Hector Reef	☐	Hunting Isl. State Park Pier	☐
PA-03	Visits				
Will Goldfinch Reef	☐	PA-22	Visits	PA-40	Visits
		Capers Reef	☐	Hunting Island Reef	☐
PA-06	Visits	R8	☐	6HI	☐
BP-25 Reef	☐				
		PA-23	Visits	PA-41	Visits
PA-08	Visits	Y-73 Reef	☐	General Gordon Reef	☐
Bill Perry Jr. Reef	☐				
		PA-24	Visits	PA-42	Visits
PA-09	Visits	Charleston 60' Reef	☐	Beaufort 45' Reef	☐
Paradise Reef	☐				
H.P. Springs Jr. Reef	☐	PA-25	Visits	PA-43	Visits
Grand Strand SW Anglers	☐	Charleston Nearshore Reef	☐	Parris Island Reef	☐
		Air Force Reef	☐		
PA-10	Visits	Charleston Coastal Anglers	☐	PA-44	Visits
Ten Mile Reef	☐	Charleston Community Reef	☐	Betsy Ross Reef	☐
Eleven Mile Reef	☐				
Bruce Rush Reef	☐	PA-26	Visits	PA-45	Visits
		Folly Beach Fishing Pier	☐	Fish America Reef	☐
PA-11	Visits				
Pawleys Island Reef	☐	PA-27	Visits	PA-47	Visits
		Comanche Reef	☐	White Water Reef	☐
PA-12	Visits	Doug Mellichamp Jr. Reef	☐		
North Inlet Reef	☐			PA-48	Visits
		PA-28	Visits	Eagle's Nest Reef	☐
PA-13	Visits	Lowcountry Anglers' Reef	☐		
Wayne Upchurch Reef	☐			PA-49	Visits
		PA-29	Visits	Hilton Head Reef	☐
PA-14	Visits	Kiawah Reef	☐	Tire Reef	☐
Georgetown Reef	☐	4KI	☐		
				⬇INSHORE REEFS	
PA-15	Visits	PA-30	Visits		
Georgetown Nearshore	☐	Edisto 60' Reef	☐	IS-01	**Visits**
Capt. Sam Crayton Reef	☐			**(Upper) Winyah Bay Inshore**	☐
		PA-31	Visits		
PA-16	Visits	Edisto 40' Reef	☐	IS-02	Visits
C.J. Davidson Jr Reef	☐			**(Lower) Winyah Bay Inshore**	☐
		PA-32	Visits		
PA-17	Visits	N. Edisto Nearshore Reef	☐	IS-03	Visits
Vermillion Reef	☐			**St. Helena Sound Inshore**	☐
		PA-34	Visits		
		CCA-McClellanville Reef	☐	IS-04	Visits
		Jimmy Leland Reef	☐	**Stono River Inshore Reef**	☐

⬅PLEASE <u>RETURN TO PAGE 2</u> (QUESTION B5) AFTER YOU COMPLETE THIS QUESTION.

Section C: Most Recent Artificial Reef Fishing DURING MAY 2006

In this section, we need you to recall information only about your MOST RECENT private boat fishing trip during MAY 2006 involving fishing on or near an SC permitted artificial reef site, if any. PLEASE CAREFULLY PRINT YOUR RESPONSES.

C1. What was the **DATE** of your **MOST RECENT SC saltwater fishing trip during MAY 2006** that involved **fishing on/near** an **SC permitted artificial reef site(s)**:
DATE OF TRIP: May _____, 2006 [ONLY YOUR MOST RECENT MAY TRIP.]

C2. Please **print the name(s) of the SC permitted artificial reef area(s) you fished on/near during your most recent trip in MAY 2006 (See list on Page 3 for the artificial reef site names):**
Name(s) of site/area: ☐

C3. Please **print the name** of **boat ramp/ marina** (e.g., **name of ramp, marina, private dock**, etc.) you **used on this specific fishing trip in MAY 2006 (See Question C1's date above)**:
Name of departure location (e.g. boat ramp, marina, etc.): ☐

C4. For this specific trip **(See Question C1's date above) involved fishing on a near-shore or offshore SC artificial reef site, please print the name of the bay, sound, harbor or inlet you used to access the open ocean on this SC artificial reef trip in MAY 2006:**
You accessed the open ocean by: ☐

C5. In what **city and state did you begin this most recent (MAY 2006) fishing trip** involving **fishing on or near SC artificial reef sites** using a private boat? **[Please enter your RESIDENT city, state, & zip code, IF this May 2006 SC artificial fishing trip was part of a longer trip in which you spent at least one night way from your residence (e.g. vacation trip to the SC coastal area).]**
City: ☐ **State:** ☐ **Zip Code**: ☐

C6. Did you need to **take time off from work without pay** to take this trip?
☐ No ☐ Yes

C7. Including yourself, **how many people were in your party** on this trip?
☐ **# of People**

C8. Including yourself, how **many people went fishing** on this most recent trip?
☐ **# of People**

C9. Was this **MAY 2006 fishing trip** involving artificial reef sites a **part of a longer trip in which you spent at least one night way from your residence?**
☐ Yes ☐ No ➔ PLEASE GO TO QUESTION C10 ON THE NEXT PAGE (Page 5).

a. Did you make this trip **primarily to go fishing**?
☐ No ☐ Yes

b. How many **nights were you away** from where you live on this most recent trip?
☐ **Nights**

c. How many **days** of your recent trip were **spent fishing**?
☐ **Days (Please count partial days as full days.)**

[Please go to Question C10 on the next page (page 5).]

C10. For this specific **MAY 2006** SC artificial reef trip indicated in **Question C1**, please estimate **how much money YOU PERSONALLY SPENT during this fishing trip**. If you **paid for others**, please indicate how many people you paid for, but **DO NOT include any costs paid by others for you**. **Please round your estimates to the nearest dollar.**

EXPENSES RELATED TO YOUR MOST RECENT PRIVATE BOAT ARTIFICIAL REEF FISHING TRIP IN MAY 2006:	Your Expenses	Total Number of People You Paid For (Including you)
Bait Purchases (Your share)	$ .00	
Ice (Your share)	$ .00	
Boat Fuel & Oil (Your share)	$ .00	
Fishing Tournament/Derby Fees	$ .00	
Fishing tackle **(**rented or bought for this trip**)**	$ .00	
Access & boat launching fees	$ .00	
Parking fees at marinas or ramps	$ .00	
Meals & drinks: Restaurants & bars	$ .00	
Drinks & food: Convenience/grocery stores	$ .00	
Lodging (e.g. motel) or Camping Fees, etc.	$ .00	
Auto/Truck/RV Fuel	$ .00	
Auto/RV Rental Fees	$ .00	
Airfare/Plane Tickets	$ .00	
Other**:**	$ .00	

C11. Approximately what **percentage of** related fishing trip expenses **for this most recent** (**MAY 2006**) fishing trip (**See Question C1**) **were purchased in South Carolina**?
☐ **% purchased in South Carolina (0% to 100%).**

C12. Please print the names of the TWO (2) most abundant fish species CAUGHT on or near SC ARTIFICIAL REEF SITES during this most recent MAY 2006 trip:
1. ☐ 2. ☐

Section D: Expenditures on Fishing Related Equipment and Vacation Homes

In this section, we ask you about your expenditures on fishing gear during the previous 12 months. Again, please give us only the total amount you paid, i.e. your share, if you co-own a particular item.

D1. During the past 12 months, did you purchase any fishing gear (e.g. rods, lures, knives, tackle etc.)?
☐ Yes ☐ No ➔ PLEASE GO TO QUESTION D2 BELOW.

D1.1 EXCLUDING boat and boating related expenditures, please estimate your **TOTAL** personal **purchases for saltwater fishing gear items during the last 12 months: $ .00**

D1.2 What percentage of this fishing gear was purchased from retailers & other businesses (e.g. tackle shops) **in South Carolina: % (0% to 100%).**

D2. Do you **own a second home** (e.g. summer home) **in South Carolina** that is ever **used for saltwater recreational fishing trips**?
☐ Yes ☐ No ➔ PLEASE GO TO SECTION E ON THE LAST PAGE (Page 6).

D3. Please estimate the **percentage of time** during a year you use this **second home in South Carolina for recreational saltwater fishing.** ☐ **%**

PLEASE GO TO SECTION E ON THE LAST PAGE (Page 6).

Section E: Information about You and Your Fishing Experience

The following questions will provide information that will help us better understand who fishes in South Carolina and to forecast future demand for marine artificial reef sites and recreational fishing in general. Again, all responses are strictly confidential.

E1. **What year were you** born? 19 ☐

E2. **Are you…?** ☐ Male ☐ Female

E3. What is the **highest level of education** you have completed? (Please **check one.**)

- ☐ Less than 9th grade
- ☐ Some high school (no diploma)
- ☐ High school graduate (including GED)
- ☐ Associate degree or technical school
- ☐ Some college (no degree)
- ☐ College graduate (bachelor degree)
- ☐ Professional or advanced degree.

E4. What best **describes your employment status**? (Please **check <u>all</u> that apply**)

- ☐ Unemployed
- ☐ Full-time homemaker
- ☐ Retired
- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Self-employed
- ☐ Student (part-time)
- ☐ Student (full-time)
- ☐ Military (full-time)

E5. **How many** years have you been saltwater recreational fishing? ☐ Years

E6. Are you currently **employed by or own a business related** to the **SC recreational fishing industry** (e.g., a fishing guide, tackle shop employee, etc.)? ☐ **No** ☐ **Yes**

E7. What is your **race**? (Please **check all that apply**)

- ☐ White
- ☐ Black/African American
- ☐ American Indian /Alaska Native
- ☐ Asian
- ☐ Native Hawaiian or Other Pacific Islander

E8. Please **check <u>one</u>** category below that describes your **household's total annual income before taxes <u>in 2005</u>**. (Only **<u>check one</u>** category.)

- ☐ Less than $9,999
- ☐ $10,000 - $14,999
- ☐ $15,000 - $24,999
- ☐ $25,000 - $34,999
- ☐ $35,000 - $49,999
- ☐ $50,000 - $74,999
- ☐ $75,000 - $99,999
- ☐ $100,000 - $149,999
- ☐ $150,000 - $199,999
- ☐ $200,000 or more

E9. Please print the mailing address you would like us to mail your hat to <u>IF you qualify</u> to receive a FREE HAT:

Your Name:	
Mailing Address:	

E10. Can the **College of Charleston's Dept. of Hospitality & Tourism Mgt.** send you **information** about joining their **SC fishing license survey panel**? ☐ **NO** ☐ **YES**

☐ **Please check this if you would like to receive a summary of this DNR survey results.**

THANK YOU FOR TAKING YOUR TIME TO FILL OUT THIS QUESTIONNAIRE. PLEASE PUT IT INTO THE **ENCLOSED POSTAGE-PAID ENVELOPE** AND **MAIL IT BACK TO US AS SOON AS POSSIBLE**. If you do not have a postage-paid envelope, please mail to **Robert Martore, SC Marine Resources Center, PO Box 12559, Charleston, SC 29422-2559. Please contact Robert Martore at 843-953-9303** if you desire additional details about this survey. **THANK YOU!**

Please feel free to give any comments you desire in the area below: ⬇

Appendix 1.2. Questions on 2006 Diver Intercept Card (Actual Questionnaire used during Diver Intercepts was Formatted and Printed on Both Sides of a 5 inch by 8 inch Card)

PLEASE HELP the SC Marine Resource Division (MRD) gather critical information on diving in & off of South Carolina! Please fill out this form and leave it with the MRD interviewer. You are helping us obtain information important to recognizing the economic impact of diving in South Carolina. **ALL RESPONSES ARE CONFIDENTIAL**. For more info, regarding this survey, **please contact: (NAME OF CONTACT, DNR E-MAIL ADDDRESS, AND PHONE #)**. **THANK YOU.**

Today's date is: (month/day/year): _____/_____/_____

PROFILE OF DIVER:

1a. Your **resident state**: _____ **1b. YOUR ZIP CODE:** _____

2. What year were you born? _____ **3. Gender**: **Male** **Female**

4. Please estimate the **number of dives you made during the past 12 months**: (Circle one category)

1-10 11-20 21-40 41-60 61-80 81-100 101+

PROFILE OF CURRENT DIVE TRIP: [DATE OF YOUR MOST RECENT SC DIVE, IF NOT TODAY: _____]

5. What type of dives are you planning **today (or your most recent dive) in &/or off of SC**? (Please **check one category** that best applies):

☐ Recreational dives ☐ Training dives ☐ Research dive ☐ Other: _____

6. What group or individuals will **you be diving with today**? (Please **check one category** that best applies)

☐ Charter by this shop ☐ Diving with friends on a private boat ☐ Other: _____

7. How many **dives** do you plan to conduct **today**? (Circle one category)

0 dives 1 dive 2 dives 3+ dives

8. What are the locations of the SC dives you will be making today? (Please print.)1st dive: _____**2nd dive**: _____**9. For today's dive trip**, **please estimate how much money you expect to spend on today's SC dive trip**:

$ _____ Charter fee (if any)
$ _____ Diving equipment rented cost (if any)
$ _____ Daily launching and/or docking fee (if any)
$ _____ **Boat** fuel and oil (your share)
$ _____ Air for **your personal** tank (local shop)
$ _____ Other local purchases (please list) _____

[PLEASE TURN THIS CARD OVER]

PLEASE CONTINUE TO QUESTION 10 IF YOU ARE NOT A RESIDENT OF CHARLESTON, BEREKELY, HORRY, GEORGETOWN, DORCHESTER Or OTHER SC COASTAL COUNTIES (IF YOU ARE A "LOCAL" OR RESIDED IN A SC COASTAL COUNTY, PLEASE GO TO QUESTION 16.)

10. Was your **main purpose** in traveling to the SC coast to **dive**?

YES **NO**

11. If NOT diving, what is your **main purpose** for visiting SC coastal area? (Please **check one** category that best applies):

☐ Business ☐ Vacation/Pleasure ☐ Convention ☐ Other: _____

12. What means of transportation did you use to arrive in the SC coastal area? (Please **check one** category)

☐ Personal vehicle ☐ Air ☐ Rental vehicle ☐ Other: _____

13. How many **total nights** do you plan to be away from home for your SC coastal trip?

_____ # Nights (GO to Question 14)

(**IF only a day trip, GO to Question 15.)**

14. Where are you staying during your visit to the SC coastal area? (Please **circle one** category that best applies):

☐ Hotel/Motel ☐ Private home ☐ Rental apt/Condo
☐ Bed & Breakfast ☐ Second home ☐ Campground

Appendix 1.2. (Continued) Questions on 2006 Diver Intercept Card

15. MOST IMPORTANT QUESTION OF ALL:
Thinking about your vacation/trip to the SC coastal area, how much will your party spend on the following items: 

Expected Purchases in the Local Area on This Trip:	Dollars
Lodging (hotel, condo rental, campground, etc.):	
Restaurant & Fast Food Outlet Purchases:	
Supermarket/Quick Stop Purchases:	
Attractions/Entertainment (e.g. golf, museums, etc.):	
Shopping (e.g. gifts, souvenirs):	
Other Local Purchases (Specify):	

16. PLEASE PROVIDE YOUR NAME & MAILING ADDRESS IF IT IS OK TO MAIL YOU A FOLLOW-UP QUESTIONNAIRE:

NAME: _____

ADDRESS: _____

THANK YOU.

(ALL RESPONSES INCLUDING ADDRESSES ARE CONFIDENTIAL & WILL ONLY BE USED BY THE SCDNR.)

Appendix 2: Tables of Selected Response Data

Table A1. Population of Fiscal Year 2005-06 (FY06) and Fiscal Year 06-07 (FY07) SC Saltwater Recreational Fishing License Holders Sampled by License Address Regions for the 2006 Artificial Reef User Survey, 2006.

			SC License Regions			Regions Percent within a Fiscal Year				
Mailing Months	**Fiscal Year**	**FY Total[1]**	**SC Coastal**	**SC Non-Coastal**	**Out of State**	**Total**	**SC Coastal**	**SC Non-Coastal**	**Out of State**	
May-Aug.	FY06	102,440	60,986	21,913	19,541	100.0%	59.5%	21.4%	19.1%	
Sept.-Nov.	FY07[2]	87,021	52,934	20,013	14,074	100.0%	60.8%	23.0%	16.2%	
Sampling by mailing months, recall months and SC license address regions, 2006.										
Sample Mailing/Recall Months			**SC License Regions**			**Mail Sample Percents[3] within a Fiscal Years**				
Mailing Month	Recall Month	Total	SC Coastal	SC Non-Coastal	Out of State (NSC)	Total	SC Coastal	SC Non-Coastal	Out of State (NSC)	
MAY	APRIL	1,260	1,260	-	-	-	2.1%	-	-	
JUNE	MAY	3,750	1,250	1,250	1,250	3.7%	2.0%	5.7%	6.4%	
JULY	JUNE	3,750	1,250	1,250	1,250	3.7%	2.0%	5.7%	6.4%	
AUG	JULY	3,750	1,250	1,250	1,250	3.7%	2.0%	5.7%	6.4%	
SEPT	AUG	3,750	1,250	1,250	1,250	4.3%	2.4%	6.2%	8.9%	
OCT	SEPT	1,483	770	713	-	1.7%	1.5%	3.6%	-	
NOV	OCT	1,483	770	713	-	1.7%	1.5%	3.6%	-	
ALL MAILINGS:		19,226	7,800	6,426	5,000	na	na	na	na	
TOTALS: FY06:		12,510	5,010	3,750	3,750	12.2%	8.2%	17.1%	19.2%	
TOTALS: FY07:		6,716	2,790	2,676	1,250	7.7%	5.3%	13.4%	8.9%	

[1]Regions based upon counts of license entered with county codes.

[2]FY07 counts are based upon updates of FY07 licenses through October 2006.

[3]Percent of all usable license records used within a given license region and FY. For example, the June sample mailing to NSC licensees (May recall month) was 6.4% of all usable FY06 licenses in the NSC region.

Table A2.1 RTS Rates by License Regions and Recall Month

	Count of RTS by License Regions				RTS Percentage by License Regions			
Recall Month	**Total**	**SCC**	**SCNC**	**NSC**	**Total**	**SCC**	**SCNC**	**NSC**
April	96	96	-	-	7.6%	7.6%	-	-
May	312	114	68	130	8.3%	9.1%	5.4%	10.4%
June	254	93	56	105	6.8%	7.4%	4.5%	8.4%
July	294	108	69	117	7.8%	8.6%	5.5%	9.4%
August	152	74	44	34	4.1%	5.9%	3.5%	2.7%
September	66	43	23	-	4.5%	5.6%	3.2%	-
October	94	70	24	-	6.3%	9.1%	3.4%	-
Total	**1,268**	**598**	**284**	**386**	**6.6%**	**7.7%**	**4.4%**	**7.7%**

Table A2.2. Adjusted Response Rates by Survey Mode, Months and License Regions

Recall Month	**Survey Mode**	**Total**	**SCC Region**	**SCNC Region**	**NSC Region**
April	Mail	24.5%	24.5%	-	-
	Internet	5.9%	5.9%	-	-
	Total	30.4%	30.4%	-	-
May	Mail	24.1%	23.9%	29.8%	18.1%
	Internet	8.1%	8.1%	9.1%	7.1%
	Total	32.2%	32.0%	38.8%	25.3%
June	Mail	24.1%	23.1%	30.8%	18.3%
	Internet	7.5%	7.8%	8.4%	6.2%
	Total	31.6%	30.9%	39.2%	24.5%
July	Mail	24.1%	22.2%	29.8%	20.0%
	Internet	8.3%	7.2%	9.9%	7.9%
	Total	32.4%	29.3%	39.7%	27.9%
August	Mail	32.8%	26.6%	30.2%	41.3%
	Internet	10.4%	9.8%	12.0%	9.3%
	Total	43.1%	36.4%	42.2%	50.6%
September	Mail	24.4%	22.0%	27.0%	-
	Internet	9.4%	9.6%	9.1%	-
	Total	33.8%	31.6%	36.1%	-
October	Mail	26.1%	22.7%	29.6%	-
	Internet	9.2%	10.0%	8.4%	-
	Total	35.3%	32.7%	38.0%	-
Total	Mail	26.0%	23.7%	29.7%	24.7%
	Internet	8.5%	8.2%	9.6%	7.7%
	Total	**34.6%**	**31.9%**	**39.3%**	**32.4%**

Table A2.3. Unadjusted Response Rates by Survey Mode, Months and Regions

Recall Month	Survey Mode	Total	SCC Region	SCNC Region	NSC Region
April	Mail	22.6%	22.6%	-	-
	Internet	5.5%	5.5%	-	-
	Total	28.1%	28.1%	-	-
May	Mail	22.1%	21.8%	28.2%	16.2%
	Internet	7.4%	7.4%	8.6%	6.4%
	Total	29.5%	29.1%	36.7%	22.6%
June	Mail	22.5%	21.4%	29.4%	16.7%
	Internet	7.0%	7.2%	8.0%	5.7%
	Total	29.5%	28.6%	37.4%	22.4%
July	Mail	22.2%	20.2%	28.2%	18.2%
	Internet	7.7%	6.6%	9.4%	7.1%
	Total	29.9%	26.8%	37.5%	25.3%
August	Mail	31.4%	25.0%	29.1%	40.2%
	Internet	9.9%	9.2%	11.6%	9.0%
	Total	41.4%	34.2%	40.7%	49.2%
September	Mail	23.3%	20.8%	26.1%	-
	Internet	9.0%	9.1%	8.8%	-
	Total	32.3%	29.9%	34.9%	-
October	Mail	24.5%	22.7%	29.6%	-
	Internet	8.6%	10.0%	8.4%	-
	Total	33.1%	32.7%	38.0%	-
Total	**Mail**	**24.3%**	**21.9%**	**28.4%**	**22.8%**
	Internet	**8.0%**	**7.5%**	**9.2%**	**7.1%**
	Total	**32.3%**	**29.4%**	**37.6%**	**29.9%**

Table A2.4. Statistics on the Numbers of Fishing Trips in North AR Cluster by License Region and Recall Month

License Region	Statistics	April	May	June	July	August	September	October	Total
SCC Region	N	12	15	28	19	18	10	10	112
	Mean	4.42	4.27	4.64	3.37	3.61	6.60	4.40	4.34
	Median	3	2	3	2	2.5	2.5	2	2.5
	Std. Deviation	3.40	5.48	5.42	3.17	3.18	8.55	6.11	4.99
	Std. Error of Mean	0.98	1.42	1.02	0.73	0.75	2.70	1.93	0.47
SCNC Region	N	-	16	15	24	18	14	9	96
	Mean	-	3.44	9.40	5.29	6.39	4.36	7.56	5.91
	Median	-	3	5	3	4.5	3	3	3
	Std. Deviation	-	2.16	11.92	8.12	8.22	3.63	12.66	8.29
	Std. Error of Mean	-	0.54	3.08	1.66	1.94	0.97	4.22	0.85
NSC Region	N	-	13	14	13	44	-	-	84
	Mean	-	3.15	3.93	9.54	5.95	-	-	5.74
	Median	-	2	4	3	4	-	-	4
	Std. Deviation	-	3.31	1.77	18.69	6.33	-	-	8.79
	Std. Error of Mean	-	0.92	0.47	5.18	0.95	-	-	0.96
Total	N	12	44	57	56	80	24	19	292
	Mean	4.42	3.64	5.72	5.63	5.53	5.29	5.89	5.26
	Median	3	2	4	3	4	3	2	3
	Std. Deviation	3.40	3.83	7.44	10.61	6.30	6.11	9.62	7.38
	Std. Error of Mean	0.98	0.58	0.99	1.42	0.70	1.25	2.21	0.43

Table A2.5. Statistics on the Numbers of Fishing Trips in Central AR Cluster by License Region and Recall Month

License Region	Statistics	April	May	June	July	August	September	October	Total
SCC Region	N	12	15	21	29	23	9	12	121
	Mean	3.50	3.47	4.90	4.03	4.43	2.78	4.83	4.12
	Median	2	2	3	3	3	2	3	3
	Std. Deviation	3.53	3.25	4.98	5.64	5.06	2.22	5.02	4.66
	S. Error of Mean	1.02	0.84	1.09	1.05	1.06	0.74	1.45	0.42
SCNC Region	N	-	9	14	22	18	6	8	77
	Mean	-	3.22	2.50	3.95	5.39	2.00	2.13	3.60
	Median	-	3	2	3	2	2	1.5	2
	Std. Deviation	-	1.99	1.56	3.32	9.48	0.89	1.55	5.07
	Std. Error of Mean	-	0.66	0.42	0.71	2.23	0.37	0.55	0.58
NSC Region	N	-	3	5	5	12	-	-	25
	Mean	-	4.00	1.80	2.40	7.50	-	-	4.92
	Median	-	3	2	2	3	-	-	2
	Std. Deviation	-	3.61	0.84	1.14	12.54	-	-	8.96
	Std. Error of Mean	-	2.08	0.37	0.51	3.62	-	-	1.79
Total	N	12	53	56	40	27	20	15	223
	Mean	3.50	5.45	3.86	3.68	3.44	3.75	2.47	4.03
	Median	2	3	3	2	3	3	2	2
	Std. Deviation	3.53	8.66	4.55	3.92	2.82	4.17	1.81	5.42
	Std. Error of Mean	1.02	1.19	0.61	0.62	0.54	0.93	0.47	0.36

Table A2.6. Statistics on the Numbers of Fishing Trips in South AR Cluster by License Region and Recall Month

License Region	Statistics	April	May	June	July	August	September	October	Total
SCC Region	N	6	5	9	12	14	8	8	62
	Mean	3.33	7.00	10.11	4.00	3.43	5.75	11.50	6.13
	Median	3	5	2	3.5	2.5	3.5	2	3
	Std. Deviation	1.86	5.66	19.32	2.89	3.61	5.95	23.65	11.55
	Std. Error of Mean	0.76	2.53	6.44	0.83	0.96	2.10	8.36	1.47
SCNC Region	N	-	6	7	8	12	3	7	43
	Mean	-	3.33	7.71	3.13	7.42	5.00	4.71	5.49
	Median	-	2.5	2	3	2.5	3	3	3
	Std. Deviation	-	3.01	10.08	1.46	16.32	4.36	4.79	9.68
	Std. Error of Mean	-	1.23	3.81	0.52	4.71	2.52	1.81	1.48
NSC Region	N	-	1	4	6	15	-	-	26
	Mean	-	-	4.50	4.00	3.40	-	-	3.81
	Median	-	6	4.5	3	2	-	-	3
	Std. Deviation	-	.	3.11	3.63	2.59	-	-	2.81
	Std. Error of Mean	-	.	1.55	1.48	0.67	-	-	0.55
Total	N	6	12	20	26	41	11	15	131
	Mean	3.33	5.08	8.15	3.73	4.59	5.55	8.33	5.46
	Median	3	3.5	2.5	3	2	3	2	3
	Std. Deviation	1.86	4.38	13.98	2.66	9.12	5.35	17.37	9.75
	Std. Error of Mean	0.76	1.26	3.13	0.52	1.42	1.61	4.48	0.85

Table A2.7 Statistics on the Numbers of Nights Away by License Region and Recall Month

License Region	Statistics	April	May	June	July	August	September	October	Total
SCC Region	N	4	4	15	17	8	5	3	56
	Mean	1.00	1.50	1.73	1.53	0.75	0.20	2.33	1.36
	Median	1	1	1	1	0	0	2	1
	Std. Deviation	1.15	1.91	2.15	1.87	1.04	0.45	1.53	1.73
	Std. Error of Mean	0.58	0.96	0.56	0.45	0.37	0.20	0.88	0.23
SCNC Region	N	-	18	31	35	27	13	18	142
	Mean	-	2.67	3.61	4.40	3.04	2.46	2.61	3.35
	Median	-	3	3	4	2	3	2	3
	Std. Deviation	-	1.57	2.46	2.20	2.16	1.85	2.28	2.24
	Std. Error of Mean	-	0.37	0.44	0.37	0.42	0.51	0.54	0.19
NSC Region	N	-	10	16	18	48	-	-	92
	Mean	-	4.20	5.81	5.22	4.23	-	-	4.70
	Median	-	3.5	4	4	3	-	-	4
	Std. Deviation	-	2.78	3.94	3.61	4.53	-	-	4.09
	Std. Error of Mean	-	0.88	0.98	0.85	0.65	-	-	0.43
Total	N	4	32	62	70	83	18	21	290
	Mean	1.00	3.00	3.73	3.91	3.51	1.83	2.57	3.39
	Median	1	3	3	3	3	1	2	3
	Std. Deviation	1.15	2.18	3.16	2.89	3.80	1.89	2.16	3.11
	Std. Error of Mean	0.58	0.39	0.40	0.35	0.42	0.44	0.47	0.18

Table A2.8. Number of Private Boat Trips Only Involving Fishing on AR Sites by Recall Month and License Region (See Appendix 1.1, Mail Questionnaire, Question B3)

Mail Region	Recall Month	April	May	June	July	August	September	October	Total
SCC Region	N	19	26	45	36	42	21	18	207
	% of Total N	9.2	12.6	21.7	17.4	20.3	10.1	8.7	100.0
	Mean	1.9	2.4	2.9	2.3	1.9	2.2	1.9	2.3
	Median	1	2	2	1.5	1	2	1.5	2
	S.D	1.6	2.5	2.6	2.0	1.4	1.7	1.3	2.0
	S.E.	0.4	0.5	0.4	0.3	0.2	0.4	0.3	0.1
SCNC Region	N	-	20	30	32	31	16	16	145
	% of Total N	-	13.8	20.7	22.1	21.4	11.0	11.0	100.0
	Mean	-	2.2	2.2	2.7	1.9	1.9	1.7	2.1
	Median	-	1.5	1	2	2	2	1	2
	S. D.	-	2.5	2.1	2.4	1.0	1.0	0.9	1.8
	S. E.	-	0.5	0.4	0.4	0.2	0.3	0.2	0.2
NSC Region	N	-	11	18	19	49	-	-	97
	% of Total N	-	11.3	18.6	19.6	50.5	-	-	100.0
	Mean	-	1.9	2.3	1.8	2.6	-	-	2.3
	Median		1	2	1	2	-	-	2
	S. D.	-	1.5	2.1	1.2	2.3	-	-	2.0
	S. E.	-	0.5	0.5	0.3	0.3	-	-	0.2
Total	N	19	57	93	87	122	37	34	449
	% of Total N	4.2	12.7	20.7	19.4	27.2	8.2	7.6	100.0
	Mean	1.9	2.2	2.6	2.3	2.2	2.1	1.8	2.2
	Median	1	2	2	2	2	2	1	2
	S. D.	1.6	2.3	2.4	2.0	1.8	1.5	1.1	2.0
	S. E.	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.1

Table A2.9. Number of Private Boat Fishing Trips in Creeks, Sounds, and Bays by Recall Month and License Region (See Appendix 1.1, Mail Questionnaire, Question A6a)

Mail Region	Recall Month	April	May	June	July	August	September	October	Total
SCC Region	N	119	146	147	152	212	106	115	997
	% of Total N	11.9	14.6	14.7	15.2	21.3	10.6	11.5	100.0
	Mean	4.8	4.5	5.4	5.5	5.4	4.5	6.0	5.2
	Median	3	3	3	3	3	3	3	3
	S. D.	5.9	6.9	7.1	7.5	8.6	4.8	8.1	7.3
	S. E.	0.5	0.6	0.6	0.6	0.6	0.5	0.8	0.2
SCNC Region	N	-	86	95	118	137	62	71	569
	% of Total N	-	15.1	16.7	20.7	24.1	10.9	12.5	100.0
	Mean	-	2.9	4.1	3.3	3.6	3.7	4.0	3.6
	Median	-	2	3	2	2	2	2	2
	S. D.	-	2.9	4.3	3.2	3.7	4.1	3.7	3.7
	S. E.	-	0.3	0.4	0.3	0.3	0.5	0.4	0.2
NSC Region	N	-	71	69	79	199	-	-	418
	% of Total N	-	17.0	16.5	18.9	47.6	-	-	100.0
	Mean	-	4.7	3.3	4.5	4.8	-	-	4.5
	Median		3	2	3	3	-	-	3
	S. D.	-	5.2	2.6	5.0	6.4	-	-	5.5
	S.E.	-	0.6	0.3	0.6	0.5	-	-	0.3
Total	N	119	303	311	349	548	168	186	1984
	% of Total N	6.0	15.3	15.7	17.6	27.6	8.5	9.4	100.0
	Mean	4.8	4.1	4.5	4.5	4.7	4.2	5.2	4.6
	Median	3	2	3	3	3	2	3	3
	S. D.	5.9	5.6	5.6	5.9	6.9	4.5	6.8	6.1
	S. E.	0.5	0.3	0.3	0.3	0.3	0.3	0.5	0.1

Table A2.10 Number of Private Boat Fishing Trips Nearshore by Recall Month and License Region (See Question A6b)

Mail Region	Recall Month	April	May	June	July	August	September	October	Total
SCC Region	N	50	68	86	84	120	59	57	524
	% of Total N	9.5	13.0	16.4	16.0	22.9	11.3	10.9	100.0
	Mean	4.0	2.6	3.2	3.2	3.2	2.6	4.4	3.3
	Median	2	2	2	2	2	2	2	2
	S. D.	5.7	2.4	2.9	2.9	5.1	2.0	5.3	4.0
	S.E.	0.8	0.3	0.3	0.3	0.5	0.3	0.7	0.2
SCNC Region	N	-	50	58	83	85	35	36	347
	% of Total N	-	14.4	16.7	23.9	24.5	10.1	10.4	100.0
	Mean	-	2.7	3.2	2.9	2.9	2.7	3.1	2.9
	Median	-	2	2	2	2	2	2	2
	Std. Deviation	-	2.3	3.7	2.7	2.9	2.7	3.6	3.0
	S.E.	-	0.3	0.5	0.3	0.3	0.4	0.6	0.2
NSC Region	N	-	31	45	51	125	-	-	252
	% of Total N	-	12.3	17.9	20.2	49.6	-	-	100.0
	Mean	-	2.9	2.4	2.8	2.8	-	-	2.7
	Median		2	2	2	2	-	-	2
	S.D.	-	2.1	1.7	3.1	2.6	-	-	2.5
	S.E.	-	0.4	0.3	0.4	0.2	-	-	0.2
Total	N	37	113	145	156	225	57	61	794
	% of Total N	4.7	14.2	18.3	19.6	28.3	7.2	7.7	100.0
	Mean	2.6	2.6	3.7	2.9	3.0	2.7	2.2	2.9
	Median	1	2	2	2	2	2	1	2
	S.D.	2.6	2.3	4.0	2.5	2.7	3.1	2.3	2.9
	S.E.	0.4	0.2	0.3	0.2	0.2	0.4	0.3	0.1

Table A2.11. Number of Private Boat Fishing Trips Offshore by Recall Month and License Region (See Question A6c)

Mail Region	Recall Month	April	May	June	July	August	September	October	Total
SCC Region	N	37	47	72	62	74	37	35	364
	% of Total N	10.2	12.9	19.8	17.0	20.3	10.2	9.6	100.0
	Mean	2.6	2.4	4.1	3.1	2.8	3.2	2.5	3.0
	Median	1	2	3	2	2	2	1	2
	S.D.	2.6	1.8	4.4	2.4	3.0	3.7	2.7	3.2
	S.E.	0.4	0.3	0.5	0.3	0.3	0.6	0.5	0.2
SCNC Region	N	-	45	54	63	65	20	26	273
	% of Total N	-	16.5	19.8	23.1	23.8	7.3	9.5	100.0
	Mean	-	2.8	3.2	2.8	3.0	1.8	1.8	2.8
	Median	-	2	2	2	2	1	1	2
	S.D.	-	3.0	3.3	2.4	2.6	1.2	1.5	2.7
	S.E.	-	0.4	0.5	0.3	0.3	0.3	0.3	0.2
NSC Region	N	-	21	19	31	86	-	-	157
	% of Total N	-	13.4	12.1	19.7	54.8	-	-	100.0
	Mean	-	2.5	3.6	2.8	3.2	-	-	3.1
	Median	-	2	2	2	2	-	-	2
	S.D.	-	1.7	3.8	2.9	2.7	-	-	2.8
	S.E.	-	0.4	0.9	0.5	0.3	-	-	0.2
Total	N	131	352	382	415	645	192	204	2321
	% of Total N	5.6	15.2	16.5	17.9	27.8	8.3	8.8	100.0
	Mean	6.6	5.5	6.6	6.5	6.6	5.8	7.2	6.4
	Median	4	3.5	4	4	4	4	4	4
	S.D.	9.1	6.3	8.0	7.6	8.6	6.1	10.3	8.0
	S.E.	0.8	0.3	0.4	0.4	0.3	0.4	0.7	0.2

Table A2.12. Number of Private Boat Fishing Trips (Sum of Responses to Questions A6a, A6b and A6c) by Recall Month and License Region. (Note: Individual trips to a given area may have occurred on the same day.)

Mail Region	Recall Month	April	May	June	July	August	September	October	Total
SCC Region	N	131	162	176	172	244	116	124	1125
	% of Total N	11.6	14.4	15.6	15.3	21.7	10.3	11.0	100.0
	Mean	6.6	5.8	7.8	7.5	7.1	6.4	8.3	7.1
	Median	4	4	5	5	4	4	4	4
	S.D.	9.1	7.2	9.5	9.3	10.3	6.8	12.0	9.4
	S.E.	0.8	0.6	0.7	0.7	0.7	0.6	1.1	0.3
SCNC Region	N	-	109	120	144	160	76	80	689
	% of Total N	-	15.8	17.4	20.9	23.2	11.0	11.6	100.0
	Mean	-	4.7	6.3	5.7	5.8	4.8	5.5	5.5
	Median	-	3	4	4	4	3	3	4
	S.D.	-	4.9	7.4	5.4	6.3	4.9	6.5	6.0
	S.E.	-	0.5	0.7	0.4	0.5	0.6	0.7	0.2
NSC Region	N	-	81	86	99	241	-	-	507
	% of Total N	-	16.0	17.0	19.5	47.5	-	-	100.0
	Mean	-	5.9	4.7	5.9	6.5	-	-	6.0
	Median	-	4	4	3	4	-	-	4
	S.D.	-	6.1	4.4	6.7	7.9	-	-	6.9
	S.E.	-	0.7	0.5	0.7	0.5	-	-	0.3
Total	N	131	162	176	172	244	116	124	1125
	% of Total N	11.6	14.4	15.6	15.3	21.7	10.3	11.0	100.0
	Mean	6.6	5.8	7.8	7.5	7.1	6.4	8.3	7.1
	Median	4	4	5	5	4	4	4	4
	S.D.	9.1	7.2	9.5	9.3	10.3	6.8	12.0	9.4
	S.E.	0.8	0.6	0.7	0.7	0.7	0.6	1.1	0.3

Table A3.1. Estimated Total Number of Artificial Reef (AR) Related Fishing Trips by SC Private Boat Anglers During 2006 Based on Monthly Responses of SC Saltwater Recreational Fishing Licensees[1] and the FYO6 License Population (Records) Sampled (See Table A1).

Region	Licenses	Percent
SCC	60,986	59.5%
SCNC	21,913	21.4%
NSC	19,541	19.1%
Totals	**102,440**	**100.0%**

SCC: SC Coastal License Region

SCNC: SC Non-Coastal License Region

NSC: Non-Resident License Region (Out of State)

Percentages of AR Related Fishing Trips in Given Month and Region Used to Estimate Monthly AR Trips by Licensees During 2006 (See Table 2.5 and report text):

Region	March	April	May	June[2]	July	Aug	Sept	Oct	Nov	Dec
SCC	8%	8%	10%	16%	16%	16%	13%	13%	8%	8%
SCNC	6%	6%	6%	9%	9%	9%	10%	10%	6%	6%
NSC	6%	6%	6%	10%	10%	10%	6%	6%	6%	6%

Estimated Total Licensees Completing One or More AR Trips by Month and Region Based on Total Population of Licensees Sampled:

Region	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Totals
SCC	4,879	4,879	6,099	9,758	9,758	9,758	7,928	7,928	4,879	4,879	70,744
SCNC	1,315	1,315	1,315	1,972	1,972	1,972	2,191	2,191	1,315	1,315	16,873
NSC	1,172	1,172	1,172	1,954	1,954	1,954	1,172	1,172	1,172	1,172	14,070
Totals	7,366	7,366	8,586	13,684	13,684	13,684	11,292	11,292	7,366	7,366	**101,686**

Estimated Total AR Trips by Month and Region Based On Two Trips Per Licensee:

Region	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Totals
SCC	9,758	9,758	12,197	19,516	19,516	19,516	15,856	15,856	9,758	9,758	141,488
SCNC	2,630	2,630	2,630	3,944	3,944	3,944	4,383	4,383	2,630	2,630	33,746
NSC	2,345	2,345	2,345	3,908	3,908	3,908	2,345	2,345	2,345	2,345	28,139
Totals	14,732	14,732	17,172	27,368	27,368	27,368	22,584	22,584	14,732	14,732	**203,373**

Percentage of Total Estimated AR Trips by Month and Region:

Region	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Region Percent
SCC	4.8%	4.8%	6.0%	9.6%	9.6%	9.6%	7.8%	7.8%	4.8%	4.8%	69.6%
SCNC	1.3%	1.3%	1.3%	1.9%	1.9%	1.9%	2.2%	2.2%	1.3%	1.3%	16.6%
NSC	1.2%	1.2%	1.2%	1.9%	1.9%	1.9%	1.2%	1.2%	1.2%	1.2%	13.8%
Totals	**7.2%**	**7.2%**	**8.4%**	**13.5%**	**13.5%**	**13.5%**	**11.1%**	**11.1%**	**7.2%**	**7.2%**	**100.0%**

[1]**It was assumed that artificial reef trips were insignificant during the months of January and February (See text).**

[2]**Percentages used for the summer months (i.e. June-August) were rounded three-months averages for these months.**

Table A4.1. Count of Gender and Residency Status, and Mean Ages of Responding Intercepted South Carolina Charter Divers during 2006.

Counts by Gender and Residency:

Diver Gender	SC Residents:			SC Coastal County Residents:		
	No	**Yes**	**Total**	**No**	**Yes**	**Total**
Female:	22	6	28	24	4	28
Row %	78.6%	21.4%	100.0%	85.7%	14.3%	100.0%
Total %[1]	21.6%	5.9%	27.5%	23.5%	3.9%	27.5%
Male:	51	23	74	55	19	74
Row %	68.9%	31.1%	100.0%	74.3%	25.7%	100.0%
Total %	50.0%	22.5%	72.5%	53.9%	18.6%	72.5%
Totals:	73	29	102	79	23	102
Row %	**71.6%**	**28.4%**	**100.0%**	**77.5%**	**22.5%**	**100.0%**

[1]Percentage of all counts within each group, i.e. "SC Resident" and "SC Coastal County Resident."

Means of Diver Ages by Gender and Residency

Diver Gender	SC Resident?	Mean Age	N	Std. Deviation
Female:	**No**	32.7	21	13.785
	Yes	28.0	5	16.628
	Total*	31.8	26	14.135
Male:	**No**	37.3	49	12.866
	Yes	39.0	22	13.985
	Total*	37.9	71	13.145
Combined:	**No**	35.9	70	13.225
	Yes	37.0	27	14.819
	Total	36.2	97	13.617

***ANOVA Results**

One-Way ANOVA Groups			Sum of Squares	df	Mean Square	F**
Age vs. Gender	**Between Groups**	(Combined)	709.07185	1	709.0719	**3.94148**
	Within Groups		17090.475	95	179.8997	
	Total		17799.546	96		

** Significant at the 5% level.

Table A5.1 Means of Trip Expenditure Categories of Private Boat Anglers Fishing at Sites within the South Carolina Artificial Reef System during April-October 2006 based on Responses from Random Samples of SC Saltwater Recreational License Holders

License Region	Stayed Overnight?		Bait	Ice	Boat Fuel & Oil	Other Fees	Fishing Tackle	Ramp Fees	Parking Fees	Restaurants	Food Retail Stores	Daily Lodging	Auto/Truck Fuel	Other Misc.
SCC	**Yes**	Mean	23.19	10.89	141.07	55.00	34.44	2.00	9.63	75.93	30.74	36.87	34.48	3.70
		N	27	27	27	27	27	27	27	27	27	26	27	27
		SE[1]	6.37	2.22	26.61	33.69	11.89	0.98	6.28	19.27	5.68	14.31	8.15	3.70
	No	Mean	15.48	9.75	84.92	14.97	25.35	19.70	3.70	31.74	26.27	0	17.96	5.09
		N	199	199	199	199	199	199	199	199	199	182	199	199
		SE	1.80	1.54	12.06	6.52	5.78	18.11	2.48	13.13	5.44	0	2.87	2.32
	Total:	Mean	16.40	9.89	91.63	19.75	26.43	17.58	4.41	37.02	26.81	4.61	19.93	4.92
		N	226	226	226	226	226	226	226	226	226	208	226	226
		SE	1.76	1.38	11.14	7.03	5.28	15.95	2.31	11.82	4.84	1.95	2.72	2.09
SC N-C*	**Yes**	Mean	29.36	14.48	162.11	34.62	36.61	4.01	9.08	97.24	48.34	34.10	75.13	2.90
		N	184	184	184	184	184	184	184	184	184	182	184	184
		SE	4.54	1.28	36.53	16.70	5.91	1.32	3.10	9.06	4.88	6.10	7.57	1.60
	No	Mean	22.16	8.46	103.73	13.05	20.01	2.77	5.67	26.72	18.54	0.00	50.00	6.40
		N	82	82	82	82	82	82	82	82	82	71	82	82
		SE	4.66	1.51	21.21	12.20	4.59	1.31	3.47	4.94	2.49	0.00	18.39	3.93
	Total:	Mean	27.14	12.62	144.11	27.97	31.49	3.62	8.03	75.50	39.15	24.53	67.38	3.98
		N	266	266	266	266	266	266	266	266	266	253.00	266	266
		SE	3.45	1.01	26.13	12.15	4.35	1.00	2.40	6.75	3.56	4.49	7.73	1.64
ALL	**Yes**	Mean	28.57	14.02	159.42	37.23	36.33	3.75	9.15	94.51	46.09	34.45	69.92	3.00
		N	211	211	211	211	211	211	211	211	211	208	211	211
		SE	4.04	1.15	32.02	15.17	5.37	1.16	2.82	8.28	4.34	5.62	6.74	1.47
	No	Mean	17.43	9.38	90.41	14.41	23.79	14.76	4.28	30.27	24.01	0.00	27.31	5.47
		N	281	281	281	281	281	281	281	281	281	253	281	281
		SE	1.87	1.18	10.54	5.82	4.30	12.83	2.03	9.40	3.92	0.00	5.78	2.00
	Grand Total	Mean	22.21	11.37	120.00	24.20	29.17	10.04	6.37	57.82	33.48	15.54	45.59	4.41
		N	492	492	492	492	492	492	492	492	492	461	492	492
		SE	2.05	0.84	15.06	7.31	3.38	7.34	1.67	6.59	2.95	2.66	4.49	1.30

1-Standard error of the mean.

*SC N-C: Pooled expenditures of SCNC and NSC AR anglers.

Appendix 3: Summary of Responses by SC Artificial Reef Permitted Area (See Appendix 1.1, Mail Questionnaire, Question B4). Note: Response data has been standardized to responses per 1,000 anglers.

Appendix 3: Description of Site Abbreviations Used in the Following Appendix Tables A3.1 through A3.3 and Appendix Figures A3.1 through Fig. A3.4.

Site Abbreviation	Site Description
PA01Jim	PA-01, Jim Caudle Reef
PA01Lit	PA-01, Little River Reef
PA02Off	PA-02, Little River Offshore Reef
PA02Bar	PA-02, Barracuda Alley
PA03Will	PA-03, Will Goldfinch Reef
PA06BP	PA-06, BP-25 Reef
PA08Bill	PA-08, Bill Perry Jr. Reef
PA09Para	PA-09, Paradise Reef
PA09HP	PA-09, H.P. Springs Jr. Reef
PA09Grad	PA-09, Grand Strand SW Anglers
PA10TenM	PA-10**,** Ten Mile Reef
PA10EleM	PA-10**,** Eleven Mile Reef
PA10Brue	PA-10**,** Bruce Rush Reef
PA11Paw	PA-11, Pawleys Island Reef
PA12Nor	PA-12, North Inlet Reef
PA13Way	PA-13, Wayne Upchurch Reef
PA14Geo	PA-14, Georgetown Reef
PA15Near	PA-15, Georgetown Nearshore
PA15Capt	PA-15, Capt. Sam Crayton Reef
PA16CJ	PA-16, C.J. Davidson Jr Reef
PA17Verm	PA-17, Vermillion Reef
PA18Gree	PA-18, Greenville Reef
PA18Ralp	PA-18, Ralph H. Skelton Reef
PA19Cape	PA-19, Cape Romain Reef
PA20Hect	PA-20, Hector Reef
PA22Capr	PA-22, Capers Reef
PA22R8	PA-22, R8
PA23Y73	PA-23, Y-73 Reef
PA24C60	PA-24, Charleston 60' Reef
PA25Near	PA-25, Charleston Nearshore Reef
PA25AirF	PA-25, Air Force Reef
PA25Coas	PA-25, Charleston Coastal
PA25Comm	PA-25, Anglers Charleston Community Reef
PA26Foly	PA-26, Folly Beach Fishing Pier
PA27Coma	PA-27, Comanche Reef
PA27Doug	PA-27, Doug Mellichamp Jr. Reef
PA28LowC	PA-28, Lowcountry Anglers' Reef
PA29Kiaw	PA-29, Kiawah Reef
PA294KI	PA-29, 4KI
PA30Ed60	PA-30, Edisto 60' Reef
PA31Ed40	PA-31, Edisto 40' Reef
PA32Edis	PA-32, N. Edisto Nearshore Reef

Appendix 3 (Continued)	
Site Abbreviation	Site Description
PA34CCA	PA-34, CCA-McClellanville Reef
PA34Jimm	PA-34, Jimmy Leland Reef
PA36Edis	PA-36, Edisto Offshore Reef
PA38Frip	PA-38, Fripp Island Reef
PA39Hunt	PA-39, Hunting Isl. State Park Pier
PA40Hunt	PA-40, Hunting Island Reef
PA406HI	PA-40, 6HI
PA41Gord	PA-41, General Gordon Reef
PA42Beau	PA-42, Beaufort 45' Reef
PA43Parr	PA-43, Parris Island Reef
PA44Bets	PA-44, Betsy Ross Reef
PA45Fish	PA-45, Fish America Reef
PA47Whit	PA-47, White Water Reef
PA48Eagl	PA-48, Eagle's Nest Reef
PA49Hilt	PA-49, Hilton Head Reef
PA49Tire	PA-49, Tire Reef
IS01Up	IS-01, Upper Winyah Bay Inshore
IS02Low	IS-02, Lower Winyah Bay Inshore
IS03StHe	IS-03, St. Helena Sound Inshore
IS04Ston	IS-04, Stono River Inshore Reef

Appendix 3.1: Numbers of Visitors and Number of Visitors per 1,000 Anglers by AR Reef and Recall Month

Site Name	April		May		June		July		August		September		October		Total	
PA01Jim	0	0.0	2	1.8	6	5.4	6	5.4	25	16.1	3	6.3	3	6.1	45	7.3
PA01Lit	1	2.8	8	7.3	11	10.0	9	8.0	23	14.8	5	10.4	2	4.1	59	9.5
PA02Off	1	2.8	8	7.3	9	8.2	11	9.8	21	13.5	4	8.4	1	2.0	55	8.9
PA02Bar	0	0.0	1	0.9	1	0.9	0	0.0	1	0.6	0	0.0	0	0.0	3	0.5
PA03Will	1	2.8	1	0.9	2	1.8	2	1.8	2	1.3	0	0.0	2	4.1	10	1.6
PA06BP	0	0.0	4	3.6	6	5.4	7	6.3	7	4.5	1	2.1	3	6.1	28	4.5
PA08Bill	1	2.8	1	0.9	7	6.4	6	5.4	8	5.2	1	2.1	3	6.1	27	4.4
PA09Para	4	11.3	12	10.9	16	14.5	14	12.5	15	9.7	5	10.4	7	14.3	73	11.8
PA09HP	0	0.0	1	0.9	3	2.7	3	2.7	2	1.3	1	2.1	0	0.0	10	1.6
PA09Grad	2	5.6	2	1.8	1	0.9	4	3.6	2	1.3	0	0.0	0	0.0	11	1.8
PA10TenM	2	5.6	7	6.4	11	10.0	12	10.7	18	11.6	8	16.7	4	8.1	62	10.0
PA10EleM	0	0.0	2	1.8	2	1.8	5	4.5	5	3.2	1	2.1	1	2.0	16	2.6
PA10Brue	0	0.0	0	0.0	1	0.9	2	1.8	1	0.6	0	0.0	0	0.0	4	0.6
PA11Paw	1	2.8	5	4.5	9	8.2	6	5.4	8	5.2	5	10.4	4	8.1	38	6.1
PA12Nor	1	2.8	2	1.8	5	4.5	0	0.0	8	5.2	0	0.0	2	4.1	18	2.9
PA13Way	1	2.8	0	0.0	1	0.9	1	0.9	1	0.6	0	0.0	0	0.0	4	0.6
PA14Geo	1	2.8	7	6.4	5	4.5	7	6.3	10	6.5	3	6.3	6	12.2	39	6.3
PA15Near	1	2.8	6	5.4	10	9.1	11	9.8	14	9.0	5	10.4	4	8.1	51	8.2
PA15Capt	0	0.0	2	1.8	0	0.0	1	0.9	2	1.3	0	0.0	0	0.0	5	0.8
PA16CJ	2	5.6	3	2.7	3	2.7	2	1.8	1	0.6	0	0.0	0	0.0	11	1.8
PA17Verm	2	5.6	3	2.7	10	9.1	5	4.5	7	4.5	4	8.4	1	2.0	32	5.2
PA18Gree	1	2.8	1	0.9	7	6.4	3	2.7	3	1.9	1	2.1	0	0.0	16	2.6
PA18Ralp	0	0.0	0	0.0	1	0.9	1	0.9	0	0.0	0	0.0	0	0.0	2	0.3
PA19Cape	0	0.0	0	0.0	4	3.6	7	6.3	4	2.6	0	0.0	1	2.0	16	2.6
PA20Hect	0	0.0	3	2.7	3	2.7	1	0.9	3	1.9	0	0.0	0	0.0	10	1.6
PA22Capr	4	11.3	8	7.3	3	2.7	7	6.3	7	4.5	2	4.2	2	4.1	33	5.3
PA22R8	3	8.5	5	4.5	5	4.5	3	2.7	3	1.9	1	2.1	0	0.0	20	3.2
PA23Y73	2	5.6	4	3.6	3	2.7	10	8.9	5	3.2	2	4.2	2	4.1	28	4.5
PA24C60	2	5.6	11	10.0	9	8.2	19	17.0	14	9.0	5	10.4	6	12.2	66	10.7
PA25Near	1	2.8	7	6.4	13	11.8	16	14.3	12	7.7	2	4.2	6	12.2	57	9.2
PA25AirF	0	0.0	0	0.0	2	1.8	2	1.8	0	0.0	0	0.0	0	0.0	4	0.6
PA25Coas	0	0.0	1	0.9	2	1.8	4	3.6	1	0.6	1	2.1	2	4.1	11	1.8
PA25Comm	1	2.8	0	0.0	1	0.9	2	1.8	0	0.0	0	0.0	0	0.0	4	0.6
PA26Foly	1	2.8	3	2.7	0	0.0	2	1.8	4	2.6	1	2.1	3	6.1	14	2.3
PA27Coma	3	8.5	7	6.4	3	2.7	10	8.9	9	5.8	5	10.4	2	4.1	39	6.3
PA27Doug	0	0.0	1	0.9	0	0.0	1	0.9	1	0.6	0	0.0	0	0.0	3	0.5
PA28LowC	1	2.8	0	0.0	2	1.8	7	6.3	5	3.2	1	2.1	3	6.1	19	3.1
PA29Kiaw	1	2.8	2	1.8	6	5.4	2	1.8	4	2.6	1	2.1	0	0.0	16	2.6
PA294KI	1	2.8	3	2.7	4	3.6	3	2.7	3	1.9	0	0.0	1	2.0	15	2.4
PA30Ed60	3	8.5	4	3.6	7	6.4	12	10.7	12	7.7	2	4.2	3	6.1	43	6.9
PA31Ed40	0	0.0	2	1.8	12	10.9	11	9.8	14	9.0	1	2.1	2	4.1	42	6.8
PA32Edis	2	5.6	3	2.7	1	0.9	3	2.7	7	4.5	3	6.3	3	6.1	22	3.6
PA34CCA	1	2.8	0	0.0	0	0.0	2	1.8	1	0.6	0	0.0	1	2.0	5	0.8
PA34Jimm	0	0.0	0	0.0	1	0.9	1	0.9	0	0.0	0	0.0	0	0.0	2	0.3
PA36Edis	0	0.0	0	0.0	3	2.7	4	3.6	14	9.0	1	2.1	2	4.1	24	3.9
PA38Frip	1	2.8	1	0.9	5	4.5	3	2.7	6	3.9	3	6.3	3	6.1	22	3.6

Appendix 3.1: Numbers of Visitors and Number of Visitors per 1,000 Anglers by AR Reef and Recall Month (Continue)

Site Name	April		May		June		July		August		September		October		Total	
PA39Hunt	0	0.0	1	0.9	1	0.9	1	0.9	6	3.9	1	2.1	0	0.0	10	1.6
PA40Hunt	2	5.6	3	2.7	3	2.7	2	1.8	3	1.9	4	8.4	2	4.1	19	3.1
PA406HI	1	2.8	0	0.0	2	1.8	0	0.0	2	1.3	1	2.1	0	0.0	6	1.0
PA41Gord	1	2.8	4	3.6	5	4.5	8	7.1	6	3.9	3	6.3	3	6.1	30	4.8
PA42Beau	2	5.6	3	2.7	5	4.5	6	5.4	4	2.6	4	8.4	2	4.1	26	4.2
PA43Parr	1	2.8	5	4.5	5	4.5	7	6.3	12	7.7	1	2.1	1	2.0	32	5.2
PA44Bets	1	2.8	3	2.7	8	7.3	10	8.9	9	5.8	7	14.6	2	4.1	40	6.5
PA45Fish	1	2.8	2	1.8	3	2.7	3	2.7	2	1.3	0	0.0	3	6.1	14	2.3
PA47Whit	0	0.0	3	2.7	0	0.0	0	0.0	7	4.5	3	6.3	1	2.0	14	2.3
PA48Eagl	0	0.0	2	1.8	3	2.7	1	0.9	5	3.2	1	2.1	4	8.1	16	2.6
PA49Hilt	1	2.8	1	0.9	2	1.8	2	1.8	8	5.2	2	4.2	5	10.2	21	3.4
PA49Tire	0	0.0	2	1.8	1	0.9	2	1.8	7	4.5	0	0.0	1	2.0	13	2.1
IS01Up	3	8.5	5	4.5	9	8.2	5	4.5	5	3.2	6	12.5	4	8.1	37	6.0
IS02Low	4	11.3	5	4.5	5	4.5	3	2.7	6	3.9	5	10.4	2	4.1	30	4.8
IS03StHe	0	0.0	2	1.8	4	3.6	11	9.8	8	5.2	2	4.2	3	6.1	30	4.8
IS04Ston	1	2.8	1	0.9	3	2.7	5	4.5	4	2.6	1	2.1	4	8.1	19	3.1
Total	67	189.3	185	168.0	275	249.8	316	282.4	407	262.6	119	248.4	122	248.5	1491	240.7

Appendix 3.2: Numbers of AR Trips and Numbers of Trips per 1,000 Anglers by AR Reef and Recall Month

Site Name	April		May		June		July		August		September		October		Total	
PA01Jim	0	0.0	3	2.7	14	12.7	15	13.4	51	32.9	7	14.6	9	18.3	99	16.0
PA01Lit	2	5.6	22	20.0	23	20.9	13	11.6	46	29.7	18	37.6	2	4.1	126	20.3
PA02Off	2	5.6	10	9.1	20	18.2	21	18.8	43	27.7	15	31.3	1	2.0	112	18.1
PA02Bar	0	0.0	1	0.9	1	0.9	0	0.0	2	1.3	0	0.0	0	0.0	4	0.6
PA03Will	1	2.8	1	0.9	4	3.6	6	5.4	3	1.9	0	0.0	4	8.1	19	3.1
PA06BP	0	0.0	4	3.6	9	8.2	8	7.1	14	9.0	1	2.1	7	14.3	43	6.9
PA08Bill	3	8.5	1	0.9	9	8.2	9	8.0	16	10.3	1	2.1	6	12.2	45	7.3
PA09Para	10	28.2	32	29.1	40	36.3	25	22.3	21	13.5	11	23.0	23	46.8	162	26.2
PA09HP	0	0.0	1	0.9	5	4.5	5	4.5	3	1.9	1	2.1	0	0.0	15	2.4
PA09Grad	3	8.5	8	7.3	1	0.9	8	7.1	5	3.2	0	0.0	0	0.0	25	4.0
PA10TenM	3	8.5	11	10.0	19	17.3	25	22.3	37	23.9	13	27.1	9	18.3	117	18.9
PA10EleM	0	0.0	3	2.7	3	2.7	12	10.7	9	5.8	2	4.2	2	4.1	31	5.0
PA10Brue	0	0.0	0	0.0	1	0.9	4	3.6	6	3.9	0	0.0	0	0.0	11	1.8
PA11Paw	1	2.8	5	4.5	20	18.2	11	9.8	15	9.7	7	14.6	7	14.3	66	10.7
PA12Nor	3	8.5	3	2.7	8	7.3	0	0.0	11	7.1	0	0.0	4	8.1	29	4.7
PA13Way	1	2.8	0	0.0	2	1.8	1	0.9	1	0.6	0	0.0	0	0.0	5	0.8
PA14Geo	1	2.8	9	8.2	8	7.3	16	14.3	18	11.6	4	8.4	10	20.4	66	10.7
PA15Near	1	2.8	6	5.4	17	15.4	15	13.4	25	16.1	5	10.4	8	16.3	77	12.4
PA15Capt	0	0.0	3	2.7	0	0.0	1	0.9	2	1.3	0	0.0	0	0.0	6	1.0
PA16CJ	3	8.5	4	3.6	4	3.6	2	1.8	1	0.6	0	0.0	0	0.0	14	2.3
PA17Verm	3	8.5	4	3.6	13	11.8	8	7.1	12	7.7	4	8.4	2	4.1	46	7.4
PA18Gree	3	8.5	1	0.9	10	9.1	6	5.4	5	3.2	2	4.2	0	0.0	27	4.4
PA18Ralp	0	0.0	0	0.0	1	0.9	3	2.7	0	0.0	0	0.0	0	0.0	4	0.6
PA19Cape	0	0.0	0	0.0	5	4.5	10	8.9	5	3.2	0	0.0	2	4.1	22	3.6
PA20Hect	0	0.0	3	2.7	3	2.7	1	0.9	7	4.5	0	0.0	0	0.0	14	2.3
PA22Capr	6	16.9	12	10.9	5	4.5	13	11.6	8	5.2	2	4.2	3	6.1	49	7.9
PA22R8	6	16.9	7	6.4	9	8.2	5	4.5	5	3.2	1	2.1	0	0.0	33	5.3
PA23Y73	3	8.5	8	7.3	3	2.7	14	12.5	11	7.1	3	6.3	3	6.1	45	7.3
PA24C60	2	5.6	18	16.3	18	16.3	36	32.2	39	25.2	6	12.5	9	18.3	128	20.7
PA25Near	1	2.8	10	9.1	33	30.0	28	25.0	17	11.0	2	4.2	11	22.4	102	16.5
PA25AirF	0	0.0	0	0.0	3	2.7	7	6.3	0	0.0	0	0.0	0	0.0	10	1.6
PA25Coas	0	0.0	1	0.9	3	2.7	11	9.8	3	1.9	1	2.1	2	4.1	21	3.4
PA25Comm	2	5.6	0	0.0	2	1.8	7	6.3	0	0.0	0	0.0	0	0.0	11	1.8
PA26Foly	1	2.8	5	4.5	0	0.0	3	2.7	13	8.4	2	4.2	12	24.4	36	5.8
PA27Coma	7	19.8	10	9.1	3	2.7	15	13.4	20	12.9	6	12.5	2	4.1	63	10.2
PA27Doug	0	0.0	1	0.9	0	0.0	1	0.9	1	0.6	0	0.0	0	0.0	3	0.5
PA28LowC	3	8.5	0	0.0	8	7.3	10	8.9	16	10.3	1	2.1	6	12.2	44	7.1
PA29Kiaw	1	2.8	2	1.8	10	9.1	2	1.8	7	4.5	1	2.1	0	0.0	23	3.7
PA294KI	3	8.5	5	4.5	6	5.4	4	3.6	6	3.9	0	0.0	1	2.0	25	4.0
PA30Ed60	4	11.3	5	4.5	15	13.6	19	17.0	18	11.6	3	6.3	4	8.1	68	11.0
PA31Ed40	0	0.0	3	2.7	22	20.0	21	18.8	26	16.8	1	2.1	3	6.1	76	12.3
PA32Edis	2	5.6	5	4.5	1	0.9	3	2.7	39	25.2	4	8.4	4	8.1	58	9.4
PA34CCA	1	2.8	0	0.0	0	0.0	9	8.0	1	0.6	0	0.0	1	2.0	12	1.9
PA34Jimm	0	0.0	0	0.0	1	0.9	4	3.6	0	0.0	0	0.0	0	0.0	5	0.8
PA36Edis	0	0.0	0	0.0	3	2.7	9	8.0	46	29.7	1	2.1	3	6.1	62	10.0
PA38Frip	1	2.8	3	2.7	15	13.6	4	3.6	11	7.1	5	10.4	5	10.2	44	7.1

Appendix 3.2: Numbers of AR Trips and Numbers of Trips per 1,000 Anglers by AR Reef and Recall Month (Continue)

Site Name	April		May		June		July		August		September		October		Total	
PA39Hunt	0	0.0	3	2.7	1	0.9	1	0.9	10	6.5	1	2.1	0	0.0	16	2.6
PA40Hunt	4	11.3	5	4.5	13	11.8	4	3.6	3	1.9	8	16.7	2	4.1	39	6.3
PA406HI	1	2.8	0	0.0	8	7.3	0	0.0	4	2.6	3	6.3	0	0.0	16	2.6
PA41Gord	1	2.8	8	7.3	11	10.0	13	11.6	7	4.5	4	8.4	3	6.1	47	7.6
PA42Beau	3	8.5	4	3.6	9	8.2	9	8.0	6	3.9	9	18.8	3	6.1	43	6.9
PA43Parr	5	14.1	12	10.9	6	5.4	14	12.5	21	13.5	5	10.4	2	4.1	65	10.5
PA44Bets	3	8.5	4	3.6	18	16.3	22	19.7	14	9.0	10	20.9	2	4.1	73	11.8
PA45Fish	1	2.8	3	2.7	6	5.4	5	4.5	2	1.3	0	0.0	10	20.4	27	4.4
PA47Whit	0	0.0	4	3.6	0	0.0	0	0.0	9	5.8	3	6.3	5	10.2	21	3.4
PA48Eagl	0	0.0	4	3.6	6	5.4	1	0.9	6	3.9	2	4.2	5	10.2	24	3.9
PA49Hilt	1	2.8	2	1.8	4	3.6	2	1.8	9	5.8	2	4.2	9	18.3	29	4.7
PA49Tire	0	0.0	5	4.5	1	0.9	4	3.6	11	7.1	0	0.0	4	8.1	25	4.0
IS01Up	6	16.9	7	6.4	14	12.7	9	8.0	13	8.4	11	23.0	10	20.4	70	11.3
IS02Low	6	16.9	7	6.4	11	10.0	8	7.1	8	5.2	15	31.3	5	10.2	60	9.7
IS03StHe	0	0.0	4	3.6	5	4.5	18	16.1	11	7.1	9	18.8	5	10.2	52	8.4
IS04Ston	1	2.8	1	0.9	3	2.7	8	7.1	14	9.0	3	6.3	12	24.4	42	6.8
Total	115	324.9	303	275.2	516	468.7	568	507.6	793	511.6	215	448.9	242	492.9	2752	444.2

Appendix 3.3: Numbers of Visitors and Numbers of Visitors per 1,000 Anglers by AR Reef and MRFSS Waves

Site Name	Wave 3		Wave 4		Wave 5		Total	
PA01Jim	8	3.6	31	11.6	6	6.2	45	7.7
PA01Lit	19	8.6	32	12.0	7	7.2	58	9.9
PA02Off	17	7.7	32	12.0	5	5.2	54	9.2
PA02Bar	2	0.9	1	0.4	0	0.0	3	0.5
PA03Will	3	1.4	4	1.5	2	2.1	9	1.5
PA06BP	10	4.5	14	5.2	4	4.1	28	4.8
PA08Bill	8	3.6	14	5.2	4	4.1	26	4.5
PA09Para	28	12.7	29	10.9	12	12.4	69	11.8
PA09HP	4	1.8	5	1.9	1	1.0	10	1.7
PA09Grad	3	1.4	6	2.2	0	0.0	9	1.5
PA10TenM	18	8.2	30	11.2	12	12.4	60	10.3
PA10EleM	4	1.8	10	3.7	2	2.1	16	2.7
PA10Brue	1	0.5	3	1.1	0	0.0	4	0.7
PA11Paw	14	6.4	14	5.2	9	9.3	37	6.3
PA12Nor	7	3.2	8	3.0	2	2.1	17	2.9
PA13Way	1	0.5	2	0.7	0	0.0	3	0.5
PA14Geo	12	5.4	17	6.4	9	9.3	38	6.5
PA15Near	16	7.3	25	9.4	9	9.3	50	8.6
PA15Capt	2	0.9	3	1.1	0	0.0	5	0.9
PA16CJ	6	2.7	3	1.1	0	0.0	9	1.5
PA17Verm	13	5.9	12	4.5	5	5.2	30	5.1
PA18Gree	8	3.6	6	2.2	1	1.0	15	2.6
PA18Ralp	1	0.5	1	0.4	0	0.0	2	0.3
PA19Cape	4	1.8	11	4.1	1	1.0	16	2.7
PA20Hect	6	2.7	4	1.5	0	0.0	10	1.7
PA22Capr	11	5.0	14	5.2	4	4.1	29	5.0
PA22R8	10	4.5	6	2.2	1	1.0	17	2.9
PA23Y73	7	3.2	15	5.6	4	4.1	26	4.5
PA24C60	20	9.1	33	12.4	11	11.3	64	11.0
PA25Near	20	9.1	28	10.5	8	8.2	56	9.6
PA25AirF	2	0.9	2	0.7	0	0.0	4	0.7
PA25Coas	3	1.4	5	1.9	3	3.1	11	1.9
PA25Comm	1	0.5	2	0.7	0	0.0	3	0.5
PA26Foly	3	1.4	6	2.2	4	4.1	13	2.2
PA27Coma	10	4.5	19	7.1	7	7.2	36	6.2
PA27Doug	1	0.5	2	0.7	0	0.0	3	0.5
PA28LowC	2	0.9	12	4.5	4	4.1	18	3.1
PA29Kiaw	8	3.6	6	2.2	1	1.0	15	2.6
PA294KI	7	3.2	6	2.2	1	1.0	14	2.4
PA30Ed60	11	5.0	24	9.0	5	5.2	40	6.8
PA31Ed40	14	6.4	25	9.4	3	3.1	42	7.2
PA32Edis	4	1.8	10	3.7	6	6.2	20	3.4
PA34CCA	0	0.0	3	1.1	1	1.0	4	0.7
PA34Jimm	1	0.5	1	0.4	0	0.0	2	0.3
PA36Edis	3	1.4	18	6.7	3	3.1	24	4.1

Appendix 3.3: Numbers of Visitors and Numbers of Visitors per 1,000 Anglers by AR Reef and MRFSS Waves (Continue)

Site Name	Wave 3		Wave 4		Wave 5		Total	
PA38Frip	6	2.7	9	3.4	6	6.2	21	3.6
PA39Hunt	2	0.9	7	2.6	1	1.0	10	1.7
PA40Hunt	6	2.7	5	1.9	6	6.2	17	2.9
PA406HI	2	0.9	2	0.7	1	1.0	5	0.9
PA41Gord	9	4.1	14	5.2	6	6.2	29	5.0
PA42Beau	8	3.6	10	3.7	6	6.2	24	4.1
PA43Parr	10	4.5	19	7.1	2	2.1	31	5.3
PA44Bets	11	5.0	19	7.1	9	9.3	39	6.7
PA45Fish	5	2.3	5	1.9	3	3.1	13	2.2
PA47Whit	3	1.4	7	2.6	4	4.1	14	2.4
PA48Eagl	5	2.3	6	2.2	5	5.2	16	2.7
PA49Hilt	3	1.4	10	3.7	7	7.2	20	3.4
PA49Tire	3	1.4	9	3.4	1	1.0	13	2.2
IS01Up	14	6.4	10	3.7	10	10.3	34	5.8
IS02Low	10	4.5	9	3.4	7	7.2	26	4.5
IS03StHe	6	2.7	19	7.1	5	5.2	30	5.1
IS04Ston	4	1.8	9	3.4	5	5.2	18	3.1
Total	460	208.9	723	270.9	241	248.5	1424	243.8

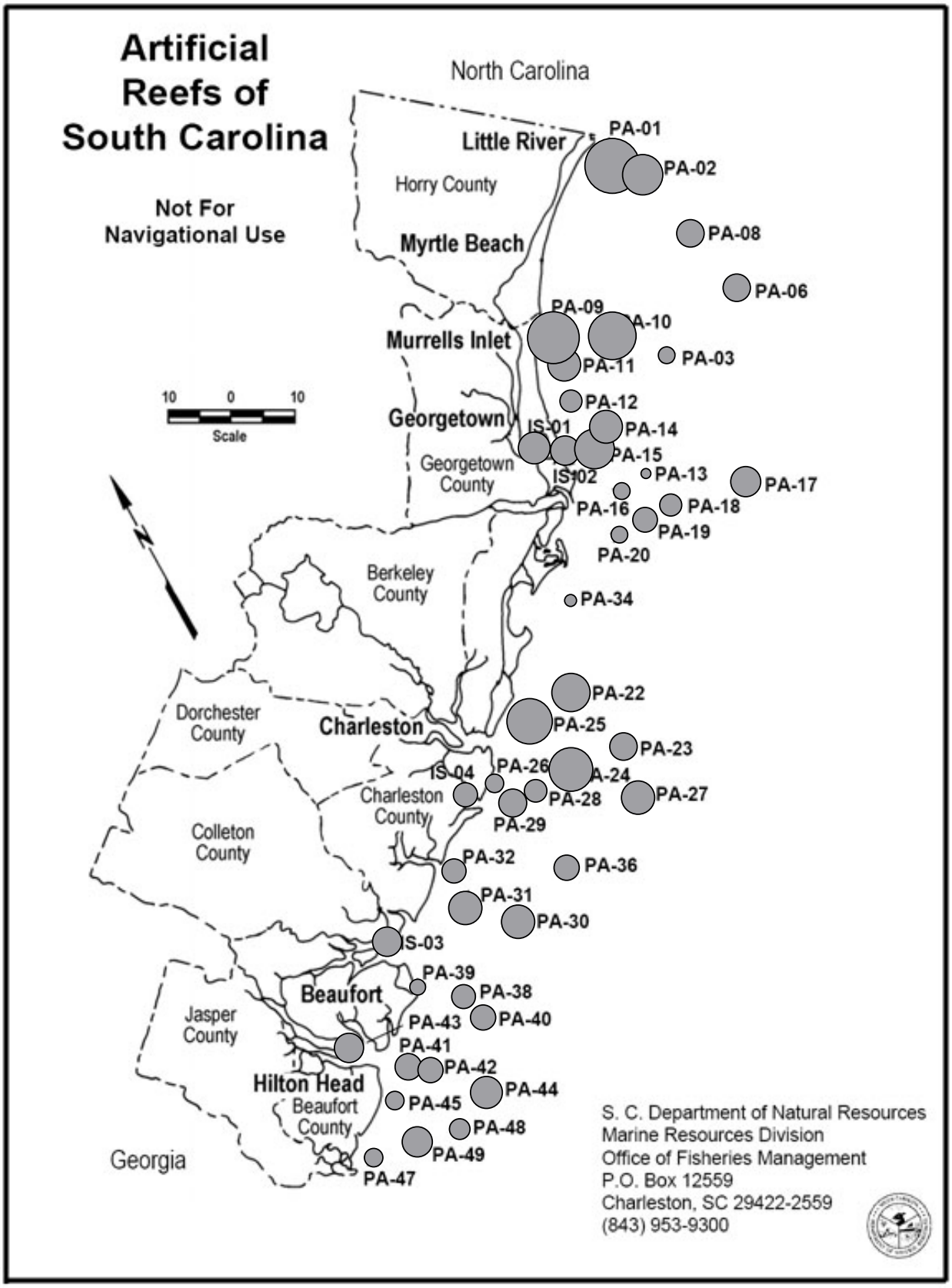


Fig. A3.1 Angler Trips Involving Permitted Areas (e.g. Large Circles Represent More Trips).

Fig. A3.2. Number of Fishing Trip Visits Per 1,000 Anglers to AR Permitted Areas of the North AR Cluster during 2006.

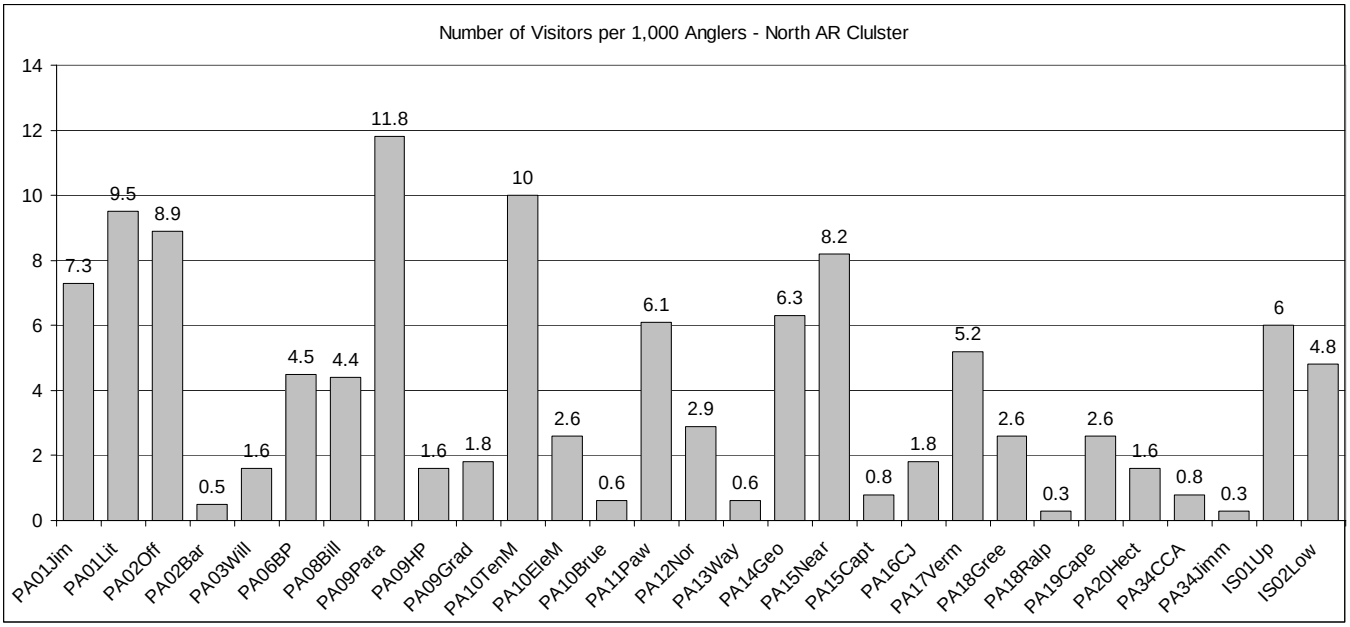


Fig. A3.3. Number of Fishing Trip Visits Per 1,000 Anglers to AR Permitted Areas of the Central AR Cluster during 2006.

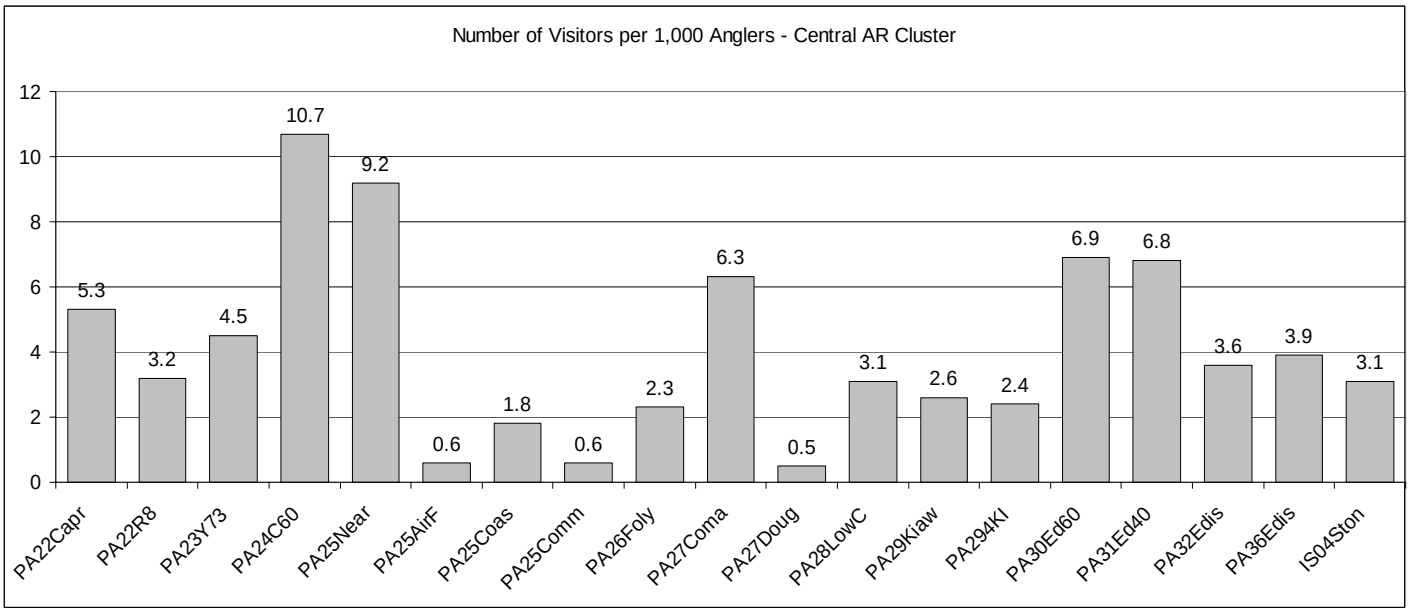
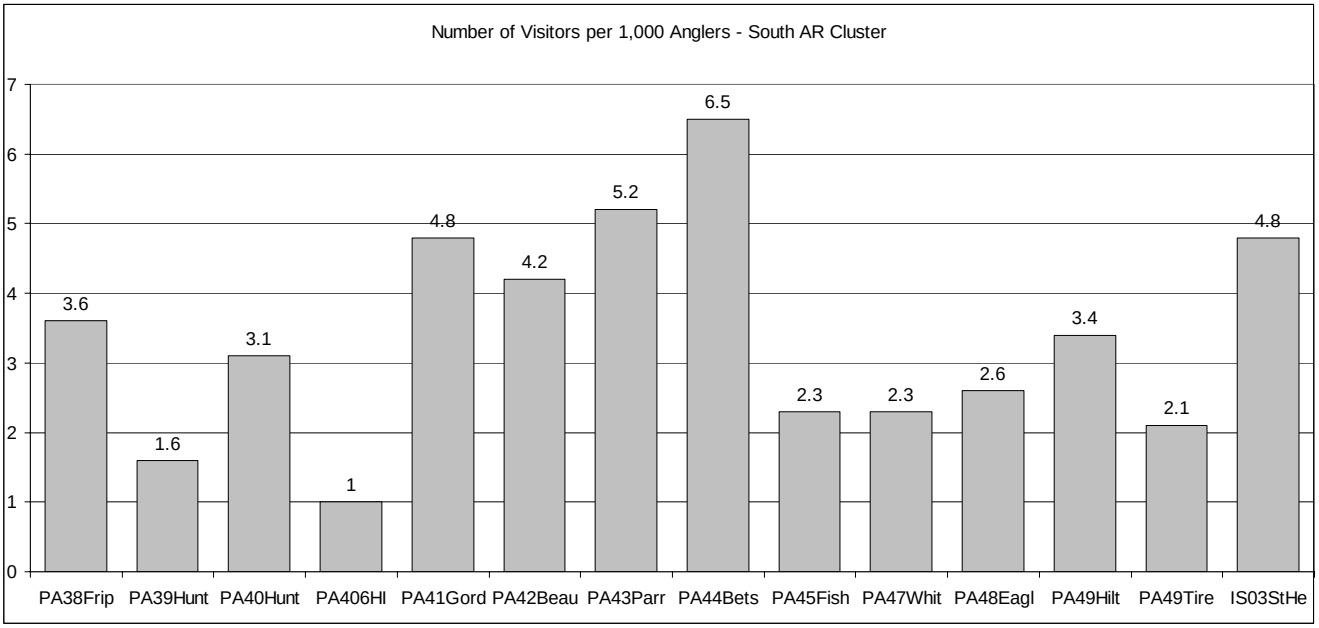


Fig. A3.4. Number of Fishing Trip Visits Per 1,000 Anglers to AR Permitted Areas of the South AR Cluster during 2006.



Appendix J. Code of Federal Regulations for Fisheries of Gulf of Mexico

Code of Federal Regulations

TITLE 50--Wildlife and Fisheries

CHAPTER VI--FISHERY CONSERVATION AND MANAGEMENT, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Part 622, Fisheries of the Caribbean, Gulf, & South Atlantic - § 622.10 (b) Conservation measures for protected resources; and Part 635, Atlantic Highly Migratory Species - § 635.21 (c)(5)(i)(E)-(L),(ii) Atlantic Highly Migratory Species

§ 622.10 (b) Gulf reef fish commercial vessels and charter vessels/headboats--(1) Sea turtle conservation measures.

(b) Gulf reef fish commercial vessels and charter vessels/headboats–-(1) Sea turtle conservation measures. (i) The owner or operator of a vessel for which a commercial vessel permit for Gulf reef fish or a charter vessel/headboat permit for Gulf reef fish has been issued, as required under §§ 622.4(a)(2)(v) and 622.4(a)(1)(i), respectively, must post inside the wheelhouse, or within a waterproof case if no wheelhouse, a copy of the document provided by NMFS titled, "Careful Releas Protocols for Sea Turtle Release With Minimal Injury," and must post inside the wheelhouse, or in an easily viewable area if no wheelhouse, the sea turtle handling and release guidelines provided by NMFS.

(ii) Such owner or operator must also comply with the sea turtle bycatch mitigation measures, including gear requirements and sea turtle handling requirements, specified in §§ 635.21(c)(5)(i) and (ii) of this chapter, respectively. (iii) Those permitted vessels with a freeboard height of 4 ft (1.2 m) or less must have on board a dipnet, tire, shorthandled dehooker, long-nose or needle-nose pliers, bolt cutters, monofilament line cutters, and at least two types of mouth openers/mouth gags. This equipment must meet the specifications described in §§ 635.21(c)(5)(i)(E) through (L) of this chapter with the following modifications: the dipnet handle can be of variable length, only one NMFS-approved short-handled dehooker is required (i.e., § 635.21(c)(5)(i)(G) or (H) of this chapter); and life rings, seat cushions, life jackets, and life vests or any other comparable, cushioned, elevated surface that allows boated sea turtles to be immobilized, may be used as alternatives to tires for cushioned surfaces as specified in § 635.21(c)(5)(i)(F) of this chapter.

§ 635.21 (c)(5)(i)(E)-(L),(ii) Gear operation and deployment restrictions.

(c) *Pelagic longlines.* For purposes of this part, a vessel is considered to have pelagic longline gear on board when a power-operated longline hauler, a mainline, floats capable of supporting the mainline, and leaders (gangions) with hooks are on board. Removal of any one of these

elements constitutes removal of pelagic longline gear. If a vessel issued a permit under this part is in a closed area designated under paragraph (c)(2) of this section with pelagic longline gear on board, it is a rebuttable presumption that fish on board such vessel were taken with pelagic longline gear in the closed area.

(5) The operator of a vessel required to be permitted under this part and that has pelagic longline gear on board must undertake the following sea turtle bycatch mitigation measures:

(i) *Possession and use of required mitigation gear.* Required sea turtle bycatch mitigation gear, which NMFS has approved under paragraph (c)(5)(iv) of this section as meeting the minimum design standards specified in paragraphs (c)(5)(i)(A) through (c)(5)(i)(M) of this section, must be carried onboard, and must be used to disengage any hooked or entangled sea turtles in accordance with the handling requirements specified in paragraph (c)(5)(ii) of this section.

(E) *Dipnet.* One dipnet is required onboard. Dipnets are to be used to facilitate safe handling of sea turtles by allowing them to be brought onboard for fishing gear removal, without causing further injury to the animal. Turtles must not be brought onboard without the use of a dipnet. The minimum design standards for dipnets are as follows:

(*1*) *Size of dipnet.* The dipnet must have a sturdy net hoop of at least 31 inches (78.74 cm) inside diameter and a bag depth of at least 38 inches (96.52 cm) to accommodate turtles below 3 ft (0.914 m)carapace length. The bag mesh openings may not exceed 3 inches (7.62 cm) 3 inches (7.62 cm). There must be no sharp edges or burrs on the hoop, or where it is attached to the handle.

(*2*) *Extended reach handle.* The dipnet hoop must be securely fastened to an extended reach handle or pole with a minimum length equal to, or greater than, 150 percent of the freeboard, or at least 6 ft (1.83 m), whichever is greater. The handle must made of a rigid material strong enough to facilitate the sturdy attachment of the net hoop and able to support a minimum of 100 lbs (34.1 kg) without breaking or significant bending or distortion. It is recommended, but not required, that the extended reach handle break down into sections.

(F) *Tire.* A minimum of one tire is required for supporting a turtle in an upright orientation while it is onboard, although an assortment of sizes is recommended to accommodate a range of turtle sizes. The required tire must be a standard passenger vehicle tire, and must be free of exposed steel belts.

(G) *Short-handled dehooker for ingested hooks.* One short-handled device for removing ingested hooks is required onboard. This dehooker is designed to remove ingested hooks from boated sea turtles. It can also be used on external hooks or hooks in the front of the mouth. Minimum design standards are as follows:

(*1*) *Hook removal device.* The hook removal device must be constructed of 1/4-inch (6.35 mm) 316 L stainless steel, and must allow the hook to be secured and the barb shielded without re-engaging during the removal process. It must be no larger than 1 5/16 inch (3.33 cm) outside diameter. It may not have any unprotected terminal points (including blunt ones), as this could cause injury to the esophagus during hook removal. A sliding PVC bite block must be used to protect the beak and facilitate hook removal if the turtle bites down on the dehooking device. The bite block should be constructed of a 3/4 -inch (1.91 cm) inside diameter high impact plastic cylinder (e.g., Schedule 80 PVC) that is 10 inches (25.4 cm) long to allow for 5 inches (12.7 cm) of slide along the shaft. The device must be of a size appropriate to secure the range of hook sizes and styles used in the pelagic longline fishery targeting swordfish and tuna.

(*2*) *Handle length.* The handle should be approximately 16 - 24 inches (40.64 cm - 60.69 cm) in length, with approximately a 5-inch (12.7 cm) long tube T-handle of approximately 1 inch (2.54 cm) in diameter.

(H) *Short-handled dehooker for external hooks.* One short-handled dehooker for external hooks is required onboard. The short-handled dehooker for ingested hooks required to comply with paragraph (c)(5)(i)(G) of this section will also satisfy this requirement. Minimum design standards are as follows:

(*1*) *Hook removal device.* The dehooker must be constructed of 5/16-inch (7.94 cm) 316 L stainless steel, and the design must be such that a hook can be rotated out without pulling it out at an angle. The dehooking end must be blunt, and all edges rounded. The device must be of a size appropriate to secure the range of hook sizes and styles used in the pelagic longline fishery targeting swordfish and tuna.

(*2*) *Handle length.* The handle should be approximately 16 - 24 inches (40.64 cm - 60.69 cm) long with approximately a 5-inch (12.7 cm) long tube T-handle of approximately 1 inch (2.54 cm) in diameter.

(I) *Long-nose or needle-nose pliers.* One pair of long-nose or needle-nose pliers is required on board. Required long-nose or needle-nose pliers can be used to remove deeply embedded hooks from the turtle's flesh that must be twisted during removal. They can also hold PVC splice couplings, when used as mouth openers, in place. Minimum design standards are as follows:

(*1*) *General.* They must be approximately 12 inches (30.48 cm) in length, and should be constructed of stainless steel material.

(J) *Bolt cutters.* One pair of bolt cutters is required on board. Required bolt cutters may be used to cut hooks to facilitate their removal. They should be used to cut off the eye or barb of a hook, so that it can safely be pushed through a sea turtle without causing further injury. They should

also be used to cut off as much of the hook as possible, when the remainder of the hook cannot be removed. Minimum design standards are as follows:

(*1*) *General.* They must be approximately 17 inches (43.18 cm) in total length, with 4-inch (10.16 cm) long blades that are 2 1/4 inches (5.72 cm) wide, when closed, and with 13-inch (33.02 cm) long handles. Required bolt cutters must be able to cut hard metals, such as stainless or carbon steel hooks, up to 1/4-inch (6.35 mm) diameter.

(K) *Monofilament line cutters.* One pair of monofilament line cutters is required on board. Required monofilament line cutters must be used to remove fishing line as close to the eye of the hook as possible, if the hook is swallowed or cannot be removed. Minimum design standards are as follows:

(*1*) *General* . Monofilament line cutters must be approximately 7 1/2 inches (19.05 cm) in length. The blades must be 1 in (4.45 cm) in length and 5/8 in (1.59 cm) wide, when closed, and are recommended to be coated with Teflon (a trademark owned by E.I. DuPont de Nemours and Company Corp.).

(L) *Mouth openers/mouth gags.* Required mouth openers and mouth gags are used to open sea turtle mouths, and to keep them open when removing ingested hooks from boated turtles. They must allow access to the hook or line without causing further injury to the turtle. Design standards are included in the item descriptions. At least two of the seven different types of mouth openers/gags described below are required:

(*1*) *A block of hard wood.* Placed in the corner of the jaw, a block of hard wood may be used to gag open a turtle's mouth. A smooth block of hard wood of a type that does not splinter (e.g. maple) with rounded edges should be sanded smooth, if necessary, and soaked in water to soften the wood. The dimensions should be approximately 11 inches (27.94 cm) 1 inch (2.54 cm) 1 inch (2.54 cm). A long-handled, wire shoe brush with a wooden handle, and with the wires removed, is an inexpensive, effective and practical mouth-opening device that meets these requirements.

(*2*) *A set of three canine mouth gags.* Canine mouth gags are highly recommended to hold a turtle's mouth open, because the gag locks into an open position to allow for hands-free operation after it is in place. A set of canine mouth gags must include one of each of the following sizes: small (5 inches)(12.7 cm), medium (6 inches) (15.24 cm), and large (7 inches)(17.78 cm). They must be constructed of stainless steel. A 1 -inch (4.45 cm) piece of vinyl tubing (3/4-inch (1.91 cm) outside diameter and 5/8-inch (1.59 cm) inside diameter) must be placed over the ends to protect the turtle's beak.

(*3*) *A set of two sturdy dog chew bones.* Placed in the corner of a turtle's jaw, canine chew bones are used to gag open a sea turtle's mouth. Required canine chews must be constructed of durable nylon, zylene resin, or thermoplastic polymer, and strong enough to withstand biting without

splintering. To accommodate a variety of turtle beak sizes, a set must include one large (5 1/2 - 8 inches(13.97 cm - 20.32 cm) in length), and one small (3 1/2 - 4 1/2 inches (8.89 cm - 11.43 cm) in length) canine chew bones.

(*4*) *A set of two rope loops covered with hose.* A set of two rope loops covered with a piece of hose can be used as a mouth opener, and to keep a turtle's mouth open during hook and/or line removal. A required set consists of two 3-foot (0.91 m) lengths of poly braid rope (3/8-inch (9.52 mm) diameter suggested), each covered with an 8-inch (20.32 cm) section of 1/2 inch (1.27 cm) or 3/4 inch (1.91 cm) light-duty garden hose, and each tied into a loop. The upper loop of rope covered with hose is secured on the upper beak to give control with one hand, and the second piece of rope covered with hose is secured on the lower beak to give control with the user's foot.

(*5*) *A hank of rope.* Placed in the corner of a turtle's jaw, a hank of rope can be used to gag open a sea turtle's mouth. A 6-foot (1.83 m) lanyard of approximately 3/16-inch (4.76 mm) braided nylon rope may be folded to create a hank, or looped bundle, of rope. Any size soft-braided nylon rope is allowed, however it must create a hank of approximately 2 - 4 inches (5.08 cm - 10.16 cm) in thickness.

(*6*) *A set of four PVC splice couplings.* PVC splice couplings can be positioned inside a turtle's mouth to allow access to the back of the mouth for hook and line removal. They are to be held in place with the needle-nose pliers. To ensure proper fit and access, a required set must consist of the following Schedule 40 PVC splice coupling sizes: 1 inch (2.54 cm), 1 1/4 inch (3.18 cm), 1 1/2 inch (3.81 cm), and 2 inches (5.08 cm).

(*7*) *A large avian oral speculum.* A large avian oral speculum provides the ability to hold a turtle's mouth open and to control the head with one hand, while removing a hook with the other hand. The avian oral speculum must be 9-inches (22.86 cm) long, and constructed of 3/16-inch (4.76 mm) wire diameter surgical stainless steel (Type 304). It must be covered with 8 inches (20.32 cm) of clear vinyl tubing (5/16-inch (7.9 mm) outside diameter, 3/16-inch (4.76 mm) inside diameter).

(ii) *Handling and release requirements.* (A) Sea turtle bycatch mitigation gear, as required by paragraphs (c)(5)(i)(A) through (D) of this section, must be used to disengage any hooked or entangled sea turtles that cannot be brought onboard. Sea turtle bycatch mitigation gear, as required by paragraphs (c)(5)(i)(E) through (M) of this section, must be used to facilitate access, safe handling, disentanglement, and hook removal or hook cutting of sea turtles that can be brought onboard, where feasible. Sea turtles must be handled, and bycatch mitigation gear must be used, in accordance with the careful release protocols and handling/release guidelines specified in paragraph (a)(3) of this section, and in accordance with the onboard handling and resuscitation requirements specified in §223.206(d)(1)of this title.

(B) *Boated turtles.* When practicable, active and comatose sea turtles must be brought on board, with a minimum of injury, using a dipnet as required by paragraph (c)(5)(i)(E) of this section. All turtles less than 3 ft (.91 m) carapace length should be boated, if sea conditions permit.

(*1*) A boated turtle should be placed on a standard automobile tire, or cushioned surface, in an upright orientation to immobilize it and facilitate gear removal. Then, it should be determined if the hook can be removed without causing further injury. All externally embedded hooks should be removed, unless hook removal would result in further injury to the turtle. No attempt to remove a hook should be made if it has been swallowed and the insertion point is not visible, or if it is determined that removal would result in further injury. If a hook cannot be removed, as much line as possible should be removed from the turtle using monofilament cutters as required by paragraph (c)(5)(i) of this section, and the hook should be cut as close as possible to the insertion point before releasing the turtle, using boltcutters as required by paragraph (c)(5)(i) of this section. If a hook can be removed, an effective technique may be to cut off either the barb, or the eye, of the hook using bolt cutters, and then to slide the hook out. When the hook is visible in the front of the mouth, a mouth-opener, as required by paragraph (c)(5)(i) of this section, may facilitate opening the turtle's mouth and a gag may facilitate keeping the mouth open. Short-handled dehookers for ingested hooks, long-nose pliers, or needle-nose pliers, as required by paragraph (c)(5)(i) of this section, should be used to remove visible hooks from the mouth that have not been swallowed on boated turtles, as appropriate. As much gear as possible must be removed from the turtle without causing further injury prior to its release. Refer to the careful release protocols and handling/release guidelines required in paragraph (a)(3) of this section, and the handling and resuscitation requirements specified in §223.206(d)(1) of this title, for additional information.

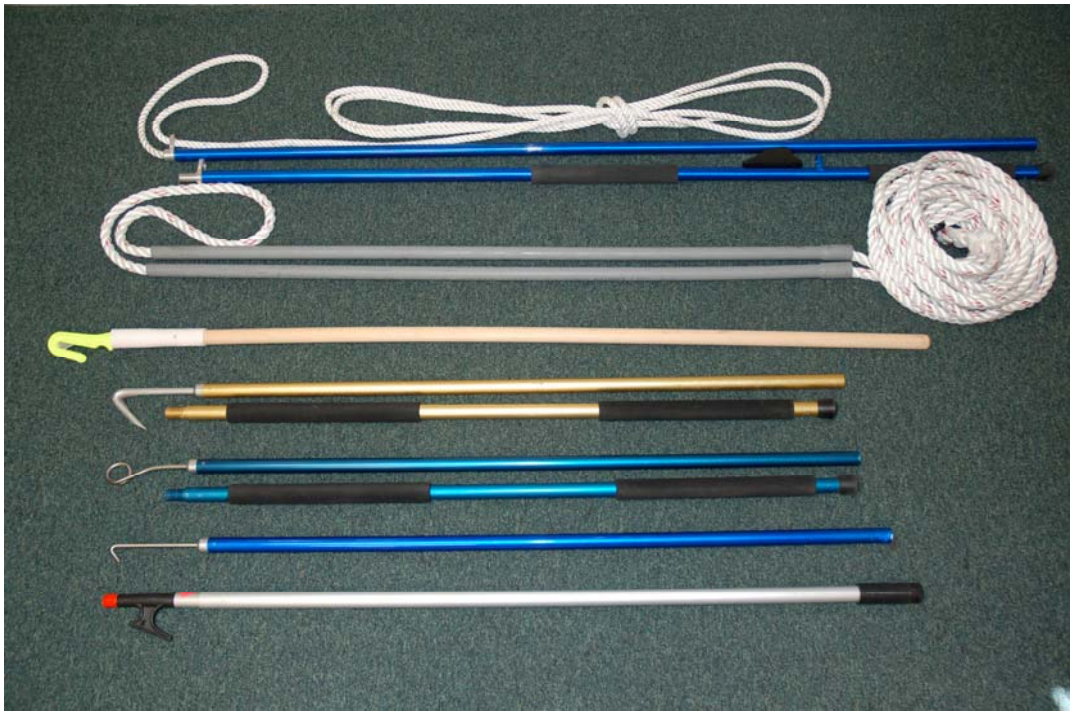
(C) *Non-boated turtles.* If a sea turtle is too large, or hooked in a manner that precludes safe boating without causing further damage or injury to the turtle, sea turtle bycatch mitigation gear required by paragraphs (c)(5)(i)(A)–(D) of this section must be used to disentangle sea turtles from fishing gear and disengage any hooks, or to clip the line and remove as much line as possible from a hook that cannot be removed, prior to releasing the turtle, in accordance with the protocols specified in paragraph (a)(3) of this section.

(*1*) Non-boated turtles should be brought close to the boat and provided with time to calm down. Then, it must be determined whether or not the hook can be removed without causing further injury. A front flipper or flippers of the turtle must be secured with an approved turtle control device from the list specified in paragraph (c)(2)(v)(D) of this section. All externally embedded hooks must be removed, unless hook removal would result in further injury to the turtle. No attempt should be made to remove a hook if it has been swallowed, or if it is determined that removal would result in further injury. If the hook cannot be removed and/or if the animal is entangled, as much line as possible must be removed prior to release, using a line cutter as required by paragraph (c)(5)(i) of this section. If the hook can be removed, it must be removed using a long-handled dehooker as required by paragraph (c)(5)(i) of this section.

Without causing further injury, as much gear as possible must be removed from the turtle prior to its release. Refer to the careful release protocols and handling/release guidelines required in paragraph (a)(3) of this section, and the handling and resuscitation requirements specified in §223.206(d)(1) for additional information.

NOAA Technical Memorandum NMFS-SEFSC-580

CAREFUL RELEASE PROTOCOLS FOR SEA TURTLE RELEASE WITH MINIMAL INJURY



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Fisheries
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149

December 2008
Revised October 2010

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U.S. DEPARTMENT OF COMMERCE
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The development of these protocols involved a large number of very cooperative people from government, industry, and academia. We are especially grateful to all the NMFS fisheries observers who have provided their feedback on the use of careful release equipment and protocols. Invaluable was the cooperation and assistance of the captains, crew, managers, and owners of the vessels participating in the NED experimental fishery for their input and willingness to try the gear removal devices and develop many of the procedures outlined in this document.

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Appendix A: Design Standards and Equipment for the Careful Release of Sea Turtles Caught in Hook and Line Fisheries

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Chapter 1 Introduction

The following sea turtle handling protocols describe the tools and techniques for removing fishing gear from incidentally captured sea turtles. They should be followed whenever an interaction, such as a hooking and/or an entanglement, with a sea turtle occurs. The equipment and techniques described here are intended to reduce sea turtle injury and to promote post-release survival. The document, which updates Epperly et al. 2004, is designed primarily to give specific handling guidelines for removing gear from sea turtles captured in hook-and-line fisheries. Interactions with other gear types (e.g., trawls, gillnets, fixed gear) and species (e.g., fish, marine mammals) are mentioned briefly here, but this is not intended to be a comprehensive guide for interactions with these gear types or species.

These protocols synthesize the results of scientific research involving sea turtle mitigation measures and post-hooking mortality criteria developed for pelagic longline fisheries. In 2001-2003, experiments were conducted in the Western Atlantic Northeast Distant Waters statistical reporting area (NED) to evaluate sea turtle mitigation measures in the pelagic longline fisheries (Watson et al. 2004, Watson et al. 2005). Post-trip interviews with the captains and NMFS observers were conducted to specifically discuss the efficacy of various tools provided to remove gear from sea turtles. Based on user feedback from these experiments and field-testing subsequent to these experiments, gear removal tools have been updated, and equipment design standards have been revised accordingly.

Several fisheries have mandatory release gear requirements and handling and release guidelines for the handling of incidentally-caught sea turtles [e.g., 69 FR 40734, July 6, 2004 (HMS PLL); 71 FR 45428, August 9, 2006 (GOM reef fish); 72 FR 5633, February 7, 2007 (HMS BLL); HMS pelagic longline and bottom longline fishery regulations are located in 50 CFR 635 and South Atlantic snapper-grouper and Gulf of Mexico reef fish regulations are located in 50 CFR 622]; requirements and appropriate release tools may vary by fishery. This document contains the general approved design standards for all currently certified release gears. Individual fisheries may have more specific design standards. Check with the applicable regulations as the final authority for required tools and specifications in each fishery. A laminated instruction card for sea turtle handling/release guidelines should be prominently displayed in the wheelhouse or near the steering station for instant reference, and this may be required by some fisheries (e.g., Atlantic HMS fisheries, 66 FR 48813, September 24, 2001).

This guidance is intended for lawful activities authorized under the ESA, including prosecution of fisheries with incidental take statements and actions to provide assistance to stranded turtles. A demonstration of the use of these tools and techniques can been seen in the video “Removing Fishing Gear from Longline Caught Sea Turtles” (Hataway and Epperly 2004).

Note: these protocols have been revised in 2010 to include a modified careful handling placard “Sea Turtle Handling/Release Guidelines: Quick Reference for Hook and Line Fisheries” in Appendix D to cover handling and release guidelines for all hook and line fisheries. Required

and approved gear examples are no longer listed in this document and must be obtained from the *Federal Register* or Code of Federal Regulations. No other changes have been made at this time.

Handling Recommendations for Other Species

Although these release protocols and equipment design standards have been developed primarily with sea turtles in mind, many of the devices and techniques also are effective on some species of fish, marine mammals and seabirds. Although bringing sea turtles onboard for gear removal is recommended whenever feasible, it is **not advisable** to bring most other large species (e.g., marine mammals, medium and large sharks, sawfish, billfish, some finfish) onboard for gear removal. **Deeply ingested (where the insertion point of the barb is not visible) hooks should not be removed from any species, including sea turtles; however, all species would benefit from having as much line removed from the hook as possible.** For further information on reef fish release, including discussions on hook removal and weighted release devices ("release sinkers"), see Bartholomew and Bohnsack (2005). Information on using venting tools may be found at: http://www.flseagrant.org/program_areas/fisheries/venting/ and http://isurus.mote.org/research/cfe/fish-bio/how-to-vent-a-fish.htm.

Caution must be exercised when handling sharks (Figure 1-1a), and the use of long-handled dehookers is advised. Billfish (Figure 1-1b) and tuna often benefit from dehooking and resuscitation or recovery before release; see details on billfish handling and recovery in Prince et al. (2002). Specific guidelines for releasing smalltooth sawfish have been established (71 FR 45428, August 9, 2006), and additional information on sawfish and billfish/tuna handling can be found at: http://www.flmnh.ufl.edu/fish/education/sawfishbrochure.pdf, http://www.nmfs.noaa.gov/pr/species/fish/smalltoothsawfish.htm, and http://www.sefsc.noaa.gov/fisheriesbiology.jsp.

Figures 1-1a and b. Dehooking a shark (a) and recovering a billfish (b) before release [Photos courtesy of Aquatic Release Conservation (ARC)].

Sturgeon bycatch, including several Endangered Species Act (ESA) listed species, has been documented in several coastal and estuarine fisheries that use gill nets, trawls, pots, traps, weirs, pound nets and hook-and-line. In some instances, particularly when captured in gill nets, the fish may benefit from resuscitation if their opercular flaps were obstructed or in areas of low dissolved oxygen. If a sturgeon is removed from fishing gear and appears non-responsive, attempt to resuscitate the fish by flushing water over the gills for several minutes (~ five to ten minutes) or "swim" the fish by gently moving it through the water to flush water over the gills.

More information on sturgeon conservation can be found at:
http://www.nmfs.noaa.gov/pr/species/fish/ and at http://www.nero.noaa.gov/prot_res/.

Marine Mammal Careful Handling and Release Guidelines

Summarized from: Marine Mammal Handling/Release Guidelines: A quick reference for Atlantic pelagic longline gear (Appendix D).

Available from: http://www.nmfs.noaa.gov/pr/pdfs/interactions/handling_release.pdf

Marine mammal interactions are a relatively rare event in most fisheries; however, due to the protected status and small population sizes of most marine mammal species, each event is significant. Therefore, it is important that fishermen provide as much documentation as possible about these interactions and work to carefully remove gear from marine mammals where conditions and safety considerations allow. When an interaction with a marine mammal occurs, the fishermen should document the appearance and size of the animal, the types of injuries that occurred, efforts to release the animal, and the characteristics of any gear remaining on the animal after release. These data on each marine mammal interaction must be reported to the NMFS Office of Protected Resources on the Marine Mammal Injury/Mortality Reporting Form (see reporting address and form availability information below) if there is an incidental mortality or injury to a marine mammal during commercial fishing activities. The incident must be reported within 48 hours after the end of the fishing trip, or for non-vessel fisheries, within 48 hours of the occurrence. Detailed documentation is critical because if this whale is seen again with the gear remaining or with serious injuries, it could be counted twice against the allowed incidental take for the fishery if the initial interaction was not properly documented and reported.

In the case of small cetaceans (e.g., dolphins and pilot whales) entangled in fishing gear or hooked, the crew should work carefully to disentangle the animal and/or remove gear as conditions and human safety allows. The vessel crew should avoid abrupt actions or vessel movements that may panic the animal. The vessel should stop alongside the animal, attempt to recover gear, and gently work to bring the animal alongside the vessel. Work to minimize the amount of tension on the animal from gear remaining in the water, and ensure that the animal has access to the surface to breathe. Cut wraps or other entangling gear from the animal's body using a gaff or long-line cutter, being careful to avoid direct contact between the animal and sharp objects. If the animal is hooked, cut the barb off the hook using long-handled bolt cutters and/or use a NMFS approved de-hooking device to remove the hook. If a hook remains attached to the animal, cut any attached line as close to the hook as possible.

In the case of large whales (for example humpback whales, right whales, or sperm whales), fishers should not attempt to directly disentangle the animal without assistance. Instead, the vessel should be maneuvered in such a way as to minimize tension on the line, and the fishers should immediately contact the U.S. Coast Guard at VHF Ch. 16 or contact the Provincetown Center for Coastal Studies Disentanglement Hotline at (800) 900-3622 for instructions if fishing within the U.S. EEZ. It is strongly recommended that disentanglement is only attempted with the assistance or advice of these experts. However, if contact is not possible (e.g., due to the vessel's location), the decision to attempt disentanglement should be made based on the experience and comfort level of the crew due to the significant risk of the procedure. If the crew decides to proceed with disentanglement, proper documentation of the interaction (video, multiple photographs and drawings) is essential. The primary goal if attempting disentanglement should be to remove all complete loops wrapped around the animal if possible. If the line is embedded in the flesh and healed over, cut the lines on either side as short as possible, and do not attempt to remove that section of line. **Never enter the water to attempt disentanglement under any circumstances.**

If a marine mammal interaction occurs, it is likely that another will occur if fishing is continued in the same area. Following an interaction, fishermen should notify other vessels working in the area that the interaction occurred and move to another area or wait 48 hours before continuing fishing operations.

Contact Information: NMFS Office of Protected Resources Attn: MMAP, 1315 East-West Highway, Silver Spring, MD 20910. Fax Number: 301-427-2522.

MMAP Form Available at:
http://www.nmfs.noaa.gov/pr/pdfs/interactions/mmap_reporting_form.pdf.

Vessel/Crew's Responsibilities upon Sighting a Sea Turtle

Generally, it is expected that all turtles less than three feet straight carapace length can be boated safely if sea conditions permit; larger turtles should also be boated when conditions and equipment permit. If it is determined that the turtle cannot be brought aboard without causing further injury to the turtle, or if conditions are such that the turtle cannot be safely brought aboard, then protocols for turtles not boated should be followed (refer to Chapter 2). Whenever possible, turtles should be brought onboard to make gear removal easier and safer, following the handling guidelines for turtles boated (refer to Chapters 3 - 5). When conditions permit, the vessel's crew must attempt to remove all of the gear from the turtle. The captain and crew are responsible for the turtle's safety from first sighting until release, and all efforts should be made to release the turtle with minimal injury and minimal remaining gear.

Gear Removal Protocols

General guidelines for removing gear from sea turtles not boated and boated follow in Chapters 2 – 5. These removal tools and techniques are applicable to a variety of fisheries, but a few gear-specific protocols are introduced here.

Trawl Fisheries

In trawl fisheries, care should be taken not to drop the turtle from the net onto the deck below or allow the bag to slam into the side of the vessel, as this can result in serious injury. Turtles incidentally captured in trawl fisheries may have sustained an extended period of forced submergence and may require resuscitation (Chapter 3).

Gillnet Fisheries

If a sea turtle is entangled in gillnet gear, slow the vessel and adjust the vessel direction to move towards the turtle. Once the turtle is brought alongside the vessel, stop and put the vessel in neutral. Slowly retrieve the net, avoiding tugging or yanking motions. Considering the size of the turtle, sea conditions, and crew safety, determine whether the turtle can be boated. Avoid pulling up the turtle by the gear that it is entangled in, as this could injure the turtle. Bring the turtle onboard using a dip net or turtle hoist. If the turtle cannot be disentangled easily from the net, carefully cut the net off the turtle using a blunt-sided line cutter and attempt to remove any gear attached to the turtle. If conditions do not permit the turtle to be boated, control the turtle with a pair of turtle control devices if possible, and bring the turtle close to the vessel. Try to work the turtle free from the net, and use long-handled line cutters to cut the net and lines off of the turtle if necessary.

Fixed Gear Fisheries

Sea turtles can become entangled in the vertical lines of fixed gear (e.g., crab pots, whelk pots). If a turtle is encountered entangled in fixed gear, contact the NMFS Northeast Region Stranding Hotline at 1-978-281-9351 (when the interaction occurred in the coastal waters of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and Virginia) or the U.S. Coast Guard on VHF Ch. 16 (all other U.S. coastal waters) for further instructions. It is recommended that disentanglement is only attempted with the assistance or advice of experts.

Specific guidelines for disentangling sea turtles captured in fixed gear, gear collection protocols and required documentation procedures can be found at:
http://www.nero.noaa.gov/prot_res/stranding/stdn.html and
http://www.nero.noaa.gov/prot_res/stranding/SeaTurtleDisentanglementNetwork.pdf.

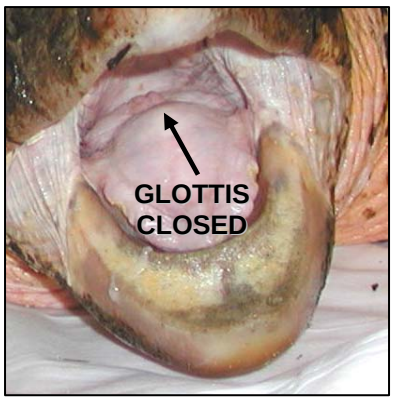
Hook-and-line Fisheries

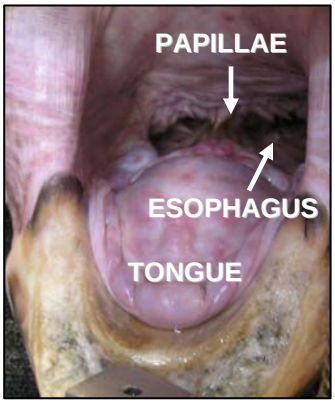
Captains and crews in hook-and-line fisheries should scan the line as far ahead as possible during gear retrieval to sight turtles in advance and to avoid getting ahead of the line while retrieving gear. Upon sighting a turtle, the vessel and line reel speed should be slowed and the vessel direction adjusted to move toward the turtle, minimizing tension on the line. Gentle, consistent tension should be kept with enough slack to keep the turtle near the vessel but in the water. Once the turtle is brought alongside the vessel, stop and put the vessel in neutral. Do not use gaffs or other sharp objects in direct contact with the turtle to retrieve or control it, although a gaff may be used to control the line. Assess the turtle's condition and size, nature of the interaction,

location of the hook, and available crew. The vessel must be stopped in order to respond to these interactions, and a decision must be made whether the turtle can be brought onboard safely. There are three possible sea turtle interactions with hook-and-line fishing gear: (1) entangled but not hooked, (2) hooked but not entangled, and (3) hooked and entangled. The protocols here are written to optimize the success of gear removal, utilizing at least three crew members in some scenarios. If there are not at least three crew members available, modifications to the protocols have been suggested where appropriate (e.g., the turtle control devices can be tied off, some mouth gags offer hands-free operation).

Assessing Whether to Remove Hooks

The decision whether to remove a hook is very important, and may directly affect the turtle's chances for survival. **If you are unsure whether hook removal will cause further serious injury to the turtle, do not remove the hook.** All externally embedded hooks should be removed. Chapter 4 contains details on opening the mouth of boated turtles to conduct an assessment of ingested hook location. Hooks in the mouth should be removed when they are visible in part or whole, but judgment should be used in each case. **If the hook is in the braincase, glottis, or otherwise deeply embedded where you believe removal will cause more damage, do not remove the hook.**





Figures 1-1 a, b and c. Oral cavity anatomy [(a) Photo courtesy of Don Lewis, (b) & (c) NMFS/SEFSC photos]

The glottis (Figures 1-1a and b) is located in the middle of the tongue (Figure 1-1c, large muscular organ fixed to the floor of the mouth), and consists of the opening to the trachea and the valve to open and close the airway. The esophagus begins at the back of the mouth and is lined with papillae (Figure 1-1c). Only remove hooks from the esophagus (Figure 1-1c) when the insertion point of the barb is clearly visible, and exercise extreme caution during hook removal. **Never attempt to remove a hook that has been swallowed when the insertion point is not visible, as removal may cause more damage to the turtle than leaving the hook in place.** When a hook cannot safely be removed, monofilament cutters should be used to cut the line as close as possible to the eye of the hook. If part of the hook is visible and accessible, but cannot be removed (e.g., hook in glottis), bolt cutters should be used to cut off and remove the visible part of the hook. See Chapter 2 for details about removing hooks from turtles not boated and Chapter 5 for turtles that are boated.

Releasing the Turtle

Once gear is removed and the turtle recovered, boated turtles should be released in waters of similar temperature as at capture, when fishing or scientific collection gear is not in use, the engine is in neutral, and in an area where they are unlikely to be recaptured or injured by vessels. Make sure that the turtle is safely away from the vessel before starting the engines. Release the turtle by lowering it over the aft portion of the vessel, close to the water's surface, when gear is not in use and the engines are in neutral. The turtle's behavior and swimming and diving abilities should be monitored after release and recorded. A turtle that has shown no sign of life after 24 hours on deck may be considered dead and returned to the water in the same manner.

Chapter 2 Equipment and Techniques for Sea Turtles Not Boated

When a turtle is too large to be boated, or if sea conditions prevent the safe boating of turtles, the gear must be removed while the turtle remains in the water. The turtle should be brought as close as possible and allowed a short time to calm down if necessary before being brought fully alongside, where gear removal must be conducted as quickly as possible. Do not ever enter the water to remove gear from an animal under any circumstances. The first section in this chapter details the tools and methods to control the turtle for both the crew's and the turtle's safety. The second section details the tools and techniques to be used for gear removal. Next, different possible scenarios involving three types of potential hook-and-line gear interactions are described, outlining the combination of tools (Figure 2-1) best adapted for each scenario.

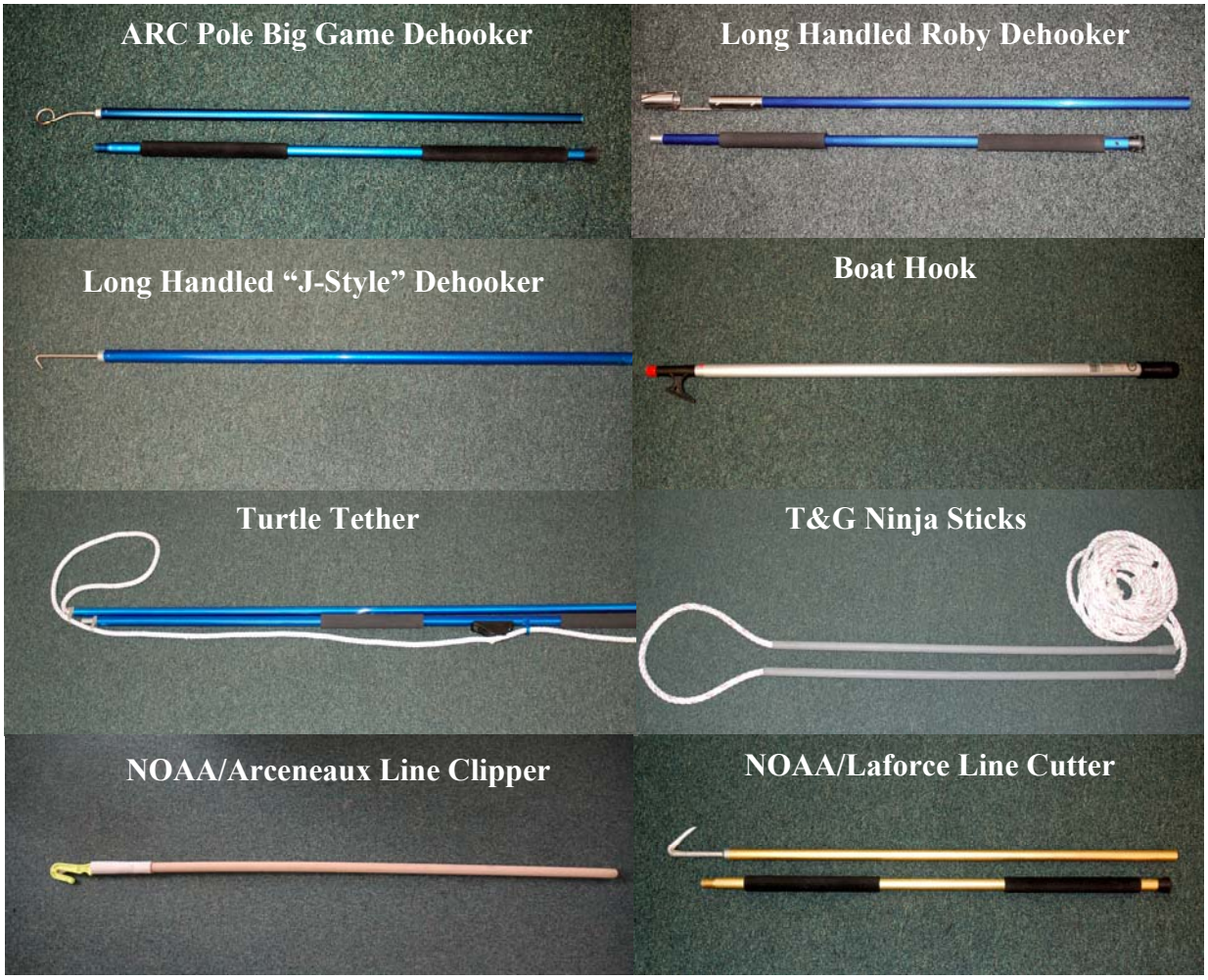


Figure 2-1. Long-handled tools for sea turtles not boated (NMFS/SEFSC photos).

Turtle Control Devices

Turtle control devices were designed in response to safety concerns for fishing vessel crew members and for incidentally captured sea turtles, as well as to facilitate the likelihood of maximum gear removal potential. These devices, which should be used in pairs, take pressure off the involved gear and help stabilize the animal. They secure the front flippers of the sea turtle so that the animal can be controlled at the side of the vessel, facilitating rapid gear removal while reducing the chances that taut line could snap under the strain of the active sea turtle and recoil towards the crew members on deck. These devices should never be used around the turtle's neck or head. After securing the animal's flippers at the side of the vessel, use dehookers and line cutters as needed, depending on the type of gear interaction, as described on Pages 2-13 – 2-14. Currently, there are two turtle control device styles that reduce safety risks associated with removing gear from active sea turtles not boated, particularly leatherbacks.

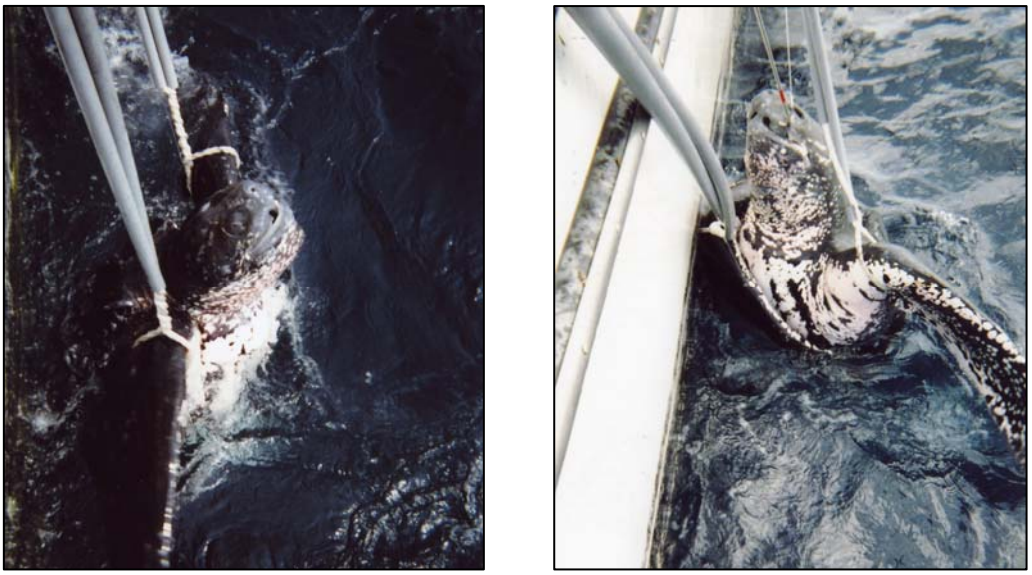
(1) Turtle Tether

The first type of turtle control device, referred to as the "Turtle Tether," is designed to "noose" the flipper using one pole and a line threaded through eyebolts. The end of the negatively buoyant tether line should be threaded through an eyebolt at the end of the tether, then through two eyebolts farther down the pole. A tag line threaded through the end of the tether must be attached to the vessel to ensure that the turtle cannot escape with the tether attached. Loop the stiff rope around the front flipper up to the "shoulder" region, tighten, and cinch the rope in the cleat. Keep a firm hold of the tether pole to keep the animal near the vessel, allowing for dehooking and disentanglement (Figures 2-2a and b). To optimize safe handling of the turtle, two people should each operate a set of the Turtle Tethers to capture both flippers and restrain the turtle alongside the vessel.

Figures 2-2a and b. Controlling a leatherback using a turtle tether (NMFS/SEFSC photos)

(2) T&G Ninja Sticks

The second type of turtle control device, referred to as the "T&G Ninja Sticks," consists of two long poles (electrical conduit PVC, fiberglass, aluminum, or similar) with line threaded through or securely affixed to both lengths. The free end of the line should be tethered to the vessel unless an additional tag line is used, leaving enough slack to create a ~24" working section of line between the two poles to secure the flipper. Holding one pole in each hand, capture the flipper, bring the poles together, and twist the line until the flipper is secured. To optimize safe handling of the turtle, two people should each operate a set of the T&G Ninja Sticks to capture both flippers and restrain the turtle alongside the vessel (Figures 2-3a and b).



Figures 2-3a and b. Controlling a leatherback using a pair of T&G Ninja Sticks (NMFS/SEFSC photos).

Equipment to Remove Line and Netting

(1) Long-handled Line Clipper/Cutter

Line cutters are designed to cut high-test monofilament line, netting material, and line (e.g., braided/twisted rope) from entangled sea turtles. Carefully slide the blunt end of the line cutter under the line or netting that you wish to remove and pull the line cutter to capture it within the recessed blade(s) of the device (Figure 2-4a). In hook and line fisheries, a line cutter may also be used to cut the monofilament line as close as possible to the hook, minimizing remaining gear when hook removal is not possible.

Figures 2-4a and b. Using line cutter (a) and monofilament cutter (b) on entangled leatherbacks (NMFS/SEFSC photos).

(2) Monofilament Cutters

If the turtle is close to the vessel, hand-held monofilament cutters may be used to remove line or netting material from hooked and/or entangled turtles (Figure 2-4b). Turtles should be released with as little gear as possible remaining.

Equipment to Remove Hooks

(1) Long-handled Dehooker for Internal Hooks

(a) ARC (Aquatic Release Conservation) Pole Big Game Dehookers

The ARC Pole Big Game Dehooker models, which are manufactured in several sizes, are examples of NOAA Fisheries certified equipment. These dehookers are designed for removing hooks that are external or that are lodged in the mouth, throat, or esophagus without touching or removing the animal from the water. The device engages and secures the leader, allowing the hook to be secured within an offset loop without re-engaging the barb during the removal process (Figure 2-5). Specific instructions for the long-handled pole models are given here, and more general guidelines for using all types of ARC dehookers can be found in Plate 2-1.

Figure 2-5. Removing hook with an ARC Pole Big Game Dehooker (NMFS/SEFSC photo).

Instructions for using ARC Pole Big Game Dehookers:

1) The person controlling the leader must carefully bring the animal alongside the vessel, using a turtle control device to help control the turtle if possible. They should stay to the left of the dehooking person and maintain a taut leader.
2) The person with the dehooker should be to the right of the person with the leader to capture the leader, and no one should get in between the leader and the dehooking device in case the line breaks or the hook dislodges.
3) There is only one correct way to place the pigtail over the leader. The person controlling the leader must maintain leader tension. The person with the dehooker places the dehooker on the leader at a 90° angle with the open end of the curl facing them, and the tail end of the curl facing up. Pull until the curl of the dehooking device captures the line (like a bow and arrow), and rotate the device 1/4 turn clockwise. When placed correctly, the leader will be in the center of the pigtail curl.
4) Slide the dehooker down the leader until it engages the shank of the hook and bottoms out. Slightly rotate the device back and forth to ensure proper engagement on the hook. If the dehooker has been notched (see instructions below) to help facilitate circle hook removal, the hook will seat into the notch.
5) When the hook is engaged, the dehooking device must be brought together with the leader, parallel to the line. If the line is not parallel with the dehooking device, the point of the hook will have a tendency to turn out and allow for possible re-engagement after release.
6) Working together, the person with the leader and the person with the dehooker must communicate and keep the line taut until the exact moment that the person using the dehooker disengages the hook with a short, sharp jab downward. If removing a circle hook, a rocking or twisting motion of approximately 180° during the downward jab motion may be necessary to facilitate circle hook removal. After engaging shank of the

hook, keep the line parallel with tension and start a rocking (back and forth) and pushing motion to remove the circle hook. The rocking motion in addition to the traditional pushing motion allows the circle hook to be twisted and pushed out.

7) The leader person must give a little slack when the person with the dehooker is jabbing downward, so timing and communication are important. After the hook is removed, the point of the hook will rotate and stop on the offset bend of the dehooker (Figure 2-6), protecting the point and preventing re-engagement of the hook.

Figure 2-6. Point of the hook is shielded to prevent re-engagement (NMFS/SEFSC photo).

Notch Modification for the ARC Dehookers:

In collaboration with the Australian Fisheries Management Authority and industry experts, ARC tested a notch modification to their dehookers. They determined that notching the pigtail curl allows the fisher to use a rocking and pushing (instead of just pushing) motion that increases the effectiveness of circle hook removal. The notch is created where the hook lies in the bottom portion of the curl (Figure 2-7a), securing the shank enough to rock the hook from side to side while pushing the circle hook out. The notch modification can be easily and quickly accomplished with a simple metal file (Figure 2-7b) in approximately 15 minutes. During laboratory trials, the notch modification (Figure 2-7c) was found to be an effective modification to these tools to assist in hook removal, particularly circle hook removal, while maintaining the integrity of the device's tensile strength. However, it was determined that by maintaining proper line tension and using a rocking or twisting motion while pushing downward, circle hooks still could be removed effectively without the notch modification. Detailed instructions for notching the ARC dehookers can be found in Appendix A, Chapter A2.

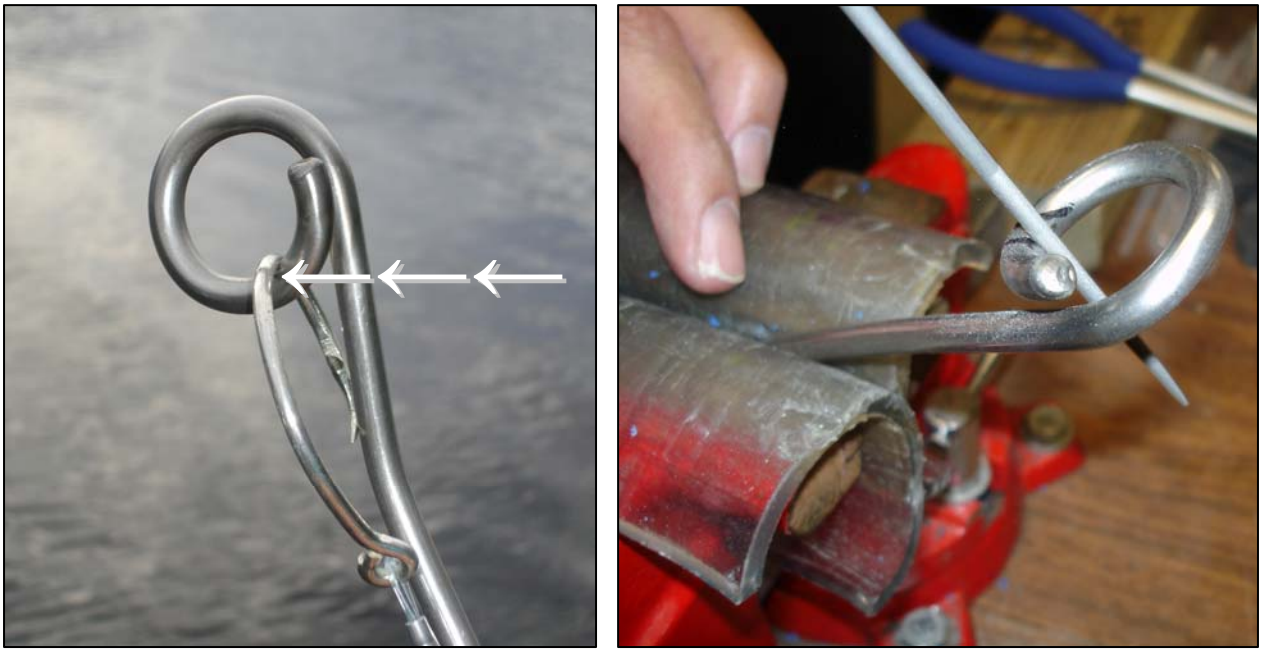
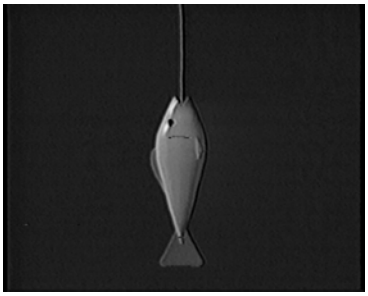


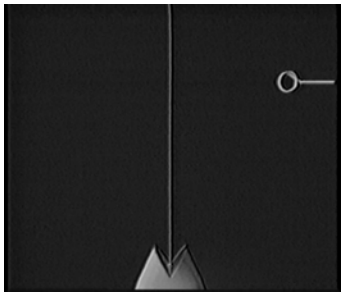
Figure 2-7 a, b and c. Notch the pigtail curl where the shank of the hook contacts the vertical bottom of the pigtail curl, ~1/16" - 1/8" deep and ~1/8" wide using a metal file [(a) Photo courtesy of ARC; (b) and (c) NMFS/SEFSC photos].

Plate 2-1 Instructions for ARC Dehookers

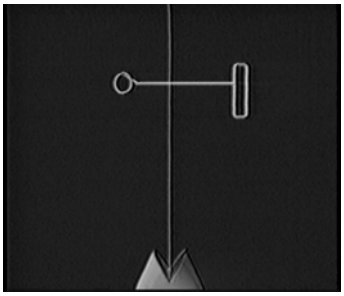
The illustrations here depict fish, but the technique can be used for sea turtles, marine mammals, and sea birds as well.



Step 1



Step 2



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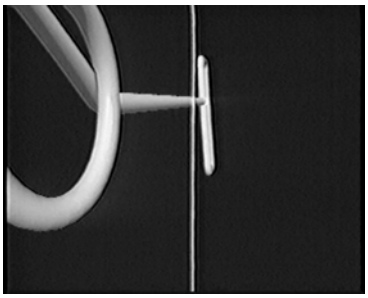
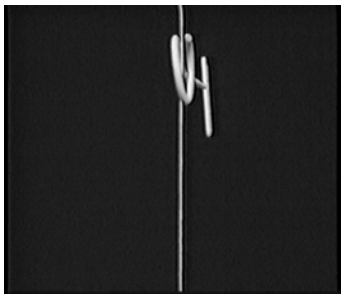
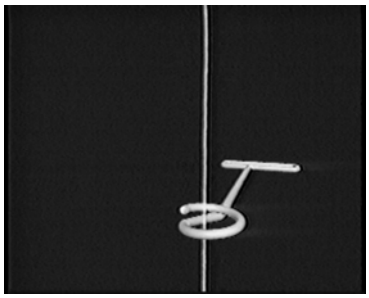


Step 4



Step 5



Step 6

Figures provided by Aquatic Release Conservation

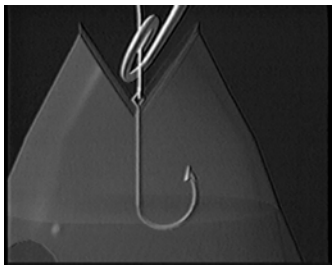
(1 – 2) Grab the leader with one hand and hold the dehooker in your other hand, making sure the open end of the pigtail is facing up.

(3) Place the rod of the dehooker on the leader perpendicular to the leader as you would a bow and arrow.

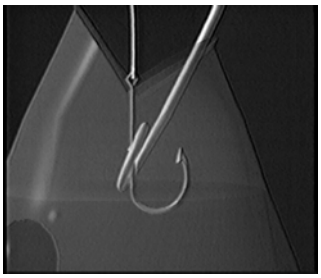
(4 – 5) Draw the dehooker back towards you until you engage the line.

(6) Turn the dehooker 1/4 turn clockwise. This puts the leader in the center of the curl.

Plate 2-1 Continued



Step 7



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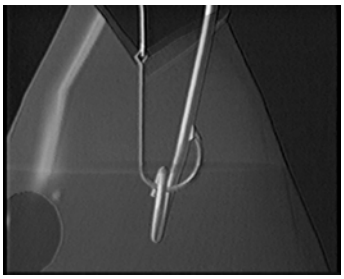

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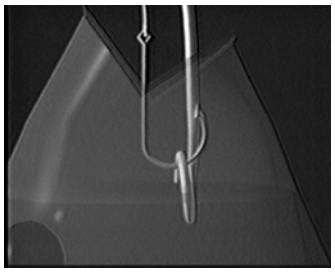

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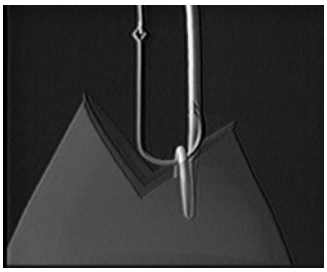
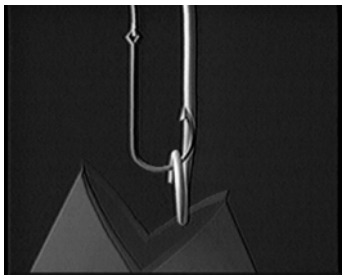


Step 11



Step 12

(7 - 9) Keeping your hands apart, follow the leader down until the dehooker bottoms out on the hook.

(10) Bring your hands together making sure the leader is tight and parallel with the dehooking device.

(11-12) Give a slight thrust downward (or rocking/twisting downward thrust) with the dehooking device until the hook disengages, then pull out the dehooker with the hook. The point of the hook will be hidden by the offset bend so that the hook does not re-engage.

(2) Long-handled Dehooker for External Hooks

(a) Aquatic Release Conservation (ARC) Pole Big Game Dehookers

Refer to the description of this device beginning on Page 2-4.

(b) Long-handled J-Style Dehooker

This long-handled dehooking device may be used for dehooking in circumstances where the animal is hooked externally. Hold the leader in one hand with tension and hold the dehooker in your other hand. Place the dehooker on the leader and follow the leader down until it bottoms out on the shank of hook (Figure 2-8). With tension on the leader, the ideal position for dehooking is to lower the hand with the leader to the 8 o'clock position and raise the hand with the dehooker to the two o'clock position (Illustrated in Plate 5-3); depending on the positioning, a smaller angle may be appropriate. Twist the dehooker slightly and pull until the hook is dislodged. Be cautious not to allow the hook to re-engage once removed.

Figure 2-8. Using J-Style dehooker on externally hooked leatherback (NMFS/SEFSC photo).

(c) Long-handled Roby Dehooker

This dehooker is suitable for removing external hooks and can be mounted to a long handle for use on turtles not boated. The design, which incorporates four notches at 90° angles at the base of a cylinder, grasps the hook very securely (Figure 2-9), facilitating the twisting motion necessary to remove circle hooks. Engage the line by feeding it through the diagonal slit in the side of the cylinder, and then secure the hook in the notches. Once the hook is secured, use a pushing motion to release the hook. If you are removing a circle hook, a twisting motion of approximately 180° while thrusting the dehooker downward may be required to remove the circle hook.

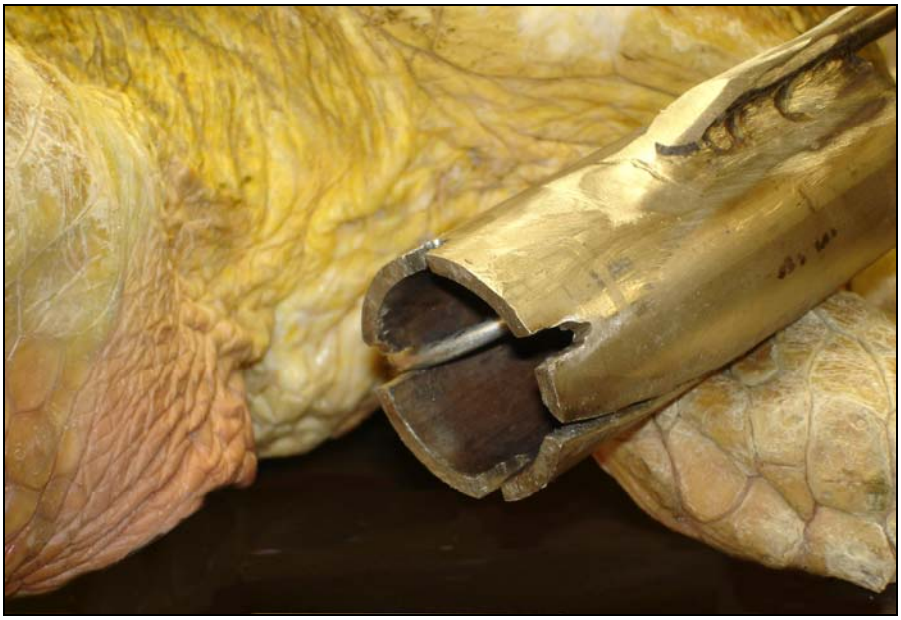


Figure 2-9. Roby dehooker (NMFS/SEFSC photo).

Plate 2-2 Instructions for the Roby Dehooker

Step 1

Step 2

Step 3

Step 4

(1) Hold leader in one hand with tension and hold the Roby dehooker in the other hand. Feed the leader through the diagonal slit in the cylinder.

(2) Position the dehooker so that it is firmly seated against the shank of the hook, secured in the notches.

(3) Bring both hands together (leader and dehooker parallel with each other) while maintaining tension on the leader.

(4) With the leader and dehooker together, give a short, sharp jab to dislodge the hook and remove it from the animal. Rotate or twist up to 180° during the jabbing motion if necessary to remove the hook, particularly when removing circle hooks. Maintain line tension and take care to prevent the hook from re-engaging after removal.

Long-handled Device to Pull an "Inverted V" during Disentanglement

A standard boat hook, long-handled J-Style dehooker, or standard fishing gaff may be used to assist in disentanglements and to pull a "V" for dehooking entangled sea turtles, as described in the "Inverted V" dehooking technique below.

"Inverted V" Dehooking Technique

1) Once at the surface, the animal may have a tendency to entangle itself more. After the first inspection, let the turtle calm down for a short period of time (in some cases up to 10 minutes) then gently draw it to the boat, using turtle control devices when practical to control the animal.

2) An additional crew member should carefully engage the monofilament leader closest to the embedded hook with a gaff, boat hook or long-handled J-Style dehooker, depending on the distance to the hook. If using a gaff, care should be taken to ensure that the point of the gaff does not ever contact the turtle. The gaff person should pull the line upward into an "Inverted V" to enable engagement of the dehooking device on the line closest to the hook (Figure 2-10).

3) Follow the instructions on Pages 2-4 – 2-12 to remove the hook from the turtle using a long-handled dehooking device. The gaff person would serve the same function as the leader person.

4) After the hook is removed and secured by the dehooker, carefully remove all line with the line cutter to disentangle the animal (Pages 2-3 – 2-4).

Figure 2-10. Pulling an "Inverted V" (Photo courtesy of ARC).

Possible Scenarios Encountered for Sea Turtles Not Boated in Hook-and-line Fisheries

(1) Entangled but not hooked (*recommended personnel and equipment: at least three crew / two turtle control devices / long-handled dehooker for internal hooks / line cutter / long-handled device to pull an "Inverted V"*)

Control the turtle at the side of the boat using the involved line, or preferably with a turtle control device (Pages 2-2 – 2-3). If there are not at least three crew members available, the turtle control devices should be tied off. Secure the loose hook with the long-handled dehooker for internal hooks and carefully slide the blunt end of the line cutter under the line that you wish to remove. The dehooker for internal hooks is preferable because it can hold the loose hook to control it and protect the barb from reengaging. Pull the line cutter and the line will be captured within the recessed blade(s) of the device (Figure 2-4a). A long-handled J-Style dehooker, boat hook, or gaff may be carefully used to manage the line while cutting with the line cutters. Monofilament cutters may also be useful if the turtle is close to the side of the vessel (Figure 2-4b).

(2) Hooked but not entangled (Figure 2-11) (*recommended personnel and equipment: at least three crew / two turtle control devices / long-handled dehooker*).

Control the turtle at the side of the boat using the involved line, or preferably with turtle control devices (Pages 2-2 – 2-3). If there are not at least three crew members available, the turtle control devices should be tied off. The choice of dehooker will depend on the location and depth of the hook. Do not attempt to remove hooks that have been swallowed beyond where the insertion point of the barb is visible, or when it appears that hook removal will cause further serious injury to the turtle. If the hook cannot be removed, ensure that as much line as possible is removed and, if possible, remove some of the hook with bolt cutters.

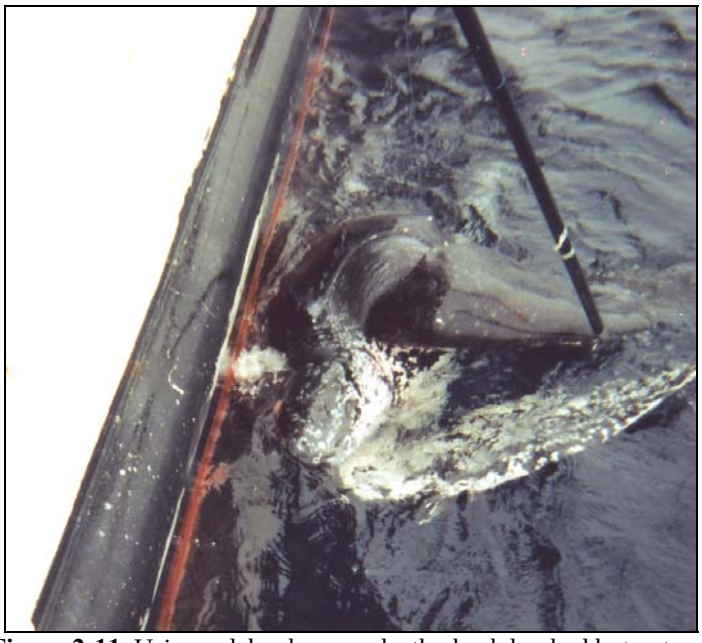


Figure 2-11. Using a dehooker on a leatherback hooked but not entangled (NMFS/SEFSC photo).

(3) Hooked and entangled (Figure 2-12) (*recommended personnel and equipment: multiple crew / two turtle control devices / dehooker / line cutter / long-handled device to pull an "Inverted V"*)

Control the turtle at the side of the boat using the line (if applicable), or preferably with turtle control devices (Pages 2-2 – 2-3). For turtles wrapped in line or hooked in the armpit or shoulder with the line running underneath the turtle, not over the turtle, the "Inverted V" technique is necessary for release (Page 2-10). Remove the hook first prior to line removal. Follow the instructions on Pages 2-3 – 2-12 for removing hooks and line.

Figure 2-12. A hooked and entangled leatherback (NMFS/SEFSC photo)

Chapter 3 Boating and Holding Sea Turtles

Boating the Turtle

It is very important that the turtle is never pulled out the water, even partially or for a short distance, using the gear with which the turtle is hooked or entangled. This could cause serious injury to the turtle, especially when the turtle has swallowed a hook. Once boated, the turtle will be handled according to the procedures for boated turtles.

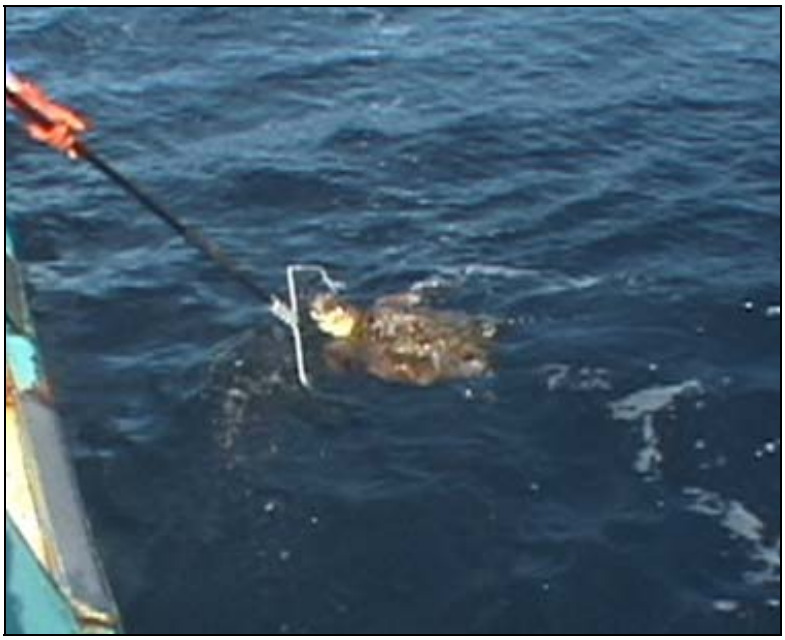


Figure 3-1. Bringing a turtle onboard using a dip net (NMFS/SEFSC photo).

(1) Dip Net

If the turtle is small enough and conditions are such that it can be brought aboard the vessel safely (Figure 3-1), use a dip net (Figure 3-2) meeting standards specified in NMFS regulations to carefully bring the turtle aboard. Place the net under the turtle, and safely lift the turtle out of the water and onto the deck. If the vessel is equipped with "cut out doors," use this door to minimize the distance from the water for the turtle to be retrieved.

Figure 3-2. Dip net (NMFS/SEFSC photo).

(2) Turtle Hoist

(a) Large Turtle Hoist

A large turtle hoist is recommended to bring turtles onboard that cannot be boated using a smaller dip net or on vessels equipped with a hydraulic lift. This is particularly useful when removing gear from leatherback sea turtles. The hoist is lowered into the water using a hydraulic lift and brought near the turtle. Once the hoist is in the water, the turtle can be guided into the device using the attached gear and/or turtle control device. Once the turtle is positioned within the hoist, release tension on the gear, and the turtle will descend deeper into the lift. The hoist and turtle are then raised slowly back onto the deck (Figure 3-3). The device is designed so that when onboard, the turtle is suspended above the deck on a platform of mesh netting supported by a rigid ring and contained within a webbing fence (Figure 3-4). The turtle is immobilized in this lift, facilitating

safe and rapid gear removal. Once all gear has been removed, the hoist and turtle are lowered back into the water deep enough for the turtle to swim out of the frame. Orient the hoist so that the turtle is facing away from the boat upon release. The use of this device is demonstrated in the video "Leatherbacks Aboard" (Epperly and Hataway 2004).

Figure 3-3. Bringing leatherback onboard using a large turtle hoist (NMFS/SEFSC photo).

Figure 3-4. Leatherback supported onboard in large turtle hoist (NMFS/SEFSC photo).

(b) Small Turtle Hoist

A small turtle hoist (Figure 3-5) is recommended to bring turtles onboard that cannot be boated using a traditional dip net with an extended reach handle. This is particularly useful when removing gear from sea turtles while on a vessel with a high freeboard or when storage space is extremely limited. Once the hoist is in the water, the turtle can be guided into the device using the attached gear and/or turtle control device. Use the attached lines to guide the frame under the turtle, and haul the lines evenly to capture the

turtle and bring it onboard, using care to maintain the net parallel to the water's surface so that the turtle cannot slip out. A pulley system or hydraulic lift can be used to hoist the frame out of the water if available. Once all gear has been removed, the hoist and turtle are lowered back into the water deep enough for the turtle to swim out of the frame, releasing tension on the outer lines if necessary to tip the frame. Orient the hoist so that the turtle is facing away from the boat upon release.

Figure 3-5. Small turtle hoist (Photo courtesy Alvaro Segura, World Wildlife Fund).

Holding the Turtle

While onboard, the turtle must be kept moist and in the shade, maintaining its body temperature above 60° F, similar to water temperatures at capture. It must be safely isolated and immobilized on a cushioned surface. The large turtle hoist serves this purpose; smaller turtles will need to be placed on a cushioned surface, such as an automobile tire. If you encounter a turtle with a tag, note the tag number and species and report the find to the address on the tag. All gear should be removed immediately. If possible, and especially if the turtle appears lethargic, leave the turtle on deck at least four hours up to twenty-four hours and monitor its condition, allowing stress toxins to dissipate.

(1) Cushion/Support Device

A suitably-sized cushion/support device, such as a standard automobile tire (Figure 3-6) without a rim or boat cushion, should be used to safely isolate and immobilize the animal once it is onboard. Place the turtle in its normal orientation whenever possible while immobilized, unless there is a reason to have it temporarily resting on its carapace.

Figure 3-6. Loggerhead supported using an automobile tire (NMFS/SEFSC photo)

(2) Comatose Turtles

If a turtle appears to be comatose (unresponsive, unconscious), attempt to revive it before release per 66 FR 67495, December 31, 2001. Place the turtle on its plastron (lower shell) and elevate the hindquarters approximately 15 - 30° (Refer to Plate 3-1) to permit the lungs to drain off water for a period of four up to twenty-four hours. A board, tire or boat cushion, etc. can be used. Keep the skin, and especially the eyes, moist while the turtle is on deck by covering the animal's body with a wet towel, periodically spraying it with water, or by applying petroleum jelly to its skin and carapace. Periodically, gently touch the corner of the eye or eyelid and pinch the tail near the vent (reflex tests) to monitor responsiveness. Do not put the turtle in a container of water for resuscitation, as even shallow water may cause it to drown.

Turtles can withstand lengthy periods without breathing; a comatose sea turtle may not move, breathe voluntarily, or show reflex responses or other signs of life. In other cases, a lightly comatose turtle may show shallow breathing or reflexes such as eyelid or tail movement when touched. Sea turtles may take some time to revive; do not give up too quickly. Regulations (66 FR 67495, December 31, 2001; 50 CFR 223.206) allow a fisherman to keep a turtle on deck up to 24 hours for resuscitation purposes without a permit. Even turtles that are successfully resuscitated benefit from being held on deck as long as possible (up to 24 hours) to fully recover from the stress of accidental forced submergence.

In the past, an alternative method of resuscitation, known as plastral pumping, was sometimes recommended (see FR 43 32801, July 28, 1978; 57 FR 57354, December 4, 1992). This practice involved placing the turtle on its carapace and pumping the plastron with hand or foot. However, we strongly discourage this technique, as further study determined that it may actually do more harm than good and should not be attempted during resuscitation (per 66 FR 67495, December 31, 2001). Plastral pumping may cause the airway to block and cause the viscera to compress the lungs which are located dorsally, thereby hindering lung ventilation.

Plate 3-1

Sea Turtle Resuscitation Guidelines

If a turtle appears to be unresponsive or comatose, attempt to revive it before release. Turtles can withstand lengthy periods without breathing; a comatose sea turtle will not move, breathe voluntarily, or show reflex responses or other signs of life. In other cases, an unresponsive turtle may show shallow breathing or reflexes such as eyelid or tail movement when touched. Use the following method of resuscitation in the field if veterinary attention is not immediately available:

- **Place the turtle on its plastron (lower shell) and elevate the hindquarters approximately 15 - 30 degrees to permit the lungs to drain off water for a period of 4 up to 24 hours. A board, tire or boat cushion, etc. can be used for elevation.**

- **Keep the turtle in the shade, at a temperature similar to water temperature at capture. Keep the skin (especially the eyes) moist while the turtle is on deck by covering the animal's body with a wet towel, periodically spraying it with water, or by applying petroleum jelly to its skin and carapace. Do not put the turtle into a container with water.**

- **Do not put the turtle on its carapace (top shell) and pump the plastron (breastplate) or try to compress the turtle to force water out, as this is dangerous to the turtle and may do more harm than good.**

- **Periodically, gently touch the corner of the eye or eyelid and pinch the tail near the vent (reflex tests) to monitor consciousness.**

- **Sea turtles may take some time to revive; do not give up too quickly. Turtles that are successfully resuscitated benefit from being held on deck as long as possible (up to 24 hours) to fully recover from the stress of accidental forced submergence.**

- **Release successfully resuscitated turtles over the stern of the boat, when fishing or scientific collection gear is not in use, the engine is in neutral, and in areas where they are unlikely to be recaptured or injured by vessels. A turtle that has shown no sign of life after 24 hours on deck may be considered dead and returned to the water in the same manner.**

NMFS/SEFSC Photos

References:

Federal Register, December 31, 2001. Government Printing Office, Washington DC 66 (250), pp. 67495- 67496.

October 2008

Chapter 4 Equipment and Techniques for Opening the Mouth of Boated Turtles

Opening the Mouth

When a turtle with an internal hook injury is brought on board, it will likely have its mouth open. If the animal is not voluntarily opening its mouth, there are a few mouth-opening techniques you can apply:

1) Block the turtle's nostrils to encourage the turtle to open its mouth (Figure 4-1).

2) Tickle the throat or pull outward on the throat skin.

3) Cover the nostrils and carefully apply light pressure to the anterior corner of the eye socket (not the eye itself) with one hand and apply firm pressure in the throat area with your other hand.

Figure 4-1. Opening the mouth (NMFS/SEFSC photo).

If you still cannot open the mouth, use a mouth opener, such as rope loops covered with protective tubing or an avian speculum. The mouth openers will enable you to access the turtle's mouth, while the mouth gags will keep the turtle's mouth open so you can remove any hooks and/or line. Keep in mind that various mouth gags will block your view inside the mouth in different ways. Therefore, select which mouth gag will best suit the dehooking or disentanglement procedure that you need to perform. You can improve your visibility at the back of the turtle's mouth and upper esophagus by using the needle-nose pliers. After securing the mouth open, gently slide the pliers in the closed position forward into the upper esophagus and separate the pliers' jaws to open the esophagus.

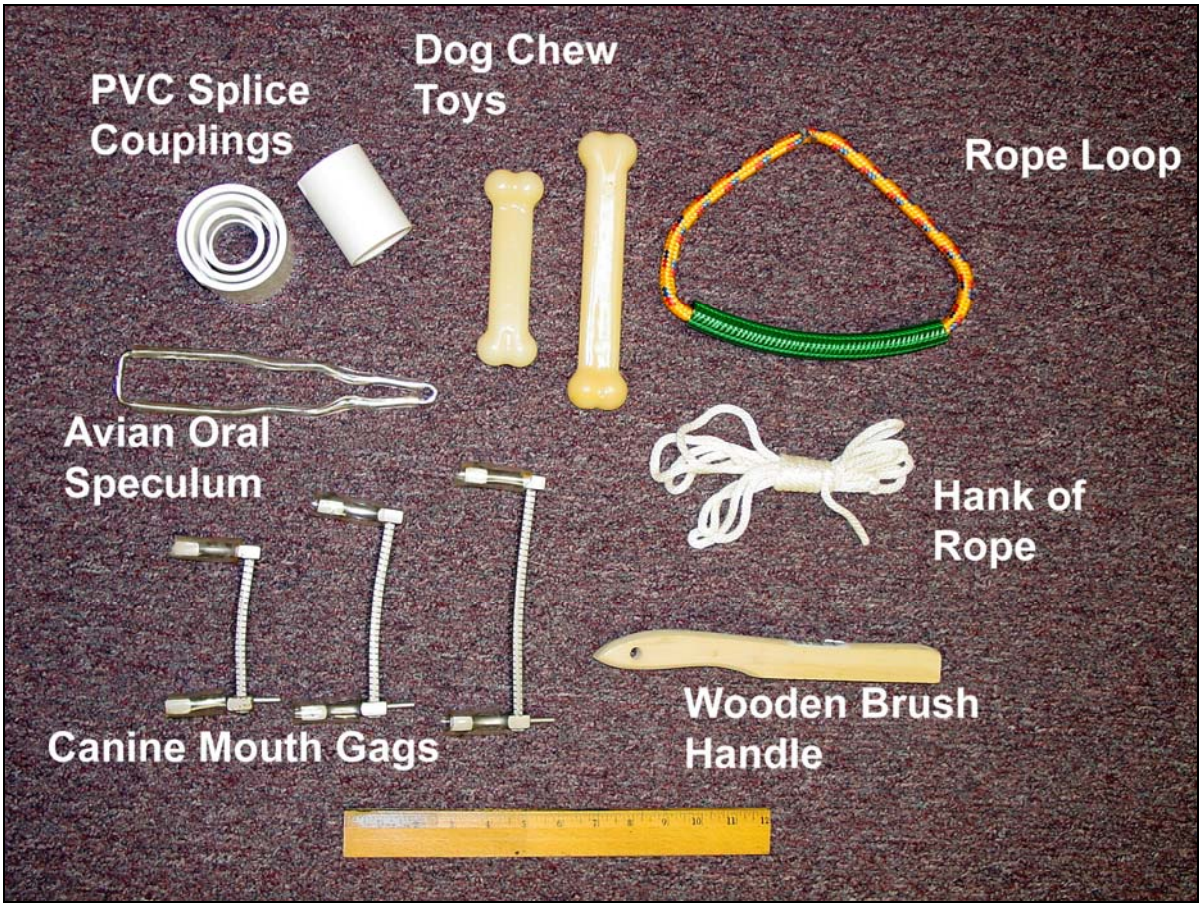


Figure 4-2. Mouth openers and gags (NMFS/SEFSC photo).

Mouth Openers and/or Gags

The following devices (Figure 4-2) can be used to open the mouth and/or maintain the mouth open: Use caution with these methods, as injury can result if these tools slip.

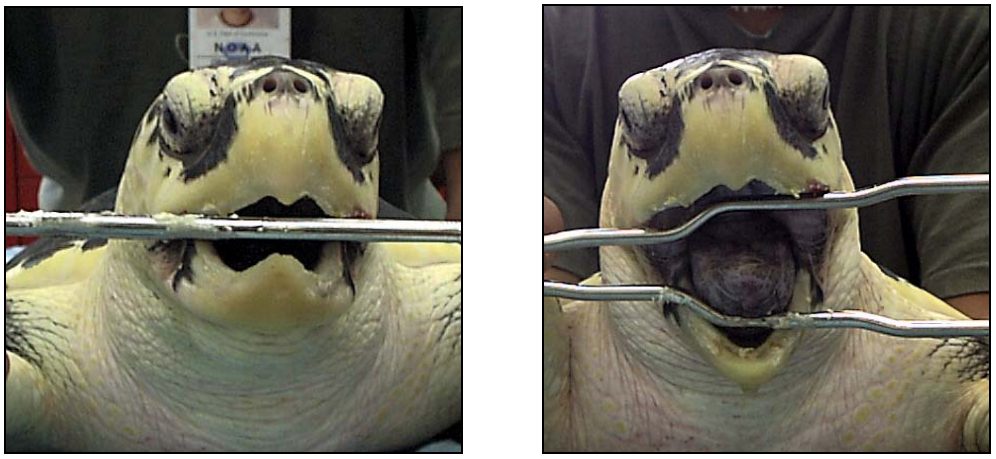
(1) Set of Two Rope Loops with Protective Tubing (both a mouth opener and mouth gag)

Slide the ropes with protective tubing in between the jaws and move them away from the front of the mouth to gain the greatest leverage (Figure 4-3). Care should be taken to avoid contact with the eyes. With the free ends of the rope knotted together to form a loop, you can hold the lower rope loop with your foot and the other with one hand, leaving one free hand.

Figure 4-3. Opening the mouth using rope loops (Photo courtesy of ARC).

(2) Large Avian Oral Speculum (both a mouth opener and mouth gag)

Slide the avian speculum flat inside the turtle's mouth (Figure 4-4a) and rotate it (Figure 4-4b). Notice that the speculum is stepped and can be used for different sized turtles by selecting for its different widths. This mouth opener can be used only on the smallest of animals, as larger turtles can easily crush the avian speculum.



Figures 4-4a and b. Using an avian speculum as an (a) mouth opener and (b) gag (NMFS/SEFSC photos).

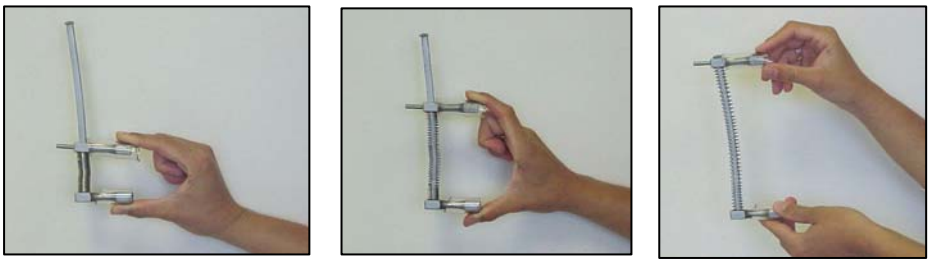
(3) Block of Hard Wood (mouth opener and mouth gag)

Soak the wood block/handle first to soften it and decrease damage to the beak. Position it in the posterior corner of the mouth to keep the mouth open (Figures 4-5a and b).

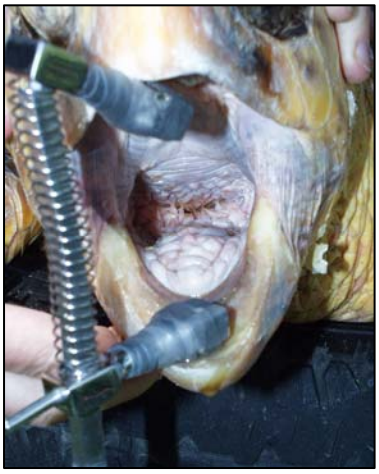
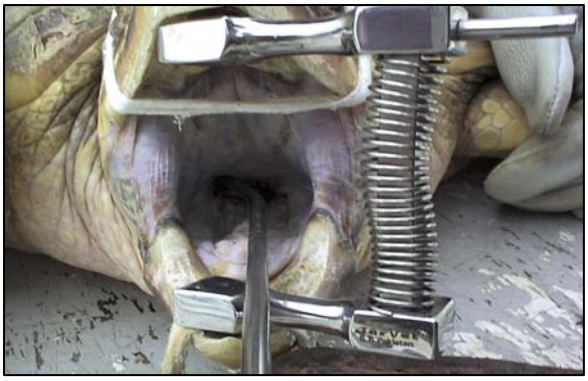
Figures 4-5 a and b. Wooden brush handle used as (a) mouth opener and (b) gag [(a) Photo courtesy of ARC, (b) NMFS/SEFSC photo]

(4) Set of Three Canine Mouth Gags (mouth gag)

This type of gag locks into the open position and allows for hands free operation once it is in place. The canine mouth gag's arms are compressible when they are perpendicular to the main axis. The rubber feet on the gag lock nicely into the groove on the upper and lower beak. When the turtle bites down on the extremity of the arms, they will shift from being perpendicular and therefore will lock. Use the smallest one possible that will not crush. Compress the gag and insert it in the turtle's mouth. As the turtle opens its mouth, the gag will expand (Figures 4-6a – c). Maintain your hold on the gag until it has locked in place. Do not force the turtle's mouth open all the way; let the spring tension on the gag and turtle's own mouth movement set the maximum open position. Position the mouth gag at the front center of the jaw with the axis off to one side to provide the maximum open working area in the mouth and the surest footing for the gag (Figures 4-7a and b).



Figures 4-6a, b, and c. (a) Canine mouth gag fully compressed, (b) partially compressed, and (c) fully open (NMFS/SEFSC photos).

Figures 4-7a and b. Canine mouth gag (NMFS/SEFSC photos).

(5) Set of Two Sturdy Dog Chew Bones (mouth gag)

Position the proper size dog chew bone in the posterior corner of the mouth to keep the mouth open. The larger bones (Figure 4-8a) are easy to hold, but block access to much of the mouth. Smaller bones (Figure 4-8b) do not reduce your view inside the turtle's mouth and work equally well.


Figures 4-8a and b. Large (a) and small (b) dog chew bones (NMFS/SEFSC photo).

(6) Hank of Rope (mouth gag)

Position the lanyard in the posterior corner of the jaw to keep the mouth open (Figure 4-9). Alternatively, you can place the rope across the entire width of the mouth and block both sides of the jaw, but this blocks your view of the back of the mouth.

Figure 4-9. Hank of rope mouth gag (NMFS/SEFSC photo)

(7) Set of Four PVC couplings (mouth gag)

Insert the appropriate size PVC coupling (chosen by considering both the size of the turtle and the tools to be used) inside the turtle's mouth (Figure 4-10). Hold it with a pair of pliers to stabilize it inside the mouth. In order to prevent the coupling from interfering with the dehooking devices, thread the line through the coupling before inserting it.

Figure 4-10. PVC coupling mouth gag (NMFS/SEFSC photo).

Chapter 5 Equipment and Techniques for Removing Gear from Boated Turtles

When dehooking is possible, several devices (Figure 5-1 and Figure 5-2) may be used to remove hooks, depending on the depth and location. Some hooks that are lightly hooked externally may be easily removed using your hand. If the hook has been deeply ingested, a short-handled dehooker for internal hooks must be used. If the hook is external or in the front of the mouth or beak with the barb of the hook clearly visible, a short-handled dehooker for internal hooks or a short-handled dehooker for external hooks may be used.

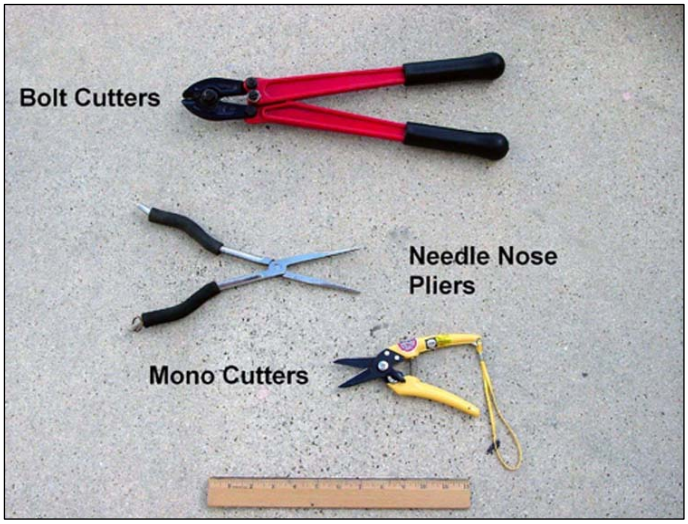


Figure 5-1. Bolt cutters, needle-nose pliers, and monofilament cutters (NMFS/SEFSC photo).

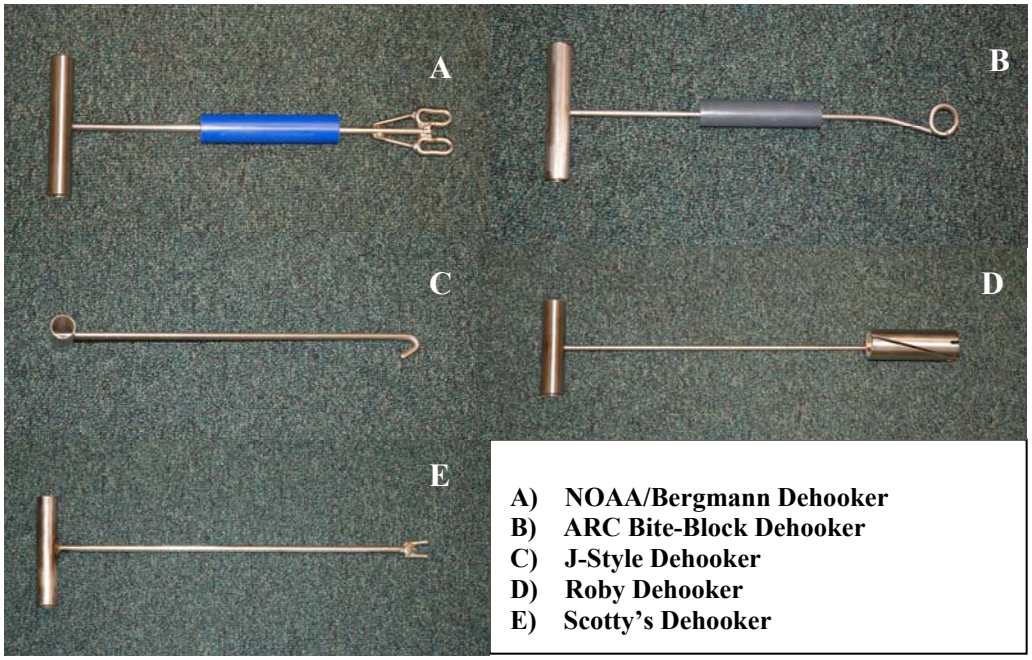


Figure 5-2. Short handled dehookers (NMFS/SEFSC photos).

Needle-nose or Long-nose Pliers

The needle-nose pliers can be used to remove hooks that are deep in the animal's flesh and must be twisted during removal. They are also useful in holding PVC splice couplings in place when used as mouth openers, and they can be used to remove hooks in the mouth in some situations.

Bolt Cutters

Bolt cutters are essential for removing hooks, as the easiest way to remove a hook may be to cut off the eye or barb so that the hook can be pushed through or backed out without causing further injury to the sea turtle. If the hook cannot be removed, bolt cutters should be used to cut off as much of the hook as possible.

Equipment to Remove Line and Netting

Refer to description in Chapter 2.

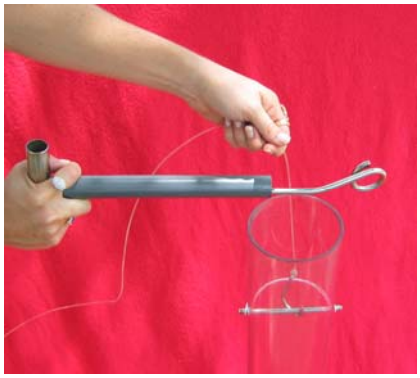
Short-handled Dehooker for Internal Hooks

(1) 17" Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker

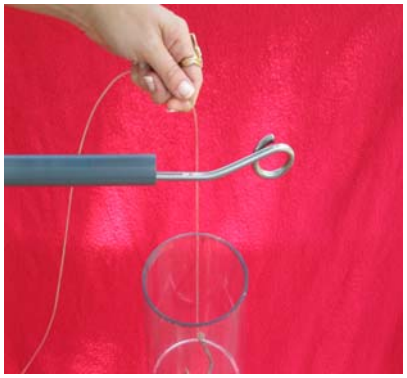
This dehooking device has been designed to prevent sea turtles from biting down on the dehooking device during internal hook removal (Figure 5-3). The PVC bite block also reduces the damage on the sea turtle's beak if the turtle bites down. This dehooker can be modified to facilitate removal of circle hooks, as described in the notch modification text in Chapter 2. Refer to Plate 5-1 for detailed instructions on using this device.

Figure 5-3. Bite Block Deep-hooked (Sea Turtle) ARC Dehooker (NMFS/SEFSC photo).

Plate 5-1 Instructions for the 17” Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker

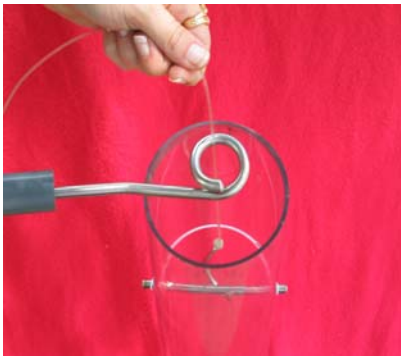


Step 1

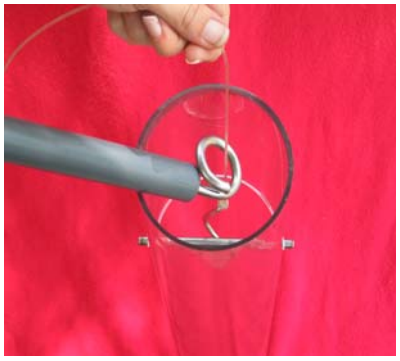


Step 2

Step 3



Step 4



Step 5

Step 6

Figures provided by Aquatic Release Conservation

(1) To correctly use this dehooking device, you must keep the PVC bite block pulled up along the handle when engaging the leader to allow for proper leader and hook engagement.

(2) Maintain leader tension and place the dehooker on the leader at a 90° angle with the open end of the curl up.

(3) Pull the dehooker towards you (like a bow & arrow) until the open end of the curl engages/captures the leader.

(4) Turn the dehooker 1/4 turn clockwise. The leader is now in the center of the pigtail.

(5) Release the bite block, allowing it to slide to the bottom of the dehooker. Following the leader, insert the curl and PVC end into the mouth as far as the animal will allow.

(6) Should the sea turtle bite down, the dehooker will slide up to 5” in and out.

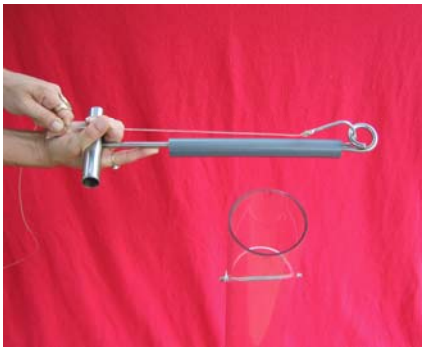
Plate 5-1 Continued

Step 7

Step 8

Step 9

Step 10



Step 11

Figures provided by Aquatic Release Conservation

(7) With the sliding motion allowed by the bite block, continue to follow the leader down the shank of the hook. If the dehooker has been notched to help facilitate circle hook removal, the hook will seat into the notch.

(8) After the dehooker is seated on the shank of the hook, (leader tight) give a sharp, short jab downward with the dehooker. As the hook is removed, the point of the hook will rotate and stop on the offset angle of the dehooker, protecting the point and preventing re-engagement of the hook

(9) After the hook is dislodged, keep the leader tight and pull the dehooker out until it stops at the PVC bite block.

(10) The bite block will cover the hook and further prevent re-engagement.

(11) Wait for the turtle to open its mouth and remove the entire dehooking device and hook.

(2) NOAA/Bergmann Dehooker

This dehooker has been found to be effective in removing both external and internal hooks during field and laboratory trials. The design, similar to that of the Scotty's dehooker (Pages 5-10 – 5-11), employs a pushing method to remove hooks (Figure 5-4). Because it grasps the hook securely, it also facilitates the twisting motion necessary to remove circle hooks. Unlike the Scotty's dehooker, it has rounded terminal ends, enabling its use for internal hooks in addition to external hooks. However, because the barb of a J-hook may not be protected, this device should not be used to remove internal J-hooks.

This dehooker works by pushing or pushing/twisting the hook out of the turtle; consider hook location and placement prior to use. Hold the leader in one hand with tension and hold the NOAA/Bergmann dehooker in the other hand. Position the dehooker so that it is firmly seated against the shank of the hook. Bring both hands together (leader and dehooker parallel with each other) while maintaining tension on the leader. With the leader and dehooker together, give a short, sharp jab to dislodge the hook and remove it from the animal. If you are removing a circle hook, a twisting motion of approximately 180° while thrusting the dehooker may be required to remove the circle hook. Be cautious not to allow the hook to re-engage once removed. The barb of the circle hook should rest against the center of the dehooker with proper line tension to prevent reengagement. Refer to Plate 5-2 for detailed instructions on using this device.

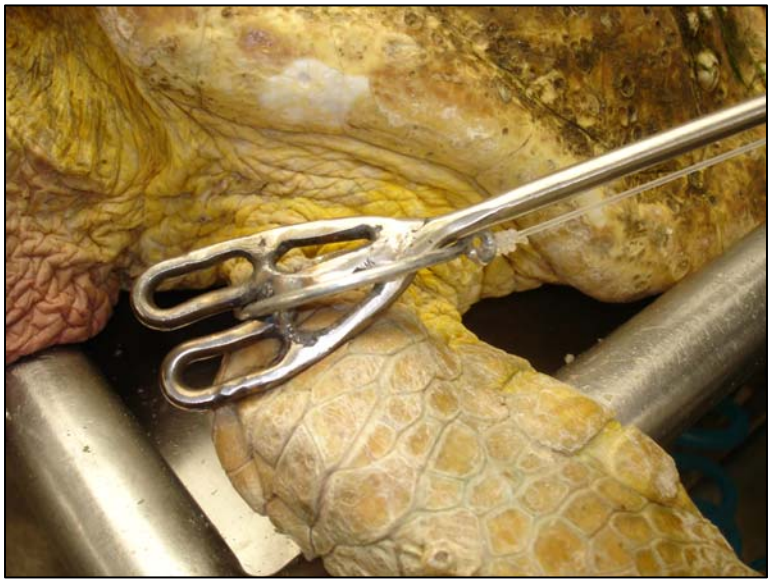


Figure 5-4. NOAA/Bergmann dehooker (NMFS/SEFSC photo).

Plate 5-2 Instructions for NOAA/Bergmann Dehooker

Step 1

Step 2

Step 3

Step 4

(1) Hold leader in one hand with tension and hold the dehooker in the other hand.

(2) Position the dehooker so that it is firmly seated against the shank of the hook.

(3) Bring both hands together (leader and dehooker parallel with each other) while maintaining tension on the leader.

(4) With the leader and dehooker together, give a short, sharp jab to dislodge the hook and remove it from the animal. Rotate or twist up to 180° if necessary to remove the hook, particularly when removing circle hooks. Maintain line tension at an angle if necessary to prevent the hook from re-engaging after removal.

Short-handled Dehooker for External Hooks

(1) 17" Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker

Refer to description beginning on Page 5-2.

(2) NOAA/Bergmann Dehooker

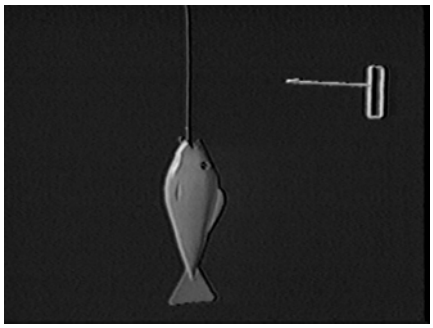
Refer to description beginning on Page 5-5.

(3) Short-handled J-Style Dehooker

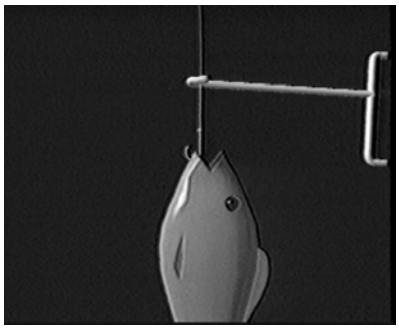
The J-Style dehooker is designed for use only when the hook is visible in the front of the mouth or beak, or if it is external (Figure 5-5). This dehooker works by rotating and pulling the hook out of the turtle; consider hook location and placement prior to use. Hold the leader in one hand with tension and hold the J-Style dehooker in your other hand. Place the dehooker on the leader and follow the leader down until it bottoms out on the shank of hook. With tension on the leader, lower the hand with the leader to the eight o'clock position, and raise the hand with the dehooker to the two o'clock position. Twist the dehooker slightly and pull until the hook is dislodged, and be cautious not to allow the hook to re-engage once removed. Refer to Plate 5-3 for detailed instructions on using this device.

Figure 5-5. J-Style dehooker (NMFS/SEFSC photo).

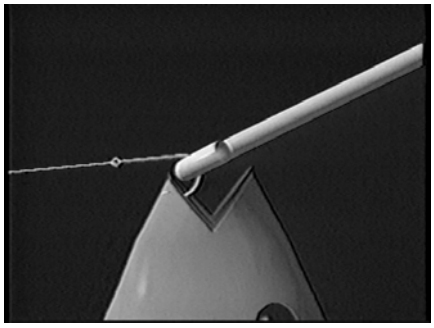
Plate 5-3 Instructions for the J-Style Dehooker



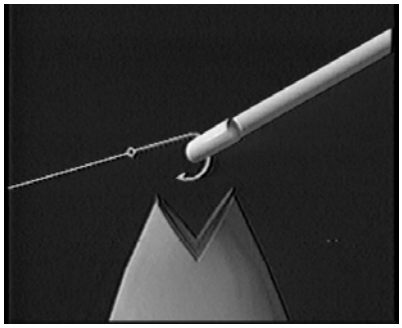
Step 1



Step 2



Step 3



Step 4

Figures provided by Aquatic Release Conservation

(1) Grab the leader with one hand and hold the dehooking device with your other hand (with the end facing toward you).

(2) Place the dehooking device on the leader.

(3) Follow the leader down until you engage the hook.

(4) Pull the dehooking device and leader apart with constant pressure and raise the hand with the dehooking device to the two o'clock position and lower the hand with the leader to the eight o'clock position. With a slight twist and shake the hook will be disengaged.

(4) Scotty's Dehooker

The Scotty's dehooker is designed for use only when the hook is visible in the front of the mouth or beak (Figure 5-6), or if it is external. This dehooker works by pushing or pushing/twisting the hook out of the turtle; consider hook location and placement prior to use. Hold the leader in one hand with tension and hold the Scotty's dehooker in your other hand. Position the dehooker so that it is firmly seated against the shank of the hook. Bring both hands together (leader and dehooker parallel with each other) while maintaining tension on the leader. With the leader and dehooker together, give a short, sharp jab to dislodge the hook and remove it from the animal. Be cautious not to allow the hook to re-engage once removed.

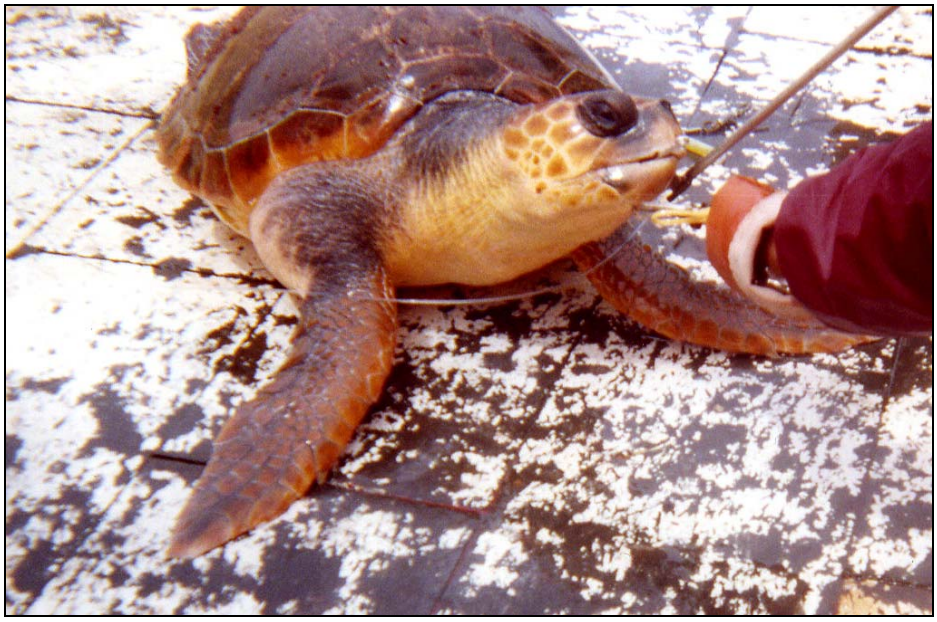
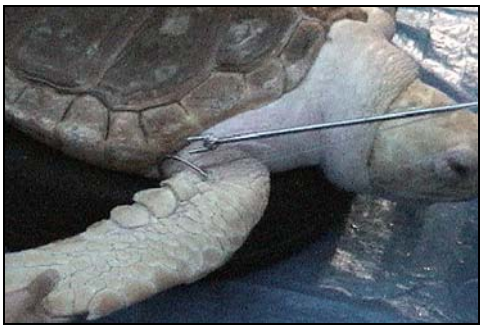
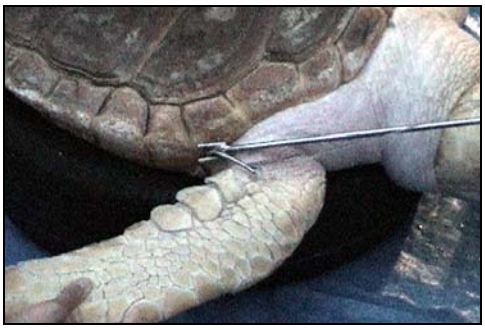


Figure 5-6. Scotty's dehooker (NMFS/SEFSC photo).

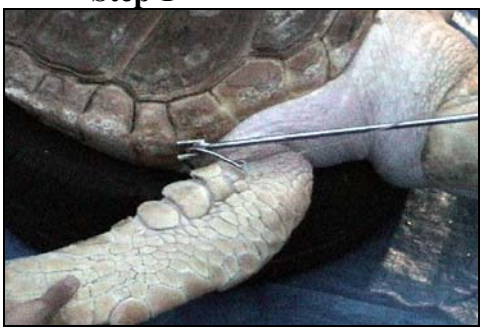
Plate 5-4 Instructions for Scotty's Dehooker



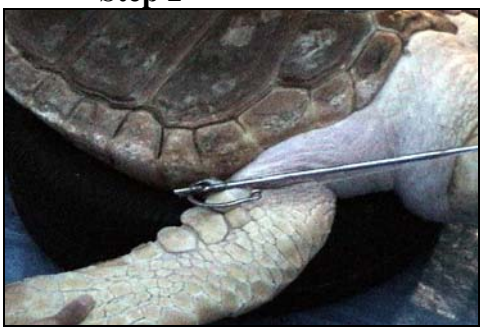
Step 1



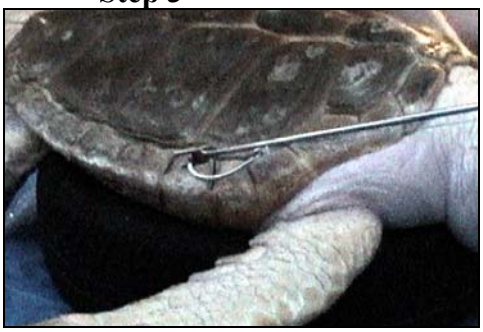
Step 2



Step 3



Step 4



Step 5

(1) Hold leader with tension in one hand and hold the Scotty's dehooker in the other hand.

(2) Position the dehooker so that it is firmly seated against the shank of the hook.

(3) Bring both hands together (leader and dehooker parallel with each other) while maintaining tension on the leader. With the leader and dehooker together, give a short, sharp jab to dislodge the hook and remove it from the animal.

(4) Rotate or twist slightly if necessary to remove the hook.

(5) Be careful not to allow the hook to re-engage once removed.

(5) Short-handled Roby Dehooker (Refer to Plate 2-3)

The short-handled Roby dehooker is suitable for removing external hooks and works by pushing and twisting the hook out of the turtle; consider hook location and placement prior to use. The design, which incorporates four notches at 90° angles at the base of a cylinder, grasps the hook very securely, facilitating the twisting motion necessary to remove circle hooks. Engage the line by feeding it through the diagonal slit in the side of the cylinder, and then position the dehooker so that it is firmly seated against the shank of the hook, which is secured in the notches. Once the hook is secured, give a short, sharp jab to dislodge the hook and remove it from the animal. If you are removing a circle hook, a twisting motion of approximately 180° during the downward jab may be required to remove the circle hook.

Appendix A

DESIGN STANDARDS AND EQUIPMENT FOR THE CAREFUL RELEASE OF SEA TURTLES CAUGHT IN HOOK AND LINE FISHERIES

Chapter A1 Introduction

The purpose of the careful release equipment is to increase post-release survival of incidentally-captured sea turtles by releasing them with minimal injury. These specifications have been revised and expanded, based upon field-testing of equipment, user feedback, and product design updates resulting in part from experiments in the Northeast Distant (NED) statistical reporting area and subsequent experiments and observations.

Several fisheries have mandatory release gear requirements; requirements and appropriate release tools may vary by fishery. This document contains the general approved design standards for currently certified release gears. Individual fisheries may have more specific design standards. Check with the applicable regulations as the final authority for required tools and specifications in each fishery. Note: approved release gear previously constructed according to original Atlantic Highly Migratory Species (HMS) Pelagic Longline Fishery design standards (FSEIS June 22, 2004; 69 FR 40736 July 6, 2004) would still qualify for this fishery under these current standards.

New release tools may be certified by submitting them to the NOAA Fisheries Southeast Fisheries Science Center for testing. Gear specialists and researchers will assess each item's usefulness and safety in removing gear from animals during laboratory and/or field trials. When new items are certified by NOAA Fisheries, a notice will be published in the Federal Register.

The National Marine Fisheries Service does not recommend or endorse any proprietary product or material mentioned in this document. However, example models of certified commercially available products are listed for convenience; other products meeting minimum design standards may be available or may be constructed. The use of registered or trademarked products is by reference only; no endorsement or affiliation is implied for any of these products.

The “pigtail style” dehookers described in this document are manufactured by Aquatic Release Conservation, Inc. (ARC). ARC has stated that their dehookers are covered by their U.S. and international patents, specifically identifying U.S. Patent # 4,914,853, #6,840,002 and U.S. Design Patent # 382,628, as well as modifications to these patents. In essence, ARC has given permission, by means of a license, to all individual fisheries participants to make, have made, construct, and use, any of its patented dehookers provided that these dehookers are for individual use. No authority is granted by ARC to make dehookers for resale or for gifts. The precise rights granted by ARC are defined in a License Agreement to be found at the ARC website located at: http://dehooker4arc.com/disclaimer.cfm. If an individual fisheries participant desires to enter into and take advantage of this License Agreement, they must register with ARC and execute a License Agreement. The government has not studied any of the ARC patents, and therefore has no opinion whatsoever as to the validity of these patents or whether making or using the ARC dehookers would infringe patents of others.

Chapter A2 Equipment for Sea Turtles Not Boated

In circumstances where a sea turtle is too large to be boated, or conditions preclude the safe boarding of the animal, vessels should possess, maintain, and utilize the following equipment and release the turtle with minimal injury.

Turtle Control Devices

In response to safety concerns for fishing vessel crew members and for incidentally captured sea turtles, as well as to facilitate the likelihood of maximum gear removal, turtle control devices were devised. Their function is to control the front flippers of the sea turtle so that the animal can be controlled at the side of the vessel during gear removal. Restraint is most effective when a pair of turtle control devices is used. Currently, there are two approved turtle control device styles, the "Turtle Tether" and the "T&G Ninja Sticks;" both reduce safety risks associated with removing gear from active sea turtles not boated, particularly leatherbacks. Minimum design standards are as follows:

(1) Turtle Tether

(a) *Design Standards:*

(i) *Line*. 15 – 20' of 1/2" hard lay negative buoyancy line (e.g., Samson crab rope #SSR-100-MHL) or similar is used to make a ~ 30" loop to slip over the flipper. The line is fed through a ~ 3/4" inside diameter fair lead, eyelet or eyebolt at the working end of a pole and through a ~ 3/4" eyelet or eyebolt in the midsection. A 1/2" quick release cleat (e.g., Clamcleat® or similar) holds the line in place near the end of the pole. A final ~ 3/4" eyelet or eyebolt should be positioned ~ 7" behind the cleat to secure the line, while allowing a safe working distance to avoid injury when releasing the line from the cleat.

(ii) *Extended reach handle.* The line must be securely fastened to an extended reach handle or pole. Check applicable regulations for required minimum handle length (e.g., the U.S. Highly Migratory Species Pelagic Longline Fisheries require a minimum length equal to or greater than 150% of the freeboard or a minimum of 6', whichever is greater. Freeboard is defined for these purposes (other definitions exist) as the working distance between the top rail of the gunwale to the water's surface, and will vary based on the vessel design). There is no restriction on the type of material used to construct this handle as long as it is sturdy. The handle must include a tag line to attach the tether to the vessel to prevent the turtle from breaking away with the tether still attached.

(b) *Example Model(s) Meeting Current Design Standards:*

(i) *Turtle Tether (*e.g., *ARC Model TT08, Model TT12) (Plate B-1)*

(2) T&G Ninja Sticks

(a) ***Design Standards:***

(i) *Line.* Approximately 30 – 35' of 1/2" to 5/8" soft lay polypropylene line, nylon line, or similar is fed through 2 PVC conduit, fiberglass, or similar sturdy poles and knotted using an overhead (recommended) knot at the end of both poles or otherwise secured. There should be ~ 18 - 24" of exposed rope between the poles to be used as a working surface to capture and secure the flipper. Knot the line at the ends of both poles to prevent line slippage if they are not otherwise secured. The remaining line is used to tether the apparatus to the boat unless an additional tag line is used.

(ii) *Extended reach handles*. Two lengths (cut to freeboard height) of rigid electrical conduit sunlight resistant 3/4" Schedule 40 PVC, fiberglass, aluminum or similar should be used. Check applicable regulations for required minimum handle length (e.g., the U.S. Highly Migratory Species Pelagic Longline Fisheries require a minimum length equal to or greater than 150% of the freeboard or a minimum of 6', whichever is greater. Freeboard is defined for these purposes (other definitions exist) as the working distance between the top rail of the gunwale to the water's surface, and will vary based on the vessel design).

(b) ***Example Model(s) Meeting Current Design Standards:***

(i) *"T&G Ninja Sticks" (Plate B-2)*

<u>Equipment to Remove Line and Netting</u>

(1) Long-handled Line Clipper/Cutter

Line clippers or cutters are designed to cut high test monofilament line as close as possible to the hook and to assist in removing other line and netting from entangled sea turtles, in an effort to minimize remaining gear upon release. NOAA Fisheries has established minimum design standards for the line clippers (65 FR 16347, March 28, 2000, and 66 FR 17370, March 30, 2001) that can be purchased or fabricated using available and low cost materials. One long-handled line clipper or cutter and a set of replacement blades should be onboard. The minimum design standards for line clippers or cutters are as follows:

(a) ***Design Standards:***

(i) *A protected and secured cutting blade*. The cutting blade(s) must be capable of cutting 2.0 – 2.1 mm monofilament line (400# test) or polypropylene multi-strand material, known as braided or tarred mainline, and it should be maintained in working order. The blade must be curved, recessed, contained in a holder, or otherwise designed to facilitate its safe use so that direct contact between the cutting surface and the sea turtle or the user is prevented. The cutting instrument must be securely attached to an extended reach handle and easily replaced. One extra set of replacement blades meeting these

standards must also be carried on board to replace all cutting surfaces on the line cutter or clipper;

(ii) *Extended reach handle*. The line cutter blade must be securely fastened to an extended reach handle or pole. Check applicable regulations for required minimum handle length (e.g., the U.S. Highly Migratory Species Pelagic Longline Fisheries require a minimum length equal to or greater than 150% of the freeboard or a minimum of 6', whichever is greater. Freeboard is defined for these purposes (other definitions exist) as the working distance between the top rail of the gunwale to the water's surface and will vary based on the vessel design). For flexibility of configuration during use and for storage purposes, it is recommended that the handle break down into sections, although this is not a requirement. There is no restriction on the type of material used to construct this handle as long as it is sturdy and facilitates the secure attachment of the cutting blade.

(b) *Example Model(s) Meeting Current Design Standards:*

(i) *NOAA/Arceneaux Line Clipper (Plate B-3)*. The NOAA/Arceneaux line clipper can be fabricated by securely attaching a flat hardened stainless steel seat belt cutter with recessed cutting blades (such as the Lifesaver II Seat Belt Cutter™, Lifesaver Seat Belt Cutter™, Emergency Seat Belt Cutter, Innovative Scuba Razor Line Cutter or similar) to an extended reach handle using bolts and/or cable ties. A replacement blade set would require one additional seat belt cutter for the NOAA/Arceneaux Line Clipper;

(ii) *NOAA/Laforce Line Cutter (Plate B-4)*. The Laforce Line Cutter has a cutting end manufactured from a 6" long 1/2" aluminum rod with a 4 1/8" end at a 45° angle with two 420 C stainless steel serrated cutting blades secured inside the angle. It must be attached to an extended reach handle. A set of replacement blades would require two stainless steel serrated cutting blades for the NOAA/Laforce Line Cutter.

(2) Monofilament Cutters

Monofilament cutters should be used to remove netting, entangling line, or line as close as possible to the eye of the hook in the event that the hook was swallowed, or when the hook cannot be removed. This reduces the amount of gear retained by the animal in the event that all gear cannot be removed safely. Minimum design standards are as follows:

(a) *Design Standards:*

(i) *General*. These should be ~ 7 1/2" in length with ~1 3/4" long, 5/8" wide (closed) blades.

(b) *Example Model(s) Meeting Current Design Standards:*

(i) *Any monofilament cutters meeting design standards [e.g., Jinkai Model MC-T].*

Equipment to Remove Hooks

Dehooking devices may be designed to remove internal hooks, external hooks, or both. All long-handled tools should be able to capture and control the line, and the dehooking end must be securely fastened to the extended reach handle. They also should be designed to allow a twisting motion, which is necessary for circle hook removal.

(1) Long-handled Dehooker for Internal Hooks.

Some long-handled dehooking devices are designed to remove internal hooks from sea turtles that cannot be boated, and it may also be used to remove external hooks. Because this design should shield the barb of the hook and prevent it from re-engaging, this device also may be used to engage a loose hook during line removal when the turtle is entangled but not hooked.

Minimum design standards are as follows:

(a) ***Design Standards:***

(i) *Hook removal device.* The hook removal device should be constructed of ~ 3/16" - 5/16" marine grade stainless steel (316L) or similar and have a dehooking end no larger than 1 7/8" outside diameter. This device must securely control the leader while shielding the barb to prevent the hook from re-engaging during removal. It cannot have any unprotected sharp terminal points, as these could cause injury to the mouth and esophagus during hook removal. The device must be of a size appropriate to secure the range of hook sizes and styles in the applicable fishery (e.g., 16/0 - 20/0 circle hooks in the Atlantic pelagic longline swordfish and tuna fisheries would require use of 5/16" wire and an outside diameter of 1 7/8");

(ii) *Extended reach handle*. Check applicable regulations for required minimum handle length (e.g., the U.S. Highly Migratory Species Pelagic Longline Fisheries require a minimum length equal to or greater than 150% of the freeboard or a minimum of 6', whichever is greater. Freeboard is defined for these purposes (other definitions exist) as the working distance between the top rail of the gunwale to the water's surface and will vary based on the vessel design). For flexibility of configuration during use and for storage purposes, it is recommended that the handle break down into sections, although this is not a requirement. There is no restriction on the type of material used to construct this handle as long as it is sturdy and facilitates the secure attachment of the hook removal device.

(b) ***Example Model(s) Meeting Current Design Standards:***

(i) *ARC Pole Big Game Dehooker Models BP04, BP08, BP11, P610 and BPIN (Plate B-5).* These devices are constructed of a 5/16" 316 L stainless steel rod curled into a pigtail spiral loop end with no exposed terminal point, and they are recommended for hook sizes 6/0 to 20/0. The rod is 7" from point of attachment to the end of the loop, and includes a 5.3° angle offset to shield the barb of the hook. The loop is designed at a 12.2° angle

bend from the rod and has an inside diameter of 1 1/4" and an outside diameter of 1 7/8 with an 1/8" gap between rod and loop to facilitate line engagement. Some models are manufactured with a three-part anodized aluminum pole that breaks down into 4' sections for storage. The 9" insert model (*BPIN*) must be attached to an extended reach handle.

Notch Modification for the ARC Dehookers

Any of the ARC models listed above can be notched to facilitate circle hook removal (refer to Chapter 2 for photographs and more discussion on the notch modification). The notch is created where the hook lies in the bottom portion of the curl, securing the shank enough to rock the hook from side to side while pushing the circle hook out. The notch modification can be accomplished with a metal file in approximately 15 minutes. The depth and width of each notch should be customized for the hooks used, although no notch should be deeper than 1/3 of the wire diameter to maintain the integrity of the device's tensile strength.

Instructions for notching the dehooker:

1. Place the type and size circle hook that you are using in the pigtail curl with the line parallel and tight.

2. Mark with a felt-tip pen/marker the exact location that the shank of the circle hook comes into contact with the vertical bottom of the pigtail curl.

3. Remove the hook, take a metal file (rectangle recommended, e.g., General 6 Piece Needle File Set from Ultratech Tool System, model # 707476), and notch (file) the marked area of the pigtail curl, where the shank of the hook was, approximately 1/16" to 1/8" deep and approximately 1/8" wide, depending on the hooks used. Use eye protection while filing the notch.

4. The width and depth of the notch should be determined by the size and type of the circle hook used in that particular fishery in order to facilitate the best fit. Do not exceed a depth of ~ 1/3 the wire diameter to avoid compromising the tensile strength of the wire.

(2) Long-handled Dehooker for External Hooks. Some long-handled dehookers are designed for use on externally hooked sea turtles that cannot be boated. The long-handled dehooker for internal hooks will also satisfy this purpose.

Minimum design standards are as follows:

(a) ***Design Standards:***

(i) *Hook removal device.* The dehooker should be constructed of ~ 3/16" – 5/16" marine grade stainless steel (316L) rod if constructing a wire style dehooker (e.g., the ARC and J-style dehookers). When constructing other styles (e.g., NOAA/Bergmann and Roby

dehookers), marine grade stainless steel (316L) should be used for all components. The design should be such that the hook can be rotated out without pulling it out at an angle. The dehooking end should be blunt with all edges rounded (it is critical that there are no sharp edges) and the outside diameter should be no greater than 1 7/8"; a smaller diameter end may be more appropriate in fisheries which often encounter small turtles or use small hooks. The device must be of a size appropriate to secure the range of hook sizes and styles observed to date in the applicable fishery (e.g., 16/0 – 20/0 circle hooks in the Atlantic pelagic longline swordfish and tuna fisheries would require use of 5/16" wire and an outside diameter of 1 7/8");

(ii) *Extended reach handle.* The hook removal device must be securely fastened to an extended reach handle or pole. Check applicable regulations for required minimum handle length (e.g., the U.S. Highly Migratory Species Pelagic Longline Fisheries require a minimum length equal to or greater than 150% of the freeboard or a minimum of 6', whichever is greater. Freeboard is defined for these purposes (other definitions exist) as the working distance between the top rail of the gunwale to the water's surface and will vary based on the vessel design).

(b) ***Example Model(s) Meeting Current Design Standards:***

(i) *ARC Pole Big Game Dehooker Models BP04, BP08, BP11, P610 and BPIN (Plate B-5).* These devices are constructed of a 5/16" 316 L stainless steel rod curled into a pigtail spiral loop end with no exposed terminal point, and they are recommended for hook sizes 6/0 to 20/0. The rod is 7" from point of attachment to the end of the loop, and includes a 5.3° angle offset to create a 1/8" gap between rod and loop to facilitate line engagement. The loop is designed at a 12.2° angle bend from the rod and has an inside diameter of 1 1/4" and an outside diameter of 1 7/8". Some models are manufactured with a three-part anodized aluminum pole that breaks down into 4' sections for storage. The 9" insert model (*BPIN*) must be attached to an extended reach handle;

(ii) *Long-handled J-Style Dehooker or "Flip Stick" [e.g., ARC Model LJ6P (Plate B-6)]*. The dehooker should be constructed of ~ 3/16" – 5/16" diameter marine grade stainless steel (316L) rod ≥ 48" in length with a 1" dehooking end at a 45° angle to the rod forming a "J" shape;

(iii) *Long-handled Roby Dehooker (Plate B-7).* This device has a 3 3/4" long cylinder (1 5/8" outside diameter) with four ~ 1/8" notches at 90° angles on the edge and a ~ 1/8" diagonal slit to capture the line across the length of the cylinder. To attach the working end to a long handle, two pieces of 1/4" x 1" x 3" flat bar one at upper end and one at the midrange of the central rod can be welded and formed around long handled pole and securely fastened using a through bolt.

Long-handled Device to Pull an "Inverted V" during Disentanglement

The primary use for this tool is to pull a "V" when implementing the "Inverted V" dehooking technique for disentangling and dehooking entangled sea turtles. Minimum design standards are as follows:

(1) ***Design Standards:***

(i) *Hook end.* The device, such as a boat hook, gaff, or long-handled J-Style dehooker should be constructed of stainless steel or aluminum. The semicircular or "J" shaped end must be securely attached to a handle. A sharp point, such as a gaff hook, is only to be used in holding the monofilament line and should never contact the sea turtle;

(ii) *Extended reach handle.* The device must be securely fastened to an extended reach handle or pole. Check applicable regulations for required minimum handle length (e.g., the U.S. Highly Migratory Species Pelagic Longline Fisheries require a minimum length equal to or greater than 150% of the freeboard or a minimum of 6', whichever is greater. Freeboard is defined for these purposes (other definitions exist) as the working distance between the top rail of the gunwale to the water's surface and will vary based on the vessel design).

(2) ***Example Model(s) Meeting Current Design Standards:***

(i) *Any long-handled J-Style Dehooker or "Flip Stick" [e.g., ARC Model LJ6P (Plate B-6)]* See Page A2-6 above for a description;

(ii) *Any standard boat hook (e.g., Davis Telescoping Boat Hook to 96" Model 85002A;*

(iii) *Any standard fishing gaff [e.g., West Marine # F6H5 Hook and # F6-006 Handle].*

Chapter A3 Boating and Holding Sea Turtles

Whenever possible, sea turtles must be brought on board immediately and handled in accordance with the procedures outlines in the standards for the handling of incidentally caught sea turtles [50 CFR 223.206 (d)(1)], unless extreme sea conditions prevent the crew from safely boating the turtle. Generally, all turtles < 3' straight carapace length should be boated. Vessels should maintain and utilize the following equipment and release the turtle with minimal injury:

Boating the Turtle

(1) Dip Net. A dip net facilitates the safe handling of sea turtles by allowing them to be brought onboard for gear removal without causing further injury to the animal. The turtle should never be brought onboard without a net or hoist. Using the involved gear to raise the turtle may result in serious injury and impact post-release survivorship, especially in cases where the turtle has ingested the hook. NMFS has established minimum design standards for the dip nets (65 FR 16347, March 28, 2000 and 66 FR 17370, March 30, 2001). These minimum design standards for dip nets are as follows:

(a) ***Design Standards:***

(i) *Size of dip net*. The dip net must have a sturdy net hoop of at least 31" inside diameter and a bag depth of at least 38" to accommodate turtles less than 3' carapace length. The bag mesh openings may not exceed 3" x 3" (bar measure). There should be no sharp edges or burrs on the hoop or where it is attached to the handle. There is no requirement for the hoop to be circular as long as it meets the minimum specifications;

(ii) *Extended reach handle.* The dip net hoop must be securely fastened to an extended reach handle or pole. Check applicable regulations for required minimum handle length (e.g., the U.S. Highly Migratory Species Pelagic Longline Fisheries require a minimum length equal to or greater than 150% of the freeboard or a minimum of 6', whichever is greater. Freeboard is defined for these purposes (other definitions exist) as the working distance between the top rail of the gunwale to the water's surface and will vary based on the vessel design). For flexibility of configuration during use and for storage purposes, it is recommended that the handle break down into sections, although this is not a requirement. There is no restriction on the type of material used to construct this handle, as long as it is sturdy enough to support a minimum of 100 lbs without bending or breaking, and facilitates the sturdy attachment of the net hoop.

(b) ***Example Model(s) Meeting Current Design Standards:***

(i) *ARC 12' Breakdown Lightweight Dip Net Model DN6P (6'), DN08 (8') or DN14 (12') or ARC Net Assembly (hoop, net, coupling-DNIN) and handle (Plate B-8).* This dip net is constructed of a hollow heavy duty aluminum tubing to form a 97" circumference hexagonal frame, and the 38" bag is 2 1/2" square nylon mesh;

(ii) *Lindgren-Pitman, Inc. Model NMFS-Turtle Net.* This dip net is constructed of heavy duty stainless steel tubing to form a 31" diameter circular frame with a 45" bag of 2" square nylon mesh;

(iii) *Bluewater Tackle.* This lightweight dip net is constructed of a composite material frame and handle with a bag of 3" stretch mesh;

(iv) *Howell Tackle.* This lightweight dip net is constructed of a composite material frame and handle with a bag of 3" stretch mesh.

(2) Turtle Hoist. A hoist is recommended to bring turtles onboard that cannot be boated using a smaller dip net, or where storage constraints do not allow for an extended reach handle. Minimum design standards are as follows:

(a) ***Large Turtle Hoist.*** This style is recommended for boating large turtles, such as leatherbacks, which need a supportive platform while onboard.

(1) ***Design Standards:***

(i) *General*. The hoist should be designed so that when onboard, the turtle is suspended above the deck on a platform of mesh netting supported by a rigid ring, and contained within a webbing fence a minimum of 18" high. The top two rings (1 3/4" 50 series aluminum round bar) should be ~ 7'6" in diameter, and the bottom ring (1 1/2" 50 series aluminum round bar) should be ~ 4' in diameter. The middle and bottom rings are connected using 12 angled (~ 25") spoke braces of ~ 23" (1" 50 series aluminum round bar or 6061 T6 1" Schedule 40 pipe) welded in place with an appropriate welding wire (5052, 6061 or 3003 wire). Knotless polypropylene 8 mm 600 ply netting, 6.5" stretch is stretched across the middle ring. The fence is supported by the top and middle rings, which are connected by a 3 mm, 4.7" stretch mesh braided polyethylene webbing to create a fence a minimum of 18" high, wrapped along the top ring with 1/2" polypropylene rope. 8" x 2 1/2" rubber cookies (4 per each of 12 sections) can be used on the middle ring to facilitate rolling the hoist up the side of the vessel and to cushion impact of hoist against the side of the vessel. In rough seas, a vang is necessary to hold the hoist close to side of vessel. A three or four point bridle is attached to the top ring using pairlinks and 3/4" nylon 3-strand line, and a hydraulic lift is used to bring hoist aboard. The hoist should be capable of lifting a minimum of 1/2 ton.

(2) ***Example Model(s) Meeting Current Design Standards:***

(i) *Large Turtle Hoist (Plate B-9).* This hoist (designed, in part, and constructed by Blue Water Fishing Tackle Co., Inc., D.N. Kelley Shipyard, Diversified Marine LLC, Eagle Eye II Corporation, Polar Packaging, Inc., Reidar's Manufacturing, Inc., *F/V Sea Hawk*, and Scandia, Inc.) was designed to bring leatherbacks onboard following the above specifications. Modifications to the

vessel will likely be necessary to install the hoist, including: a platform to house the lift, alterations to the boom including strongback, pivoting gooseneck, hydraulic ram attachment and reinforcement, hydraulic ram, hydraulic runs, or a duel winch arrangement, and for safe lifting, a 2200 PSI planetary hydraulic winch with hydraulic runs, control and rigging (SS wire and blocks).

(b) ***Small Turtle Hoist.*** In some cases, such as on a vessel with a high freeboard distance or if there is not enough room for storing a dip net, an extended reach handle may be impractical, even with small turtles. A supportive frame with mesh netting, but without an extended reach handle, may be best in these circumstances.

(1) ***Design Standards:***

(i) *General*. The frame should be rigid and capable of supporting at least 100 pounds, with a minimum diameter of 31" to accommodate turtles less than 3' carapace length. This frame can be hinged or otherwise designed so that it can be folded for ease of storage as long as it can be quickly reassembled. If the frame is designed to fold or break down for storage, the hardware must be self contained (e.g., barrel bolts on both sides to lock down frame with no loose pieces like through bolts and nuts), and there must be no sharp edges. The shape of the frame does not matter (e.g., round, square, rectangular, or a "U-shaped" or "J-shaped" basket) as long as it meets the required specifications and securely contains the turtle. The frame may be constructed of heavy duty stainless steel tubing welded into shape or ~ 2" PVC pipe connected at the corners using 90° elbow fittings. PVC pipes should be drilled to facilitate water drainage for ease of hauling. A shallow bag net with mesh openings not to exceed 3" x 3" (bar measure) should be securely affixed to the frame, and lines (e.g., polypropylene, nylon, polyester) should be securely attached to each corner to control and retrieve the frame and net. The lines can be operated using a pulley system if available on the vessel. No extended reach handle is needed on this type of net.

(2) ***Example Model(s) Meeting Current Design Standards:***

(i) *Small Turtle Hoist (Plate B-10)*. This is a frame net without a handle, with a square, rectangular or round stainless steel or PVC frame with a mesh bag securely affixed and lines attached to the corners or at least three points around a circle to bring turtles onboard.

Holding the Turtle

(1) Cushion/support Device.

(a) ***Design Standards:***

(i) The device should effectively cushion and support the animal while it is onboard. It should be appropriately sized to fully support a range of turtle sizes.

(b) ***Example Model(s) Meeting Current Design Standards:***

(i) *A standard automobile tire*. A standard (not from a truck or heavy equipment) passenger vehicle tire not mounted on a rim, free of exposed steel belts, is effective for supporting the turtle while it is onboard. If the turtle is too large for the tire, it must be contained and supported on an alternative cushioned surface. An assortment of sizes is recommended to accommodate a range of turtle sizes.

(ii) *Boat cushion.* A standard boat cushion will effectively support smaller turtles.

(iii) *Large turtle hoist.* This style is recommended for supporting large turtles, such as leatherbacks, which need a supportive platform while onboard.

Chapter A4 Equipment for Opening the Mouth of Boated Turtles

Opening the Mouth

In many cases, a mouth opener or gag must be used in order to remove internal hooks from boated turtles. It must be designed to allow access to the hook or line without causing further injury to the turtle. It is recommended that at least one type allow for hands-free operation of the gear removal devices once the gag is in place (only the canine mouth gag satisfies this recommendation, see item (2) below). Design standards are included in the item description. A minimum of two of the seven different types/categories of mouth openers/gags from the following list will offer the necessary flexibility:

Mouth Openers and/or Mouth Gags

(1) Set of Two Rope Loops Covered with Protective Tubing. A set consists of two pieces of poly braid rope covered with light duty garden hose or similar flexible tubing each tied or spliced into a loop to provide a one-handed method for keeping the mouth open. The upper loop gives the user control using one hand, and the second rope/hose length is secured on lower beak using the user's foot for extra control. This keeps the mouth open to allow access to the hook and/or line. Two 36" lengths of poly-braid rope (3/8" diameter suggested) should be covered with an 8" section of 1/2" or 3/4" tubing and each tied or spliced into two loops. Any set of rope loops covered with tubing meeting these specifications is acceptable;

(2) Large Avian Oral Speculum. An avian oral speculum gives you the ability to hold the mouth open and control the head with one hand while removing the hook with the other hand. This tool is for use only on small turtles, as larger turtles may be able to crush the speculum. The avian oral speculum should be 9" long, and constructed of 3/16" wire diameter surgical stainless steel (Type 304). It should be covered with 8" of clear vinyl tubing (5/16" outside diameter, 3/16" inside diameter), friction tape (e.g., 3M™ Temflex™ 1755 Cotton Friction Tape) or similar to pad the surface. Example models meeting these specifications include: Model # 85408 from Webster Vet Supply; VSP # 216-08 from Veterinary Specialty Products; Jorvet Model J-51z; and Krusse Model 273117. These can be purchased through veterinary supply businesses;

(3) Block of Hard Wood. A smooth block of hard wood is an inexpensive, effective and practical mouth-gagging device that meets these requirements and is readily available on most vessels. Placed in the corner of the jaw, it is used to gag open the mouth. The wood should be of a type that does not splinter (e.g., maple) with rounded edges, and it should be sanded smooth, if necessary, and soaked in water to soften the wood. The dimensions should be approximately 11" x 1" x 1" or appropriately sized for the size of turtles that might be caught. Any block of hard wood meeting these specifications is acceptable. A long-handled, wire brush with a maple wooden handle and the wires removed is an inexpensive, effective and practical device that meets these requirements (e.g., *Olympia Tools Long-Handled Wire Brush and Scraper #974174).*

A wooden hammer handle may be suitable, providing it is made from wood which does not splinter under pressure (e.g. ash, maple);

(4) Set of Three Canine Mouth Gags. The use of canine mouth gags is highly recommended to hold the mouth open, as the gag locks into the open position and allows for hands free operation once it is in place. These tools are for use only on small and medium sized turtles, as larger turtles may be able to crush the mouth gag. A set of canine mouth gags should include one of each of the following sizes: small (~ 5"), medium (~ 6"), and large (~ 7"). They must be constructed of stainless steel. The ends should be covered with clear vinyl tubing, friction tape (e.g., 3M™ Temflex™ 1755 Cotton Friction Tape) or similar to pad the surface. A set includes one of each size and can be purchased through veterinary supply businesses. An example set meeting these specifications is *Jorvet Model #4160, 4162, and 4164*;

(5) Set of Two Sturdy Dog Chew Bones. These "chew toys" are inexpensive, easy to handle, and sold in several sizes in pet stores. Placed in the corner of the jaw, it is used to gag open the mouth. They should be designed of durable nylon or thermoplastic polymer, strong enough to withstand biting without splintering. One large (e.g., "Giant" 8" or "Wolf" 5 1/2") and one small (e.g., "Regular" 4 1/2" or "Petite" 3 1/2") will accommodate a variety of beak sizes. Example models meeting current specifications include: Nylabone® (a trademark owned by T.F.H. Publications, Inc.); Gumabone® (a trademark owned by T.F.H. Publications, Inc.); and Galileo® dog chew (a trademark owned by T.F.H. Publications, Inc.);

(6) Hank of Rope. A lanyard of braided rope (e.g., nylon, polypropylene, polyester) can be folded to create a hank of rope. Placed in the corner of the jaw, it is used to gag open the mouth. A 6' lanyard of approximately 3/16" braided nylon rope can be folded to create a hank of rope. Any size soft braided nylon rope is acceptable, provided it creates a hank of approximately 2 - 4" thickness;

(7) Set of Four PVC Couplings. Inexpensive PVC couplings can be positioned inside the mouth to allow access to the back of the mouth. They should be held in place with the needle-nose pliers. Standard Schedule 40 PVC couplings in a variety of sizes (1", 1 1/4", 1 1/2", and 2") will ensure proper fit and access. A set includes all four sizes.

Chapter A5 Equipment for Removing Gear from Boated Turtles

Assess what the best hook removal technique is in each circumstance. Depending on the position and depth of the hook, needle-nose pliers and/or bolt cutters may be the most efficient way to remove hooks. If required, dehooking devices may be used to remove external or internal hooks (if the insertion point of the hook can be seen). All short-handled dehooking tools for removing internal hooks should have a bite block to protect the turtle's beak. They should also be designed to allow a twisting motion, which is necessary for circle hook removal. The NOAA/Bergmann dehooker is approved for removing external circle or J-hooks, and internal circle hooks from turtles boated. It should not be used to remove internal J-hooks from turtles boated.

Needle-nose or Long-nose Pliers

Long-nose or needle-nose pliers can be used to assist in removal of hooks that are embedded in the animal's flesh and must be twisted during removal, or for removing hooks from the front of the mouth. They are also useful in holding PVC splice couplings in place when used as mouth openers. Minimum design standards are as follows:

(1) ***Design Standards:***

(i) *General.* They should be ~ 12" in length. It is recommended that these be of stainless steel material.

(2) ***Example Model(s) Meeting Current Design Standards:***

(i) *Any 12" long-nose or needle-nose pliers* [*e.g., 12" S.S. NuMark Model #030 281 109 871, Offshore Angler® Stainless Longreach Pliers Model #38-481-759-00, Pittsburgh® 15" Long Nose Locking Pliers]*.

Bolt Cutters

Bolt cutters are essential for removing hooks, and must be of a size practical to be used inside the turtle's mouth. They are used to cut off the eye or barb so that the hook can be pushed through easily without causing further injury to the sea turtle. They also are used to cut off as much of the hook as possible when the remainder cannot be removed. Minimum design standards are as follows:

(1) ***Design Standards:***

(i) *General*. They should be ~ 14 – 17" in total length, ~ 4" long blades that are ~ 2 1/4" wide (closed) with ~ 10 – 13" long handles. They must be able to cut hard metals such as stainless or carbon steel hooks up to 1/4" diameter.

(2) ***Example Model(s) Meeting Current Design Standards:***

(i) *Any bolt cutters meeting design standards [e.g., H.K. Porter Model 1490 AC].*

Equipment to Remove Line

(1) Monofilament Cutter. Monofilament cutters should be used to remove line as close as possible to the eye of the hook in the event that the hook was swallowed, or when the hook cannot be removed. This reduces the amount of gear retained by the animal in the event that the hook cannot safely be removed. Minimum design standards are as follows:

(a) ***Design Standards:***

(i) *General*. These should be ~ 7 1/2" in length with ~1 3/4" long, 5/8" wide (closed) blades.

(b) ***Example Model(s) Meeting Current Design Standards:***

(i) *Any monofilament cutters meeting design standards [e.g., Jinkai Model MC-T]*

Short-handled Dehooker for Internal Hooks

This dehooker is designed to remove internal hooks from boated sea turtles, including hooks in the front of the mouth, as well as external hooks. Minimum design standards are as follows:

(1) Design Standards:

(i) *Hook removal device.* The dehooker should be constructed of ~ 3/16" – 5/16" marine grade stainless steel (316L) rod if constructing a wire style dehooker (e.g., ARC dehooker). When constructing other styles (e.g., NOAA/Bergmann dehooker), marine grade stainless steel (316L) should be used for all components. The end must allow the hook to be secured and the barb to be shielded without re-engaging during the removal process. It must be no larger than 1 7/8" total width; a smaller diameter end may be more appropriate in fisheries which often encounter small turtles or use small hooks. It cannot have any unprotected terminal points as this could cause injury to the esophagus during hook removal (it is critical that there are no sharp edges). A sliding PVC bite block should be used to protect the beak and facilitate hook removal if the turtle bites down on the dehooking device. The bite block should be constructed of a 3/4" or smaller inside diameter high impact plastic cylinder (e.g., Schedule 80 PVC) that is 4 - 6" long to allow for at least 5" of slide along the shaft. The device must be of a size appropriate to secure the range of hook sizes and styles observed to date in the applicable fishery (e.g., 16/0 - 20/0 circle hooks in the Atlantic pelagic longline swordfish and tuna fisheries would require use of 5/16" wire and an outside diameter no greater than 1 7/8");

(ii) *Handle length*. The handle should be ≤ 47" (recommended length of 16" – 24") with a ~ 4 – 6" long tube T-handle of ~ 1" diameter, wire loop handle or similar.

(2) Example Model(s) Meeting Current Design Standards:

(i) *17" Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker Model ST08 (Plate B-11).* This device is constructed of a 1/4" 316 L stainless steel rod curled into a pigtail spiral loop end. The loop is placed at a 5.3° angle offset to create a 1/8" gap between rod and loop to facilitate line engagement. The loop is designed at a 12.2° angle bend from the rod, and an inside diameter of 13/16" and an outside diameter of 1 5/16". It has a 3/4" I.D. high impact plastic cylinder bite block 5" in length. This model may be notched according to the instructions in Chapter A2.

(ii) *The NOAA/Bergmann Dehooker (Plate B-12).* This device has two ~2 3/4"rounded prongs at the end to form a uniform gap of at least 7/32". It has a 3/4" inside diameter high impact plastic cylinder bite block 5" in length. *Note*: This dehooker is approved for removing external circle or J-hooks, and internal circle hooks from turtles boated. It **should not be used to remove internal J-hooks** from turtles boated.

Short-handled Dehooker for External Hooks. These dehookers are designed for use when the hook is external, or when hooks are located in the front of the mouth. Minimum design standards are as follows:

(1) Design Standards:

(i) Hook removal device. The dehooker should be constructed of ~ 3/16" – 5/16" marine grade stainless steel (316L) rod if constructing a wire style dehooker (e.g., the ARC, Scotty's and J-Style dehookers). When constructing other styles (e.g., NOAA/Bergmann and Roby dehookers), marine grade stainless steel (316L) should be used for all components. The design should be such that the hook can be rotated out without pulling it out at an angle, and the dehooking end should be blunt and all edges rounded (it is critical that there are no sharp edges). The device must be of a size appropriate to secure the range of hook sizes and styles observed to date in the applicable fishery (e.g., 16/0 - 20/0 circle hooks in the Atlantic pelagic longline swordfish and tuna fisheries would require use of 5/16" wire and an outside diameter of 1 7/8");

(ii) *Handle length.* The handle length should be ≤ 47" (recommended length of 16"-24"), with a ~ 5" long tube T-handle of ~ 1" diameter, wire loop handle or similar is recommended.

(2) Example Model(s) Meeting Current Design Standards:

(i) *17" Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker Model ST08 (Plate B-11).* This model may be notched according to the instructions in Chapter A2. See description on Page A5-2 above;

(ii) *NOAA/Bergmann Dehooker (Plate B-12).* See description on Page A5-2;

(iii) *Short-handled J-Style Dehooker (Plate B-6)* [e.g., ARC Hand Held Large J-Style Dehooker Model LJ07 or LJ24]. See description on Page A5-2 above;

(iv) *Scotty's Dehooker (Plate B-13).* This device has two 1 1/4" long prongs at the end to form a 3/4" wide fork. This device is approved for removing external circle or J-hooks from turtles boated. It should **not** be used to remove any internal hooks;

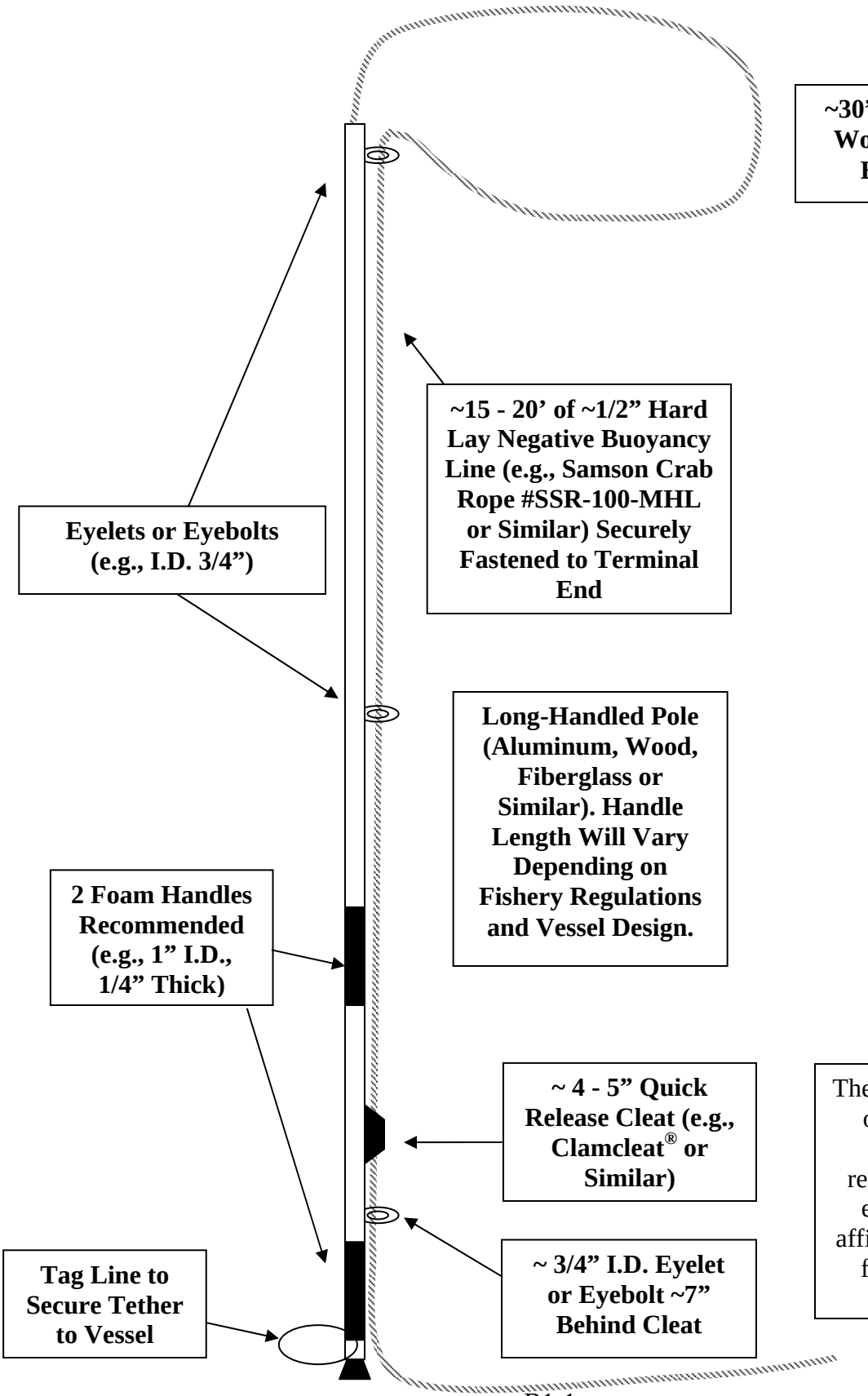
(v) *Short-handled Roby Dehooker (Plate B-14).* This device has a ~ 3 3/4" long cylinder (1 5/8" outside diameter) with four ~1/8"notches at 90° angles on the edge and a ~1/8" diagonal slit to capture the line across the length of the cylinder.

Appendix B

DESIGN SCHEMATICS FOR CAREFUL RELEASE EQUIPMENT

Plate B-1

TURTLE TETHER



The use of registered or trademarked products is by reference only; no endorsement or affiliation is implied for any of these products.

Plate B-2

T&G NINJA STICKS

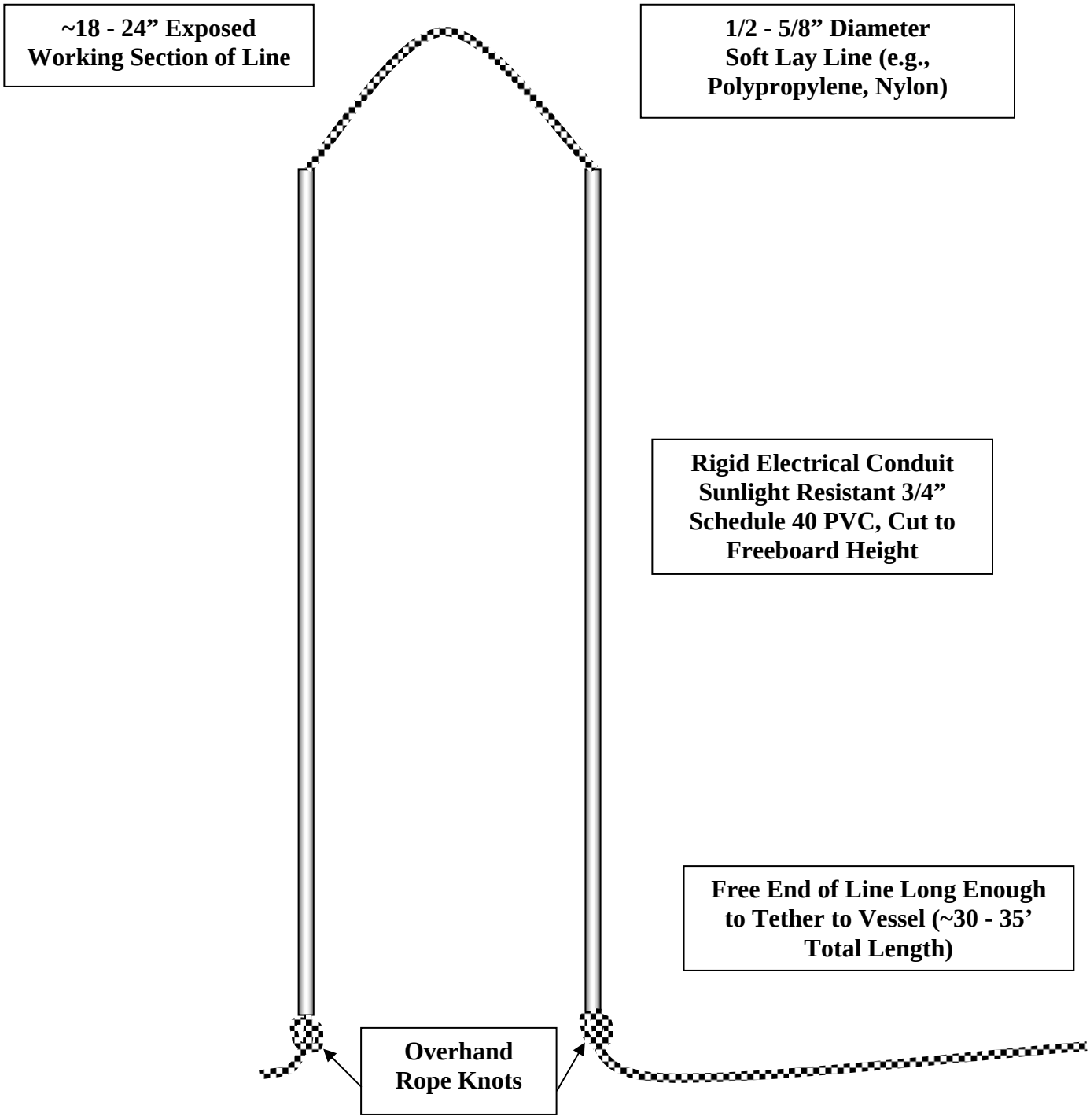
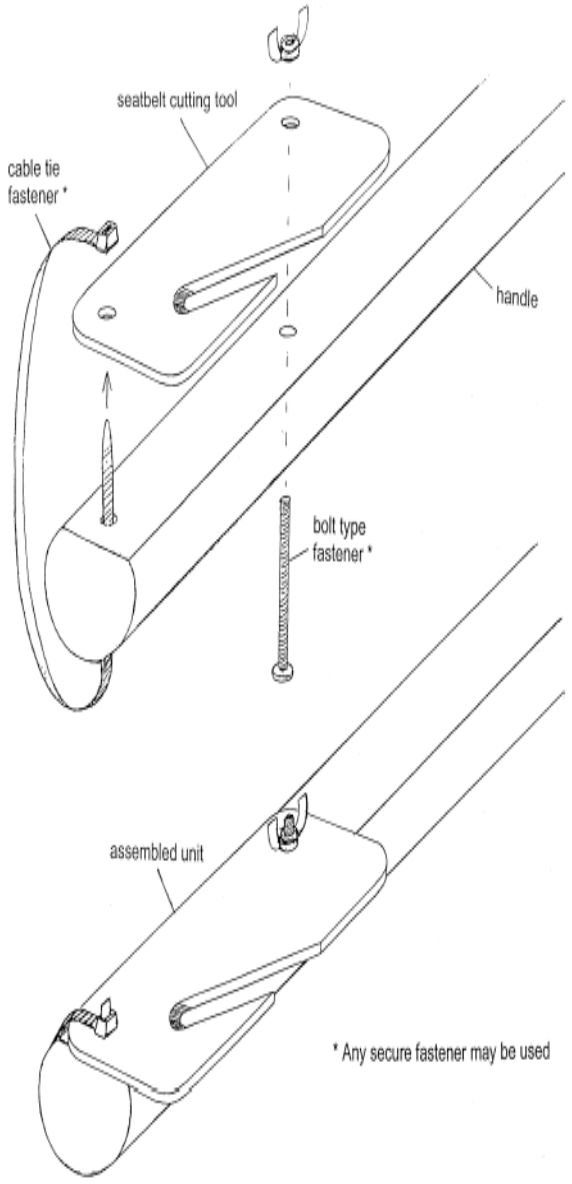


Plate B-3

NOAA/ARCENEAUX LINE CLIPPER

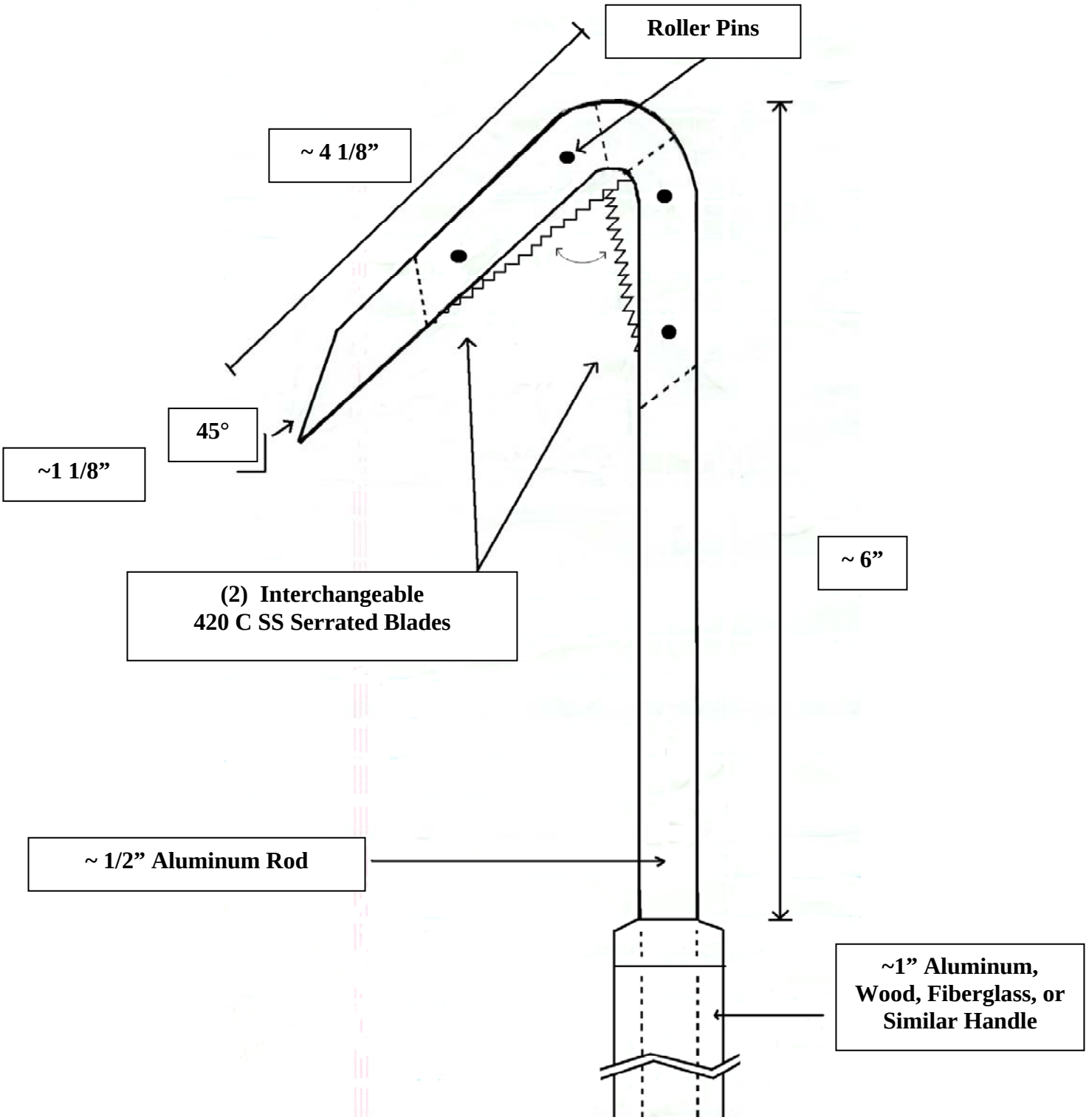


50 CFR 660.33 Ch. VI (10-1-02 Edition)

[65 FR 16347, Mar. 28, 2000, as amended at 67 FR 40236, June 12, 2002; 67 FR 48576, July 25, 2002]

Plate B-4

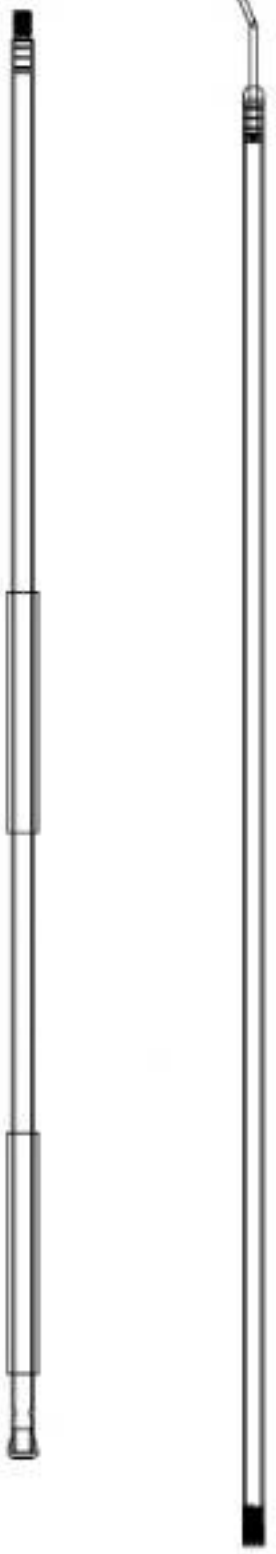
NOAA/LAFORCE LINE CUTTER



Modified Version of Diagram Provided by ARC

Plate B-5

ARC POLE BIG GAME DEHOOKER

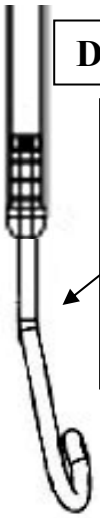


~ 3/16" - 5/16" 316L SS Rod

Total Length 4 - 12' Depending on Freeboard Height. Working End Must Be Securely Attached to Sturdy Handle (e.g., Wood, Aluminum, Fiberglass) (2 Breakdown Pole Sections Depicted Here).

2 Foam Handles (Optional) (e.g., 1" I.D., 1/4" Thick)

Detail of Working End



5.3° to 13° (Range) Offset Angle to Shield the Point of the Hook

~ 5 - 7" From Point of Insertion to End of Curl

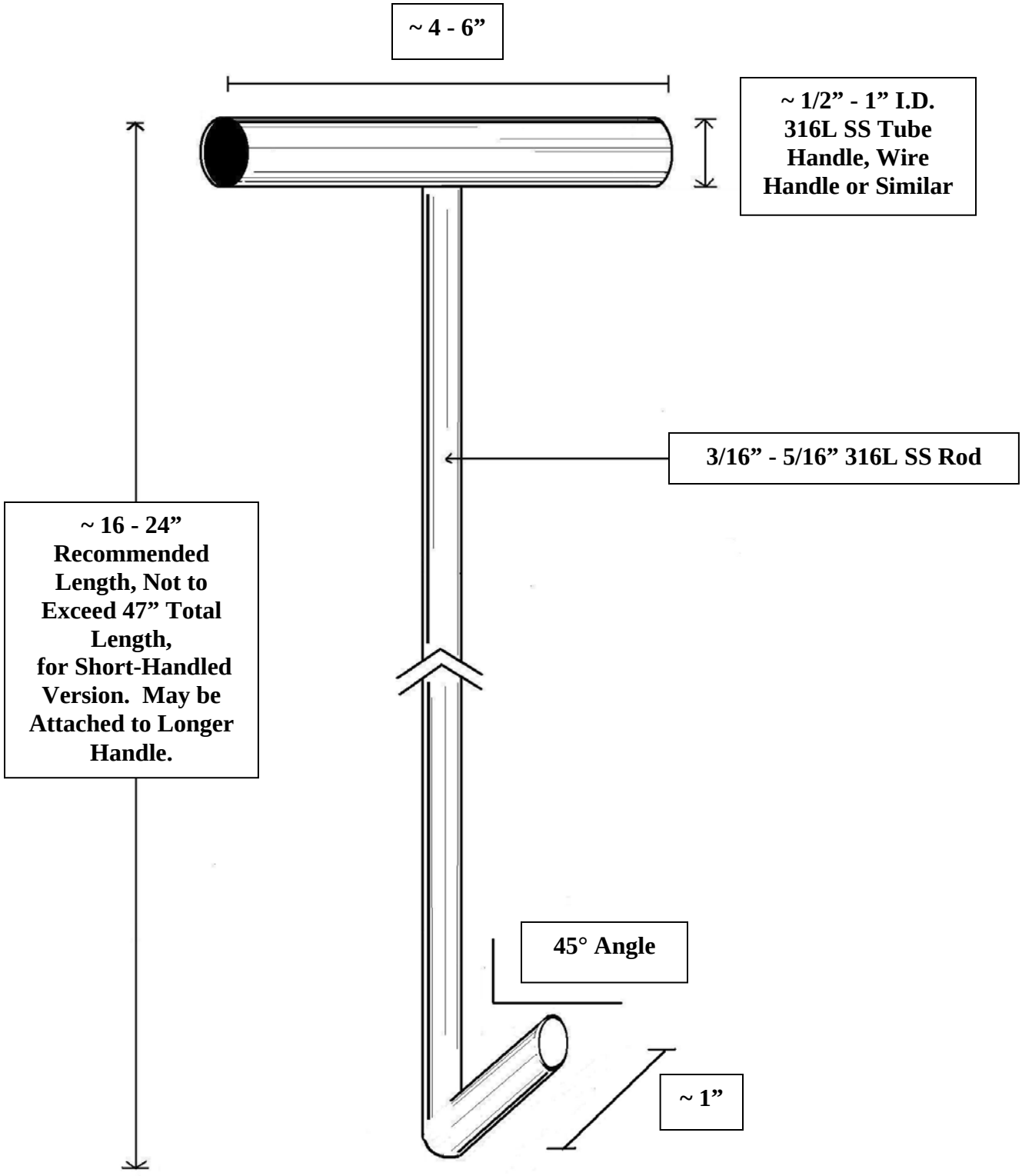
12.2° to 24° (Range) Angle Bend from the Rod to Accept a Range of Hook Sizes

Loop I.D. 1 1/4" and O.D. No Greater than 1 7/8" with ~1/8" Gap Between Rod and Loop to Facilitate Line Engagement

Modified Version of Diagram Provided by ARC
U.S. Patent # 4,914,853; U.S. Design Patent # 382,628

Plate B-6

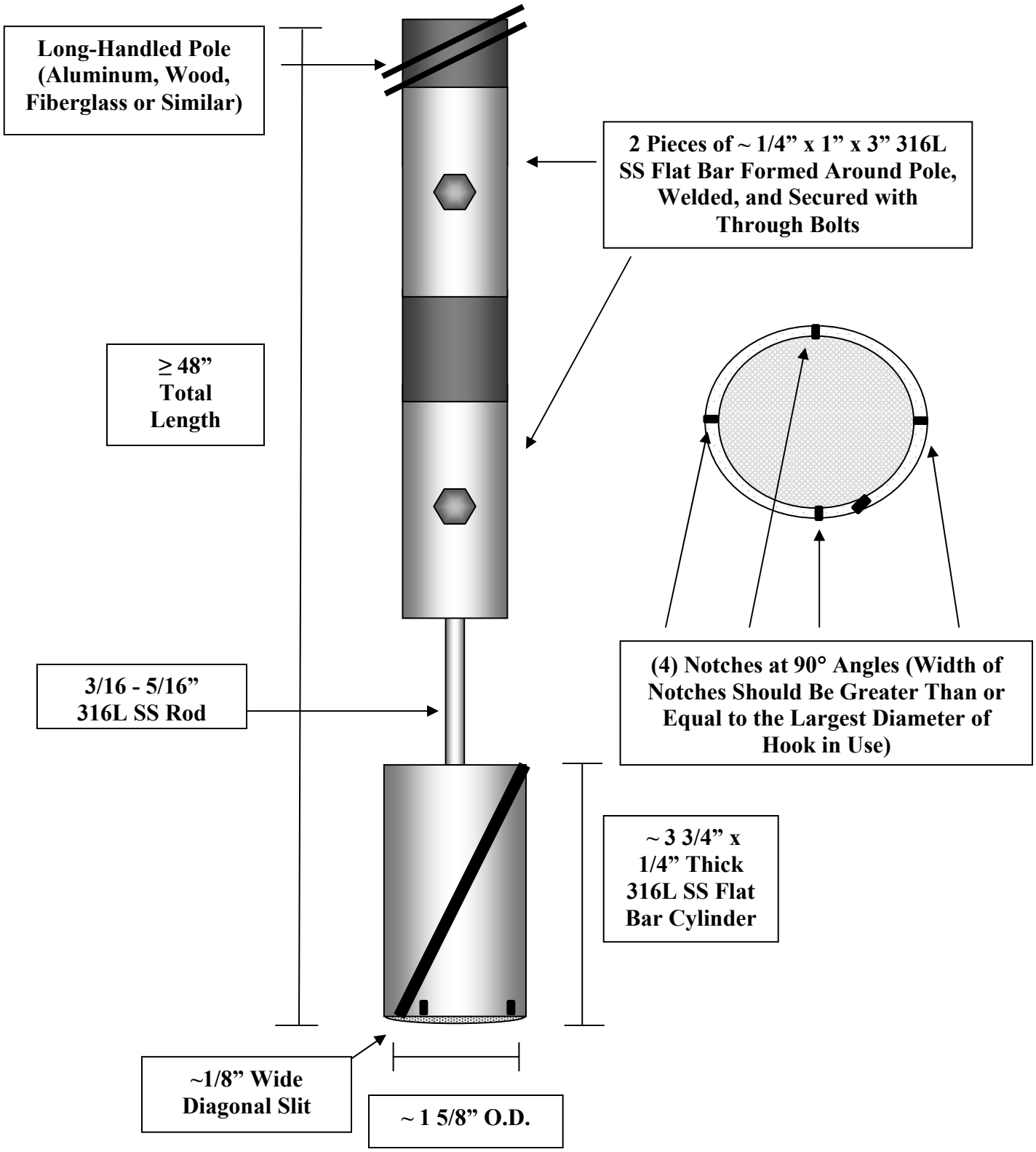
J- STYLE DEHOOKER



Modified Version of Diagram Provided by ARC

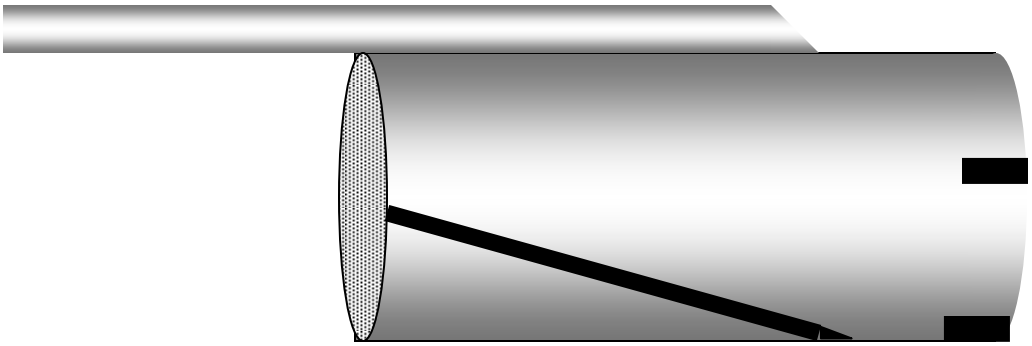
Plate B-7

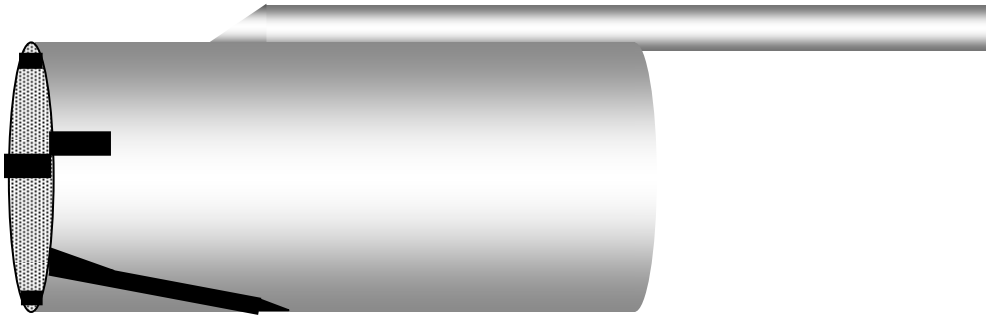
LONG-HANDLED ROBY DEHOOKER



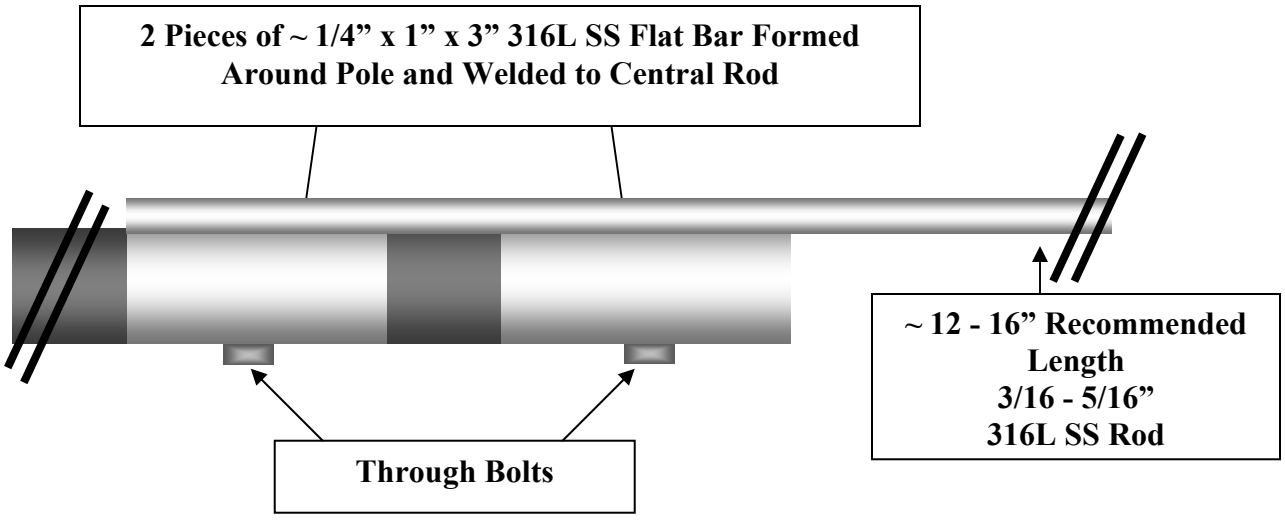
All Edges Must Be Rounded So That They Are Not Sharp

Plate B-7 Continued | **Side Views**





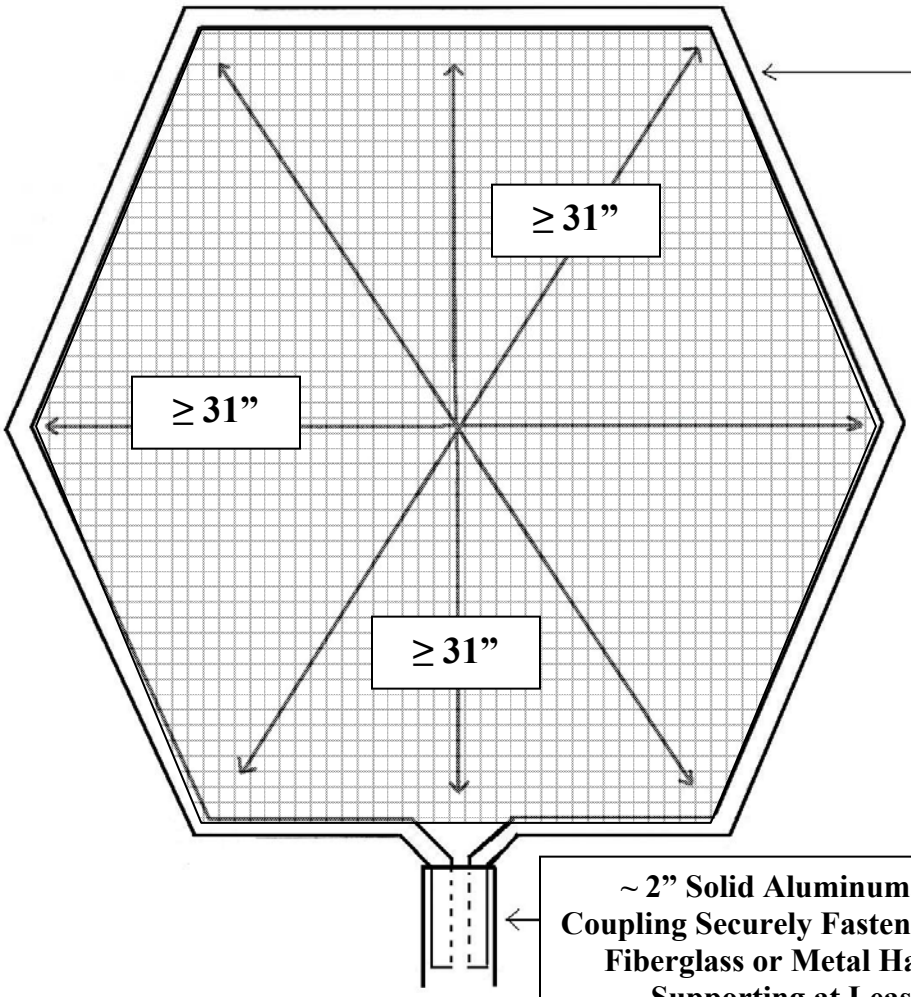
All Edges Must Be Rounded So That They Are Not Sharp



Attachment Method May Vary as Long as Working End Is Securely Attached

Plate B-8

DIP NET



~ 3/4” Heavy Duty Hollow Aluminum, Marine Grade SS Tubing, or Composite Material Frame. Hexagonal Shape Depicted Here as an Example, But Other Shapes (e.g., Round) Are Acceptable.

~ 2” Solid Aluminum, SS, or Similar Coupling Securely Fastened to Sturdy Wood, Fiberglass or Metal Handle Capable of Supporting at Least 100 Pounds

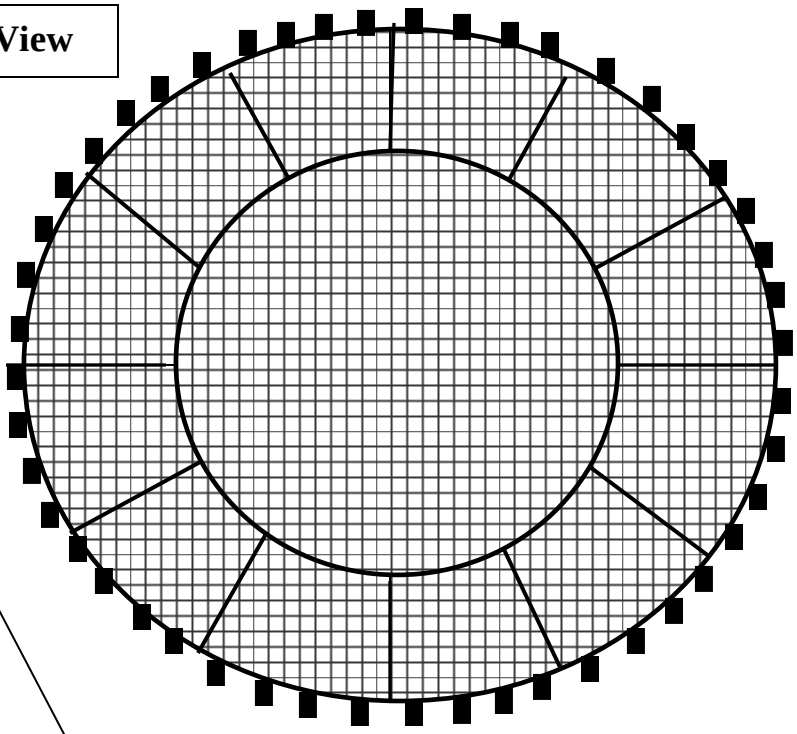
Mesh Openings Must Not Exceed 3” x 3” (Bar Measure).
Bag Depth Must Be ≥ 38”.

Modified Version of Diagram Provided by ARC

Plate B-9

LARGE TURTLE HOIST

Top View



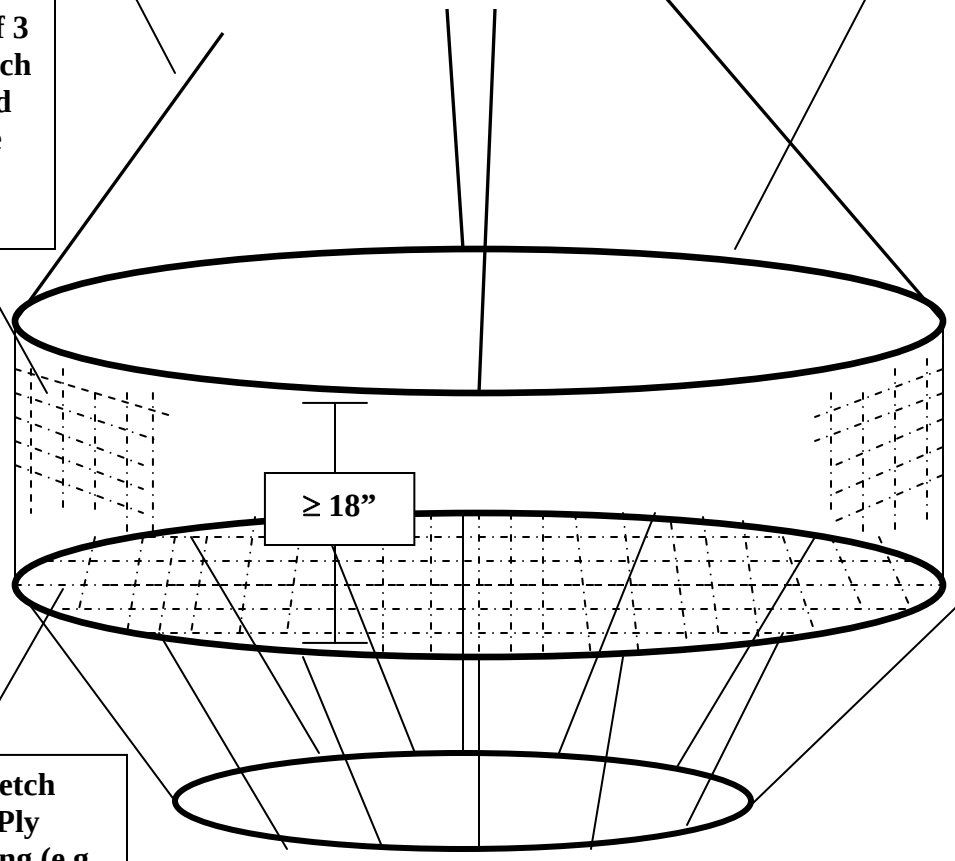
4 Round Rubber Cookies (8” x 2 1/2”) per section (48 Total) on Top

3 or 4 Point Bridle Attached with Pairlinks and 3/4” Nylon 3-Strand Line

Top/Fence Ring 7’ 6” Diameter (1 3/4” Round 50 Series Aluminum Bar Wrapped in 1/2” Polypropylene Wrap Rope)

Fence Constructed of 3 mm, 4.7” Stretch Mesh Braided Polyethylene Webbing

Middle Ring 7’ 6” Diameter (13/4” Round 50 Series Aluminum Bar) Wrapped in 1/2” Polysteel Rope Around Circumference



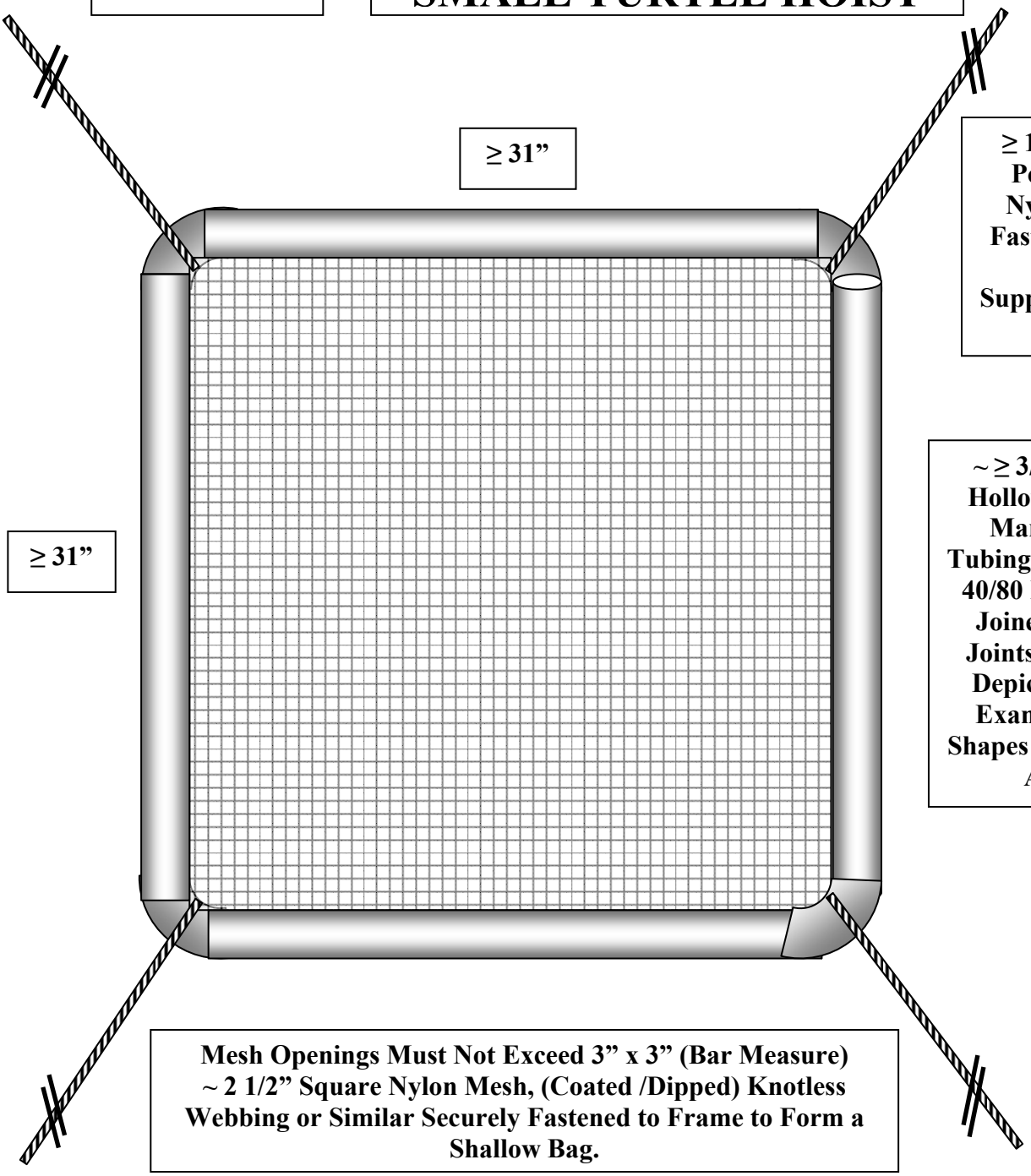
(12) Beveled Spokes ~23” (1” Round 50 Series Aluminum Bar or 6061 T6 Schedule 40 Pipe) Set at ~25°. Welded Using Appropriate Welding Wire (5052, 6061 or 3003).

8 mm, 6.5” Stretch Knotless 600 Ply Polyethylene Netting (e.g., Ultra Cross Netting by NET Systems, Inc.)

Bottom Ring 4’ Diameter (1 ½” Round 50 Series Aluminum Bar)

Plate B-10

SMALL TURTLE HOIST



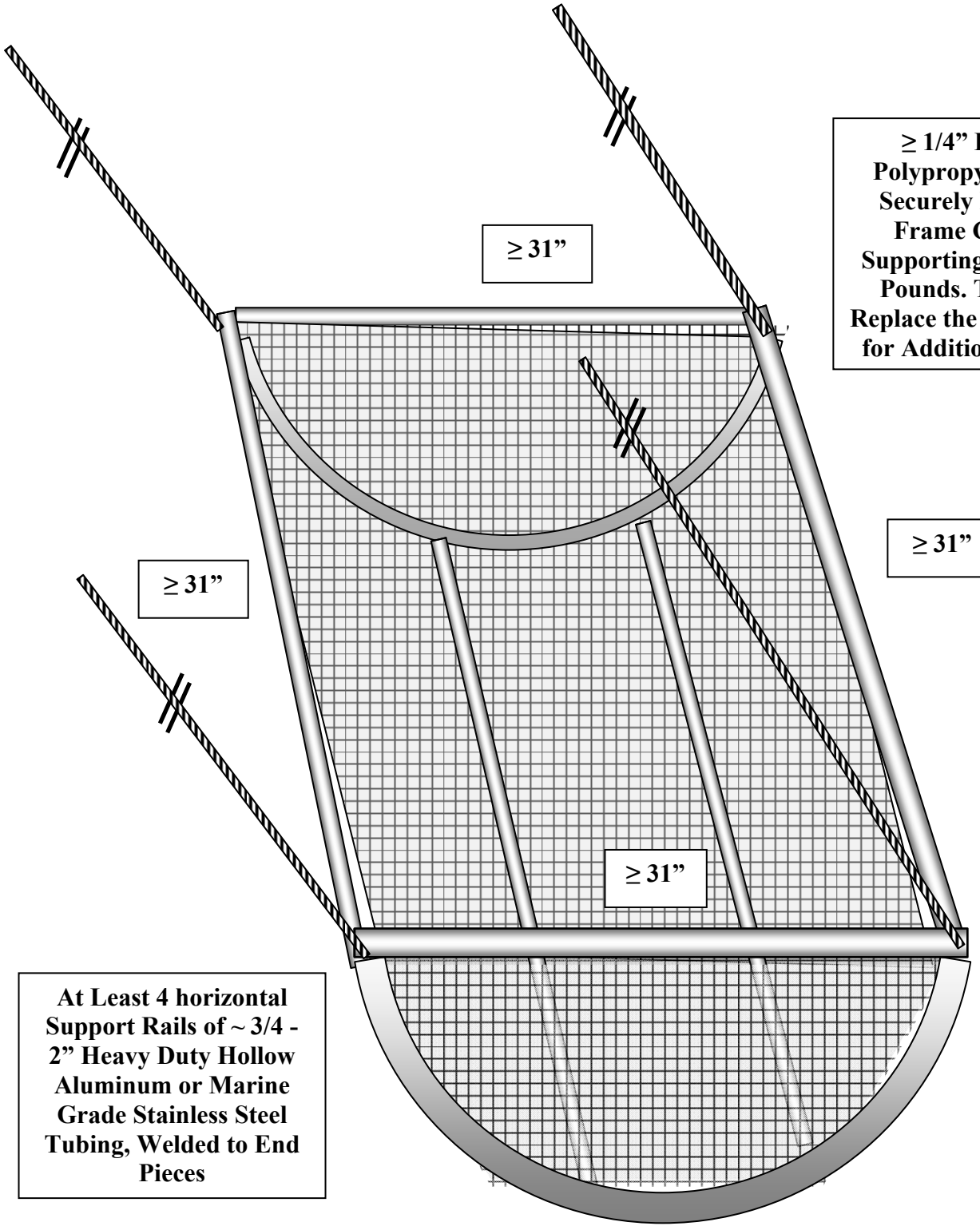
≥ 1/4" Line (e.g., Polypropylene, Nylon) Securely Fastened to Frame Capable of Supporting At Least 100 Pounds

~ ≥ 3/4" Heavy Duty Hollow Aluminum or Marine Grade SS Tubing, or ~ 2" Schedule 40/80 PVC. Welded or Joined Using Elbow Joints. Square Shape Depicted Here As an Example, but Other Shapes (e.g., Round) Are Acceptable.

Mesh Openings Must Not Exceed 3" x 3" (Bar Measure) ~ 2 1/2" Square Nylon Mesh, (Coated /Dipped) Knotless Webbing or Similar Securely Fastened to Frame to Form a Shallow Bag.

Plate B-10 Continued

BASKET STYLE SMALL TURTLE HOIST



≥ 1/4” Line (e.g., Polypropylene/Nylon) Securely Fastened to Frame Capable of Supporting at Least 100 Pounds. Tubing Can Replace the Outside Lines for Additional Stability.

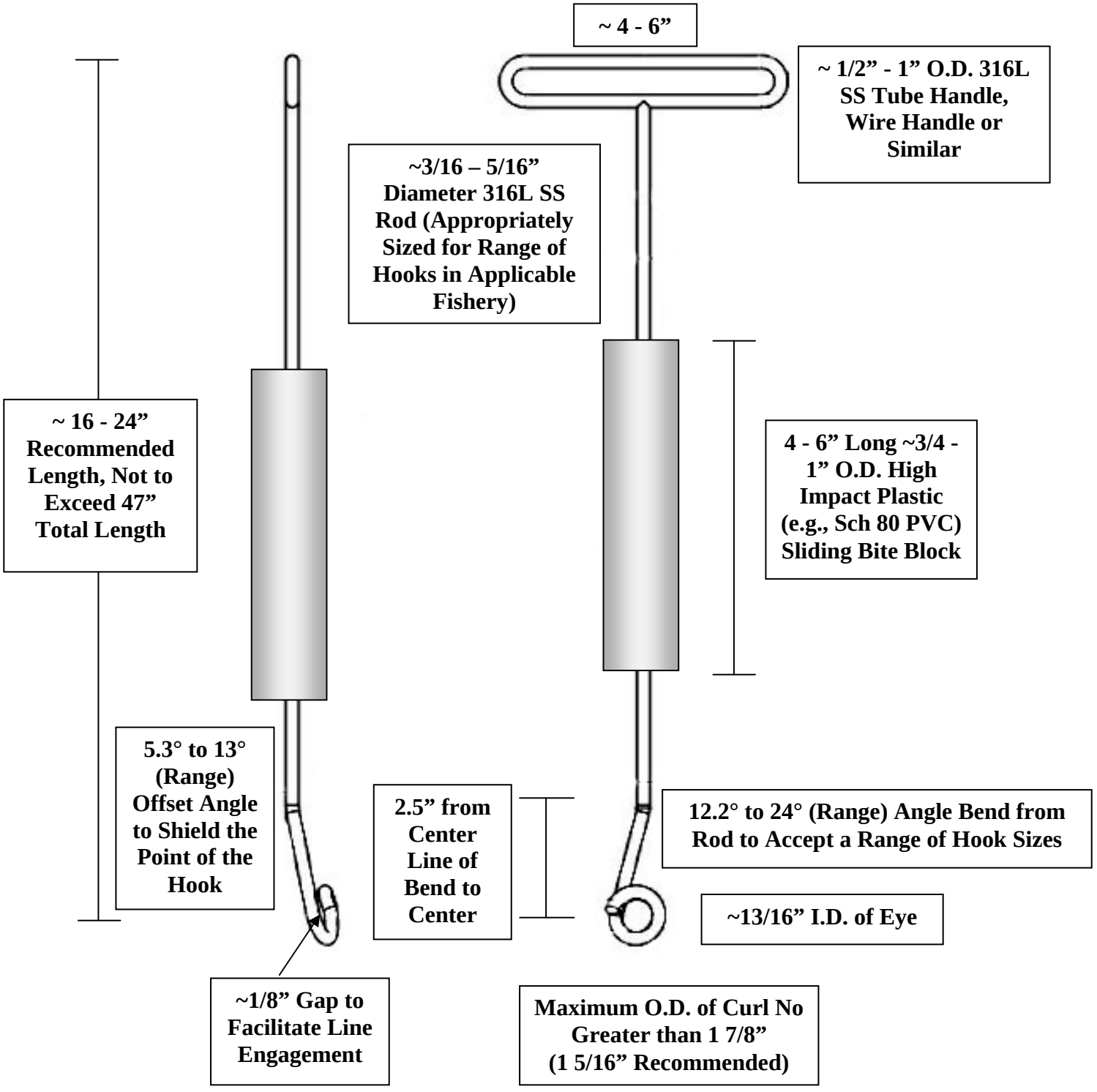
End Rails of Basket Can Be Welded or Attached Using Clips So That It Is Removable

At Least 4 horizontal Support Rails of ~ 3/4 - 2” Heavy Duty Hollow Aluminum or Marine Grade Stainless Steel Tubing, Welded to End Pieces

Recommended ~ 2 1/2” Square Nylon Mesh (Coated / Dipped) Knotless Webbing or Similar Securely Fastened to Frame to Form a Shallow Bag.

Plate B-11

ARC BITE BLOCK DEHOOKER



Modified Version of Diagram Provided by ARC
U.S. Patent # 4,914,853 and 6,840,002; U.S. Design Patent # 382,628; International Patent # WO/2005/055712

Plate B-12

NOAA/BERGMANN DEHOOKER

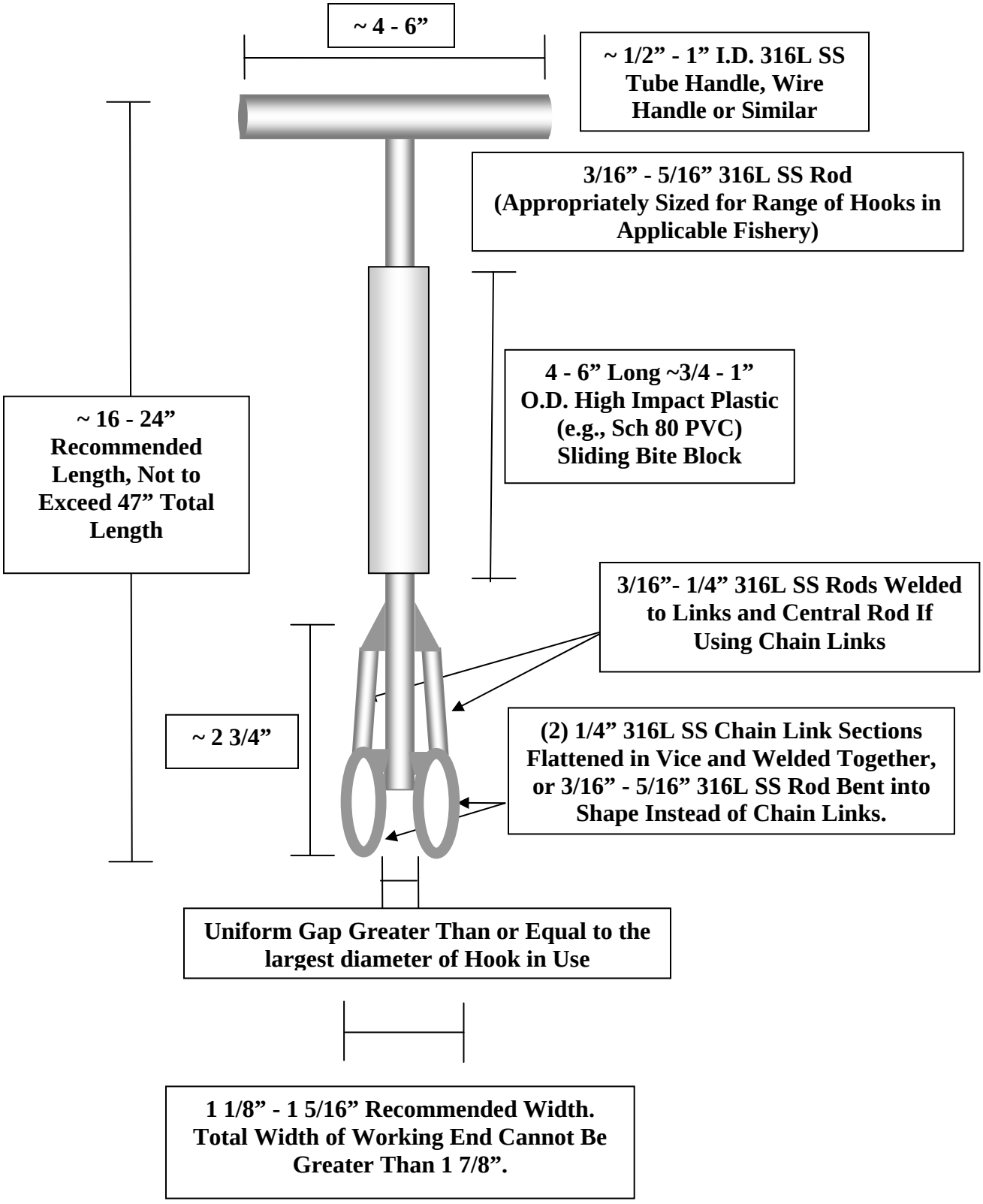
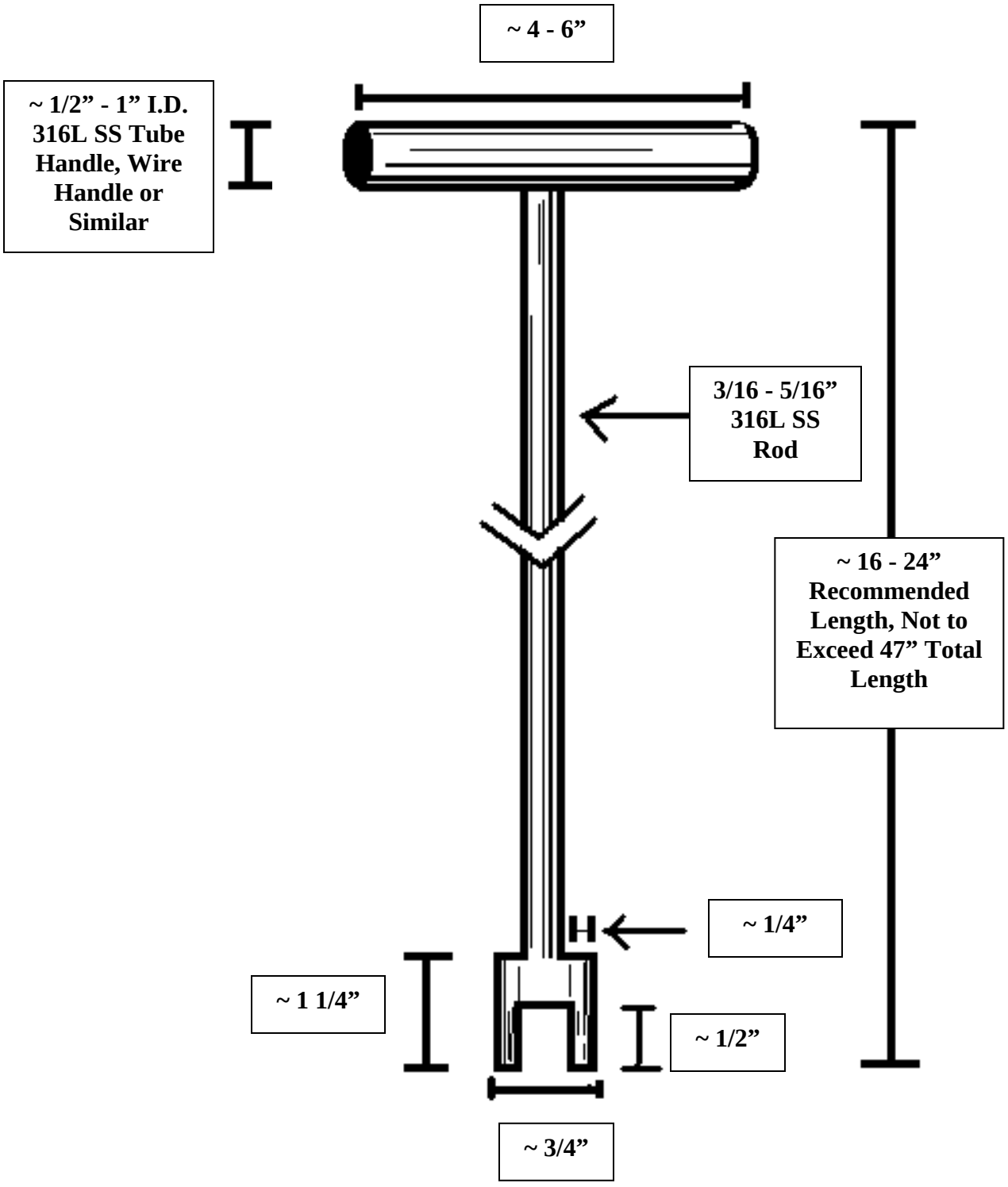


Plate B-13

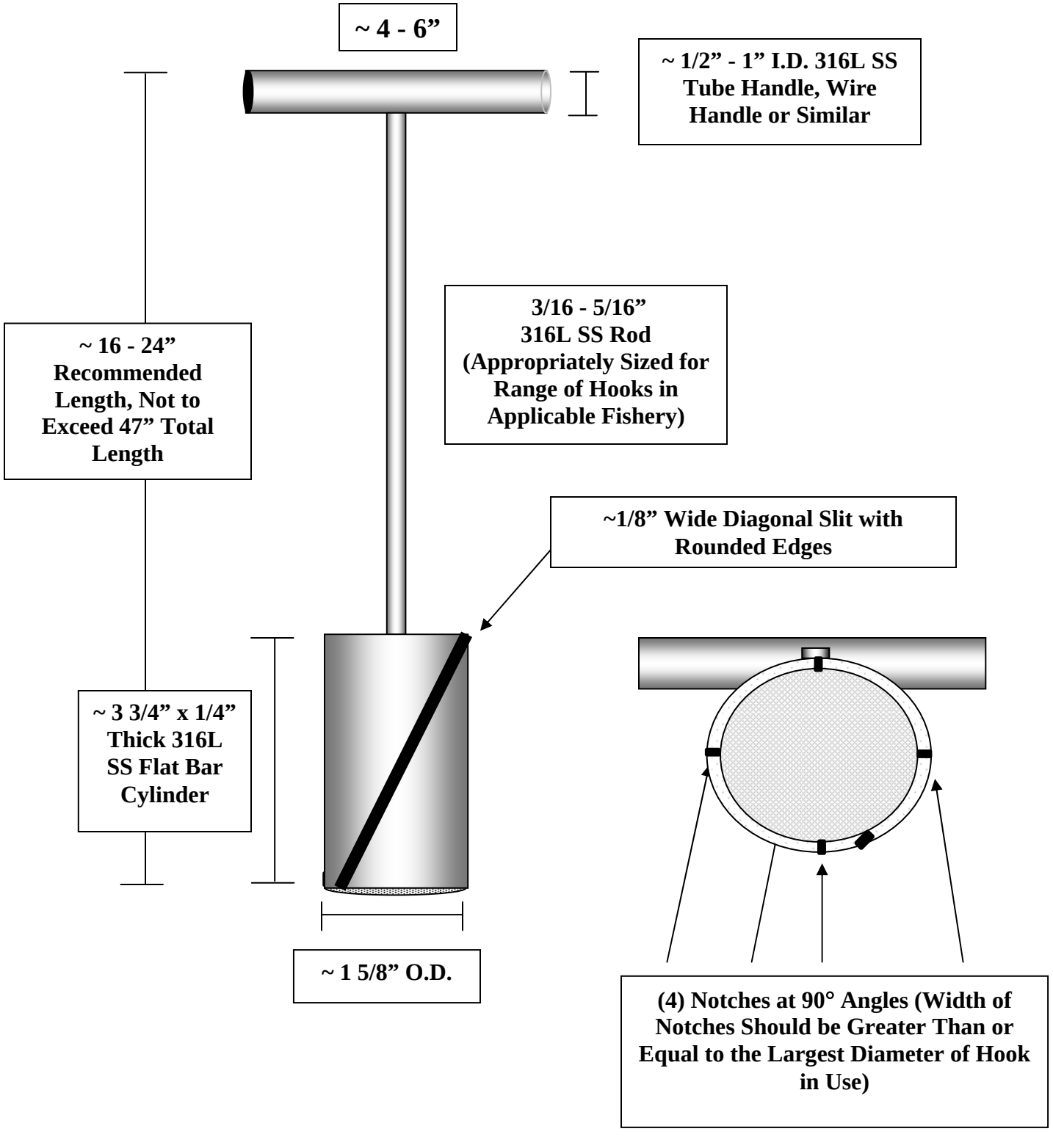
SCOTTY'S DEHOOKER



Modified Version of Diagram Provided by ARC

Plate B-14

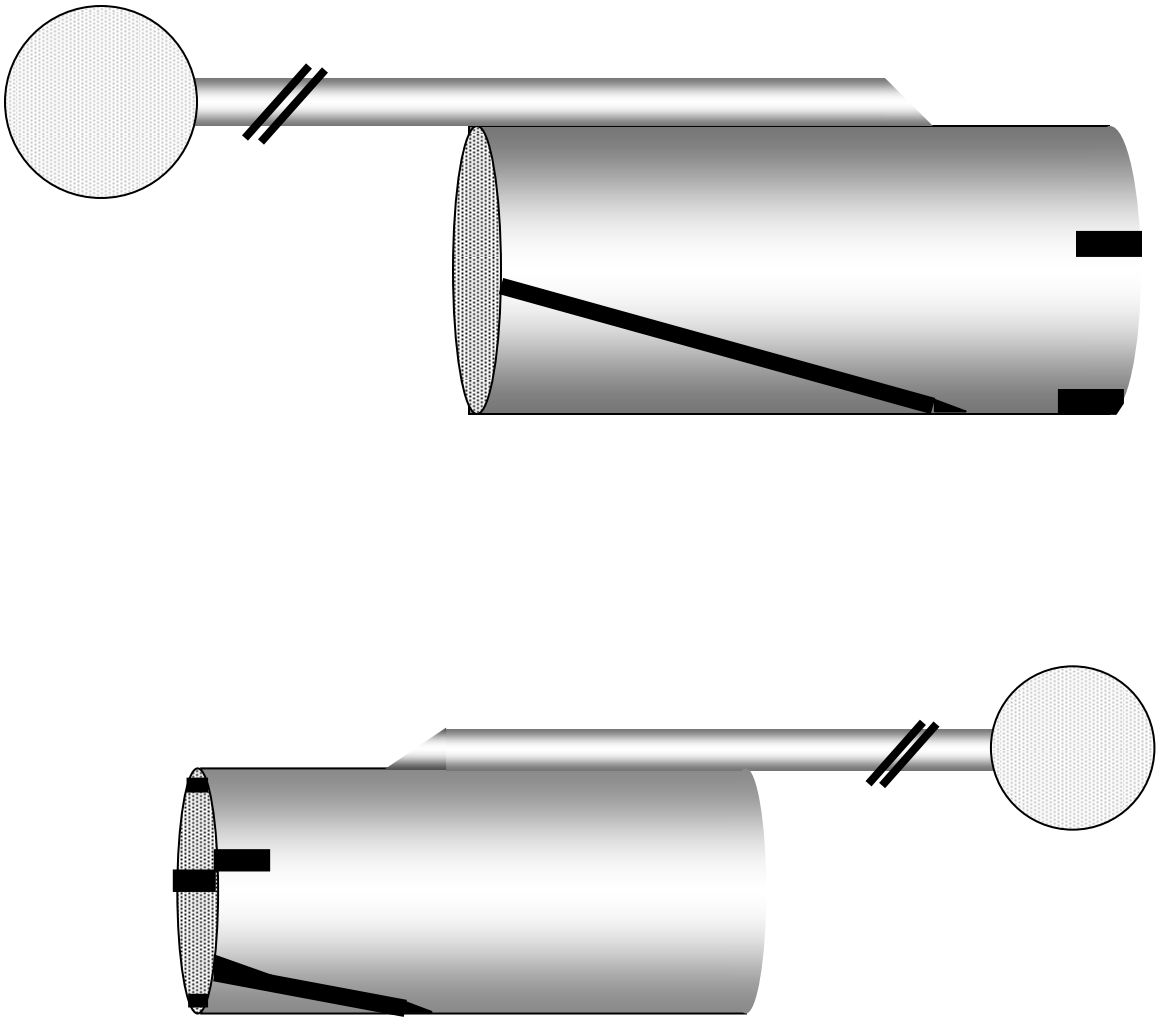
SHORT-HANDLED ROBY DEHOOKER



All Edges Must be Rounded So That They Are Not Sharp

Plate B-14 Continued

Side Views



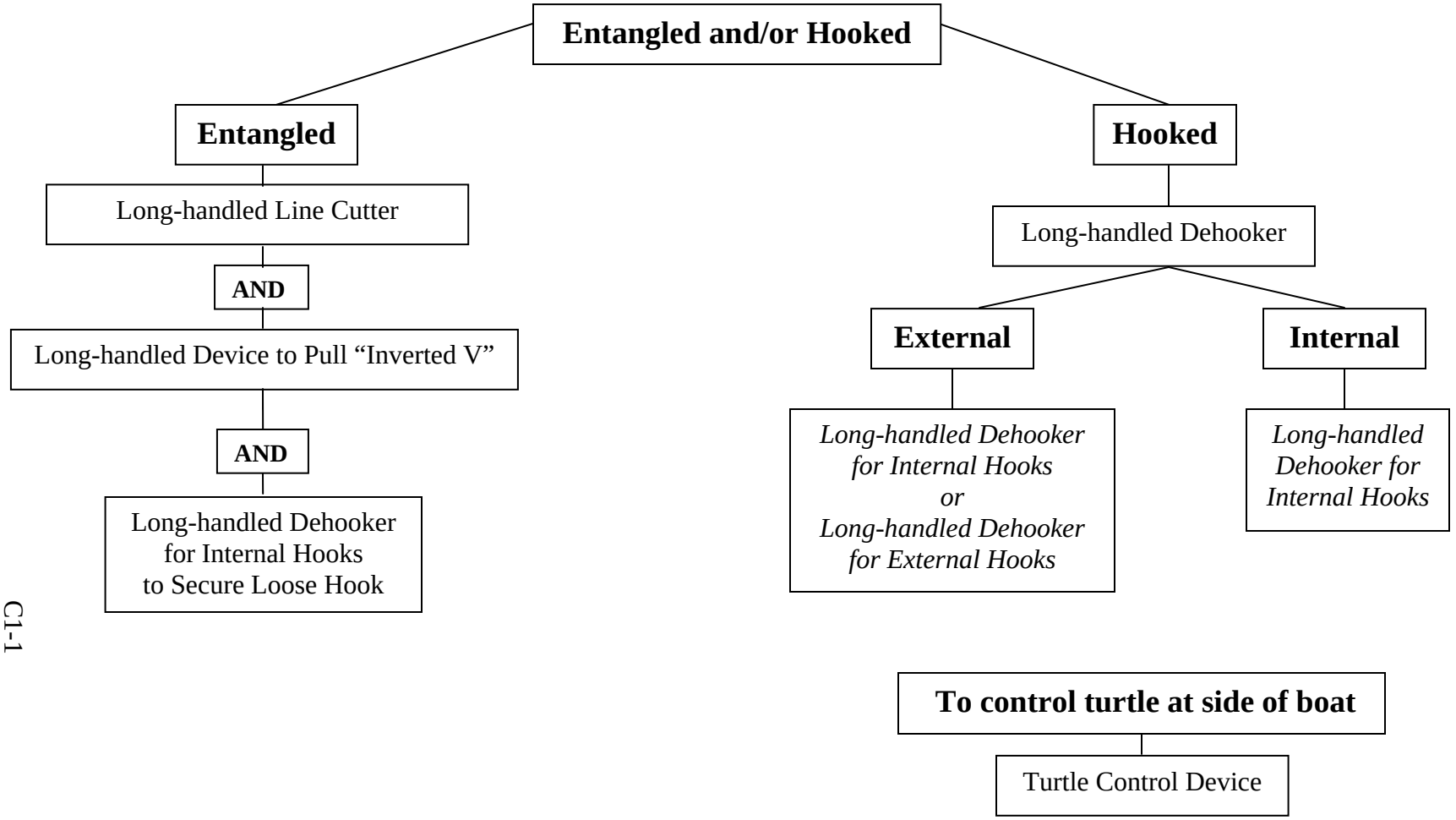
All Edges Must Be Rounded So That They Are Not Sharp

Appendix C

EQUIPMENT SELECTION FLOWCHART FOR THE CAREFUL RELEASE OF INCIDENTALLY CAPTURED SEA TURTLES

Plate C-1

Sea Turtles Not Boated



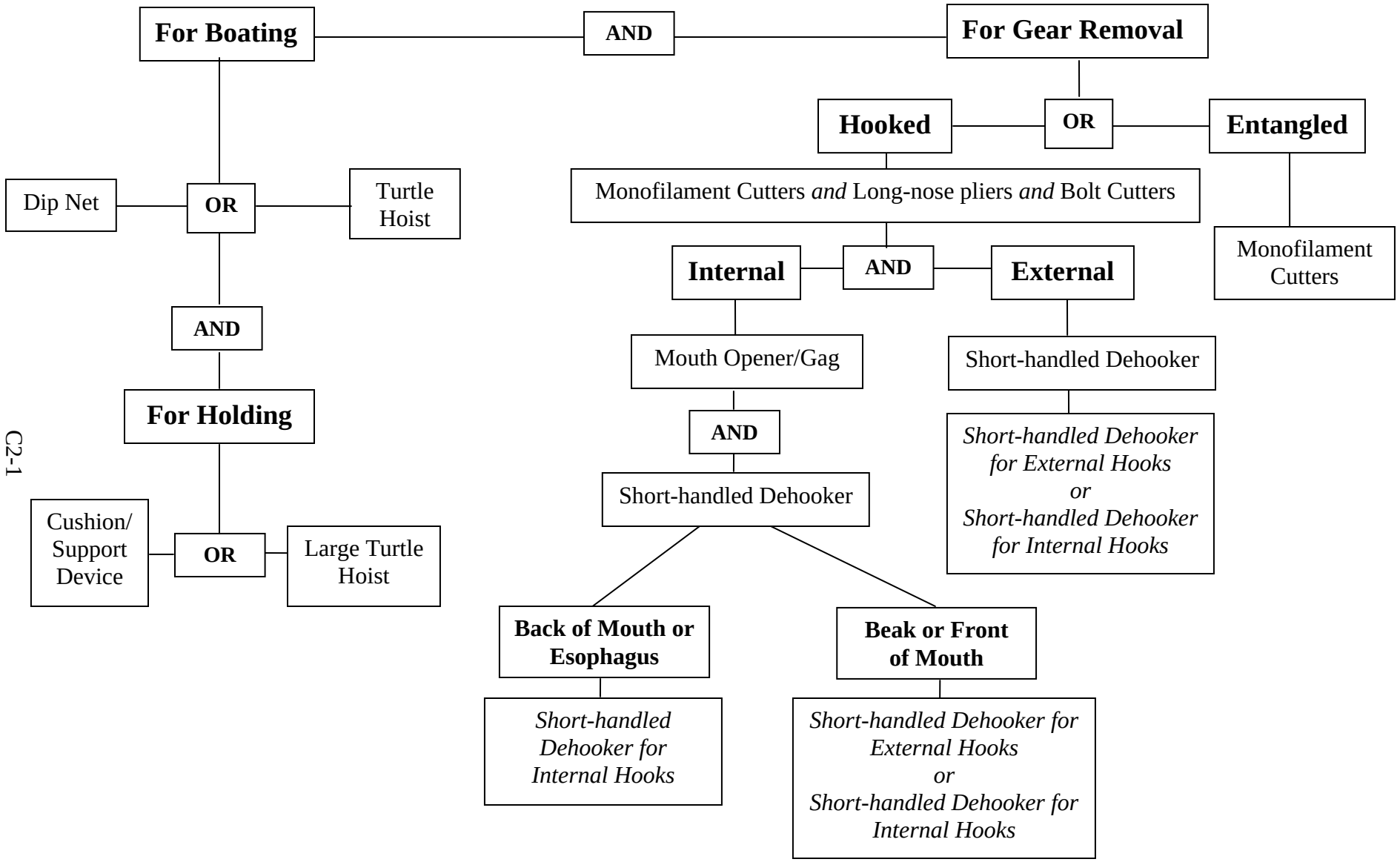
C1-1

To control turtle at side of boat

Turtle Control Device

Plate C-2

Sea Turtles Boated



Appendix D

SEA TURTLE AND MARINE MAMMAL HANDLING AND CAREFUL RELEASE PLACARDS

Sea Turtle Handling/Release Guidelines: Quick Reference for Hook and Line Fisheries

Guidelines for all turtles

- Scan as far as possible to sight turtles in advance and reduce likelihood of jerking turtles out of the water.
- Longline Vessels: Do not get ahead of the line while picking up gear. This reduces the chance of fouling or running over gear and turtle.

  Upon sighting a turtle:
  - Slow vessel and line reel speed
  - Adjust direction of the vessel to move toward turtle
  - Minimize tension on the line with the turtle

  Holding the line with the turtle on it, continue to move toward the turtle at a slow speed. **STOP VESSEL** and **PUT IN NEUTRAL** once turtle is brought alongside.
- Slowly retrieve line with turtle, keeping a gentle, consistent tension on the line. Avoid tugging or yanking line quickly. **DO NOT USE GAFFS OR SHARP OBJECTS** in direct contact with the turtle to retrieve it; a gaff may be used only to control the line during line removal.
- Ensure that enough slack is left in the line to keep turtle near the vessel, yet in water, until it can be determined whether or not it is possible to release turtle in the water, or safely bring it aboard.
- If turtle can be safely brought aboard and vessel is equipped with "cut-out doors," use this cut-out area to bring turtles aboard to minimize the distance from the water.
- Resuscitate comatose boated turtles as needed, holding them for up to 24 hours (keep moist and in the shade) if necessary.
- More information on releasing sea turtles is available in the *Careful Release Protocols for Sea Turtle Release with Minimal Injury* and on the web at: http://sero.nmfs.noaa.gov/.

Guidelines for turtles not boated

- Control turtle by maintaining pressure on line, or preferably, with a type of turtle tether, and bring the turtle as close to the vessel as possible. DO NOT lift turtles clear of the water.
- If entangled and not hooked, use dehooking tools to secure unattached hooks. Use clippers to cut the line. DO NOT leave line attached.
- If hooked and entangled, remove the hook first. Then, after the hook is removed, proceed to remove all line.
- All externally embedded hooks should be removed. If hook removal is not possible, cut the line at the eye of the hook (or as close as possible).
- Internal hooks should be removed only if an internal dehooker is being used. Do not attempt to remove hook if the hook has been swallowed beyond where the insertion point of the barb is visible, or when it appears that the hook removal will cause further injury. Remove as much of the line and/or hook as possible.

Guidelines for boated turtles

- If possible, bring turtle on board using a suitable dip net or other approved lifting device. Support turtle on a cushioned surface, such as a tire, while onboard.

  DO NOT LIFT THE TURTLE OUT OF THE WATER USING THE LINE, GAFF, OR OTHER SHARP OBJECTS
- Remove all externally embedded hooks.
- Internal hooks should be removed when the insertion point of the barb is clearly visible and only if an approved internal dehooker is being used. Do not remove the hooks that have been swallowed when the insertion point is not visible, or when it appears hook removal will cause further damage (e.g., in the brain case or glottis). Remove as much of the line and/or hook as possible.

Stop!

To release turtle (1) STOP VESSEL and place in neutral; (2) Ease turtle gently into the water, head first, through cut-out door if so equipped; and (3) Observe that turtle is safely away from the vessel before engaging the propeller and continuing operations.

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

See http://sero.nmfs.noaa.gov/ for additional copies of placard. Revised 10/2010

Sea Turtle Handling/Release Guidelines: Quick Reference for Atlantic Shark GILLNET Gear

October 2006

Guidelines for Handling Gear

- Gillnet gear should be set and/or fished to achieve maximum net **tautness**. This will prevent turtles from becoming entangled in the net in the case of an encounter.
- Scan net as far ahead as possible to sight turtles in advance and reduce the risk of jerking turtles out of the water.
- Vessel operators are required to check nets every 0.5 to 2 hours (50 CFR§ 635.21 (e) (3) (vi)).

Upon Sighting a Turtle

- **Slow vessel** and adjust direction to move towards the turtle. Once turtle is alongside, place the vessel in **neutral**.
- Slowly retrieve the net, avoiding tugging or yanking motions.
- Considering the size of the turtle, sea conditions, and safety of crew, determine whether the turtle can be boated. (All turtles should be **boated if possible**.)

Guidelines for Turtles Boated

- **Boat the turtle** using a dipnet or large turtle hoist. Avoid pulling up the turtle by the gear it is entangled in, as this could injure the animal. Gaffs may only be used to control the fishing gear, **DO NOT USE GAFFS OR SHARP OBJECTS** to retrieve the turtle.
- **Support the turtle** on a cushioned surface, such as a tire, while it is onboard.
- If the turtle cannot easily be disentangled from the net, **carefully cut the net** off the turtle. **Blunt-sided** line cutters such as first-aid clippers are preferred. If one-sided cutters/clippers are used, carefully slide the blunt end under the line or net you want to cut. Attempt to remove any lines or net attached to the turtle.
- **Identify** the species of turtle and record when and where the interaction occurred.

Guidelines for Turtles NOT Boated

- If the turtle is too large to be boated, control the turtle with a turtle tether if possible and bring the turtle close to the vessel.
- **Identify** the species of turtle and record when and where the interaction occurred.
- Try to work the turtle free from the net while the turtle is next to the boat. Use line cutters/clippers with a handle extension or first-aid clippers to cut the net off the turtle if necessary. Carefully slide the **BLUNT END** of the line cutter under the line or net you want to remove. Attempt to remove any lines or net attached to the turtle.

Guidelines for UNCONSCIOUS Turtles

- Place the turtle on its lower shell and **elevate** its hindquarters approximately 6 inches to permit the lungs to drain off water (Figure A).
- Keep the **skin and eyes moist** by covering the turtle with a moist towel or periodically spraying it with water while it is onboard. Place the turtle in the shade if necessary, while maintaining its body temperature above 60°F.
- Check for muscle **reflexes** approximately every 3 hours by touching the eyelid or tail (Figure B). An unconscious, but live turtle may or may not respond to touch.
- Be patient. Sea turtles caught and held underwater are stressed and may take some time to revive. If the turtle has shown no sign of life before returning to port, or after 24 hours on deck, it may safely be considered dead. Release the turtle in the water in a non-fishing area.

A

B

Contact Information

More information on releasing sea turtles is available on the on the web at: http://www.nmfs.noaa.gov/sfa/hms and in the publication, *Careful Release Protocols for Sea Turtle Release with Minimal Injury,* which is available on this website. Call (301) 713-2347 to obtain a copy of the report or for additional copies of this placard.

Stop!

GUIDELINES FOR RELEASING A TURTLE

(1) **STOP VESSEL** and place in **NEUTRAL**;
(2) **Ease turtle** gently into the water, head first, through cut-out door if so equipped;
(3) Observe that turtle is safely **away from the vessel** before engaging the propeller and move 1 nmi before continuing fishing operations.

NOAA — National Oceanic and Atmospheric Administration — U.S. Department of Commerce

SEA TURTLE DISENTANGLEMENT NETWORK

EMERGENCY CONTACT NUMBERS – Please Call Immediately
NOAA Fisheries Service Stranding HOTLINE: 978-281-9351
PCCS (Mass. Only): 800-900-3622 or USCG VHF CH. 16

Sea turtles can become accidentally entangled in active or discarded fixed fishing gear and other man-made material. These entanglements may prevent the recovery of endangered and threatened sea turtle populations. NOAA Fisheries has established the Sea Turtle Disentanglement Network to promote reporting and increase successful disentanglement of sea turtles. Please report all sea turtle entanglements and disentanglements, including documentation, to the contact numbers listed above.

How to Approach an Entangled Sea Turtle:

- Look for moving or unusually clumped buoys and lines near the turtle.
- Approach turtle slowly and carefully until vessel is alongside, then stop the vessel.
- If possible, record lat/lon and time at turtle's initial location.

How to Assess and Document the Entanglement:

- Is the turtle moving, attempting to swim away from the vessel or diving?
- How is the turtle entangled: flippers (front right, front left, etc.), head, shell?
- Are there single or multiple wraps of line on the turtle?
- Are the wraps restricting the turtle's movement or cutting into the skin?
- Is the turtle bleeding?
- Are there any other new or old injuries (such as propeller wounds)?

Leatherback Photos: Don Lewis

Loggerhead Photo: Thomas Dellinger / University of Madeira, Portugal

How to Disentangle:

- Do not get into the water with the turtle or bring it aboard. Work from the vessel with the turtle in the water.
- Determine which line is under strain from anchoring or drifting gear.
- Grapple the anchoring line and maintain a firm hold to keep turtle close to the vessel without lifting the turtle above the water. To avoid losing the turtle before completely disentangled, ***do not release or cut this line before trying to remove all other gear.***
- Try to unravel the gear from the turtle without cutting. Be careful around powerful flippers, jaws, and claws.
- If the gear cannot be removed by unraveling and the turtle is at risk of strangulation, drowning or further injury, try to cut the line.
- Avoid cutting turtle by pulling line away from the turtle with a boat hook before cutting.
- If gear must be cut, tie it off to the boat or existing gear to avoid losing the gear. Save all cut off/removed gear for analysis ashore (see *Documentation*).
- If you cannot free the turtle of ***ALL gear***, report the last known location, area landmarks, wind and current speed and direction, and any identifying characteristics about the turtle or gear. Report this information to the red contact numbers above or VHF Ch. 16.

How to Release:

- Leave engines in neutral and release the turtle from the last line (the anchoring line).
- Record the lat/lon and time of release.
- Ensure that the turtle is safely away from the vessel before starting the engines.
- Observe turtle behavior after release. Did it dive and/or swim away or did it remain relatively immobile at the surface?

Documentation:

- Log critical information (time, location, sea turtle description, signs of injury, behavior) when you encounter an entangled sea turtle.
- Log information about gear (line type, color and diameter, buoy/float type and color, buoy/pot ID#s), and final location of gear (brought ashore, left at site,etc.). Photograph/video the gear and sea turtle if possible.
- Reports and documentation (time, location, description, photos, video) of dead or injured sea turtles are also important.
- Report logged information to the red contact numbers at top of this card. Send photos, video and any removed gear to:

NOAA Fisheries Protected Resources Division
One Blackburn Drive, Gloucester, MA 01930

SEA TURTLES YOU MAY ENCOUNTER

LEATHERBACK SEA TURTLE

Shell Length: Up to 6 feet.

Weight: Up to one ton.

Features: Largest sea turtle. Lacks a hard shell and body scales. Covered by black leathery skin, often with white or pinkish-blue spots on the head, flippers, and body. The shell is divided into 7 longitudinal ridges. Front flippers are smooth, broad, and lack claws.

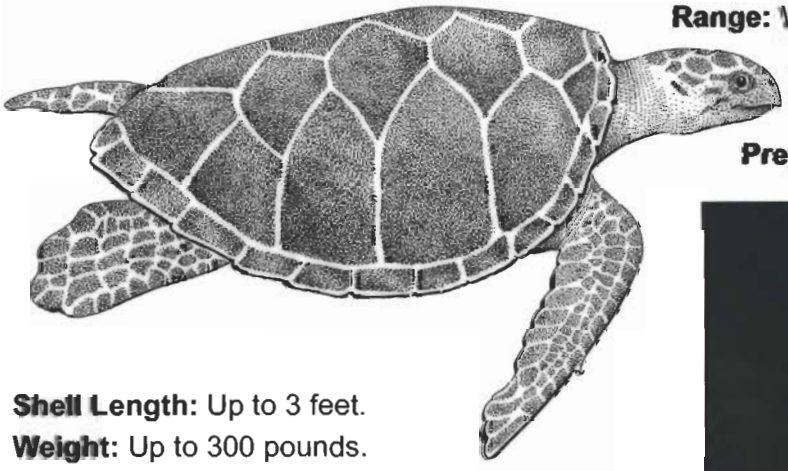
Range: Worldwide. Highly migratory, ranging as far north as Canada and are most commonly seen in northeastern waters June - November. Migrates south in winter.

Prey: Primarily jellyfish.

Photo: Nova Scotia Leatherback Turtle Working Group

Illustrations: Linda Bound / International Wildlife Coalition

LOGGERHEAD SEA TURTLE



Shell Length: Up to 3 feet.

Weight: Up to 300 pounds.

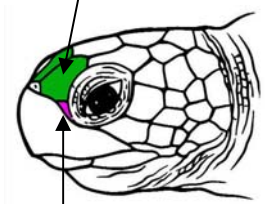
Features: Shell is hard and covered with plates. Head large and broad with powerful jaws for crushing prey. Front flippers are covered in scales, with two claws on each flipper. Shell and head yellow-orange to reddish brown, often covered by barnacles.

Range: Worldwide. Ranging as far north as the Gulf of Maine and most commonly seen in northeast waters May - November. Migrates south in winter.

Prey: Crustaceans, molluscs.

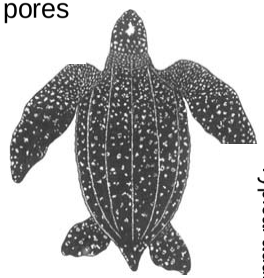
Photo: J Wyneken

Sea Turtle Identification Key



Hard carapace (shell) with large scutes (shell plates)

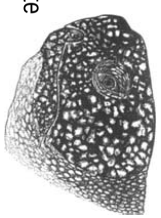
Leathery, no scutes; Longitudinal dorsal ridges



Typical adult colors are described here; colors may differ, particularly in hatchlings and juveniles

Leatherback *Dermochelys coriacea*

Carapace: dark gray/black with white spots; Plastron: white with dark blotches

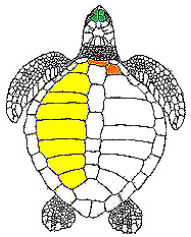


Two pairs prefrontal scales

Usually 5 or more costal (lateral) scutes; first costal scute touches nuchal

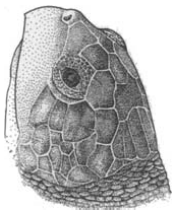
Usually 4 inframarginal scutes with pores

Usually 6 or more costal scutes

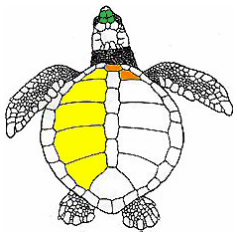


Olive Ridley *Lepidochelys olivacea*

Carapace: gray to olive green; number of costal scutes may be asymmetrical; Plastron: white/yellow

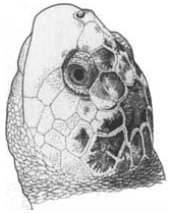


Usually 5 costal scutes

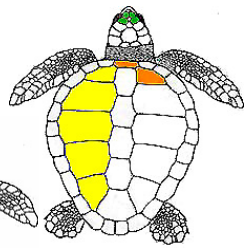


Kemp's Ridley *Lepidochelys kempii*

Carapace: gray to light olive green; round; Plastron: white/yellow

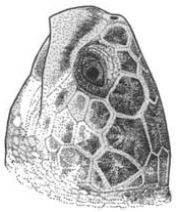


Usually 3 inframarginal scutes without pores

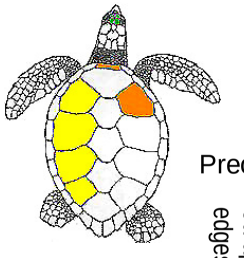


Loggerhead *Caretta caretta*

Carapace: red brown/dark brown; first costal scute is very small; Plastron: yellow/orange

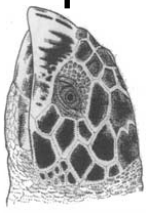


Usually 4 inframarginal scutes without pores



Hawksbill *Eretmochelys imbricata*

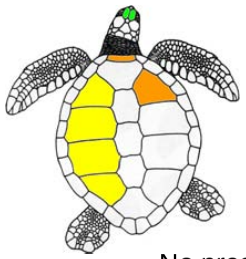
Carapace: tan, brown and black with random streaks; overlapping scutes; Plastron: cream with dark blotches



One pair prefrontal scales; serrated lower jaw

Usually 4 costal (lateral) scutes; first costal scute does not touch nuchal

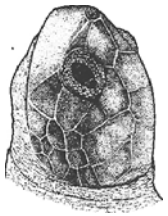
Usually 4 costal (lateral) scutes; first costal scute does not touch nuchal; usuallly 4 inframarginal scutes without pores



Preocular scales

Flatback *Natator depressus*

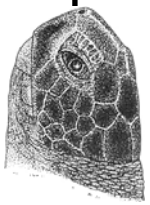
Carapace: olive gray; carapace has upturned edges on adults; Plastron: yellow



No preocular scales

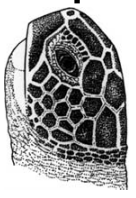
Black *Chelonia mydas*

Carapace: black or gray with black markings; Plastron: gray

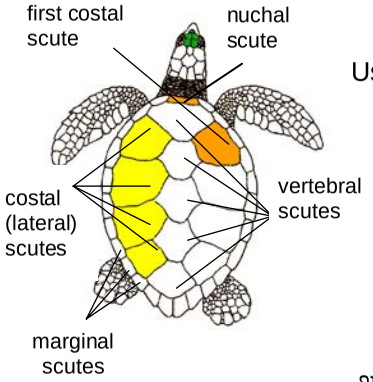


Green *Chelonia mydas*

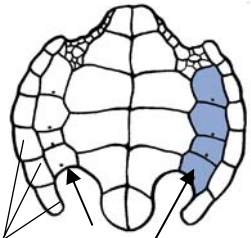
Carapace: brown with radiating streaks; Plastron: white to yellow



Dorsal View (Carapace)



Ventral View (Plastron)



Inframarginal scutes touch both the plastron and marginal scutes of the carapace.

Leatherback, ***Dermochelys coriacea*** (**Spanish:** Baula, Tortuga Laud**,** Tora; **French:** Tortue Luth; **Portuguese:** Tartaruga Gigante, Tartaruga-de-couro)
Adult Size Range: Length: 165-190+ cm**/** 65-75+ in; **Weight:** 400-500 kg females, males to 900 kg/ 885-1985 lb
Range: All oceans, sub-arctic to tropical; mainly pelagic oceanic (surface dwelling in the open ocean) but found in bays and over continental shelves

Green, Black*, *Chelonia mydas* (**Spanish:** Tortuga Verde, Tortuga Blanca; Tortuga Negra, Prieta; **French**: Tortue Verte; **Portuguese:** Tartaruga Verde, Aruanã)
Adult Size Range: Length: 90-120 cm/ 35-45 in; **Weight:** 120-230 kg/ 265-510 lb
Range: All subtropical and tropical seas; bays and coastal waters; black form restricted to eastern Pacific Ocean; pelagic oceanic (surface dwelling in the open ocean) small juveniles; benthic neritic (bottom dwelling in coastal waters) large juveniles and adults
*The status of the black turtle or eastern Pacific green turtle as *Chelonia agassizii* or *C. mydas agassizii* as a distinct species or subspecies is not supported, although it is often treated as such.

Flatback, ***Natator depressus*** (**Spanish:** Kikila, Tortuga Franca Oriental; **French:** Chelonée à dos Plat; **Portuguese:** Tartaruga de Casco Achatado)
Adult Size Range: Length: to 100 cm/ 40 in; **Weight:** to 90 kg/ 200 lb
Range: Tropical coastal Australia, including the waters up to Irian Jaya, Papua New Guinea and Java; pelagic neritic (surface dwelling in coastal waters)

Hawksbill, ***Eretmochelys imbricata*** (**Spanish:** Tortuga Carey; **French:** Tortue Imbriquée, Tortue Caret; **Portuguese:** Tartaruga-de-pente, Tartaruga de Escamas, Tartaruga Bico de Falcão, Tartaruga Verdadeira)
Adult Size Range: Length: 90-110+ cm/ 35-45+ in; **Weight:** 60-80 kg/ 130-175 lb
Range: All oceans; tropical waters, rarely subtropical; reef areas; pelagic oceanic (surface dwelling in the open ocean) small juveniles; benthic neritic (bottom dwelling in coastal waters) large juveniles and adults

Loggerhead, ***Caretta caretta*** (**Spanish:** Caguama, Amarilla, Cabezona, Tortuga Boba; **French:** Caouanne; **Portuguese:** Tartaruga Boba, Tartaruga Comum, Tartaruga Careta, Tartaruga Cabeçuda, Tartaruga amarela, Careba Dura, Careba Amarela)
Adult Size Range: Length: 90-130 cm/ 35-50 in; **Weight:** 100-180 kg/ 220-400 lb
Range: All oceans; primarily subtropical and temperate waters; often associated with structures (i.e., reefs, wrecks, platforms); pelagic oceanic (surface dwelling in the open ocean) small juveniles; benthic neritic (bottom dwelling in coastal waters) large juveniles and adults

Kemp's Ridley, ***Lepidochelys kempii*** (**Spanish:** Tortuga Lora, Cotorra; **French:** Tortue de Kemp; **Portuguese:** Tartaruga de Kemp)
Adult Size Range: Length: to 70 cm/ 28 in; **Weight:** 35-50 kg/ 80-110 lb
Range: Gulf of Mexico, eastern USA, rarely in eastern North Atlantic; coastal, primarily subtropical and temperate waters; pelagic oceanic (surface dwelling in the open ocean) small juveniles; benthic neritic (bottom dwelling in coastal waters) large juveniles and adults

Olive Ridley, ***Lepidochelys olivacea*** (**Spanish:** Tortuga Golfina, Tortuga Olivacea, Parlama; **French:** Tortue Olivâtre; **Portuguese:** Tartaruga Oliva, Tartaruga Olivácea, Tartaruga Pequena, Xibirro)
Adult Size Range: Length: 70-80 cm/ 28-32 in; **Weight:** 35-60 kg/ 80-130 lb
Range: Pacific, Indian and Atlantic Oceans, rarely in eastern North Atlantic; pelagic oceanic (surface dwelling in the open ocean); most often in tropical waters

Sources:

Seaturtle.org

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MARINE MAMMAL
HANDLING/RELEASE GUIDELINES
A Quick Reference for Atlantic Pelagic Longline Gear

GUIDELINES FOR ALL MARINE MAMMALS

- Have an identification guide, paper, and camera ready at all times in case of an interaction.
- Document as much information as possible to describe the marine mammal, particularly physical appearance and potential injuries:
  - Animal's length
  - Animal's features to be used for species identification (color pattern, dorsal fin shape, head shape)
  - Any gear remaining on the animal (type, placement, color, size, etc.)
  - Any existing tags on the animal (description, tag number)
- Take photographs from different angles. Pictures of the head, dorsal fin, and tail are most helpful in species ID. Fishermen should submit these photos to NMFS Office of Protected Resources, along with the Injury/Mortality Reporting Form.
- Attempt to release the animal with minimal injury (see below).
- After an interaction with a marine mammal:
  - Remove remainder of the gear from the water
  - Record all injuries and mortalities of marine mammals within 24 hrs of returning to shore on the NMFS Marine Mammal Injury/Mortality Reporting Form (see below)
  - Move at least one nautical mile away to avoid further interactions
  - Alert other fishermen in the area of the presence of marine mammals
- Reporting Requirement: Submit the Marine Mammal Injury/Mortality Reporting Form by fax to (301) 427-2522, or by mail: NMFS Office of Protected Resources Attn: MMAP, 1315 East West Highway, Silver Spring, MD 20910. Additional copies of the reporting form may be requested from the same address, or found online at: http://www.nmfs.noaa.gov/pr/pdfs/interactions/mmap_reporting_form.pdf.

GUIDELINES FOR SMALL MARINE MAMMALS

- Ensure the crew is ready to assist.
- Avoid abrupt actions or vessel movements that may panic the animal.
- As soon as the opposite side of the mainline is available, use two long gaffs to recover it. DO NOT USE GAFFS OR SHARP OBJECTS in direct contact with the animal. A gaff should be used only to control the line.
- Move the vessel cautiously, STOP THE VESSEL within range of the marine mammal.
- Gently bring the marine mammal alongside the vessel.
- If a tangle exists:
  - Gaff the other side of the mainline and attach it to the vessel or float ball to isolate the vessel and marine mammal from any tension on the remaining gear in the water
  - Work the tangle off the marine mammal as smoothly and quickly as possible
- If the animal is hooked:
  - Use a NMFS-approved dehooking device
  - Cut the barb off the hook with long-handled bolt cutters
  - Cut the line with line cutters as close to the hook as possible
- Remove as much line as possible from the animal.
- DO NOT use a tether, ninja sticks, or other devices more appropriate for dehooking or disentangling sea turtles to control the animal.

GUIDELINES FOR LARGE WHALES

- If a large whale is alive and entangled in fishing gear, contact the Provincetown Center for Coastal Studies Disentanglement Hotline at (800) 900-3622 or immediately contact the U.S. Coast Guard at VHF Ch. 16 for instructions.
  - -Maneuver the vessel in such a way as to minimize tension on the line
- If a large whale is dead and on the line, immediately contact the U.S. Coast Guard at VHF Ch. 16 for instructions.

SAFETY FIRST!

Hooked or entangled marine mammals can be unpredictable. There are inherent human safety concerns associated with handling/disentangling marine mammals. Be prudent and safe on the water. Human safety is paramount.

GET A MOVE ON!

If you have one marine mammal interaction, there is a high likelihood that you will have additional encounters if you continue fishing in the same area. Alert other fishermen via radio communication and MOVE, or wait 48 hours to reset gear rather than risk further interactions.

(727) 824-5312 • www.nmfs.noaa.gov

MARINE MAMMAL
SPECIES FACT SHEET

LONG-FINNED PILOT WHALE
Globicephala melas

SIZE: 16-18 ft, 4,000-5,000 lbs
BODY: Long robust body, bulbous head with prominent melon and slight beak. Sickle-shaped flippers are sharply pointed and long. Black with white cape behind dorsal fins, prominent white anchor patch on abdomen between flippers, very long peduncle.
DIET: Squid and fish.
HABITAT: Pelagic continental shelf edge and slope, submerged banks; associated with Gulf Stream features.

SHORT-FINNED PILOT WHALE
Globicephala macrorhynchus

SIZE: 15-18 ft, 3,000-4,000 lbs
BODY: Long robust body, flippers gently curved, pointed and less than one-sixth of body length, all black, diffuse white anchor patch between fins, very long dorsal fin.
DIET: Squid and fish.
HABITAT: Tropical, pelagic to coastal; in the Gulf Stream.

RISSO'S DOLPHIN
Grampus griseus

SIZE: 10-12.5 ft, 500-600 lbs
BODY: Blunt head with squared melon but no beak. Vertical crease in forehead. Light gray back and sides with darker dorsal fin, flippers, and flukes. White color from scarring, large prominent dorsal fin, and darker than body. Large black eyes.
DIET: Squid specialist.
HABITAT: Pelagic; continental shelf edge and steep upper sections of slope; tropical waters.

BOTTLENOSE DOLPHIN
Tursiops truncatus

SIZE: 6-12 ft, 330-1,435 lbs
BODY: Short, thick well-defined beak. Coastal form is shorter and slimmer, offshore form is larger. Gray with no distinctive color pattern. Dorsal fin is tall with broad base, located on the middle back.
DIET: Fish, invertebrates, and squid.
HABITAT: Coastal form: shallow, warm inshore waters. Offshore form: offshore waters of shelf edge and slope.

PYGMY SPERM WHALE
Kogia breviceps

SIZE: 10-12 ft, 695-880 lbs
BODY: Robust body with squared or conical shark-like head with tiny underslung lower jaw. Dark gray, lighter down sides to white belly. Pale crescent-shaped false gill on each side between eye and flipper. Tiny dorsal fin, located aft of mid-back.
DIET: Squid, fish, and crustaceans.
HABITAT: Pelagic; continental shelf edge, and slope.

HARBOR PORPOISE
Phocoena phocoena

SIZE: 4.5-6 ft, 125-145 lbs
BODY: Smallest cetacean in the U.S. Atlantic. Stocky with small pointed flippers, no beak. Dark gray or black on back with lighter sides and white belly. No distinctive markings. Dorsal fin is small, triangular; located slightly aft of mid-body.
DIET: Schooling fish and invertebrates.
HABITAT: Coastal, cold waters usually less than 650 ft.

HUMPBACK WHALE
Megaptera noveaengliae

SIZE: 36-52 ft, 25-30 tons
BODY: Flippers long, usually white, flukes broad with irregular trailing edge. Black with white on throat and belly. Small dorsal fin with a broad base, raised bump in front, and "knuckles" behind. Shows flukes when diving.
DIET: Small schooling fish (herring, sand lance, capelin) and krill.
HABITAT: Pelagic and coastal.

MINKE WHALE
Balaenoptera acutorostrata

SIZE: 29-33 ft, 5-10 tons
BODY: Small, sleek body, head is sharply pointed with a flat rostrum. Flippers pointed, flukes broad. Black or dark grey, white band on both flippers. Prominent dorsal fin, two thirds back on body.
DIET: Variety of schooling fish, squid, and zooplankton.
HABITAT: Pelagic, but common in bays and shallow coastal waters.

ATLANTIC SPOTTED DOLPHIN
Stenella frontalis

SIZE: 7-7.5 ft, 220-310 lbs
BODY: Long, thick, white-tipped beak. Tri-color background, variable spotting. Dorsal fin is tall, dark, located on middle back.
DIET: Squid and variety of fish.
HABITAT: Coastal to pelagic. Tropical to warm-temperate waters over the continental shelf.

PANTROPICAL SPOTTED DOLPHIN
Stenella attenuata

SIZE: 5.2-8.5 ft, 220-255 lbs
BODY: Slender body with long narrow, white-tipped beak. Bi-color background, distinct cape is narrow at face, dips deeply forward of dorsal fin. Small spots develop with age. Dorsal fin is tall and slender.
DIET: Squid and schooling fish.
HABITAT: Pelagic; deep waters seaward of shelf edge, tropical to warm-temperate waters.

COMMON DOLPHIN
Delphinus delphis

SIZE: 7.5-8.5 ft, 155-245 lbs
BODY: Slender body, with long pointed beak. Black back and cape form V-shaped saddle, hourglass pattern on sides: tan patch forward and gray patch aft. Black beak and eye ring, line from jaw to flipper.
DIET: Variety of fish and squid.
HABITAT: Pelagic; subtropical to temperate waters >100 fathoms.

STRIPED DOLPHIN
Stenella coeruleoalba

SIZE: 7-8 ft, 200-330 lbs
BODY: Slender body with narrow pale tail stock, moderately long dark beak. Bold light blaze from shoulder to dorsal fin, black stripe from eye to anus. Dorsal fin is tall and dark.
DIET: Deepwater squid, fish, and shrimp.
HABITAT: Pelagic; deep waters of continental shelf edge and slope. Associated with Gulf Stream north wall.

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Illustrations By Garth Mix 2006

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Appendix L. Code of Federal Regulations for Fisheries in the Western Pacific

Code of Federal Regulations

TITLE 50--Wildlife and Fisheries

CHAPTER VI--FISHERY CONSERVATION AND MANAGEMENT, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Part 665, Fisheries in the Western Pacific – §665.812 (a)(5), (a)(6), and (a)(7) Sea Turtle Take Mitigation Measures

§ 665.812 Sea turtle take mitigation measures.

(a) Possession and use of required mitigation gear. The gear required in paragraph (a) of this section must be used according to the sea turtle handling requirements set forth in paragraph (b) of this section.

(1) Hawaii longline limited access permits. Any owner or operator of a vessel registered for use under a Hawaii longline limited access permit must carry aboard the vessel line clippers meeting the minimum design standards specified in paragraph (a)(5) of this section, dip nets meeting the minimum design standards specified in paragraph (a)(6) of this section, and dehookers meeting the minimum design and performance standards specified in paragraph (a)(7) of this section.

(2) Other longline vessels with freeboards of more than 3 ft (0.91m). Any owner or operator of a longline vessel with a permit issued under §665.801 other than a Hawaii limited access longline permit and that has a freeboard of more than 3 ft (0.91 m) must carry aboard the vessel line clippers meeting the minimum design standards specified in paragraph (a)(5) of this section, dip nets meeting the minimum design standards specified in paragraph (a)(6) of this section, and dehookers meeting this minimum design and performance standards specified in paragraph (a)(7) of this section.

(3) Other longline vessels with freeboards of 3 ft (0.91 m) or less. Any owner or operator of a longline vessel with a permit issued under §665.801 other than a Hawaii limited access longline permit and that has a freeboard of 3 ft (0.91 m) or less must carry aboard their vessels line clippers capable of cutting the vessels fishing line or leader within approximately 1 ft (0.3 m) of the eye of an embedded hook, as well as wire or bolt cutters capable of cutting through the vessel's hooks.

(4) Handline, troll, pole-and-line, and other vessels using hooks other than longline vessels. Any owner or operator of a vessel fishing under the Pelagics FEP with hooks other than longline gear are not required to carry specific mitigation gear, but must comply with the handling requirements set forth in paragraph (b) of this section.

Line clippers.

(5) Line clippers are intended to cut fishing line as close as possible to hooked or entangled sea turtles. NMFS has established minimum design standards for line clippers. The Arceneaux line clipper (ALC) is a model line clipper that meets these minimum design standards and may be fabricated from readily available and low-cost materials (see Figure 3 to this part). The minimum design standards are as follows:

(i) A protected cutting blade. The cutting blade must be curved, recessed, contained in a holder, or otherwise afforded some protection to minimize direct contact of the cutting surface with sea turtles or users of the cutting blade.

(ii) Cutting blade edge. The blade must be capable of cutting 2.0-2.1 mm monofilament line and nylon or polypropylene multistrand material commonly known as braided mainline or tarred mainline.

(iii) An extended reach holder for the cutting blade. The line clipper must have an extended reach handle or pole of at least 6 ft (1.82 m).

(iv) Secure fastener. The cutting blade must be securely fastened to the extended reach handle or pole to ensure effective deployment and use.

Dip nets.

(6) Dip nets are intended to facilitate safe handling of sea turtles and access to sea turtles for purposes of cutting lines in a manner that minimizes injury and trauma to sea turtles. The minimum design standards for dip nets that meet the requirements of this section nets are:

(i) An extended reach handle. The dip net must have an extended reach handle of at least 6 ft (1.82 m) of wood or other rigid material able to support a minimum of 100 lb (34.1 kg) without breaking or significant bending or distortion.

(ii) Size of dip net. The dip net must have a net hoop of at least 31 inches (78.74 cm) inside diameter and a bag depth of at least 38 inches (96.52 cm). The bag mesh openings may be no more than 3 inches by 3 inches (7.62 cm by 7.62 cm).

Dehookers.

(7) (i) Long-handled dehooker for ingested hooks. This item is intended to be used to remove ingested hooks from sea turtles that cannot be boated, and to engage a loose hook when a turtle is entangled but not hooked and line is being removed. One long-handled dehooker for ingested hooks is required on board. The minimum design and performance standards are as follows:

(A) *Hook removal device.* The hook removal device must be constructed of5/16inch (7.94 mm) 316L stainless steel and have a dehooking end no larger than 17/8inches (4.76 cm) outside diameter. The device must be capable of securely engaging and controlling the leader while shielding the barb of the hook to prevent the hook from re-engaging during removal. It must not have any unprotected terminal points (including blunt ones), as these could cause injury to the esophagus during hook removal. The device must be of a size capable of securing the range of hook sizes and styles used by the vessel.

(B) *Extended reach handle.* The hook removal device must be securely fastened to an extended reach handle or pole with a length equal to or greater than 150 percent of the vessel's freeboard or 6 ft (1.83 m), whichever is greater. It is recommended that the handle be designed so that it breaks down into sections. The handle must be sturdy and strong enough to facilitate the secure attachment of the hook removal device.

(ii) Long-handled dehooker for external hooks. This item is intended to be used to remove externally-hooked hooks from sea turtles that cannot be boated. The long-handled dehooker for ingested hooks described in paragraph (a)(7)(i) of this section meets this requirement. The minimum design and performance standards are as follows:

(A) *Construction.* The device must be constructed of5/16inch (7.94 mm) 316 L stainless steel rod. A 5 inch (12.70 cm) tube T-handle of 1 inch (2.54 cm) outside diameter is recommended, but not required. The dehooking end must be blunt with all edges rounded. The device must be of a size capable of securing the range of hook sizes and styles used by the vessel.

(B) *Handle.* The handle must have a length equal to or greater than the vessel's freeboard or 3 ft (0.91 m), whichever is greater.

(iii) Long-handled device to pull an “inverted V.” This item is intended to be used to pull an “inverted V” in the fishing line when disentangling and dehooking entangled sea turtles. One long-handled device to pull an “inverted V” is required on the vessel. The minimum design and performance standards are as follows:

(A) *Hook end.* It must have a hook-shaped end, like that of a standard boat hook or gaff, which must be constructed of stainless steel or aluminum.

(B) *Handle.* The handle must have a length equal to or greater than 150 percent of the vessel's freeboard or 6 ft (1.83 m), whichever is greater. The handle must be sturdy and strong enough to allow the hook end to be effectively used to engage and pull an “inverted V” in the line.

(C) The long-handled dehookers described in paragraphs (a)(7)(i) and (ii) of this section meet this requirement.

(iv) Short-handled dehooker for ingested hooks. This item is intended to be used to remove ingested hooks, externally hooked hooks, and hooks in the front of the mouth of sea turtles that

can be boated. One short-handled dehooker for ingested hooks is required on board. The minimum design and performance standards are as follows:

(A) *Hook removal device.* The hook removal device must be constructed of1/4inch (6.35 mm) 316 L stainless steel, and the design of the dehooking end must be such to allow the hook to be secured and the barb shielded without re-engaging during the hook removal process. The dehooking end must be no larger than 1-5/16 inch (3.33 cm) outside diameter. It must not have any unprotected terminal points (including blunt ones), as this could cause injury to the esophagus during hook removal. The dehooking end must be of a size appropriate to secure the range of hook sizes and styles used by the vessel.

(B) *Sliding plastic bite block.* The dehooker must have a sliding plastic bite block, which is intended to be used to protect the sea turtle's beak and facilitate hook removal if the turtle bites down on the dehooker. The bite block must be constructed of a3/4inch (1.91 cm) inside diameter high impact plastic cylinder (for example, Schedule 80 PVC) that is 10 inches (25.40 cm) long. The dehooker and bite block must be configured to allow for 5 inches (12.70 cm) of slide of the bite block along the shaft of the dehooker.

(C) *Shaft and handle.* The shaft must be 16 to 24 inches (40.64 to 60.69 cm) in length, and must have a T-handle 4 to 6 inches (10.16 to 15.24 cm) in length and3/4to 11/4inches (1.90 to 3.18 cm) in diameter.

(v) Short-handled dehooker for external hooks. This item is intended to be used to remove externally hooked hooks from sea turtles that can be boated. One short-handled dehooker for external hooks is required on board. The short-handled dehooker for ingested hooks required to comply with paragraph (a)(7)(v) of this section meets this requirement. The minimum design and performance standards are as follows:

(A) *Hook removal device.* The hook removal device must be constructed of5/16inch (7.94 cm) 316 L stainless steel, and the design must be such that a hook can be rotated out without pulling it out at an angle. The dehooking end must be blunt, and all edges rounded. The device must be of a size appropriate to secure the range of hook sizes and styles used by the vessel.

(B) *Shaft and handle.* The shaft must be 16 to 24 inches (40.64 to 60.69 cm) in length, and must have a T-handle 4 to 6 inches (10.16 to 15.24 cm) in length and3/4to 11/4inches (1.90 to 3.18 cm) in diameter.

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MyFWC.com

April 11, 2011

Mr. David Cupka
South Atlantic Fishery Management Council
P.O. Box 12753
Charleston, SC 29422

RE: Extension of Florida Octocoral Regulations into Federal Waters

Dear Mr. Cupka:

Over the past year, the Florida Fish and Wildlife Conservation Commission (Commission) has been working with the South Atlantic Fishery Management Council (SAFMC) and the Gulf of Mexico Fishery Management Council (GMFMC) to coordinate future allowable octocoral (erect, nonencrusting species of the subclass Octocorallia, except sea fans *Gorgonia flabellum* and *Gorgonia ventalina*, plus the attached substrate within one inch of the holdfast) management. The GMFMC intends to transfer management octocorals to the SAFMC. In turn, the SAFMC is in the process of redefining the fishery management unit in their Coral, Coral Reef, and Live/Hardbottom Habitat Fishery Management Plan (FMP) to exclude allowable octocorals in federal waters off Florida. The Commission agreed to manage the allowable octocoral fishery in both Florida state waters and federal waters adjacent to the state. In order to take over the management of this fishery, Florida octocoral regulations must be extended into federal waters. Florida regulations would also be modified to establish an annual quota for allowable octocoral harvest in state and federal waters off Florida. Additionally, the Commission would prohibit all harvest of octocorals in Atlantic federal waters north of Cape Canaveral and in the Coral Habitat Areas of Particular Concern adjacent to Florida state waters (Stetson-Miami Terrace and Pourtales Terrace). These changes should occur prior to the removal of allowable octocorals in federal waters off Florida from the fishery management unit of the FMP to prevent loss of regulations in federal waters.

Florida's marine life fishery is highly regulated. The number of commercial fishery participants is capped by a tiered endorsement system. Many of these endorsements are non-transferable. Recreational harvesters are limited to six octocoral colonies per person per day.

According to the Magnuson Stevens Fishery Conservation and Management Act Title 16 U.S.C. Section 1856, a state has the ability to extend their regulations into federal waters if there is no federal FMP or if there are no regulations for federal waters.

Commission staff is currently working with the marine life industry to develop an annual quota for both state and federal waters. Commission staff will present a draft rule recommending extension of state regulations for octocorals into federal waters, including the modifications listed above, to the Commission at the June 8-9, 2011 Commission meeting in St. Augustine, Florida.

The Commission has been and continues to work with the GMFMC and SAFMC as allowable octocorals in federal waters off Florida are removed from the fishery management unit of the FMP. The Commission is committed to preserving this resource for the future and is considering extending its regulatory authority into federal waters.

Sincerely,

Mark Robson
Director
mr/cc/mc
cc: Roy Crabtree
Bob Shipp

Finding of No Significant Impact (FONSI) for the Comprehensive Ecosystem-Based Amendment 2 for the South Atlantic Region

National Marine Fisheries Service (NMFS)
December 7, 2011

The Comprehensive Ecosystem-Based Amendment 2 (CE-BA 2) amends four fishery management plans (FMPs). CE-BA 2 includes Amendment 7 to the FMP for Coral, Coral Reefs, and Live/Hardbottom Habitats of the South Atlantic Region (Coral FMP); Amendment 23 to the FMP for the Snapper-Grouper Fishery of the South Atlantic Region (Snapper-Grouper FMP); Amendment 21 to the FMP for Coastal Migratory Pelagic Resources in the Atlantic and the Gulf of Mexico (Coastal Migratory Pelagics FMP); and Amendment 1 to the FMP for Pelagic *Sargassum* Habitat of the South Atlantic Region (*Sargassum* FMP).

CE-BA 2 proposes to modify management of octocorals; modify management in the special management zones (SMZs) off South Carolina; modify sea turtle release gear requirements for snapper-grouper fishermen; and designate essential fish habitat (EFH) and EFH-Habitat Areas of Particular Concern (EFH-HAPCs).

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 CFR 1508.27 state the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant in making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of these actions are analyzed based on the CEQ's context and intensity criteria, NAO 216-6 criteria and NMFS Instruction 30-12-4-1, July 22, 2005, Guidelines for Preparation of FONSI. These include:

1) Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?

Response: No. None of the actions contained within CE-BA 2 are expected to jeopardize the sustainability of any target species. **Action 1, Preferred Alternative 3** would revise the fishery management unit (FMU) of the Coral FMP to include octocorals off Georgia, North Carolina, and South Carolina. Octocorals off of Florida would be removed from the FMP and would result in no federal management. As explained in Section 4.1.1 of the Environmental Assessment (EA), although octocoral harvest is managed under the Coral FMP and subsequent amendments, the Florida Fish and Wildlife Commission (FWC) is responsible for most of the management, implementation and enforcement of regulations because the majority of the harvest occurs in state waters. In a letter dated, April 11, 2011 (**Appendix M**), the FWC describes management measures it would implement with regards to octocorals if the South Atlantic Fishery Management Council (Council) proceeds with **Action 1, Preferred Alternative 3.** The FWC intends to extend Florida octocoral regulations into federal waters off Florida, establish an annual quota for allowable octocoral harvest in state and federal waters off Florida, and prohibit harvest of octocorals in Florida waters north of Cape Canaveral, Florida and in the CHAPCs adjacent to Florida waters.

Action 3, Preferred Alternative 3 would establish an annual catch limit (ACL) equal to zero for octocorals off South Carolina, North Carolina, and Georgia in the revised FMU (under **Action 1**). Functionally, this would not have any impact on the active octocoral harvesters as there has been a prohibition on octocoral harvest north of Florida for 16 years. Under this alternative, management of octocorals off Florida would continue to be managed by the FWC. CE-BA 2 makes no changes to management of other coral species in the FMU, including protected species *Acropora*; harvest of these species would continue to be prohibited.

Under **Action 4, Preferred Alternative 2** and **Preferred Alternative 3** would limit harvest of snapper-grouper and coastal migratory pelagic species in the SMZs off the coast of South Carolina to the recreational bag limit. This would have a positive impact on the resource by reducing the amount of fishing pressure on the stocks.

Actions 5 would modify the sea turtle handling gear requirements in the snapper-grouper fishery in response to fishermen's concern that the current requirements are unwieldy and inappropriate in all situations. This action would have no impact on the harvest of target species. **Actions 6-8** pertain to the establishment of EFH and EFH-HAPCs and would have no impact on the harvest of target species.

Section 3.2 in the EA describes the species most impacted by these actions. Each alterative is analyzed with respect to biological impacts in Chapter 4 of the EA.

2) Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?

Response: No. Section 3.2 in the EA describes the species most impacted by these actions, including non-target species. Based on the analysis of each alternative, each alterative is analyzed respect to biological impacts (Chapter 4), actions in the subject amendment are not likely to jeopardize the sustainability of any non-target species. One of the objectives of this comprehensive amendment is to remove octocorals off Florida from the Coral FMU and to establish ACLs for octocorals off Georgia, South Carolina and North Carolina (**Actions 1** and **Action 3**). Under these actions, there is not expected to be any change in the harvest of non-target species. **Action 4**, which would modify the management in the SMZs off South Carolina, would limit the harvest of target snapper-grouper and coastal migratory pelagic species to the recreational bag limit. There is the possibility that commercial fishermen would seek out other species in the SMZs or would move their operations to another more profitable area. The level of fishing effort by commercial fishermen in the SMZs is unknown but is thought to be minimal. **Action 5** would modify the sea turtle handling tools required by the snapper-grouper fishermen. It is expected that with these modifications the fishermen will be better equipped to handle any incidentally hooked sea turtles. **Action 6-8** would establish EFH or EFH-HAPCs, which does not modify fishing regulations, and is not expected to jeopardize the sustainability of any non-target species.

3) **Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and identified in fishery management plans?**

Response: No. Based on the analysis of the EFH and EFH-HAPC actions (Sections 4.6, 4.7, and 4.8), the proposed actions are not expected to cause substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Act and identified in fishery management plans. **Actions 6-8** propose establishing new EFH or EFH-HAPCs. **Action 6**, proposes establishing EFH-HAPCs for the snapper-grouper fishery; including EFH-HAPCs for golden tilefish and blueline tilefish. CE-BA 2 would also designate the deepwater marine protected areas (MPAs) designated in Snapper-Grouper Amendment 14 as EFH-HAPCs. These MPAs include the Snowy Grouper Wreck MPA, Northern South Carolina MPA, Edisto MPA, Charleston Deep Artificial Reef MPA, Georgia MPA, North Florida MPA, St. Lucie Hump MPA, and the East Hump MPA. Figure 4-6 in the EA shows a map of this proposed designation.

Action 7 proposes to amend the Coral FMP to designate the Deepwater Coral HAPCs (CHAPCs) as designated in CE-BA 1 as EFH-HAPCs. These would include the Cape Lookout CHAPC, Cape Fear CHAPC, Blake Ridge Diapir CHAPC, Stetson-Miami Terrace CHAPC, and Pourtalés Terrace CHAPC. Figure 4-7 in the EA shows a map of this proposed designation.

Action 8 would establish EFH for *Sargassum* to include the top 10 meters of the water column in the South Atlantic exclusive economic zone bounded by the gulf stream, as EFH for pelagic *Sargassum*. Figure 4-8 in the EA shows a map of this proposed designation.

The establishment of EFH and EFH-HAPCs would require that further consideration be given to fishing and non-fishing activities that occur in these areas, but the mere establishment of EFH and EFH-HAPCs does not improve or cause substantial damage to ocean and coastal habitats. It is expected that the establishment of the EFH and EFH-HAPCs would benefit the ocean and coastal habitats in the future through the EFH consultation process.

4) **Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?**

Response: No. The proposed actions are not expected to have a substantial adverse impact on public health or safety because they do not alter the fisheries significantly from the status quo (Chapter 4, Section 4.11). In fact, **Action 5,** which would modify the sea turtle handling gear requirements for the snapper-grouper fishery, could enhance public health and safety. These gear requirement modifications were requested by fishermen because some of the currently required sea turtle handling gear are unwieldy and inappropriate for the small vessels used by some snapper-grouper fishermen. **Action 5** proposes modifying the gear requirements based on the freeboard height of the vessels. This action is consistent with the requirements of the June 7, 2006, "Biological Opinion for the Continued Authorization of the Snapper-Grouper Fishing in the U.S. South Atlantic Exclusive Economic Zone as Managed under the Snapper-Grouper Fishery Management Plan of the South Atlantic Region." (Snapper-Grouper BiOp) It is also consistent with the sea turtle handling requirements of the FMP for Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP).

5) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Response: No. Based on the analysis of impacts relative to protected species or critical habitat (Chapter 4), the proposed actions are not expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species. A description of ESA listed species in the action area can be found in Section 3.2.2 of the EA.

Action 1 and **Action 3** would modify the FMU for octocorals and establish an ACL for octocorals in the modified FMU. However, the actions would make no changes to management of other coral species in the FMU, including protected species of *Acropora*; harvest of these species would continue to be prohibited.

In a May 18, 2010, consultation memorandum, NOAA Fisheries Service determined the continued authorization of the coral fishery was not likely to adversely affect Endangered Species Act (ESA)-listed sea turtles and marine mammals. Because the coral fishery operates at depths beyond those inhabited by smalltooth sawfish and the two *Acropora* species, and beyond the depth where *Acropora* critical habitat was designated, the May 18, 2010, memo also determined the fishery would have no adverse effect on these species or their designated critical habitat. The measures proposed in **Action 1** and **Action 3** would not modify the coral fishery in a manner that is anticipated to cause adverse effects to listed species or critical habitat that were not previously considered.

Action 4 would require that commercial snapper-grouper and coastal migratory pelagic species harvested in the SMZs off South Carolina be restricted to the recreational bag limit. NOAA Fisheries Service completed the Snapper-Grouper BiOp on June 7, 2006. The opinion concluded the continued authorization of the fishery would not affect ESA-listed marine mammals and is not likely to jeopardize the continued existence of any other ESA-listed species. On August 13, 2007, a formal consultation and associated biological opinion was completed on the continued authorization of the South Atlantic coastal migratory pelagics fishery managed under the FMP. The opinion concluded that the continued authorization of the fishery is not likely to jeopardize the continued existence of any listed species or adversely affect critical habitat.

The measures proposed under **Action 4** would restrict harvest of snapper-grouper and coastal migratory pelagic species in SMZs off South Carolina have been determined not to modify the proposed action in a manner that would cause an effect to listed species or critical habitat that was not considered in previous consultations.

Action 5 would modify the sea turtle handling gear requirements for the snapper-grouper fishery. These gear requirement modifications were requested by fishermen because some of the required sea turtle handling gear are unwieldy and inappropriate for the small vessels used by some snapper-grouper fishermen. **Action 5** proposes modifying the gear requirements based on the freeboard height of the vessels. This action is consistent with the requirements of the June 7, 2006, Snapper-Grouper Biological Opinion. It is also consistent with the sea turtle handling requirements of the Reef Fish FMP.

None of the other actions in CE-BA 2 are expected to adversely affect endangered or threatened species, marine mammals or critical habitat of these species.

6) **Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?**

Response: No. The proposed action is not expected to substantially impact the biodiversity and/or ecosystem function within the affected area. Actions in this amendment serve to modify the FMU for the octocoral fishery, establish an ACL for the octocoral fishery, modify management in the SMZs off South Carolina, modify the sea turtle handling gear requirements, and designate EFH and EFH-HAPCs. None of these actions are expected to have an impact on biodiversity and/or ecosystem function.

7) **Are significant social or economic impacts interrelated with natural or physical environmental effects?**

Response: No. Actions contained in CE-BA 2 would modify the octocoral FMU, specify an ACL for the octocoral fishery in the revised FMU, modify management in the SMZs off South Carolina, modify the sea turtle release gear requirements in the snapper-grouper fishery, and designate EFH and EFH-HAPCs. None of the actions would severely restrict fishing effort from the status quo in the octocoral, snapper-grouper, coastal migratory pelagics or the *Sargassum* fisheries. Since fishing effort would likely remain at the status-quo level, the social and economic impacts would be positive for the fisheries and its interrelatedness with the natural environment would likely remain unchanged.

8) **Are the effects on the quality of the human environment likely to be highly controversial?**

Response: No. The effects of the quality of the human environment as a result of CE-BA 2 are expected to be positive. **Action 1** and **Action 3** would modify the FMU for the octocoral fishery and establish an ACL for octocorals in the modified FMU. These actions would not impose changes that are functionally different from the status quo. Harvest of octocorals north of Florida would continue to be prohibited while harvest of octocorals within Florida would be managed by the State of Florida. **Action 4** would require that commercial snapper-grouper and coastal migratory pelagic species harvest in the SMZs off South Carolina be restricted to the recreational bag limit. This action may have a negative economic impact on the commercial fishers who regularly fish in the SMZs but the number of fishers that this action would impact is thought to be relatively small. **Action 4** would positively impact the human environment in that it would ensure that the SMZs are used for recreational harvest, as intended. **Action 5** would modify the sea turtle handling gear requirements to be more appropriate to vessel size. These gear requirement modifications were requested by fishermen because some of the required sea turtle handling gear are unwieldy and inappropriate for the smaller vessels used by some snapper-grouper fishermen. Modifications to these requirements would also reduce the costs associated with acquiring the sea turtle handling gear. **Actions 6-8** are not expected to have any impact on the human environment. A description of the social and economic environment can be found in Section 3.6 and impacts of each alternative on the social and economic environment are analyzed in Chapter 4 of the EA.

9) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

Response: No. The description of the affected environment (Chapter 3) does not identify any unique or ecologically critical areas. Based on that description, the proposed actions are not expected to result in substantial impacts to unique or ecologically critical areas.

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: No. The effects on the human environment (described in Section 3.6) are not likely to be highly uncertain or involve unique or unknown risks. A thorough economic and social analysis of impacts (Chapter 4) revealed no substantial change in human impacts is expected.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: No. Based on the analysis of cumulative impacts (Section 4.9), the proposed actions are not related to other actions with individually insignificant, but cumulatively significant impacts. **Action 5**, which would modify the sea turtle handling gear requirements, responds to concerns from fishermen on sea turtle handling requirements implemented through Amendment 15B to the Snapper-Grouper FMP.

Action 6 and **Action 7** are related to management actions taken in previous amendments. **Action 6** proposes to amend the Snapper-Grouper FMP to designate snapper-grouper MPAs as EFH-HAPCs. These snapper-grouper marine protected areas (MPAs) were established through Amendment 14 to the Snapper Grouper FMP and include: Snowy Grouper Wreck MPA, Northern South Carolina MPA, Edisto MPA, Charleston Deep Artificial Reef MPA, Georgia MPA, North Florida MPA, St. Lucie Hump MPA, and the East Hump MPA. Figure 4-6 in the EA provides a map of these areas. Similarly, **Action 7** would amend the Coral FMP to designate the CHAPCs as EFH-HAPCs. These CHAPCs were established through the implementation of the CE-BA 1 and include the Cape Lookout CHAPC, Cape Fear CHAPC, Blake Ridge Diapir CHAPC, Stetson-Miami Terrace CHAPC, and Pourtalés Terrace CHAPC. Figure 4-7 in the EA shows a map of this proposed designation. The establishment of EFH-HAPCs would require that further consideration be given to fishing and non-fishing activities that occur in these areas, but the mere establishment of EFH and EFH-HAPCs would not be individually significant or cumulatively significant. Other actions in CE-BA 2 are not related to any other past, present, or future actions, which have or will occur in the South Atlantic, or any other region.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: No. The proposed actions are not likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places nor would it cause loss or destruction of significant scientific, cultural or historical resources. In the

South Atlantic, several notable shipwrecks can be found in federal and state waters including Loftus (eastern Florida), SS Copenhagen (Southeast Florida), Half-Moon (Southeast Florida), Hebe (Myrtle Beach), Georgiana (Charleston, South Carolina), Monitor (Cape Hatteras, North Carolina), Huron (Nags Head, North Carolina), and Metropolis (Coralla, North Carolina). Fishing activity already occurs in the vicinity of these sites but actions within this amendment would have no additional impacts on the above listed historic resources, nor would they alter any regulations intended to protect them.

13) Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

Response: No. Based on the biological impacts analysis (Chapter 4), the proposed actions are not expected to result in the introduction or spread of any non-indigenous species.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: No. None of the proposed actions are likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration. Actions contained within this comprehensive amendment are intended to modify the FMU for octocorals in the South Atlantic region, specify an ACL for octocorals, modify the management in the SMZs off South Carolina, modify the snapper-grouper sea turtle handling tools requirements, and establish EFH for *Sargassum* and EFH-HAPCs for snapper-grouper species and deepwater coral. The establishment of EFH and EFH-HAPCs would require further consideration be given to fishing and non-fishing activities that occur in these areas, but the mere establishment of EFH and EFH-HAPCs does not result in regulatory changes nor does it establish a precedent for future actions.

15) Can the proposed action reasonably be expected to threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment?

Response: No. The proposed actions are not expected to threaten a violation of federal, state, or local law or requirements for the protection of the environment. A thorough analysis of other applicable laws related to the implementation of CE-BA 2 was conducted as a part of the regulatory package, as well as an EA which fulfills the mandates set forth by the National Environmental Policy Act (NEPA). These analyses revealed all actions contained in the CE-BA 2 and its associated NEPA documentation are in compliance with any and all federal, state, and local laws.

A description of the administrative environment can be found in Section 3.5 of the EA. Administrative impacts are analyzed for each action in Chapter 4.

16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: No. The proposed actions are not expected to result in any cumulative adverse effects that could have a substantial effect on the target species or non-target species. A cumulative effects analysis (Section 4.9.6) was conducted for CE-BA 2 and revealed no cumulative adverse effects on the human environment.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting EA prepared for CE-BA 2, it is hereby determined that the proposed actions would not significantly affect the quality of the human environment as described above and in the supporting EA. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement is not necessary for these proposed actions.

Miles M. Croom

DEC 07 2011

Roy E. Crabtree, Ph.D.
Southeast Regional Administrator

Date