3/1/2011

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AMENDMENT 10 TO THE FISHERY MANGEMENT PLAN FOR SPINY LOBSTER IN THE GULF OF MEXICO AND SOUTH ATLANTIC with Draft Environmental Impact Statement, Initial Regulatory Flexibility Act Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement

March 2011

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This is a publication of the Gulf of Mexico Fishery Management Council Pursuant to National Oceanic and Atmospheric Administration Award No. NA10NMF4410011 and the South Atlantic Fishery Management Council Pursuant to NOAA Award No. FNA05NMF4410004

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ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ACOE	Army Corps of Engineers
ACT	annual catch target
AM	accountability measure
APA	Administrative Procedure Act
B	Biomass
B_{MSY}	Biomass at MSY
CEA	Cummulative Effects Analysis
CEQ	Council on Environmental Quality
CFMC	Caribbean Fishery Management Council
CFR	Code of Federal Regulations
Councils	Gulf of Mexico Fishery and South Atlantic Management Councils
CPUE	catch per unit effort
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DEIS	draft environmental impact statement
DQA	Data Quality Act
EA	environmental assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F	instantaneous fishing mortality rate
FAC	Florida Adminstrative Code
FAO	Food and Agriculture Organization (United Nations)
FKNMS	Florida Keys National Marine Sanctuary
FMFC	Florida Marine Fisheries Commission
FMP	fishery management plan
FMRI	Florida Marine Research Institute
F_{MSY}	Fishing Mortality Rate Yielding MSY
FMU	fishery management unit
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
FWS	United States Fish and Wildlife Service
GC	general counsel
GCSE	General Counsel Southeast Region
GMFMC	Gulf of Mexico Fishery Management Council
HAPC	Habitat Areas of Particular Concern
IRFA	initial regulatory flexibility analysis
LEAP	Law Enforcement Advisory Panel
M	instantaneous natural mortality rate
MARFIN	Marine Fisheries Initiative
MBTA	Migratory Bird Treaty Act

MFMT	Maximum Fishing Mortality Threshold
MMPA	Marine Mammal Protection Act
MP	million pounds
MPA	Marine Protected Area
MRFSS	Marine Recreational Fishery Statistics Survey
MRIP	Marine Recrational Information Program
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MSST	Minimum Stock Size Threshold
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	Same as NMFS
OFL	overfishing limit
OMB	Office of Management and Budget
OY	optimum yield
PRA	Paperwork Reduction Act
RA	Regional Administrator of NMFS
RFA	Regulatory Flexibility Act
RIR	regulatory impact review
RSE	restricted species endorsement
SAFMC	South Atlantic Fishery Management Council
SBA	Small Business Administration
SEDAR	Southeast Data Assessment Review (stock assessment
SEFSC	Southeast Fisheries Science Center of NMFS
SERO	Southeast Regional Office (NMFS)
SFA	Sustainable Fisheries Act
SMZ	special management zone
SoVI	Social Vulnerability Index
SPL	saltwater products license (FL)
SPR	spawning potential ratio
SRCL	Special Recreational Crawfish License
SSB	spawning stock biomass
SSBR	spawning stock biomass per recruit
SSC	Scientific and Statistical Committee
TAC	total allowable catch
TED	turtle excluder device
TCP	trap certification program
USCG	United States Coast Guard
VEC	valued environmental component
ww	whole weight

AMENDMENT 10 TO THE FISHERY MANAGEMENT PLAN FOR SPINY LOBSTER IN THE GULF OF MEXICO AND SOUTH ATLANTIC REGIONS

INCLUDING A DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS), INITIAL REGULATORY FLEXIBILITY ANALYSIS (IRFA), DRAFT REGULATORY IMPACT REVIEW (DRIR), AND SOCIAL IMPACT ASSESSMENT/FISHERY IMPACT STATEMENT (SIA/FIS)

Proposed actions:	Establish annual catch limits and accountability measures for Caribbean spiny lobster; remove several other species of lobster from the FMP; establish sector allocations; redefine biological reference points; update the framework process; and establish or modify other management measures.
Lead agency:	FMP Amendment – Gulf of Mexico and South Atlantic Fishery Management Councils EIS - NOAA Fisheries Service
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NOI for Amendment 10:	1/28/09 (74FR4943) – SAFMC _____ - GMFMC
Scoping meetings held:	SAFMC as part of Comp. ACL Amendment (1/26/09 in Charleston, SC; 1/27/09 in New Bern, NC; 2/3/09 in Key Largo, FL; 2/4/09 in Cape Canaveral, FL and 2/5/09 in Pooler, GA) GMFMC (9/21/09 in Key West, FL and 9/22/09 in Marathon, FL)
NOI for EIS:	3/12/10 (75FR48:11843)
Public Hearings held:	4/11-14 &4/18-20/2011
DEIS filed:	_____
DEIS notice published:	_____
DEIS Comments received by:	_____
FEIS filed:	_____
FEIS Comments received by:	_____

Abstract

To be added

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EXECUTIVE SUMMARY

To be drafted prior to public hearings by Gregg

1.0 INTRODUCTION

This Draft Environmental Impact Statement (DEIS) for Amendment 10 to the Fishery Management Plan for Spiny Lobster in the Gulf of Mexico and South Atlantic (Spiny Lobster FMP) will bring the FMP into compliance with Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requirements. The Spiny Lobster FMP is jointly managed by the Gulf of Mexico and South Atlantic Fishery Management Councils (Councils).

1.1 Background

In 2006, the Magnuson-Stevens Act was re-authorized and included a number of changes to improve conservation of managed fishery resources. The goals require that conservation and management measures "shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry". Included in these changes are requirements that the Regional Councils must establish both a mechanism for specifying annual catch limits (ACLs) at a level such that overfishing does not occur in the fishery, and accountability measures (AMs) to correct if overages occur. Accountability measures are management controls to prevent the ACLs from being exceeded and to correct by either in-season or post-season measures if they do occur.

The ACL is set by the Councils, but begins with specifying an overfishing limit (OFL), which is the yield above which overfishing occurs. Once an OFL is specified, an acceptable biological catch (ABC) is recommended by the Councils' Scientific and Statistical Committees. The ABC is based on the OFL and takes into consideration scientific uncertainty. The OFL and ABC are set by scientists, whereas the next two reference points, ACL and annual catch target (ACT) are set by managers. The ACT is not required, but if used should be set at a level that takes into account management uncertainty and provides a low probability of the ACL being exceeded. These measures must be implemented by 2010 for all stocks experiencing overfishing, and 2011 for all other stocks.

There are some exceptions for the development of ACLs; for example, when a species can be considered an ecosystem component species and species with annual life cycles. Stocks listed in the Fishery Management Unit are classified as either ''in the fishery'' or as an ''ecosystem component''. By default, stocks are considered to be "in the fishery" unless declared ecosystem component species. Ecosystem component species are exempt from the requirement for ACLs. In addition, ecosystem component species may, but are not required to be included in a FMP for any of the following reasons: data collection purposes; ecosystem considerations related to specification of optimum yield for the associated fishery; as considerations in the development of conservation and management measures for the associated fishery; and/or to address other ecosystem issues.

To be considered for possible classification as an ecosystem component species, the species should:

(A) Be a non-target species or non-target stock;
(B) Not subject to overfishing, approaching overfished, or overfished;
(C) Not likely to become subject to overfishing or overfished, according to the best available information, in the absence of conservation and management measures; and
(D) Not generally be retained for sale or personal use.

The original Spiny Lobster FMP included the Caribbean spiny lobster, *Panulirus argus*, and other incidental species of lobster (spotted spiny lobster, *Panulirus guttatus*; smoothtail spiny lobster, *Panulirus laevicauda*; Spanish slipper lobster, *Scyllarides aequinoctialis*, and ridged slipper lobster, *Scyllarides nodifer*) which inhabit or migrate through coastal waters and the fishery conservation zone now named the exclusive economic zone (EEZ) of the Gulf of Mexico and the South Atlantic (GMFMC and SAFMC 1982). All five species of lobster are in the fishery, but only two species, the Caribbean spiny lobster and ridged slipper lobster, are listed under the Fishery Management Unit (GMFMC and SAFMC 1986).

Of the four species other than the Caribbean spiny lobster in the Spiny Lobster FMP, only the ridged slipper lobster is specified in the regulations; the other species are in the management unit for data collection purposes only. Landings information is not available on the smoothtail and spotted spiny lobsters. Low numbers of these species may be landed as Caribbean spiny lobster in either the commercial or recreational sector, but no records are available at this time. Spanish and ridged slipper lobsters also occur in federal waters along the west coast of Florida and are primarily landed as bycatch in shrimp trawls. Because landings information is scarce and incomplete, setting ACLs would be difficult for these species. The Councils could list these four species as ecosystem components or remove them from the FMP; in either case, ACLs and accountability measures would not be required. If these species are left in the FMP under the current designation, ACLs and accountability measures must be set.

An ACL for a given stock or stock complex can be established in several ways: either a single ACL for the entire fishery, divided into sector ACLs (i.e., recreational and commercial sectors), divided into sector and gear types (i.e., recreational, commercial diving, bully netting, and commercial trapping), or divided into state-federal ACLs. In any of these cases, the sum of the ACLs cannot exceed the ABC. Under the reauthorized Magnuson-Stevens Act and the 2008 amended guidelines for National Standard 1 (74 FR 3178), ACLs and, if selected by the Council, ACTs should be adjusted by framework. Revision of the current framework procedure would allow such adjustments.

Current regulations on the Caribbean spiny lobster, *Panulirus argus*, off the Gulf of Mexico and South Atlantic are summarized in Table 1.1.1 and defined in 50 CFR 640.2. *Scyllarides nodifer* is the other species in the Fishery Management Unit and codified in the regulations in four sections. The common name Slipper (Spanish) lobster as *Scyllarides nodifer* in the regulations (i.e., 50 CFR 640.2) is not the correct common

name according to Williams et al. (1988) and FAO Fisheries Synopsis (1991) authorities on the correct common names of invertebrate species; the correct common name is ridged slipper lobster. For the purposes of this document this common name listed above will be used throughout the rest of the document. The regulations specified for ridged slipper lobster discuss conservation and management [50 CFR 640.1(b)], define slipper lobster by genus species [50 CFR 640.2], prohibit harvest of a berried (egg-bearing) lobsters [50 CFR 640.21 9(a)], and prohibit the use of poisons and explosives to take slipper lobster in the exclusive economic zone [50 CFR 640.22 9(a)(3)].

Table 1.1.1. Current commercial and recreational Caribbean spiny lobster regulations for federal waters of the South Atlantic and the Gulf of Mexico.

	Permits required	Size Limits	Bag/Possession Limits	Closed areas	Closed Season	Gear Restrictions	Other Prohibitions
Commercial	Federal spiny lobster vessel permit except if fishing in federal waters off FL. FL commercial harvester permit required in EEZ off FL. Tailing permit if tailing lobster.	Carapace must be more than 3" (measured in the water), separated tails must be at least 5.5"	Off of NC, SC, and GA, 2 per person. Off FL and other Gulf states 6 per person per day.*	None	FL and other Gulf states: April 1 through August 5 NC, SC, or GA: No closed season.	No spear, hooks, piercing devices, explosives, or poisons. Degradable panel required on non-wooden traps.	Trap tending at night No taking of spiny lobster with eggs.
Recreational	State endorsement required to the fishing license.	Carapace must be more than 3" (measured in the water).	Off of NC, SC, and GA, 2 per person. Off FL and other Gulf states 6 per person per day.	None	FL and other Gulf states: April 1 through August 5 Exception off FL: 2-day non-trap mini-season last Wed and Thurs in July** Off other Gulf states: 2-day non-trap mini-season last Sat and Sun in July	No spear, hooks, piercing devices, or explosives. Degradable panel required on non-wooden traps.	No taking of spiny lobster with eggs.

* A person is exempt from the bag/possession limits off Florida if the harvest of Caribbean spiny lobster is by diving or by use of bully net, hoop net, or spiny lobster trap; and the vessel has on board the required commercial Florida state licenses.

**During the two-day mini-season off Florida, the bag limit is 12 Caribbean spiny lobsters per person per day, in or from the EEZ, other than off Monroe County. Off Monroe County the bag limit is 6 Caribbean spiny lobsters per person per day.

Two current federal regulations may be causing detrimental impacts to the resource as well as creating enforcement problems. First, under certain situations and with a federal tailing permit, Caribbean spiny lobster tails may be separated from the body onboard a fishing vessel. This allowance creates difficulties for law enforcement in determining if hooks and spears were used to harvest the resource. Second, up to 50 Caribbean spiny lobsters under the minimum size limit or one per trap, whichever is greater, may be retained aboard a vessel provided they are held in a live well. When in a trap, such juveniles or "short" lobsters are used to attract other lobsters for harvest. Federal regulations are not consistent with State of Florida regulations, which allow up to 50 Caribbean spiny lobsters under the minimum size limit and one per trap. However, some studies have shown this practice may increase the fishing mortality on juvenile lobsters and could facilitate their illegal trade. The Councils are considering modifying or repealing these two regulations.

Consultation under the 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. 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.

To satisfy the ESA consultation requirements, NOAA Fisheries Service completed a formal consultation, and resulting biological opinion, on the continued authorization of the Gulf of Mexico and South Atlantic spiny lobster fishery in 2009. When making determinations on FMP actions, not only are the effects of the specific actions proposed analyzed, but also the effects of all discretionary fishing activity under the affected FMPs. Thus, the biological opinion analyzed the potential impacts to ESA-listed species from the continued authorization of the federal spiny lobster fishery. The opinion stated the fishery was not likely to adversely affect ESA-listed marine mammals, Gulf sturgeon or designated critical habitat for elkhorn and staghorn corals. However, the opinion determined that the spiny lobster fishery would adversely affect sea turtles, smalltooth sawfish, and elkhorn and staghorn corals, but would not jeopardize their continued existence. An incidental take statement was issued for green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles, smalltooth sawfish, and both species of coral. Reasonable and prudent measures to minimize the impact of these incidental takes were specified, along with terms and conditions to implement them. Specific terms and conditions required to implement the prescribed reasonable and prudent measures include, but are not limited to: creating new or expanding existing closed areas to protect

coral, allowing the public to remove trap-related marine debris, and implementing trap line-marking requirements. The Councils are considering alternatives to meet these requirements.

1.2 Purpose Statement

The purpose of this amendment is to bring the Spiny Lobster FMP into compliance with Magnuson-Stevens Act requirements for ACLs and AMs to prevent overfishing; update biological reference points, policies, and procedures; and consider adjustment of management measures to aid law enforcement and comply with measures to protect endangered species established under a biological opinion.

1.3 Need for the Proposed Action

Revisions to the Magnuson-Stevens Act in 2006 require FMPs contain ACLs for all managed species. ACLs must be set at a level that prevents overfishing and does not exceed the recommendations of the respective Councils' Scientific and Statistical Committees for ABC. Fisheries Management Plans are also required to establish AMs, which are management controls that ensure ACLs are not exceeded or provide corrective measures if overages occur. For stocks determined by the Secretary of Commerce to be subject to overfishing, ACLs and AMs must be effective in 2010; for all other stocks managed under an FMP, except species with annual life cycles and ecosystem component species, ACLs and AMs must be effective in 2011. No species in the Spiny Lobster FMP is known to be undergoing overfishing. The Councils intend to meet the 2011 deadline through Amendment 10 to the Spiny Lobster FMP.

Current definitions of maximum sustainable yield, optimum yield, overfishing, and overfished were set for Caribbean spiny lobster in Amendment 6. Currently, the Councils have different definitions for each criterion. The Councils may modify these definitions based on recommendations of the Scientific and Statistical Committees. A single definition for each biological reference point would simplify management.

The implementation process for a plan amendment can take over a year from initial scoping to final implementation. Framework procedures provide a mechanism for timelier implementation of routine actions such as setting ACLs, and a guideline for implementing such actions in a consistent manner. The framework procedure in the Spiny Lobster FMP was set in Amendment 2 and allows changes to be made to gear and harvest restrictions. Revisions would allow additional actions to be implemented through the framework procedure. Amendment 2 also contains a process for the State of Florida to propose modifications to regulations. This process is now outdated and needs to be updated.

The Councils are considering modifying or repealing two current federal regulations regarding tailing permits and use of undersized lobsters as attractants may be causing detrimental impacts to the resource as well as creating enforcement problems. In addition, the Councils are considering alternatives to meet the requirements of the 2009

Biological Opinion. Specific terms and conditions required to implement the prescribed reasonable and prudent measures include, but are not limited to: creating new or expanding existing closed areas to protect coral, allowing the public to remove trap-related marine debris, and implementing trap line-marking requirements.

1.4 Management History

Fishery Management Plan for Spiny Lobster in the Gulf of Mexico and the South Atlantic (1982)
The Spiny Lobster FMP largely extended Florida's rules regulating the fishery to the EEZ throughout the range of the fishery, i.e., North Carolina to Texas. The FMP regulations were effective on July 2, 1982 (47 FR 29203). Major items are as follows:

- MSY is estimated as 12.7 million pounds annually for the maximum yield per recruit size of 3.5 inch carapace length.
- OY is specified to be all lobster more than 3 inch carapace length or not less than 5.5 inch tail length that can be harvested by commercial and recreational fishermen given existing technology and prevailing economic conditions.
- A minimum harvestable size limit of more than 3 inch carapace length or not less than 5.5 inch tail length shall be established.
- A closed season from April 1 through July 25 shall be established. During this closed season there shall be a five-day "soak period" from July 21-25 and a five-day grace period for removal of traps from April 1-5.
- All spiny lobster traps shall have a degradable surface of sufficient size so as to allow escapement of lobsters from lost traps.
- All spiny lobster taken below the legal size limit shall be immediately returned to the water unharmed except undersized or "short" lobsters which may be carried on the boat/vessel provided they are: for use as lures or attractants in traps and kept in a shaded "bait" box while being transported between traps. No more than three live "shorts" per trap (traps carried on the boat) or 200 live "shorts", whichever is greater, may be carried at any one time.
- A special two-day recreational non-trap season shall be established.
- The retention on boat boats or vessels or possession on land of "berried" female spiny lobsters taken from the FCZ at any time shall be prohibited. Stripping or otherwise molesting female lobsters to remove the eggs shall be prohibited. "Berried" female lobsters taken in traps or with other gear must be immediately returned to the water alive and unharmed.

Table 1.4.1. GMFMC/SAFMC FMP Amendments affecting spiny lobster.

Description of Action	FMP/Amendment	Effective Date
Updated the FMP rules to be more compatible with that of Florida (State). The management measures: limited attractants to 100 per vessel, required live wells, required a commercial vessel permit, provided for a recreational permit, limited recreational fishermen to possession of 6 lobsters, modified the special 2-day recreational season before the commercial season, modified the duration of the closed commercial season (April 1 – August 5 with a preseason soak period beginning August 1), provided a 10-day trap retrieval period, prohibited possession of egg-bearing spiny lobster, specified the minimum size limit for tails [The harvesting of *Panulirus argus* spiny lobsters with a carapace length 3" or less; or if the carapace and tail are separated, with a tail length of less than 5.5" shall be prohibited.], provided for a tail separation permit, and prohibited possession of egg-bearing slipper lobster.	Amendment 1 (1987)	July 15, 1987 (52 FR 22659) with certain rules deferred and implemented on May 16, 1988 (53 FR 17 196) and on July 30, 1990 (55 FR 26448).
Modified the problems/issues and objectives of the fishery management plan; modified the statement of optimum yield [OY is specified to be all spiny lobster more than 3" carapace length or not less than 5.5" tail length that can be legally harvested by commercial and recreational fishermen given existing technology and prevailing economic conditions. OY is estimated at 9.5 million pounds.]; established a protocol and procedure for an enhanced cooperative state/council management system for instituting future compatible State and federal rules without amending the FMP; and added to the vessel safety and habitat sections of the FMP.	Amendment 2 (1989)	October 27, 1989 (54 FR 48059)

Table 1.4.1. GMFMC/SAFMC FMP Amendments affecting spiny lobster. (continued)

Description of Action	FMP/Amendment	Effective Date
Contained provisions for adding a scientifically measurable definition of overfishing [overfishing exists when the eggs per recruit ratio of the exploited population to the unexploited population is reduced below 5% and recruitment of small lobsters into the fishery has declined for 3 consecutive fishing years. Overfishing will be avoided when the eggs per recruit ratio of exploited to unexploited populations is maintained above 5%.], an action plan to prevent overfishing, should it occur, as required by the Magnuson Act National Standards (50 CFR 602), and the requirement for collection of fees for the administrative cost of issuing permits.	Amendment 3 (1990)	March 25, 199 1 (5 6 FR 12357)
Included extension of the Florida spiny lobster trap certificate system for reducing the number of traps in the commercial fishery to the EEZ off Florida, revision of the FMP commercial permitting requirements; limitation of the number of live undersize lobster used as attractants for baiting traps; specification of gear allowed for commercial fishing in the EEZ off Florida, specification of the possession limit of spiny lobsters by persons diving at night; requirement of lobsters harvested by divers be measured without removing from the water; and specification of uniform trap and buoy numbers for the EEZ off Florida.	Regulatory Amendment 1 (1992)	
Included a change in the days for the special recreational season in the EEZ off Florida; a prohibition on night-time harvest off Monroe County, Florida, during that season; specification of allowable gear during that season; and different bag limits during that season off the Florida Keys and the EEZ off other areas of Florida.	Regulatory Amendment 2 (1993)	

Table 1.4.1. GMFMC/SAFMC FMP Amendments affecting spiny lobster. (continued)

Description of Action	FMP/Amendment	Effective Date
Allowed the harvest of two lobsters per person per day for all fishermen all year long but only north of the Florida/Georgia border. This measure was added to the framework procedure so that future potential changes to the limit do not require a plan amendment. [Developed by the SAFMC]	Amendment 4 (1994)	September 15, 1995 (60 FR 41 828)
Identified Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concern for spiny lobster. Areas which meet the criteria for EFH-HAPCs for spiny lobster include Florida Bay, Biscayne Bay, Card Sound, and coral/hard bottom habitat from Jupiter Inlet, Florida through the Dry Tortugas, Florida. [Developed by the SAFMC]	Amendment 5 (1998)	July 14, 2000
Amended the FMP as required to make definitions of MSY, OY, overfishing and overfished consistent with National Standard Guidelines; identified and defined fishing communities and addressed bycatch management measures. MSY for species in the spiny lobster management unit is unknown. The Council reviewed alternatives and concluded the best available data supports using 20% Static SPR as a proxy for MSY. OY for the spiny lobster fishery is the amount of harvest that can be taken by U.S. fishermen while maintaining the SPR at or above 30% Static SPR. Overfishing for species in the Spiny Lobster FMP can only be defined in terms of the fishing mortality component given the data-poor status of these species. Based on the written guidance from NMFS, the Council is setting the overfishing level as a fishing mortality rate (F) in excess of the fishing mortality rate at 20% Static SPR (F20% Static SPR). [Developed by the SAFMC]	Amendment 6 (1998)	December 2, 1999

Table 1.4.1. GMFMC/SAFMC FMP Amendments affecting spiny lobster. (continued)

Description of Action	FMP/Amendment	Effective Date
Identified EFH, described the distribution and relative abundance of juvenile and adult spiny lobster for offshore, near-shore, and estuarine habitats of the Gulf. [Developed by the GMFMC]	Generic Amendment (1998) (no Spiny Lobster amendment number)	Partially approved February 8, 1999 64 FR 13363
The amendment had proposed revision to maximum sustainable yield (MSY), optimum yield (OY), maximum fishing mortality threshold (MFMT), and maximum stock size threshold (MSST) for spiny lobster. MSY, OY, and MSST were disapproved because they were based on transitional spawning stock biomass per recruit (SSBRs). The amendment updated the description of the spiny lobster fisheries and provided fishing community assessment information for Monroe County, Florida. [Developed by the GMFMC]	Generic SFA Amendment (1999) (no Spiny Lobster amendment number)	Partially approved December 2, 1999 64 FR 59126
Created two no-use marine reserves. Tortugas South (60 square nautical miles) was cited in the GMFMC EEZ to encompass a spawning aggregation site for mutton snapper. Tortugas North (120 square nautical miles) included part of the fishery jurisdiction of the FKNMS, Dry Tortugas National Monument, GMFMC, and the state of Florida, and was cooperatively implemented by these agencies. [Developed by the GMFMC]	Generic Tortugas Marine Amendment/ Spiny Lobster Amendment 7	August 19,2002 67 FR 47467
Specified that the holder of a valid crawfish license or trap number, lobster trap certificate and state saltwater products license issued by the Florida FWC may harvest and possess, while in the EEZ off Florida, undersized lobster not exceeding 50 per boat and 1 per trap aboard each boat, if used exclusively for luring, decoying or otherwise attracting non-captive lobster into traps.	Regulatory Amendment 3 (2002)	

Table 1.4.1. GMFMC/SAFMC FMP Amendments affecting spiny lobster. (continued)

Description of Action	FMP/Amendment	Effective Date
Set minimum size limit for importation of spiny lobster; and disallowed importation of spiny lobster tail meat which is not in whole tail form with the exoskeleton attached and the importation of spiny lobster with eggs attached or importation of spiny lobster where the eggs, swimmerets, or pleopods have been removed or stripped.	Amendment 8 (2008)	February 11, 2009 (74 FR 1148)
CEBA-1 provides a presentation of spatial information for EFH and EFH-Habitat Areas of Particular Concern designations for species in the Spiny Lobster FMP.	Amendment 9 (2009)	

2.0 MANAGEMENT ALTERNATIVES

2.1 Action 1: Other species in the Spiny Lobster FMP

*Note: More than one alternative may be chosen as a preferred.

Alternative 1: No Action – Retain the following species: smoothtail spiny lobster**,** *Panulirus laevicauda,* spotted spiny lobster, *Panulirus guttatus,* Spanish slipper lobster, *Scyllarides aequinoctialis,* in the Fishery Management Plan for data collection purposes only, but do not add them to the Fishery Management Unit.

Alternative 2: Set annual catch limits and accountability measures using historical landings for Spanish slipper lobster *Scyllarides aequinoctialis,* after adding them to the Fishery Management Unit and for ridged slipper lobster, *Scyllarides nodifer,* currently in the Fishery Management Unit.

Alternative 3: List species as ecosystem component species:

Option a: smoothtail spiny lobster**,** *Panulirus laevicauda*
Option b: spotted spiny lobster, *Panulirus guttatus*
Option c: Spanish slipper lobster, *Scyllarides aequinoctialis*
Option d: ridged slipper lobster, *Scyllarides nodifer*

Preferred Alternative 4: Remove the following species from the Joint Spiny Lobster FMP:

Option a: smoothtail spiny lobster**,** *Panulirus laevicauda*
Option b: spotted spiny lobster, *Panulirus guttatus*
Option c: Spanish slipper lobster, *Scyllarides aequinoctialis*
Option d: ridged slipper lobster, *Scyllarides nodifer*

Comparison of Alternatives: Landings and regulations are established for two species of lobster within the fishery management unit, the Caribbean spiny lobster and the ridged slipper lobster (GMFMC and SAFMC 1982). Landings of lobster species by the recreational sector are not documented by the Marine Recreational Fisheries Statistics Survey (MRFSS); only finfish data are collected. Florida FWC documents recreational catch of Caribbean spiny lobster landings through a survey. Florida FWC documents commercial landings of Caribbean spiny lobster and slipper lobsters by family, meaning they could be either Spanish or ridged slipper lobster.

No landings or bycatch information have been documented for smoothtail or spotted spiny lobster species. Because these species are found mostly inshore and are relatively small, neither commercial nor recreational fishers in the Florida Keys generally target these species in U.S. federal waters (W. Kelly, Florida Keys Commercial Fishermen's Association, personal communication, 2010). Outside of Brazil, the smoothtail spiny lobster is considered to be of minor importance (FAO 2007). In the commercial Caribbean spiny lobster fishery, spotted spiny lobsters are only captured in traps set directly on the reef (Sharp et al. 1997). Spotted spiny

lobsters rarely occupy the same dens as Caribbean spiny lobsters (Sharp et al. 1997), so they are unlikely to be taken incidentally by divers.

Even though slipper lobster are not always identified to species level when documented, the slipper lobster catch is believed to be primarily composed of ridged slipper lobster, because it is the only species commonly occurring along the west coast of Florida north of the Florida Keys that attains a size sufficient to be exploited for the industry (Sharp et al. 2007). Table 2.1.1 shows a decrease in slipper lobster landings, number of vessels, and trips. However, catch per unit effort (CPUE, pounds per trip) may have actually increased in recent years. The change in landings seems to be the result of a change in commercial shrimp effort. Major declines in commercial shrimp effort when slipper lobsters were caught occurred 98/99 to 99/00 and 03/04 to 04/05 (Table 2.1.1).

Table 2.1.1. Number of trips when slipper lobster were caught by vessels with a shrimp permit, plus landings and value of those slipper lobsters in the Gulf and South Atlantic.

Fishing year	Trips	Pounds	Pounds per trip (CPUE)	2008$
97/98	335	30,900	92	$131,100
98/99	225	13,100	58	$56,900
99/00	146	7,200	49	$33,500
00/01	145	8,800	60	$49,200
01/02	179	8,600	48	$51,100
02/03	130	10,000	77	$58,200
03/04	132	17,000	129	$98,800
04/05	72	5,000	69	$23,500
05/06	63	4,300	68	$22,100
06/07	56	6,100	108	$30,900
07/08	23	6,400	280	$36,900
08/09	22	1,900	86	$7,700

Source: SEFSC, FTT (19Mar10) data

Sharp et al. (2007) suggested decreased landings of slipper lobsters are related to the decreased number of commercial shrimping trips, because much of the slipper lobster landings are incidental catch in shrimp trawls. Gulf commercial shrimping effort was down 77% for 2009 from the base years of 2001-2003 (J. Nance, Southeast Fisheries Science Center, unpub). Effort (trips) of slipper lobster for 2009 was down 85% from the base-years average. Over the most recent three years (2006-2009), average slipper lobster landings were down 77%. So, decreases in landings for slipper lobster could be the result of decreased shrimp effort. We have also seen decreased effort in other fisheries due to economic issues such as increased fuel prices. The possibility still exists that effort has decreased because of decreases in the resource, but the stable-to-increasing CPUEs indicate otherwise.

In contrast to the total average commercial trap Caribbean spiny lobsters landings, slipper lobster landings are low and constitute less than 1% of the total average landings in both federal and state waters of the South Atlantic and Gulf of Mexico (Table 2.1.2). One commercial fisherman

stated out of 2,200 traps fished each year he averages only about three slipper lobsters per year (K. Lassard, commercial fisherman, personal communication, 2010).

Table 2.1.2. Average commercial trap landings, number of trips, and value of slipper lobsters (Slipper) versus Caribbean spiny lobster (Spiny) from 1999 through 2008 for Gulf federal waters, South Atlantic federal waters, and state of Florida landings combined for both coasts. Average pounds landed are live whole animal weight.

Average	Gulf federal		Atlantic federal		Florida state waters	
	Slipper	Spiny	Slipper	Spiny	Slipper	Spiny
Pounds	6,527	164,912	996	998,218	1,594	3,419,293
# Trips	69	413	26	2,976	21	17,805
$ Value	$26,580	$828,149	$4,080	$4,878,155	$6,074	$17,655,979

Source: Florida FWC, Marine Fisheries Information System 2009, Note: These data are based on the trip ticket program. Only one space is available for waters fished. Fishers could fish in both state and federal waters within one day, based on the season and other fishing behaviors. This table should be viewed with some caution, because additional unaccounted variability could exist due to the way the data is recorded and analyzed.

In addition to commercial trap landings data on the ridged and Spanish slipper lobsters, bycatch information is also available from observer coverage of the U.S. Gulf of Mexico and Southeastern Atlantic shrimp fishery (Scott-Denton 2004). During these studies, observers did not always specify whether the species was a ridged or Spanish slipper lobster, often only the family was recorded. An additional species from this family was recorded as bycatch, the Chace slipper lobster, *Scyllarus chacei*. This species is not currently within the Spiny Lobster FMP and bycatch of this species was the lowest of all three species characterized to the species level.

Observer bycatch of all the slipper lobster species was low for both the Gulf of Mexico and South Atlantic waters (Table 2.1.3). Catch during the current time period was 0.22 slipper lobster (all species) per characterized tow in the Gulf and 0.07 slipper lobster per characterized tow in the South Atlantic. A majority of the observer data from the family Scyllaridae was documented off the west coast of Florida and some off the Louisiana/Texas coast (Figure 2.1.1). Ridged slipper lobster was documented more often than Spanish slipper lobster in the Gulf of Mexico, similar to Alabama and Florida documented landings. Low bycatch of the family Scyllaridae was also documented off the east coast of Florida (Figure 2.1.1).

Table 2.1.3. Current and historical bycatch of lobster species documented by observer coverage of the U.S. Gulf of Mexico and Southeastern Atlantic Shrimp Fishery.

Lobster species	Gulf (current) (2001-2002)	Atlantic (current) (2001-2007)	Gulf (historical) (1992-1996)	Atlantic (historical) (1992-1995)
Caribbean spiny lobster (*Panulirus argus)*	19	0	6	0
Ridged slipper Lobster (*Scyllarides nodifer*)	101	1	103	0
Spanish slipper lobster (*Scyllarides aequinoctialis*)	16	1	41	0
Family Scyllaridae (slipper lobsters: ridged, Spanish or Chace)	68	45	0	0
Characterized Tows (Sum)	839	649	1,438	301

Source: E. Scott-Denton, NMFS Galveston Laboratory.

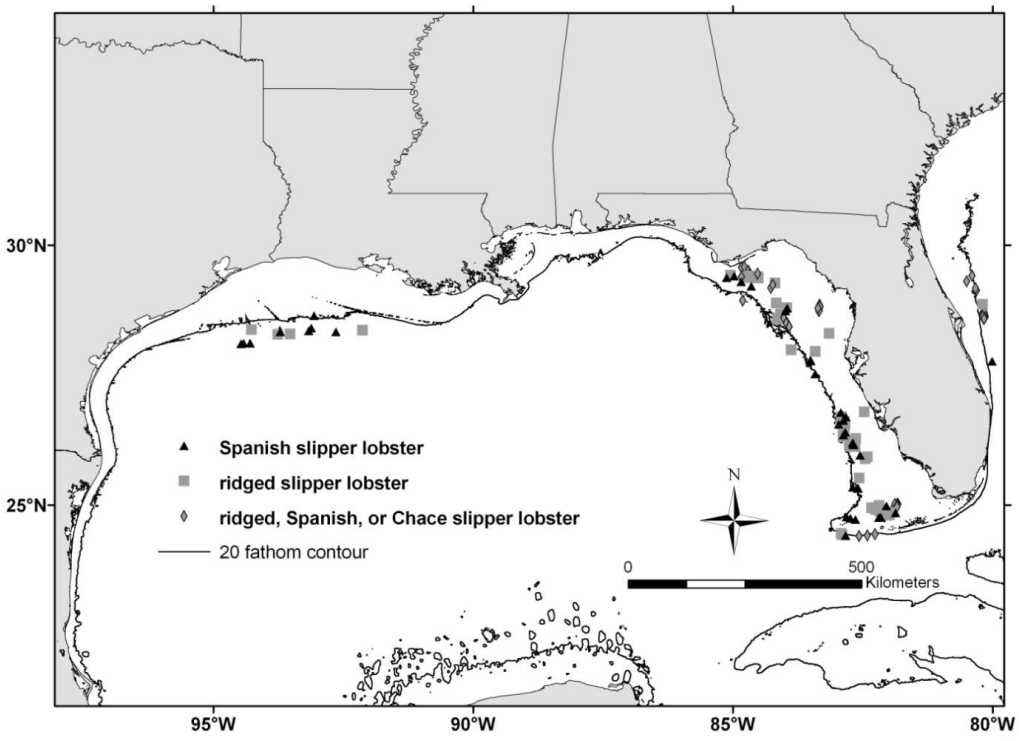

Figure 2.1.1. Location of bycatch documented from the observer shrimp trawl coverage of the U.S. Gulf of Mexico and Southeastern Atlantic coast.
Source: E. Scott-Denton, NMFS Galveston Laboratory, personal communication.

Recreational landings for slipper lobsters are not recorded by the Florida FWC survey, only Caribbean spiny lobster landings. However, due to the intense recreational fishery for Caribbean spiny lobster, some fishers may harvest slipper lobster species if observed (Sharp et al. 2007). It should be noted some recreational fishing tournaments may target slipper lobsters as note by a Panama City, Florida fishing website (http://www.schooners.com/events/lobsterfestival.htm#results). However, examination of intensive creel surveys of the recreational spiny lobster fishery in the Florida Keys, which were conducted during the special two-day sport season and the first two weeks of the regular season, indicated slipper lobsters are not as targeted by recreational fishers in the Keys, but there is evidence that they are targeted to some degree by recreational divers in the northern Gulf of Mexico (Sharp, personal communitcation). However, because of their cryptic nature, it is unlikely a substantial recreational fishery will develop (Sharp et al. 2007). Also, due to the lack of data on slipper lobster species life history, growth rates, and reproductive biology, conducting an effective stock assessment would be difficult (Sharp et al. 2007).

Alternative 1 would retain all species in the Spiny Lobster FMP for data collection purposes only, without adding them to the Fishery Management Unit (FMU). After 28 years, the Councils have not seen the need to add these stocks to the FMU. However, the Magnuson-Stevens Act requires ACLs for all species in the FMP except ecosystem component species, so this alternative would not comply with legal requirements.

Alternative 2 would set ACLs and AMs using historical commercial landings for Spanish slipper lobster after adding them to the Fishery Management Unit, and for ridged slipper lobster, currently in the Fishery Management Unit. The ACLs and AMs would need to be set for both species combined because commercial landings are recorded by family, meaning catch could be composed of Spanish slipper lobster, ridged slipper lobster, or both. Positive biological benefits may be expected from setting ACLs and AMs; however, landings of these two species combined are low so the effect may be small. Due to a lack of monitoring and data collection sources for these two species, ACLs may be very difficult to track and accountability measures may need to be less restrictive to account for limited landings information and potential large fluctuations. The status of this stock is completely unknown, and further life history information is needed before an effective assessment can be undertaken, especially regarding recruitment dynamics, growth rates, behavior, and reproductive biology. Setting ACLs and AMs for the two slipper lobsters combined may not provide the desired positive benefits to the ecological and biological environment because little is known about these two species and currently there are not adequate monitoring programs in place.

Alternative 3 would place any of the four species in the Fishery Management Unit and list them as ecosystem component species (**Options a-d**). The option to use ecosystem component status is intended to encourage the incorporation of ecosystem considerations into fishery management plans (see Figure 2.1.2 as a guide). Species can be defined as ecosystem component species for reasons such as for ecosystem considerations related to specification of optimum yield for the associated fishery, as considerations in the development of conservation and management measures for the associated fishery, or to address other ecosystem issues.

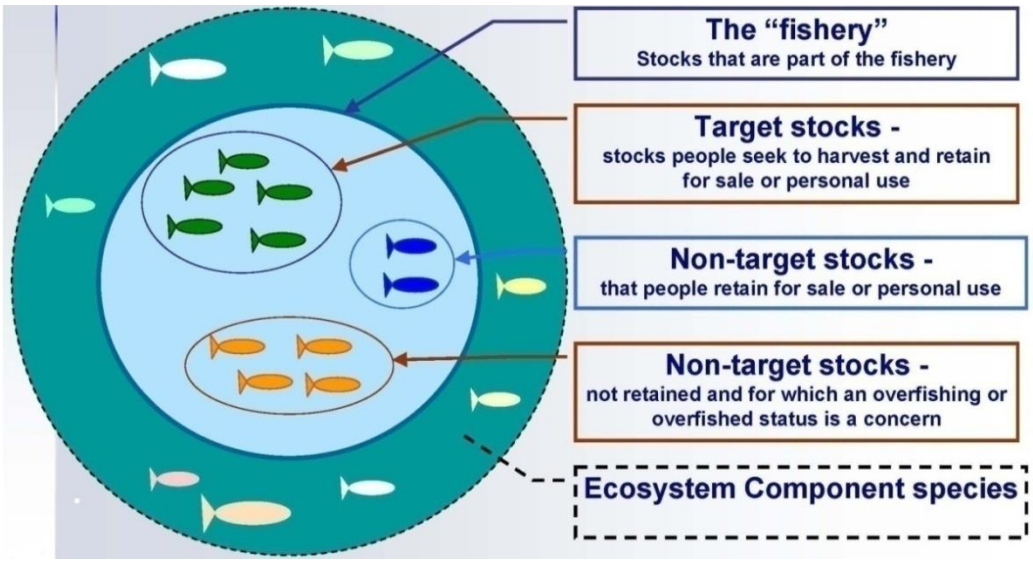

Figure 2.1.2. A conceptual model of stocks in the fishery and ecosystem component stocks.
Source: National Standard 1 guidelines.

Alternative 3, Options a and **b,** would place smoothtail and spotted spiny lobsters in the fishery management unit and list them as ecosystem component species. The smoothtail and spotted spiny lobsters meet all of the ecosystem component criteria, because they are non-targeted, not subject to overfishing or overfished, nor likely to become subject to overfishing or overfished (Table 2.1.4). The National Standard 1 final guidelines add new language in 50 CFR 600.310(d)(5)(i)(D) —''not generally retained for sale or personal use''— in lieu of ''*de minimis* levels of catch'' and clarify that occasional retention of a species would not, in itself, preclude consideration of a species in the ecosystem component classification.

Table 2.1.4. Ecosystem component criteria for stocks in the Gulf of Mexico and South Atlantic. Average landings were calculated by combining Gulf and South Atlantic commercial landings.

			National Standard 1 Guidelines Criteria			
Species	**Average shrimp trawl landings (pounds) 1997-2009**	**Average trap landings (pounds) 1999-2008**	**Non-target**	**Not overfished or overfishing?**	**Not likely to become overfished or overfishing**	**Not generally retained for sale or personal use**
smoothtail spiny lobster	0	0	X	Unknown	Unknown	X
spotted spiny lobster	0	0	X	Unknown	Unknown	X
Spanish slipper lobster	9,942	11,120	X	Unknown	Unknown	
ridged slipper lobster				Unknown	Unknown	

Source: Florida FWC, Marine Fisheries Information System 2009. Note: An "X" indicates the National Standard 1 criteria apply to that species and SEFSC, FTT (19Mar10) data

Commercial trap landings of the Spanish and ridged slipper lobsters (**Options c and d**) are low and average 11,120 lbs. whole animal weight per year during 1999-2008. The average landings from commercial vessels with a shrimp permit are also low and average 9, 942 lbs. whole animal weight per year during 1997-2009. The commercial shrimp trawl fishery appeared to target slipper lobsters in the 1980s, peaking in 1985 and then decreasing greatly until the 1990s (Sharp et al. 2007). This drop in slipper lobster landings by the commercial shrimp fleet might be related to regulatory changes implemented during 1987 that prohibited both the possession of egg-bearing females of the ridged slipper lobster and the removal of eggs by clipping their pleopods. Additionally, commercial shrimp trawls were required to have turtle-excluding devices (TEDS) in the early 1990s which may have also reduced the efficiency with which the gear captured slipper lobsters (Sharp et al. 2007).

Currently, slipper lobsters are not believed to be targeted by commercial or recreational fishers. However, both Spanish and ridged slipper lobster are generally retained for sale or personal use; therefore, these species may not meet all the National Standard 1 guidelines for ecosystem component species. Placing these species in the ecosystem component classification, would allow them to remain in the fishery management plan for data collection, but not require setting ACLs. Maintaining these lesser lobster species in the fishery management plan and listing them as ecosystem component species would allow these species to be maintained under federal protection. There could be positive biological and ecological benefits for these species if regulatory action was needed at a later date because these species would be within the fishery management plan. However, maintaining species within the fishery management plan and designating them as ecosystem component species without current monitoring programs may negate any potential positive benefits to the resource.

Preferred Alternative 4 would remove species from the Spiny Lobster FMP; only the Caribbean spiny lobster would remain. If species are removed from federal management, states can manage harvest of the species within federal waters adjacent to state waters for vessels registered to the state or landing catch in the state. Currently, Florida regulations prohibit possession or harvest of egg-bearing females of any spiny or slipper lobster species; thus some of these species would receive greater protection under state management than under current federal management.

Smoothtail and spotted spiny lobsters (**Option a** and **b**) have no landings information available, and if they do not need to be in the Spiny Lobster FMP for data collection or other management purposes, then it may be appropriate for these species to be removed. If any of the species are removed from the Spiny Lobster FMP without another agency taking over management, the potential for negative impacts to the physical and biological environments may occur, if fishing effort for these species increased. However, as stated above, these species would be afforded greater protection under Florida regulations than if they were retained in the FMP.

Of the two species of slipper lobster (**Option c** and **d**), the ridged slipper lobster currently has some federal regulations. The regulations specified for ridged slipper lobster discuss conservation and management [50 CFR 640.1(b)], define slipper lobster by genus species (*S. nodifers*) [640.2], prohibit harvest of a berried (egg-bearing) lobsters [50 CFR 640.21 9(a)], and

prohibit the use of poisons and explosives to take slipper lobster in the EEZ [50 CFR 640.22 9(a)(3)]. If these species were removed from the fishery management plan, the federal regulations for ridged slipper lobster would no longer apply. However, the state of Florida could manage the fishery in the EEZ off state waters, and Florida state regulations are more conservative than federal regulations in that they prohibit the harvest of egg-bearing females for all species of slipper lobster.

As stated above, commercial landings of slipper lobster are low and have been decreasing over the years. Most data indicate these species are only incidentally caught, primarily by the commercial shrimp fishery and incidentally in Caribbean spiny lobster traps. Slipper lobster landings have decreased concurrent with decreased effort in the commercial shrimp fishery. No recreational landings data are available, but creel surveys of the recreational spiny lobster fishery in the Florida Keys conducted during the special two-day sport season and the first two weeks of the regular season indicated slipper lobsters are not targeted by recreational fishers in the Keys, and although there is some evidence that they are targeted to some degree by recreational divers in the northern Gulf of Mexico, because of slipper lobsters cryptic nature, behavior, and size, they are unlikely to support a substantial recreational fishery.

2.2 Action 2: Modify the Current Definitions of Maximum Sustainable Yield, Overfishing Threshold, and Overfished Threshold for Caribbean Spiny Lobster

2.2.1 Action 2-1: Maximum Sustainable Yield (MSY)

Alternative 1: No Action- Use the current definitions of MSY as a proxy. The Gulf of Mexico approved definition**:** MSY is estimated as 12.7 million pounds annually for the maximum yield per recruit size of 3.5 inch carapace length. The South Atlantic approved definition: MSY is defined as a harvest strategy that results in at least a 20% static SPR (spawning potential ratio).

Alternative 2: Modify the Gulf of Mexico definition to mirror the South Atlantic definition of MSY proxy, defined as 20% static SPR.

Alternative 3: the MSY equals the yield produced by fishing mortality at maximum sustainable yield (F_{MSY}) or proxy for F_{MSY}. Maximum sustainable yield will be defined by the most recent SEDAR and joint Scientific and Statistical Committee processes.

Preferred Alternative 4: the MSY proxy will be the Overfishing Limit (OFL) recommended by the Gulf of Mexico Scientific and Statistical Committee at 7.90 million pounds.

Note: The MSY definition for the Gulf of Mexico was edited to the approved definition (Alternative 1).

2.2.2 Action 2-2: Overfishing Threshold (Maximum Fishing Mortality Threshold)

Alternative 1: No Action - Use the current definitions of overfishing thresholds. The Gulf and South Atlantic approved definition: overfishing level as a fishing mortality rate (F) in excess of the fishing mortality rate at 20% static SPR ($F_{20\%}$ static SPR).

Alternative 2: Specify the Maximum Fishing Mortality Threshold (MFMT) as F_{MSY} or F_{MSY} proxy. The most recent SEDAR and joint Scientific and Statistical Committees will define F_{MSY} or F_{MSY} proxy. This should equal the Overfishing Limit (OFL) provided by the Scientific and Statistical Committees (SSCs). The Councils will compare the most recent value for the current fishing mortality rate (F) from the SEDAR/SSC process to the level of fishing mortality that would result in overfishing (MFMT) and if the current F is greater than the MFMT, overfishing is occurring. Comparing these two numbers:

- $F_{CURRENT}$/MFMT = X.XXX

*This comparison is referred to as the **overfishing ratio**. If the ratio is greater than 1, then overfishing is occurring.

Preferred Alternative 3: Specify the Maximum Fishing Mortality Threshold (MFMT**)** as the Overfishing Limit (OFL) defined by the Gulf of Mexico Scientific and Statistical Committee at 7.90 million pounds.

Note: The overfishing definition for the Gulf of Mexico was edited to the approved definition (Alternative 1), eliminating the need for the previous Alternative 2.

2.2.3 Action 2-3: Overfished Threshold (Minimum Stock Size Threshold)

Alternative 1: No Action – Do not establish an overfished threshold. The Gulf of Mexico does not have an approved definition of the overfished threshold. The South Atlantic Council approved definition is a framework procedure to add a biomass based component to the overfished definition, due to no biomass levels and/or proxies being available.

Alternative 2: The MSST is defined by the most recent SEDAR and joint Scientific and Statistical Committees process. The Councils will compare the current spawning stock biomass (SSB) from the SEDAR and Scientific and Statistical Committees process to the level of spawning stock biomass that could be rebuilt to the level to produce the MSY in 10 years. Comparing these two numbers:

- $SSB_{CURRENT}/MSST = Y.YYY$

This comparison is referred to as the **overfished ratio**. If the ratio is less than 1, then the stock is overfished.

Preferred Alternative 3: Minimum Stock Size Threshold (MSST) = (1-M) x B_{MSY}. Definitions: M= instantaneous natural mortality and B_{MSY} = biomass at maximum sustainable yield or the appropriate proxy.

Note: The overfished threshold for the Gulf of Mexico was not approved so it was corrected (Alternative 1).

Comparison of Alternatives: There are three sub-actions for modification of the current definition for each of the following biological reference points: maximum sustainable yield (MSY), overfishing threshold (MFMT), and overfished threshold (MSST). The optimum yield (OY) definition is addressed under Action 4-2.

Currently the Councils have different approved definitions for two of three biological reference points, **Actions 2-1** and **2-3**, respectively. The Gulf Council does not currently have an approved MSST definition and the South Atlantic Council's approved definition is a framework procedure (GMFMC and SAFMC 1982; GMFMC and SAFMC 1990; GMFMC 1999, SAFMC 1998, SEDAR 8 2005). The Gulf Council definitions submitted to the NOAA Fisheries Service in their Generic Sustainable Fisheries Act (SFA) Amendment were partially approved (NOAA Fisheries Service letter received November 17, 1999). The letter states that spawning potential ratio is not biomass-based and is not an acceptable proxy for MSY or MSST. In addition, the letter goes on to state that transitional SPR is not an appropriate proxy for the MFMT for spiny lobster, because it is affected by past fishing mortality. However, static SPR is the appropriate proxy for MFMT. After modification the Gulf Council's definition was approved (NOAA Fisheries Service letter received November 17, 1999).

Transitional SPR versus static SPR was used for the unapproved definitions of MSY and MSST by the Gulf Council. As the name suggests SPR ratio expresses spawning per recruit as a ratio in a fished condition, relative to the maximum theoretical amount of spawning per recruit that

occurs when there is no fishing (Slipke and Maceina 2000; MRAG Americas 2001). Due to increased fishing effort reducing the potential reproductive output, the denominator in the spawning potential ratio is always greater than or equal to the numerator, so the resulting values will range between 0 and 1 (MRAG Americas 2001).

The benchmark assessment for Caribbean spiny lobster (SEDAR 8 2005) found that the biomass of the stock could not be estimated. Therefore a MSY, Biomass at MSY, and MSST were not estimated (Table 2.2.1). An updated assessment on Caribbean spiny lobster was completed in 2010. After careful consideration, the Review Panel concluded there is sufficient concern with the performance of the two assessment models to reject the results and that the stock status of Caribbean spiny lobster in the southeastern U.S. was unknown. This was primarily based on new genetic evidence presented by Mike Tringali from Florida FWC indicating the southeastern U.S. Caribbean spiny lobster stock largely depends on external recruitment from upstream Caribbean populations. Due to this new genetic information the Review Panel concluded that the U.S. Caribbean spiny lobster stock cannot be assessed in isolation and the assessment was not conducted on the appropriate geographical and biological scale needed to capture population-wide dynamics. The Gulf SSC went on to request in a motion that monitoring and research be supported to produce a Pan-Caribbean population-wide assessment. The South Atlantic SSC will review the update assessment for spiny lobster at their meeting in April 2011.

Alternative 1 under **Actions 2-1** and **2-3** would use the current approved definitions of MSY and MSST, separately for each Council. Due to the Caribbean spiny lobster fishery being a jointly managed species, it may be the best time for the Councils to adopt the same biological reference points in this full amendment. However, under **Action 2-2**, the Council's have the same approved definitions for the overfishing threshold, but may select a different alternative based on new scientific information from the 2010 update stock assessment and SSC Review Processes.

The maximum sustainable yield (**Action 2-1**) is currently unknown for Caribbean spiny lobster because biomass estimates are unreliable due to outside recruitment from the Pan-Caribbean population and therefore unaccepted from the 2010 Update Assessment. **Alternative 2** under **Action 2-1 (MSY)** would modify the definition of MSY to mirror the South Atlantic Council's definition, which is a harvest strategy resulting in 20% static SPR versus using landings estimates which is currently the approved Gulf Council definition-**Alternative 1**). The South Atlantic Council reviewed alternatives and concluded the best available data supports using 20% static SPR as a proxy for MSY. The Gulf Council's unapproved definition submitted in the 1999 SFA Amendment was 20% transitional SPR. NOAA Fisheries Service disapproved this estimate because it was not biomass-based and was not an acceptable proxy for MSY (NOAA Fisheries Service letter received November 17, 1999). The South Atlantic Council's definition was not biomass based either but was approved in Amendment 6, 1998 and became effective December 2, 1999.

Justification for using static SPR is based on projected yield streams at equilibrium, versus the current dynamic measure (transitional SPR), which may change in future years from the current estimate. This could make the projections less reliable than using equilibrium recruitment and mortality conditions (static SPR). Since stock assessments are not usually completed on an

annual basis, static SPR may be a better index to use for yield projections. Further, static SPR does not require constant recruitment, because it is expressed on a "per recruit" basis and is useful as a measure of overfishing (MRAG Americas 2001).

Alternative 3 under **Action 2-1 (MSY)** and **Alternatives 2** under **Action 2-2 (Overfishing Threshold)** and **Action 2-3 (Overfished Threshold)** would modify all biological determination criteria from the current definitions to the most recent SEDAR and joint SSC's process. This alternative would provide the best available science in the update assessment and modify the separate Council definitions into one biological reference point for MSY, overfishing, and overfished threshold. However, the 2010 update assessment for spiny lobster was not accepted by the joint SSC subcommittee review panel (November 2010) or by the Gulf SSC at their January 2011 meeting. The 2010 update assessment was not accepted based on new evidence indicating the southeastern U.S. stock largely depends on external recruitment from upstream Caribbean populations, precluding reliable estimation of management reference points.

Due to the MSY being currently unknown, the Gulf Council proposed using the Gulf SSC recommendations for the overfishing limit. This recommendation was calculated using Tier 3a of the Gulf ABC Control Rule, discussed in greater detail under Action 4-1. Using Tier 3a of the Gulf ABC Control Rule, the Gulf SSC recommended an OFL be set as the mean of the most recent landings in the last 10 years (2000/01-2009/10 fishing years; Table 2.4.1) plus two standard deviations using data from the update assessment that excluded attractants. Note: an attractant is an "undersize lobster" used in a trap to draw other legal sized lobsters into the traps due to their gregarious behavior (2010 Update Assessment Report). Section 2.7 addresses the use of "undersize lobsters' used as attractants. The 2004/05 recreational fishing landings were estimated from commercial: recreational ratios in other fishing years (Table 2.4.1). Due to the biomass estimates being unreliable for Caribbean spiny lobster and the 2010 update stock assessment being rejected, the Gulf and South Atlantic Council selected **Preferred Action 2-1 (MSY), Alternative 4**. This alternative would establish the MSY proxy as the OFL recommended by the Gulf SSC at 7.90 million pounds. The unaccepted MSY estimate calculated in the 2010 update assessment for Caribbean spiny lobster was the yield at $F_{20\%SPR}$ = 7,950,000 lbs. (Update Assessment Review Workshop Report 2010). The unaccepted value (7,950,000 lbs.) estimated from the update assessment is almost the exact same value as the current **Preferred Action 2-1 (MSY), Alternative 4** calculated by the Gulf SSC from the ABC Control Rule. It is fortunate that these numbers worked out to be so close because Tier 3a of the ABC Control Rule is based on landings (OFL=7.90 million pounds) and the stock assessment based on the best available science estimated an OFL based on the MSY proxy of $F_{20\%SPR}$ = 7,950,000 lbs.

In addition to the MSY level being unknown the overfishing limit (MFMT) is also unknown due to biomass estimates for Caribbean spiny lobster being unreliable. Therefore the Gulf Council requested that the OFL be defined by the Gulf of Mexico SSC at 7.90 million pounds and that is the current **Preferred Action 2-2 (Overfishing Threshold), Alternative 3**.

The proxy of $F_{20\%SPR}$ for F_{MSY} was used to estimate this value in both the update and benchmark assessments (Table 2.2.1). The value estimated from the update assessment for MFMT was 0.45 per year very close to the estimate calculated from the benchmark assessment at 0.49 per year.

These estimates are based on a fishing mortality rate at MSY or in the case of Caribbean spiny lobster a proxy for F_{MSY} defined as $F_{20\%SPR}$. The Councils felt using the landings based estimate was more appropriate for the MFMT rather than using the fishing mortality proxy. Since the MSY proxy was the OFL=7.90 mp (**Preferred Action 2-1, Alternative 4**), specifying the overfishing threshold at a rate that exceeds 7.90 mp is appropriate (**Preferred Alternative 3 under Action 2-2**).

Based on biomass of Caribbean spiny lobster remaining un-estimated in the southeastern U.S. due to external recruitment from Pan-Caribbean populations the MSST is also unknown. Under the current **Preferred Action 2-3 (Overfished Threshold), Alternative 3** the MSST = (1-M) x B_{MSY}. Definitions: M= instantaneous natural mortality and B_{MSY} = biomass at maximum sustainable yield or the appropriate proxy. The instantaneous natural mortality number used for both the SEDAR 8 benchmark assessment and 2010 update assessment was M=0.34 per year. However, due to the biomass of the southeastern U.S. Caribbean spiny lobster stock remaining unknown, MSST cannot be calculated, but it was estimated in the 2010 update assessment at 1.150×10^{12} eggs (Table 2.2.1).

Table 2.2.1. Management benchmarks for Caribbean spiny lobster in the southeastern United States.

Criterion	Description	Definition	Unaccepted Values 2010 Update Assessment	Accepted Values from SEDAR 8 2005
MSY	Maximum Sustainable Yield	Yield@$F_{20\%SPR}$	7,950,000 lbs.	Not estimated
MFMT	Maximum Fishing Mortality Threshold	$F_{MSY} = F_{20\%SPR}$	0.45 per year	0.49 per year
B_{MSY}	Biomass at MSY	Biomass@$F_{20\%SPR}$	1.743×10^{12} eggs	Not estimated
MSST	Minimum Spawning Stock Threshold	B_{MSY} x (1-M)	1.150×10^{12} eggs	Not estimated

Source: Update Assessment Review Workshop Report 2010 (unaccepted assessment values) and SEDAR 8 Benchmark Assessment 2005 (accepted assessment values).

The alternatives for MSY (**Action 2-1, Alternative 3**), Overfishing Threshold (**Action 2-2, Alternative 2**), and Overfished Threshold (**Action 2-3, Alternative 2**) were not accepted by the Joint SSCs SEDAR review process or the Gulf SSC. Therefore as currently written, **Actions 2-1 (MSY)**, **Alternatives 2** and **3** are the same. However, the Councils felt it was necessary to leave these alternatives in the document for a future benchmark assessment on Caribbean spiny lobster because a more reliable Caribbean-wide estimate of biomass may be produced. At that time these alternatives may provide the best protection for the resource. Currently, these alternatives may not provide the best protection for the resource because the current biomass of Caribbean spiny lobsters in the southeastern U.S. is unknown and the estimates calculated from the most recent SEDAR process were unaccepted. Until another benchmark assessment can be completed for Caribbean spiny lobster with additional information on the Pan-Caribbean stock **Action 2-1 (MSY), Alternative 4** and **Action 2-2 (Overfishing Threshold), Alternative 3** provide the best protection for the resource. The Overfished Threshold **(Action 2-3, Alternative 3)** is currently unknown but would provide the same biological reference point for both Councils and when the biomass is able to be estimated for Caribbean spiny lobster, would provide adequate protection

for the resource. However, without a clear estimate of Caribbean spiny lobster biomass it is unknown if **Alternatives 2** or **3** under **Action 2-3 (Overfished Threshold)** would provide the best protection for the resource.

2.3 Action 3: Establish Sector Allocations for Caribbean Spiny Lobster in State and Federal Waters from North Carolina through Texas

Preferred Alternative 1: No action – Do not establish sector allocations.

Alternative 2: Allocate the spiny lobster ACL by the following sector allocations: 80% commercial and 20% recreational.

Alternative 3: Allocate the spiny lobster ACL by the following sector allocations: 74% commercial and 26% recreational.

Alternative 4: Allocate the spiny lobster ACL by the following sector allocations: 78% commercial and 22% recreational.

Alternative 5: Allocate the spiny lobster ACL by the following sector allocations: 77% commercial and 23% recreational.

Alternative 6: Allocate the spiny lobster ACL by the following sector allocations: 76% commercial and 24% recreational.

Comparison of Alternatives: **Preferred Alternative 1** would prevent establishment of sector ACLs and make it more difficult to track total landings to ensure the ACL is not exceeded. In the South Atlantic Council's area, north of Florida, all fishermen are limited to two Caribbean spiny lobsters per person per day year round, which effectively allocates 100% to the recreational sector in this area.

Alternative 2 is based on the "better year" which was the 1998/99 fishing season when the trap fishery had the highest proportion of total landings. This alternative was supported by 10 of the 14 members of the Advisory Board present at the May 23-24, 2006. The Councils are including all gear types for the commercial sector into one allocation equal to 80%; the recreational allocation would equal 20%. **Alternative 3** is based on using 1993-94 landings for allocations and was supported by 3 of the 14 members of the Advisory Board. The Councils are lumping to commercial sector into one allocation equal to 74%; the recreational allocation would equal 26%. **Alternative 4** is the average of **Alternatives 2** and old Alternative 3 (see Appendix A) and was supported by 11 of the 14 members of the Advisory Board present. This is the consensus recommendation of the Advisory Board for spiny lobster allocations. The Councils are lumping the commercial sector into one allocation equal to 78%; the recreational allocation would equal 22%. **Alternative 5** uses catches from fishing years/seasons 1991/92 through 2009/10 (Table 2.4.1). **Alternative 6** bases 50% of the allocation on the most recent 10 years (2000/01-2009/10) and 50% based on the most recent 3 years (2007/08-2009/10).

By way of comparing to recent landings, the recreational sector harvested 21% in 2009/2010. **Alternative 2** would represent a reduction of 1% to the recreational sector, **Alternative 3** would represent an increase of 5%, **Alternative 4** would represent an increase of 1%, **Alternative 5** would represent an increase of 2%, and **Alternative 6** would represent an increase of 3%. Using the same base year (2009/10), the commercial sector would see an increase of 1% under

Alternative 2, a decrease of 5% under **Alternative 3**, a decrease of 1% under **Alternative 4**, a decrease of 2% under **Alternative 5**, and a decrease of 3% under **Preferred Alternative 6**. **Prefered Alternative 1** would allow both sectors to operate as they have in the past, and the Councils will monitor the level of harvest and take action if necessary through the framework procedure.

2.4 Action 4: Acceptable Biological Catch (ABC) Control Rule, ABC Level(s), Annual Catch Limits, and Annual Catch Targets for Caribbean Spiny Lobster

2.4.1 Action 4-1: Acceptable Biological Catch (ABC) Control Rule

Alternative 1: No Action – Do not establish an ABC Control Rule for spiny lobster.

Alternative 2: Adopt the following ABC Control rule:
Option a: the South Atlantic Council's ABC control rule.
Preferred Option b: the Gulf Council's ABC control rule.

Alternative 3: Establish an ABC Control Rule where ABC equals OFL.

Alternative 4: Specify ABC as equal to the mean of the last 10 years landings.

Alternative 5: Specify ABC as equal to the high of the last 10 years landings.

Alternative 6: Specify ABC as equal to the low of the last 10 years landings.

Comparison of Alternatives: ABC is recommended by the SSC using a control rule specified by the Councils. The South Atlantic SSC provided an ABC Control Rule at their April 2010 meeting and the Gulf SSC approved an ABC Control Rule at their January 2010 meeting. These two rules need to be consolidated and/or modified such that both SSCs agree on one ABC Control Rule for spiny lobster. At the December South Atlantic Council meeting, the Council directed their SSC to consider the Gulf ABC Contol Rule. The South Atlantic SSC meets April 5-7, 2011. The SSC recommendations will be presented to the public during public hearings, and the SSC-recommended ABC will be addressed by both Councils in June as they take final action on the amendment.

In the interim, the Councils are considering a range of alternatives based on landings data and the expected SSC Control Rules. The public is asked to comment on this range of alternatives.

Alternative 2a would use the South Atlantic Control Rule which would use the mean (5.6 mp) or median (5.5 mp) of the last 10 years landings data for species without any biomass reference points. This contol rule may change after the SSC meeting in April.

Preferred Alternative 2b would use the Gulf control rule under Tier 3a, as recommended by the Gulf SSC. This tier is used when the following conditions are met:

> *No assessment is available, but landings data exist. The probability of exceeding the overfishing limit in a given year can be approximated from the variance about the mean of recent landings to produce a buffer between the overfishing limit and acceptable biological catch. Based on expert evaluation of the best scientific information available, recent historical landings are without trend, landings are small relative to stock biomass, or the stock is unlikely to undergo overfishing if future landings are equal to or moderately higher than the mean of recent landings. For stock complexes, the*

determination of whether a stock complex is in Tier 3a or 3b will be made using all the information available, including stock specific catch trends.

Under this control rule, OFL is set at mean landings (recent 10 year recommended) plus two standard deviations. ABC is set using a buffer from OFL that represents an acceptable level of risk due to scientific uncertainty. The buffer will be predetermined for each stock or stock complex by the Council with advice from the SSC as:

a. ABC = mean of the landings plus 1.5 * standard deviation (risk of exceeding OFL = 31%)
b. ABC = mean of the landings plus 1.0 * standard deviation (default) (risk of exceeding OFL = 16%)
c. ABC = mean of the landings plus 0.5 * standard deviation (risk of exceeding OFL = 7%)
d. ABC = mean of the landings (risk of exceeding OFL = 2.3%)

The Gulf SSC recommended using mean landings plus 1.5 standard deviations for Caribbean spiny lobster**.** The rationale for this choice was the SSC's conclusion, based on population genetics and physical transport data presented, that there was a high probability that juvenile spiny lobster that settle in south Florida recruit from several spawning populations throughout the greater Caribbean and are not locally self-recruited. Therefore, there is a low probability that landings in south Florida will have a substantial effect on future recruitment there. The OFL recommended by the Gulf SSC is 7.9 mp and the ABC is 7.32 mp.

Table 2.4.1 shows values for each alternative using the recent 10-year average landings. **Alternative 3** would set ABC equal to OFL; however, some method would be needed for setting the OFL if the current control rules are not used. **Alternatives 4-6** cover the range of values under consideration by the Councils.

Table 2.4.1. Caribbean spiny lobster landings.

Fishing Season	Com. Total	%Com	Rec. Total	%Rec	Com. & Rec. Total
1991/92	6,836,015	79%	1,815,791	21%	8,651,806
1992/93	5,368,188	80%	1,352,443	20%	6,720,631
1993/94	5,309,790	74%	1,883,114	26%	7,192,904
1994/95	7,181,641	79%	1,905,995	21%	9,087,636
1995/96	7,017,134	78%	1,930,718	22%	8,947,852
1996/97	7,744,104	80%	1,922,596	20%	9,666,700
1997/98	7,640,177	77%	2,304,186	23%	9,944,363
1998/99	5,447,533	81%	1,302,677	19%	6,750,210
1999/00	7,669,207	76%	2,461,981	24%	10,131,188
2000/01	5,568,707	74%	1,949,033	26%	7,517,740
2001/02	3,079,263	71%	1,251,081	29%	4,330,343
2002/03	4,577,392	76%	1,455,298	24%	6,032,690
2003/04	4,161,589	75%	1,411,509	25%	5,573,097
2004/05	5,472,994	76%	1,657,535	24%	6,906,397
2005/06	2,963,160	72%	1,131,014	28%	4,094,174
2006/07	4,799,493	79%	1,304,511	21%	6,104,004
2007/08	3,778,037	76%	1,215,069	24%	4,993,105
2008/09	3,269,397	72%	1,263,509	28%	4,532,906
2009/10	4,343,305	79%	1,126,714	21%	5,470,019
All years	5,380,375	77%	1,601,086	23%	6,981,461
Recent 10-year values					
Mean					5,584,939
Median					5,521,558
Minimum					4,094,174
Maximum					7,517,740
Mean + 1.5Std.					7,323,117
Mean + 2.0Std.					7,902,510

Source: Landings from Florida Fish & Wildlife Commission; current as of 6/24/10. Recreational landings are estimated landings through Labor Day of each season only. The recreational landings from 2000 onward reflect the retrospective analysis done to include additional recreational permit holders that were not incorporated into the original landings models. Total landings for the 2004/05 season were not provided because the recreational surveys were not conducted that season due to storms; previous estimates only included the 2-day season landings and substantially underestimated total recreational landings for the combined 2-day season and the first month of the regular season. Recreational 2004/05 landings were estimated based on the average percent of recreational landings in the preceeding years.

2.4.2 Action 4-2: Set Annual Catch Limits (ACLs) for Caribbean Spiny Lobster

Alternative 1: No Action – Do not set Annual Catch Limits.

Alternative 2: Set an Annual Catch Limit for the entire stock based on the Acceptable Biological Catch:

Preferred Option a: Annual Catch Limit = OY = Acceptable Biological Catch.
Option b: Annual Catch Limit = OY = 90% of Acceptable Biological Catch.
Option c: Annual Catch Limit = OY = 80% of Acceptable Biological Catch.

Alternative 3: Set Annual Catch Limits for each sector based on allocations determined in Action 3:

Option a: Annual Catch Limit = OY = (sector allocation x Acceptable Biological Catch).
Option b: Annual Catch Limit = OY = 80% or 90% of (sector allocation x Acceptable Biological Catch).
Option c: Annual Catch Limit = OY = sector allocation x (80% or 90% x% of Acceptable Biological Catch).

Comparison of Alternatives: ACLs are set by managers and should take into account management uncertainty. Management uncertainty occurs because sufficient catch information is lacking, and may include late catch reporting, misreporting, and underreporting of catches. Management uncertainty is affected by the ability to control actual catch in the fishery. For example, a fishery with in-season catch data and in-season closure authority has better management control than a fishery without these features. ACLs, in coordination with accountability measures, must prevent overfishing.

The Caribbean spiny lobster stock was last assessed in 2005 (SEDAR 8). This assessment determined the stock was not undergoing overfishing based on a static spawning potential ratio of 20% (F20%) as set in Amendment 6. However, because the spawning stock includes the entire Caribbean region, spawning biomass at the maximum sustainable yield (B_{MSY}) or the minimum stock size threshold (MSST) could not be determined; therefore, the assessment could not determine if the stock is overfished. A stock assessment update was completed in November 2010. The base run of the model determined the stock is not overfished or undergoing overfishing. The SSC Subcommittee reviewed the SEDAR 8 Update and suggested using values based on the assumed maturity schedule. The new values indicated no overfishing ($F_{current}/F_{20\%SPR} = 0.47$) and not overfished ($SSB_{current}/SSB\ F_{20\%SPR} = 1.29$). However, the SSC Joint Subcommittee rejected the assessment update and they have no confidence in the reference points.

The Councils' joint SSCs are responsible for recommending an ABC control rule and ABC for each stock to the Councils. The ABC is the level of a stock's annual catch that accounts for the scientific uncertainty in the estimate of the overfishing level and any other scientific uncertainty; in most cases ABC will be reduced from the overfishing limit to reduce the probability overfishing might occur. For the Caribbean spiny lobster fishery, the Gulf SSC has recommended using Tier 3A of their control rule, which results in an ABC of 7.32 mp.

An ACL for a given stock can be established as either a single ACL for the entire fishery, or separate ACLs for various sectors. One ACL for the entire stock (**Alternative 2**) may be appropriate if sector allocations are not set (Action 3). The ACL cannot exceed the ABC. If a Council recommends an ACL which equals ABC (**Preferred Alternative 2 Option a**), and the ABC is equal to the overfishing limit (OFL), the Council must provide sufficient analysis and justification for the approach or the Secretary of Commerce may presume overfishing will not be prevented. However, the Gulf SSC set OFL at 7.9 mp which is higher than the recommended ABC. The ACL can also be reduced from the ABC to account for management uncertainty. Under the Gulf SSC's ABC, **Alternative 2 Options b and c** would equal 6.59 mp and 5.86 mp, respectively.

Add numbers

Sector ACLs (**Alternative 3**) may be appropriate if allocations are set, or if based on landings data. Florida commercial landings data are available by gear (trap, diving, and bully net) from the 1991/1992 season through the 2007/2008 season. Recreational landings data in Florida are slightly less complete for the same time period. If more than one ACL is set, the sum of the ACLs can equal (**Alternative 3 Option a**), but not exceed, the ABC. The ABC could be separated using the sector allocations chosen in Action 3, then each ACL could be reduced for management uncertainty particular to that sector (**Alternative 3 Option b**). Alternately, the ABC could be reduced for overall management uncertainty first, then the resulting amount divided into separate sector ACLs (**Alternative 3 Option c**). The actual pounds for each option would depend on the allocation set in Action 3 (see Table 4.4.2.2 for the full range of allocations associated with each option).

2.4.3 Action 4-3: Set Annual Catch Targets for Caribbean Spiny Lobster

Alternative 1: No Action – Do not set Annual Catch Targets.

Alternative 2: Set an Annual Catch Target for the entire stock.
- **Option a:** Annual Catch Target = x% of Annual Catch Limit.
- **Option b:** Annual Catch Target = Annual Catch Limit.
- **Preferred Option c**: Annual Catch Target = 6.0 million pounds

Alternative 3: Set Annual Catch Targets for each sector based on allocations from Action 3.
- **Option a:** Annual Catch Target = (sector allocation x Annual Catch Limit).
- **Option b:** Annual Catch Target = x% of (sector allocation x Annual Catch Limit).
- **Option c:** Annual Catch Target = sector allocation x (x% of Annual Catch Limit).

Comparison of Alternatives: The ACT is the amount of annual catch of a stock that is the management target of the fishery, and accounts for further management uncertainty in controlling the actual catch at or below the ACL. An ACT set less than the ACL provides a buffer so the risk of exceeding the ACL is reduced and, therefore, the likelihood of triggering accountability measures is reduced. An ACT lowers the allowed catch below the ACL, but

provides stability for fisheries that are apt to fluctuate around a target catch rate. Potential values for ACTs will be determined after the joint SSCs have set an ABC.

Alternative 1 would not set an ACT for Caribbean spiny lobster. The National Standard 1 Guidelines do not require ACTs be established, but provide that ACTs may be used as part of a system of accountability measures. Accountability measures are required regardless of whether ACTs are established. If no ACT is set, the accountability measures would be based on the ACL.

One ACT could be set for the entire Caribbean spiny lobster stock (**Preferred Alternative 2**) if a single ACL is set for the stock (Action 4-2 Alternative 2). A single ACT would apply to all sectors and any accountability measures would be triggered simultaneously. Currently, no quotas constrain harvest of Caribbean spiny lobster. If the Councils were to set the ACT equal to the ACL (**Alternative 2 Option a**), no buffer would be in place. An ACT less than the ACL (**Alternative 2 Option a and Preferred Option c**) acts as a quota and creates a buffer which would be an accountability measure to alert the Councils and NOAA Fisheries Service that landings are nearing the ACL.

Sector ACTs **(Alternative 3)** could be set if separate sector ACLs are set **(**Action 4-2, Alternative 4**)** or if a single ACL is set for the stock **(**Action 4-2, Alternative 2**)**. In the second case, the accountability measures could be based on the stock ACL allowing one or more of the separate ACTs to be exceeded without severe consequences. This separation might be useful if one group consistently has landings below their allocation and can "absorb" any overage from another group. If separate ACTs are set, the sum of the ACTs can equal the ACL (**Alternative 3 Option a**). The ACL could be separated using the sector allocations chosen in Action 3, then each ACT could be reduced for management uncertainty particular to that sector (**Alternative 3 Option b**). Alternately, the ACL could be reduced for overall management uncertainty first, then the resulting amount divided into separate sector ACTs (**Alternative 3 Option c**).

2.5 Action 5: Accountability Measures (AMs) by Sector

*Note: More than one alternative, option, sub-option, or combinations thereof, may be chosen as preferred.

Alternative 1: No Action – Do not set accountability measures. Currently there are no management measures in place that could be considered AMs.

Alternative 2: Establish commercial in-season accountability measures**:**

Option a: close the commercial fishery when the ACL is projected to be met.

Option b: implement a commercial trip limit when 75% of the commercial ACL is projected to be met.

Alternative 3: Establish post-season accountability measures:

Option a: Commercial

Sub-option i: ACL payback in the fishing season following a previous years ACL overage.

Sub-option ii: Adjust the length of the fishing season following an ACL overage.

Sub-option iii: Implement a trip limit.

Option b: Recreational

Sub-option i: ACL payback in the fishing season following an ACL overage. To estimate the overage, compare the recreational ACL with recreational landings over a range of years. For 2011, use only 2011 landings. For 2012, use the average landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running average.

Sub-option ii: Adjust the length of the fishing season following an ACL overage. To estimate the overage, compare recreational ACL with recreational landings over a range of years. For 2011, use only 2011 landings. For 2012, use the average landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running average.

Sub-option iii: Adjust bag limit for the fishing season following a previous season's ACL overage.

Option c: Recreational and commercial combined accountability measures

Sub-option i: Adjust season length for both recreational and commercial harvest of spiny lobster in the fishing season following an ACL overage

Sub-option ii: Recreational and commercial ACL payback in the fishing season following a previous season's ACL overage (if a combined ACL is chosen).

Preferred Alternative 4: Establish the ACT as the accountability measure for Caribbean spiny lobster.

Comparison of Alternatives: Accountability measures are designed to provoke an action once either the ACL or ACT is reached during the course of a fishing season to reduce the risk overfishing will occur. However, depending on how timely the data are, it might not be realized that either the ACL and/or ACT has been reached until after a season has ended. Such AMs include prohibited retention of species once the sector ACT is met, shortening the length of the

subsequent fishing season to account for overages of the ACL, and reducing the ACL in the subsequent fishing season to account for overages.

The National Standard 1 guidelines recognize that existing FMPs may use terms and values that are similar to, associated with, or may be equivalent to AMs in many fisheries for which annual specifications are set for different stocks or stock complexes. In these situations the guidelines suggest that, as Councils revise their FMPs they use the same terms as set forth in the National Standard 1 guidelines. Current Caribbean spiny lobster regulations include size limits, a seasonal closure, bag limits, and certain prohibited gear types (Table 2.1.1). There is no previously specified measure that would be considered an AM. Therefore, AMs for the Caribbean spiny lobster fishery in the Gulf and South Atlantic must be specified pursuant to Magnuson-Stevens Act requirements.

There are several types of AMs that may be applied in the Caribbean spiny lobster fishery. In-season AMs are those that are triggered during the fishing season and are typically before an ACL is exceeded. Some examples of in-season AMs include quota closures, trip or bag limit reductions, gear restrictions, or catch shares. Post-season AMs would be triggered if the ACL is exceeded and would typically be implemented the following fishing season. Post-season AMs could include seasonal closures, reduced trip limits, bag limits, and quotas, or shortening of the fishing season implemented in the subsequent year.

Alternative 1, no action, would not establish AMs for the spiny lobster fishery. The Magnuson-Stevens Act requires that ACLs and AMs be established in 2011; therefore, if **Alternative 1** were chosen as a preferred alternative the Spiny Lobster FMP would not be incompliance with those requirements.

Under **Alternative 2,** commercial in-season AMs would be triggered in order to prevent the ACL from being exceeded. Once the ACL is projected to be met, the Regional Administrator would publish a notice notifying the fishery of the closing date for the season. After that date all harvest and possession, and purchase and sale, of spiny lobster would be prohibited for those holding commercial spiny lobster permits. The Council may choose one or more post-season AMs under **Alternative 3** in addition to the in-season AMs under **Alternative 2**. This would be the most administratively burdensome scenario; however, if an ACL overage were to occur after an in-season AM has been implemented, a post-season AM would be available to the Regional Administrator as a means to correct an overage and prevent overfishing.

Under **Alternative 3,** post-season AMs would be implemented in the fishing season following the season when an ACL is exceeded. Post-season AMs would allow all landings for a particular season to be reported before any harvest restricting measures would take effect, and is thus associated with less uncertainty than in-season monitoring. This method of accountability alone may correct for one year's or several year's overages; however, it does little to prevent an overage from occurring again unless it is chosen in conjunction with an in-season AMs. Implementing post-season AMs for the recreational sector may be more pragmatic than in-season AMs since MRFSS and MRIP do not collect landings information on crustaceans and Florida's data survey method would be the primary means of tracking recreational landings unless some other method of recreational data collection is implemented.

Preferred Alternative 4 would use the ACT of six million pounds as the AM. The level of harvest would be compared to the ACT and evaluated on an ongoing basis. If the ACT or ACL is reached or exceeded repeatedly, modification to the management measures would be made via framework to prevent future harvest from exceeding the ACL. The biological impacts of **Preferred Alternative 4** would likely be similar to that status quo since the combined recreational/commercial average landings for the last 10 fishing seasons do not exceed the preferred ACT of six million pounds. Additionally, a recent study using microsatellite DNA analysis to identify sources of recruitment among Caribbean spiny lobsters indicates the majority of recruits come from areas outside the management area (Hunt and Tringali, 2011). Therefore, any true biological benefits that may accrue in the Caribbean spiny lobster population found within the subject management area, as a result of implementing any one of the AMs considered, are likely to be negligible. Under **Preferred Alternative 4**, variations in year-to-year harvest would be accounted for by evaluating what percentage of the ACT is caught over several years, rather than on a single season basis. It is unlikely the ACL would be exceeded repeatedly under the current ACL preferred alternative based on landings history; however, the updated framework procedure contained within this amendment would facilitate timely adjustments to the National Standard 1 harvest parameters if needed in the future. The ability to expeditiously implement modifications to the ACL, ACT, and AMs for Caribbean spiny lobster would limit any negative biological impact that could result from continued ACT or ACL overages.

2.6 Action 6: Develop or Update a Framework Procedure and Protocol for Enhanced Cooperative Management for Spiny Lobster

*Note: more than one alternative may be chosen as a preferred.

Alternative 1: No Action – Do not update the Protocol for Enhanced Cooperative Management or the Regulatory Amendment Procedure.

Preferred Alternative 2: Update the current Protocol for Enhanced Cooperative Management.

Alternative 3: Update the current Regulatory Amendment Procedures to develop a Framework Procedure to modify ACLs and AMs.

Alternative 4: Revise the current Regulatory Amendment Procedures to create an expanded Framework Procedure:

Preferred Option a: Adopt the base Framework Procedure
Option b: Adopt the more broad Framework Procedure
Option c: Adopt the more narrow Framework Procedure

Comparison of Alternatives: The current Protocol for Enhanced Cooperative Management outlines the roles of the federal and State of Florida agencies in managing Caribbean spiny lobster. The current Regulatory Amendment Procedure outlines the actions that can be implemented through framework actions, such as gear and harvest restrictions. The current Protocol and Procedure, was developed through Amendment 2 (GMFMC 1989). This action proposes to modify and update the *protocol* to include relevant agency names and authorities. The framework *procedure* would also be updated to include relevant terms and adjustments to ACLs, ACTs, and accountability measures.

Alternative 1 (No Action) would not modify the current protocols or procedures to include modern terminology and adjustments to ACLs, ACTs, and accountability measures. The Regional Administrator (RA) would maintain his/her current ability to adjust trip limits, bag limits, size limits, seasonal closures, and gear restrictions, but no means would exist of making needed adjustments to the National Standard 1 harvest parameters or management measures in a timely manner.

Preferred Alternative 2 would retain the current agreement with the State of Florida, but update the language to be consistent with changes in agency names and terminology since 1989. This alternative could be chosen in conjunction with either **Alternative 3** or **4**.

Proposed Language for the Updated Protocol

Protocol for Roles of Federal and State of Florida Agencies for the Management of Gulf and South Atlantic Spiny Lobster

1. The Gulf of Mexico and South Atlantic Fishery Management Councils (Councils) and NOAA Fisheries Service acknowledge that the fishery is largely a State of Florida (State) fishery, which extends into the exclusive economic zone (EEZ), in terms of current participants in the directed fishery, major nursery, fishing, and landing areas, historical regulation of the fishery. As such, this fishery requires cooperative state/federal efforts for effective management through the Fishery Management Plan for the Spiny Lobster Fishery of the Gulf of Mexico and South Atlantic (Spiny Lobster FMP).

2. The Councils and NOAA Fisheries Service acknowledge that the State is managing and will continue to manage the resource to protect and increase the long-term yields and prevent depletion of lobster stocks and that the State Administrative Procedure Act and rule implementation procedures, including final approval of the rules by Governor and Cabinet, provide ample and fair opportunity for all persons to participate in the rulemaking procedure.

3. The Florida Fish and Wildlife Conservation Commission (FWC) acknowledges that rules proposed for implementation under any fishery management plan amendment, regulatory or otherwise, must be consistent with the management objectives of the Spiny Lobster FMP, the National Standards, the Magnuson-Stevens Fishery Conservation and Management Act, and other applicable law. Federal rules will be implemented in accordance with the Administrative Procedures Act.

4. The Councils and NOAA Fisheries Service agree that, for any rules defined within an amendment to the Spiny Lobster FMP, the State may propose the rule directly to NOAA Fisheries Service, concurrently informing the Councils of the nature of the rule, and that NOAA Fisheries Service will implement the rule within the EEZ provided it is consistent under paragraph three. If either of the Councils informs NOAA Fisheries Service of their concern over the rule's inconsistency with paragraph three, NOAA Fisheries Service will not implement the rule until the Councils, FWC, and NOAA Fisheries Service resolve the issue.

5. The State will have the responsibility for collecting and developing the information upon which to base the fishing rules, with assistance as needed by NOAA Fisheries Service, and cooperatively share the responsibility for enforcement with federal agencies.

6. Florida FWC will provide to NOAA Fisheries Service and the Councils written explanations of its decisions related to each of the rules; summaries of public comments; biological, economic and social analysis of the impacts of the proposed rule and alternatives; and such other relevant information.

7. The rules will apply to the EEZ for the management area of North Carolina through Texas, unless the Regional Administrator (RA) determines those rules may adversely impact other state and federal fisheries. In that event, the RA may limit the application of the rule, as necessary, to address the problem.

8. NOAA Fisheries Service and the Councils agree that their staffs will prepare the proposed and final rules and the associated National Environmental Policy Act documentation and other documents required to support the rule.

Under **Alternatives 3** and **4**, adjustments to ACLs, ACTs, accountability measures, and other management measures could be made relatively quickly as new fishery and stock abundance information becomes available. The FMP amendment process requires Alternatives that would update or revise the current procedure would likely be biologically beneficial for spiny lobster because they would allow periodic adjustments to National Standard 1 guideline harvest parameters, and management measures could be altered in a timely manner in response to stock assessment or survey results. **Alternative 3** and **4** would be expected to increase the efficiency and effectiveness of management change, potentially allowing less severe corrective action when necessary, or the quicker receipt of social and economic benefits associated with less restrictive management. In the long term, positive social and economic effects, relative to the status quo, would be expected from more timely management adjustments.

Alternative 3 would update language and formatting, as well as allow adjustments to ACLs, ACTs, and accountability measures. When the procedure was originally developed, these parameters were not in use. The updates would streamline the process for making these changes if a new stock assessment indicates their necessity. However, the procedure remains fairly restrictive both substantively and procedurally. The changes are summarized in Table 2.6.1. The full text of the updated framework procedure follows.

Table 2.6.1. Proposed framework modifications under Alternative 3.

Items retained from current framework	Items modified from current framework	Items added to current framework
Adjustments to or implementation of trip limits, bag limits (including zero bag limits), minimum sizes, gear restrictions, and seasonal/area closures	Change the term "Regional Director" to "Regional Administrator"	Use of SEDAR reports or other documentation the Councils or FWC deem appropriate to provide biological analyses
	Change the term "FMFC" to "Florida Fish and Wildlife Conservation Commission (FWC)"	The SSC prepares a written report to the Councils and FWC specifying OFL and a range of ABCs for species in need of catch reductions to achieve OY
		The SEDAR report or SSC will recommend rebuilding periods
Adjustment to or implementation of timeframes for recovery of an overfished species		Adjustments to ABCs, ACLs, and/or sector ACLs
Initial specification and subsequent adjustments of biomass levels and age structured analysis		Adjustment to or implementation of ACTs and AMs
Inclusion of public input in the framework adjustment process		Adjustments to or establishment of MSY
		Adjustments to or implementation of quotas, including closing any commercial fishery when the quota is filled

<u>Proposed Language for Updated Framework Procedure</u>

Joint Fishery Management Plan for the Spiny Lobster Fishery of the Gulf of Mexico (Gulf) and South Atlantic Framework Procedure for Specification of Annual Catch Limits, Annual Catch Targets, Overfishing Limits, Acceptable Biological Catch, Accountability Measures, and annual adjustments:

1. At times determined by NOAA Fisheries Service Southeast Regional Office and Florida Fish and Wildlife Conservation Commission (FWC), the Gulf of Mexico and South Atlantic Councils (Councils), and the Southeast Data, Assessment, and Review (SEDAR) steering committee, stock assessments or assessment updates for spiny lobster in the Gulf and South Atlantic will be conducted under the SEDAR process. Each SEDAR stock assessment or assessment update will: 1) assess, to the extent possible, the current biomass (B), biomass proxy, or spawning potential ratio (SPR) levels for each stock; 2) estimate fishing mortality (F) in relation to F_{MSY} (maximum fishing mortality threshold [MFMT]) and F_{OY}); 3) determine the overfishing limit (OFL); 4) estimate other population parameters deemed appropriate; 5) summarize statistics on the fishery; 6)

specify the geographical variations in stock abundance, mortality, recruitment, and age of entry into the fishery for each stock or stock complex; and 7) develop estimates of B_{MSY}.

2. The Councils and the FWC will consider SEDAR stock assessments, or other documentation deemed appropriate, to provide the biological analysis and data listed above in paragraph 1. Either the Southeast Fisheries Science Center or the stock assessment branch of a State agency may serve as the lead in conducting the analysis, as determined by the SEDAR Steering Committee. The joint Gulf and South Atlantic Scientific and Statistical Committees (SSCs) or some subgroup thereof, will prepare a written report specifying an OFL to the Councils and FWC and may recommend a range of acceptable biological catch (ABC) for attaining or maintaining optimum yield (OY). The OFL is the annual harvest level corresponding to fishing at MFMT (F_{MSY}). The ABC range is intended to provide guidance to the joint SSC subgroup, and is the OFL as reduced due to scientific uncertainty to reduce the probability overfishing will occur in a year. To the extent practicable, the probability overfishing will occur at various levels of ABC and the annual transitional yields (i.e., catch streams) calculated for each level of fishing mortality within the ABC range should be included with the recommended range.

If the spiny lobster stock is determined to be undergoing overfishing or is overfished, the recommended ABC range shall be calculated so as to end overfishing and achieve spiny lobster levels at or above B_{MSY} within the rebuilding periods specified by the Councils and FWC and approved by NOAA Fisheries Service. The SEDAR panel or joint SSC subgroup will recommend rebuilding periods based on the National Standard 1 guidelines, including generation times for the affected stocks. Generation times are to be specified by the stock assessment panel based on the biological characteristics of the individual stocks. The subgroup or panel will recommend a B_{MSY} level and a minimum stock size threshold (MSST) from B_{MSY} to the Councils and FWC. The panel or subgroup may also recommend more appropriate estimates of $F_{MSY,}$ MSY proxy, OY, the overfishing threshold (MFMT), and the overfished threshold (MSST). Where data are inadequate to compute an OFL and recommended ABC range, the subgroup or panel will use other available information as a guide in providing their best estimate of an OFL corresponding to MFMT and ABC range that should result in not exceeding the MFMT.

3. The joint SSC sub-group will examine SEDAR reports or other new information, the OFL determination, and the recommended ABC range. In addition, the joint SSC sub-group will examine information provided by the social scientists and economists from the Councils' staffs and from the Southeast Regional Office analyzing social and economic impacts of any specification demanding adjustments of allocations, annual catch limits (ACLs), annual catch targets (ACTs), accountability measures (AMs), quotas, bag limits, or other fishing restrictions. The joint SSC sub-group will use the ABC control rule to set ABC at or below the OFL, taking in account scientific uncertainty. If the joint SSC sub-group set ABC equal to OFL, they will provide rational why they believe that level of fishing will not exceed MFMT.

4. The Councils and FWC may conduct a public hearing on the reports and the joint SSCs' ABC recommendation at, or prior to, the time it is considered by the Councils for

action. Other public hearings also may be held. The Councils and FWC may convene their Spiny Lobster Advisory Panels, and optionally their socioeconomic experts, to review the report before taking action.

5. If necessary, the Councils and FWC will utilize the following criteria in selecting an ACL, ACT, AM, and a stock restoration time period, in addition to taking into consideration the recommendations and information provided in paragraphs 1-4:

a. Set ACL at or below the ABC specified by the joint SSC sub-group or set a series of annual ACLs at or below the projected ABCs to account for management uncertainty. If the Councils and FWC set the ACL equal to ABC, and ABC has been set equal to OFL, the Councils and FWC will provide rationale why they believe that level of fishing will not exceed MFMT.

b. Optionally, subdivide the ACLs into commercial, for-hire, and private recreational sector ACLs or gear specific ACLs that maximize the net benefits of the fishery to the nation. The sector ACLs will be based on allocations determined by criteria established by the Councils and FWC, and specified by the Councils through a plan amendment. If spiny lobster is overfished, and harvest in any year exceeds the ACL or sector ACL, management measure and catch levels for that sector will be adjusted in accordance with the AMs established for that stock.

c. Optionally, set ACTs or sector ACTs at or below ACLs and in accordance with the provision of the AMs for spiny lobster. The ACT is the management target that accounts for management uncertainty in controlling the actual catch at or below the ACL. If an ACL is exceeded repeatedly, the Councils and FWC have the option to establish an ACT if one does not already exist for a particular stock, and to adjust or establish AMs for that stock as well.

6. The Councils will provide to the RA: 1) the joint SSC sub-group specification of OFL and recommendation of ABCs, ACLs, sector ACLs, ACTs, sector ACTs, AMs, sector AMs; 2) stock restoration target dates for each stock or stock complex; 3) estimates of B_{MSY} and MSST; 4) estimates of MFMT, and; 5) the quotas, bag limits, trip limits, size limits, closed seasons, and gear restrictions necessary to avoid exceeding the ACL or sector ACLs. The Councils will also provide the joint SSC subgroup reports, a regulatory impact review, proper National Environmental Policy Act documentation, and the proposed regulations within a predetermined time as agreed upon by the Councils, FWC and RA. The Councils and FWC may also recommend new levels or statements for MSY (or proxy) and OY.

7. The RA will review the Councils' recommendations and supporting information; if he/she concurs the recommendations are consistent with the objectives of the Spiny Lobster FMP, the National Standards, and other applicable law, he/she shall prepare a framework action and forward notice of proposed rules to the Assistant Administrator for publication (providing appropriate time for additional public comment). The RA will consider all public comment and information received and will forward a final rule for

publication in the Federal Register within 30 days of the close of the public comment, or such other time as agreed upon by the Councils and RA.

8. Appropriate regulatory changes that may be implemented by final rule in the Federal Register include:

a. ACLs or sector ACLs, or a series of annual ACLs or sector ACLs.

b. ACTs or sector ACTs, or a series of annual ACTs or sector ACTs, and establishment of ACTs for stocks which do not have an ACT.

c. AMs, or sector AMs.

d. Bag limits, size limits, vessel trip limits, closed seasons or areas, gear restrictions, and quotas designed to achieve OY and keep harvest levels from exceeding the ACL or sector ACL.

e. New levels or statements of MSY (or proxy) and OY for any stock.

f. Fishing season/year adjustments.

9. The RA is authorized, through notice action, to conduct the following activities.

a. Close the commercial fishery for spiny lobster at such time as projected to be necessary to prevent the commercial sector from exceeding the commercial sector ACL or ACT for the remainder of the fishing year or sub-quota season.

b. Close the recreational fishery for spiny lobster at such time as projected to be necessary to prevent recreational sector ACLs or ACTs from being exceeded.

c. Reopen a commercial or recreational season that had been prematurely closed if needed to assure that a sector ACL or ACT can be reached.

10. If NOAA Fisheries Service decides not to publish the proposed rule of the recommended management measures, or to otherwise hold the measures in abeyance, then the RA must notify the Councils and FWC with the reasons for concern along with suggested changes to the proposed management measures that would alleviate the concerns. Such notice shall specify: 1) The applicable law with which the amendment is inconsistent; 2) the nature of such inconsistencies; and 3) recommendations concerning the action that could be taken by the Councils to conform the amendment to the requirements of applicable law.

The options in **Preferred Alternative 4** would increase the flexibility of the Councils and NOAA Fisheries Service by identifying additional measures that could be changed under the procedure. In addition, these framework options would clarify the appropriate process needed for each type of change. The major differences among the options are highlighted in Table 2.7.2. The full text of the revised framework procedure for each option follows.

Table 2.6.2. Comparison of Alternative 4 options for a framework procedure.

	Option a (Base)	Option b (Broad)	Option c (Narrow)
Types of framework processes	Open abbreviated Open standard Closed	Open Closed	Open Closed
When open framework can be used	New stock assessment New information or circumstances When changes are required to comply with applicable law or a court order	In response to any new information or changed circumstances	Only when there is a new stock assessment
Actions that can be taken	Abbreviated Open framework can be used for actions that are considered minor and insignificant Standard Open framework used for all others *Representative lists of actions that can be taken under Abbreviated and Standard Open framework are given, but are not exclusive* Closed framework can be used for a specific list of actions	Open framework can be used for a representative list of actions, plus other measures deemed appropriate by the Councils Closed framework can be used for a specific list of actions, plus any other immediate action specified in the regulations	Open framework can only be used for specific listed actions Closed framework can only be used for a specific list of actions
Public input	Requires public discussion at one meeting for each Council	Requires public discussion at one meeting for each Council	Requires public discussion during at least three meetings for each Council, and discussion at separate public hearings within the areas most affected by the proposed measures.
AP/SSC participation	Each Council may convene their SSC, SEP, or AP, as appropriate	Convening the SSC, SEP, or AP, prior to final action is not required	Each Council shall convene their SSC, SEP, and AP
How a request of action is made	Abbreviated requires a letter or memo from the Councils with supporting analyses Standard requires a completed framework document with supporting analyses	Via letter, memo, or the completed framework document with supporting analyses.	Via letter, memo, or completed framework document with supporting analyses.

Option a (Base)
This framework procedure provides standardized procedures for implementing management changes pursuant to the provisions of the Spiny Lobster Fishery Management Plan (FMP) managed jointly between the Gulf of Mexico and South Atlantic Fishery Management Councils (Councils). Two basic processes are included: the open framework process and the closed framework process. The open framework addresses issues where more policy discretion exists in selecting among various management options developed to address an identified management issue, such as changing a size limit to reduce harvest. The closed framework addresses much more specific factual circumstances, where the FMP and implementing regulations identify specific action to be taken in the event of specific facts occurring, such as closing a sector of a fishery when the quota is or is projected to be harvested.

Open Framework:

1. Situations under which the open framework procedure may be used to implement management changes include the following:
    a. A new stock assessment results in changes to the overfishing limit, acceptable biological catch, or other associated management parameters.
    In such instances the Councils may, as part of a proposed framework action, propose an annual catch limit (ACL) or series of ACLs and optionally an annual catch target (ACT) or series of ACTs, as well as any corresponding adjustments to maximum sustainable yield (MSY), optimum yield (OY), and related management parameters.
    b. New information becomes available or circumstances change.
    The Councils will, as part of a proposed framework action, identify the new information and provide rationale why this new information indicates management measures should be changed.
    c. Changes are required to comply with applicable law such as the Magnuson-Stevens Act, Endangered Species Act, Marine Mammal Protection Act, or are required as a result of a court order.
    In such instances the Regional Administrator (RA) will notify the Councils in writing of the issue and that action is required. If there is a legal deadline for taking action, the deadline will be included in the notification.
2. Open framework actions may be implemented in either of two ways: abbreviated documentation or standard documentation process.
    a. Abbreviated documentation process. Regulatory changes that may be categorized as routine or insignificant may be proposed in the form of a letter or memo from the Councils to the RA containing the proposed action, and the relevant biological, social, and economic information to support the action. Either Council may initiate the letter or memo, but both Councils must approve it. If multiple actions are proposed, a finding that the actions are also routine or insignificant must also be included. If the RA concurs with the determination and approves the proposed action, the action will be implemented through publication of appropriate notification in the Federal Register. Changes that may be viewed as routine or insignificant include, among others:
        i. Reporting and monitoring requirements,

ii. Permitting requirements,
iii. Bag and possession limit changes of not more than one lobster,
iv. Size limit changes of not more than 10% of the prior size limit,
v. Vessel trip limit changes of not more than 10% of the prior trip limit,
vi. Closed seasons of not more than 10% of the overall open fishing season,
vii. Restricted areas (seasonal or year-round) affecting no more than a total of 100 nautical square miles,
viii. Respecification of ACL, ACT, or quotas that were previously approved as part of a series of ACLs, ACTs or quotas,
ix. Specification of MSY proxy, OY, and associated management parameters (such as overfished and overfishing definitions) where new values are calculated based on previously approved specifications,
x. Gear restrictions, except those that result in significant changes in the fishery, such as complete prohibitions on gear types,
xi. Quota changes of not more than 10%, or retention of portion of an annual quota in anticipation of future regulatory changes during the same fishing year.

b. Standard documentation process. Regulatory changes that do not qualify as routine or insignificant may be proposed in the form of a framework document with supporting analyses. Non-routine or significant changes that may be implemented under a framework action include, among others:
i. Specification of ACTs or sector ACTs,
ii. Specification of ABC and ABC control rule,
iii. Creation of rebuilding plans and revisions to approved rebuilding plans,
iv. Changes specified in section 2(a) that exceed the established thresholds.

3. Either Council may initiate the open framework process to inform the public of the issues and develop potential alternatives to address the issues. The framework process will include the development of documentation and public discussion during at least one meeting for each Council.
4. Prior to taking final action on the proposed framework action, each Council may convene their SSC, SEP, or AP, as appropriate, to provide recommendations on the proposed actions.
5. For all framework actions, the initiating Council will provide the letter, memo, or the completed framework document along with proposed regulations to the RA in a timely manner following final action by both Councils.
6. For all framework action requests, the RA will review the Councils' recommendations and supporting information and notify the Councils of the determinations, in accordance with the Magnuson-Stevens Act (Section 304) and other applicable law.

Closed Framework:

Consistent with existing requirements in the FMP and implementing regulations, the RA is authorized to conduct the following framework actions through appropriate notification in the Federal Register:

a. Close or adjust harvest in any sector of the fishery for a species, sub-species, or species group that has a quota or sub-quota at such time as projected to be necessary to prevent the sector from exceeding its sector-quota for the remainder of the fishing year or sub-quota season,
b. Reopen any sector of the fishery that had been prematurely closed,
c. Implement an in-season accountability measure for a sector that has reached or is projected to reach, or is approaching or is projected to approach its ACL, or implement a post-season accountability measure for a sector that exceeded its ACL in the current year.

Option b (Broad)

This framework procedure provides standardized procedures for implementing management changes pursuant to the provisions of the Spiny Lobster Fishery Management Plan (FMP) managed jointly between the Gulf of Mexico and South Atlantic Fishery Management Councils (Councils). Two basic processes are included: the open framework process and the closed framework process. The open framework addresses issues where more policy discretion exists in selecting among various management options developed to address an identified management issue, such as changing a size limit to reduce harvest. The closed framework addresses much more specific factual circumstances, where the FMP and implementing regulations identify specific action to be taken in the event of specific facts occurring, such as closing a sector of a fishery when the quota is or is projected to be harvested.

Open Framework:

1. The Councils may utilize this framework procedure to implement management changes in response to any additional information or changed circumstances. The Councils will, as part of a proposed framework action, identify the new information and provide rationale why this new information requires management measures be adjusted.
2. Open framework actions may be implemented at any time based on information supporting the need for adjustment of management measures or management parameters:
   Changes that may be implemented via the open framework procedure include:
   a. Reporting and monitoring requirements,
   b. Permitting requirements,
   c. Bag and possession limits,
   d. Size limits,
   e. Vessel trip limits,
   f. Closed seasons,
   g. Restricted areas (seasonal or year-round),
   h. Re-specification of annual catch limits (ACLs), annual catch targets (ACTs), or quotas that were previously approved as part of a series of ACLs, ACTs or quotas,
   i. Specification of maximum sustainable yield (MSY) proxy, optimum yield (OY), and associated management parameters (such as overfished and overfishing

definitions) where new values are calculated based on previously approved specifications,

j. Gear restrictions, except those that result in significant changes in the fishery, such as complete prohibitions on gear types,
k. Quota,
l. Specification of ACTs or sector ACTs,
m. Creation of rebuilding plans and revisions to approved rebuilding plans,
n. Any other measures deemed appropriate by the Council.

3. Either Council may initiate the open framework process to inform the public of the issue and develop potential alternatives to address the issue. The framework process will include the development of documentation and public discussion during one meeting for each Council.
4. For all framework actions, the initiating Council will provide the letter, memo, or the completed framework document along with proposed regulations to the Regional Administrator (RA) following final action by both Councils.
5. For all framework action requests, the RA will review the Councils' recommendations and supporting information and notify the Councils of the determinations, in accordance with the Magnuson-Stevens Act (Section 304) and other applicable law.

Closed Framework:

Consistent with existing requirements in the FMP and implementing regulations, the RA is authorized to conduct the following framework actions through appropriate notification in the Federal Register:

a. Close or adjust harvest in any sector of the fishery for a species, sub-species, or species group that has a quota or sub-quota at such time as projected to be necessary to prevent the sector from exceeding its sector-quota for the remainder of the fishing year or sub-quota season,
b. Reopen any sector of the fishery that was prematurely closed,
c. Implement an in-season accountability measure for a sector that has reached or is projected to reach, or is approaching or is projected to approach its ACL, or implement a post-season accountability measure for a sector that exceeded its ACL in the current year,
d. Take any other immediate action specified in the regulations.

Option c (Narrow)

This framework procedure provides standardized procedures for implementing management changes pursuant to the provisions of the Spiny Lobster Fishery Management Plan (FMP) managed jointly between the Gulf of Mexico and South Atlantic Fishery Management Councils (Councils). Two basic processes are included: the open framework process and the closed framework process. The open framework addresses issues where more policy discretion exists in selecting among various management options developed to address an identified management issue, such as changing a size limit to reduce harvest. The closed framework addresses much more specific factual circumstances, where the FMP and implementing regulations identify specific action to be taken in the event of specific facts occurring, such as closing a sector of a fishery when the quota is or is projected to be harvested.

Open Framework:

1. The open framework procedure may be used to implement management changes include only when a new stock assessment results in changes to the overfishing limit, acceptable biological catch, or other associated management parameters. In such instances the Councils may, as part of a proposed framework action, propose an annual catch limit (ACL) or series of ACLs and optionally an annual catch target (ACT) or series of ACTs, as well as any corresponding adjustments to maximum sustainable yield (MSY), optimum yield (OY), and related management parameters.
2. Actions that may be implemented via the framework procedure include:
    a. Reporting and monitoring requirements,
    b. Bag and possession limits,
    c. Size limits,
    d. Closed seasons,
    e. Restricted areas (seasonal or year-round),
    f. Quotas.
3. Either Council may initiate the open framework process to inform the public of the issue and develop potential alternatives to address the issue. The framework process will include the development of documentation and public discussion during at least three meetings for each Council, and shall be discussed at separate public hearings within the areas most affected by the proposed measures.
4. Prior to taking final action on the proposed framework action, each Council shall convene its SSC, SEP, and AP to provide recommendations on the proposed actions.
5. For all framework actions, the initiating Council will provide the letter, memo, or the completed framework document, and all supporting analyses, along with proposed regulations to the RA in a timely manner following final action by both Councils.
6. For all framework action requests, the RA will review the Councils' recommendations and supporting information and notify the Councils of the determinations, in accordance with the Magnuson-Stevens Act (Section 304) and other applicable law. The RA will provide the Councils weekly updates on the status of the proposed measures.

Closed Framework:

Consistent with existing requirements in the FMP and implementing regulations, the RA is authorized to conduct the following framework actions through appropriate notification in the Federal Register:

a. Close or adjust harvest in any sector of the fishery for a species, sub-species, or species group that has a quota or sub-quota at such time as projected to be necessary to prevent the sector from exceeding its sector-quota for the remainder of the fishing year or sub-quota season,
b. Reopen any sector of the fishery that was prematurely closed,
c. Implement an in-season accountability measure for a sector that has reached or is projected to reach, or is approaching or is projected to approach its ACL, or implement a post-season accountability measure for a sector that exceeded its ACL in the current year.

2.7 Action 7: Modify Regulations Regarding Possession and Handling of Short Caribbean Spiny Lobsters as "Undersized Attractants"

Alternative 1: No Action – Allow the possession of no more than 50 undersized Caribbean spiny lobsters, or one per trap aboard the vessel, whichever is greater, for use as attractants.

Alternative 2: Prohibit the possession and use of undersized Caribbean spiny lobsters as attractants.

Alternative 3: Allow undersized Caribbean spiny lobsters, but modify the number of allowable undersized lobsters, regardless of the number of traps fished:

Option a: allow 50 undersized lobsters

Option b: allow 35 undersized lobsters

Preferred Alternative 4: Allow undersized spiny lobster not exceeding 50 per boat and 1 per trap aboard each boat if used exclusively for luring, decoying or otherwise attracting non-captive spiny lobsters into the trap**.**

Comparison of Alternatives: Currently, regulations at 50 CFR 640.21(c) state the following:

> *A live spiny lobster under the minimum size limit specified in paragraph (b)(1) of this section that is harvested in the EEZ by a trap may be retained aboard the harvesting vessel for future use as an attractant in a trap provided it is held in a live well aboard the vessel. No more than fifty undersized spiny lobsters, or one per trap aboard the vessel, whichever is greater, may be retained aboard for use as attractants. The live well must provide a minimum of ¾ gallons (1.7 liters) of seawater per spiny lobster. An undersized spiny lobster so retained must be released alive and unharmed immediately upon leaving the trap lines and prior to one hour after official sunset each day.*

Alternative 2 would eliminate the difficulties law enforcement officials currently experience in prosecuting undersized spiny lobster cases, and any negative biological impacts attributable to undersized lobster as attractants. Prohibiting the use of undersized spiny lobster as attractants may, therefore, lead to a reduced risk of exceeding the ACL in any given year and hedge against future overfishing. The enforcement and biological benefits under **Alternative 2** are likely to be negligible given recent date that suggests the majority of Caribbean spiny lobster recruits come from outside management area (Hunt and Tringali, 2011), and confinement mortality of undersized Caribbean spiny lobsters is estimated to be low (10%) (SEDAR 8, 2005); however, the socioeconomic impacts of prohibiting the use of undersized spiny lobster as attractants could be significant given a large portion of commercial fishermen fishing for spiny lobster use undersized lobster as attractants. Subsequent to the allowance for the use of undersized spiny lobsters as attractants in state regulation in 1977, Amendment 1 to the Spiny Lobster FMP (1987) stated as a major issue:

> *The illegal market in undersize lobsters, on board handling and exposure of undersize lobsters and their confinement in traps as attractants are significant sources of undersize lobster mortality that are preventing the fishery from harvesting optimum yield. Although undersize lobsters are an effective attractant, the mortality associated with their use as attractants, in combination with increasing number of traps being fished, are contributing to the fishery's inability to achieve optimum yield….*

Enforcement issues still exist today despite the implementation of the "50 Short" rule and the requirement to use live wells to maintain undersize spiny lobster onboard fishing vessels. The most recent SEDAR assessment for spiny lobster assumed a 10% mortality rate of undersized spiny lobsters used as attractants. Though this mortality percentage is relatively low, eliminating the use of undersize lobsters may increase the number of juveniles that are allowed to fully mature and reach harvestable sizes. **Alternative 3** would not improve law enforcement efforts in the fishery; however, it could potentially increase the number of Caribbean spiny lobsters allowed to grow to harvestable sizes without incurring the same magnitude of socioeconomic impacts that would accrue under **Alternative 2**.

Preferred Alternative 4 is very similar to **Alternative 1** in that it would allow spiny lobster to be kept onboard for use as attractants; however, it would change the provision to allow 50 spiny lobster *plus* one per trap, rather than 50 spiny lobster *or* one per trap, and it would remove the "whichever is greater" portion of the provision. **Preferred Alternative 4** would mirror Florida's state regulations, and ease some enforcement concerns related to inconsistent regulations across the state /federal jurisdictional boundary. However, **Preferred Alternative 4** would provide the least opportunity for juvenile Caribbean spiny lobsters to grow to harvestable size of all the alternatives considered because it would increase the number of spiny lobsters able to be maintained onboard a vessel, and thus result in increased confinement mortalities. However, total bycatch may actually increase because traps with bait would need to soak longer to achieve the same catch as traps with undersized attractants. Although mortality of shorts may result in some foregone yield, a prohibition on the use of shorts could result in increased bycatch of other species and decreased economic benefits.

2.8 Action 8: Modify Tailing Requirements for Caribbean Spiny Lobster for Vessels that Obtain a Tailing Permit

*Note: more than one alternative may be chosen as a preferred alternative.

Alternative 1: No Action – Possession of a separated Caribbean spiny lobster tail in or from the EEZ is allowed only when the possession is incidental to fishing exclusively in the EEZ on a trip of 48 hours or more, and a federal tailing permit is issued to and on board the vessel.

Alternative 2: Eliminate the Tail-Separation Permit for all vessels fishing for Caribbean spiny lobster in Gulf and South Atlantic waters of the EEZ.

Preferred Alternative 3: Revise the current regulations to clearly state that all vessels must have either a federal spiny lobster permit or a Florida Restricted Species Endorsements associated with a Florida Saltwater Products License to obtain a tailing permit.

Preferred Alternative 4: All Caribbean spiny lobster landed must either be landed all "whole" or all "tailed".

Comparison of Alternatives: Alternative 1 would not modify the current Tail-Separation Permit regulations for Caribbean spiny lobster. A Tail-Separation Permit would still be required to land spiny lobsters tailed, and the trips would still be required to be 48 hours or longer in duration. The ability to tail spiny lobsters is important to fishermen who do not have the storage capacity to hold large amounts of whole spiny lobster onboard over long trip durations. Tailing allows such fishermen to safely store more product in coolers without compromising quality, thus maximizing the profitability of each trip. However, some fishermen (commercial and recreational) may be tailing lobsters in an effort to conceal the fact that they may be undersized. **Alternative 2** would be the most effective measure for slowing the speed of harvest and preventing potential ACL overages of all the alternatives being considered under this action. Removing the ability for fishermen to tail any Caribbean spiny lobster before landing would increase the probability that most lobsters landed would be of legal size because they could easily be measured. **Preferred Alternative 3** alone would address the issue of recreational fishermen obtaining Tail-Separation Permits, but it would not address the issue of commercial fishermen landing undersized lobster by tailing them. **Preferred Alternative 3** would provide a minimal biological benefit since it is thought that there are very few recreational fishermen who have in their possession a Tail-Separation Permit.

Preferred Alternative 4 would address the issue of some fishermen landing part of their catch whole and part of it tailed, a practice that has been reported via anecdotal reports. It has also been reported that several fishery participants that engage in this practice do so in order to land sub-legal spiny lobsters for profit. If under **Preferred Alternative 4** most fishermen choose to land the majority of their Caribbean spiny lobster harvest whole, the rate at which Caribbean spiny lobsters are harvested would likely decrease due to storage capacity issues of whole lobster tails on participating vessels.

2.9 Action 9: Limit Spiny Lobster Fishing in Certain Areas in the EEZ off Florida to Protect Threatened Staghorn and Elkhorn Corals (*Acropora*)

Alternative 1: No Action – Do not limit spiny lobster fishing in certain areas in the EEZ off Florida to address ESA concerns for *Acropora*.

Alternative 2: Prohibit spiny lobster trapping on all known hardbottom in the EEZ off Florida in water depths less than 30 meters.

Alternative 3: Expand existing and/or create new closed areas to prohibit spiny lobster trapping in the EEZ off Florida.

Preferred Option a: Create 25 —large closed areas to protect threatened *Acropora* corals.

Option b: Create 37 —medium closed areas to protect threatened *Acropora* corals.

Option c: Create 52 —small closed areas to protect threatened *Acropora* corals.

Alternative 4: Expand existing and/or create new closed areas to prohibit all spiny lobster fishing in the EEZ off Florida.

Option a: Create 25 —large closed areas to protect threatened *Acropora* corals.

Option b: Create 37 —medium closed areas to protect threatened *Acropora* corals.

Option c: Create 52 —small closed areas to protect threatened *Acropora* corals.

Comparison of Alternatives: The biological opinion on the spiny lobster fishery requires the Councils protect areas of staghorn and elkhorn coral (*"Acropora")* by expanding existing or creating new closed areas. These alternatives are being developed to meet those requirements. See Figures 4.9.1.1 through 4.9.1.3c in Section 4 for the locations of proposed and existing areas closed to trapping from west to east.

The Florida Keys National Marine Sanctuary (FKNMS) has designated 15 special use or sanctuary preservation areas in federal waters where trap fishing is prohibited [15 CFR 922.164(d)(iii)]. *Acropora* occur at relatively high densities in many of these areas. However, colonies of high conservation value and additional areas of high *Acropora* density exist outside these closed areas. Creating new closed areas or expanding existing closed areas to include these areas of high *Acropora* density would help reduce the likelihood of interactions between spiny lobster traps and coral colonies.

The alternatives in this action propose several options for creating new or expanding existing closed areas to protect threatened coral colonies. The original alternatives required selecting a buffer zone size. However, it became clear that this approach would likely create closed areas so small that they may be difficult to locate and avoid at sea. Small areas can also create law enforcement challenges. To address these concerns, the alternatives considered were changed.

The current alternatives propose closed areas of varying sizes. The primary challenge with selecting closed areas is balancing impacts to the fishery and benefits to the environment. Larger areas are more easily enforced, fewer in number, and more likely to provide protection to corals. Larger areas are bigger because they encompass multiple reefs/hardbottom areas where

Acropora colonies are found. However, they also include (and would prohibit trapping on) sand/rubble habitats where fishers prefer to set traps. As the closed areas get smaller, the amount of sand/rubble habitat that would be closed to fishing also decreases. However, as areas get smaller their overall number increases and problems with enforcement also increase.

The proposed closed areas were selected for several reasons. Colonial size data were used to identify *Acropora* colonies of varying sizes and maturities. The largest "super colonies" have been designated as the highest conservation priority because of their importance to sexual reproduction. *Acropora* corals are generally considered sexually mature when the surface area of live tissue exceeds 100 cm^2. Elkhorn corals with a living tissue surface area of 1000 cm^2 could be considered "super colonies." A similar distinction could be made for staghorn corals with a living tissue surface area of 500 cm^2. Colonies of this size have exponentially higher reproductive potential compared to other sexually mature colonies, and represent essential sources of gamete production. Colonies of this size are also exceedingly rare. Sampling at over 1,000 locations throughout the Florida Keys and the Dry Tortugas identified only 17 super colonies (6 staghorn colonies and 9 elkhorn colonies). The same level of sampling has also identified 62 sexually mature colonies (32 staghorn colonies and 30 elkhorn colonies) and 61 non-sexually mature colonies (58 staghorn colonies and 3 elkhorn colonies).

Additional data indicating the location of *Acropora* colonies were also used to develop the proposed areas. These data points simply reflect whether *Acropora* colonies were present at the time of sampling and do not include colonial size information. Since no size information is available for these colonies conservation priorities could not be assigned. It is important to remember that locations without assigned conservation priorities are not of low conservation value; rather they are areas with minimal data. In all likelihood, areas of high *Acropora* occurrence provide significant conservation benefits and should be viewed as areas requiring special attention and protection.

The boundaries of all the closed areas run along lines of latitude and longitude, and only form right angles. No angled boundaries are proposed to improve compliance and support enforcement. In general, the "large" areas span whole minutes of lat./long. (i.e., 24°34'0" to 24°33'0"), and the "medium" areas span 30 second intervals of lat./long. (i.e., 24°33'30" to 24°33'0"). "Small" areas do not follow any particular sizing pattern.

Alternative 1 (No Action) would have the least biological benefit to *Acropora*, and would perpetuate the existing level of risk of interaction between these species and the fishery. **Alternative 1** would not meet the requirement established under the biological opinion. **Alternative 2** would provide the greatest biological benefit to *Acropora* and other hardbottom/coral resources. **Alternative 2** would prohibit trapping on all hardbottom in the Florida EEZ, which includes areas under both Councils' jurisdiction. The vast majority of *Acropora* colonies in the Florida EEZ occur in waters under the South Atlantic Council's jurisdiction. While areas of hardbottom habitat in the Florida EEZ fall under the jurisdiction of the Gulf Council, the water quality in these areas is generally too poor to sustain *Acropora* colonies. However, if water quality improves these areas would likely support *Acropora*. Prohibiting trapping on all hardbottom areas would close approximately 73 square miles of the EEZ off Florida to trapping. The negative social and economic impacts of **Alternative 2** are

likely to be significant. Closing all hardbottom areas to trapping would significantly reduce the area available to trapping and may make trapping all together impractical. Relative to **Alternative 2**, **Alternatives 3 and 4** would be less biologically beneficial to *Acropora* colonies located outside the closed areas. **Alternative 3, Options a-c** would reduce the risk of trap damage to *Acropora* by prohibiting the use of traps near areas of high *Acropora* density or near colonies with high conservation value. **Preferred Alternative 3, Option a** would likely provide the greatest biological benefit because it closes approximately 14 square miles of hardbottom habitat to trapping. **Alternative 3, Option b and c** would likely have decreasing biological benefits, closing approximately 8 and 4 square miles of hardbottom habitat to trapping, respectively. As closed areas get smaller the potential for interactions between trap gear and corals increase. The negative social and economic impacts from **Alternative 3, Options a-c** would likely be reduced as the size of the closed areas gets smaller. However, the burden of enforcing closed areas would increase as closed areas get smaller. **Alternative 4** and the associated options would provide slightly more biological benefit to *Acropora* colonies than **Alternative 3** and the associated options because it would prohibit all fishing for spiny lobster in the proposed closed areas. **Alternative 4, Options a-c** would likely have additional social and economic impacts than **Alternative 3** since it would apply to both the commercial and recreational sectors. However, requirements for both sectors may be viewed as more equitable. **Alternatives 2, 3, and 4** would fulfill the requirements of the terms and conditions prescribed in the biological opinion.

2.10 Action 10: Require Gear Markings so all Spiny Lobster Trap Lines in the EEZ off Florida are Identifiable

Alternative 1: No Action – Do not require gear marking measures for spiny lobster trap lines.

Preferred Alternative 2: Require all spiny lobster trap lines in the EEZ off Florida to be COLOR, or have a COLOR marking along its entire length. All gear must comply with marking requirements no later than August 2014.

Alternative 3: Require all spiny lobster trap lines in the EEZ off Florida to have a permanently affixed 4-inch COLOR marking every 15 ft along the buoy line or at the midpoint if less than 15 ft. All gear must comply with marking requirements no later than August 2014.

Comparison of Alternatives: The biological opinion on the fishery requires the establishment of buoy line marking requirements no later than August 2014, and that the incidental take of protect species be monitored. These alternatives are being developed to meet those requirements. Currently, all spiny lobster traps fished in the EEZ off Florida must follow the gear marking requirements established by the State of Florida at 68B-24 in the Florida Administrative Code (FAC). Those regulations require a buoy or a time-release buoy to be attached to each spiny lobster trap or at each end of a weighted trap trotline. Each buoy must be a minimum of six inches in diameter and constructed of Styrofoam, cork, molded polyvinyl chloride, or molded polystyrene [FAC 68B-24.006(3)]. Additionally, each trap and buoy used must have the fishers' current lobster license or trap number permanently affixed in legible figures. On each buoy, the affixed lobster license or trap number shall be at least two inches high [FAC 68B-24.006(4)].

Lines are consistently found as marine debris and most frequently recovered without the buoys or traps still attached. Miller et al. (2008) reported lost pot/trap gear was the second most prevalent type of marine debris in the Florida Keys and the most damaging to benthic habitat. In all cases, lines were without buoys. While current gear marking regulations require buoys and traps to be marked, buoys are frequently dislodged from lines and the lines used in the spiny lobster fishery are also used in other fisheries and for other purposes. These conditions make it extremely difficult to determine if line found in the environment, or entangling protected species, originated from the spiny lobster fishery. A lack of uniquely identifiable markings also makes monitoring incidental take in the fishery difficult. Trap line marking requirements would allow for greater accuracy in identifying fishery interactions impacts to benthic habitats and protected species leading to more targeted measures to reduce the level and severity of those impacts.

Marine debris surveys conducted in the Florida Keys documented that 21% of trap lines found were less than 15 ft long and approximately 53% were between 15 and 45 ft in length with the remainder being longer than 50 ft (Miller et al. 2008). The average length of line encountered was approximately 35 ft (Miller et al. 2008). Requiring gear marks along the

entire length of the line or at least every 15 ft (**Alternative 3**) improves the likelihood that line found in the environment can be identified properly.

Trap line marking requirements are currently in place for other fisheries in other regions. Under the Atlantic Large Whale Take Reduction Plan trap/pot fisheries in the Northeast and Mid-Atlantic regions must use red, orange, or black markings on their gear depending on the fishery. When the line in use is the same color as the required gear marking color scheme, those lines are marked with a white line.

Since color marking schemes using red, orange, and black are currently in use, those colors were not considered here. Spiny lobster industry members requested that only colors that were not likely to attract sea turtle be considered for gear marking requirements. Most sea turtles appear to have at least some color vision and most are able to see a color spectrum similar to what humans observe (Liebman and Granda 1971, Granda and O'Shea 1972, Liebman and Granda 1975, Levenson et al. 2004, Mäthger et al. 2007). Limited research has not yet identified any particular color that would be less likely to attract sea turtles. However, anecdotal evidence from sea turtle rehabilitation suggests that bright colors such as pinks, yellows, and bright greens can capture their attention (S. Schaf, Florida Fish and Wildlife Conservation Commission, pers. comm. 2010). Given this information, COLOR (to be determined) was selected for the gear marking requirement in **Preferred Alternative 2** because it was not currently in use elsewhere.

Three methods for marking gear were tested and found to work satisfactorily in the Northeast Region under normal conditions. At the top of Figure 2.10.1, colored twine is seized around the line and woven between the strands. In the center, the line was spray-painted; this method requires that the line be dry. At the bottom, colored electrical tape was wrapped in one direction and then back over itself to form two layers. Similar marking techniques would likely be sufficient for the spiny lobster fishery under **Alternative 3**. Requiring a specific color trap line or a color tracer in the line (Figure 2.10.2) as under **Preferred Alternative 2** would also be sufficient.

Figure 2.10.1. Examples of satisfactory gear markings for trap lines in the Northeast Region.

Figure 2.10.2. Example of a color tracer line (orange) woven along the entire length of a black trap line. In the image, the trap line is coiled.

The State of Florida could greatly improve the efficacy of gear marking requirements for spiny lobster gear fished in the EEZ off Florida by creating compatible gear marking requirements for spiny lobster trap gear in state waters. The selection of a gear marking scheme does not preclude non-spiny lobster fishers for using the same color. The State of Florida could further improve the efficacy of gear marking requirements proposed under this action by instituting gear marking requirements for other state water trap fisheries (i.e., blue crab and stone crab).

Alternative 1 (No Action) would have no biological benefit for protected species and would not satisfy the trap line marking requirements of the biological opinion. This alternative is unlikely to have any social or economic impact. **Preferred Alternatives 2** would likely have slightly more biological benefit than **Alternative 3.** Requiring gear markings along the entire length of trap lines would minimize the likelihood that a portion of a spiny lobster trap line is recovered without an identifiable mark. **Alternative 3** would provide greater biological benefit than **Alternative 1** but the benefits would likely be less than **Preferred Alternative 2** for the reason described above. The social and economic impacts from **Alternatives 2 and 3** would likely be similar. Additional costs would be incurred to replace existing trap lines with trap lines of specific color (**Alternative 2**). However, trap lines are generally replaced after several years due to wear and the phase in provision of this action should allow fishers to begin using lines that meet the gear marking requirements as they replace old lines. The materials needed to meet the requirements of **Alternative 3** would likely cost less than those required in **Preferred Alternative 2.** However, the time commitment need to properly marking all lines as proposed in **Alternative 3** may greater than the time required to switch out old lines.

2.11 Action 11: Allow the Public to Remove Derelict or Abandoned Spiny Lobster Traps Found in the EEZ off Florida

Alternative 1: No Action – Do not allow the public to remove any derelict or abandoned spiny lobster trap found in the EEZ off Florida.

Alternative 2: Allow the public to completely remove from the water any derelict or abandoned spiny lobster trap found in the EEZ off Florida from the end of lobster season trap removal period (usually April 5) until the beginning of the next season's trap deployment period (August 1).

Alternative 3: Allow the public to completely remove from the water any derelict or abandoned spiny lobster trap found in the EEZ off Florida during the closed seasons for both spiny lobster and stone crab (May 20-July 31).

Alternative 4: Allow the public to remove spiny lobster trap lines, buoys, and/or throats, but otherwise leave in place, any trap found in the EEZ off Florida from the end of season trap removal period (usually April 5) until the beginning of the next season's trap deployment period (August 1).

Alternative 5: Allow the public to remove spiny lobster trap lines, buoys, and/or throats, but otherwise leave in place, any trap found in the EEZ off Florida during the closed seasons for both spiny lobster and stone crab (May 20-July 31).

Preferred Alternative 6: Delegate authority to regulate the removal of derelict or abandoned spiny lobster traps occurring in the EEZ off Florida to the Florida FWC.

Comparison of Alternatives: The biological opinion on the spiny lobster fishery requires the Councils explore allowing the public to remove derelict trap gear from the EEZ off Florida. Current federal regulations state that any trap, buoy, or rope found in the EEZ of Florida and any other Gulf state outside of this authorized period is considered unclaimed or abandoned property and may be disposed of in any manner considered appropriate by the Assistant Administrator or authorized officer [50 CFR 640.20(b)(3)(iii)]. Those regulations also state that pulling or tending another person's spiny lobster trap, without prior authorization is prohibited.

Florida regulations allow spiny lobster traps to be deployed beginning August 1 of each year and require all traps be removed from the water by April 5 (with the opportunity for an extension under certain circumstances). The State of Florida considers trap remaining in the environment outside of the authorized fishing season to be derelict [FAC 68B-55.004].

At any time, local, state, or federal government personnel may remove trap debris and derelict traps from areas permanently closed to trapping without prior authorization from Florida FWC [FAC 68B-55.002 and 68B-55.004]. During the spiny lobster season, Florida FWC employees, local, state, or federal personnel may retrieve derelict traps at any time

deemed appropriate by Florida FWC. Members of a fishery participant organization may also remove derelict traps, at any time deemed appropriate by Florida FWC during the season, if they have a Florida FWC-approved trap retrieval plan. During the closed season for spiny lobster, and after any authorized trap retrieval period together with any extensions, nonprofit nongovernmental organizations, fishery participant organizations, or other community or citizens groups may retrieve derelict traps as part of coastal cleanup events authorized by Florida FWC [FAC 68B-55.004].

Trap debris may be removed at any time from shoreline areas shoreward of mean low water, and from mangroves or other shoreline vegetation by nonprofit nongovernmental organizations, fishery participant organizations, or other community or citizens groups when they organize, promote, and participate in coastal cleanup events for the purpose of removing marine debris. Prior authorization from Florida FWC is required for any coastal clean-up events that remove trap debris occurring in state waters seaward of mean low water [FAC 68B-55.002].

The specific State of Florida trap debris/derelict trap regulations are as follows:
68B-55.001 Definitions
(2) "Trap debris" means any piece of a trap, or any combination of such pieces not constituting a fishable trap.
(3) "Derelict trap" means any trap during any closed season for the species, or any fishable trap during the open season that lacks more than two of the following elements:
(a) Buoy.
(b) Line.
(c) Current Commission-issued trap tag (if required).
(d) Current license.
(4) "Fishable trap" means a trap that has 6 intact sides and at least two of the following elements:
(a) Buoy.
(b) Line.
(c) Current Commission-issued trap tag (if required).
(d) Identification.
(5) "Fishery Participant Organization" means a group of commercial fishermen all of whom possess a current saltwater products license and a blue crab, stone crab or spiny lobster endorsement. For the purpose of participation in the retrieval of derelict traps this means participants who receive and possess written permission from each other to bring their traps into land or move them back into line, who work under law enforcement supervision to retrieve traps, or who prepare a plan for Commission authorization pursuant to this rule.

68B-55.002 Retrieval of Trap Debris
(1) Local, state, or federal governmental entities, nonprofit nongovernmental organizations, fishery participant organizations, or other community or citizens groups are hereby authorized to remove trap debris from shoreline areas landward of mean low water, and from mangroves or other shoreline vegetation when they organize, promote, and participate in coastal cleanup events for the purpose of removing marine debris.

(2) Except as provided in subsection (3), other coastal cleanup events for the purpose of removing trap debris from all other areas of state waters shall only be undertaken with prior authorization from the Commission, to assure that such removal is adequately supervised.
(3) Local, state, or federal government personnel may remove trap debris located in areas that are permanently closed to trapping without prior authorization from the Commission.
Specific Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 7-1-03, Amended 10-15-07.

68B-55.004 Retrieval of Derelict Traps and Traps Located in Areas Permanently Closed to Trapping.
(1) During the closed season for the harvest of any species for which traps are allowable gear, and after any authorized trap retrieval period together with any extensions, traps are considered to be derelict and may be retrieved as part of coastal cleanup events conducted by local, state, or federal government entities, nonprofit nongovernmental organizations, fishery participant organizations, or other community or citizens groups. Except as provided in subsection (3), such events shall only be undertaken with prior authorization from the commission, to assure that such removal is adequately supervised but without the mandatory reporting required in Rule 68B-55.003, F.A.C.
(2) During the open season for harvest of any species for which traps are allowable gear, retrieval of derelict traps may occur at any time deemed appropriate by the Commission. Commission employees, local, state, or federal personnel, or members of a fishery participant organization may retrieve derelict traps. Except as provided in subsection (3), retrieval other than by Commission personnel shall only be pursuant to a Commission approved plan. The plan shall include the operational area and time period proposed, authorized personnel, the number of vessels, methods of disposition, and number and qualifications of supervisory personnel. An approved plan shall also include notification of the Commission's Division of Law Enforcement no less than 24 hours prior to commencement of retrieval under this program with final float plan information including contact information, vessel registration numbers, trip times, and number of days.
(3) Local, state, or federal government personnel may retrieve traps located in areas that are permanently closed to trapping without prior authorization from the Commission.
Specific Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 7-1-03, Amended 10-15-07.
Trap losses in the spiny lobster fishery range from 10 to 20% of all traps fished, or 50,000 to 100,000 traps, annually (Lewis et al. 2009). Years with strong or frequent tropical systems (i.e., tropical storms and/or hurricanes) can increase the number. For example, during the 2005–06 lobster seasons approximately 60% of registered traps were lost because of hurricanes Katrina, Rita, and Wilma (Lewis et al. 2009). Of the traps lost only a small percentage are ever recovered.

Lost traps pose multiple threats to the environment and protected species. Lost traps can "ghost" fish for a year or more (FWC unpubl. data, Lewis et al. 2009), and trailing trap lines can become entangled on the reef, damaging corals and sponges (Chiappone et al. 2005). Marine mammals and ESA-listed sea turtles and marine fish can also become entangled in trailing ropes (Guillroy et al. 2005, Seitz and Poulakis 2006, Lewis et al. 2009). Wooden traps eventually degrade after many months, but plastic trap throats and polystyrene buoys

persist indefinitely in the marine environment. Seagrass meadows can be damaged when traps are lost or left for periods longer than six weeks (Uhrin et al. 2005). Thousands of lost and abandoned traps can have a significant effect on the reef environment and benthic habitats.

Unlike nearshore areas where traps can be located during aerial surveys or by boats during low tides, traps lost in federal waters are more difficult to identify. Traps identified in the nearshore environment are also more conducive to trap clean-up events because of their proximity to boat ramps and areas where recovered traps can be off loaded. Organized clean ups for the sole purpose of removing derelict trap gear in federal waters is generally expensive and difficult to conduct. Allowing the public to remove derelict trap gear (**Alternatives 2 and 3**) would promote many individual contributions, which could have a large cumulative effect.

Arguments against allowing the public to remove derelict or abandoned traps cite concerns that legally fishing traps may be removed by someone other than themselves, either intentionally or by accident. However, some industry members did recognize the potential environmental impacts of lost traps and suggested their own alternative that would allow the public to make traps unfishable (**Alternatives 4 and 5**). Specifically, they recommended authorizing the removal of buoys, trap lines, and throats from derelict spiny lobster traps in the EEZ. They stated that these actions would render the trap unlikely to ghost fish, and would reduce a traps likelihood of moving during storm events. This proposal also ensured that no one other than the owner of the trap would be authorized to remove the trap from the water.

Another argument against allowing the public to pull derelict traps is a concern over confusion between similar looking traps. For example, some industry members voiced concerns that legally fishing stone crab traps would be confused for derelict spiny lobster traps by the public and pulled. **Alternatives 3 and 5** would only allow the public to remove derelict traps during the closed seasons for both spiny lobster and stone crabs. Limiting the removal of traps to the closed seasons for both species ensures that only truly derelict traps are removed.

Alternative 1 (No Action) would have no biological benefit for protected species or benthic habitat and would perpetuate the existing level of risk for interactions between these protected species and lost trap gear. No negative social or economic impacts are anticipated under this alternative. **Alternative 2** would likely have the greatest biological benefits. This alternative would allow for the complete removal of all derelict or abandoned traps and authorize that removal for the longest period of time, likely increasing the number of derelict or abandoned traps removed. **Alternative 3** would also allow for the complete removal of derelict or abandoned trap gear, but for a shorter period. As a result, the biological benefit of **Alternative 3** may be less than **Alternative 2**. The potential social and economic impacts from **Alternative 2** include the accidental or intentional removal of legally fishing traps. Well meaning members of the public may accidentally remove a legally fishing lobster trap from the water. Likewise, well meaning members of the public may accidentally remove similar looking traps (i.e., stone crab traps). The potential social and economic impacts from

Alternative 3 would likely be similar those expected from **Alternative 2**; however the likelihood of the accidental removal of legally fished, similar looking traps may be reduced. Since fines may be levied for derelict traps recovered by law enforcement or during Florida FWC contracted trap removal programs, allowing the public to remove traps may have positive economic impacts in the form of avoided fines. **Alternatives 4 and 5** would likely have less biological benefit than **Alternatives 2 and 3**. Allowing the public to remove trap line, buoys, and throats would help reduce the potential impacts from ghost fishing and entanglement. However, traps remaining in the environment still have the potential to cause damage to benthic habitat. **Alternative 4** would allow more time for the public to remove trap line, buoys, and throats from derelict or abandoned traps, potentially increasing the biological benefit. Compared to **Alternatives 2-4**, **Alternative 5** would likely have the least biological benefit. The social and economic impacts of **Alternatives 4 and 5** would likely be similar to **Alternatives 2 and 3**. Removal of lines and throats from a legally fishing trap would likely result in the same economic impacts to fishers as the complete removal of a trap from the water. It is unclear if the owner of recovered derelict trap that had previously had its trap lines, buoys, and/or throats removed would still be subject to fines. If so, the potential economic benefits from **Alternatives 2 and 3** may not be realized with **Alternatives 4 and 5**. It is currently unclear what type of biological impact **Preferred Alternative 6** would have. If the delegation of authority to the Florida FWC leads to the removal of more derelicts traps and trap debris, the biological benefits from the alternative would likely be within the range anticipated from **Alternatives 2-5**. If **Preferred Alternative 6** ultimately results in no change or fewer derelict traps and trap debris being removed, then its biological benefit would likely be similar to the effect anticipated under **Alternative 1**. The social and economic impacts of **Preferred Alternative 6** are unclear.

3.0 AFFECTED ENVIRONMENT

3.1 Description of the Fishery

3.1.1 Caribbean Spiny Lobster – Commercial Fishery

Introduction

Florida landings of Caribbean spiny lobster (*Panulirus argus*) began to increase in the late 1940s to levels ranging 4-7 mp, whole weight (ww) in the 1970s - 1990s, and then they fell to 3.5-5.0 mp in 2001 onward (Figure 3.1.1.1). This excludes landings from international waters, an estimated 1.0-5.7 mp in 1964-1975 (Vondruska 2010b). Landings occur predominantly in the Florida Keys (Monroe County) and elsewhere in south Florida. Relatively small amounts have been reported for other states since 1977, in most instances for fewer than three dealers, in which case the data are confidential.

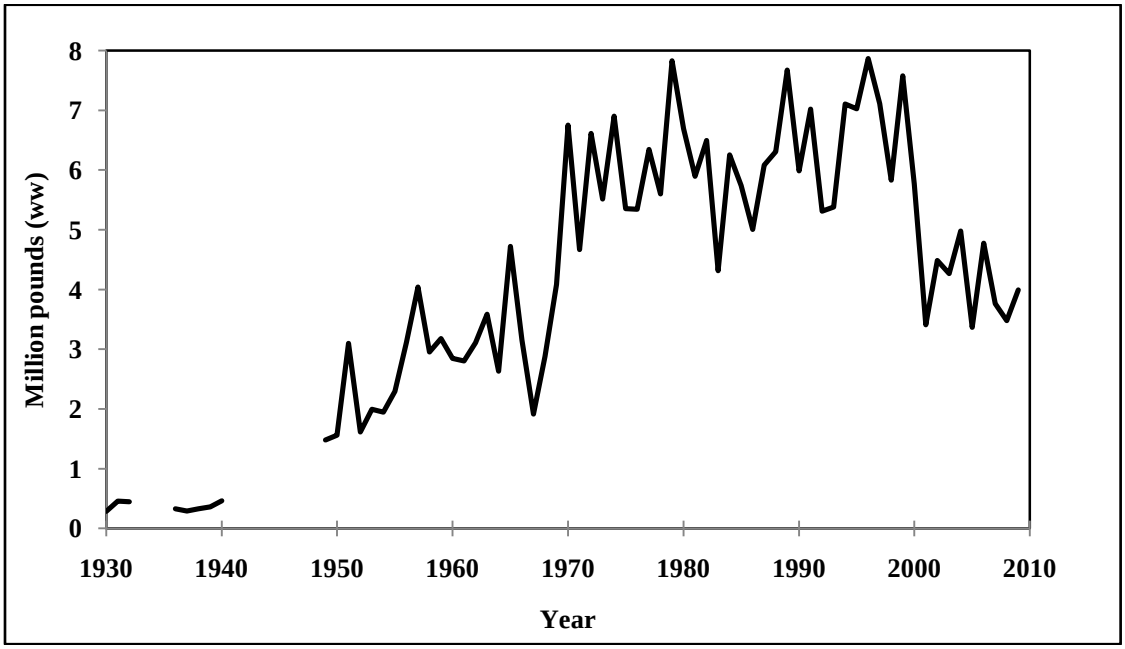

Figure 3.1.1.1. Florida commercial landings of Caribbean spiny lobster, 1930-2009.
Note: Excludes estimated landings from international waters in 1964-76 (Vondruska 2010b).

The Caribbean spiny lobster in the U.S. Exclusive Economic Zone (EEZ) of the Atlantic Ocean and Gulf of Mexico is jointly managed by the South Atlantic and Gulf of Mexico Fishery Management Councils (Councils) through the Fishery Management Plan for Spiny Lobster (Spiny Lobster FMP) in the Gulf of Mexico and South Atlantic. In the U.S. EEZ of the Caribbean Sea surrounding Puerto Rico and the U.S. Virgin Islands, the resource is managed by the Caribbean Fishery Management Council through a separate FMP. In the Gulf and South Atlantic, the commercial fishery, and to a large extent the recreational fishery, occurs off South Florida, primarily in the Florida Keys. To streamline a management process that involves both state and federal jurisdictions, the Spiny Lobster FMP basically extends the Florida FWC rules regulating the state fishery to the southeastern U.S. EEZ from North Carolina to Texas.

Currently, harvest or possession of spiny lobsters in the U.S. South Atlantic EEZ is regulated in the Code of Federal Regulations (CFR). According to 50 CFR 640.4, anyone who sells, trades, or barters or attempts to sell, trade, or barter spiny lobster harvested or possessed in the EEZ off Florida, or harvested in the EEZ other than off Florida and landed in Florida must have licenses and certificates specified to be a commercial harvester, as defined in the Florida Administrative Code. Similarly, any person who sells, trades, or barters or attempts to sell, trade, or barter a Caribbean spiny lobster harvest in the U.S. EEZ other than off Florida, a federal vessel permit must be issued and on board the harvesting vessel [50 CFR 640.4(a)(1)(ii)]. In 2010, the state of Florida issued 1,286 commercial spiny lobster permits and 293 commercial dive permits. As of November 15, 2010, NOAA Fisheries Service listed 196 valid federal spiny lobster permits.

The commercial and recreational fishing season for spiny lobster in the EEZ off Florida and the EEZ off the Gulf States, other than Florida, begins on August 6 and ends on March 31 [50 CFR 640.20(b)]. Spiny lobster traps may be worked during daylight hours only, and no spiny lobster can be harvested by diving at night in excess of the bag limit. Specifications for traps and buoys, identification requirements, and prohibited gear are detailed in the Florida Administrative Code (68B-24.006).

No person may possess a Caribbean spiny lobster in or from the Gulf and South Atlantic EEZ with a carapace length of 3.0 inches (7.62 cm) or less or a separated tail with a length less than 5.5 inches (13.97 cm) [50 CFR 640.21(b)], except under particular circumstances. The holder of a valid crawfish license, lobster trap certificates, and a valid SPL may harvest and possess, while on the water, undersized spiny lobsters to use as attractants. Florida regulations allow for 50 such undersized attractants plus one per trap aboard each vessel, but Federal regulations allow for 50 or one per trap. Both sets of regulations require the use of live wells for undersized lobsters that follow specific guidelines. The possession aboard a fishing vessel of a separated spiny lobster tail is allowed only during trips of 48 hours or more if Federal tail-separation permit has been issued to that vessel. As of November 15, 2010, NOAA Fisheries Service listed 357 valid federal tailing permits.

Current regulation prohibits the possession of a spiny lobster or parts thereof in or from the Gulf and South Atlantic EEZ from which the eggs, swimmerettes or pleopods have been removed [50 CFR 640.21(a)]; and requires any berried spiny lobster to be returned immediately to the water [50 CFR 640.7(g)].

3.1.2 Other Federal Laws and Regulations that Protect Spiny Lobster

Lacey Act

The Lacey Act, as amended in 1981 (16 USC §§ 3372 et seq.) prohibits any person from importing, exporting, transporting, selling, receiving, acquiring, or purchasing in interstate or foreign commerce any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any state or in violation of any foreign law. For example, it is a violation of the Lacey Act to import Caribbean spiny lobster that is in

violation of the exporting country's minimum harvest-size standard. Many of the countries that harvest Caribbean spiny lobster have minimum harvest size standards.

Florida Keys National Marine Sanctuary and Protection Act

In November 1990, Congress passed the Florida Keys National Marine Sanctuary and Protection Act that established the Florida Keys National Marine Sanctuary (FKNMS) (Pub.L 101-605).[1] The FKNMS is comprised of 9,660 square kilometers (about 2,900 square nautical miles) of coastal waters off the Florida Keys. It extends approximately 220 miles southwest of the southern tip of the Florida peninsula and includes the world's third largest coral barrier reef. Within the Sanctuary are 24 no-take zones. Fifty-eight percent of the Sanctuary resides in Florida waters and 42% is in federal waters. Both NOAA and the State of Florida manage the Sanctuary. The waters of the FKNMS are within the jurisdiction of both Councils.

Biscayne Bay National Park

Originally established as a national monument by Congress in 1968, Biscayne Bay National Park was re-designated as a national park in 1980. The Park's purpose is to preserve and protect its rare combination of terrestrial and aquatic natural resources. The Park includes approximately 173,000 acres in Miami-Dade County, and is about 22 miles long. The park extends from shore about 14 miles to the 60-foot contour and contains about 72,000 acres of coral reefs. Under existing Supervisor's rules for the Park, several areas are closed year-round to public entry to protect sensitive resources and wildlife. This also means not taking Caribbean spiny lobster in those areas.

Dry Tortugas National Park

The Dry Tortugas National Park was established by Congress in 1992 (Public Law 102-525). Possession of Caribbean spiny lobster is prohibited within boundaries of the park unless the individual took the lobster outside the park waters and the person in possession has proper State/Federal licenses and permits [36 CFR 7.27(b)(4)(i)]. The presence of lobster aboard a vessel in park waters, while one or more persons from such vessel are overboard, constitutes prima facie evidence that the lobsters were harvested from park waters in violation of the above regulation.

State Spiny Lobster Laws and Fisheries Histories

Descriptions and discussions of the development of the spiny lobster fishery in Florida are provided in Labisky et al. (1980), Moe (1991), Florida Marine Fisheries Commission (1991), Prochaska and Baarda (1975), and Williams (1976). Significant events or facts about the development of the fishery include the fishery being primarily a bait fishery up until the twentieth century (Labisky et al. 1980); construction of the Overseas Railroad in 1912 (destroyed by the Labor Day Hurricane of 1935, replaced by the Overseas Highway in 1938) and a large ice-making and cold-storage facility in Key West by the 1920s, allowing shipment to distant markets; the implementation of size limits in 1929 (Prochaska and Baarda 1975); the development of freeze processing, enabling the expansion of the retail market in the 1940s; the development of SCUBA, hydraulic

[1] The National Marine Sanctuary System was created in 1972. Two areas in the Florida Keys were designated as sanctuaries, the first in 1975 and the second in 1981. These areas were included in the Florida Keys National Marine Sanctuary in November 1990.

systems to haul traps, and the use of shorts (Moe 1991); the first gear restrictions imposed in 1965 (trap regulations; Prochaska and Baarda 1975 and Williams 1976); the enactment of the special two-day sport season in 1975; the development of the state fishery management plan in 1987; the creation in 1991 of the recreational spiny lobster license and initiation of annual surveys to estimate recreational harvests and a commercial trap certificate program.

The estimated number of traps used for commercial fishing for Caribbean spiny lobster in Florida approximately doubled every 10 years during 1950-1990, reached nearly a million traps in the early 1990's, and was reduced to less than a half million traps by the late 2000s. Shivlani, (2009) analyzed the expansion and regulation of the fishery. The State first issued commercial lobster permits in 1954/55; imposed a fee of $50 per permit starting in 1971; and in 1987-1988 limited the numbers of traps per permit holder to 2000 and initiated a permit moratorium, among other things, all with the expectation of reducing landings (Milon et al. 1998). In 1991, the Florida Legislature passed law creating the Trap Certificate Reduction Program (TCP) to "stabilize the lobster fishery by reducing the total number of traps" (Florid Statutes 370.142(1), as quoted in Shivlani 2009). "It is the goal of the Commission [which administers the program] to substantially reduce mortality of undersize spiny lobster in the fishery, by reducing the number of traps used in the fishery to the lowest number which will maintain or increase overall catch levels, promote economic efficiency in the fishery, and conserve natural resources" [FAC 68B-24.001]. Quoting Larkin and Milon (2000):

> The state of Florida has managed the commercial spiny lobster trap fishery using a tradable effort permit program since 1992. Under this input control program, individuals own shares of a restricted input, but output is unregulated. This type of program can be contrasted with an output control program, such as individual transferable quotas (ITQs) where individuals own shares of a restricted output. The commonality between these programs is that they both allow shares to be bought or sold. The transfer of shares essentially generates a private market for effort or harvest rights, which can allow for efficiency and profitability gains in the fishery (Squires et al. 1995).

While many studies focused on the fishery as a whole, Shivlani et al. (2005) analyzed the impact of the TCP on fishing communities and economic viability of individual fishermen. Based on survey responses for the 2001/02 fishing season, it appears that 1,232 is the minimum for the average number of trap certificates needed for economic viability at the vessel (fishing business) level (Shivlani et al. 2005; also, see Shivlani, 2009). According to this study, the initial allocation of certificates among fishermen under the TCP had created two groups of fishermen. Apparently, those initially awarded more than 1,500 certificates viewed the TCP as a means of reducing the size of their operations, and those initially awarded fewer than 1,500 certificates were forced for the most part to purchase certificates from other fishermen to remain competitive (Shivlani 2009). As part of their analysis of the TCP, Milon et al. (2000) include a summary of initial eligibility rules and certificate allocations under the TCP, along with data on certificate purchases and sales, leasing, prices and other matters. When landings were at their peak in the mid-1990s, the purchase prices for certificates were upward of $60 and a leasing system developed (Shivlani 2009).

Given the financial barriers to entry into trap fishing, commercial dive fishing for spiny lobster emerged and expanded in the wake of the TCP. Commercial divers were not subject to controls on effort and entry until 2004, and this weakened the effectiveness of the TCP as a limited access program for the fishery as a whole (Shivlani 2009, p 89).[2] Compared with traps, landings from diving increased rapidly in the first decade of the TCP, from 0.098 mp in 1991/92 to a peak of 0.582 mp in 1999/00, and then declined to 0.152 mp by2009/10 (Table 3.1.2.1). In south Florida, there is a daily diving-vessel trip limit of 250 lobsters [FAC 68B-24.0055]. Owners of trap certificates cannot own a commercial diving permit [FAC 68B-24.0055(1)]. There is a moratorium on issuing new licenses (permits) for commercial dive fishing; they had declined from 405 in 04/05 to 293 in 2009/10 (Table 3.1.2.1).

The Special Recreational Crawfish License (SRCL) allows the harvest, but not the sale of a special daily bag limit of lobsters. The SRCLs were first issued for the 1994/95 lobster fishing season. The SRCLs were implemented for persons who held Saltwater Products Licenses (SPLs) and Spiny Lobster/Crawfish endorsements in 1993/94, but did not meet the income requirements for a Restricted Species (RS) endorsement that allows the sale of spiny lobster. The SRCL special bag limit was 50 lobsters in 2003/04 and it will have been reduced to 10 lobsters by 2011/12 [FAC 68B-24.004]. The number of SRCLs declined from 515 in 1994/95 (with landings of 74,980 pounds for 22,267 person days of effort) to 168 by 2008/09 (with landings of 10,727 pounds for 3,594 person days of effort) (Table 3.1.2.1 and SEDAR 8, 2010 update, Table 2.1.2, 01Dec10). To maintain an SRLC, a recreational lobster permit is required and an RS endorsement for spiny lobster (required for commercial fishing) is prohibited. The SRCLs will not be issued or renewed after 2012/13 [FAC 68B-24.0035].

[2]With some exceptions related to age or other factors, commercial vessel operators, vessels (fishing firms), and crew members must sell $5,000 of products or have earned income of $2,500 per year from sales to licensed Florida dealers to qualify for a restricted species endorsement (FAC 68B-24.0035; FS 379.355(5); FS 379.361 (2) on SPLs; FWC, Restricted Species Endorsement Application).

Table 3.1.2.1. Number of licenses (permits) and landings (thousands of pounds, ww).

Fishing year	Crawfish/lobster trap permits		Commercial dive permits		Special recreational crawfish		Restricted species licenses	Stone crab trap permits
	Permits	Landings	Permits	Landings	Permits	Landings		
90/91	4,245	5,899		98			7,092	4,719
91/92	3,869	6,602		192			7,891	4,914
92/93	3,498	5,125		223			7,921	5,044
93/94	3,199	5,109		176			8,329	5,515
94/95	2,283	6,895		253	515	75	9,361	6,066
95/96	2,312	6,682		308	430	67	9,813	4,954
96/97	2,513	7,363		334	398	55	9,904	4,347
97/98	2,415	7,185		394	365	50	9,874	3,851
98/99	2,424	5,003		351	363	49	9,531	3,491
99/00	2,298	7,024		582	318	61	9,207	3,216
00/01	2,282	4,934		569	301	38	9,881	2,863
01/02	1,965	2,606		442	273	32	9,916	1,492
02/03	1,853	3,988		547	291	44	9,969	1,658
03/04	1,801	3,727		392	280	39	9,739	1,533
04/05	1,601	5,096	405	305	9	34	9,488	1,433
05/06	1,444	2,644	380	259	23	26	8,912	1,348
06/07	1,346	4,495	352	243	14	27	8,537	1,273
07/08	1,302	3,449	334	286	81	21	8,470	1,251
08/09	1,268	2,988	322	241	168	17	8,210	1,202
09/10	1,286	4,084	293	152				

Permits: Florida Fish and Wildlife Conservation Commission, website data for annual summaries of licenses and/or permits. Data for 2009/10 obtained separately. Landings: SEDAR 8 Update 2010 (final, 01Dec10). Recreational landings are estimated for 1985/86-1991/92, using regression analysis and commercial landings by region in August, and they are estimated for 2004/05 based on averages 2003/04 and 2005/06 (SEDAR 8, 29Apr05, Section 3.1.1.2, pp 5-6; Joseph Munyandorero and Bob Muller, personal communication, FWC, FMRI, 03Jan11). SRLC landings are reported quarterly by the license/permit holders (Florida Administrative Code 68B-24.0035).

Currently, Florida law requires anyone who commercially harvests or sells spiny lobster to have a Saltwater Products License (SPL). An SPL may be issued in the name of an individual or a valid vessel registration number issued in the name of the licensed applicant. The State also requires anyone who sells spiny lobster to have an RSE and Crawfish Endorsement.

Spiny lobster harvested in Florida waters must remain in a whole condition while on or below state waters and the practice of separating the tail from the body is prohibited [FAC 68B-24.003(4)]. Possession of spiny lobster tails that have been separated on or below state waters is prohibited unless the spiny lobster is being imported pursuant to FAC 68B-24.0045, or were harvested outside state waters and the separation was pursuant to a federal permit allowing such separation. If tails are separated from the

body, tails must be at least 5.5 inches in length,[3] otherwise, if whole, the carapace must be greater than 3 inches long [FAC 68B-24.003(1)].

In Florida, the harvest or possession of egg-bearing spiny lobster is prohibited and any egg-bearing lobster found in traps must be immediately returned to the water free, alive and unharmed [FAC 68B-24.007]. The practice of stripping or otherwise molesting egg-bearing spiny lobster to remove the eggs is prohibited and the possession of spiny lobster or spiny lobster tails from which the eggs, swimmerets or pleopods have been removed or stripped is prohibited [FAC 68B-24.007].

Possession of undersized lobster is prohibited, except in the spiny lobster trap fishery, where fishermen use undersized lobsters to attract legal-sized ones. Allowable gears are traps, hand-held net, hoop net (diameter no larger than 10 feet), bully net (diameter no larger than 3 feet), and by diving. The vessel limit for harvest with a bully net is 250 lobsters per vessel per day, for the trap fishery there is no bag or trip limit, and limits for the dive fishery are regional. Additional restrictions and requirements depend on the method of harvest.

For those in the spiny lobster trap fishery, trap certificates and tags are required for all traps. A tag must be securely attached to each trap; spiny lobster trap specifications and trap, buoy, and vessel marking requirements apply; and traps, buoys, and vessels must display the Crawfish endorsement number. Traps must be constructed of wood or plastic and be no larger than 3 feet by 2 feet or the volumetric equivalent (12 cubic feet) with the entrance located on top of the trap. Each plastic trap must have a degradable panel. Traps may be baited and placed in the water beginning August 1. Traps may be worked during daylight hours only. Traps may not be placed within 100 feet of the intracoastal waterway or any bridge or seawall. Traps must be removed from the water by April 5 each year. Harvest is prohibited in designated areas of John Pennekamp Coral Reef State Park. Florida law authorizes Florida FWC to retrieve traps left in the water after the close of the season and fines the traps' owners to cover the costs of retrieving the traps.

All vessels used by persons commercially harvesting lobster by diving, scuba, or snorkel must display the Commercial Dive Permit on the vessel SPL. A person with a Commercial Dive Permit cannot own trap certificates. After January 1, 2005, no diver permits were issued, renewed or replaced except those that were active in 2004-05. Dive permits that are not renewed by September 30 of each year are forfeited. A 250-lobster daily vessel limit applies in Broward, Dade, Monroe, Collier, and Lee counties and adjoining federal waters.

The commercial and regular recreational Caribbean spiny lobster seasons start on August 6 and end on March 31 [FAC 68B-24.005(1)]. No person can harvest, attempt to harvest, or have in his possession, regardless of where taken, any spiny lobster during the closed season of April 1 through August 5 of each year, except during the two-day sport season, for storage and distribution of lawfully possessed inventory stocks or by special permit issued by the Florida FWC [FAC 68B-24.005(1)]. During the two-day sport

[3] No less than 5.5 inches not including any protruding muscle tissue.

season no person can harvest spiny lobster by any means other than by diving or with the use of a bully net or hoop net.

A Wholesale Dealer License is required for any person, firm or corporation that sells spiny lobster to any person, firm, or corporation except to the consumer and who may buy spiny lobster from any person pursuant to section 370.06(2) of the Florida Statutes or any licensed wholesale dealer.

Zoning laws have indirectly affected the spiny lobster fishery in south Florida. In August 1986, Monroe County changed its zoning laws by implementing the Monroe County Land Use Plan (Plan). Under the Plan, commercial fishers must store, build, repair, and dip traps in industrial or commercially zoned areas, within areas designated as commercial fishing villages or in areas termed specific fishing districts (Johnson & Orbach 1990).[4] Prior to the zoning change, fishers could store and work on traps on residential property. Under Article V, Section 9.5 – 143(f) of the Monroe County Ordinances, where a nonconforming use of land or structure is discontinued or abandoned for six months or one year in the case of stored lobster traps, then such use may not be reestablished or resumed, and subsequent use must conform to provisions detailed in the chapter of the ordinances.

3.1.3 Recreational Fishery – Caribbean Spiny Lobster

Introduction

The Florida recreational spiny lobster fishing season has two parts: a two-day sport season that occurs before commercial spiny lobster fishers place their traps in the water and a regular season that coincides with the commercial fishing season. The two-day sport season has been and remains popular as illustrated by a July 28, 1991, article in the *St. Petersburg Times* that concerns "lobstermania" and a July 30, 2009, *Miami Herald* article with the title, "Lobster hunters turn out in droves for Florida mini-season." Recreational spiny lobster fishers individually spend hundreds of dollars for fuel, ramp fees, food, beverages, scuba, snorkeling and hooking equipment and licenses annually. At the same time, however, there have been and continue to be residents and business and commercial interests in the Keys who favor abolishing the sport season. Processors are among those who are critical of the sport season. Shivlani *et al*. (2004) reported that 11% of the processors that they interviewed blamed the sport season for declining commercial landings.

The state of Florida has a variety of permits that will allow recreational fishers to take spiny lobster. In 2010, the state issued 129,865 annual or five-year crawfish permits; in addition, they issued 36,030 other permits, such as Sportsman Gold or Saltwater Lifetime permit, that also allow holders to take spiny lobster. NOAA Fisheries Service does not require a permit for recreational fishing in the EEZ.

[4] Traps used to be dipped in recycled oil to protect them from the marine environment. However, that practice was prohibited beginning in 1995. Now fishermen soak traps in a brine solution to extend the life of their traps.

Beginning with a pilot study in 1991 and continuing through 2007, the FWC has surveyed these permit holders regarding their lobster fishing activities using mail surveys to estimate landings and fishing effort. In 2007, the FWC conducted its first e-mail survey of these permit holders, and since 2008 has used e-mail surveys exclusively to conduct the surveys. These surveys provide an estimate of recreational landings and fishing effort during two specific time periods during the recreational fishing season -- the special 2-day sport season and the first month of the regular lobster fishing season (August 6th through Labor Day). Although the regular lobster fishing season in Florida does not close until April 1, the FWC surveys have only incorporated those two time periods because anecdotal observations, which were subsequently confirmed by these surveys and an additional small season-ending survey, indicated that the largest proportion of recreational lobster fishing effort occurs during those two periods and consequently provided the best opportunity to accurately monitor long-term trends in the fishery using mail surveys. Additional mail surveys throughout the fishing season would have been cost and labor prohibitive. However, the recently developed e-mail survey now makes it more feasible to survey permit holders about their late season fishing activities. The FWC is developing surveys designed to provide estimates of recreational landings from Labor Day to the end of the fishing season.

Like the commercial fishery, the recreational fishery is concentrated along the Florida Keys. The survey conducted in 2008, for example, estimated that approximately 64% of the 1,247,000 lbs of lobsters that were harvested during the two-day sport season and first month of the regular season were harvested in the Keys, and approximately 36% (443,702) were harvested in the southeast coast of the state. See Figure 3.1.3.1. Less than 1% as harvested elsewhere in the state. Typically, approximately 60% of the statewide fishing effort is occursin the Florida Keys (Florida Fish and Wildlife Conservation Commission 2002).

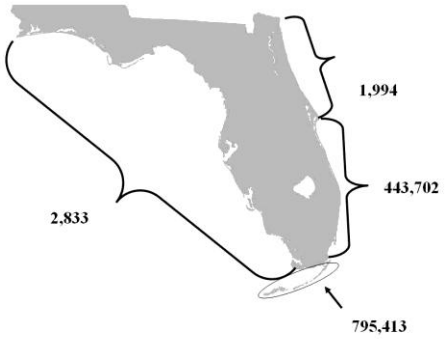

Figure 3.1.3.1 1. Estimated recreational lobster landings (lbs) during the 2008 Special Two-Day Sport Season and first month of the regular lobster fishing season.
Source: Florida Fish & Wildlife Conservation Commission, Florida Fish & Wildlife Research Institute.

The large majority of recreational landings are taken by divers who tend to target spiny lobster in similar areas as commercial divers. Little fishing effort occurs north of Monroe County on the Gulf side. The recreational fishery is largely observed from docks, boats, residential properties, and numerous other places along the Florida Keys and

southernmost counties where a diver can get into the water from shore or from boats or platforms where an individual can use a bully or hoop net. The geographic variability has made the inclusion of spiny lobster in the Marine Recreational Fisheries Statistics Survey (MRFSS) cost prohibitive. There has been and continues to be no evidence of subsistence fishing for spiny lobster (SAFMC & GFMC 1982: p. 8-3).

The commercial and regular recreational fishing season for spiny lobster in the EEZ off Florida and the EEZ off the Gulf States, other than Florida, begins on August 6 and ends on March 31 (50 CFR §640.20(b)). No person may possess a Caribbean spiny lobster in or from the Gulf and South Atlantic EEZ with a carapace length of 3.0 inches (7.62 cm) or less or a separated tail with a length less than 5.5 inches (13.97 cm) (50 CFR §640.21(b)).

State Spiny Lobster Laws and Fisheries Histories

The popularizations of scuba and hookah diving and development of small fiberglass pleasure boats in the 1950s and 1960s increased recreational access to the spiny lobster fishery. Fiberglass boats had many advantages over wooden boats. First, the average retail price of a fiberglass boat was significantly less than the price of a similarly sized wooden boat because fiberglass boats could be constructed faster and cheaper. Second, because the hulls of fiberglass boats were lighter than those of comparably sized wooden boats, fiberglass boats could be powered by smaller engines or outboard motors, which were less costly. Third, the location of outboard motors at the back of the boat increased the rate of speed that a boat could travel because inboard motors were at the middle of the boat giving it a more forward center of gravity that slowed the boat. Fourth, smaller fiberglass boats could be towed on a trailer and didn't require a marina or dock space for storage. Recreational fishers could now trailer their boats, and get to and from fishing areas faster and with less costly boats.

Recreational diving for lobsters and associated tourism increased in the Florida Keys in the 1960s (Labisky et al. 1980). By the early 1970s, there were increasing conflicts between Florida's commercial fishers and recreational divers who harvested spiny lobster, so in 1975 the state enacted legislation that created the Special Two-Day Sport Season, which was originally established as July 20 and 21 of each year before the regular season began on July 26. Another purpose of the sport season was to increase tourism in the Keys, which in the early to mid 1970s was experiencing an economic downturn (Shivlani 2009). By the early 1980s free divers taking lobsters by hand accounted for most of the recreational catch. Divers from the outside of southern Florida generally used charter or party boats. The charter boats were typically hired by diving clubs, while party boats operated out of dive shops along the Florida Keys. Those boats carried from 30 to 50 divers and had a commercial lobster license that allowed for the combined harvests of the divers.

The Gulf and South Atlantic Spiny Lobster FMP was implemented on July 26, 1982 (47 FR 29203). The federal FMP, for the most part, extended Florida's rules of regulating the fishery to the EEZ throughout the range of the fishery (see Section 1.4).

The Florida Marine Fisheries Commission (FMFC) adopted its first fisheries management plan (state FMP) for spiny lobster on July 2, 1987. For the most part, the

management plan continued existing practices. A recreational bag limit of six lobsters per person per day was established for both the regular and two-day sport seasons. In 1987, the sport season was switched to the last weekend in July.

In November 1990, Congress passed the Florida Keys National Marine Sanctuary and Protection Act that established the Florida Keys National Marine Sanctuary (FKNMS) (Pub.L 101-605). The FKNMS is comprised of 9,660 square kilometers (about 2,900 square nautical miles) of coastal waters off the Florida Keys. It extends approximately 220 miles southwest of the southern tip of the Florida peninsula and includes the world's third largest coral barrier reef. Within the Sanctuary are 24 no-take zones. Fifty-eight percent of the Sanctuary resides in Florida waters and 48% is in federal waters. Both NOAA and the State of Florida manage the Sanctuary. The waters of the FKNMS are within the jurisdiction of both the South Atlantic and Gulf of Mexico fishery management councils. Lobster fishing is prohibited in the following no-take areas of the FKNMS: Carysfort Reef, Elbow, Key Largo Dry Rocks, Grecian Rocks, French Reef, Molasses Reef, Conch Reef, Hen and Chicken, Davis Reef, Cheeca Rocks, Alligator Reef, Tennessee Reef Research Only, Coffins Patch, Sombrero Key, Newfound Harbor, Looe Key Research Only, Looe Key, Eastern Sambo, Western Sambo, Eastern Dry Rocks, Rock Key, Sand Key, and Tortugas (Figure 3.4.2.2). No lobster fishing is allowed in the John Pennekamp Coral Reef State Park during the Special Two-Day Sport Season. During the regular season, no person can harvest lobster from or within any coral formation (patch reef). Lobster fishing is also prohibited in artificial habitat in Florida waters, Biscayne Bay/Card Sound Spiny Lobster Sanctuary, Everglades National Park, and Dry Tortugas National Park. Biscayne Bay National Park includes approximately 173,000 acres in Miami-Dade County and is about 22 miles long. The park extends from shore to about 14 miles to the 6-foot contour and contains about 72,000 acres of coral reefs.

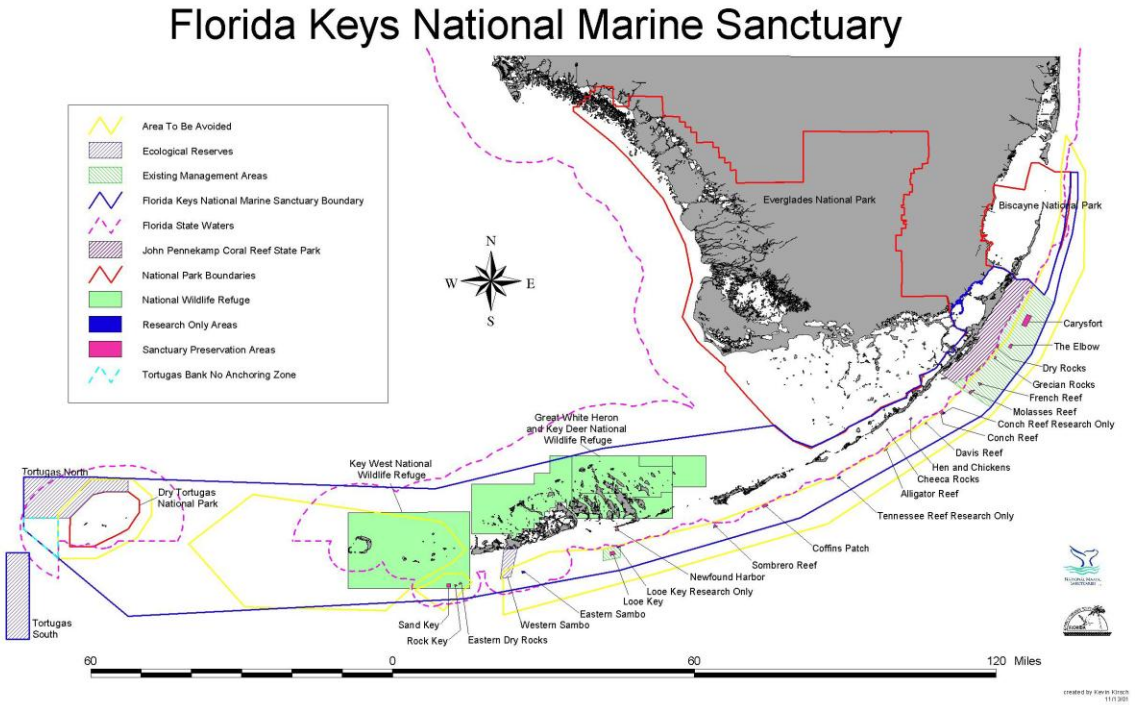

Figure 3.1.3.2. Florida Keys National Marine Sanctuary.

Until 1991, the recreational spiny lobster fishery had been an open-access fishery managed through a personal daily bag limit, a closed season and gear restrictions. There was no institutional mechanism to estimate the number of recreational spiny lobster fishers and their landings. Florida instituted a recreational spiny lobster permit/license in 1991, which was purchased as an additional endorsement to the state's saltwater fishing license. That same year, the state began to use two annual mail surveys of persons with a recreational lobster permit to estimate the number of persons who harvested lobsters under the permit and their landings of lobsters during the Special Two-Day Sport Season and from opening day to the first Monday in September of the regular fishing season. Reviews of the 1991 survey resulted in several modifications that are seen in the 1992 survey and thereafter.

By 1991, the popularity of the two-day sport season during the last weekend in July was so great that the St. Petersburg Times described it as "lobstermania." The large number of participants in the sport season "created extensive problems that lead to a general consensus by the county commission and Key West Chamber of Commerce that the [sport] season should be abolished or otherwise modified to spread out recreational fishing over a longer period" (GFMC and SAFMC 1993). Significant numbers of Keys residents and businesses also supported the elimination or modification of the two-day sport season. Among the problems were: 1) the inability of law enforcement to function effectively in the face of overwhelming effort, 2) enormous harvester-related traffic congestion (both on land and in the water) and associated safety problems, and 3) a high incidence of resource violations for lobster and other marine species, including unintentional damage to coral. Among the violations cited by law enforcement were taking of undersized lobsters, no dive flags, exceeding the bag limit, and use of prohibited gear. Unsafe practices included, but were not limited to, poor seamanship and diving in heavily traveled boat lanes. Recreational fishers and dive operations, however, strongly supported retention of the sport season, and argued that it contributed significantly to the economy of Monroe County despite its brevity.

In response to growing criticism of the sport season, the FMFC implemented a series of regulatory changes prior to the 1992-93 season that were designed to reduce the growing numbers of fishers traveling to the Keys during the two-day sport season and their associated negative impacts (Sharp et al. 2005). The changes included rescheduling the sport season from the weekend to the last Wednesday and Thursday in July, increasing the daily lobster bag limit outside the Florida Keys from 6 to 12 lobsters per person, and banning night diving in the Keys. The timing of the federal two-day sport season, however, did not change for the 1992 season and remained to be during the last weekend in July, resulting in two sport seasons that year. Since 1993, however, both the state and federal special sport seasons have co-occurred on the last Wednesday/Thursday in July (W. Sharp, FWC, personal communication, November 2010).

The Dry Tortugas National Park was established by Congress in 1992 (Public Law 102-525). Possession of Caribbean spiny lobster is prohibited within boundaries of the park unless the individual took the lobster outside the park waters and the person in possession has proper State/Federal licenses and permits [36 CFR 7.27(b)(4)(i)]. The presence of lobster aboard a vessel in park waters, while one or more persons from such vessel are

overboard constitutes prima facie evidence that the lobsters were harvested from park waters in violation of the above regulation.

Until 1993, recreational harvesters included persons who purchased a commercial permit to exceed the bag limit. Florida's implementation of the restricted species endorsement (RSE) in 1993 for lobsters meant those recreational harvesters were no longer able to exceed the bag limit because they would not meet the qualifications required of the endorsement. On August 5, 1994, the Special Recreational Crawfish License (SRCL) was issued after the implementation of the commercial spiny lobster trap certificate program. Fishers with commercial licenses with few or no reported landings received ten trap tags pursuant to the trap reduction program. SRCLs are no longer issued and cannot be transferred from the original person it was issued to. Moreover, if the SRCL is not renewed every year, the holder loses the license. The SRCL applies to recreational fishers in state, not federal, waters, and does not permit harvesting lobsters during the two-day sport season.

Presently, the sport season is scheduled the last consecutive Wednesday and Thursday of July each year, one week before the start of the commercial season. During the Special Two-Day Sport Season, recreational fishers are allowed up to six lobsters per person per day in Monroe County and Biscayne Bay National Park and up to 12 lobsters per person per day in other areas of the state. The bag limit during the regular recreational lobster-fishing season is six lobsters per person per day. During the sport season diving at night for lobster is not permitted in Monroe County or adjacent federal waters. Bully netting and hoop netting are allowed at night. During the regular season, diving at night for lobster is allowed.

A person does not need a saltwater fishing license or spiny lobster permit if s/he is fishing from a for-hire vessel (guide, charter, party boat) that has a valid vessel license in Florida waters (http://myfwc.com/License/LicPermit_RecreationalHF.htm). Hence, not all persons who harvest spiny lobster have a permit (because they are not required to) and are not included in the official numbers of recreational fishers.

Recreational Landings and Catch per Unit Effort

Estimated recreational landings, fishing effort, and CPUE for Caribbean spiny lobster in Florida during the 2-day sport season and the first month of the regular lobster fishing season were mostly lower from 2001/02 onward than in the 1990s (Figures 3.1.3.3 and 3.1.3.4).[5] In the last 5 years, they averaged 1.208 mp (ww), 406,166 person days, and 2.70 lobsters per person day. Compared with the respective totals, 30% of the landings and 24% of the effort occurred in the special 2-day season (last 5-year averages of 94,574 person days for 0.342 mp for the special season; 298,065 person days for the first month of the regular season for 0.846 mp; and 392,638 person days overall for 1.208 mp; Table 4.3.3.2; William Sharp, FWC, personal communication, 07Nov10).

[5] Recreational landings are estimated for 1985/86-1991/92, using regression analysis and commercial landings by region in August, and they are estimated for 2004/05 based on averages 2003/04 and 2005/06 (SEDAR 8, 29Apr05, Section 3.1.1.2, pp 5-6; Joseph Munyandorero and Bob Muller, personal communication, FWC, FMRI, 03Jan11).

The effects of weakened national economic conditions in the last two-three years may largely explain reduced landings, effort, and a fall off in the number of recreational licensed purchased (license data through 2009/10, Table 4.3.3.1). Previously, in the mid-2000s, at least three hurricanes had occurred when recreational fishing would otherwise be expected to be seasonally high, including Charley (9-15Aug04), Dennis (4-13Jul05) and Katrina (25Aug05) (dates from Shivlani 2009, pp 72-76 and Wikipedia). By virtue of their timing during the season, some hurricanes affected commercial fishing primarily, including most recently, Hurricane Georges (25Sep98), and Hurricanes Katrina, Rita and Wilma in 2005, both years involving the damage or destruction of large proportions of the traps (Shivlani 2009, including a map of hurricane paths for 1935 to date).

Weakened economic conditions in the last two-three years, hurricanes in 2004-2005, and other factors may help explain the lower recreational landings, effort and catch per unit effort in 2001/02 onward compared with 1990s (Figures 3.1.3.3 and 3.1.3.4). In contrast with declining effort and increased productivity for commercial fishing (Figures 3.4.1.2 and 3.4.1.3), however, recreational fishing effort has remained relatively flat during the last twenty years (Figure 4.3.3.2), along with productivity (lobsters landed per person day in Figure 3.1.2.4). Effort has been reduced and productivity has increased for commercial fishing under Florida's Trap Certificate Program, thereby achieving purposes of that Program, but the State's recreational fishing permit program imposes no limit on the number of permits issued.

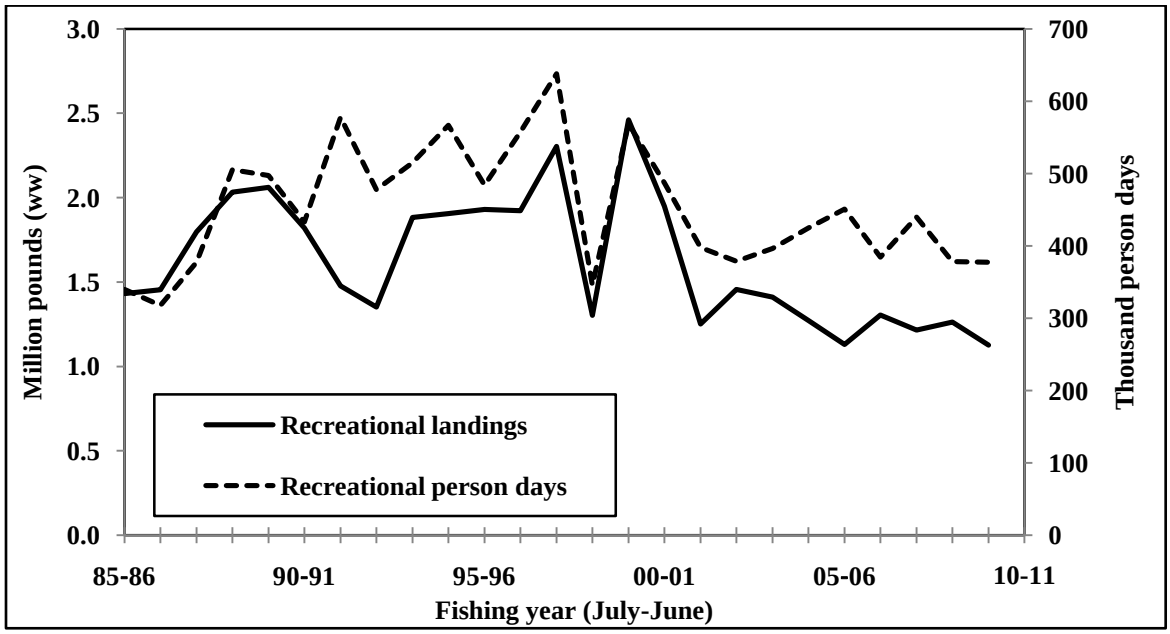

Figure 3.1.3.3. Florida recreational landings and fishing effort.
Source: SEDAR-8, 2010 update (01Dec10).

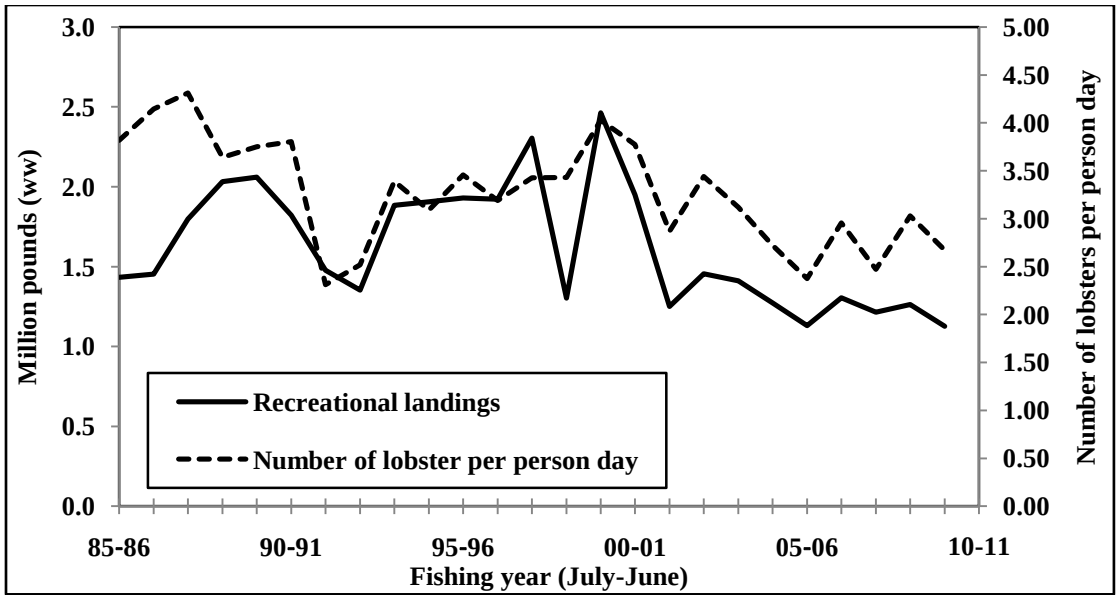

Figure 3.1.3.4. Florida recreational landings and CPUE.
Source: SEDAR-8, 2010 update (01Dec10).

Gears Used

Recreational fishers are not allowed to use traps to capture lobster. Bully nets and diving (breath-hold, SCUBA, or hookah) are the only legal recreational fishing methods. Harvest from artificial habitat is prohibited. Divers must possess a carapace measuring device and measure lobster in the water. The use of bleach or chemical solutions or simultaneous possession of spiny lobster and any plastic container capable of ejecting liquid is prohibited. Most recreational diving occurs in the Florida Keys and in moderately shallow waters.

A survey of recreational divers in the mid 1970s found that 95% of the free divers dove no deeper than 30 feet, while 81% of those who used SCUBA gear dove no deeper than 40 feet. None of the sampled divers reported diving deeper than 80 feet (SAFMC and GFMC 1982). Some spiny lobsters were caught on shallow flats by recreational fishers using bully nets, but they represented only a small portion of the recreational catch.

Hookah fishing involves diving from a boat for lobster using an air compressor that supplies air for the diver through a long hose. Multiple divers can be connected to the same compressor. The use of a hookah system has become increasingly popular because one can use it without becoming certified in scuba diving. Anyone can purchase a hookah system, although hookah diving shares many of the same risks as scuba diving such as decompression sickness and air embolism. Novice divers can stay under for longer periods of time than scuba divers, although there is always the risk of the hose breaking or dislodging from the compressor.

According to the FWC (2006a), the large proportion of recreational divers is highly active only at the start of the fishing season when the lobsters are most abundant. As the recreational lobster fishing season continues, the number of dive trips and number of

lobsters recreational divers land declines rapidly. Also, there are many divers with a license are not active during the lobster fishing season.

Some divers, generally those from outside southern Florida, will use charter or party boats. Charter boats typically are hired by diving clubs while party boats operate out of dive shops along the Florida Keys (SAFMC & GFMC 1982). These boats can hold from 30 to 50 divers and have commercial lobster licenses. In Florida, patrons aboard a fishing charter are not required to possess a recreational saltwater fishing permit because they are covered under the fishing license of the charter boat.

Those who use bully nets perch on bows of boats at night, shine bright lights into the shallows and use a long-handled net to bag spiny lobsters that move out into the open (Cocking 2009). Recreational fishers are restricted to diving and bully/hoop netting. Spears, wire snares, hooks or any gear/device that could penetrate, puncture or crush the shell of a lobster is prohibited. Divers typically use a "tickle stick" to coerce lobsters from their dens into a hand-held net.

3.1.4 Other spiny lobster species

The spotted spiny lobster and smoothtail spiny lobster are found generally in 15-20 feet of water and are considered obligate reef dwellers (Sharp et al. 1997). Further, individuals are relatively small compared to Caribbean spiny lobsters. For these reasons, commercial fishers in the Florida Keys generally do not target these species in U.S. federal waters (W. Kelley, personal communications). A "luxury" fishery exists in Bermuda and parts of the Caribbean for the spotted spiny lobster (Evans and Lockwood 1995). The smoothtail spiny lobster supports a fishery in Brazil concurrent with a Caribbean spiny lobster fishery; this species is considered to be of minor importance elsewhere (FAO 2007).

Federal regulations prohibit the possession of egg-bearing Caribbean spiny lobster and the removal of eggs, swimmerettes or pleopods; Florida regulations prohibit the same for any species of Family Palinuridae. No commercial or recreational landings data are available for either of these species, although some may be reported as Caribbean spiny lobster.

3.1.5 Slipper lobster species

The commercial fishery for slipper lobsters is mainly for the ridged slipper lobster, *Scyllarides nodifer*, but landings data are by family only and not by species (Table 3.1.4.1). The following information is taken from Sharp et al. (2007) and Spanier and Lavalli (2006). The slipper lobster fishery is basically a trawl fishery by shrimpers, who harvest slipper lobsters as bycatch. In the Florida Keys, they are harvested by divers for the aquarium trade and are also bycatch in spiny lobster traps. The vast majority of landings are along the Florida west coast. A targeted fishery developed during the 1980's by trawlers during the off-season for shrimp (spring and summer). This is also the spawning season for slipper lobsters, and their migration into shallower water at this time likely contributed to their catchability. In 1987, Florida implemented regulations prohibiting the harvest of egg-bearing female or the removal of eggs by stripping or

clipping the pleopods. Around this time, landings declined dramatically. Landings increased somewhat during the 1990's, then declined again and remained low since 1999. The number of shrimp trips also declined beginning in 1999 (Sharp et al. 2007).

Table 3.1.4.1. Commercial effort, landings, and CPUE (pounds/trip) of slipper lobsters in the Gulf and South Atlantic.

Year	Trips	Pounds (x1000)	Lbs/trip
86/87	535	28,097	53
87/88	487	19,952	41
88/89	558	40,736	73
89/90	334	14,793	44
90/91	465	27,282	59
91/92	653	48,728	75
92/93	584	48,708	83
93/94	655	60,230	92
94/95	411	33,531	82
95/96	362	26,843	74
96/97	437	43,565	100
97/98	335	30,872	92
98/99	225	13,139	58
99/00	146	7,196	49
00/01	145	8,766	60
01/02	179	8,582	48
02/03	130	9,951	77
03/04	132	17,012	129
04/05	72	5,000	69
05/06	63	4,291	68
06/07	56	6,060	108
07/08	23	6,443	280
08/09	22	1,889	86
04/05-08/09 Average	47	5.0	24
99/00-08/09 Average	97	7.5	41.2

Source: SEFSC, FTT (19Mar10) data

The majority of the commercial landings for both the Spanish and ridged slipper lobsters, occur in federal waters off the Gulf coast (Figure 2.1.1). The gear types used to harvest these species by trips were 56% by trawl, 23% by diving, and 19% by traps, which was fairly consistent over the 10-year period. Low landings of slipper lobsters were also documented in federal South Atlantic waters and Florida state waters for the combined coasts. In the Florida Keys, slipper lobster species are bycatch in traps for Caribbean spiny lobster (Sharp et al. 2007).

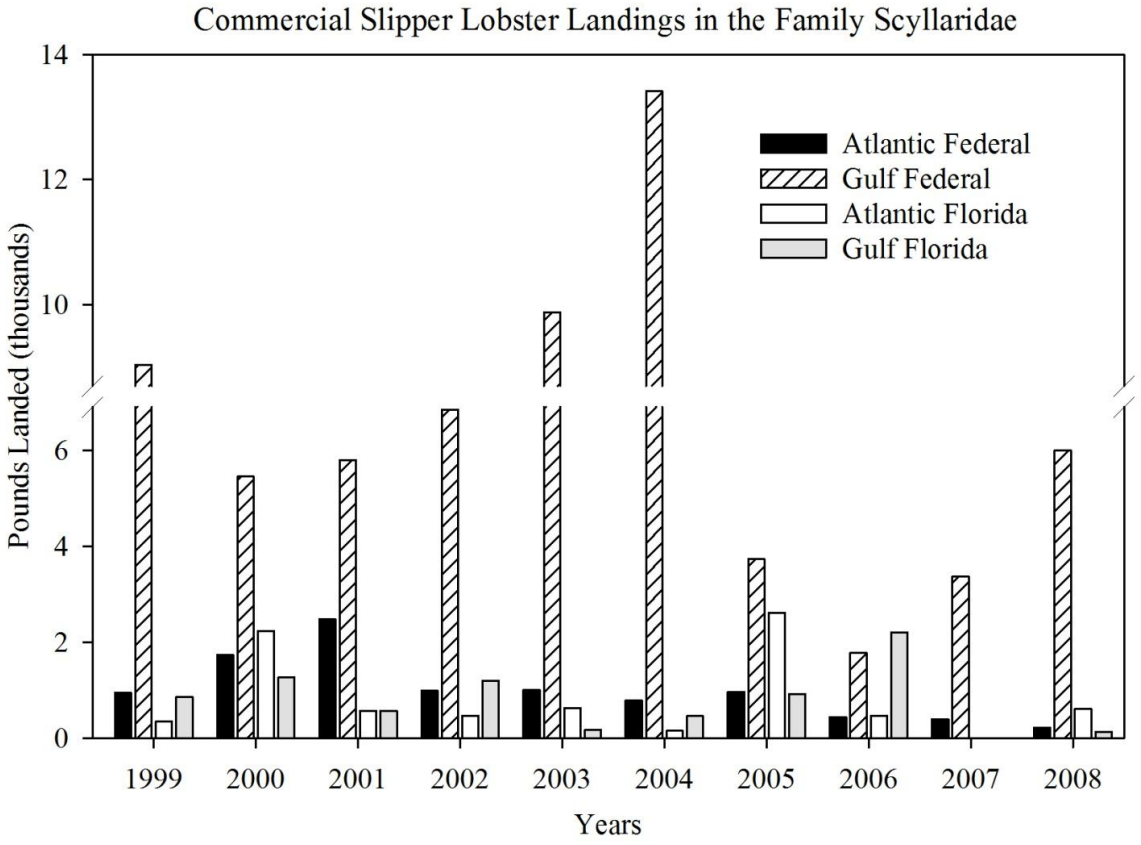

Figure 3.1.4.1. Commercial landings for the family Scyllaridae from 1999 through 2008 by coast in federal and state of Florida waters.
Source: Florida FWC, Marine Fisheries Information System 2009. Note: These data are based on the trip ticket program. There is only one space available for waters fished. Fishers could fish in both state and federal waters within one day, based on the season and other fishing behaviors. This figure should be viewed with some caution, because there could be additional unaccounted variability, due to the way the data is recorded and analyzed.

The Gulf States also had some information on slipper lobster landings. Alabama reported total commercial landings of 10,000 pounds or less whole animal weight of slipper lobsters during the 1999-2008 period. Landings records indicate that these species were incidentally caught from shrimp trawls fishing in federal waters off the west coast of Florida (C. Denson, Alabama Marine Resources Division, Alabama Department of Conservation and Natural Resources, personal communication). There were no reported landings for Mississippi, Louisiana, and Texas for slipper lobster species (Source: http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html).

From the South Atlantic states, Georgia had no reported commercial landings of slipper lobster species in either state or federal waters for the years 1999-2008 (J. Califf, Commercial Fisheries Statistics Coordinator, Coastal Resources Division, Georgia Department of Natural Resources, personal communication). In South Carolina, there were no recorded landings of slipper lobster species in state or federal waters (G. Steele, Biological Statistician, South Carolina Department of Natural Resources, personal communication). In the state waters of North Carolina there were no recorded landings

of slipper lobsters; however, during the years 1999, 2000, 2002, and 2005 commercial landings for slipper or spiny lobster were not recorded by the North Carolina Division of Marine Fisheries (A. Bianchi, Trip Ticket Coordinator, North Carolina Division of Marine Fisheries, personal communication).

Little information exists on harvest of slipper lobsters by the recreational sector. MRFSS does not survey lobster, and the State of Florida recreational survey does not collect information on any species except the Caribbean spiny lobster. A creel survey of spiny lobster fishermen conducted in the Florida Keys during the special two-day sport season and the first two weeks of the regular season indicated slipper lobsters are not targeted by these fishers in the Keys. There is some evidence that they may be targeted to some degree by divers in the northern Gulf of Mexico. However, these species are both cryptic and nocturnal, rendering them difficult to find by recreational divers. For this reason, they are unlikely to support a large recreational fishery (Sharp et al, 2007).

Federal regulations prohibit the possession of a slipper lobster, defined as *Scyllarides nodifer* only, with eggs or from which the eggs, swimmerettes, or pleopods have been removed; Florida regulations prohibit the same for all species of Family Scyllaridae. Poisons and explosives may not be used to take slipper lobster in the EEZ.

3.2 Physical Environment

Detailed descriptions of the physical environments related to the spiny lobster fishery are provided in the Final EIS for the Gulf Council's Generic Essential Fish Habitat Amendment (GMFMC 2004) and in the South Atlantic Council's Fishery Ecosystem Plan (SAFMC 2009), and are incorporated by reference herein.

The Gulf has a total area of approximately 600,000 square miles (1.5 million km^2), including state waters (Gore 1992). It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel. Oceanic conditions are primarily affected by the Loop Current, the discharge of freshwater into the Northern Gulf, and a semi-permanent, anticyclonic gyre in the western Gulf. Gulf surface water temperatures range from 12º C to 29º C (54º F to 84º F) depending on time of year and depth of water.

The Deepwater Horizon MC252 oil spill affected more than one-third of the Gulf area from western Louisiana east to the panhandle of Florida and south to the Campeche Bank in Mexico. The impacts of the Deepwater Horizon MC252 oil spill on the physical environment are expected to be significant and may be long-term. However, the oil remained outside most of the area where this species is abundant. Oil was dispersed on the surface, and because of the heavy use of dispersants, oil was also documented as being suspended within the water column, some even deeper than the location of the broken well head. Floating and suspended oil washed onto shore in several areas of the Gulf as well as non-floating tar balls. Whereas suspended and floating oil degrades over time, tar balls are persistent in the environment and can be transported hundreds of miles. Oil on the surface of the water could restrict the normal process of atmospheric oxygen mixing into and replenishing oxygen concentrations in the water column. In addition, microbes in the water that break down oil and dispersant also consume oxygen; this could

lead to further oxygen depletion. It is also possible that zooplankton that feed on algae could be negatively impacted, thus allowing more of the hypoxia-fueling algae to grow.

The South Atlantic continental shelf off the southeastern U.S., extending from the Dry Tortugas to Cape Hatteras, encompasses an area in excess of 100,000 square km (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 approximately 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. 1994).

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. 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 Pourtales 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.

Given the large to near total dependence on larval recruitment from the Caribbean, it is appropriate to include the Caribbean area in the description of the physical environment. A detailed description of the physical environment in the Caribbean related to the spiny lobster fishery is provided in Amendment 8 to the FMP (GMFMC and SAFMC 2008) and is incorporated by reference herein.

The Caribbean Sea is an interior sea formed by a series of basins lying to the east of Central America and separated from the North American Basin of the Atlantic by an island arc 2,500 nautical miles long which joins the Florida Peninsula to the north coast of Venezuela. This arc is demarcated by the Greater Antilles (Cuba, Jamaica, Hispaniola, and Puerto Rico) and the Lesser Antilles (the Virgin Islands, Guadeloupe, Martinique, St. Lucia, Barbados, and Trinidad).

As a seismic and volcanic region, the Caribbean has a much more complex topography and has numerous openings into the North American Basin. The Jamaican Ridge, running from Cape Gracias a Dios to Jamaica and Hispaniola, divides the Caribbean into two sections: one in the northwest, the other southeast, communicating across a 1500 m sill which is 20 nautical miles wide at 100m. The northwest basin is itself divided in two by the Cayman Ridge, which from the southwest point of Cuba runs toward, without reaching it, the Gulf of Honduras. Between the Gulf of Mexico and the Cayman Ridge lies the Yucatan Basin, of which the central part is 4700 m deep. At its western extremity it communicates freely at depth of more than 5000 m with the second basin, the Cayman

Basin. In the eastern part of the Cayman Basin, between the southwest point of Cuba and against the Cayman Ridge lies a narrow trench 7,680 m deep.

The Caribbean Basin is entirely in the tropical Atlantic. The mean annual temperature is near 25° C and seasonal variations are small. The winds, the eastern sector predominating, are tied to the trade wind system of the Northern Hemisphere.

3.3 Biological Environment

3.3.1 Lobster

Family Palinuridae (Figure 3.3.1.1)

Figure 3.3.1.1. From left to right the following species are: Caribbean spiny lobster, smoothtail spiny lobster, spotted spiny lobster.
Source: Photograph from Florida FWC website.

Caribbean spiny lobster
Panulirus argus, is widely distributed throughout the western Atlantic Ocean as far north as North Carolina to as far south as Brazil including Bermuda, the Bahamas, Caribbean, and Central America (Herrnkind 1980; Figure 3.3.1.2). Analyses of DNA indicate a single stock structure for the Caribbean spiny lobster throughout its range (Lipcius and Cobb 1994; Silberman and Walsh 1994; Hunt et al. 2009). This species inhabits shallow waters, occasionally as deep as 295 ft (90 m), possibly even deeper. Caribbean spiny lobster can be found among rocks, on reefs, in grass beds or in any habitat that provides protection. The species is gregarious and migratory. Maximum total body length recorded is 18 inches (45 cm), but the average total body length for this species is 8 inches (20 cm; FAO Fisheries Synopsis 1991).

Figure 3.3.1.2. Distribution of Caribbean spiny lobster.
Source: FAO Fisheries Synopsis 1991; Joint CFMC-GMFMC-SAFMC Amendment 8, 2008.

Distribution and dispersal of Caribbean spiny lobster is determined by the long planktonic larval phase, called the puerulus, during which time the infant lobsters are carried by the currents until they become large enough to settle to the bottom (Davis and Dodrill 1989). As the lobsters begin metamorphosis from puerulus to the juvenile form, the ability to swim increases and they move into shallow, nearshore environments to grow and develop.

Young benthic stages of Caribbean spiny lobster will typically inhabit branched clumps of red algae (*Laurencia sp*.), mangrove roots, seagrass banks, or sponges where they feed on invertebrates found within the microhabitat. In contrast to the social behavior of their older counterparts, the juvenile lobsters are solitary and show aggressive behavior to ensure they remain solitary. The inhabitation of macroalgae by the juvenile lobsters provides protection to the vulnerable individuals from predators while providing easy access to food sources (Marx and Hernkind 1985).

Individuals two to four years of age show nomadic behavior, emigrating out of the shallows and moving to deeper, offshore reef environments. Once in the adult phase, Caribbean spiny lobsters are thigmotactic and tend to enter social living arrangements aggregating in enclosed dens. Shelter environments may include natural holes in a reef, rocky outcrops, or artificially created environments (Lipcius and Cobb 1994).

Given the wide distribution of this species from Bermuda to Brazil, it is hard to determine a definitive stock structure for this species. There are a multitude of currents and other factors that influence the movement of water throughout their range. The long duration that lobsters spend in the larval stage, traveling by the currents severely impairs the ability of scientists to determine a stock structure. Because Florida is "downstream" from most other spawning populations, Florida waters would be expected to receive recruits from many other areas (Hunt et al. 2009).

Silberman et al. (1994) and Hunt et al. (2009) concluded Caribbean spiny lobster is a single stock from Brazil to Bermuda, and throughout the Caribbean. Members of the stock assessment panel also suggested that very little self-recruitment occurs in Florida.

Studies have shown that the presence of local gyres or loop currents in certain locations could influence the retention of locally spawned larvae. In addition, benthic structures such as coral reef may disturb the flow of water and lead to the settlement of larvae in a particular location (Lee et al. 1994).

The general anatomy of Caribbean spiny lobster conforms to the typical decapod body plan consisting of five cephalic and eight thoracic segments fused together to form the cephalothorax (Figure 3.3.1.3). The carapace, a hard shield-like structure, protects this portion of the body and is often the part of the lobster measured and used as a standard to determine organism length. All the segments bear paired appendages that serve in locomotion, sensory, or both (Phillips et al. 1980). From the head of the lobster, the appendages are ordered starting with the first antennae, second antennae, mandibles, first maxillae, and second maxillae. There are five pairs of walking legs called pereiopods (walking legs) and a six-segmented tail. The antennae function primarily to obtain sensory information by chemoreception, as do the dactyls of the walking legs and the mouthparts involved in handling food. Lobsters have great visual ability, achieved through the use of their paired, lateral compound eyes. In addition, highly distributed superficial hairs detect water movements (Ache and Macmillan 1980).

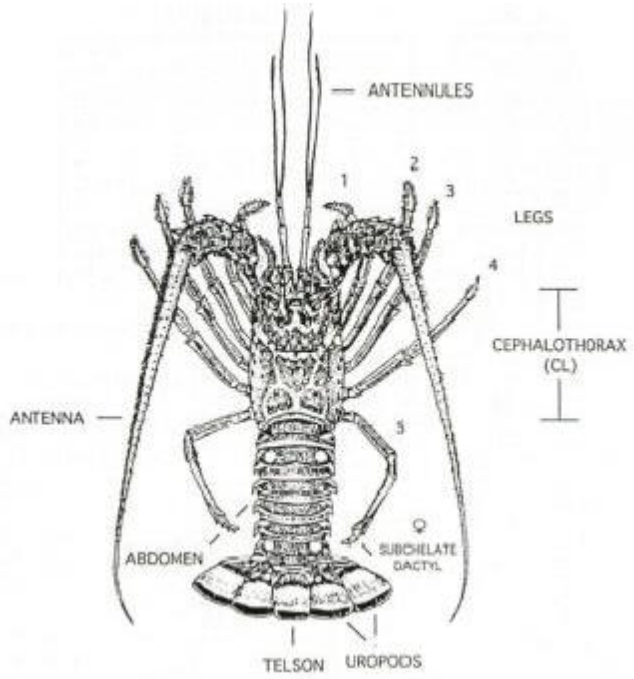

Figure 3.3.1.3. Morphology of Caribbean spiny lobster, *Panulirus argus*.
Source: Lipcius and Cobb (1994).

Gills are the main organs used by lobsters for respiration. The rate of oxygen consumption in *P. argus* is dependent upon the temperature, the degree of crowding within the den, feeding and size of the lobster; oxygen consumption is not determined by the concentration of the oxygen in the water as some studies show that oxygen uptake remained the same in both hypoxic and aerated water (Phillips et al. 1980).

Food Habits

After Caribbean spiny lobster settle from the planktonic phase to the benthic habitat they enter seagrass and macroalgae nursery habitat. Their diet consists of small gastropod mollusks, isopods, amphipods and ostracods, most of which can be found in or within close proximity to the lobster's algal shelter. Studies suggest that as the abundance of food declines in and around their algae habitat, lobsters forage more frequently and thus have more frequent contact with conspecifics. Aggressive behavior in the juvenile lobsters, which at this time live solitarily, has been observed as a means of enforcing territoriality. The consequence of increased aggressive interactions as well as a declining food source is thought to induce the nomadic emigration from the algal nursery environment to off shore reef environments (Marx and Herrnkind 1985).

During the adult and juvenile phases, the Caribbean spiny lobster will rest in shelters during daylight hours and emerge in the evening to forage for food. Adult lobsters are key predators in many benthic habitats with their diets consisting of slow-moving or stationary bottom-dwelling invertebrates including sea urchins, mussels, gastropods, clams and snails (Lipcius and Cobb 1994). Juvenile lobsters also forage at night and will eat a similar diet of invertebrates, only smaller individual prey. During feeding, prey organisms are seized and maneuvered using the anterior periopods or maxillipeds, while the mandibles carry out mechanical digestion and are capable of crushing hard mollusk shell (Herrnkind et al. 1975). Little is known about the dietary requirements of the larval phase, plankton sized lobsters.

Larger animals such as sharks and finfish frequently prey upon adult Caribbean spiny lobsters. Studies indicate that Caribbean spiny lobsters are highly selective of the dens they choose to live in and the location of these crevices. Their evening movements away from and subsequent return to their dens illustrates the spatial orientation they have to their immediate habitats (Herrnkind 1980).

Reproduction

Reproduction in the Caribbean spiny lobster occurs almost exclusively in the deep reef environment once mature individuals have made the permanent transition from the shallow seagrass nursery to the ocean coral reef system. Spawning season is in the spring and summer; however, autumnal reproduction has been known to occur in some situations (Kanciruk and Herrnkind 1976). The gestation period for eggs is about a month. Eggs are orange when they are fresh and brown when they are close to hatching. Studies have found that the initiation of spawning is related to water temperature with an optimal water temperature for mating of 24^{o}C (Lyons et al. 1981).

Reproductive fecundity is dependent upon the size of the individual as well as the geographic area in which the lobster lives. Reproductive efficiency for a given size in a given area can be determined using the relationship between fecundity and carapace length. A study conducted in South Florida found that differences exist between the fecundity/carapace length relationships of individuals living in the Dry Tortugas from individuals living in the Upper and Middle Florida Keys. Based on data provided from each location, an Index of Reproductive Potential was calculated using the model developed by Kanciruk and Herrnkind (1976):

Index = (A x B x C)/D

Where:

A = number of females in size class/total females
B = propensity of size class to carry eggs
C = egg carrying capacity of size class female
D = constant (31.27) – present to set the 76-80 mm size class index to 100 as the standard.

Choice of mate is determined by the female as well as inter-male aggression, where larger males will prevent a smaller male from courting a female (Lipcius and Cobb1994). Females mate only once during a season, while males can fertilize multiple females. During mating, the male will flick his antennules over the anterior of the female and scrape at her with the third walking legs. The male follows the female around continually trying to lift the female up and embrace her. This pattern continues until the female acquiesces and they each stand on their walking legs while the male deposits the spermatophore mass on the female sternum (Atema and Cobb 1980). Females bearing eggs will usually live in solitary dens and infrequently forage for food (Lyons, et. al. 1981). Large adult females will produce more broods, as well as spawn eggs earlier in the reproductive period than younger females since younger individuals molt earlier in the reproductive period.

Growth and Molting

The life cycle of the Caribbean spiny lobster provides larvae with the potential to travel long distances for periods ranging from a few months to almost two years (Figure 3.3.1.4). During this time, the larval lobsters remain near the surface of the water. Maximum potential dispersal distances differ from one region to another and are primarily dependent on the currents in the area. A gyre in an area where lobster eggs have hatched may keep the larva in the same geographic area, however most of the time the larva are transported out of the area, sometimes hundreds of miles (Lee et al. 1994). Once the planktonic lobsters reach about 1.4 inches (35 mm) they are large enough to settle down as post larval pueruli in shallow benthic environments to grow. Growth in juveniles is rapid with most reaching a carapace length of 2.4-2.8 inches (60-70 mm) within about two years (Hernkind 1980). Once the lobsters reach about 2.8 inches (70 mm) and begin to sexually mature, the young Caribbean spiny lobsters emigrate from the nursery to deeper offshore reef environments.

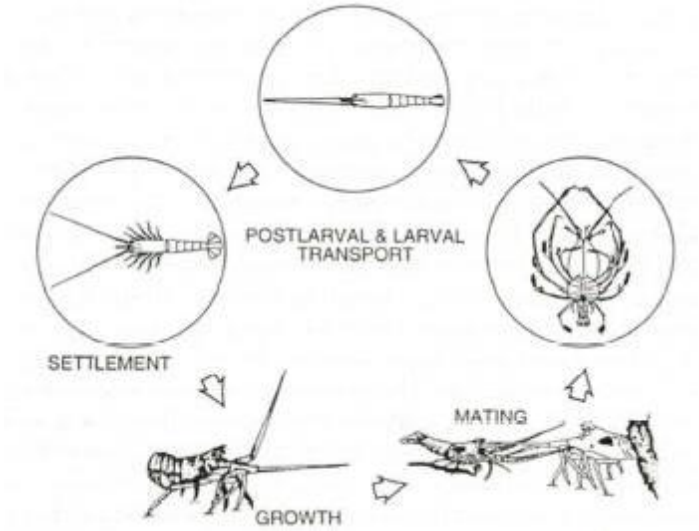

Figure 3.3.1.4. The Life Cycle of the Caribbean spiny lobster *Panulirus argus*.
Source: Lipcius and Cobb (1994).

Physical growth of lobsters is achieved through molting (Figure 3.3.1.4). A thorough understanding of the molt cycle of the Caribbean spiny lobster is an important component to the management of this fishery because the catchability and captive behavior of crustaceans is directly related to the animal's proximity to molting. The molt cycle begins with the inter-molt period, the time when a new cuticle is being created, tissue growth is rapid and the lobster actively forages. This period of time culminates in ecdysis, which is shedding the old cuticle or molting (Lipcius and Hernkind 1982).

Molting occurs primarily at night. Possible reasons for nocturnal ecdysis include decreasing the risk of cannibalism by other members of this gregarious species, and decreasing diurnal predation risks. The first action to occur during molting is the rupture of the thoracoabdominal membrane followed by a rising of the dorsal part of the cephalothorax; this action frees the eyes, bases of antennae and antennules. A series of peristaltic contractions causes the removal of the abdomen from the old cuticle, while writhing motions free the cephalothorax and attached structures. A few final wriggles and contractions terminating in a tail flip completely segregates the lobster from its old cuticle. Once molted, the lobster seeks immediate shelter, as they are especially vulnerable until their new cuticle becomes hardened (Lipcius and Hernkind 1982). For adult lobsters, molts average about two and a half times each year. The entire molting event takes approximately ten minutes. The new exoskeleton will take about 12 days from the start of the molt to harden such that it cannot be dented; however the shell is not completely formed until the 28th day (Williams 1984).

Studies found that feeding rates significantly increase in the time preceding a molt to accommodate the increasing metabolic needs associated with new cuticle formation. About a week before ecdysis, daily food intake for the Caribbean spiny lobster decreases rapidly, in correlation with a reduction in demanding activities such as locomotion and foraging. In the few days before and the time during ecdysis, feeding ceases altogether and the lobster becomes socially reclusive. Within a week of the molting event Caribbean spiny lobster will display maximal feeding, foraging and locomotor activity

rates to accommodate for the active tissue growth that occurs (Lipcius and Hernkind 1982). The dramatic swings in feeding and foraging behavior associated with the molting cycle influences the success of fishermen when capturing this species. The highest catchability of spiny lobster is expected immediately following molting because lobsters are actively foraging at this time and are therefore more likely to accept bait. Conversely, the lowest catchability of spiny lobster is expected before molting when foraging decreases and the lobster becomes less mobile (Lipcius and Hernkind 1982).

Growth and Mortality Rates

Despite the wide body of literature on this species, limited information is available on the growth and aging of the Caribbean spiny lobster due in part to the molting habits of lobsters interfering with tagging efforts. Consequently, length data, which is substantially easier and less costly to collect, has been the dominant source of information used to estimate growth in Caribbean spiny lobster. The limited quantitative information that exists on growth for this species at various locations has been compiled in a doctoral thesis by Jaime Manuel Gonzalez-Cano (1991) and was graphed below using the von Bertalanffy growth model.

$$L = Linf\ [1-e(-k(t-to))]$$

Where:
L = length of the organism at time t
Linf = asymptotic average length achieved
K = growth rate with units 1/time
T_o = time when the length of the organism would be zero

As with any fished population, especially one with poor aging information, natural mortality rates for Caribbean spiny lobster populations have been difficult to isolate from fished rates of mortality.

Locomotion and Migration

The Caribbean spiny lobster achieves locomotion by using the five pairs of walking legs attached to the cephalothorax and can swim (backward) for brief periods using its tail for propulsion (Lipcius and Cobb 1994). Caribbean spiny lobster patterns of movement fall into the following categories: homing, nomadism and migration. Throughout most of their life, Caribbean spiny lobster is a shelter dweller during the day and forages at night. Evening movements within the home range are directed; lobsters are aware of their location and can find the way back to the den of origin even if detours are caused by predators or divers. Nomadism is the movement that occurs in juvenile lobsters away from the nursery habitat and to the offshore reefs. Migration is the direct movement of an entire population or sub-population over a long distance for a given period of time (Herrnkind 1980).

Mass movements (2-60 individuals) of Caribbean spiny lobsters occur annually throughout the geographic range of the species and are dependent on latitude and climactic factors. Observed locations for the migration include Bermuda in October, the Bahamas and Florida in late October and early November, and the Yucatan and Belize in December (Herrnkind 1985). This mass migratory behavior is thought to have evolved in response to deteriorating conditions that resulted from the periods of glaciations that

occurred over the past several 100,000 years. Thus, the migration and queuing behavior became specialized by the natural selection on individuals of the harsh winters during periods of glaciations. Gonads during the migration in the fall are inactive, as they don't begin to mature until the late winter (Herrnkind 1985).

The first autumn storm in the tropics usually brings a severe drop in water temperature of about 5^{o}C, as well as high northerly winds of up to 40 km/h and large sea swells. The shallow regions that the lobsters exploit during the summer months become turbid and cold, initiating the diurnal migration of thousands of lobsters to evade these conditions. The Caribbean spiny lobster is highly susceptible to severe winter cooling and will exhibit reduced feeding and locomotion at temperatures 54-57 ºF (12-14 ºC); molting individuals usually perish under these conditions. According to Herrnkind (1985), the behavioral changes observed in Caribbean spiny lobster as well as the known biological information about the species lends credence to the idea that individuals migrate to evade the stresses of the cold and turbidity in the winter.

Caribbean spiny lobster initiate the migratory behavior by queuing, the single file formation of migrating individuals initiated by visual or tactile stimuli. Queuing is maintained by establishing contact between the antennules of one individual and anterior walking legs of another. Biologically, the queuing behavior is an important hydrodynamic drag reduction technique for the migration of individuals over long distances (Bill and Herrnkind 1976). Studies done by tagging individuals found that during the migration, individuals tended to move distances of 19-31 statute miles (30-50 km; Herrnkind 1985).

Migratory movement lasts for variable periods of time and is believed to be dependent on the total number of migratory lobsters. One study in the Bahamas in 1971 found the migration to take six hours while another study in the same location in 1969 found the migration to take five days. It is thought that the more lobsters present, the longer the migration will last to avoid overcrowding of shelters at their final destination (Kanciruk and Herrnkind 1978). After individuals reach sheltered habitats located in deeper water, such as a deep reef site, the migratory queuing behavior ends and the lobsters disperse.

Other Species in the Family Palinuridae

Spotted spiny lobster, *Panulirus guttatus*, range includes the western Atlantic, Bermuda, Bahamas, South Florida, Belize, Panama, and Venezuela, as well as the Caribbean from Cuba to Trinidad, Curacao, and Bonaire (Figure 3.3.1.5). This species prefers shallow water and inhabits rocky areas, mainly in crevices. Maximum total body length recorded is 8 in (20 cm), but the average total body length for this species is 6 in (15 cm; FAO Fisheries Synopsis 1991). This species is occasionally caught in traps, typically set for other species, such as the Caribbean spiny lobster (FAO Fisheries Synopsis 1991).

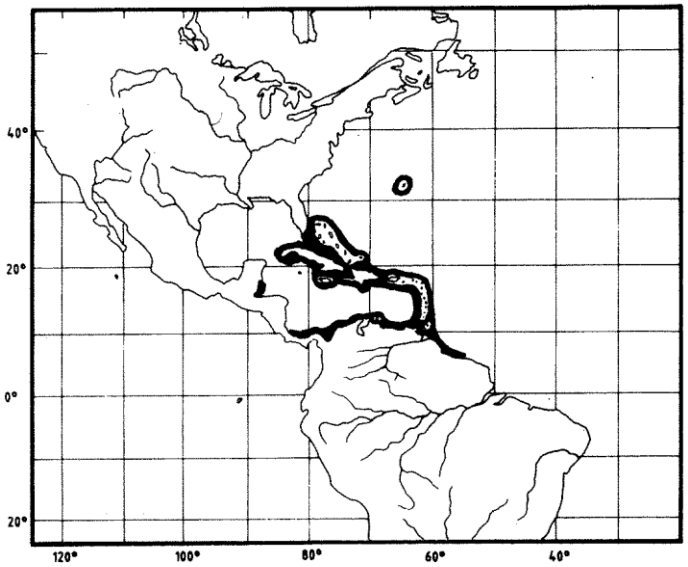

Figure 3.3.1.5. Distribution of spotted spiny lobster, *Panulirus guttatus*.
Source: FAO Fisheries Synopsis (1991).

Smoothtail spiny lobster, *Panulirus laevicauda*, range includes the western Atlantic, Bermuda, South Florida, down into Brazil, as well as Central America, and the Caribbean (Figure 3.3.1.6). This species is found in coastal waters, as deep as 164 ft (50 m) and prefers rock or coral reef substrate as habitat. Maximum total body length recorded is 12 inches (31 cm), but the average total body length for this species is 8 in (20 cm). Sometimes smoothtail spiny lobsters are taken together with Caribbean spiny lobster. The largest yield for this species is in Brazil (FAO Fisheries Synopsis 1991).

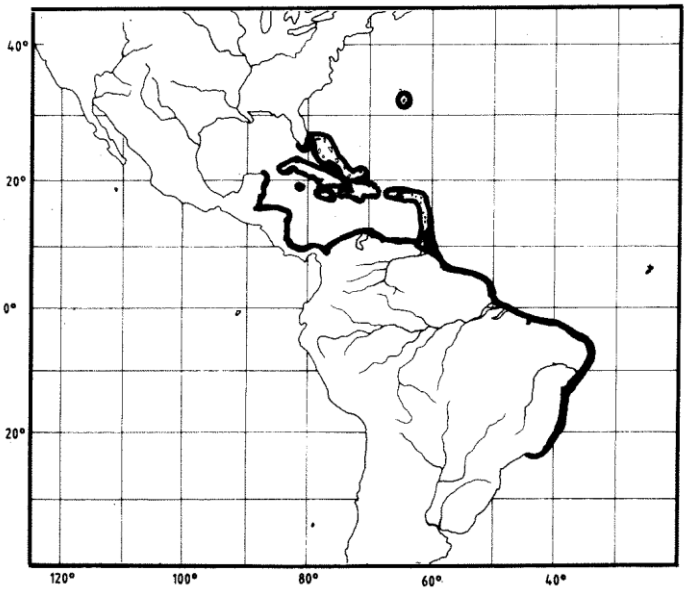

Figure 3.3.1.6. Distribution of smoothtail spiny lobster, *Panulirus laevicauda*.
Source: FAO Fisheries Synopsis (1991).

Family Scyllaridae

Spanish slipper lobsters, *Scyllarides aequinoctialis,* are distributed in the western Atlantic Ocean, as far north as South Carolina down to Brazil including Bermuda, the Gulf of Mexico, and the Caribbean (Figure 3.3.1.7). This species depth distribution ranges from 2 to 591 ft (0.6 to 180 m), usually between 2 to 210 ft (0.6 and 64 m). This species preferred habitat is sand or rocks, often on high-relief coral reefs in crevices (FAO Fisheries Synopsis 1991; Sharp et al. 2007). The animals are sluggish and nocturnal and feed on algae and detritus. They bury themselves in the sand. Maximum total body length recorded is 12 in (31 cm), but average carapace length is 5 in (12 cm; FAO Fisheries Synopsis 1991; Sharp et al. 2007).

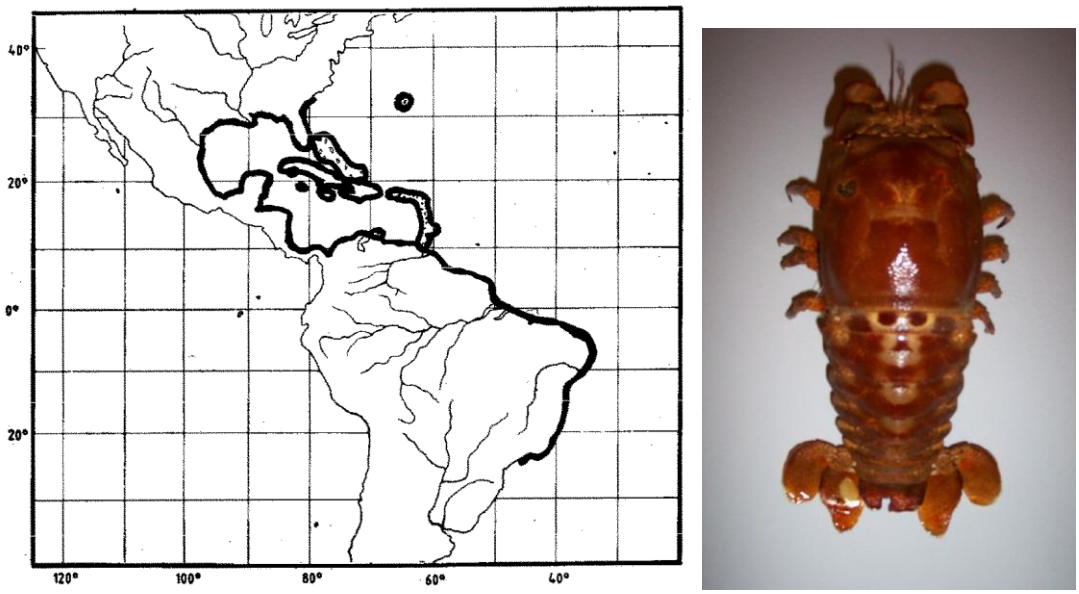

Figure 3.3.1.7. Distribution and photograph of Spanish slipper lobster, *Scyllarides aequinoctialis*.

Ridged slipper lobster, *Scyllarides nodifer*, are distributed throughout the western Atlantic Ocean, south of Cape Lookout, North Carolina, Bermuda, and the entire Gulf of Mexico (Figure 3.3.1.8). This species is typically found in the Florida Keys and Dry Tortugas (FAO Fisheries Synopsis 1991). Ridged slipper lobster depth distribution ranges between 6.5 to 299 ft (2 and 91 m) and prefer sandy substrate, sometimes mixed with mud, shell, or corals. They are often found on low-relief coral reefs and bury themselves in sediments during daylight hours (Sharp et al. 2007). Maximum total body length recorded is 14 in (35 cm), but average carapace length is 4.3 in (11 cm; FAO Fisheries Synopsis 1991; Sharp et al. 2007).

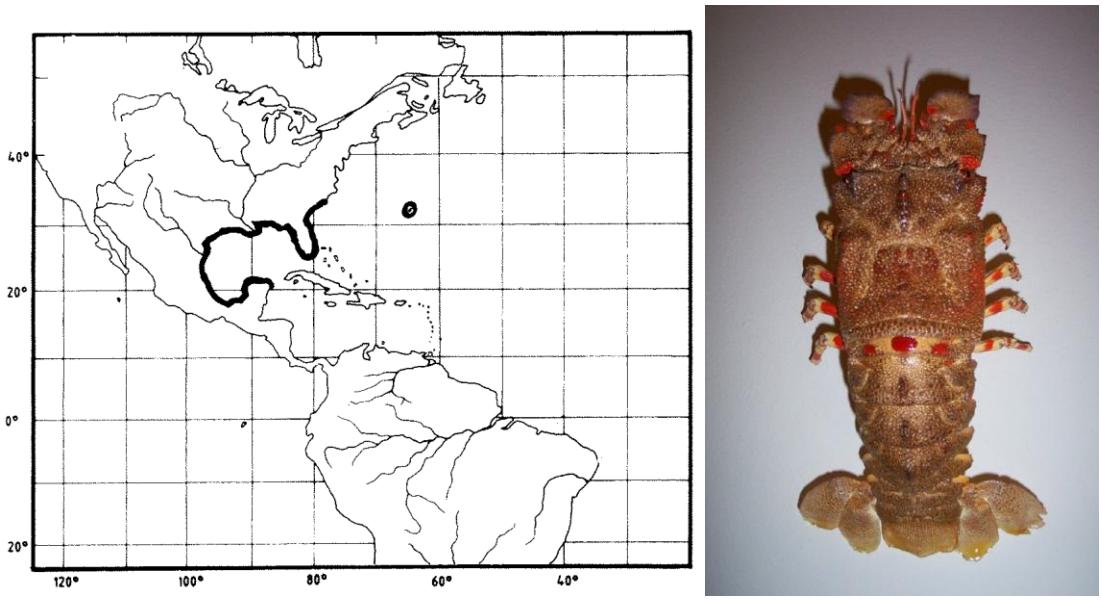

Figure 3.3.1.8. Distribution and photograph of ridged slipper lobster.
Source: FAO Fisheries Synopsis (1991); Photograph by J. Hunt (2009).

3.3.2 Protected Species

There are 32 different species of marine mammals that may occur in the EEZ of the Gulf of Mexico, South Atlantic, and Caribbean. All 32 species are protected under the Marine Mammals Protection Act (MMPA) and six are also listed as endangered under the Endangered Species Act (ESA) (i.e., sperm, sei, fin, blue, humpback and North Atlantic right whales). From 2002-2009, two bottlenose dolphins were entangled in what was likely spiny lobster trap gear. During that period, an additional eight bottlenose dolphins in Florida were discovered with entangling trap/pot. The type of gear could not be definitively linked to a target species or specific fishery. No interactions between ESA-listed marine mammals and the spiny lobster fishery have ever been documented.

Other species protected under the ESA occurring in the Gulf of Mexico, South Atlantic, and Caribbean include five species of sea turtle (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); the smalltooth sawfish, and two *Acropora* coral species (elkhorn [*Acropora palmata*] and staghorn [*A. cervicornis*]). A discussion of these species is below. Designated critical habitat for the North Atlantic right whale also occurs within the South Atlantic region.

ESA-Listed Sea Turtles
The following sections are a brief overview of the general life history characteristics of the sea turtles found in the Gulf of Mexico and South Atlantic region. Several volumes exist that cover more thoroughly the biology and ecology of these species (i.e., Lutz and Musick (eds.) 1997, Lutz et al. (eds.) 2002).

Green sea turtle hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987, Walker 1994). Pelagic stage green sea

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

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

Kemp's ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987, Ogren 1989). Once the juveniles reach approximately 20 cm carapace length they move to relatively shallow (less than 50m) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridleys feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridleys ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or from discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp's ridleys most routinely make dives of 50 m or less (Soma 1985; Byles 1988). Their maximum diving range is unknown. Depending on the life stage a Kemp's ridleys may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985; Mendonca and Pritchard 1986; Byles 1988). Kemp's ridleys may also spend as much as 96% of their time underwater (Soma 1985; Byles 1988).

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean. However, they will enter coastal waters and are seen over the continental shelf on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherbacks feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks' diets do not shift during their life cycles. Because

leatherbacks' ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of 1000 m (Eckert et al. 1989) but more frequently dive to depths of 50 m to 84 m (Eckert et al. 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora et al. 1984, Eckert et al. 1986, Eckert et al. 1989, Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora et al. 1984).

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

ESA-Listed Marine Fish

The historical range of the smalltooth sawfish in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. In the South Atlantic region, they are most commonly found in Florida, primarily off the Florida Keys (Simpfendorfer and Wiley 2004). Only two smalltooth sawfish have been recorded north of Florida since 1963 (the first was captured off of North Carolina in 1999 (Schwartz 2003) and the other off Georgia in 2002 [Burgess unpublished data]). Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 m (Bigelow and Schroeder 1953, Adams and Wilson 1995), while mature animals occur in waters in excess of 100 m (Simpfendorfer pers comm. 2006). Smalltooth sawfish feed primarily on fish. Mullet, jacks, and ladyfish are believed to be their primary food resources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1937, Bigelow and Schroeder 1953).

ESA-Listed Marine Invertebrates

Elkhorn (*Acropora palmata*) and staghorn (*A. cervicornis*) ("*Acropora*")(Figure 3.3.2.1) 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.

Acropora are two of the major reef-building corals in the wider Caribbean. In the Gulf of Mexico, South Atlantic, and Caribbean they are found most commonly in the Florida Keys and U.S. Virgin Islands, though colonies exist in Puerto Rico and Flower Gardens National Marine Sanctuary in the Gulf of Mexico. The depth range for these species ranges from <1 m to 60 m. The optimal depth range for elkhorn is considered to be 1 to 5 m depth (Goreau and Wells 1967), while staghorn corals are found slightly deeper, 5 to 15 m (Goreau and Goreau 1973).

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

Fertilization and development of elkhorn and staghorn corals is exclusively external. Embryonic development culminates with the development of planktonic larvae called planulae (Bak et al. 1977, Sammarco 1980, Rylaarsdam 1983). Unlike most other coral larvae, elkhorn and staghorn planulae appear to prefer to settle on upper, exposed surfaces, rather than in dark or cryptic ones (Szmant and Miller 2006), at least in a laboratory setting. Studies of elkhorn and staghorn corals indicated that larger colonies of both species[6] had higher fertility rates than smaller colonies (Soong and Lang 1992).

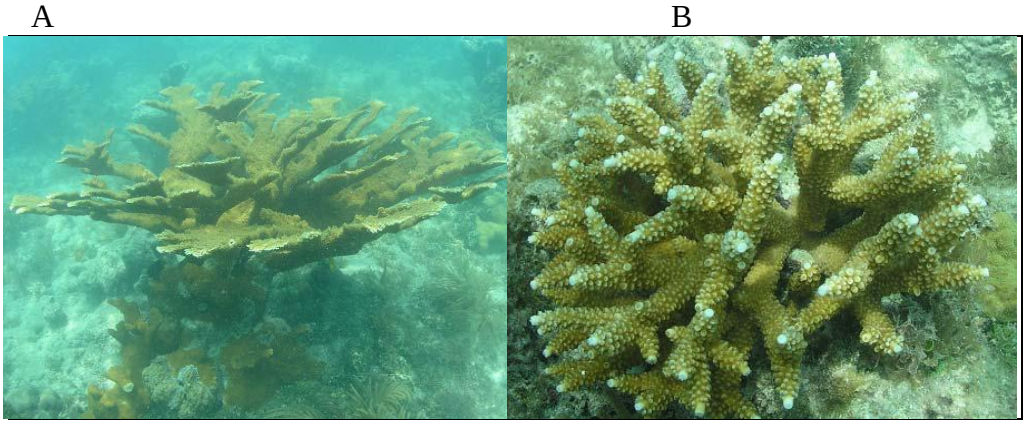

Figure 3.3.2.1 *Acropora* species. A. Elkhorn Coral (*Acropora palmata*). B. Staghorn Coral (*A. cervicornis*).
Photo Credit: W. Jaap

3.4 Economic Environment

3.4.1 Commercial Fishery

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

Commercial fishing for Caribbean spiny lobster in Florida has been affected by sharply lower prices in the last two years and by landings that have been the lowest since the early 1960's (Figure 3.4.1.1, Table 3.4.1.1; Vondruska 2010a). Ex-vessel prices decreased sharply to $3.30 / lb (ww) in 09/10, compared with the 22-year high of $7.94 /lb for 2 years earlier. Based on 5-year averages for 87/88-91/92 and 05/06-09/10, fishing effort is now much lower than it was (Table 3.4.1.1; Figure 3.4.2.2):

1) The number of vessels declined from 2,175 to 781 per year.
2) The number of trips declined from 39,086 to 15,568 per year.
3) The number of hours fished declined from 493,211 to 234,292 per year (Vondruska 2010a, Table 2).
4) The number of traps fished on all trips declined from 8.65 to 4.24 million (including duplication, because individual traps are usually fished on more than one trip, unless lost or damaged) (estimates as explained in Vondruska 2010a, Table 3, column 9).
5) Vessel-based estimates for the number of "traps that could be fished" declined from 704,580 to 368,106 traps (excluding duplication attributable to the use of individual traps on multiple trips). The number of traps that could be fished is a proxy for the number of traps licensed to fish for spiny lobster. The number peaked in 91/92 at 814,864 traps (estimates as explained in Vondruska 2010a, Table 3, column 4).

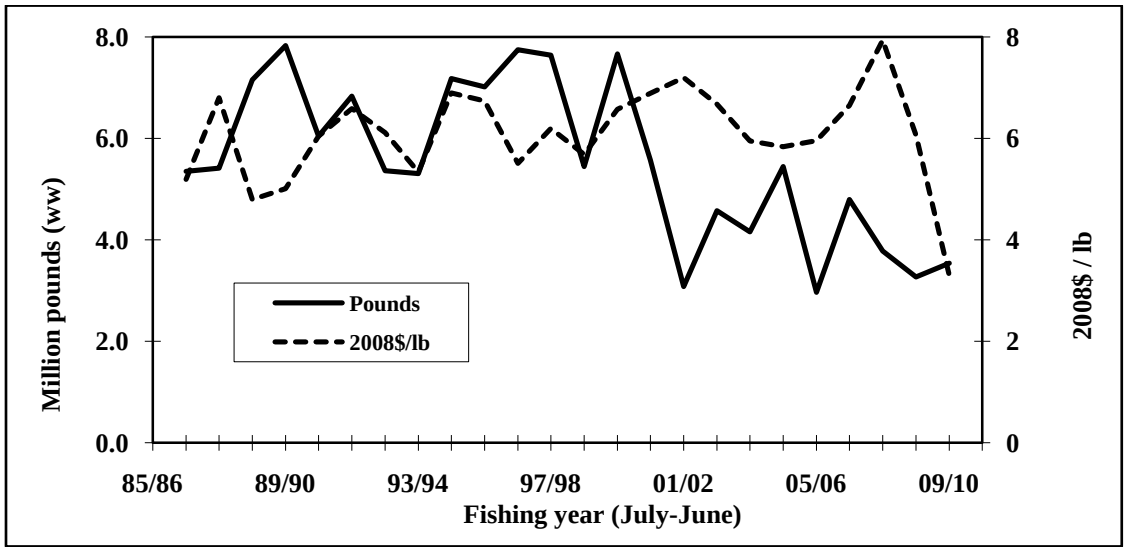

Figure 3.4.1.1 Commercial fishing for Caribbean spiny lobster, Florida landings & ex-vessel prices.
Source: FTT data as of 19Mar10, Vondruska 2010a.

Economic conditions would have been worse without long-term reductions in fishing effort and consequent increases in vessel and trip productivity. Average vessel and trip landings have exhibited flat to upward trends since the early-1990s (Figure 3.4.1.3; Table 3.4.1.1).

Initially, the number of trap certificates was reduced in steps, from 944,000 in 1992 to 543,000 by 1999. Given a decade or so of fisher experience with the program, Shivlani, Ehrhardt, Murray and Kirkley (2004) conducted a survey of fishers and analyzed the economic and social conditions at the fisher level and fisher attitudes about the program. Today, reductions in the total number of certificates occur routinely if certificates are transferred and/or revert to the state because the owner does not pay requisite annual fees for three years. Besides the Trap Certificate Program, other factors have affected commercial fishing for spiny lobster in Florida, such as gentrification, state and local regulations on the storage of traps, and availability and access to docks and dealers.

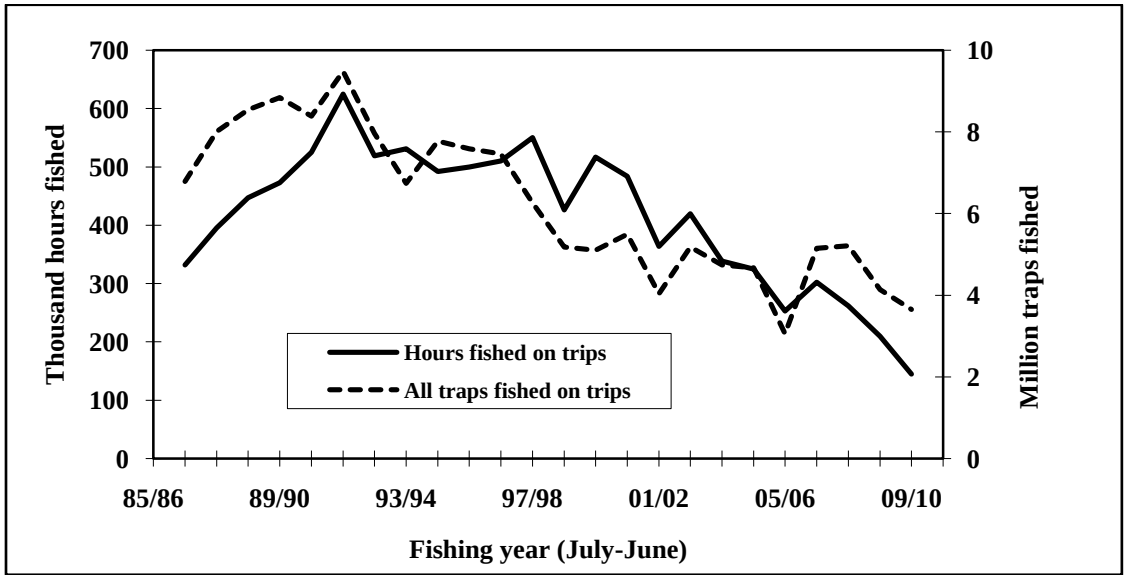

Figure 3.4.1.2 Commercial fishing for Caribbean spiny lobster in Florida, hours & traps fished.
Source: FTT data as of 19Mar10, Vondruska 2010a.

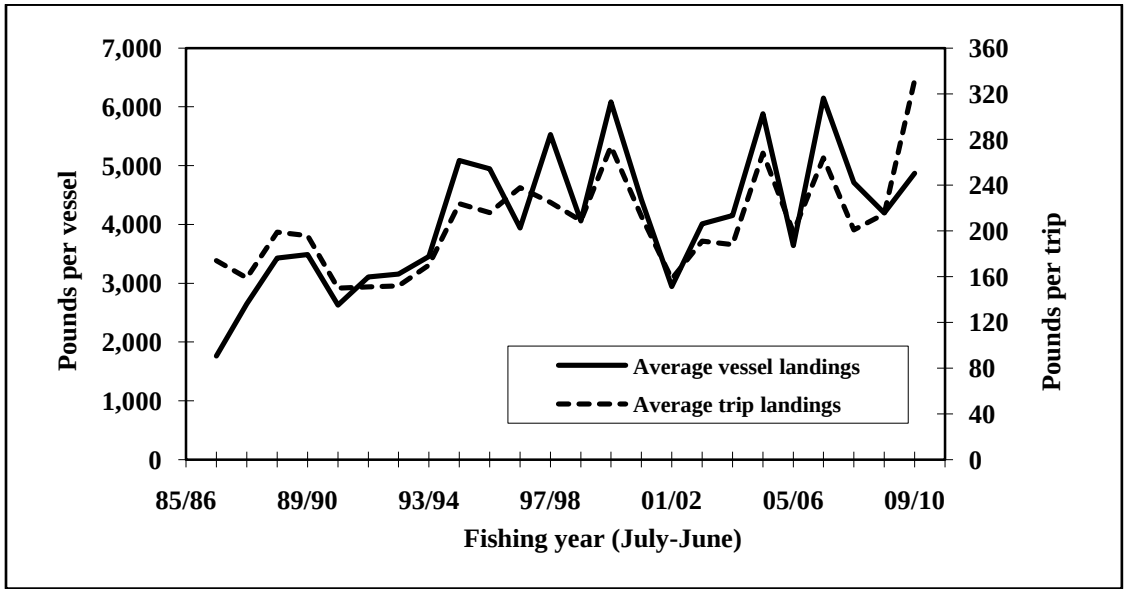

Figure 3.4.1.3 Commercial fishing for Caribbean spiny lobster in Florida, vessel and trip landings.
Source: FTT data as of 19Mar10, Vondruska 2010a.

Table 3.4.1.1. Florida commercial fishing for Caribbean spiny lobster.

Fishing year (July-June)	Landings (ww), Caribbean spiny lobster						
	Thousand pounds	Thousand 2008$	2008$ /lb	Vessels	Lbs / vessel	Trips	Lbs / trip
86/87	5,351	$27,786	$5.19		1,762	30,696	174
87/88	5,417	$36,833	$6.80	2,045	2,649	34,005	159
88/89	7,154	$34,327	$4.80	2,086	3,430	36,021	199
89/90	7,830	$39,229	$5.01	2,244	3,489	39,935	196
90/91	6,044	$36,523	$6.04	2,300	2,628	40,194	150
91/92	6,834	$45,018	$6.59	2,200	3,106	45,276	151
92/93	5,367	$32,804	$6.11	1,702	3,153	35,387	152
93/94	5,309	$28,362	$5.34	1,536	3,457	31,283	170
94/95	7,181	$49,553	$6.90	1,411	5,090	32,093	224
95/96	7,017	$47,295	$6.74	1,419	4,945	32,546	216
96/97	7,748	$42,675	$5.51	1,968	3,937	32,591	238
97/98	7,641	$47,373	$6.20	1,382	5,529	33,906	225
98/99	5,448	$30,980	$5.69	1,342	4,060	26,012	209
99/00	7,669	$50,402	$6.57	1,260	6,086	27,947	274
00/01	5,570	$38,391	$6.89	1,259	4,424	26,111	213
01/02	3,081	$22,186	$7.20	1,047	2,943	19,528	158
02/03	4,574	$30,529	$6.68	1,140	4,012	23,960	191
03/04	4,161	$24,773	$5.95	1,003	4,149	22,088	188
04/05	5,445	$31,799	$5.84	926	5,880	20,295	268
05/06	2,964	$17,666	$5.96	814	3,642	14,901	199
06/07	4,799	$31,913	$6.65	780	6,152	18,184	264
07/08	3,782	$30,025	$7.94	803	4,710	18,858	201
08/09	3,271	$19,836	$6.06	780	4,194	15,238	215
09/10	3,541	$11,695	$3.30	727	4,870	10,660	332
5-yr aver							
87/88-91/92	6,656	$38,386	$5.85	2,175	3,060	39,086	171
05/06-09/10	3,671	$22,227	$5.98	781	4,714	15,568	242
Source: FTT data (19Mar10), based on Vondruska 2010a.							

Economic Impacts
Descriptions of the commercial fishery for spiny lobster are contained in Vondruska (2010a), Vondruska (2010b), and CFMC (2008) and are incorporated herein by reference. Select summary statistics for the commercial fishery are provided in Table 3.4.1.2, and estimates of economic impacts (economic activity) are provided in Table 3.4.1.3.

Estimates of the average annual economic activity (impacts) associated with the commercial spiny lobster fishery were derived using the model developed for and applied in NMFS (2009x) and are provided in Table 3.4.1.3. Business activity for the commercial sector is characterized in the form of full-time equivalent (FTE) jobs, income impacts

(wages, salaries, and self-employed income), and output (sales) impacts (gross business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting.

Table 3.4.1.2. Five-year[1] average performance statistics for the commercial sector of the Caribbean spiny lobster fishery.

	Vessels	Total Lobster Ex-vessel Value[2] (millions)	Total All Species Ex-vessel Value[2] (millions)	Average Ex-vessel Value per Vessel
2005-2010 Average	781	$22,227	$23,399	$29,960

[1]Fishing-year (2005/2006, 2006/2007,…, 2009/20010).
[2]2008 dollars.
Source: Florida Trip Ticket System and NMFS SEFSC Accumulated Landings System.

Table 3.4.1.3. Average annual economic activity associated with the spiny lobster fisheries.

Species	Average Ex-vessel Value[1] (millions)	Total Jobs	Harvester Jobs	Output (Sales) Impacts (millions)	Income Impacts (millions)
Spiny Lobster	$22.23	4,223	580	$293,188	$125,382
- All Species[2]	$23.40	4,445	611	$308,647	$131,993

[1]2008 dollars.
[2]Ex-vessel revenues and economic activity associated with the harvests of all species harvested by vessels that harvested spiny lobster.

As noted in Table 3.4.1.3, the annual period refers to the fishing year, as appropriate to the management of the species. The estimates of economic activity include the direct effects (effects in the sector where an expenditure is actually made), indirect effects (effects in sectors providing goods and services to directly affected sectors), and induced effects (effects induced by the personal consumption expenditures of employees in the direct and indirectly affected sectors). Estimates are provided for the economic activity associated with the ex-vessel revenues from spiny lobster as well as the revenues from all species harvested by these same vessels. The estimates of ex-vessel value are replicated from Table 3.4.1.2.

Permits

There are two kinds of federal permits for fishing for spiny lobster in the EEZ, one of which allows possessing and landing whole lobster, while the other allows possessing and landing tails. The number of vessels with federal spiny lobster permits averaged 200 in the last five calendar years, while the number of vessels with federal tailing permits averaged 454, with most having home ports in Florida. The distribution of permitted vessels by "home-port" state in Table 3.4.1.4 differs from what might be expected based on commercial landings and effort data.

Table 3.4.1.4 Number of federal permits for fishing for spiny lobster in the EEZ. LC=federal lobster permits, LT=federal lobster tailing permits.

	Spiny lobster (LC permits)						Spiny lobster tailing (LT permits)					
State	2005	2006	2007	2008	2009	Total	2005	2006	2007	2008	2009	Total
AL	1	2	7	9	10	29	8	7	11	12	12	50
FL	153	139	151	179	195	817	407	390	385	381	376	1,939
GA	2	2	5	6	6	21	5	5	7	7	9	33
LA	3	1		1	1	6	2	1	1	2	1	7
MA	5	5	3	3	3	19	3	3	3	4	4	17
MS					1	1			1	1	2	4
NC	6	6	9	17	29	67	10	16	24	31	39	120
NJ	1	2	2	3	3	11	3	4	4	4	4	19
NY			1	1	1	3	1	1	1	1	2	6
PA							1	1	1	1	1	5
SC				1	2	3	4	4	1	5	13	27
TX		1	1	1	2	5	11	11	3	2	2	29
VA	1	1	5	5	5	17	1	1	5	4	5	16
Total	172	159	184	226	258	999	456	444	447	455	470	2,272

Source: NMFS, SERO, Permits Office, 03Feb11. State refers to a vessel's home port state, which is not necessarily the state in which its landings may occur.

Virtually all commercial landings of spiny lobster occur in Florida, with landings in other states being relatively low since 1977, mostly for fewer than three dealers, in which case the data are confidential (Section 3.1). During the last five fishing years, an average of 781 vessels commercially landed 3.671 mp (ww) per year in Florida, including 3.282 mp in Monroe County, and 0.670 mp from the EEZ (Tables 3.4.1.1 and 4.9.2.1). It is estimated that an annual average of 34.8 vessels in the last five years landed 0.025 mp (ww) of spiny lobster tails in Florida, with landings of 0.057 mp (ww) for whole lobster and tails for the same trips (Table 4.8.2.1, see footnote on methodology).

The estimated number of vessels with landings of tails, 34.8 vessels, is much lower than the number with permits to do so, 454 vessels (388 vessels in Florida) (Tables 4.8.2.1 and 3.4.1.4). The reasons are not known. Perhaps commercial fishing vessel operators obtain tailing permits along with other federal permits as a low-cost precaution, should the happen to have incidental catch of tails onboard. Other federal commercial fishing permits may be limited access, have a market value, and require purchase from other fishermen. Perhaps, an apparent loophole in federal and state regulations may have allowed an unknown number of tailing permits be held by for-hire fishing vessels, other for-hire vessels, and/or private recreational vessels. This loophole would be removed under Action 8, **Preferred Alternative 3**. Current FWC methods for collecting data on recreational landings of spiny lobster do not provide data on the effort, catch, and landings of spiny lobster by these vessels (R. Muller, FWC, personal communication, January 2011). The FWC or other Florida State agencies may be able to provide data to the point on vessel licenses/permits that is not now in Amendment 10. Meanwhile, it is noted that for Monroe County, the number of recreational vessels registered increased from 4,000 in 1971 to 23,340 in 2000, and to 25,370 in 2007 and that the number of commercial fishing vessels declined by 17.3% to 2,653 between 2007 and 2008

(Shivlani, 2009, p. 29). Not all for-hire fishing vessels, other for-hire vessels, and private recreational vessels engage in fishing, but those that do could account for some federal spiny lobster tailing permits for fishing in the EEZ.

3.4.2 Recreational Fishery

Number and Description of Recreational Fishers

Prior to 1991, the number of recreational spiny lobster fishers was unknown. That changed with the requirement of the Florida Crawfish Stamp (permit) that began with the 1991/92 season, which was purchased as an additional endorsement to the state's recreational saltwater fishing license. The permit provided the FWC with a mechanism by which they could monitor the fishery, specifically, the use of two annual mail surveys sent to persons with a lobster license/permit (FWC 2005). The surveys were and are used to estimate the number and landings of lobsters harvested by recreational fishers who take lobsters during the Special Two-Day Sport Season and from opening day to the first Monday in September of the regular recreational fishing season. The survey of recreational fishers who harvest during the regular fishing season focuses on the first month of the season because the majority of recreational fishing effort occurs during the first month of the season (Sharp *et al*., 2005). In 2007, the FWC began using e-mail based surveys to contact recreational permit holders and has begun evaluating using this methodology to conduct surveys of permit holders regarding their post-Labor Day lobster fishing activities with the goal of accurately estimating recreational lobster landings for the entire season.

From the 1990/91 to 1994/95 seasons, an average of 110,000 persons purchased a crawfish permit. Sharp et al. (2005) estimated that the number of permit holders that fished during the special 2-day sport season from 1993 through 2002 ranged from approximately 32,500 to approximately 57,000 and that the number permit holders that fished at some time during the first month of the regular season ranged from approximately 49,000 to 78,000 over those same years.

The FWC included a socioeconomic componentin its 1992 recreational lobster survey. Recreational fishers were asked how much they would be willing to pay to avoid a decrease in the bag limits and how much they would be willing to pay to have an increase in the bag limits. The least they were willing to pay to avoid the bag limits was $0.94 per lobster (in 1992 dollars) and to increase the bag limits was $0.37 per lobster (in 1992 dollars).

Because fewer people actually fish than have saltwater fishing licenses and permits to do so, the numbers of permits in Table 3.4.2.1 provide upper-end approximations for the potential number of recreational fishers for spiny lobster from 1995/96 through 2009/10. The number of permits may suggest an upward trend in recreational fishing activity, at least through 2007/08, but landings and effort have been mostly lower in 2001/02 onward than in the 1990s (landings, effort and CPUE in Figures 3.1.3.3 and 3.13.4; numbers of permits in Table 3.4.2.1). These indicators reflect weakened national economic conditions in the last two-three years. The status, numbers, and landings for Recreational Crawfish Licenses (SRCLs) are discussed in Section 3.1.2 and Table 3.1.2.1.

Table 3.4.2.1. Number of valid recreational fishing licenses/permits by fishing year.

Fishing year	Annual & 5-year Crawfish Permits	Sportsman Gold (Annual)	Military Gold (Annual)	Lifetime Sportsman	Lifetime Saltwater
95/96	112,627			1,772	654
96/97	120,651			1,838	824
97/98	139,553			939	1,012
98/99	130,812			1,096	1,237
99/00	135,146			1,253	1,493
00/01	137,219			1,417	1,735
01-02	128,256			1,597	2,000
02/03	123,003	8,370		1,826	2,319
03/04	136,163	15,007		2,097	2,626
04/05	130,358	17,874		2,352	2,962
05/06	136,888	20,075	6,556	2,708	3,320
06/07	143,362	21,643	7,425	3,049	3,784
07/08	146,988	20,597	8,849	3,158	4,258
08/09	141,876	19,384	10,996	3,530	5,010
09/10	129,865	15,283	10,805	3,941	6,001

*Data for 2009/10, as of July 2010. Source: William Sharp, FWC, personal communication, 08Nov10. Note: Annual data for those licenses that give the owner recreational lobster fishing privileges under lifetime and five-year permits are cumulative. The Lifetime Sportsman and Lifetime Saltwater Permit values do not include those older than 64 or younger than 16 years of age.

Presently, the cost of a resident saltwater fishing license is $17.00, which is valid for one year but does not include lobster fishing privileges ($79 for a five-year permit), and the cost of a resident lobster (crawfish) permit is $5.00 ($25.00 for a five-year permit; see http://myfwc.com/license/licpermit_swfishing.htm). The recreational lobster permit is required of all fishers 16 years and older, but not Florida residents who are 65 years or older.

Charter-fishing vessels may take 25-30 divers per trip, with perhaps 3 trips per day, and the individual divers have their own Saltwater Recreational Fishing Licenses and spiny lobster permits, and meet certification and other requirements for SCUBA diving and recreational fishing for lobster fishing (R. Muller, FWC, personal communication). In other instances, however, it appears that a charter-fishing vessel may fulfill Florida requirements for paying passengers who fish for lobster, but without their own licenses and permits.[7] For the second scenario, there is apparently no mechanism for counting

[7]Florida law requires that a charter-fishing vessel have a Saltwater Vessel License (fee based on the number of customers per trip, 4 or fewer, 10 or fewer, or 11 or more), a captain with a U.S. Coast required license, and a Florida Restricted Species (RS) endorsement in the case of lobster and some other restricted species (to allow more than the bag-limit number of animals to be on board) (Florida Statutes 379.361 (2) (c)). To cover their passengers who are not required to hold a recreational fishing license, charter-fishing vessels are required to have licenses that cost approximately $200-$800 each for both the captain and vessel (fee varies with number of passengers), and they are required to register the boat as a commercial vessel, although there is another license to cover anyone who engages in saltwater fishing from a recreational vessel ($2,000) ("licenses for charter and headboat operators, guides, vessels and piers," and "recreational licenses and permits," myFWC.com website). With some exceptions for age or other factors, the RS endorsement for charter boat operators requires that 50% of annual income and/or $2,500 from sales for the same year

landings and fishing effort, given the protocols for the mail-in survey for recreational lobster fishing.

Economic Impacts

The recreational spiny lobster fishery is very important to Monroe County. In 2001, additional socio-economic questions were added on to the annual survey. Almost 230 thousand (229,395) person-days of recreational lobster fishing occurred that year in Monroe County. Of those person-days, approximately 75% (171,127) were during the regular season, and the remaining 58,268 person-days (25%) were during the two-day sport season. Approximately 79% of those person-days (180,123) were attributed to visitors of Monroe County and the remaining 21% (49,272 person-days) to residents. See Table 3.4.2.2.

Table 3.4.2.2. Average Expenditures per Person-Day in 2001.

Season	Person Days		Ave. Exp. Per Person-Day		Total Expenditures (2001 Dollars)		
	Resident	Visitor	Resident	Visitor	Resident	Visitor	Total
Two-Day	12,306	45,962	$33.99	$129.41	418,281	5,947,942	6,366,223
Regular	36,966	134,161	$42.83	$122.35	1,583,254	16,414,598	17,997,852
Total	49,272	180,123	$40.61	$124.15	2,000,936	22,362,270	24,363,206

Source: Sharp et al. 2005.

Visitors spend substantially more per person-day than residents of Monroe County, and visitors spend slightly more during the two-day sport season than regular season. See Table 3.4.2.2. Sharp et al. (2005) estimate approximately $24 million was spent on recreational lobster fishing in the Florida Keys from the opening of the recreational season through the first Monday in September in 2001. Fishers who resided outside the Keys accounted for about $22 million (92%) of the total monies spent on recreational lobster fishing in the Keys.

3.5 Social Environment

The demographic description of the social environment is presented primarily at the county level for south Florida counties and will include a brief discussion of the communities within in those counties that are most reliant upon spiny lobster, both commercially and recreationally. The focus on south Florida is due to the nature of the fishery which is prosecuted primarily in Miami-Dade and Monroe Counties. Utilizing demographic data at the county level will allow for updated statistics from the Census Bureau, which produces estimates for geographies (counties; minor civil divisions; census designated places, etc.) that are larger than 20,000 prior to the decennial census.[8] Estimates for smaller geographies are not available at this time. Because employment

come from charter fishing (FS 379.361, licenses; Restricted Species (RS) Endorsement Application; and website on "qualifying for the Restricted Species endorsement," myFWC.com).

[8] American Community Survey estimates are based on data collected over a three year time period. The estimates represent the average characteristics of population and housing between January 2006 and December 2008 and do not represent a single point in time. Because these data are collected over three years, they include estimates for geographic areas with populations of 20,000 or more.

opportunities often occur within a wider geographic boundary than just the community level, a discussion of various demographics within the county is appropriate and will be used to address environmental justice concerns. A more detailed description of environmental justice concerns will be at the end of this section. The county descriptions will correspond with recent research that was also conducted at the county level concerning social vulnerability and is described below.

The county-level description will focus primarily on the demographic character while fishing activity at the community level will be described where needed. A brief discussion of coastal growth and development that seems to affect many coastal communities, especially those with either or both commercial and recreational working waterfronts that might be reflected in those demographic statistics is also included. This is especially true for Monroe County which has very limited land area and has seen a steady rise in land values. Recent research on the Key's communities (Shivalani 2010) has described the problem of increasing land values and disappearance of working waterfronts, especially for communities like Key West. The rapid disappearance of these types of waterfronts has important implications as the disruption of various types of fishing-related businesses and employment affect fisheries overall. The process of "gentrification," which tends to push those of a lower socio-economic class out of traditional communities as property values and taxes rise, has become common along coastal areas of the U.S. and around the world. Working waterfronts tend to be displaced with development that is often stated as the "highest and best" use of waterfront property, but often is not associated with water-dependent occupations. However, with the continued removal of these types of businesses over time, the local economy becomes less diverse and more reliant on the service sector and recreational tourism. As home values increase, people within lower socio-economic strata find it difficult to live within these communities and eventually must move. Consequently they spend more time and expense commuting to work, if jobs continue to be available. Newer residents often have no association with the water-dependent employment and may see that type of work and its associated infrastructure as unappealing. They often do not see the linkage between those occupations and the aesthetics of the community that produced the initial appeal for many migrants. The demographic trends within counties can provide some indication as to whether these types of coastal change may be occurring if an unusually high rate of growth or change in the demographic character of the population is present. A rise in education levels, property values, fewer owner occupied properties and an increase in the median age can at times indicate a growing process of gentrification.

Although the most recent estimates of census data have been used here, many of the statistics related to the economic condition of counties or communities do not capture the recent downturn in the economy which may have significant impacts on current employment opportunities and business operations. Therefore, in the descriptions of both counties and communities, it should be understood that in terms of unemployment, the current conditions could be worse than indicated by the estimates used here. To be consistent, census data are used for the various demographic characteristics and as noted earlier are limited to the most recent estimates which are an average for 2006 - 2008. Other aspects of trade and market forces as a result of the economic downturn could also affect the business operations of vessels, dealers, wholesalers and retail seafood businesses for the commercial sector and charter services and other support services for

the recreational fishery. These may not be reflected in the demographic profile provided here.

Marine Related Employment

Other county level tables provide summaries of marine related employment within the coastal counties of South Florida. These estimates provide the number of sole proprietors (# Prop) and the number of employed persons (# Emp) for various sectors associated with employment in the marine environment. These categories were chosen because the occupations that are represented within each sector often include fishing related activities or fishing related support activities. For instance, the sector entitled Scenic Water includes charter fishermen within the estimate. The sector Shipping includes various shipping containers that would be used by fish houses and others to handle seafood. While these estimates do not encompass all employment related to fishing and its support activities, it does provide some estimate of the amount of activity associated with employment related to both recreational and commercial fishing.

Social Vulnerability

In the map below, the counties in South Florida are shown with fishing communities identified in each. Each county has also been geocoded with regard to social vulnerability as measured by Social Vulnerability Index (SoVI). Those counties most vulnerable are shaded with light and darker red tones while those least vulnerable are shaded in lighter and darker blue tones. The yellow shading represents medium vulnerability. The Index was created by the Hazards Research Lab at the University of South Carolina (Cutter et al. 2003) to understand how places that are susceptible to coastal hazards might also exhibit vulnerabilities to social change or disruptions. These vulnerabilities may come in the form of high unemployment, high poverty rates, low education and other demographic characteristics. In fact, the SoVI is an index that consists of 32 different variables combined into one comprehensive index to measure social vulnerability. Although the SoVI was created to understand social vulnerability to coastal environmental hazards, it can also be interpreted as a general measure of vulnerability to other social disruptions, such as adverse regulatory change or manmade hazards. This does not mean that there will be adverse effects, only that there may be a potential for adverse effects under the right circumstances. Fishing communities in these vulnerable counties may have more difficulty adjusting to regulatory changes if those impacts affect employment or other critical social capital. At present, a social vulnerability index is being created for fishing communities in the Southeast region with more timely data (the SoVI uses 2000 census data). Until that index is completed, the SoVI will substitute at the county level for a measure of vulnerability for those communities that are within the boundaries of a particular coastal county. This concept is closely tied to environmental justice and the thresholds associated with that are addressed below.

Fishing Communities

The communities displayed in Figure 3.5.1 below represent a categorization of communities based upon their overall value of local commercial landings divided by the overall value of commercial landings. These data were assembled from the accumulated landings system which includes all species from both state and federal waters landed in 2008. All communities were ranked on this “regional quotient” and divided by those

who were above the mean and those below. Those above the mean were then divided into thirds with the top tier classified as Primarily Involved in fishing; the second tier classified as Secondarily Involved; and the third classified as being Tangentially Involved. The communities included within the map were only those communities that were categorized as primarily or secondarily involved. This breakdown of fisheries involvement is similar to the how communities were categorized in the community profiling of South Atlantic fishing communities (Jepson et al. 2005). However, the categorization within the community profiles included other aspects associated with fishing such as infrastructure and other measures to determine a community's status with regard to reliance upon fishing. While these communities represent all fishing, communities those that are more involved in the spiny lobster fishery are represented in more depth within their respective county description.

A further breakdown of community landings is provided for those communities which have substantial landings of spiny lobster as evidenced by their local quotient (lq) which is the amount of landings and value out of the total landings for the community. This provides an indication of how reliant a community may be on a particular species.

Although it is difficult to place recreational landings within a community, a table is provided below with recreational fishing communities that have been identified by their ranking on a number of criteria including number of charter permits per thousand population and recreational fishing infrastructure as listed under the MRIP survey identified within each community. Because the recreational lobster fishery is such an important part of the Florida Keys economy, most every Keys community might be considered a recreational fishing community. This list of recreational fishing communities is not exhaustive and should be considered a guide to where substantial recreational fishing activity may take place.

Southern Florida Counties

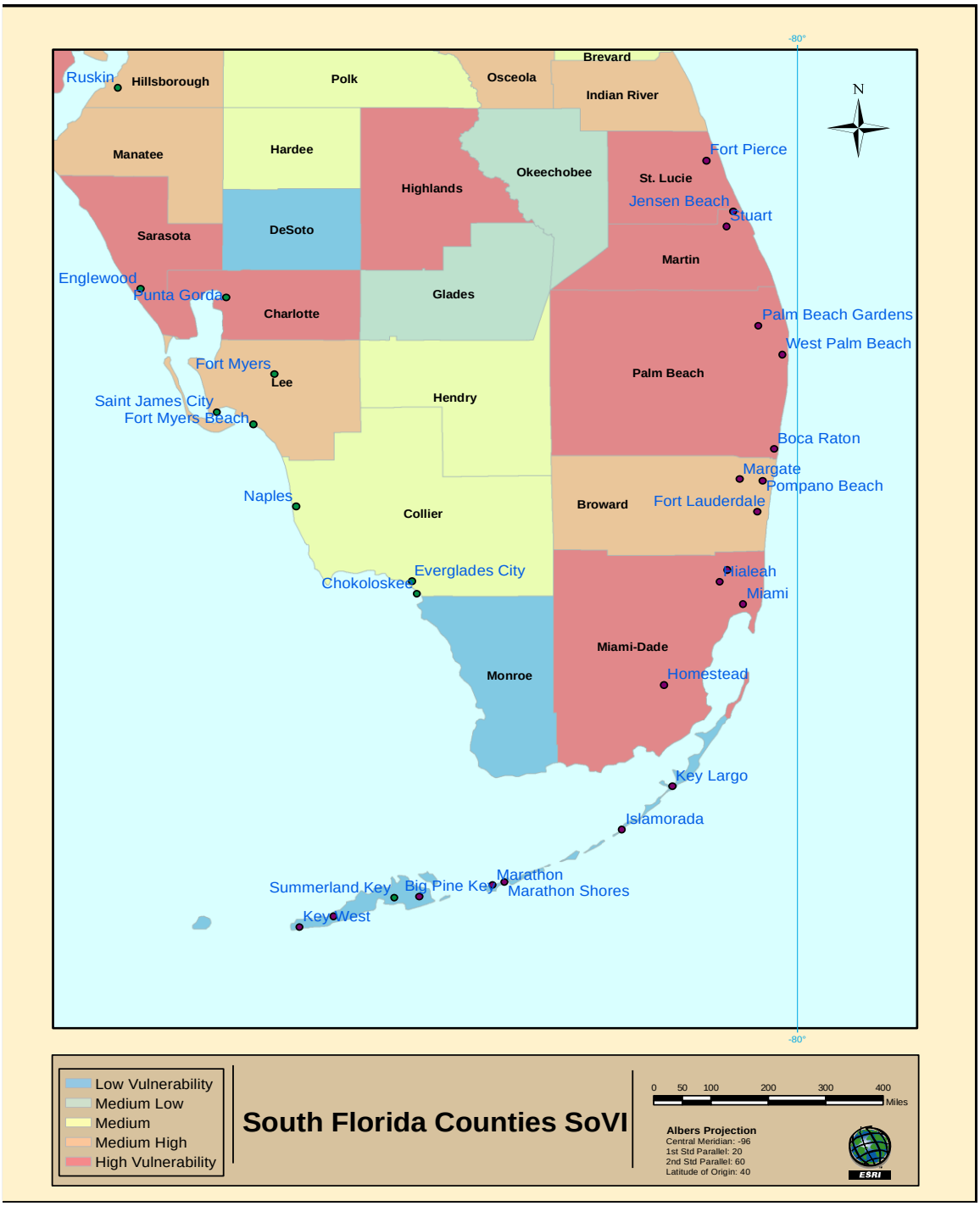

Figure 3.5.1. The Social Vulnerability Index applied to South Florida Counties.
Source: http://webra.cas.sc.edu/hvri/products/sovi.aspx#.

Table 3.5.1. Marine Related Employment for 2007 in South Florida Coastal Counties.

Florida County	Broward	Miami-Dade	Monroe	Palm Beach	Collier

Sector	# Prop	# Emp	# Prop	# Emp	# Prop	# Emp	# Prop	# Emp	# Prop	# Emp
Boat Dealers	253	.	108	.	23	.	108	.	26	
Seafood Dealers	.	406	.	.	.	112	.	46		38
Seafood Harvesters	228	.	396	.	934	.	287	.	176	
Seafood Retail	28	291	79	.	7	7	18	57		14
Marinas	.	707	34	.	.	191	10	887		204
Processors	0	142	.	.	0	.	.	176		
Scenic Water	.	313	.	.	.	315	.	94		97
Ship Boat Builders	.	776	.	.	.	17	.	100		
Shipping Support	.	1557	.	.	.	67	.	756		7
Shipping		995	.	.	.	35		69		5

Source: Census Bureau 2010

Gulf Counties

Of those commuities in the Gulf with landings of spiny lobster, Key West leads with over 50% of the pounds and close to 50% of the value of total Gulf landings or regional quota (rq) (Figure 3.5.2). Marathon is second with over 30% of both landings and value in the Gulf.

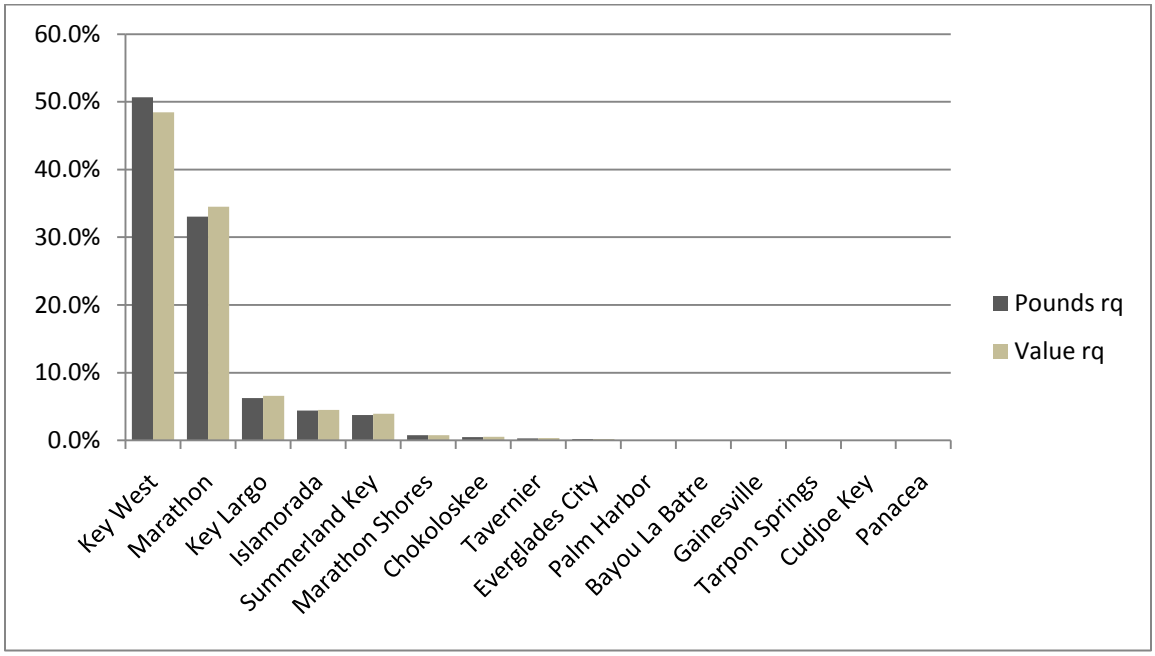

Figure 3.5.2. Proportion of spiny lobster commercial landings and value by total spiny lobster landings and value for Gulf Coast Communities.

Source: ALS 2008.

The next four communities have less than 10% each and are: Key Largo, Islamorada, Summerland Key and Marathon Shores. Chokoloskee and Everglades City in Collier County are the two highest landing communities on the mainland, both with less than 1%

of the Gulf total. These communities are featured under their respective county descriptions.

Monroe County

Monroe County had a total population of 79,589 in 2000 that is estimated to have fallen to 74,397 by 2007. The majority of residents were identified as White (92.0%) in 2000 and was estimated to have dropped slightly to 90.4% in 2007. The Hispanic population has grown from 16.0 % in 2000 to 18.0% in 2007. Florida as a state had an estimated 77.8% White population and Hispanics made up 20.5% of its total population. The White alone population for the state was estimated to be 60.7% in 2007. The median age for residents of Monroe County was estimated to have been 47.2 which is slightly higher than it was in 2000 when it was 43.0. The median age for the State of Florida was 38.7 in 2000 and was estimated to have increased to 40.1 by 2007 so Monroe County's median age is considerably older than the state as a whole. There was an estimated 2.8 % of the population in the civilian force that was estimated to be unemployed in Monroe County, which was quite a bit lower than the State's unemployment rate of 6.4%. The percentage of persons below the poverty level was estimated at 10.1% which was below the 12.6% for the state as a whole during 2007. Monroe County had a slightly higher owner occupied housing rate than the state with slightly over 71.2% of owner occupied housing to the State's 70.3% estimated for 2007 (U.S. Census Bureau).

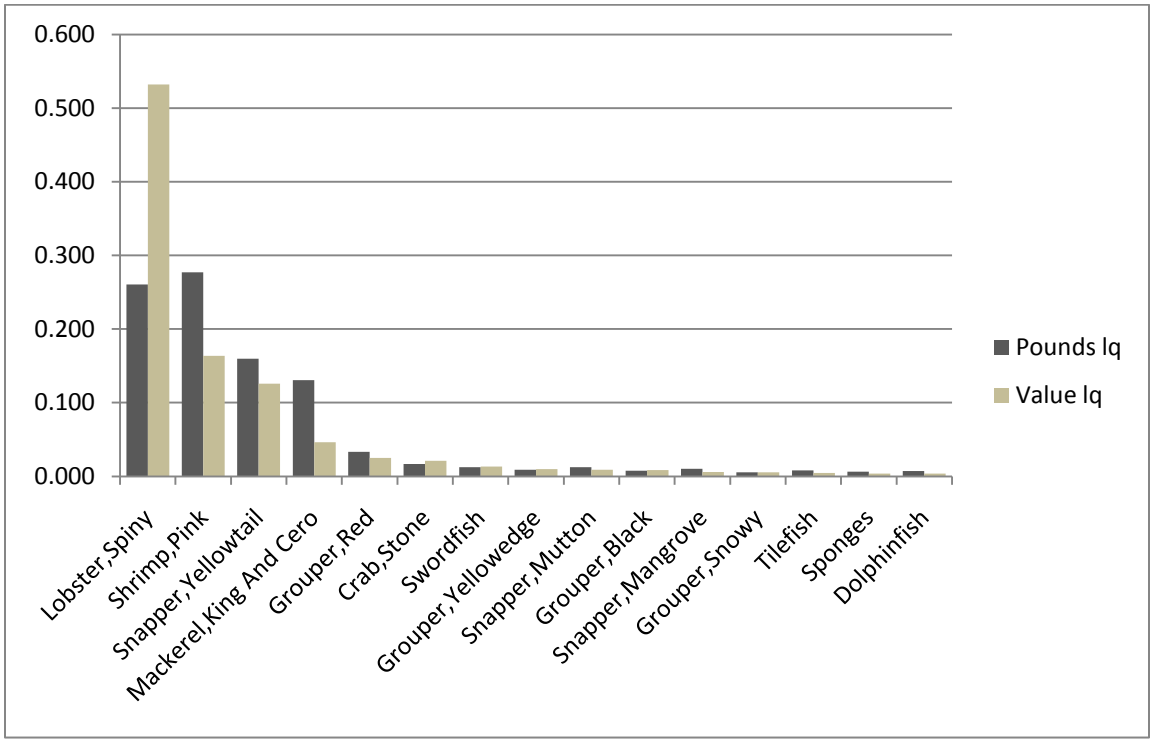

Figure 3.5.3. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Key West, Florida.
Source: ALS 2008.

Of the Monroe County communities, Key West is by far the leader in spiny lobster landings as shown in Figure 3.5.2. Spiny lobster landings have by far more value than

any other fishery or component fishery making up over 50% of total landings value for the community (Figure 3.5.3). Pink shrimp is second in value, but first in terms of pounds landed within the community.

The community of Marathon has a significant amount of local quotient value derived from spiny lobster with over 60% of total landings value coming from spiny lobster and 40% of landings in 2008 as shown in Figure 3.5.4. Stone crab landing are almost equal to lobster, but value is far greater for spiny lobster.

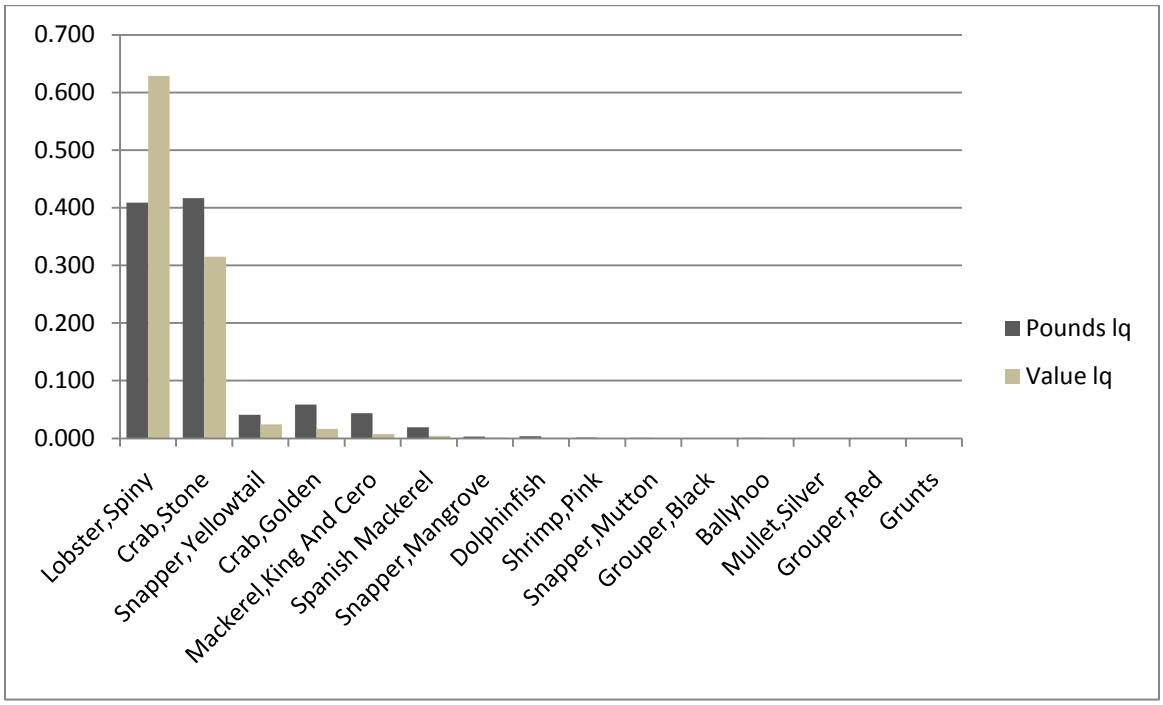

Figure 3.5.4. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Marathon, Florida.
Source: ALS 2008.

The community of Key Largo also recieves considerable value from spiny lobster with over 50% of the value from all landings coming from that species which comprises less than 20% of all landings as shown in Figure 3.5.5.

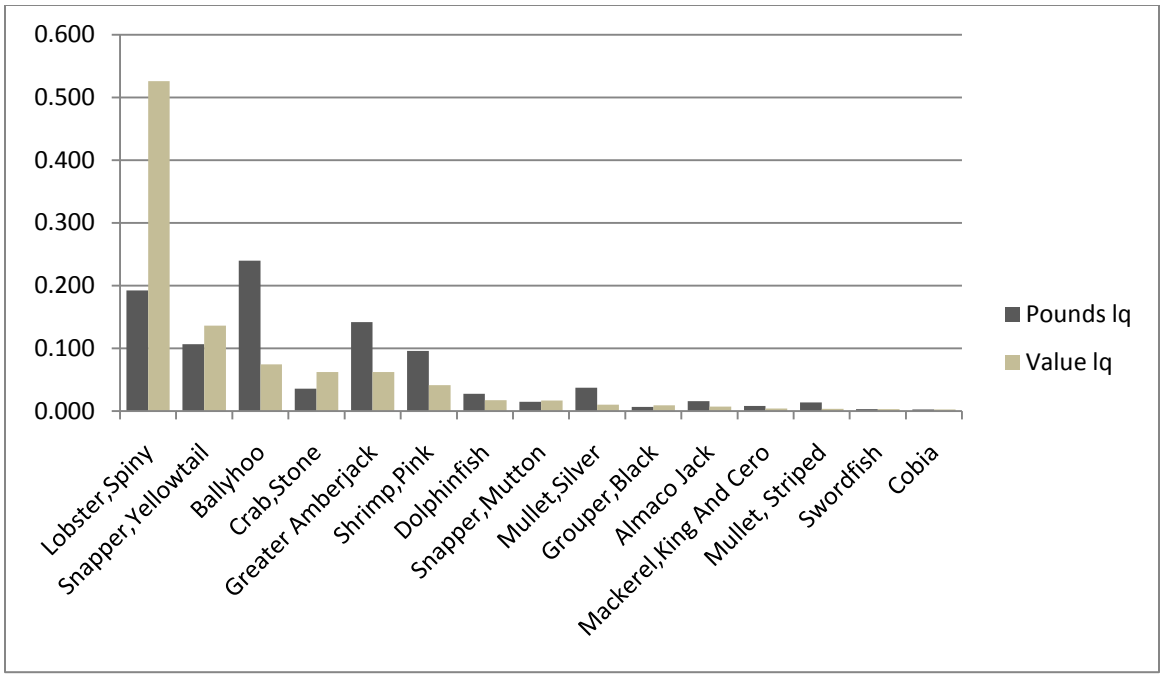

Figure 3.5.5. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Key Largo, Florida.
Source: ALS 2008.

Islamorada also derives over 50% of all value from spiny lobster landings while constituting only 20% of total landings for the community as shown in Figure 3.5.6.

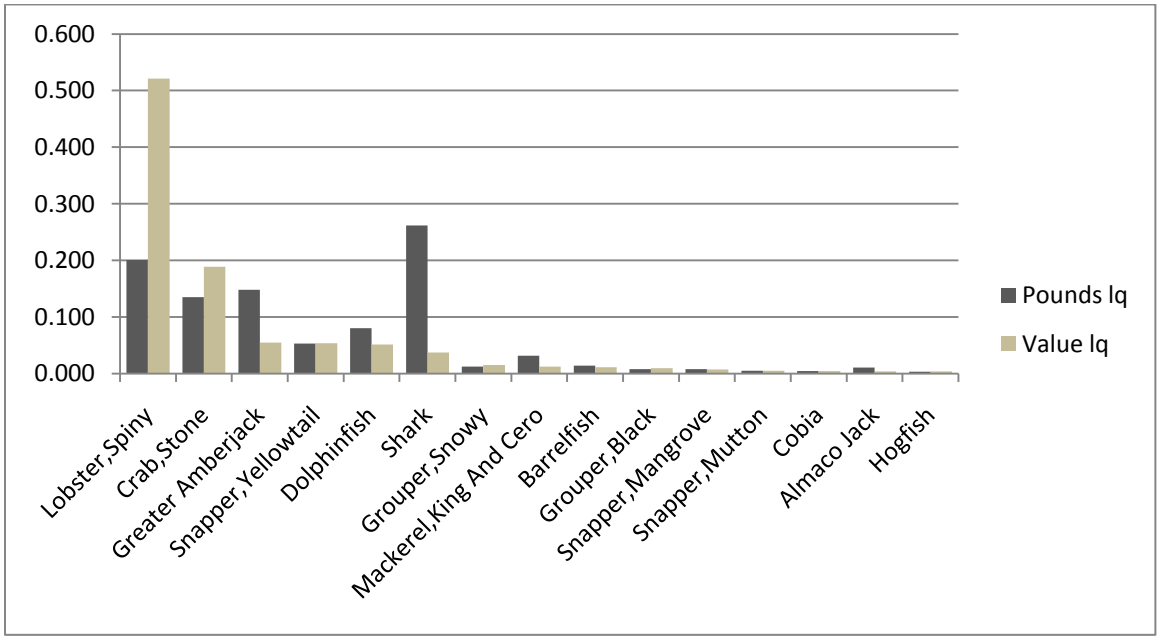

Figure 3.5.6. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Islamorada, Florida.
Source: ALS 2008.

Summerland Key, also in Monroe County, has substantial landings and value from spiny lobster. As depicted in Figure 3.5.7, spiny lobster accounts for over 60% of all landed value for the community and 40% of all landings. The next closest species is yellowtail snapper with just 10% of value and just under 20% of landings.

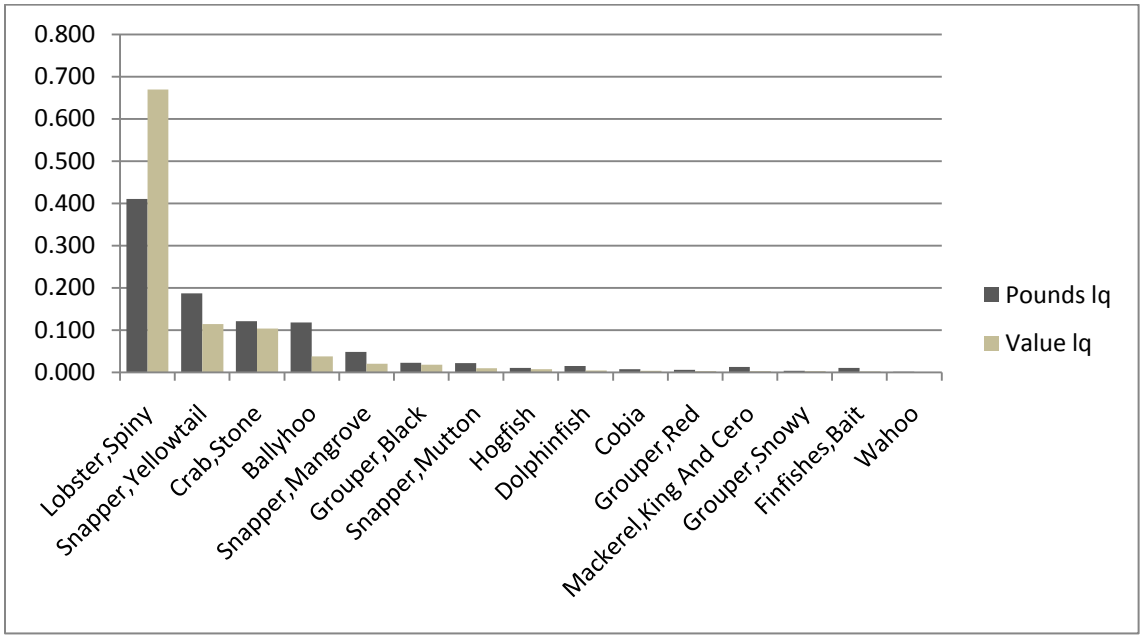

Figure 3.5.7. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Summerland Key, Florida.
Source: ALS 2008.

Collier County

Collier County had a total population of 251,377 in 2000 that is estimated to have grown to 315,839 by 2007. The majority of residents (87.2%) were identified as White in 2007 and the Hispanic population was 25.1% in 2007, while Florida as a state had an estimated 77.8% White population and Hispanics made up 20.5% of its total population. The median age for residents of Collier County was estimated to have been 44.3 while the median age for the State of Florida was 40.1 by 2007 so Collier County's median age is higher than the state as a whole. There was an estimated 5.3 % of the population in the civilian force that was estimated to be unemployed in Collier County, which was slightly below the State's unemployment rate of 6.4%. The percentage of persons below the poverty level was estimated at 10.2% which was below the 12.6% for the state as a whole during 2007. Collier County had a higher owner occupied housing rate than the state with over 76.3% of owner occupied housing to the State's 70.3% estimated for 2007 (U.S. Census Bureau)

Of the communities in Collier County that have spiny lobster landings, the two most active are Chokoloskee and Everglades City (Figures 3.5.8 and 3.5.9). Neither community derives substantial landings or value from spiny lobster, yet it is third in value for both communities. Landings and value in both communities is dominated by stone crab.

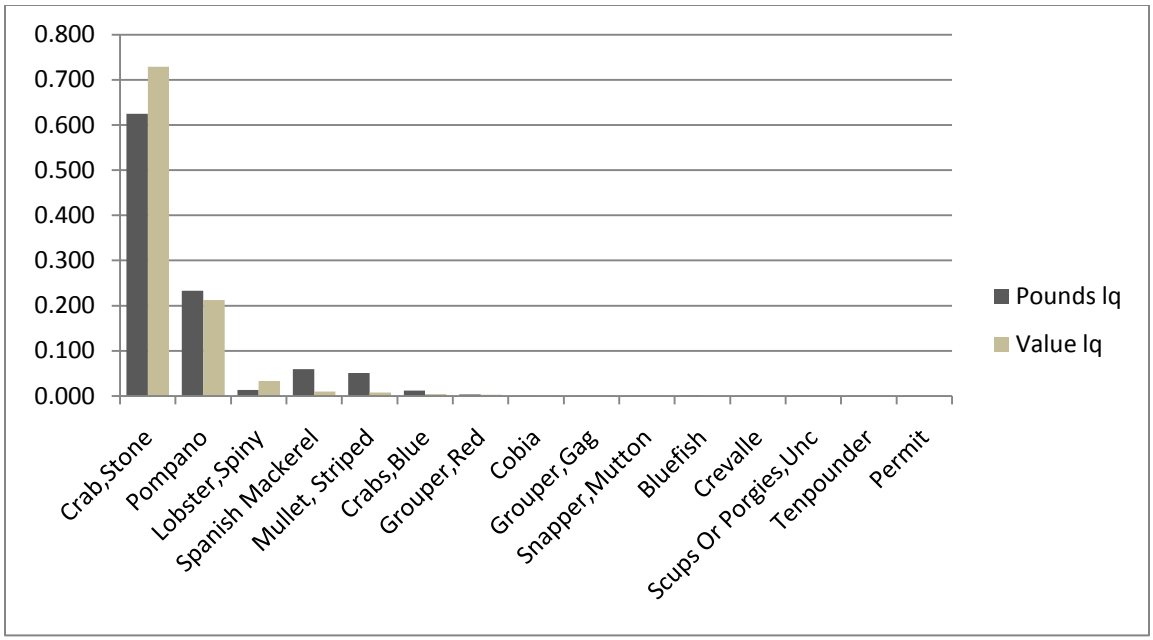

Figure 3.5.8. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Everglades City, Florida.
Source: ALS 2008.

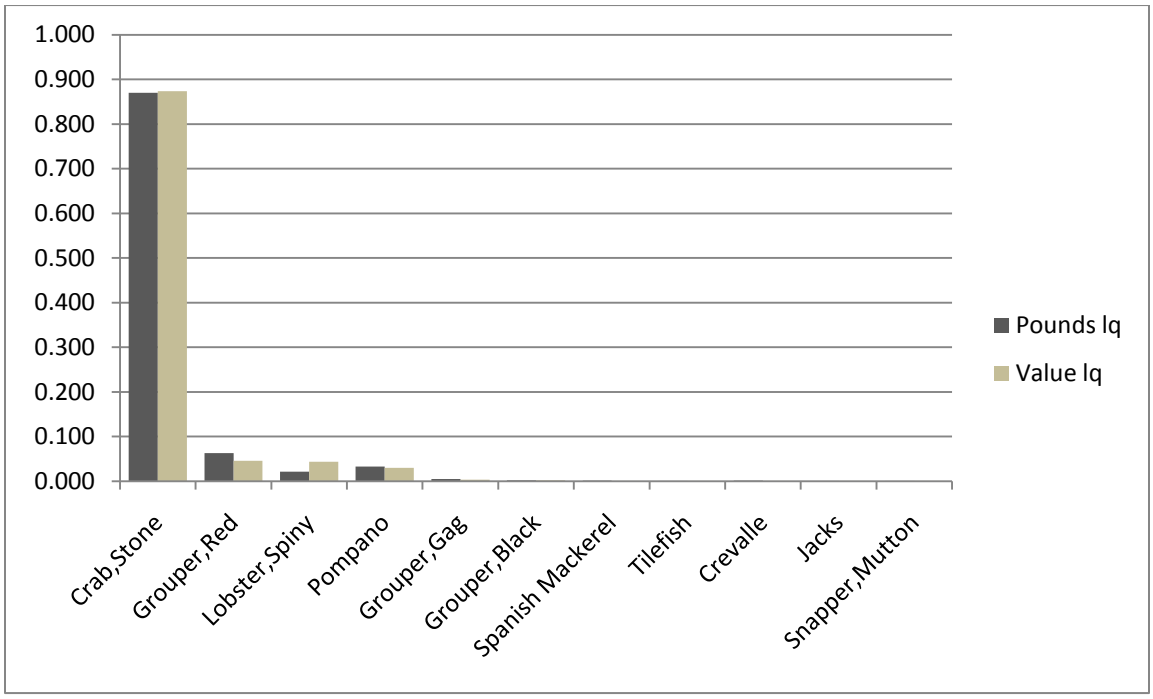

Figure 3.5.9. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Chokoloskee, Florida.
Source: ALS 2008.

South Atlantic Counties

Of those commuities in the South Atlantic with landings of spiny lobster, Miami has by far the most with over 75% of the pounds and value of total South Alantic landings (the Keys communities were included in the Gulf landings) (Figure 3.5.10). The next four communities have less than 10% each and are: Fort Lauderdale, North Miami, Palm Beach Gardens and Hialeah. These five communities are featured under their respective county descriptions.

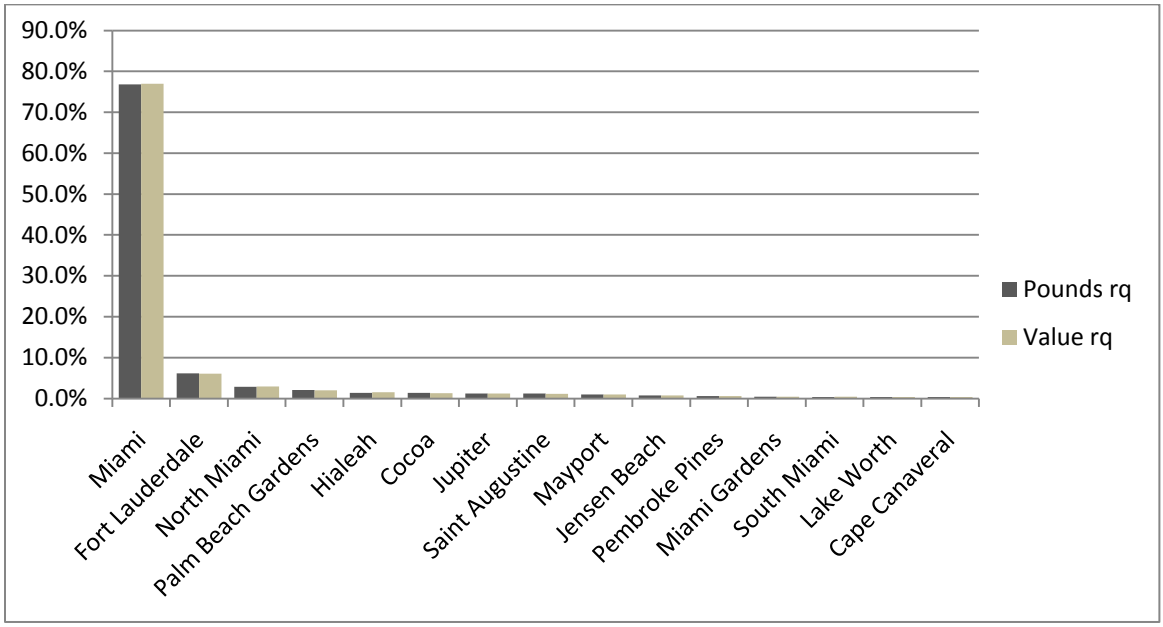

Figure 3.5.10. Proportion (rq) of spiny lobster commercial landings and value by total spiny lobster landings and value for South Atlantic communities.
Source: ALS 2008.

Palm Beach County

Palm Beach County had a total population of 1,131,191 in 2000 that is estimated to have grown to 1,754,846 by 2007. The majority of residents (75.6%) were identified as White in 2007 and the Hispanic population was 17.3% in 2007, while Florida as a state had an estimated 77.8% White population and Hispanics made up 20.5% of its total population. The median age for residents of Palm Beach County was estimated to have been 43.0 while the median age for the State of Florida was 40.1 by 2007 so Palm Beach County's median age is higher than the state as a whole. There was an estimated 6.3 % of the population in the civilian force that was estimated to be unemployed in Palm Beach County, which was almost the same as the State's unemployment rate of 6.4%. The percentage of persons below the poverty level was estimated at 11.5% which was below the 12.6% for the state as a whole during 2007. Palm Beach County had a higher owner occupied housing rate than the state with over 74.3% of owner occupied housing to the State's 70.3% estimated for 2007 (U.S. Census Bureau).

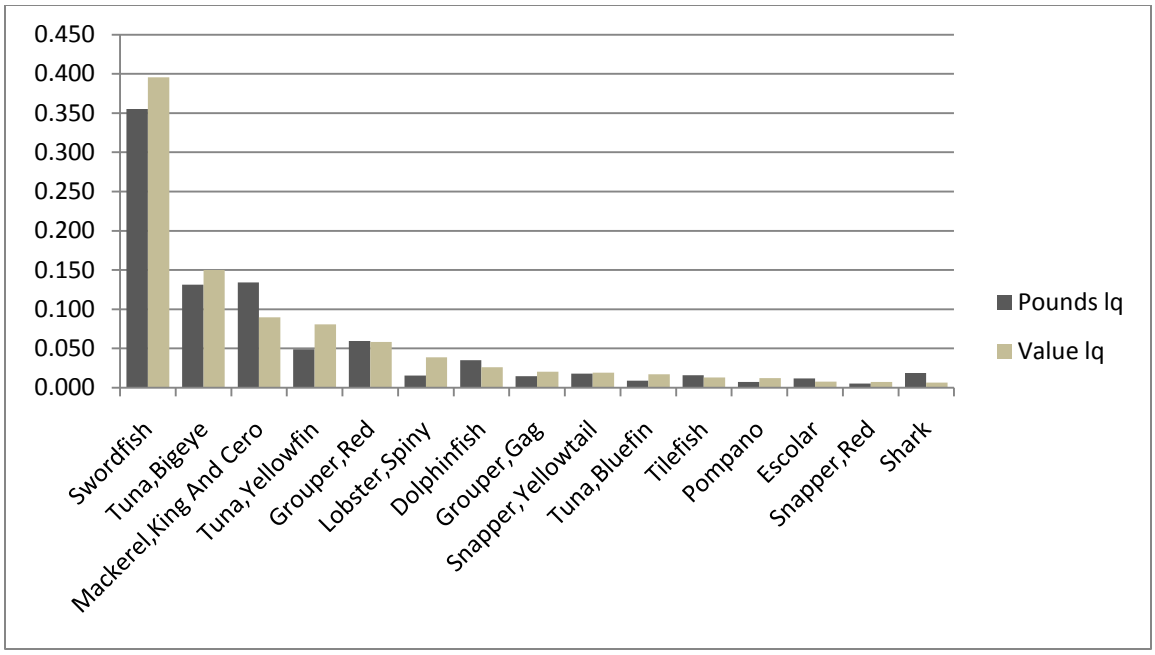

Figure 3.5.11. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Palm Beach Gardens, Florida.
Source: ALS 2008.

Value of spiny lobster for Palm Beach Gardens is just below 5% of total landings and around 2% of landings overall. Five other species rank ahead of spiny lobster in terms of value, with swordfish by far the most valuable for the community as depicted in Figure 3.5.11.

Miami-Dade County

Miami-Dade County had a total population of 2,253,779 in 2000 that is estimated to have grown to 2,387,170 by 2007. The majority of residents were identified as White (74.4%) in 2007 and the Hispanic population was 61.7%, the largest in the state. Florida as a state had an estimated 77.8% White population and Hispanics made up 20.5% of its total population. The median age for residents of Miami-Dade County was estimated to have been 38.7 while the median age for the State of Florida was 40.1.7 by 2007 so Miami-Dade County's median age is slightly younger than the state as a whole. There was an estimated 5.9 % of the population in the civilian force that was estimated to be unemployed in Miami-Dade County, which was somewhat lower than the State's unemployment rate of 6.4%. The percentage of persons below the poverty level was estimated at 16.1% which was above the 12.6% for the state as a whole during 2007. Miami-Dade County had a lower owner occupied housing rate than the state with over 60.1% of owner occupied housing to the State's 70.3% estimated for 2007 (U.S. Census Bureau).

Spiny lobster is by far the most valuable species landed in Miami with over 60% of the value of total landings and just over 30% of landings as depicted in Figure 3.5.12.

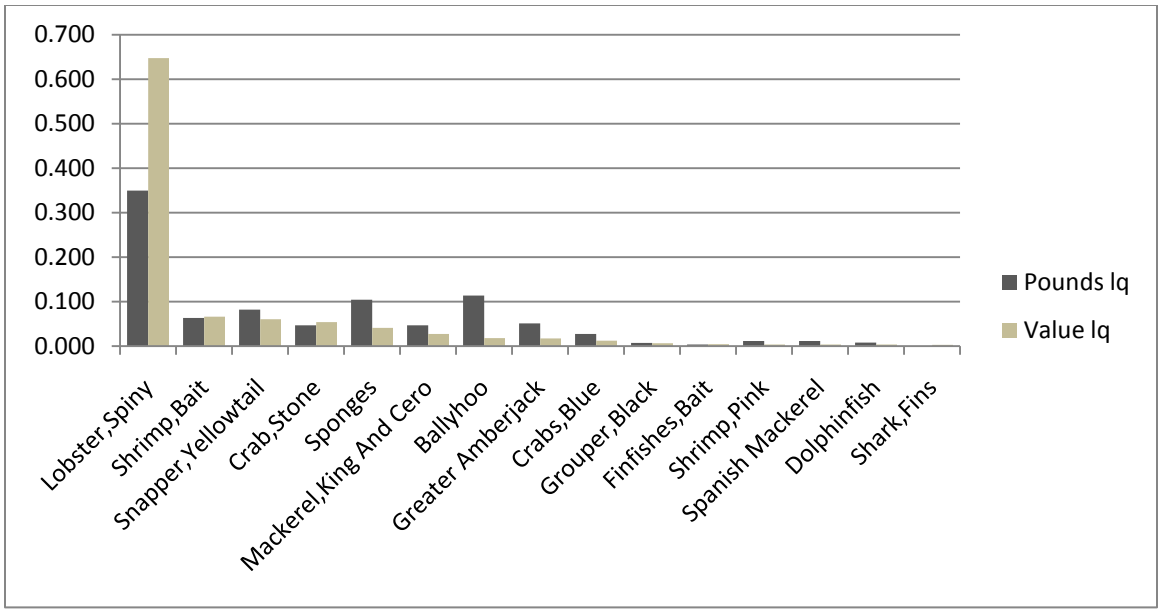

Figure 3.5.12. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Miami, Florida.
Source: ALS 2008.

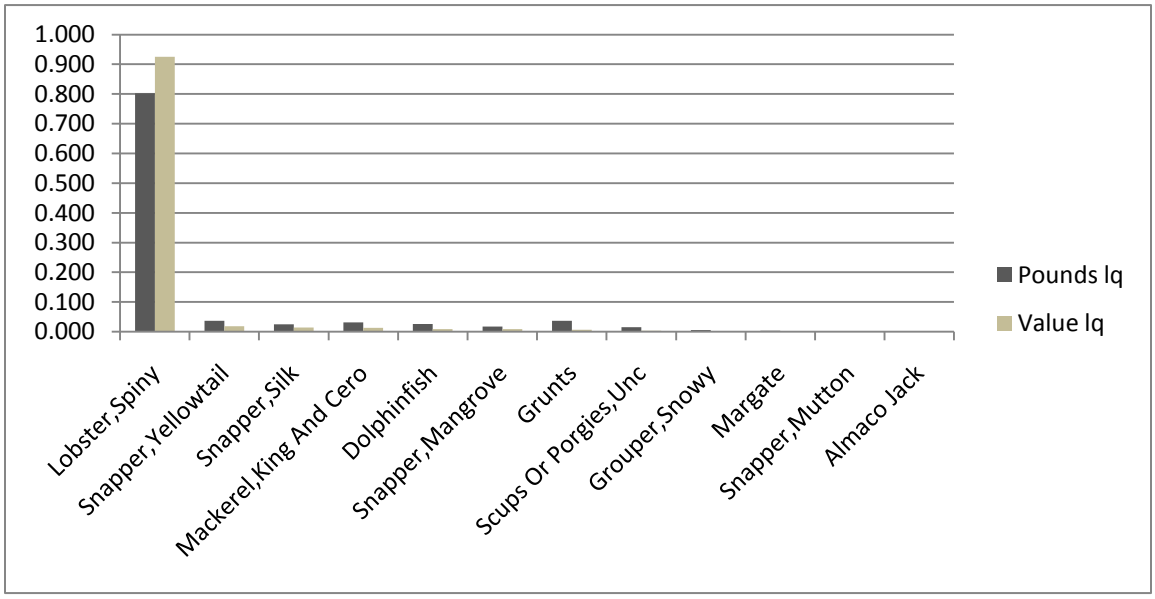

Figure 3.5.13. Proportion (lq) of landings and value for top fifteen species out of total landings and value for North Miami, Florida.
Source: ALS 2008.

North Miami landings and value are completely dominated by spiny lobster with over 90% of the value and 80% of total landings attributed to that species (Figure 3.5.13). All other species make up less than 3% each.

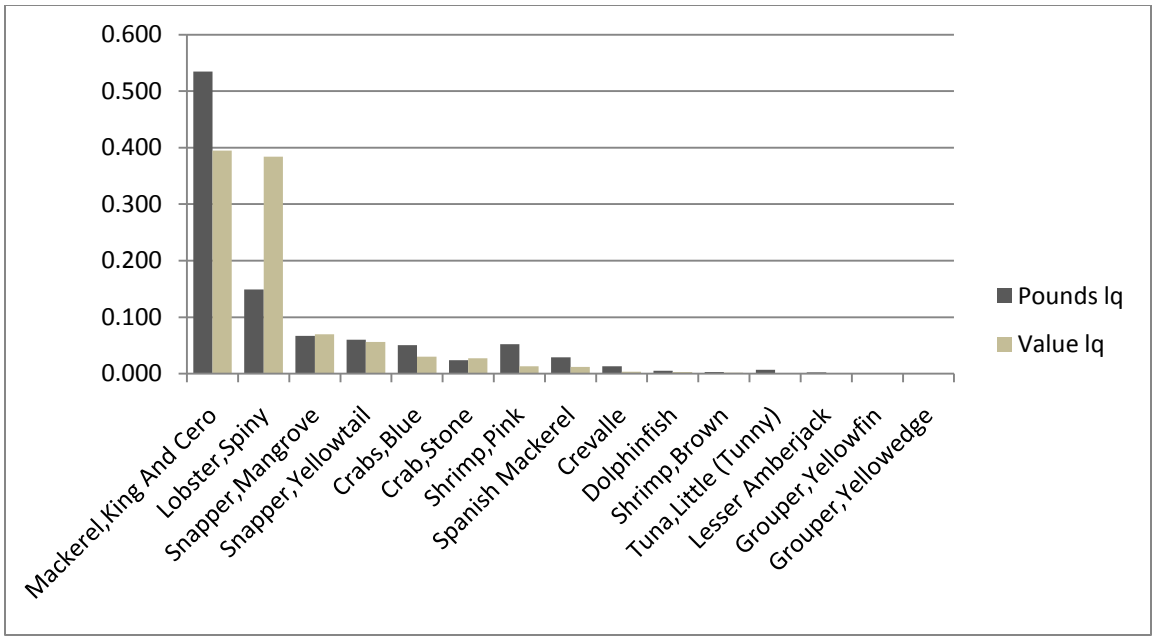

Figure 3.5.14. Proportion (lq) of landings and value for top fifteen species out of total landings and value for Hialeah, Florida.
Source: ALS 2008.

Hialeah derives almost 40% of value from all landings in spiny lobster while it represents only 15% of landings (Figure 3.5.14). In contrast, king mackerel represents over 50% of landings and only slightly less than 40% of value.

Recreational Fishing
As mentioned earlier, recreational fishing for spiny lobster is an important fishery for the Keys and surrounding counties. Table 3.5.2 lists recreational fishing communities along Florida's Atlantic coast, including the Keys.

Table 3.5.2. Recreational Fishing Commuinties along Florida's East Coast.

Rank	Community
1	Islamorada
2	Cudjoe Key
3	Key West
4	Tavernier
5	Little Torch Key
6	Ponce Inlet
7	Marathon
8	Sugarloaf Key
9	Palm Beach Shores
10	Big Pine Key
11	Saint Augustine
12	Key Largo
13	Summerland Key
14	Sebastian

15	Cape Canaveral

The ranking is based upon serveral criteria as mentioned earlier which include the number of charter permits per thousand population and the number of recreational fishing infratstructure attributed to the community as listed under the MRIP survey. As seen in Table 3.5.2, the Keys communities rank high in terms of reliance upon recreational fishing.

In Figure 3.5.15, the distribution of recreational spiny lobster permits is presented by community and suggests a wide dispersion around the state. By far the largest concentration of permits are in the lower east coast communities and the Keys with Miami having the largest concentration of permits overall. Sharp et al. (2005) find that many recreational lobster fishermen travel to the Keys, especially during the two day season. The influx of so many people in such a short time period has caused concern among many Key's residents as there is considerable overcrowding during the event. Unfortunately, management alternatives have been ineffecitve in alleviating the problem. While recreational lobster fishing brings an important economic boost to the Keys economy, there are externalities for which costs are not always apparent, but evident through social impacts.

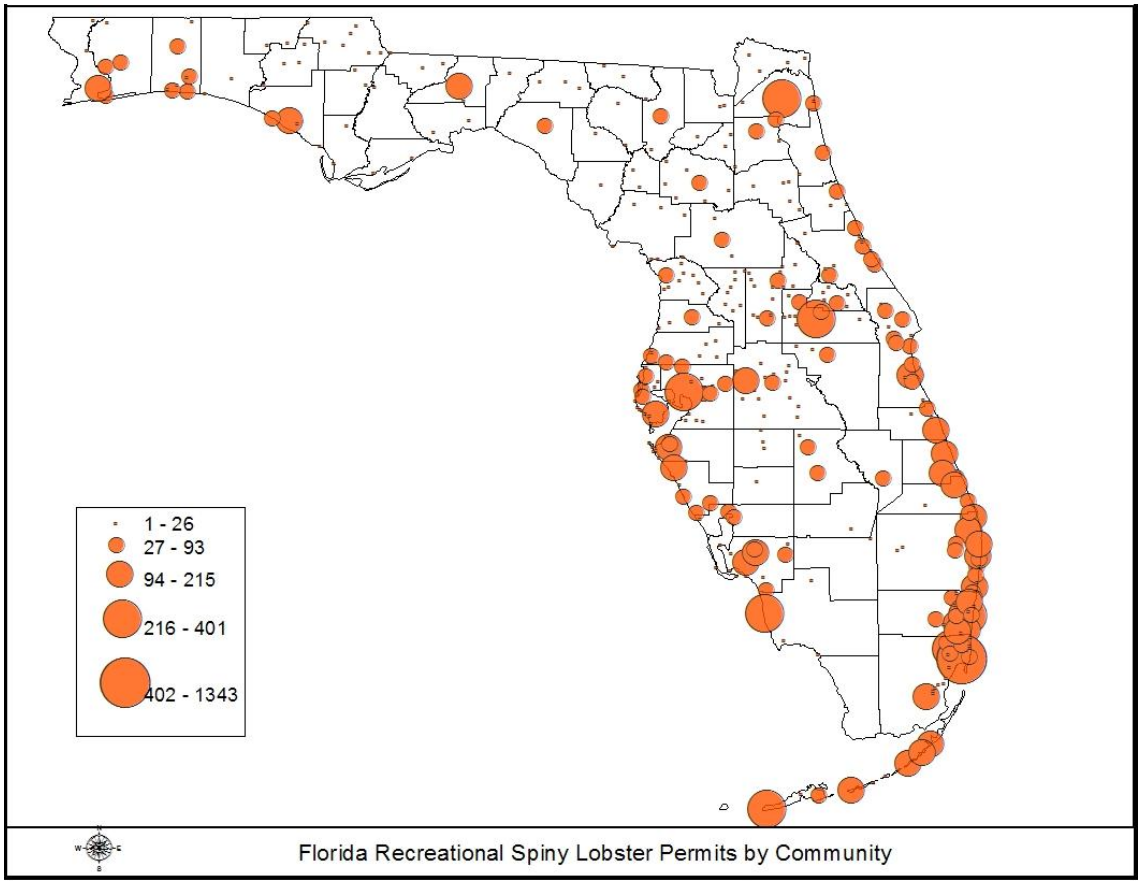

Figure 3.5.16 Florida Recreatoinal Spiny Lobster Permits for 2010 by Community of Permit Holder
Source: Florida Fish and Wildlife 2010.

3.5.1 Environmental Justice

Executive Order 12898 requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. This executive order is generally referred to as environmental justice (EJ). As mentioned, EJ is related to the idea of social vulnerability; however, there are no thresholds with regard to social vulnerability as there are with EJ. Thresholds for poverty and number of minorities have been established for EJ and those areas that exceed such thresholds are identified.

Although it is anticipated that the impacts of this amendment may affect communities with environmental justice concerns, because the impacts should not discriminate against any group, this action should not trigger any environmental justice concerns. In reviewing the thresholds for minorities among the coastal counties involved, Miami-Dade and Broward in Florida exceed the threshold for minorities, while only Miami-Dade County exceeds the poverty threshold. Again, as illustrated by the SoVI, environmental justice is closely tied to social vulnerability as most of the counties that do not meet these thresholds are also considered medium high or highly vulnerable. It is anticipated that the impacts from the following management actions may impact minorities and the poor, but not through discriminatory application of these regulations. However, it is also noted that while Monroe County does not exceed any of the EJ thresholds, nor is it classified as being vulnerable in terms of social vulnerability, there are processes that affect working waterfronts and therefore commercial and charter fishermen through the process of gentrification. While the regulatory actions within this amendment in and of themselves may not precipitate social change or disruptions, in combination with these and other outside factors, working waterfronts may be negatively affected.

3.6 Administrative Environment

3.6.1 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. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ, an area extending 200 nautical miles from the seaward boundary of each of the coastal states, and authority over US anadromous species and continental shelf resources that occur beyond the EEZ.

Responsibility for federal fishery management decision-making is divided between the 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 promulgating regulations to implement proposed plans and amendments after ensuring management measures are consistent with the Magnuson-Stevens Act and with other

applicable laws summarized in Section 10. In most cases, the Secretary has delegated this authority to NOAA Fisheries Service.

The Councils are responsible for fishery resources in federal waters of their respective regions. These waters extend to 200 nautical miles offshore from the nine-mile seaward boundary of the states of Florida, Texas, and the territory of Puerto Rico, and the three-mile seaward boundary of the Atlantic side of Florida and the states of Alabama, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and the territory of the USVI.

The Councils consist of voting members: public members appointed by the Secretary; one each from the fishery agencies of the state or territory, and one from NOAA Fisheries Service. The public is also involved in the fishery management process through participation on advisory panels and through council meetings that, with few exceptions for discussing personnel matters and litigation, are open to the public. The regulatory process is also in accordance with the Administrative Procedures Act, in the form of "notice and comment" rulemaking, which provides extensive opportunity for public scrutiny and comment, and requires consideration of and response to those comments.

Regulations contained within FMPs are enforced through actions of the NOAA's Office for Law Enforcement, the U.S. Coast Guard, and various state authorities. To better coordinate enforcement activities, federal and state enforcement agencies have developed cooperative agreements to enforce the Magnuson-Stevens Act.

3.6.2 State Fishery Management

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 state governments have the authority to manage their respective state fisheries. Each of the states exercises legislative and regulatory authority over their state's natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the state's natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Action 1: Other species in the Spiny Lobster FMP

Alternative 1: No Action – Retain the following species: smoothtail spiny lobster**,** *Panulirus laevicauda*, spotted spiny lobster, *Panulirus guttatus*, Spanish slipper lobster, *Scyllarides aequinoctialis*, in the Fishery Management Plan for data collection purposes only, but do not add them to the Fishery Management Unit.

Alternative 2: Set annual catch limits and accountability measures using historical landings for Spanish slipper lobster *Scyllarides aequinoctialis*, after adding them to the Fishery Management Unit and for ridged slipper lobster, *Scyllarides nodifer*, currently in the Fishery Management Unit.

Alternative 3: List species as ecosystem component species:

Option a: smoothtail spiny lobster**,** *Panulirus laevicauda*
Option b: spotted spiny lobster, *Panulirus guttatus*
Option c: Spanish slipper lobster, *Scyllarides aequinoctialis*
Option d: ridged slipper lobster, *Scyllarides nodifer*

Preferred Alternative 4: Remove the following species from the Joint Spiny Lobster FMP:

Option a: smoothtail spiny lobster**,** *Panulirus laevicauda*
Option b: spotted spiny lobster, *Panulirus guttatus*
Option c: Spanish slipper lobster, *Scyllarides aequinoctialis*
Option d: ridged slipper lobster, *Scyllarides nodifer*

4.1.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

Alternative 1 would not meet the National Standard 1 guidelines and would have the same impacts to the physical or biological environments as currently exist.

Alternative 2 would set annual catch limits (ACLs) and accountability measures (AMs) for slipper lobsters. This alternative would be expected to have positive impacts on the physical and biological environments if catch is constrained below current levels. However, setting an appropriate ACL would be difficult, because no data on life history, growth rates, and reproductive biology, are available to conduct an effective stock assessment. The two species of slipper lobsters, Spanish and ridged have commercial landings information, but are considered species landed as bycatch in the commercial shrimp trawl and the Caribbean lobster trap fishery. In the early 1980's vessels with state commercial shrimp trawl permits targeted slipper lobsters in the western Gulf (Sharp et al. 2007). However, average landings of slipper lobster are low and constitute less than 1% of the total average landings in both federal and state waters of the South Atlantic and Gulf (Table 2.1.2). Positive physical, ecological, and biological impacts may result from better monitoring and record keeping of the resource, and implementing accountability measures, when and if the ACLs are exceeded. However, monitoring systems would need to be established for both species of slipper lobsters to obtain these projected positive benefits.

Alternative 3 would designate all four species as ecosystem component species. Impacts would be the same as currently exist, unless new data collection programs are developed. Leaving the species in the fishery management plan may offer the benefit of collecting data in the future that could be used in the development of conservation and management measures, and positive impacts to the physical and biological environments would be expected at a later date. However, no data collection programs are currently in place for any of these species. Ridged slipper lobsters do not meet all the ecosystem component criteria outlined in the National Standard 1 guidelines, because they are sometimes targeted and are generally retained for sale or personal use.

Preferred Alternative 4 would remove any or all of the other lobster species from the fishery management plan. If other agencies, such as the individual states, took over management, positive physical and biological impacts could occur. In particular, Florida regulations concerning the taking of egg-bearing females, or stripping or removing eggs, are more conservative than federal regulations for most of these species. If another agency did not take over management of other lobster species, and overfishing or detriment to the resource occurred without our knowledge, negative physical and biological impacts would be expected. Because of the lack of landings, data on life history, growth rates, and reproductive biology, completing a stock assessment would probably not be possible, even for the ridged slipper lobster (Sharp et al. 2007).

The two spiny lobster species (**Options a** and **b**) have no landings information available, so management by any agency would be difficult. These species are not targeted by either commercial or recreational fishermen, and may not be in need of federal management.

Florida FWC estimated that in the last nine years, 23% of the landings of slipper lobsters (**Options c** and **d**) have been by commercial divers. If the Florida FWC trap limitation program proceeds and the commercial dive fishery increases, more of these species may be landed. However, little data exists to suggest commercial divers are targeting them, but instead are landing them coincidently with Caribbean spiny lobsters. Further, Florida FWC intensive creel surveys, which were conducted for Caribbean spiny lobster in the Florida Keys during the special two-day sport season and the first two weeks of the regular season indicated slipper lobsters are not targeted by recreational fishers in the Keys , showed no indication that slipper lobsters are targeted by recreational fishers in the Keys, and due to their cryptic nature are unlikely to support a substantial recreational fishery (Sharp et al. 2007). Further the commercial shrimp trawl fishery currently lands slipper lobster species as incidental catch. In the 1980s, commercial shrimpers are believed to have targeted slipper lobsters in the northeastern Gulf of Mexico; however, after implementation of various regulations such as the prohibition of egg bearing females and the turtle-excluder devices (TEDs) slipper lobster landings have been greatly reduced. As commercial shrimp trawl effort in the Gulf of Mexico declined so have slipper lobster landings (Sharp et al. 2007; see Section 2.1 and 4.1.2).

4.1.2 Direct and Indirect Effect on the Economic Environment

Data on commercial fishing for scyllarid (*Scyllaridae* family) lobsters are collected and managed inseparably, and the data are summarized for Florida in Section 2.1 and Tables 4.1.2.1 - 4.1.2.2. Today, the landings and effort are well below what they were. Landings in Florida averaged 4,737 pounds per year in the last 5 years, compared with 39,948 pounds per year in 89/90 – 93/94 (Table 4.1.2.1). The number of vessels with landings fell from 192 to 23 and the number of trips fell from 538 to 47. In the last 5 years, the ex-vessel value (paid to fishermen by first buyers) averaged $24,232 per year in 2008$ and this is a small part of the total for trip gross, $304,989, approximately two thirds of which is for shrimp (Table 4.1.2.1). Although landing of scyllarid lobsters declined markedly in the last two decades, annual average trip landings (CPUE) were relatively stable: 100 pounds per trip for the last 5 years, 70 pounds per trip in the preceding 5 years, and 55 pounds per trip in 86/87 – 90/91 (Table 4.1.2.2).

Table 4.1.2.1. Florida commercial fishing for scyllarid lobsters.

Period	Vessels	Trips	Landings, lbs	2008$	2008 $ /lb	Trip gross, 2008$	Shrimp in trip gross, 2008$	Vessel gross, 2008$
Trips for which landings of slipper lobster >= 1 lb								
89/90-93/94	192	538	39,948	152,479	3.82	2,503,041	2,095,000	2,503,041
04/05-08/09	23	47	4,737	24,232	5.12	304,989	216,000	304,989
Trips for which landings of slipper lobster >= 1 lb and slipper lobster is the top species in trip value.								
89/90-93/94	78	137	27,173	106,037	3.90	120,604		120,604
04/05-08/09	8.6	15.8	3,476	18,546	5.34	19,606		19,606
NMFS, SEFSC, FTT (19Mar10), methods as for spiny lobster in Vondruska (2010). In ranking species (or groups of species) by dollar value on individual trips, all shrimp are counted as one species, and the same is true for groupers, snappers other than yellowtail snapper, tuna, and stone crab.								

During the past 20 years or so, scyllarid lobsters landed in Florida have been caught at greater depths, approximately 80-110 ft, compared with 30-45 ft for Caribbean spiny lobster, and 40-70 ft for shrimp. The median monthly time in hours away from port for trips for scyllarid lobsters was more variable than for shrimp (shrimp, approximately 8 hours), more seasonal, and typically, much higher, often 70 hours to 200 hours or more per trip. These data on depth of capture and time away from port for trips are consistent with results of a two-year study of populations of several species of lobster, including *S. nodifer* (depth, 30 meters) (Sharp et al. 2007). Apparently, *S. nodifer* reside in dens during the day and may feed on unconsolidated bottoms at night. Sharp et al. (2007, p. 237) indicate that in the early 1980s, shrimp fishermen had directed fishing effort toward *S. nodifer* on the west coast of Florida in the spring and summer, and that such effort declined from the late 1980s onward. Indeed, for most, but not all vessels with landings, scyllarid lobster accounted for a relatively small part of vessel gross revenue, with shrimp accounting for perhaps two-thirds (Table 4.1.2.1, top part; data for 86/87 - 08/09 in Table 4.1.2.2).

However, scyllarid lobster should not be viewed strictly as an incidental or bycatch species when fishing for shrimp, because a relatively small number of account for well over half of the landings. In the last 5 years, scyllarid lobsters were the top species in dollar value for an annual average of 16 trips (8.6 vessels) out of 47 trips (23 vessels) with landings, and these 16 trips accounted for much of the total landings (3,476 pounds out of 4,737 pounds landed (Table 4.1.2.1). In 89/90 – 93/94, an annual average of 137 trips (78 vessels) accounted for 27,173 pounds out of the total of 39,948 pounds landed (on 538 trips and 192 vessels).

Table 4.1.2.2. Florida commercial fishing for scyllarid lobsters.

Fishing year	Slipper (Scyllaridae family) lobster				Trip gross, all species landed	Value of shrimp in trip gross	Slipper lobster
	Vessels	Trips	Lbs	2008$	2008$	2008$	Lbs / trip
86/87	145	535	28,097	$139,737	$3,164,506	$2,847,000	53
87/88	131	487	19,952	$77,776	$3,368,151	$3,094,000	41
88/89	198	558	40,736	$127,040	$3,462,936	$3,145,000	73
89/90	149	334	14,793	$46,590	$1,911,348	$1,699,000	44
90/91	187	465	27,282	$100,244	$2,005,785	$1,757,000	59
91/92	213	653	48,728	$190,484	$2,041,960	$1,586,000	75
92/93	193	584	48,708	$201,406	$2,909,027	$2,326,000	83
93/94	220	655	60,230	$223,671	$3,647,087	$3,107,000	92
94/95	130	411	33,531	$117,551	$2,425,114	$1,789,000	82
95/96	148	362	26,843	$109,467	$1,741,169	$1,258,000	74
96/97	193	437	43,565	$194,740	$2,755,427	$2,467,000	100
97/98	122	335	30,872	$131,100	$2,589,996	$2,287,000	92
98/99	101	225	13,139	$56,937	$967,323	$662,000	58
99/00	71	146	7,196	$33,469	$1,300,163	$839,000	49
00/01	88	145	8,766	$49,169	$1,321,361	$983,000	60
01/02	81	179	8,582	$51,109	$1,767,823	$1,245,000	48
02/03	59	130	9,951	$58,195	$857,261	$637,000	77
03/04	58	132	17,012	$98,764	$671,789	$429,000	129
04/05	36	72	5,000	$23,537	$532,271	$430,000	69
05/06	30	63	4,291	$22,078	$496,995	$411,000	68
06/07	26	56	6,060	$30,933	$185,422	$26,000	108
07/08	10	23	6,443	$36,865	$159,716	$116,000	280
08/09	14	22	1,889	$7,747	$150,541	$97,000	86
Averages for rows above, excepting last column (see footnote)							
86/87-90/91	162	476	26,172	$98,277	$2,782,545	$2,508,400	55
99/00-03/04	71	146	10,301	$58,141	$1,183,679	$826,600	70
04/05-08/09	23	47	4,737	$24,232	$304,989	$216,000	100
NMFS, SEFSC, FTT (19Mar10) data. All shrimp are counted as one species. Data are for trips with landings of at least one pound of scyllarid lobsters for July-June fishing years. Multi-year averages for pounds per trip							

were obtained from data in this table as pounds / trips, e.g., for 04/05-08/09 (100 lbs / trip = 4,737 lbs / 47 trips).

Scyllarid lobsters have been landed in states from South Carolina through Mississippi according to data for 1977-2010, notably Florida and Alabama (NMFS, SEFSC, ALS data as of 03Feb11). However, the landings for some years, states and gear, including landings in Alabama and Florida by coast, may be relatively small and/or confidential because of reporting by fewer than three dealers. On a calendar year basis, landings in the southeast (SC-MS only) peaked in 1985 at 113,440 pounds, and they were 1,283 pounds in 2009, and 1,921 pounds in 2010 (data for 2010 is preliminary and may not cover 12 months). During 1997-2009, shrimp trawls accounted for 85.2% of the landings by gear for the southeast (SC-MS only), followed by spiny lobster traps at 9.2%, and diving at 5.0%, with smaller amounts for other gear. Florida's east coast accounted for most of the landings by diving, where diving was the leading gear (approximately, 9,000 out of 14,000 lbs, 1997-2010 all-year totals).

The long-term decline in landings of scyllarid lobsters depicted in Table 4.4.2.2 may be partly explained by several factors: requiring the use of TEDs in shrimp trawls in waters off Florida (1990); prohibiting the molestation and possession of berried female lobsters in Florida (1987); and a decline in effort in the shrimp fishery (Sharp et al. 2007). Given the significance of fuel in trip costs, fuel prices could have been a factor in 2004-2008.[9]

Alternative 1 would not result in any change in the species contained in the management unit, species retained for data collection, or species listed as ecosystem components. As a result, all status quo management conditions and related operation of the fishery, and associated economic benefits, would remain unchanged. If any or all of the species considered by this action require more detailed and management protection, however, as would occur under **Alternative 2**, **Alternative 1** would prevent such protection from occurring, increasing the likelihood of current or future resource decline, with associated reduction in economic benefits.

Alternative 2 would set annual catch limits and accountability measures using historical landings for Spanish slipper lobster (*Scyllarides aequinoctialis*), after adding to the Fishery Management Unit, and for ridged slipper lobster (*S. nodifer*), currently in the Fishery Management Unit. If the either or both of the species are considered to require more detailed and management protection, this would occur under **Alternative 2**, whereas **Alternative 1, Alternative 3 and Alternative 4** would prevent such protection from occurring, increasing the likelihood of current or future resource decline, with associated reduction in economic benefits. If current or future resource decline were to occur under **Alternatives 1, 3 or 4,** but not under **Alternative 2**, the reduction in economic benefits could be as much as depicted in Table 4.1.2.1**.** Stating it the other way around, the economic benefit for **Alternative 2** is represented by the ex-vessel value of $24,232 in 2008$ for scyllarid lobsters, which could be reduced to zero under **Alternatives 1, 3 or 4.**

[9]Diesel fuel rose sharply in 2007-2008, peaked in July 2008, and declined by half in late 2008 to levels of late 2006. Note: An index of producer-level prices for diesel fuel averaged 100.5 in 2003, peaked at 431.9 in July 2008 and fell to 168.0 in December 2008 (U.S. Bureau of Labor Statistics, producer price index for no. 2 diesel fuel, 1982 base of 100).

There are some caveats. If current or future resource decline were to occur under **Alternatives 1, 3, or 4,** but not under **Alternative 2**, the loss under **Alternatives 1, 3, or 4** refers to scyllarid lobster only. This assumes that the vessel owners (operators) could pursue other fishing opportunities and not be driven out commercial fishing.

Among the options for **Alternative 3**, data on commercial fishing are not available for any of the four species separately. Sharp et al. (2007) describe the ecology for some of these species, and describe commercial fishing for *Scyllaridae* family (scyllarid) lobsters as a whole, meaning the last two species combined. Data on commercial fishing in Florida for scyllarid lobsters are managed by NMFS, SEFSC, and summarized in Section 2.1, with additional information Tables 4.1.2.1 - 4.1.2.2.

If any or all of the species considered by this action require more detailed management protection than would occur under **Alternative 1** or **Alternative 2 (**for scyllarid lobsters only), then **Alternative 3** would prevent such protection from occurring, increasing the likelihood of current or future resource decline, with associated reduction in economic benefits. Should such resource decline occur under **Alternative 3**, **Option c and Option d** together, it is estimated that the ex-vessel value of landings of scyllarid lobsters could decline by as much as $24,232 per year (Table 4.1.2.1). That is, this amount represents the estimated economic impact of **Alternative 3, Option c and Option d** together, when compared with **Alternative 1**. The economic impact of **Alternative 3, Option a, or Alternative 3, Option b**, is not known, but assumed to be less.

See discussion under **Alternative 3**. It assumed that the economic impacts of **Alternatives 3-4** are essentially the same.

4.1.3 Direct and Indirect Effect on the Social Environment

The effects on the social environment from removing or not removing other species from the fishery management plan would likely accrue from the implementation of new ACLs and AMs on those species. The no action **Alternative 1** would have little impact on the social environment, yet may not be feasible if these species remain in the FMP as National Standard 1 will not be met. Setting ACLs and AMs in **Alternative 2** would likely have an impact on the social environment depending upon the thresholds selected and the measures that were implemented to account for any overages. Listing species as ecosystem components as in **Alternative 3** or removing species from the FMP as in **Preferred Alternative 4** would likely have few social impacts unless one or more of the **Options a-d** were not selected. Leaving any species in the FMP would require ACLs and AMs be set. Because landing information on these species is imprecise, setting an ACL and subsequent AMs would be problematic and could cause some social disruption and changes in fishing behavior if thresholds were set too low. These species tend to be bycatch in other fisheries which makes monitoring difficult. While removing them from the FMP may preclude any monitoring of status of these species, continuing to manage them with ACLs and AMs may be costly or impractical.

4.1.4 Direct and Indirect Effect on the Administrative Environment

Alternative 1 would not meet the requirements of the Magnuson-Stevens Act, and could leave NOAA Fisheries Service and the Councils subject to litigation, which would result in a significant administrative burden. Specifying an ACL alone (**Alternative 2**) would not increase the administrative burden over the status-quo. However, the monitoring and documentation needed to track the ACL could result in a need for additional cost and personnel resources because a monitoring mechanism is not already in place. After the ACL is specified, the administrative burden associated with monitoring and enforcement, implementing management measures, and accountability measures would increase. **Alternative 3** would designate species as ecosystem component species which would eliminate the administrative burden associated with establishing ACLs and AMs for those species. **Preferred Alternative 4** would remove species from the FMP, resulting in less administrative burden with regards to establishing ACLs and AMs. However, removing these species from the FMP may make developing management measures for these species more difficult if the need arises.

4.2 Action 2: Modify the Current Definitions of Maximum Sustainable Yield, Overfishing Threshold, and Overfished Threshold for Caribbean Spiny Lobster

Action 2-1: Maximum Sustainable Yield (MSY)

Alternative 1: No Action- Use the current definitions of MSY as a proxy. The Gulf of Mexico approved definition**:** MSY is estimated as 12.7 million pounds annually for the maximum yield per recruit size of 3.5 inch carapace length. The South Atlantic approved definition: MSY is defined as a harvest strategy that results in at least a 20% static SPR (spawning potential ratio).

Alternative 2: Modify the Gulf of Mexico definition to mirror the South Atlantic definition of MSY proxy, defined as 20% static SPR.

Alternative 3: the MSY equals the yield produced by fishing mortality at maximum sustainable yield (F_{MSY}) or proxy for F_{MSY}. Maximum sustainable yield will be defined by the most recent SEDAR and joint Scientific and Statistical Committee processes.

Preferred Alternative 4: the MSY proxy will be the Overfishing Limit (OFL) recommended by the Gulf of Mexico Scientific and Statistical Committee at 7.90 million pounds.

Note: The MSY definition for the Gulf of Mexico was edited to the approved definition (Alternative 1).

Action 2-2: Overfishing Threshold (Maximum Fishing Mortality Threshold)

Alternative 1: No Action - Use the current definitions of overfishing thresholds. The Gulf and South Atlantic approved definition: overfishing level as a fishing mortality rate (F) in excess of the fishing mortality rate at 20% static SPR ($F_{20\%}$ static SPR).

Alternative 2: Specify the Maximum Fishing Mortality Threshold (MFMT) as F_{MSY} or F_{MSY} proxy. The most recent SEDAR and joint Scientific and Statistical Committees will define F_{MSY} or F_{MSY} proxy. This should equal the Overfishing Limit (OFL) provided by the Scientific and Statistical Committees (SSCs). The Councils will compare the most recent value for the current fishing mortality rate (F) from the SEDAR/SSC process to the level of fishing mortality that would result in overfishing (MFMT) and if the current F is greater than the MFMT, overfishing is occurring. Comparing these two numbers:

- $F_{CURRENT}$/MFMT = X.XXX

*This comparison is referred to as the **overfishing ratio**. If the ratio is greater than 1, then overfishing is occurring.

Preferred Alternative 3: Specify the Maximum Fishing Mortality Threshold (MFMT**)** as the Overfishing Limit (OFL) defined by the Gulf of Mexico Scientific and Statistical Committee at 7.90 million pounds.

Note: The overfishing definition for the Gulf of Mexico was edited to the approved definition (Alternative 1), eliminating the need for the previous Alternative 2.

Action 2-3: Overfished Threshold (Minimum Stock Size Threshold)

Alternative 1: No Action – Do not establish an overfished threshold. The Gulf of Mexico does not have an approved definition of the overfished threshold. The South Atlantic Council approved definition is a framework procedure to add a biomass based component to the overfished definition, due to no biomass levels and/or proxies being available.

Alternative 2: The MSST is defined by the most recent SEDAR and joint Scientific and Statistical Committees process. The Councils will compare the current spawning stock biomass (SSB) from the SEDAR and Scientific and Statistical Committees process to the level of spawning stock biomass that could be rebuilt to the level to produce the MSY in 10 years. Comparing these two numbers:

- $SSB_{CURRENT}/MSST = Y.YYY$

This comparison is referred to as the **overfished ratio**. If the ratio is less than 1, then the stock is overfished.

Preferred Alternative 3: Minimum Stock Size Threshold (MSST) = (1-M) x B_{MSY}. Definitions: M= instantaneous natural mortality and B_{MSY} = biomass at maximum sustainable yield or the appropriate proxy.

4.2.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

There are three sub-actions for modification of the current definition of each of the following biological reference points: maximum sustainable yield (MSY), overfishing threshold (MFMT), and overfished threshold (MSST). **Alternative 1,** no action under all actions could have negative impacts to the physical and biological/ecological environment, due to the biological reference points being inconsistent MSY and MSST between the two Councils. In addition, the South Atlantic Council's approved definition of MSY is a proxy based on spawning potential ratio and is not a biomass based proxy. In the past, the Gulf Council's definitions were not approved because they were not based on biomass proxies; however, due to the biomass of Caribbean spiny lobster being unknown in the southeastern U.S., spawning potential ratio may be an appropriate proxy (NOAA Fisheries Service letter received November 17, 1999).

The South Atlantic Council currently uses static SPR as a proxy and **Alternative 2**, under **Actions 2-1** would modify the Gulf Council's definition to static SPR. This would make the overfished definitions consistent between the Councils and static SPR is a better proxy for yield projections, because it uses equilibrium changes in recruitment and mortality. Consistency between Councils when establishing biological reference points would be more beneficial for the physical and biological environments. Using the same proxies reduces confusion for assessments and provides guidance for analysts. Further, based on the information available on Caribbean spiny lobster, static SPR is a more appropriate proxy to use. Transitional SPR proxies should be estimated on an annual basis and are not beneficial for long term yield projections (MRAG Americas 2001). Caribbean spiny lobster were not undergoing overfishing based on the MFMT proxy definition of $F_{20\%}$ static SPR in either the benchmark or update assessments and the

overfished status could not be evaluated without a Pan-Caribbean wide stock assessment (SEDAR 8 2005; 2010 Update Assessment).

Alternative 3 under **Action 2-1 (MSY)** and **Alternatives 2** under **Action 2-2 (Overfishing Threshold)** and **Action 2-3 (Overfished Threshold)** would modify the current definitions to the biological reference points established during the SEDAR and joint SSC processes. These would be based on the best available science and reviewed by experts; therefore, this alternative if selected as preferred could provide the best benefits to the physical and biological environments. The biological reference points would be consistent between Councils and based on the most recent data. However, due to the most recent results from the SEDAR and SSC processes for Caribbean spiny lobster in the southeastern U.S. being unaccepted due to external recruitment from other Caribbean populations these alternatives may not provide the best protection to the resource.

Preferred Alternative 4 (Action 2-1) would set the MSY proxy as the OFL=7.90 mp recommended by the Gulf SSC using landings data and Tier 3a of the Gulf ABC Control Rule. Currently this preferred alternative provides the best protection of the resource because the 2010 update assessment was rejected. This alternative would also establish the MSY proxy 4.8 mp lower than the Gulf approved no action, **Alternative 1** (MSY=12.7 mp, annually). Similarly, **Preferred Alternative 3** under **Action 2-2 (MFMT)** is based on Caribbean spiny lobster landings and may provide the best protection of the resource and thereby the biological and ecological environments. However, without a clear estimate of Caribbean spiny lobster biomass it is unknown if **Alternatives 2** or **3** under **Action 2-3 (Overfished Threshold)** would provide the best protection for the resource and various subsequent negative and positive impacts to the biological and ecological environments.

4.2.2 Direct and Indirect Effect on the Economic Environment

Defining the MSY, OY and MSST of a species does not alter the current harvest or use of the resource. Specification of these measures merely establishes benchmarks for fishery and resource evaluation from which additional management actions for the species would be based, should comparison of the fishery and resource with the benchmarks indicate that management adjustments are necessary. The impacts of these management adjustments will be evaluated at the time they are proposed. As benchmarks, these parameters would not limit how, when, where, or with what frequency participants in the fishery engage the resource. This includes participants who directly utilize the resource (principally, commercial vessels, for-hire operations, and recreational anglers), as well as participants associated with peripheral and support industries. All entities could continue normal and customary activities under any of the alternative specifications. Participation rates and harvest levels could continue unchanged.

Since there would be no direct effects on resource harvest or use, there would be no direct effects on fishery participants, associated industries or communities. Direct effects only accrue to actions that alter harvest or other use of the resource. Specifying MSY, OY, and MSST, however, establishes the platform for future management, specifically from the perspective of bounding allowable harvest levels. The relationship between and implications of the harvests levels implied by the MSY and OY alternatives relative to the status quo are discussed in Section 4.4.2.2 (formerly Section 4.2.2.2).

Fishery management decisions influence public perception of responsible government control and oversight. These perceptions in turn influence public behavior. This behavior may be positive, such as cooperative participation in the management process, public hearings, and data collection initiatives, or negative, such as non-cooperation with data initiatives, legal action, or pursuit of political relief from management action. Positive behavior supports the efficient use of both the natural resource and the economic and human capital resources dedicated to the management process. Negative behavior harms the integrity of the information on which management decisions are based, induces inefficient use of management resources, and may prevent or delay efficient use of the natural resource. The specific benefits and costs of these behaviors cannot be calculated. Although disagreement with the exact specifications contained in the MSY and OY alternatives may occur, any of the alternatives satisfy the technical guidelines and would establish the required platform from which future action can be taken and, thus, should generally induce satisfaction with the management of the resource. However, the alternatives vary in implications for total allowable harvest and constituents who favor more liberal harvests would likely prefer the alternatives in the decreasing order of the potential harvest implied by the alternative specifications, while those who favor more conservative harvests would likely hold the opposing preferences. The net effect of the behavioral responses from these opposing constituent groups cannot be determined.

Administrative costs of fishery management accrue to the time and labor involved in developing new regulations, permitting systems, or other management actions. To the extent that each of the MSY and OY alternatives provides fishery scientists and managers with specific objective and measurable criteria to use in assessing the status and performance of the fishery, the impacts of the various alternatives on administrative costs are indistinguishable. However, the more conservative (lower) the equivalent allowable harvest level, the greater the potential for harvest overages, necessitating additional management action, with associated administrative costs.

In addition to the trigger to subsequent management that MSY and OY may provide, the MSST identifies the stock level below which a resource is determined overfished. Should the evaluation of the resource relative to the benchmark result in said designation, harvest and/or effort controls are mandated as part of a recovery plan. These harvest and effort controls would directly impact the individuals, social networks, and associated industries associated with the resource or fishery, inducing short-term adverse economic impacts until the resource is rebuilt and less restrictive management is allowable.

4.2.3 Direct and Indirect Effect on the Social Environment

The setting of MSY for Caribbean spiny lobster is primarily a biological threshold that may impact the social environment depending upon where the threshold is set. These thresholds are determined through the assessments by several scientific panels and are entirely determined on the biology of the spiny lobster. Therefore, any indirect effect on the social environment would depend upon the level determined for each threshold and how it relates to current landings by both commercial and recreational sectors. The setting of this threshold becomes even more critical if sector allocation is chosen and at what level each sector allocation is set. Certainly if this threshold is set below current landing levels, there will be changes to the social environment

and setting sector allocation will become controversial. The no action **Alternative 1** would likely have few impacts as it uses the present definition. **Alternative 2 and Alternative 3** could have impacts if the threshold is well below current landing levels, although it is likely that **Alternative 2** would not change that threshold substantially. The **Preferred Alternative 4**, which uses the MSY proxy recommended by their SSC, may have few negative social effects if the threshold is above the mean landings and not substantially reduced by other management action.

The setting of the overfished threshold, for Caribbean spiny lobster is also primarily a biological threshold that may impact the social environment depending upon where the threshold is set. With all of these thresholds it is assumed that the long term effect will ensure a stable stock and should have positive social benefits. But as mentioned earlier, there can be short term negative social effects if the thresholds impose levels that reduce the current levels of harvest. These thresholds are determined through the assessments by several scientific panels and are entirely determined on the biology of the spiny lobster. Therefore, the effect on the social environment would depend upon the level determined for the overfishing threshold and how it relates to current landings by both commercial and recreational sectors. Like the other alternatives, the setting of this threshold becomes important if sector allocation is chosen and at what level each sector allocation is set. Certainly if this threshold is set below current landing levels, there will be changes to the social environment and setting sector allocation will become controversial. The no action **Alternative 1** would likely have few impacts as it uses the present definition, although if this threshold is too high then long term problems with stock viability could accrue. The **Alternative 2** could have impacts if the threshold is well below current landing levels. The **Preferred Alternative 3** like other alternatives could have short term negative social impacts if the level is set such that landing levels would need to be reduced substantially.

4.2.4 Direct and Indirect Effect on the Administrative Environment

There could be additional administrative burdens, if these biological reference points are not modified for consistency. Changing these biological reference points is required under the requirements of the Magnuson-Stevens Act, and if not done, could leave NOAA Fisheries Service and the Councils subject to litigation, which would result in a significant administrative burden.

4.3 Action 3: Establish Sector Allocations for Caribbean Spiny Lobster in State and Federal Waters from North Carolina through Texas

Preferred Alternative 1: No action – Do not establish sector allocations.

Alternative 2: Allocate the spiny lobster ACL by the following sector allocations: 80% commercial and 20% recreational.

Alternative 3: Allocate the spiny lobster ACL by the following sector allocations: 74% commercial and 26% recreational.

Alternative 4: Allocate the spiny lobster ACL by the following sector allocations: 78% commercial and 22% recreational.

Alternative 5: Allocate the spiny lobster ACL by the following sector allocations: 77% commercial and 23% recreational.

Alternative 6: Allocate the spiny lobster ACL by the following sector allocations: 76% commercial and 24% recreational.

4.3.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

The Florida Fish and Wildlife Conservation Commission (FWC) invited representatives of stakeholder groups participating in Florida's Lobster Fishery to serve as members of the Spiny Lobster Ad Hoc Advisory Board (Advisory Board). The Advisory Board was made up of five commercial trappers, three commercial divers, three recreational fishers, two wholesale dealers, two environmental groups, and one FWC representative on the board.

The Advisory Board was designed to bring together a group of stakeholder representatives from around the state who represent the diversity of the lobster fishery community and included commercial lobster trappers, commercial lobster divers, recreational lobster fishers, a special recreational license holder, wholesale lobster dealers, an environmental group, and a representative from the FWC. The goal was to provide constructive comments and guidance to the FWC in the form of proposed refinements to the management of Florida's spiny lobster fishery. Over a period of sixteen months the Advisory Board met approximately eight times for approximately two days each to focus on reviewing and discussing lobster fishery issues and proposals for refinements to Florida's spiny lobster fishery.

The Advisory Board examined landings records for all sectors of the spiny lobster fishery from fishing seasons 1993/94 through 2003/2004. These data have been updated and are included in detail in Table 4.3.1.1. The Advisory Board ignored landings from unknown and other gear categories. The Advisory Board alternatives were developed by splitting the landings into four sectors (commercial trap, commercial diving, commercial bully nets, and recreational. During that time, the allocation of the lobster harvest among the different sectors changed. During the initial years of trap reductions, annual landings were generally higher than they had been in a

decade. Landings by commercial divers increased, but because landings were so high, the progressive shift in the landings allocation toward that group appeared subtle. However, a period of lower landings beginning with the 2000/01 season underscored this shift toward the commercial dive fishery and the recreational fishery as well. Regulations limiting harvest of commercial divers were enacted beginning with the 2003/04 season. The effects of these rules can be seen by comparing allocations in the 2002/03 and 2003/04 seasons. Landings were essentially the same in both seasons, but the harvest share of commercial divers was reduced because of trip limits and banning harvest from artificial habitat. It appears that in high landing years, trappers have a larger harvest share because lobsters are available to be captured later in the season when there is little diving activity. Harvest from casitas is most effective early in the season. (Note: Harvest by casitas was prohibited during 2003). In low landings years, these early landings make up a larger harvest share than in high landings years. There is a need to understand current allocations in the spiny lobster fishery, how those allocations have shifted over time, and how rule changes have likely impacted allocation. The Councils have collapsed the commercial suballocations into one commercial allocation for the alternatives being considered.

Table 4.3.1.1. Florida landings of spiny lobster, by sector (thousand pounds, ww).

Fishing year	Directed commercial					Bait	Recreational		Total
	Traps	Diving	Other	Total	% of total		Pounds	% of total	
1991/92	6,602	192	43	6,836	79%	427	1,816	21%	8,652
1992/93	5,125	223	20	5,368	80%	352	1,352	20%	6,721
1993/94	5,109	176	24	5,310	74%	237	1,883	26%	7,193
1994/95	6,808	254	119	7,182	79%	310	1,906	21%	9,088
1995/96	6,638	308	72	7,017	78%	306	1,931	22%	8,948
1996/97	7,319	338	88	7,744	80%	360	1,923	20%	9,667
1997/98	7,148	397	96	7,640	77%	405	2,304	23%	9,944
1998/99	5,037	352	58	5,448	81%	188	1,303	19%	6,750
1999/00	6,996	588	85	7,669	76%	368	2,462	24%	10,131
2000/01	4,856	635	77	5,569	74%	288	1,949	26%	7,518
2001/02	2,610	447	22	3,079	71%	234	1,251	29%	4,330
2002/03	3,992	560	25	4,577	76%	259	1,455	24%	6,033
2003/04	3,727	392	42	4,162	75%	231	1,412	25%	5,573
2004/05	5,126	312	35	5,473	76%	244	1,658	23%	7,201
2005/06	2,680	267	17	2,963	72%	147	1,131	28%	4,094
2006/07	4,517	252	31	4,799	79%	160	1,305	21%	6,104
2007/08	3,468	289	21	3,778	76%	185	1,215	24%	4,993
2008/09	3,006	244	20	3,269	72%	98	1,264	28%	4,533
2009/10	4,149	152	42	4,343	79%	139	1,127	21%	5,470
10 yr ave	3,813	355	33	4,201	75%	198	1,377	25%	5,585
5 yr ave	3,564	241	26	3,831	76%	146	1,208	24%	5,039

Sources: The Gulf Council's Standing and Special Spiny Lobster SSC estimated the recreational landings for 2004/05. Otherwise, the data source for 1991/92 - 2009/10 sector totals, grand total, and commercial sector breakouts for traps and diving for 1994/95 - 2009/10 is FWC (W. Sharp, FWC, personal communication, 07Nov10, including updates as of 24Jun10). Data source for commercial sector breakouts for traps and diving, 1986/87 - 1993/94 and estimated fishing mortality associated with the use of under-sized lobsters as bait (attractants) in traps for all years is SEDAR 8 update 2010 (final, 01Dec10). Landings for "other" commercial gear estimated from unrounded data used in this table. Recreational landings from 92/93 are estimated using surveys of recreational lobster permit holders and represent combined landings during the special 2-day sport season and from opening day of the regular season (Aug. 6) through Labor Day. Grand total excludes estimated fishing mortality for bait. Underlying data may differ among sources.

So, why does increasing harvest from one sector have the effect of reducing the harvest of another sector? It is because the total lobster harvest each year is largely dependent upon the number of lobster available to be harvested that year and not by the amount of fishing effort expended to catch those lobsters, except in those unusual circumstances where effort is curtailed by extraordinary events such as hurricanes. Across the range of effort in the fishery since approximately 1975, landings and effort have not been related. Good fishing years have occurred with high and low effort, as have poor fishing years. For example, the best year on record for the commercial fishery was 1979 when nearly 7.9 million pounds were landed using ~600,000 traps. In contrast, 1983 was a poor fishing season with a harvest of 4.5 million pounds, again from ~600,000 traps. Similar observations can be made in recent years when landings estimates for all fishing groups were available. During 1999, the fishery (recreational and commercial) harvested 10.1 million pounds from 534,000 traps, 4,377 commercial fishing dive days, and 555,000 recreational fishing days. In contrast, the 2001 harvest of 4.3 million pounds was caught from the same number of traps, 4,538 commercial dive days, and 366,000 recreational fishing days. Furthermore, the size-structure of the lobsters landed by the fishery has remained constant since 1987 as has the average size. The average size has consistently been 3 ¼ inch carapace length, just barely above the minimum legal size. This indicates that the fishery is heavily reliant on a single year class of lobsters each season – those that have just grown to legal size. Fluctuations in harvest are related to fluctuations in the numbers of new recruits to the fishery and not the number of traps, diver-days or recreational fishing days. Put another way, the size of the 'lobster pie' each year is determined by the number of lobsters attaining legal size. A change in fishing effort by any one sector simply alters that sector's piece of the pie.

The Councils are using the alternatives and the administrative record developed by the FWC as the basis for developing allocation alternatives given that the majority of the harvest occurs off the State of Florida and given that the Councils have delegated much of the management to the State of Florida through a protocol established in Spiny Lobster Amendment 2 in 1989. The consensus recommendations of the Advisory Board, including all options evaluated, are presented in a document dated May 2007. The alternatives and rational is taken from the Facilitator's Summary Report of the May 23-24, 2006 Meeting. These documents and other materials related to the Spiny Lobster Advisory Committee are available at: http://www.myfwc.com/RULESANDREGS/MarineFisheries_Workshops.htm

Allocating the ACL between the recreational and commercial sectors will have no direct effect on the Physical and Biological/Ecological Environments. The range of commercial allocations

(74-80%) is not sufficient to affect the number of lobster traps used so there would be no change in the impacts from lobster traps.

4.3.2 Direct and Indirect Effect on the Economic Environment

The sector allocations under Action 3 have no application in Amendment 10 apart from ACL and ACT alternatives under Action 4 wherein they are incorporated. In this context, their effects are discussed in Section 4.4.2. Sector allocations and ATCs are not mandated under the Magnuson-Stevens Act, whereas ACLs and AMs are. Depending on Council choices of alternatives for Actions 3-5, Amendment 10 may be perceived as adding to the cumulative impacts on fishing of previous economic development, law and regulation, which may have had differential impacts on commercial and recreational fishing, especially in Monroe County (Shivlani, 2009). Any economic impacts of Amendment 10 would occur largely in Monroe County. That is, even though the FMP applies to all southeastern coastal states (North Carolina through Texas), practically all of the landings of Caribbean spiny lobster occur in Florida, largely in Monroe County, which accounts for 90% for Florida's commercial landings and 67% of Florida's recreational landings (averages for 2005/06-2009/10).[10]

Recreational and commercial landings and fishing effort for Caribbean spiny lobster in Florida have been volatile, and mostly lower from 2001/02 onward than in the 1990s (Figures 4.3.2.1 and 4.3.2.2).

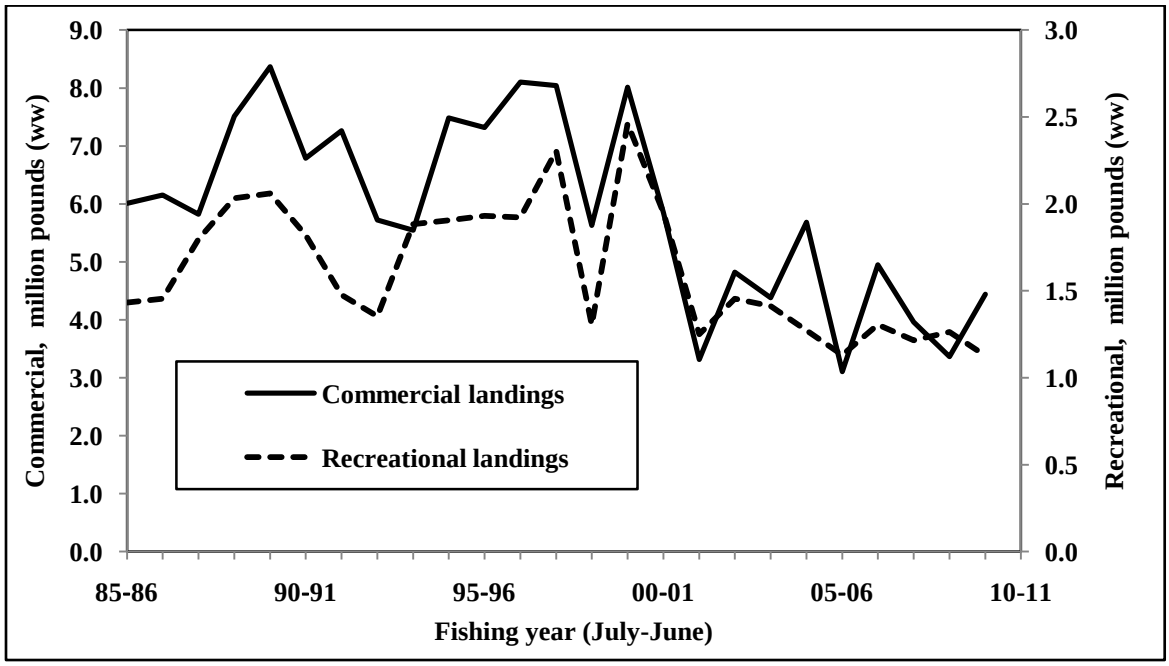

Figure 4.3.2.1. Florida commercial and recreational landings.

[10] Relatively small amounts have been reported for other states since 1977, in most instances for fewer than three dealers, in which case the data are confidential (unpublished analysis of NMFS, SEFSC, ALS data as of 31Aug10, John Vondruska, 13Dec10). The percentages of landings for Monroe County are based on 2004/05 – 2009/10 averages for data from Joseph Munyandorero and Bob Muller (personal communication, FWC, FMRI, 12Oct10, unpublished data).

Source: SEDAR-8, 2010 update (01Dec10).

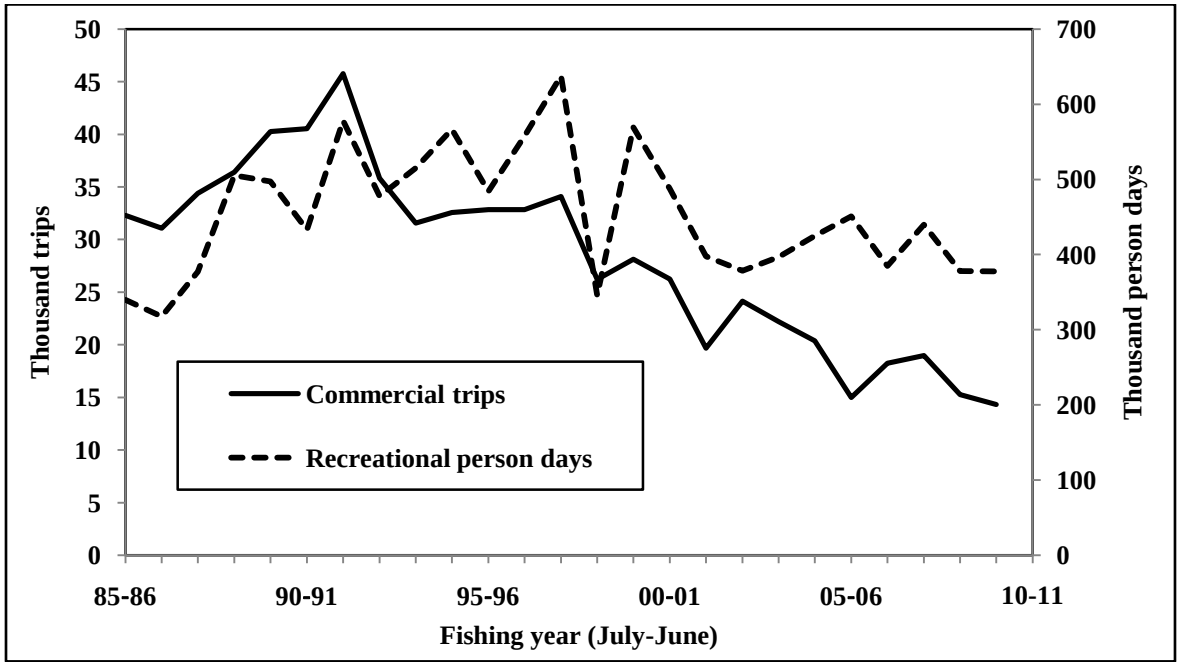

Figure 4.3.2.2. Florida commercial and recreational fishing effort.
Source: SEDAR-8, 2010 update (01Dec10).

Since 1991, regulation of recreational landings of Caribbean spiny lobster in Florida has been achieved through a complex system of state and federal bag limits, which vary by area fished and time of year. In addition, there are mandatory licenses and permits, as described in Sections 3.1.3 and 3.4.2 (number of Florida recreational permits and licenses for spiny lobster by type and year in Table 3.4.2.1). In contrast with commercial fishing for spiny lobster, however, participation and entry are not limited (Shivlani 2009). Data on recreational landings, effort, and numbers of permits, and lower ex-vessel prices in the commercial sector all reflect weakened national economic conditions in the last few years (figures in Sections 3.1.3 and 3.1.4).

Commercial fishing effort for Caribbean spiny lobster in Florida has been reduced substantially under the State's Trap Certificate Program. The number of vessel and trips with landings are far less than what they were in the early 1990s, along with the number of hours fished and the estimated number of traps fished (Vondruska 2010a). Despite lower landings in the 2000s (Figure 4.3.2.1), trends in productivity continued to increase in terms of landings per trip and landings per vessel, albeit at a slower pace than in the past (Section 3.4.1). Recreational landings were also lower in the 2000s, but fishing effort appears to be relatively flat compared with commercial fishing effort (Figures 4.3.2.1 and 4.3.2.2), and recreational CPUE has remained relatively flat compared with commercial fishing CPUE (commercial fishing CPUE, Figure 3.4.1.3 and recreational fishing CPUE, Figure 3.1.3.4).

4.3.3 Direct and Indirect Effect on the Social Environment

By establishing sector allocations there would likely be some changes in fishing behavior and impacts to the social environment. The mere act of separating the ACL into two sector ACLs

has the perception of creating scarcity in that limits have been imposed on each individual sector. The setting of an ACL has the same impact but on the overall fishery. Each subsequent division will drive perceptions of scarcity and likely change the fishing behavior of those within a particular sector. The commercial lobster fishery has been under a trap reduction program since the early 1990s and seen a gradual reduction in the number of traps being fished. This was the goal of the trap reduction program. However, recently the active trap reduction portion of the program has stopped and only passive trap reduction continues. This was requested by the industry which did not seem to believe the trap reduction program was producing the economic efficiency that was one of the goals of the program. Over the past decade, there has been a gradual increase in the portion of overall landings being taken by the recreational sector. As mentioned above, spiny lobster stock is dependent upon annual recruitment, so harvest is highly dependent upon the effort with either sector. Whether the trap reduction program is partly responsible for this shift is unknown. While traps have been reduced there has not been a parallel reduction in commercial landings. Recreational trips have declined also, so it may not be merely an increase in recreational effort either. It is likely that a complex set of factors are contributing to the shift in landings. Changes in regulation both to commercial diving and recreational diving and the use of casitas along with illegal activity have all likely had an impact on the shifting effort and harvest.

By not establishing separate sector allocations, the **Preferred Alternative 1** allows for an overall ACL which may make tracking difficult as there is no in season monitoring for either sector, although trip tickets can be monitored for the commercial sector. This alternative would allow for harvest to freely flow between the commercial and recreational sectors as it has in the past; although, if harvest exceeds the overall ACL then both sectors will close. This would likely become more an issue for the commercial sector as that season lasts longer than the recreational, because commercial fishermen continue to fish when lobster become more scarce. **Alternatives 2 and 4** would provide an increase in allocation to the commercial sector and subsequent reduction to the recreational; while **Alternative 3** would provide an increase to the recreational sector. Of all the different scenarios, **Alternative 4** seems to have some support as it was selected by a special panel of stakeholders as representative of the most favorable of the options. **Alternatives 5 and Alternative 6** both provide increases to the recreational sector, although smaller than previous alternatives. So, in all cases, it would be expected that there may be negative social effects to whichever sector receives less than their current allocation and those effects would correspond to the amount of reduction.

4.3.4 Direct and Indirect Effect on the Administrative Environment

There are no administrative impacts from allocating among the commercial and recreational sectors other than preparation of the amendment document and notices.

4.4 Action 4: Acceptable Biological Catch (ABC) Control Rule, ABC Level(s), Annual Catch Limits, and Annual Catch Targets for Caribbean Spiny Lobster

Action 4-1: Acceptable Biological Catch (ABC) Control Rule

Alternative 1: No Action – Do not establish an ABC Control Rule for spiny lobster.

Alternative 2: Adopt the following ABC Control rule:
Option a: the South Atlantic Council's ABC control rule.
Preferred Option b: the Gulf Council's ABC control rule.

Alternative 3: Establish an ABC Control Rule where ABC equals OFL.

Alternative 4: Specify ABC as equal to the mean of the last 10 years landings.

Alternative 5: Specify ABC as equal to the high of the last 10 years landings.

Alternative 6: Specify ABC as equal to the low of the last 10 years landings.

Action 4-2: Set Annual Catch Limits (ACLs) for Caribbean Spiny Lobster

Alternative 1: No Action – Do not set Annual Catch Limits.

Alternative 2: Set an Annual Catch Limit for the entire stock based on the Acceptable Biological Catch:
Preferred Option a: Annual Catch Limit = OY = Acceptable Biological Catch.
Option b: Annual Catch Limit = OY = 90% of Acceptable Biological Catch.
Option c: Annual Catch Limit = OY = 80% of Acceptable Biological Catch.

Alternative 3: Set Annual Catch Limits for each sector based on allocations determined in Action 3:
Option a: Annual Catch Limit = OY = (sector allocation x Acceptable Biological Catch).
Option b: Annual Catch Limit = OY = 80% or 90% of (sector allocation x Acceptable Biological Catch).
Option c: Annual Catch Limit = OY = sector allocation x (80% or 90% x% of Acceptable Biological Catch).

Action 4-3: Set Annual Catch Targets for Caribbean Spiny Lobster

Alternative 1: No Action – Do not set Annual Catch Targets.

Alternative 2: Set an Annual Catch Target for the entire stock.
Option a: Annual Catch Target = x% of Annual Catch Limit.
Option b: Annual Catch Target = Annual Catch Limit.
Preferred Option c: Annual Catch Target = 6.0 million pounds

Alternative 3: Set Annual Catch Targets for each sector based on allocations from Action 3.

Option a: Annual Catch Target = (sector allocation x Annual Catch Limit).

Option b: Annual Catch Target = x% of (sector allocation x Annual Catch Limit).

Option c: Annual Catch Target = sector allocation x (x% of Annual Catch Limit).

4.4.1 Direct and Indirect Effects on the Physical and Biological/Ecological Environments

Acceptable biological catch is recommended by the Scientific and Statistical Committee (SSC) and specified by the Council. The South Atlantic SSC provided an ABC Control Rule at their April 2010 meeting, but will reconsider this rule at their April 2011 meeting. The Gulf SSC approved an ABC Control Rule at their January 2011 meeting. These two rules must be consolidated and/or modified such that both SSCs agree on one ABC Control Rule for spiny lobster.

Setting an ABC, ACL, or ACT could affect the physical environment if harvest changes from current levels. Lobster fishing, particularly when traps are used, can have negative impacts on the bottom as described in Section 4.9.1. Commercial trap fishing for Caribbean spiny lobster is not managed by landings but by restricting the number of trap tags issued by the State of Florida. Therefore, unless the state increases the number of trap tags it distributes, the number of traps could not increase even if more landings were allowed. If harvest is restricted under an ACL or ACT, fishing effort could be reduced through accountability measures such as a shortened season, and negative impacts might be decreased.

Setting an ABC, ACL, or ACT potentially will have an impact on the biological environment if harvest changes from current levels, and AMs are triggered when they are met or exceeded. The ABC level will be determined by the SSCs. An ACL equal to the ABC would allow a higher level of landings than an ACL lower than the ABC. Likewise, not setting an ACT would allow a higher level of landings than setting an ACT.

Traps impact species other than lobsters. Fish, crabs, and other invertebrates may be captured as bycatch. Marine mammals and sea turtles can become entangled in trap line. These negative impacts could increase or decrease if effort changes; however, even if ACLs or ACTs are set higher than current harvest levels, effort would not be expected to increase. Current effort is limited by the number of trap tags issued by the State of Florida, commercial and recreational bag limits, and the length of the fishing season. Although fishers could fish more often and fish during a longer part of the season to increase effort, they presumably are already fishing at the level they desire because regulations do not prohibit such increased effort.

The more divided the ACL is, the more accountability each division will have. With a single ACL for the stock, one sector could exceed its allocation without triggering accountability measures, as long as the stock ACL is not exceeded. If the ACL is separated by sectors, accountability measures would be triggered as each sector reaches its limit. This level of control would be expected to result in greater positive impacts on the biological environment because catch would be more restricted. Further, with separate ACLs or ACTs, different types of

accountability measures could be triggered that are more suited to the particular sector, and therefore, be more effective in constraining harvest within the ACL.

4.4.2 Direct and Indirect Effect on the Economic Environment

Pending further deliberations through June 2011, the ABCs for **Alternatives 2-6** of Action 4-1 are shown in Table 4.4.2.1. These ABCs are transferred to Table 4.4.2.2, which provides a basis for comparing the effects of sector allocations, ABCs and ACLs. There are 108 single or paired-set ACLs. For example, consider the ACL in the upper left corner of Table 4.4.2.2, 5.522 mp, which is for **Preferred Alternative 2a** of Action 4-2 (ACL = 100% of ABC) and **Alternative 2a** of Action 4-1 (ABC = 10-year median landings). For purposes of comparison, it is assumed that the **Alternative 1** landings are as shown in Table 4.4.2.1.

Table 4.4.2.1 Florida spiny lobster, status quo landings & ABCs, million pounds (ww)

ABC alternative	5-yr means	ABC control rule	ABC
Alt. 1 (status quo), total landings	5.039		
Commercial landings	3.831		
Recreational landings	1.208		
Alt. 2a: SAFMC ABC control rule		10-year median	5.522
Alt. 2b: GMFMC ABC control rule		10-year mean + 1.5 sd	7.320
Alt. 3: GMFMC OFL (ABC = OFL)		10-year mean + 2.0 sd	7.900
Alt. 4		10-year mean	5.585
Alt. 5		10-year high	7.518
Alt. 6		10-year low	4.094

The landings for Alternative 1 (status quo), and the ABC values for Alternatives 2-6 in Table 4.2.2.1 are based on data in Table 2.4.1. The Gulf Council's Standing and Special Spiny Lobster SSC recommended that spiny lobster be considered as a special case fishery for purposes of setting OFL and ABC in accord with Tier 3a of the Generic Annual Catch Limits / Accountability Measures Amendment (Table 2.1.3, ABC control rule) (draft committee-report summary for the meeting in Tampa, Florida, 18-21Jan11). The SSC provided the ABC values for Alternatives 2b and 3 based on statistics for the most recent 10-year (2000/01 – 2009/10) period; i.e., ABC = mean + 1 sd = 7.32 mp and OFL = mean + 2 sd = 7.90 mp. They estimated recreational landings for 2004/05, a year for which they were not specified in the source. Data source: FWC (Bill Sharp, FWC, Marathon, FL), personal communication, 07Nov10, including updates as of 24Jun10.

Table 4.4.2.2 Florida spiny lobster, ABC control rules and ABC, million pounds (ww)

Action 3, sector allocation alternatives	ACL: % of	Sector %	Action 4.1 ABC Alternatives based on 00/01 - 09/10 data

	ABC		2a: 10-yr median	2b: 10-yr mean + 1.5 sd	3: 10-yr mean + 2.0 sd	4: 10-yr mean	5: 10-yr high	6: 10-yr low
Action 4-2, Alternative 2, specify overall ACL and OY based on a percentage of ABC								
Alt 2a: ACL = % of ABC	100%	na	5.522	7.320	7.900	5.585	7.518	**4.094**
Alt 2b: ACL = % of ABC	90%	na	**4.969**	6.588	7.110	5.026	6.766	**3.685**
Alt 2c: ACL = % of ABC	80%	na	**4.417**	5.856	6.320	4.468	6.014	**3.275**
Action 4-2, Alternative 3a: Sector ACL = Sector OY = (Sector Allocation % * 100% of ABC)								
Com ACL, Act 3, Alt 2	100%	80%	4.417	5.856	6.320	4.468	6.014	**3.275**
Rec ACL, Act 3, Alt 2	100%	20%	**1.104**	1.464	1.580	**1.117**	1.504	**0.819**
Com ACL, Act 3, Alt 3	100%	74%	4.086	5.417	5.846	4.133	5.563	**3.030**
Rec ACL, Act 3, Alt 3	100%	26%	1.436	1.903	2.054	1.452	1.955	**1.064**
Com ACL, Act 3, Alt 4	100%	78%	4.307	5.710	6.162	4.356	5.864	**3.193**
Rec ACL, Act 3, Alt 4	100%	22%	1.215	1.610	1.738	1.229	1.654	**0.901**
Com ACL, Act 3, Alt 5	100%	77%	4.252	5.636	6.083	4.300	5.789	**3.153**
Rec ACL, Act 3, Alt 5	100%	23%	1.684	1.684	1.817	1.285	1.729	**0.942**
Com ACL, Act 3, Alt 6	100%	76%	4.196	5.563	6.004	4.245	5.713	**3.112**
Rec ACL, Act 3, Alt 6	100%	24%	1.325	1.757	1.896	1.340	1.804	**0.983**
Action 4-2, Alternative 3b: Sector ACL = Sector OY = (Sector Allocation % * 90% of ABC)								
Com ACL, Act 3, Alt 2	90%	80%	3.976	5.270	5.688	4.021	5.413	**2.948**
Rec ACL, Act 3, Alt 2	90%	20%	**0.994**	1.318	1.422	**1.005**	1.353	**0.737**
Com ACL, Act 3, Alt 3	90%	74%	**3.677**	4.875	5.261	**3.720**	5.007	**2.727**
Rec ACL, Act 3, Alt 3	90%	26%	1.292	1.713	1.849	1.307	1.759	**0.958**
Com ACL, Act 3, Alt 4	90%	78%	3.876	5.139	5.546	3.921	5.277	**2.874**
Rec ACL, Act 3, Alt 4	90%	22%	**1.093**	1.449	1.564	**1.106**	1.489	**0.811**
Com ACL, Act 3, Alt 5	90%	77%	**3.826**	5.073	5.475	**3.870**	5.210	**2.837**
Rec ACL, Act 3, Alt 5	90%	23%	**1.143**	1.515	1.635	**1.156**	1.556	**0.847**
Com ACL, Act 3, Alt 6	90%	76%	**3.777**	5.007	5.404	**3.820**	5.142	**2.800**
Rec ACL, Act 3, Alt 6	90%	24%	**1.193**	1.581	1.706	**1.206**	1.624	**0.884**
Action 4-2, Alternative 3c: Sector ACL = Sector OY = (Sector Allocation % * 80% of ABC)								
Com ACL, Act 3, Alt 2	80%	80%	**3.534**	4.685	5.056	**3.574**	4.811	**2.620**
Rec ACL, Act 3, Alt 2	80%	20%	**0.883**	**1.171**	1.264	**0.894**	**1.203**	**0.655**
Com ACL, Act 3, Alt 3	80%	74%	**3.269**	4.333	4.677	**3.306**	4.451	**2.424**
Rec ACL, Act 3, Alt 3	80%	26%	**1.148**	1.523	1.643	**1.162**	1.564	**0.852**
Com ACL, Act 3, Alt 4	80%	78%	**3.445**	4.568	4.930	**3.485**	4.691	**2.555**
Rec ACL, Act 3, Alt 4	80%	22%	**0.972**	1.288	1.390	**0.983**	1.323	**0.721**
Com ACL, Act 3, Alt 5	80%	77%	**3.401**	4.509	4.866	**3.440**	4.631	**2.522**
Rec ACL, Act 3, Alt 5	80%	23%	**1.016**	1.347	1.454	**1.028**	1.383	**0.753**
Com ACL, Act 3, Alt 6	80%	76%	**3.357**	4.451	4.803	**3.396**	4.571	**2.489**
Rec ACL, Act 3, Alt 6	80%	24%	**1.060**	1.405	1.517	**1.072**	1.443	**0.786**
Source: ABCs in Table 4.4.2.1								

Among the 108 single or paired-set ACLs in Table 4.4.2.2, only 2 are discussed. If assumptions for the three variables are correctly specified here, the Gulf Council's tentative overall ACL is

7.32 mp.[11] The South Atlantic Council's tentative ACLs are 4.196 mp for commercial fishing, and 1.325 mp for recreational fishing, with the two ACLs totaling 5.552 mp.[12]

If ABC is the most direct and primary indicator of health of the spiny lobster resource used to specify ACLs, then the use of sector-allocation and ACL-ABC percentages complicate the explanation. Sector allocations may be perceived as a conservation measure, but they could keep ABC from being achieved if activity in one sector is curtailed because that sector's ACL is reached and the ACL for the other sector is not reached. This could result in closures for one sector prior to the end of the season, reduced bag limits or trip limits for that sector under the AMs of Action 5, while the other sector would not be affected, and total landings would remain below the overall limit.

Under **Alternative 1**, status quo management conditions and related operation of the fishery, and associated economic benefits, would remain unchanged, with some caveats. Assuming no degradation or jeopardy to the spiny lobster resource, the choice of **Alternative 1** would lead to the rejection of Amendment 10 by the Secretary of Commerce, and involve the additional work and cost of redoing and resubmitting the amendment, either by NMFS or the Councils. This could affect constituent perceptions about the ability of fishery managers to comply with the requirements of the Magnuson Stevens Act to specify ACLs and AMs, thereby introducing elements of uncertainty about future business conditions and fishery regulations. While the extent of any change in economic behavior of fishery participants is not known, uncertainty about business conditions and regulations may be seen as adversely affecting various sectors of the economy, including commercial and recreational fishing. If increased protection were needed, such as might occur with a lower ACLs, then **Alternative 1** could preclude such protection from occurring, thereby increasing the likelihood of current or future resource decline, with associated reduction in economic benefits.

On the other hand, some of the 108 single or paired-set ACLs in Table 4.4.2.2 could require substantial reductions in landings. The ACLs with commercial, recreational, or total landings below those for **Alternative 1** (status quo) are shown in bold type, referring to **Alternative 1** commercial landings of 3.831 mp, recreational landings of 1.208 mp, and total landings of 5.039 mp**.** Arguably, economic activity could have been reduced under the more traditional output-control AMs of Action 5, and/or via further adjustments to State of Florida market-oriented input-control regulations for the commercial sector.[13] Given the alternatives specified in

[11]The Gulf Council ACL of 7.32 mp is obtained as follows: Action 4.1 **Alternative 2b** (ABC = 10 year mean + 1.5 standard deviation units = 7.32 mp), Action 4.2 **Alternative 2a** (ACL = 100% of ABC), and Action 3 **Alternative 1** (do not establish sector allocations, ACL =100% of ABC).

[12]The South Atlantic Council's ACLs are obtained as follows: Action 4.1 **Alternative 2a** (ABC = 10 year median, 5.552 mp), Action 4.2 **Alternative 3a** (ACL = sector allocation x 100% of ABC), and Action 3 **Alternative 6** (commercial sector allocation, 76% and recreational sector allocation, 24%).

[13]Since the early 1990s, the State's Trap Certificate Program has been quite successful in meeting the objectives of substantially reducing commercial fishing effort, thereby improving productivity and economic conditions for remaining fishermen (Table 3.1.2.1; Sections 3.1.2 and 3.4.1). Much smaller landings, numbers of permits, and effort have been reduced by the State for commercial divers, as well as for recreational divers with Special Recreational Crawfish Licenses (Table 3.1.2.1).

Amendment 10, however, the more traditional output-control regulations for the commercial sector (to limit landings, impose trips limits and shorten seasons) of Actions 4-5 may be seen as having differing, if not conflicting objectives, in that they would introduce a move away from a private market mechanism for allocating harvesting rights (Larkin and Milon 2000, quoted in Section 3.1.2).

The regulations for recreational fishing of Actions 4-5 and state regulations are more harmonious, if not market oriented. The State of Florida has used area-specific bag limits and seasons to regulate recreational fishing and has not limited or reduced the relatively large number of recreational licenses and permits that may be issued (Table 3.4.2.1; Sections 3.1.3 and 3.4.2). The prospects for implementing market mechanisms under state or federal auspices to allocate recreational harvesting rights for spiny lobster would seem remote at best, though such mechanisms have been employed in recreational hunting and fishing.

Regardless, the impact on economic activity associated recreational fishing of lower bag limits, early season closures, and/or shorter seasons are more difficult to quantify than are counterparts for commercial fishing. This is because the demand for recreational fishing activity relates in part to other dimensions of trips than the amount of fish or shellfish caught. It is possible that bag limit analyses could be conducted using data collected by the FWC. One might expect a considerable range in the number of lobsters per person per trip, ranging from zero to beyond the bag limit. If so, one would expect that a reduced bag limit would affect some trips, but not all. Still, the dollar amount per lobster in terms of willingness to pay is much higher for decreases in bag limits than for increases in bag limits (Florida FMRI survey of recreational lobster fishing of 1992; see Section 3.4.2, paragraph 4 under "Number and Description of Recreational Fishers").

Data on participants in recreational fishing in Florida has been collected annually via two mail-in surveys sent to persons with lobster licenses/permits (Section 3.4.2). The mail-in surveys would not include data for spiny lobster caught by passengers aboard for-hire fishing vessels when individual participants do not have Florida licenses and permits (see Section 3.4.2, last paragraph under "Number and Description of Recreational Fishers"). Furthermore, data on economic activity specifically for for-hire vessels engaged in trips for spiny lobster does not appear to be available.

4.4.3 Direct and Indirect Effect on the Social Environment

According to the National Standard guidelines, the setting of an ABC control rule or ABC levels, have been relegated primarily to biological assessments and reference points. It is the determination of the SSC based upon the best science available. That ABC can have important social effects as it is in many ways the determination of stock status and all decisions of allowable harvest level are derived from that threshold. **Alternative 1**, the no action alternative seems to untenable, since some level needs to be set, unless as in **Alternative 3** the threshold is equal to the OFL which would likely impose few negative social effects, but could risk a volatile stock status. **Preferred Alternative 2** offers two **Options a and Preferred b** corresponding to each Council's SSC control rule which would vary depending upon the threshold levels that are calculated. The Gulf ABC calculations are above the most recent landing levels. With **Alternative 4** using the mean of the last 10 years there would be a reduction from the most

recent years landings and certainly **Alternative 6** which uses the lowest landing level of the past 10 years would have negative social effects as it would reduce harvest from current levels. **Alternative 5** would have few negative social effects in the short term as there would be no reduction in harvest, but may have long term effects if the catch limits are too high and jeopardize stock status.

While setting the biological parameters on catch through an ACL can have indirect effects on the social environment, it is difficult to know what those effects will be until a definitive number has been assigned which translates into harvest levels. Certainly, setting thresholds that adequately assess biological risk through harvest levels on stocks that are vulnerable can help stabilize landings and thereby provide long-term benefits to the fishery which should translate into positive social benefits over time. It is the short term costs involved that often drive perceptions of negative impacts. These impacts can translate into real costs that have significant impacts to both the commercial and recreational sectors. **Alternative 1** would not set ACLs and in that case harvest levels would likely revert to some other threshold, like ABC. This would likely have fewer negative social effects than a more restrictive ACL like those in **Alternative 2 Options b and c**. The **Preferred Alternative 2 Option a** would not impose a more restrictive catch limit. **Alternative 3** and its **Option a** would be similar except that it incorporates sector allocations as do the other **Alternative 3 Options b and c**.

It is the setting of Annual Catch Targets where social and economic considerations might enter the equation as management uncertainty is evaluated. Setting of Annual Catch Targets is utilized in fisheries where there may be management uncertainty that adds risk to reaching target harvest levels beyond the biological risks. It usually entails a further reduction in harvest levels to ensure catch remains at or below the ACL and does not wildly fluctuate. For fisheries where information is scarce and management is uncertain, it becomes a real possibility that there can be negative short term impacts that may not have been necessary if thresholds are too restrictive. In other fisheries which have more certainty in management and monitoring of catch, a more precise harvest level can be set with certainty and reduce volatility in the fishery. The spiny lobster fishery does not seem to be overfished and has not experienced large fluctuations in landings. Though, there are many avenues for changes in stock status that are attributed to factors outside of manager's purview, i.e. disease, hurricanes or habitat degradation. Management has imposed restrictions on catch that over the years has imposed some certainty, yet the recreational fishery does not have the timely monitoring that can be imposed on the commercial fishery. The spiny lobster fishery seems to be stable and may not require an ACT if managers feel a level of certainty in the present management regime. Therefore the **Alternative 1** may be appropriate for this fishery and may not impose further negative social effects. **Alternatives 2 and 3** could impose further reductions in harvest and could have short term negative effects depending upon the reduction of harvest from present levels. It is assumed that if these alternatives were chosen it would be for the long term benefits of increasing stock status which may have positive social benefits in the long term, but is entirely dependent upon the severity of the short term negative social effects. The **Preferred Alternative 2 Option c** would be above the most recent landing levels, although in the past landings have exceeded that threshold.

4.4.4 Direct and Indirect Effects on the Administrative Environment

Harvest of Caribbean spiny lobster is currently managed by closed seasons, restrictions on the number of traps, and bag limits. Commercial fishermen report their catch through state trip tickets, which are compiled over several months before totals are available for federal management. Recreational catch is estimated based on telephone and dockside surveys. With establishment of an ACL or ACT, commercial landings may need to be included in the Southeast Fisheries Science Center's Quota Monitoring System. This system requires dealers to report landings, usually on a biweekly basis. If ACLs or ACTs are set by sector or gear, separate entries would be needed in the system.

4.5 Action 5: Accountability Measures (AMs) by Sector

*Note: More than one alternative, option, sub-option, or combinations thereof, may be chosen as preferred.

Alternative 1: No Action – Do not set accountability measures. Currently there are no management measures in place that could be considered AMs.

Alternative 2: Establish commercial in-season accountability measures**:**

Option a: close the commercial fishery when the ACL is projected to be met.

Option b: implement a commercial trip limit when 75% of the commercial ACL is projected to be met.

Alternative 3: Establish post-season accountability measures:

Option a: Commercial

Sub-option i: ACL payback in the fishing season following a previous years ACL overage.

Sub-option ii: Adjust the length of the fishing season following an ACL overage.

Sub-option iii: Implement a trip limit.

Option b: Recreational

Sub-option i: ACL payback in the fishing season following an ACL overage. To estimate the overage, compare the recreational ACL with recreational landings over a range of years. For 2011, use only 2011 landings. For 2012, use the average landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running average.

Sub-option ii: Adjust the length of the fishing season following an ACL overage. To estimate the overage, compare recreational ACL with recreational landings over a range of years. For 2011, use only 2011 landings. For 2012, use the average landings of 2011 and 2012. For 2013 and beyond, use the most recent three-year running average.

Sub-option iii: Adjust bag limit for the fishing season following a previous seasons ACL overage.

Option c: Recreational and commercial combined accountability measures

Sub-option i: Adjust season length for both recreational and commercial harvest of spiny lobster in the fishing season following an ACL overage

Sub-option ii: Recreational and commercial ACL payback in the fishing season following a previous years ACL overage (if a combined ACL is chosen).

Preferred Alternative 4: Establish the ACT as the accountability measure for Caribbean spiny lobster.

4.5.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

Alternative 1 is not considered a viable option since it would specify no AM and therefore, would not limit harvest to the ACL or correct for an ACL overage if one were to occur. The

Magnuson-Stevens Act requires that mechanisms of accountability be established for all federally managed species. **Alternative 1** would not comply with this mandate, and would provide no biological benefit to the species.

Alternative 2 would attempt to limit commercial harvest to levels at or below the ACL or ACT by reducing and/or closing harvest once a particular landings threshold is met for the commercial sector. However, the current preferred alternatives for the actions to establish ACL and ACT use a single ACL equal to OY which is equal to the ABC, and a single ACT for the commercial and recreational sectors equal to six million pounds. If a single ACL and ACT remain the preferred alternatives for those actions, there may be no need to establish separate commercial and recreational AMs for the spiny lobster fishery.

The most biologically beneficial in-season AM would be a combination of **Option a** and **Option b**. The combination of these options would help to hedge against an ACL overage by reducing the trip limit when 75% of the commercial ACL is projected to be met, and then close the commercial sector when the quota is projected to be met. Closing the commercial fishery or reducing the trip limit once the ACL is projected to be met would remove the incentive to harvest spiny lobster because purchase and sale would also be prohibited. At this point it is appropriate to note that a recent study using microsatellite DNA analysis to identify sources of recruitment among Caribbean spiny lobsters indicates the majority of recruits come from areas outside the management area (Hunt and Tringali, 2011). Therefore, any true biological benefits that may accrue in the Caribbean spiny lobster population found within the subject management area, as a result of implementing any one of the AMs considered, are likely to be negligible. What is more likely to significantly impact the local population of spiny lobster is an environmental event on a more global scale that could potential disrupt current larval dispersion patterns into and out of the management area, or alter the habitat in such a way as to prevent the settling post-larvae Caribbean spiny lobster in southeastern waters.

The Council considered in-season AMs for the recreational sector of the spiny lobster fishery; however, difficulties in accurately tracking recreational harvest of spiny lobster in-season precluded further consideration of those alternatives (See Appendix A for Considered but Rejected Alternatives). The newly implemented Marine Recreational Information Program (MRIP) does not collect landings information on crustaceans, so in-season tracking of spiny lobster landings in the recreational fishery would depend on Florida's limited recreational data survey program. Therefore, the implementation of in-season AMs is not practical for the recreational sector of the spiny lobster fishery.

Alternative 3 includes a large suite of possible sector-specific post-season AMs that would be triggered in the event of an ACL overage. As noted previously, if the current single ACL and ACT preferred alternatives are chosen as the final alternatives for implementation, the need for separate post-season AMs for the commercial and recreational sectors may be eliminated.

The post-season AM options are designed to compensate or correct for the magnitude of the overage during the following fishing year. In doing so, harvest levels would return to their baseline ACL over the course of two fishing years, the year of the overage and the year of the overage correction. Biologically, the ideal scenario is not allow the ACL to be exceeded, then no

post-season AM would be required and the stock would realize the biological benefits of sustainable harvest conditions into perpetuity. Unfortunately, management and scientific uncertainty, and numerous other variables including economic and unforeseen biologic and weather events, play a major role in annual spiny lobster landings, which may fall above or below any number of harvest parameters. The advantage of implementing post-season AMs is that the landings data for any given year can be examined in totality before the AM is actually triggered, as opposed to in-season AMs that would rely largely on projections of harvest that may or may not have a high degree of uncertainty. Using actual landings data to calculate the precise magnitude of an overage is typically biologically beneficial in that it ensures an adequate level of payback is implemented.

A combination of recreational and commercial AMs (**Options a** and **b**), would yield similar biological benefits when compared to **Option c**, which builds in a combination sector AMs. **Option b** alone would be the least biologically beneficial post-season AM because it does not compensate for any overages created by the commercial fishery. The variability in recreational landings data should be taken into account when considering **Option b** under **Alternative 3**.

Currently, the state of Florida, where the majority of recreational fishing for spiny lobster takes place, tracks recreational landings through two separate annual surveys sent to fishermen holding recreational lobster permits. The surveys are distributed via e-mail to collect landings information on harvest during the Special Two-Day Season, and to collect landings information from the opening day of the regular season through the first Monday in September (when the majority of spiny lobster fishing effort occurs) (Sharp et al. 2005). Because Florida is the only state to track recreational landings of spiny lobster and no recreational landings data are collected by NOAA Fisheries Service, a new recreational ACL monitoring program that would need to incorporate a mechanism to collect recreational and commercial landings information to track ACLs would need to be developed. An ACL monitoring program for spiny lobster could potentially be dealer-based through the establishment of dealer permit and reporting programs specifically designed for spiny lobster. Additionally, spiny lobster could be added to the list of species for which recreational landings data is captured through MRFSS and MRIP, though doing so may not address the issue of time lags between the time of harvest and the time when the data are available to fisheries managers. Any supplemental or improved data collection efforts for spiny lobster could improve our understanding of the stock's population dynamics and harvest trends through time.

Because recreational landings data are known to be highly variable and MRIP does not currently collect information on spiny lobster harvest, using a three-year running average of estimated recreational landings compared to the recreational ACL could reduce, to some extent, variability caused by anomalous spikes or declines in landings. Sudden spikes or reductions in harvest could greatly influence post season AMs in the recreational sector if they are only considered on a year-by-year basis. Averaging recreational spiny lobster harvest over several years would minimize the influence any one exceptionally poor or exceptionally good year could have on the magnitude of the pay-back or season length reduction. **Option a** is a more biologically conservative alternative than **Option b** because the commercial component of the fishery is larger than the recreational component; however, it does not account for any overages in the recreational sector. The most precautionary post-season AM is **Option c**, which includes AMs

for the commercial and recreational sectors, which would therefore be expected to adequately compensate for overages in one or both sectors. Reducing the length of the fishing season by the amount needed to pay back the overage in addition shortening the season length to prevent a future overage would provide an additional safeguard when compared to only reducing the length of fishing season.

The most biologically conservative AM for Caribbean spiny lobster is some combination of in-season and post-season AMs. Under this scenario, if the in-season AM failed at preventing a commercial ACL overage, the Regional Administrator would still have the option to implement a post-season AM in both sectors to compensate for the overage.

Preferred Alternative 4 would use the ACT (6.0 mp) as the AM. As part of the performance standard, if the catch exceeds the ACT repeatedly, a review of the ACL, ACT, and AM would be triggered. Furthermore, if the catch exceeds the ACL more than once in the last four consecutive years, the entire system of ACLs and AMs would be re-evaluated as required by the National Standard 1 guidelines. If the subject evaluation reveals that some modification to the current National Standard 1 harvest parameters for Caribbean spiny lobster is needed in order to prevent ACL overages, such changes could be made expeditiously through a regulatory amendment based on the updated framework procedure for Caribbean spiny lobster. Regulatory amendments require less time to prepare; therefore, they are often the regulatory instrument of choice when a management measure or harvest level requires an adjustment.

The final rule implementing National Standard 1 guidelines states: "For fisheries without in-season management control to prevent the ACL from being exceeded, AMs should utilize ACTs that are set below ACLs so that catches do not exceed the ACL" (74 FR 3178). The current preferred alternative for ACL is to set the ACL equal to the ABC which would be 7.32 mp according to the Gulf Council's preferred ABC. Therefore, using an ACT of 6.0 mp as the AM for Caribbean spiny lobster is consistent with the National Standard 1 guidelines. Additionally, in-season tracking of landings of Caribbean spiny lobster may be associated with a high degree of uncertainty, especially for landings made by the recreational sector. The difficulty associated with tracking in-season landings of Caribbean spiny lobster and the Council's specification of an ACT below the preferred ACL value, makes the use of an ACT a reasonable AM alternative for Caribbean spiny lobster.

The biological impacts of **Preferred Alternative 4** would likely be similar to the status quo since the combined recreational/commercial average landings for the last 10 fishing seasons does not exceed the proposed ACT, and the maximum landings over the past three years falls slightly below the proposed ACT. Variations in year-to-year harvest would be accounted for by evaluating what percentage of the ACT is caught over several years, rather than on a single season basis. It is unlikely the ACL would be exceeded repeatedly under the current ACL preferred alternative based on landings history; however, the updated framework procedure contained within this amendment would facilitate timely adjustments to the National Standard 1 harvest parameters if needed in the future. The ability to expeditiously implement modifications to the ACL, ACT, and AMs for Caribbean spiny lobster would limit any negative biological impact that could result from continued ACT or ACL overages.

Alternative 1 would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Establishing AMs is unlikely to alter fishing behavior in a way that would cause new adverse effects to *Acropora*. The potential impacts of **Alternatives 2- 4,** and the associated sub-alternatives**,** on sea turtles and smalltooth sawfish are unclear. If they perpetuate the existing amount of fishing effort, but causes effort redistribution, any potential effort shift is unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. If these alternatives reduce the overall amount of fishing effort in the fishery, the risk of interaction between sea turtles and smalltooth sawfish will likely decrease.

4.5.2 Direct and Indirect Effect on the Economic Environment

There are some caveats. First, some alternatives and options under Action 5 could have differential economic impacts by sector, adding to those that have accrued over time in part under existing State of Florida regulations. Under State of Florida regulations, participation and entry are not limited for recreational fishing in Florida, but they are clearly limited for commercial fishing (Shivlani 2009). Some options under Action 5 may turn out to have a negative economic impact on commercial fishing via limits on landings, trips and season length, but have no impact on recreation fishing. Other alternatives and options under Action 5 could impact both sectors, or they could impact recreational fishing, but not commercial fishing.

Second, with different specifications of alternatives, economic activity associated with commercial fishing for spiny lobster in Florida could have been reduced under the more traditional output-control AMs of Action 5, and/or via further adjustments to State of Florida market-oriented input-control regulations for the commercial sector.[14] However, with the alternatives specified, Actions 4-5 may be seen as having differing, if not conflicting objectives, in that they bring a move away from an innovative private market mechanism for allocating harvesting rights (Larkin and Milon 2000, quoted in Section 3.1.2). Commercial fishing effort for Caribbean spiny lobster in Florida has been reduced substantially under the State's trap certificate reduction program, and it continues to be reduced, albeit at a slower rate (see Section 4.3.3). In other words, the number of commercial vessels and trips with landings are far below what they were in the early 1990s, along with the number of hours fished and the number of traps fished (Vondruska 2010a). Without these reductions, economic conditions in commercial amidst the lower landings of 2001 onward would have been much worse.

The State's trap certificate reduction program was intended to reduce congestion on the fishing grounds, and to improve economic conditions of those remaining in the commercial fishery. About a decade after the program's inception, Shivlani et al. (2004) conducted a survey of fishers and analyzed the economic and social conditions at the fisher level and fisher attitudes about the program. Under Amendment 10, Actions 3-5 mean a change in what is now a long-

[14]Since the early 1990s, the State's Trap Certificate Program has been quite successful in meeting the objectives of substantially reducing commercial fishing effort, thereby improving productivity and economic conditions for remaining fishermen (Table 3.1.2.1; Sections 3.1.2 and 3.4.1). Much smaller landings, numbers of permits, and effort have been reduced by the State for commercial divers, as well as for recreational divers with Special Recreational Crawfish Licenses (Table 3.1.2.1).

established regime for commercial fishing. Such a change can be expected to affect attitudes, affect the business and investment climate, affect perceptions of the economic future in commercial fishing, and affect perceptions of fishery managers. Survey data suggests that commercial fishermen operating in the Florida Keys (Monroe County) tend to have long tenure, tend to be full-time operators and derive a high percentage of their personal income from commercial fishing, and have considerable investment in vessels and traps (Shivlani et al. 2004).

Alternative 2 Option a of Action 5 would create a hard quota for the commercial sector, meaning an in-season quota-based closure, based on an ACL or an ACT, as determined under Action 4, and create no AM for recreational fishing. **Alternative 2 Option b** would create an in-season trip limit for commercial fishing when 75% of the ACL or ACT projected to be met, and create no AM for recreational fishing.

Alternative 3 Option a would create post-season reductions in ACLs or ACTs for the commercial sector, or create post-season reductions in season length for the commercial sector, or create post-season trip limits for the commercial sector, and create no AM for recreational fishing.

Alternative 3 Option b would create post-season reductions in ACLs or ACTs for the recreational sector, or create post-season reductions in season length for the recreational sector, or reduce post-season bag limits for the recreational sector, and create no AM for commercial fishing.

Alternative 3 Option c would create post-season reductions in season length for both sectors, or post-season reductions in ACLs in response to any ACL overage.

Preferred Alternative 4 would establish the ACT as the AM, perhaps referring to the Gulf Council preferred ACT of 6.0 mp (Action 4-3, **Alternative 2 c**). Clarification may be needed if it does not already exist.

Among the several choices for Action 5, **Alternative 3 Option c** or possibly **Preferred Alternative 4** (with clarification that may already exist) address the Magnuson-Stevens Act requirements to establish ABCs, ACLs and AMs (Actions 4 and 5), which Amendment 10 is intended to address (Section 1.3, "Need for Proposed Action"). Opinions may vary about the efficacy of sector allocations and ACTs, but they do add greatly to the number of possible ACLs. As shown in Table 4.4.2.2, alternatives for three variables, referring to ABC alternative, allocation-percentage alternatives, and ACL-ABC percentages bring the number of single or paired-set ACLs to 108. It is true that the Councils' preferred alternatives result in two single or paired-set ACLs, but reconciliation could involve ABC, ACL and AM choices that go beyond the requirements of the Magnuson-Stevens Act, which Amendment 10 is intended to address. In the context of Table 4.4.2.2, some possible choices of ACLs may add to the difficulty of explaining how requisite consideration of the health of the spiny lobster resource affects the specification of ACLs, apart from other considerations.

If the Councils were to choose **Alternative 1**, status quo management conditions and related operation of the fishery, and associated economic benefits, would remain unchanged, with some

caveats. Assuming no degradation or jeopardy to the spiny lobster resource, the choice of **Alternative 1** would lead to the rejection of Amendment 10 by the Secretary of Commerce, and involve the additional work and cost of redoing and resubmitting the amendment, either by NMFS or the Councils.

Therefore the choice of **Alternative 1** could affect constituent perceptions about the ability of fishery managers to comply with the requirements of the Magnuson Stevens Act to specify ABC, ACLs and AMs, thereby introducing elements of uncertainty about future business conditions and fishery regulations. While the extent of any change in economic behavior of fishery participants is not known, uncertainty about business conditions and regulations may be seen as adversely affecting various sectors of the economy, including commercial and recreational fishing. Opinions may vary, but the same could be said for said for some of other alternatives for Actions 3, 4, and 5.

4.5.3 Direct and Indirect Effect on the Social Environment

The setting of Accountability Measures can have significant direct and indirect effects on the social environment as they usually impose some restriction on harvest. The long term effects should be beneficial as they provide protection from further negative impacts on the stock. While the negative effects are usually short term, they may at times induce other indirect effects through changes in fishing behavior.

Alternative 1 would put no accountability measures in place and would risk further damage to the stock if the ACLs or ACTs were exceeded. This would avoid short term negative social impacts, but may incur longer term impacts if stock status were jeopardized. The implementation of in-season AMs in **Alternative 2** would require projection of the harvest in the commercial fishery to ensure no overages. This type of quota monitoring is not as precise as post season and cannot be accomplished with the recreational fishery as in season monitoring is not feasible. In-season monitoring might contain the overage and lessen the chance of exceeding the ACL if monitoring precision is adequate. **Alternative 2, Option a** would provide immediate protection for the stock by closing the commercial fishery when the ACL is met and depending upon AMs chosen could provide for accountability if payback is provided. **Alternative 2, Option b** could exceed the ACL by season's end depending upon the trip limit chosen. The many options under **Alternative 3**, post season monitoring and accountability can be more precise in both determining the size of the overage, but also the payback necessary. It does however increase the risk of exceeding an ACL. **Alternative 3, Option a** and its suboptions offer several alternatives for payback for the commercial fishery. **Sub option i** would impose a reduction in next year's ACL to correspond to the overage, while **Sub options ii and iii** offer other avenues for payback to constrain harvest the next year which may be preferable to a straight reduction in harvest levels. **Alternative 3, Option b** offers various suboptions for the AMs for the recreational sector that are similar to the commercial alternatives although the calculations for the harvest level are different. As with the commercial options, **Alternative 3b, Suboption i** would impose an immediate reduction on the next year's harvest, whereas **Suboptions ii and iii** offer alternatives that may have fewer negative social impacts that accrue to the recreational sector. **Alternative 3 Option c and Sub-options i and ii** offer similar AMs for both sectors combined. The **Preferred Alternative 4** would establish the ACT as an

accountability measure and close both the commercial and recreational fishery once the threshold has been projected to be reached. What impacts are derived from either in season or post season accountability measures would depend upon the volatility of the fishery and the perceived risks of exceeding the ACL. In spiny lobster, it would seem there would be few risks as the fishery seems to be fairly stable and post season accountability measures may be adequate. However, as discussed earlier, fishing behaviors can change depending upon management measures chosen and the perception of scarcity. If ACLs begin to be exceeded and accountability measures are implemented which close the fishery, effort may be directed elsewhere. The ability to redirect fishing effort is becoming more difficult as limited entry management is becoming more common. Therefore, if there are fewer choices for redirecting effort, whether it is changing fisheries or choosing temporary work outside the fishery, the indirect effects on the social environment may extend beyond the lobster fishery. As mentioned in the discussion of Section 3.5 the description of the social environment there are outside factors that are affecting fishermen in South Florida. Continued social disruption may be confounded by these other factors that have gradually pushed fishermen and their associated businesses from the waterfront. On the other hand, if accountability measures are adopted that keep stock status viable and productive, the effects on the social environment may have negative short term effects, but longer term benefits.

4.5.4 Direct and Indirect Effect on the Administrative Environment

Alternative 1 would not produce near-term administrative impacts. However, this alternative would not comply with Magnuson-Stevens Act requirements and therefore, may trigger some type of legal action for not doing so. If this scenario were to occur, the burden on the administrative environment would be great in the future. **Alternative 2** would result in some additional administrative cost and time burdens associated with tracking commercial landings in-season. The state of Florida already has a mechanism in place to track commercial landings of spiny lobster; however, a tracking mechanism would need to be developed to account for spiny lobster landings off other states such as Georgia and South Carolina. **Alternative 3** could potentially produce a significant negative impact on the administrative environment regardless of the choice of options and sub-options. Under each of the sub-options spiny lobster would need to be added to the list of species tracked via MRFSS, MRIP, and through the quota management system. Implementing these ACL/AM tracking mechanisms is not a trivial undertaking and could result in significant administrative cost and time in the near-term and long-term. Additionally, each of the sub-options would require a notice to be drafted and disseminated to fishery participants notifying them of the previous year's overages, and how much the next year's catch limit and/or bag limit would be reduced, or season shortened. **Preferred Alternative 4** could result in moderate administrative impacts in the form of multi-year evaluations of actual harvest compared the ACT and ACL. If the ACT is repeatedly exceeded or if the ACL is exceeded more than once within a four year time period, the burden on the administrative environment would likely increase if a regulatory amendment is needed to modify management measures or harvest limits for Caribbean spiny lobster.

4.6 Action 6: Develop or Update a Framework Procedure and Protocol for Enhanced Cooperative Management for Spiny Lobster

*Note: more than one alternative may be chosen as a preferred.

Alternative 1: No Action – Do not update the Protocol for Enhanced Cooperative Management or the Regulatory Amendment Procedure.

Preferred Alternative 2: Update the current Protocol for Enhanced Cooperative Management.

Alternative 3: Update the current Regulatory Amendment Procedures to develop a Framework Procedure to modify ACLs and AMs.

Alternative 4: Revise the current Regulatory Amendment Procedures to create an expanded Framework Procedure:

Preferred Option a: Adopt the base Framework Procedure
Option b: Adopt the more broad Framework Procedure
Option c: Adopt the more narrow Framework Procedure

4.6.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

Alternative 1 would maintain the Regional Administrator's current ability to adjust total allowable catch, quotas, trip limits, bag limits, size limits, seasonal closures, and area closures; however, no means would exist to make needed adjustments to the National Standard 1 harvest parameters in a timely manner. Often, when a harvest reduction is needed, corrective action is required quickly. Not allowing ACLs, ACTs, and AMs to be adjusted through framework would most likely lead to extended delays in implementing harvest reductions and/or associated AMs. Such a scenario could be biologically detrimental because excessive levels of fishing mortality, or even overfishing, would persist until the appropriate harvest limitations could be put in place through amendment action. Alternately, if new data shows a stock is doing better than previous assessments indicated, unnecessary restrictions could prevent the fishery from harvesting its optimum yield. The impacts on the physical environment would not change under this alternative.

Preferred Alternative 2 would have no impact on the physical or biological environment because its only purpose is to update the protocol, which defines the roles of federal and State of Florida agencies in managing spiny lobster. The updates would include relevant agency names and authorities. Regardless of how the current framework procedures or protocols are modified, those changes will have no immediate effect because those changes will not cause immediate changes in harvest objectives.

Alternatives 3 and 4 would likely be biologically beneficial for spiny lobster. Under **Alternative 3,** adjustments to ACLs, ACTs, and AMs could be made relatively quickly as new fishery and stock abundance information becomes available. Under **Preferred Alternative 4**, adjustments to other management measures would also be simplified. By changing the current

framework procedure to allow for periodic adjustments to National Standard 1 harvest parameters, management measures could be altered in a timely manner to implement harvest level changes or AMs in response to stock assessment or survey results. Allowing ACL and other adjustments to be made through framework actions could eliminate the need to prepare and analyze individual amendments or amendment actions for each adjustment needed. Framework actions are initiated by the Councils and implemented by the Regional Administrator, and require less time when compared to the lengthy amendment process. The majority of public participation and comment on framework issues typically takes place when the framework procedure is initially drafted during the regular amendment process, as in this action. Eliminating these time-consuming factors would enable harvest modifications to be expedited when they are most needed. The physical environment would be indirectly impacted because changes in harvest levels would change effort levels, either increasing or decreasing the impact of traps on the bottom. A quicker change to the regulations would result in a quicker change in the physical impacts of the fishery.

4.6.2 Direct and Indirect Effect on the Economic Environment

Action 6 appears to primarily administrative in intent. Implementation of Amendment 10 depends on cooperative management. However, Amendment 10 is complicated, with large numbers of possible combinations for alternatives and options. There may be differences of opinion about economic impacts among respective legislative bodies, regulatory bodies and courts. Any differences in regulation between Florida and the Councils would have the most economic impact. This is because practically all of the landings of Caribbean spiny lobster occur in Florida, which has its own regulations for this species. Furthermore, Florida landings occur largely in Monroe County (approximately 90% for commercial landings and 67% for recreational landings, percentages from Table 4.3.2.2). Hence, economic impacts under Amendment 10 would occur primarily in Florida and largely in Monroe County.

4.6.3 Direct and Indirect Effect on the Social Environment

The development of a framework procedure would have beneficial impacts on the social environment as management can react to changes in the stock status or fishery in a more timely manner. **Alternative 1**, the no action alternative would not allow for these types of changes and could, over time, have negative indirect effects. However, framework actions that are done rapidly do not always provide for as much public input and comment on the actions as other regulatory processes. The benefits of timely action often outweigh the diminished timeframe for comment though. **Preferred Alternative 2** would provide consistency in language with regulatory changes and have few effects on the social environment. **Alternatives 3 and 4** provide options for implementing a framework procedure that becomes less restrictive in terms of timing and public input going from **Preferred Alternative 4, Option a** to **Option c**. As mentioned earlier, timing and public input become the parameters that are constrained by these options. While public input and participation by advisory panels can be beneficial, it is time consuming and can slow the process. Yet, that participation can provide a more acceptable regulation which may lead to better compliance.

4.6.4 Direct and Indirect Effect on the Administrative Environment

Alternative 1 would be the most administratively burdensome of the alternatives being considered, because all modifications to ACLs, ACTs, and AMs would need to be implemented through an FMP amendment, which is a more laborious and time consuming process than a framework action. **Preferred Alternative 2** would have no impact on the administrative environment. **Alternatives 3** would incur less of an administrative burden than **Alternative 1** because several steps in the lengthy amendment process would be eliminated if the Regional Administrator were given the latitude to adjust ACLs, ACTs, and AMs through framework actions. **Preferred Alternative 4** would incur even less of an administrative burden because other management measures could also be adjusted through framework actions. **Alternative 4 Option b** would be the least burdensome because it would allow the widest range of actions to take place under the framework procedure.

The Gulf Council is considering alternatives to the framework procedures of all Gulf FMPs that are similar to the options in **Alternative 4**. If the Councils choose the same basic framework for the Spiny Lobster FMP as for other Gulf FMPs, the process of implementing framework actions may be more streamlined.

4.7 Action 7: Modify Regulations Regarding Possession and Handling of Short Caribbean Spiny Lobsters as "Undersized Attractants"

Alternative 1: No Action – Allow the possession of no more than 50 undersized Caribbean spiny lobsters, or one per trap aboard the vessel, whichever is greater, for use as attractants.

Alternative 2: Prohibit the possession and use of undersized Caribbean spiny lobsters as attractants.

Alternative 3: Allow undersized Caribbean spiny lobsters, but modify the number of allowable undersized lobsters, regardless of the number of traps fished:

Option a: allow 50 undersized lobsters

Option b: allow 35 undersized lobsters

Preferred Alternative 4: Allow undersized spiny lobster not exceeding 50 per boat and 1 per trap aboard each boat if used exclusively for luring, decoying or otherwise attracting non-captive spiny lobsters into the trap**.**

4.7.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

This action is being considered to address law enforcement concerns related to allowing vessels to maintain undersized spiny lobster onboard fishing vessels. The number and storage requirements for undersize spiny lobster allowed to be retained have been modified several times since the original Spiny Lobster FMP was implemented. In 1982 the Spiny Lobster FMP included the first provisions for keeping undersized spiny lobster for use as attractants. At that time no more than three live undersize lobsters could be placed in each trap or no more than 200 undersize lobsters could be maintained on board a vessel, whichever was greater. The July 1987 final rule implementing Amendment 1 changed the number of undersize lobster that could be kept on board to 100. In May 1988, a second final rule implementing Amendment 1 was published and included a requirement that all undersize lobster are to be maintained in a live well. A regulatory amendment was developed in 1992, which further revised the provisions regarding keeping undersize spiny lobster for use as attractants. The final rule for this regulatory amendment was published in November 1992, and reduced the number of undersize lobster allowed to be kept from 100 to 50, and maintained the live well requirement. The 1992 regulations are still in place today.

Currently, regulations at 50 CFR 640.21(c) state the following:

> *A live spiny lobster under the minimum size limit specified in paragraph (b)(1) of this section that is harvested in the EEZ by a trap may be retained aboard the harvesting vessel for future use as an attractant in a trap provided it is held in a live well aboard the vessel. No more than fifty undersized spiny lobsters, or one per trap aboard the vessel, whichever is greater, may be retained aboard for use as attractants. The live well must provide a minimum of ¾ gallons (1.7 liters) of seawater per spiny lobster.*

An undersized spiny lobster so retained must be released alive and unharmed immediately upon leaving the trap lines and prior to one hour after official sunset each day.

Therefore, each vessel is not necessarily limited to only 50 undersize lobsters, but one lobster per trap. In the commercial spiny lobster fishery, it is common for a vessel to carry more than 100 traps on any one trip. This allowance may contribute to the magnitude of positive socioeconomic impacts. Traditionally, fishermen have realized great success using live lobster as bait in lobster traps. Experiments have shown that traps baited with short lobsters catch approximately three times more lobster than traps baited with any other method (Moe 1991; Heatwole et al. 1988).

Allowing possession of undersized lobster on board any permitted spiny lobster vessel within the EEZ makes it difficult for law enforcement officials to discern whether those undersized lobsters are truly being maintained for use as attractants, or for illegal purposes. If a vessel is stopped by a law enforcement official with undersized lobster onboard in transit toward port with the intention to sell or keep those lobsters, prosecution is made more difficult by the fact that regulations allow undersized spiny lobster to be kept under certain conditions. Furthermore, the state of Florida has implemented their own requirements for the number of undersize lobster allowed to be kept onboard for use as attractants, which are slightly different from current implemented federal regulations. Florida regulations state:

A person aboard a vessel with a C# and trap certificates may harvest and possess while on the water 50 undersized spiny lobster (shorts) and one short per trap aboard the boat. Shorts must be released alive and unharmed upon leaving trap lines (livewell specifications apply). The allowance for shorts applies to the trap fishery only and sale is prohibited.

The state of Florida allows not only 50 undersized lobsters to be maintained onboard licensed vessels, but also one undersized lobster per trap, which is inconsistent with current federal regulations.

In addition to law enforcement concerns, there may be negative biological impacts of allowing 50 or more undersized spiny lobster to be maintained in a live well. If undersized spiny lobster continue to be sold illegally, and transported under the guise of being used as attractants, those lobster are not returned to the water and thus are not able to reproductively contribute to the overall biomass. Secondly, trauma incurred during holding in live wells, caused by crowding, duration of confinement during transport, relocation to a different environment, or exposure to the PaV1 virus, may also contribute to undersized spiny lobster mortality, and ultimately reduce the number of adults available for harvest. It should be noted that some undersize lobster are able to escape from the trap; however, the magnitude of such occurrences is unknown. Hunt et al (1986) indicated an exposure and confinement mortality rate of 26.3 percent for lobsters exposed to air and confined in traps for four weeks. Lobsters that were then held in live wells and confined for the same amount of time showed a mortality rate of 10.1 percent. A study conducted by Matthews (2001) indicated similar reductions in the mortality rates of spiny lobster kept for use as attractants based on observation of commercial lobster traps, due to the

implementation of the live well requirement. Additionally, the Matthews study showed commercial and recreational harvest of spiny lobster increased notably as a result of decreased mortality of undersized lobsters maintained in live wells (Matthews 2001). These mortality rates were reviewed and utilized in SEDAR 8 (2005). Although live wells reduce the risk of mortality do to air exposure some lobsters may perish as a result of predation or starvation when confined to a trap. Furthermore, the continued practice of using sub-legal size lobsters as bait has been shown to increase injuries caused by handing and to reduce the growth rate, causing females to mature at smaller sizes (Maxwell et al. 2009). Smaller females carry fewer eggs then larger females, and thus are considered less fecund than females that reach sexual maturity at larger sizes (Maxwell et al. 2009).

Alternative 1 is the second least biologically conservative of the three alternatives under consideration. Under **Alternative 1**, there would be no change from the current regulatory requirement to keep no more than 50 undersized lobsters, or one per trap aboard the vessel, whichever is greater, for use as attractants. **Alternative 1** produces the second highest rate of spiny lobster mortality associated with use as attractants relative to **Alternatives 2**, **3b,** and **Preferred Alternative 4**. Additionally, **Alternative 1** does not address the previously referenced enforcement concerns. If undersized spiny lobster continue to be sold illegally, and transported under the guise of being used as attractants, those lobster are not returned to the water, and therefore, not have the opportunity to grow to harvestable sizes . Secondly, trauma incurred during holding in live wells, caused by crowding, duration of confinement during transport or relocation to a different environment may also contribute to undersized spiny lobster mortality, which may negatively impact the population.

Through time, the Caribbean spiny lobster population has fluctuated substantially (Figure 4.7.1.1). The total biomass ranged from 15,000 mt in 1985-86 to 20,200 mt in 1995-96 and was 19,200 mt at the beginning of 2003-04. Spawning biomass increased from 3,300 mt in 1985-86 to 5,700 mt in 2003-04 (SEDAR 8 2005) indicating undersized spiny lobster benefit from use of live wells in the form of decreased mortality rates. The SEDAR 8 (2005) used an estimated 10 percent confinement mortality rate for undersized Caribbean spiny lobster kept for use as attractants; however, the time of the season and soak times can cause confinement mortality rates to fluctuate. It is difficult to know the precise number of undersize Caribbean spiny lobster used as attractants in any given year; however, it is understood to be a very common practice in the commercial sector and SEDAR 8 (2005) indicates the total fishing mortality rate in 2003-04 fishing year was 0.85 per year with the bait mortality portion of that fishing mortality rate being 0.05 per year. Figure 4.7.1.1 illustrates fishing related mortality attributable to each sector and use of undersized lobster as attractants through history.

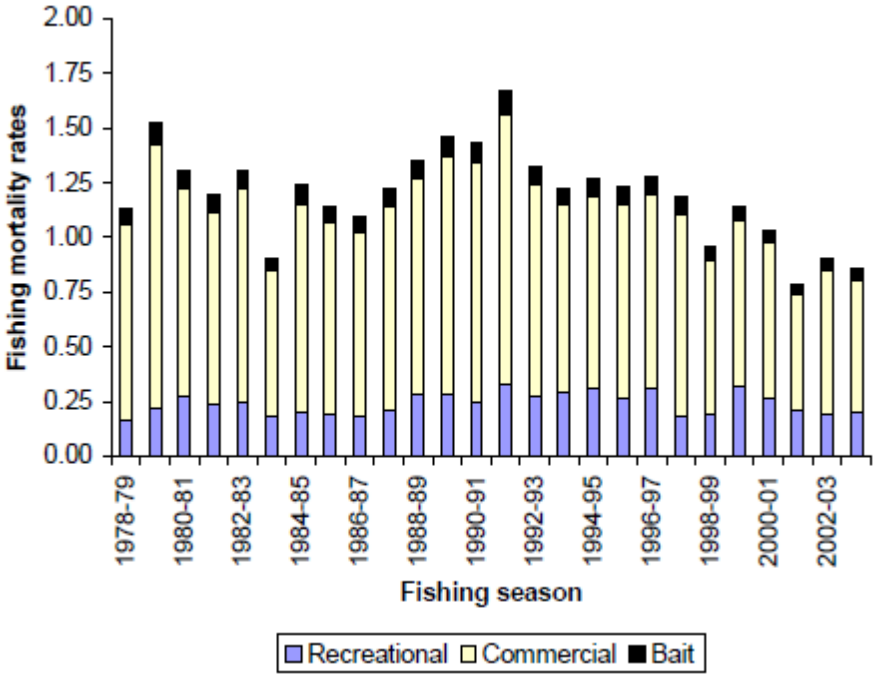

Figure 4.7.1.1. Fishing mortality per year by fishing year for the recreational fishery (purple bars), commercial fishery (yellow bars), and bait fishery (black bars).
Source: SEDAR 8, 2005

Alternative 2 would be the most biologically conservative alternative under this action since, theoretically, all mortality associated with using undersized lobsters as attractants would cease. Under **Alternative 2** there would be an approximate decrease in confinement mortality of 10 percent (SEDAR8). Prohibiting the use of undersize Caribbean spiny lobsters as attractants may also reduce the risk of potential ACL overages and hedge against future overfishing. Additionally, **Alternative 2** would address enforcement issues related to undersized Caribbean spiny lobster since there would no longer be a legal reason for any vessel to have undersize Caribbean spiny lobster onboard. Alternately, prohibiting the use of undersized lobsters for use as attractants may not be a practicable management measure for the fishery since it would likely result in a substantial decrease in harvest (Moe 1991; Heatwole et al. 1988), and could reduce opportunities for the fishery to achieve optimum yield.

Alternative 3 would not address the issues raised by the Office of Law Enforcement; however, it could help to reduce fishing mortality attributable to use of undersized lobsters for baiting purposes. **Alternative 3** is not as precautionary as **Alternative 2** , and depending upon the option chosen, may only yield negligible biological benefits over the status quo. Limiting the number of undersized lobster that could be used as attractants to 35 (**Option b.**) could potentially reduce the current level of confinement mortality by about half, which would likely increase the number of Caribbean spiny lobsters that have the opportunity to grow to harvestable sizes. Additionally, allowing only 35 undersized lobster to be used as bait, and removing the provision that allows one undersized lobster per trap (whichever is greater), could hedge against overfishing, but not to the same degree as **Alternative 2**. **Option a** is the least precautionary of the two sub-options under consideration since it deviates the least from the status quo. **Option a**

would retain the allowance for 50 undersized Caribbean spiny lobster, but would remove the one lobster per trap provision. In doing so, vessels would be limited to 50 undersized lobsters regardless of the number of traps they are carrying onboard. There may be some biological benefit in terms of increasing the number of lobsters allowed to grow to harvestable sizes under this option; however, the degree to which those benefits would impact the environment would depend on the number of fishermen who traditionally carry more than 50 traps and keep more than 50 undersized lobsters for use as attractants.

Preferred Alternative 4 is very similar to **Alternative 1** in that it would allow spiny lobster to be kept onboard for use as attractants; however, it would change the provision to allow 50 spiny lobster *plus* one per trap, rather than 50 spiny lobster "*or*" one per trap, and it would remove the "whichever is greater" portion of the provision. This alternative is the least biologically conservative for spiny lobster of all the alternatives considered because it would increase the number of undersized lobsters able to be maintained onboard a vessel for use as attractants. Changing the current use of "shorts" provision under **Preferred Alternative 4** would make the federal regulations compatible with Florida's state regulations, which may aid enforcement efforts at the state/federal water boundary. The purpose of keeping 50 spiny lobsters onboard is to ensure there is an adequate supply of attractants during the baiting process for each trap, i.e., some traps will be onboard being baited while others would be in the water with baits already in them.

Most commercial spiny lobster fishermen do not consider keeping undersized lobsters for use as attractants a form of bycatch because in their view they are "borrowing" from the resource with the intent to release the lobsters back into the environment alive. A small percentage, (10 percent depending on the time of year and soak time) of lobsters kept to be used as attractants die as a result of such use (SEDAR 8, 2005). A recent study conducted by Hunt and Tringali (2011), used DNA analysis to identify sources of recruitment for Caribbean spiny lobster. The study found the majority of recruits do not come from within the management area, suggesting that the use of undersized Caribbean spiny lobsters and other management measures for the Caribbean spiny lobster fishery would have negligible biological impacts on the population within the management area. Based on the findings of this study, it is unlikely that the continued use of undersized Caribbean spiny lobsters as attractants would adversely affect the biological environment.

Although undersized attractants are technically bycatch, their use may actually decrease the total level of bycatch by the lobster fishery. Experiments have shown that traps baited with shorts caught approximately three times more lobster than traps baited with any other method (Heatwole et al. 1988). Further, traps using non-lobster bait caught fewer lobsters than unbaited traps, probably because the bait attracted stone crabs, which lobsters avoid. Traps using non-lobster bait or no bait would thus take two to three times longer to harvest the same amount of lobsters as traps using lobster bait. Increased soak times of traps would increase bycatch of other species, such as juvenile and adult fish, crabs, and mollucs.

There is concern that allowing spiny lobsters to be kept onboard, even at the status-quo level, could perpetuate the spread of the PaV1 virus, which typically affects juvenile spiny lobsters and causes general lethargy. The virus can be transmitted via prolonged contact, and ingestion.

Spiny lobsters infected with the PaV1 virus are typically avoided by healthy, normally social, conspecifics (Behringer et al. 2008). A study conducted by Behringer (2010), found that healthy spiny lobsters were less likely to cohabitate with infected with PaV1, which could leave them vulnerable to predation if they were to choose a less safe shelter to avoid contact with the infected lobster. Therefore, the higher the number of spiny lobsters allowed to be maintained in lives wells the higher the risk of perpetuating the spread of the PaV1 virus, especially amongst young spiny lobsters that are more susceptible to acquiring the virus.

Alternative 1 would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Modifying or removing the 50-shorts rule is unlikely to alter fishing behavior in a way that would cause new adverse effects to *Acropora*. The impacts from **Alternative 2**, **Alternative 3 Option 3b ,** and **Preferred Alternative 4,** and the associated options**,** on sea turtles and smalltooth sawfish are unclear. If they perpetuate the existing amount of fishing effort, but causes effort redistribution, any potential effort shift is unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. If these alternatives reduce the overall amount of fishing effort in the fishery, the risk of interaction between sea turtles and smalltooth sawfish will likely decrease.

4.7.2 Direct and Indirect Effect on the Economic Environment

The estimated mortality associated with the use of undersized lobsters as bait is shown along with commercial landings and recreational landings. It has been declining and averaged 189,091 pounds per year in 04/05 – 09/10 compared with 541,000 pounds in 85/86 – 89/90.

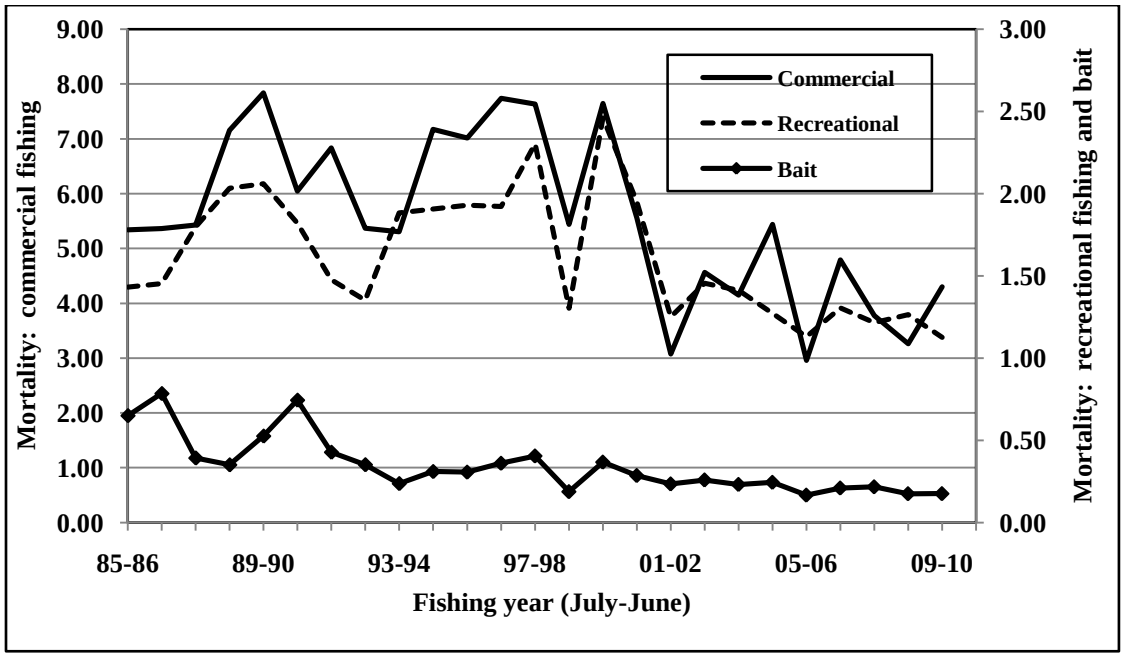

Figure 4.7.2.1 Fishing mortality: commercial and recreational fishing, and bait
Source: SEDAR 8, 2010 update, Table 2.1.1 (01Dec10)

Many commercial trap fishermen may already purchase bait, based on fishermen's perceptions on how to best attract lobsters (sample data for four landing areas in Monroe County and one in

the Miami River in 01/02; Shivlani et al. 2004). Those who reported more use of undersized lobsters as attractants had much lower average trip costs for bait compared with those who used purchased bait (such as cowhide), and they had shorter trips, and lower average trip costs for other major items as well. Average trips costs for bait were in the range of $12.72 (Middle Keys) to $133.24 (Key West), with the average trip costs for bait costs of $60.90 for the whole sample (data in current dollars for 01/02, not adjusted to 2008$).

Alternative 1 (status quo) would allow the possession of no more than 50 undersized spiny lobsters or one per trap aboard the vessel, whichever is greater, for use as attractants.

Alternative 1 would not result in any change in the use of undersized spiny lobsters in lobster traps as attractants. As a result, all status quo operation of the fishery, and associated economic benefits, would remain unchanged. However, if **Alternative 2** would reduce the risk of exceeding the ACL when compared with **Alternative 1**, then **Alternative 1** would increase the likelihood of shortened fishing seasons, trip limits, bag limits, or whatever the Councils choose as a means to regulate fishing when landings exceed or are expected to exceed the ACL.

Alternative 2 would prohibit the possession and use of undersized Caribbean spiny lobster as attractants. Compared with Alternative 1 (status quo), **Alternative 2** could reduce the likelihood of incurring shortened fishing seasons, trip limits, bag limits, or whatever the Councils choose as a means to regulate fishing when landings exceed or are expected to exceed the ACL. It is assumed here that what is counted as "bait" for stock assessment purposes represents the estimated fishing mortality associated with the use of undersized Caribbean spiny lobster as attractants, as shown in Figure 4.7.2.1 (data from SEDAR 8, 2010 update, Table 2.1.1, 01Dec10). Under **Alternative 2**, fishing mortality would be reduced by 189,091 pounds, the estimated bait-associated mortality under **Alternative 1** (status quo). At least some, if not most the undersized Caribbean spiny lobster used as attractants are kept alive on board a vessel and returned to the water alive, as required (quoting 50 CFR 640.21(c)):

The live well must provide a minimum of ¾ gallon (1.7 liters) of seawater per lobster. An undersized spiny lobster so retained [for use as an attractant] must be released alive and unharmed immediately leaving the trap lines and prior to prior to one hour after sunset each day.

Alternative 2 would in practice require the use of more purchased bait, hence increase trip costs on average for commercial fishing for spiny lobster as a whole. This would reduce producer surplus for this activity.

Alternative 3 would allow the possession and use of undersized Caribbean spiny lobster, but modify the number allowed, regardless of the number of traps fished. Depending on how it is interpreted, **Alternative 3** should reduce the fishing mortality associated with the use undersized Caribbean spiny lobster as attractants, more so for **Alternative 3, Option b**, than for **Alternative 3, Option a,** when compared with **Alternative 1** (status quo), for which the assumed fishing mortality is 189,000 pounds per year (Table 4.3.3.2). The economic impact of **Alternative 3** would be less than that of **Alternative 2,** and require the use of less purchased bait, hence less increase in trip costs for commercial fishing for spiny lobster as a whole. It would reduce producer surplus less than **Alternative 2**, when both are compared with **Alternative 1**.

Compared with **Alternative 1**, **Alternative 3** would require the use of more purchased bait, hence an increase in trip costs for commercial fishing for spiny lobster as a whole. It would reduce producer surplus from that for **Alternative 1**.

Preferred Alternative 4 would allow possession and use of undersized Caribbean spiny lobster not exceeding 50 per boat and l per trap on board if used exclusively for luring, decoying or otherwise attracting non-captive spiny lobsters into traps. This compares with of no more than 50 undersized Caribbean spiny lobsters or one per trap aboard the vessel for **Alternative 1**.

Depending on how it is interpreted, **Preferred Alternative 4** would reduce fishing mortality associated with the use undersized Caribbean spiny lobster as attractants far less than **Alternative 2,** and require the use of less purchased bait, hence less increase in trip costs for commercial fishing for spiny lobster as a whole. It would reduce producer surplus less than **Alternative 2**, when both are compared with **Alternative 1**.

It is estimated that **Preferred Alternative 4** could allow perhaps 50-80 attractants on board vessel during fishing operations (50 per vessel plus 1 per trap on board, perhaps 30-35 on average) when estimated as described below. This compares with having a maximum 50 on board under **Alternative 1**, assuming the averages estimated below are indicative (a maximum of either 50 per vessel or 30-35 per vessel based on the average number of traps on board during fishing operations).

The number of traps fished on a trip can be estimated for **Alternative 1** (status quo), when this number is interpreted to mean the number of traps hauled to remove lobsters. This is not necessarily an indication of the number traps on a vessel, which may be 30-35 at any one time during fishing operations (annual averages for trips obtained as: traps hauled per trip / sets per trip = 200 / 7 = 29; 280 / 8 = 35). In the last 5 years, the average number of traps hauled per trip was mostly in the range of 200-280 traps on trips of 14-17 hours (hours away from port), with 7-8 sets per trip, which is interpreted to mean trap lines hauled and returned to the water per trip) (underlying data as used in Vondruska 2010a). The total number traps fished on all trips declines by month on average, along with total pounds landed, and the median number of traps fished per trip.

4.7.3 Direct and Indirect Effect on the Social Environment

The use of undersized lobster as attractants has been acceptable practice in the spiny lobster fishery for some time. It complicates law enforcement as the size limits on harvested lobster can make determination of the lobster's disposition as bait or product questionable. The no action **Alternative 1** would continue the difficulty that law enforcement faces with prosecuting undersized lobster violations. **Alternative 2** could solve the law enforcement issue, but may impose a hardship on lobster fishermen who utilize "shorts" as attractants, if their harvest is reduced as a result. The two options under **Alternative 3** would continue to allow undersized lobster for attractants, but would reduce the number allowed on board and make it inconsistent with current state regulations. **Option a** would allow 50 "shorts" but make no allowance for number of traps. **Alternative 3, Option b** would reduce the number to 35 with no allowance for traps. In either case, the difficulty for law enforcement would remain. With **Preferred**

Alternative 4 there is consistency with state regulation which would benefit law enforcement but still does not address the difficulty with the ability to determine undersize harvest. There does not seem to be an alternative that solves all the issues involved with the use of "shorts" as an attractant in the spiny lobster fishery.

4.7.4 Direct and Indirect Effect on the Administrative Environment

Alternative 2 would create the lowest impact on the administrative environment since it would remove the need for enforcement personnel to check vessels for specific numbers of undersized Caribbean spiny lobsters. Enforcement officers would simply check for the absence or presence of undersized lobsters. Additionally, the task of gathering prosecutorial evidence to prove a violation would be made simpler because the vessel operator would not be able to circumvent the undersized lobster prohibition by claiming they were in transit, or had several more traps in the water. **Options a** and **b** under **Alternative 3** would not increase the administrative burden over the status quo since numbers of undersized lobsters would still need to be documented, just at a lower number. However, **Alternative 1, Alternative 3,** and **Preferred Alternative 4,** would not address the current enforcement concerns regarding the use of undersized Caribbean spiny lobster, and difficulty in prosecuting related violations would persist. Because **Preferred Alternative 4** is consistent with current state regulations in Florida, and therefore, would only ease the burden on enforcement to track compliance across the state/federal jurisdictional boundary.

4.8 Action 8: Modify Tailing Requirements for Caribbean Spiny Lobster for Vessels that Obtain a Tailing Permit

*Note: more than one alternative may be chosen as a preferred alternative.

Alternative 1: No Action – Possession of a separated Caribbean spiny lobster tail in or from the EEZ is allowed only when the possession is incidental to fishing exclusively in the EEZ on a trip of 48 hours or more, and a federal tailing permit is issued to and on board the vessel.

Alternative 2: Eliminate the Tail-Separation Permit for all vessels fishing for Caribbean spiny lobster in Gulf and South Atlantic waters of the EEZ.

Preferred Alternative 3: Revise the current regulations to clearly state that all vessels must have either a federal spiny lobster permit or a Florida Restricted Species Endorsements associated with a Florida Saltwater Products License to obtain a tailing permit.

Preferred Alternative 4: All Caribbean spiny lobster landed must either be landed all "whole" or all "tailed".

4.8.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

Currently, a Tail-Separation Permit is required for any vessel that wishes to land spiny lobster with tails detached for storage purposes on trips longer than 48 hours in duration. As of January 2010, there are 334 vessels with active Tail-Separation Permits. Regulations at 50 CFR 640.21(d) do not require that a vessel fishing for spiny lobster in the EEZ first have a federal or state permit/license/endorsement before they may obtain a federal Tail-Separation Permit. Vessels wishing to obtain a Tail-Separation Permit only have to meet the qualifying criteria of certifying that at least 10 percent of their earned income is derived from commercial fishing, and be on a trip for 48 hours or more. However, any vessel owner wishing to legally sell Caribbean spiny lobster must have the requisite permit/license/endorsement.

To commercially harvest Caribbean spiny lobster using traps in Florida state waters, a vessel must not only have a Florida Restricted Species Endorsement, but also a Crawfish Endorsement. Florida state regulations require that a Crawfish Endorsement must be obtained to sell or harvest in excess of the bag limits, Caribbean spiny lobster. Crawfish Endorsements can only be issued to a person, firm, or corporation that possesses a valid Saltwater Products License with a Restricted Species Endorsement [FAC 68B-24.0055]. Furthermore, in the 2004-2005 fishing season, a Commercial Diver Permit was required to harvest Caribbean spiny lobster in excess of the bag limit if harvested by diving. Commercial diver permits could be obtained by applicants who did not already possess one or more lobster trap certificates. However, from January 2005 – July 1, 2015, no new Commercial Diver Permits will be issued or renewed, except for those that were active during the 2004-2005 fishing season.

Current regulations do not explicitly state that a vessel must be associated with either a Florida Restricted Species Endorsement, Crawfish Endorsement, Commercial Diving Permit, and/or a

federal Spiny Lobster Permit to harvest spiny lobster in excess of the bag limits, leaving open the possibility of a non-commercially permitted vessel to obtain a tailing permit, which may affect enforcement of the minimum size requirements, the spear fishing prohibition, and illegal sales. Action 11 of Amendment 1 to the Spiny Lobster FMP (1987) clearly states the Council's initial intent for issuance of tailing permits:

> *The separation of lobster carapace and tail at sea shall be prohibited except by species permit. To be eligible for a tail separation permit, the fishing craft must have been assigned a commercial lobster permit, and must be operated for lobster fishing in the EEZ for two or more days from port. Furthermore, a signed statement that his fishing activity necessitates a tail separation permit.*

However, regulations regarding tailing permit requirements have changed several times since the inception of the permit. In 1990 a final rule implementing Amendment 1 was published in the *Federal Register*. This rule prohibited tailing of spiny lobster harvested from the EEZ except by special permit, and required that a vessel must be associated with a federal commercial spiny lobster permit to obtain a Tail-Separation Permit. In 1992 the Council opted to make the Tail-Separation Permit an endorsement to the federal Spiny Lobster Permit through a regulatory amendment. At that time, it was also determined that federal Spiny Lobster Permit issuance would discontinue when Florida's trap certificate and identification program was implemented and when Florida designated spiny lobster as a restricted species, thus limiting the sellers of Caribbean spiny lobster to individuals who have Restricted Species Endorsements on their Florida Saltwater Products License. The Florida trap certificate and identification program was implemented through a final rule published in 1993. Therefore, as stated in the 1992 regulatory amendment, a federal Spiny Lobster Permit was no longer required for vessels fishing for spiny lobster in state or federal waters off Florida. However, the regulations stated that only vessels with federal Spiny Lobster Permits could obtain a Tail-Separation Endorsement. To allow vessels participating in Florida's trap certificate program without a federal Spiny Lobster Permit, to obtain a Tail-Separation Endorsement, the regulations were modified to change the "Tail-Separation Endorsement" to a "Tail-Separation Permit", and removed the requirement for a federal Spiny Lobster Permit, as outlined in the 1992 regulatory amendment. The regulations currently state:

> *The possession aboard a fishing vessel of a separated spiny lobster tail in or from the EEZ is authorized only when the possession is incidental to fishing exclusively in the EEZ on a trip of 48 hours or more and a federal Tail-Separation Permit specified in 50 CFR 640.4(a)(2).*

50 CFR 640.4(a)(2) states:

> *For a person to possess aboard a fishing vessel a separated spiny lobster tail in or from the EEZ, a Tail-Separation Permit must be issued to the vessel and must be on board.*

The intent of allowing fishermen to tail Caribbean spiny lobster was to promote ease of storage and transport of the harvested lobster on long commercial trips. Tail-Separation Permits were

not initially intended for use by non-commercially permitted vessels. However, because the regulations do not explicitly state that a federal Spiny Lobster Permit, or a Florida Saltwater Products License with a Restricted Species Endorsement are required in order to obtain a Tail-Separation Permit some recreational fishermen have obtained Tail-Separation Permits for their own purposes. Tail-Separation Permits enable commercial vessels (and unintentionally some recreational vessels) to fish more efficiently for spiny lobster than those vessels without the permit. Because whole lobsters utilize more storage space than tails, vessels that are associated with a Tail-Separation Permit are able to store much more product than vessels that have to store the lobster whole. Space limitations such as cooler capacity onboard fishing vessels can also affect product quality. Therefore, fishermen that are allowed to tail their harvested lobster may not only store more product onboard during long trips, they may do so without having to compromise its quality. Greater efficiency means those vessels with Tail-Separation Permits are also able to take more spiny lobster from the population at a faster rate. Therefore, eliminating the Tail-Separation Permit and prohibiting all tailing of Caribbean spiny lobsters could potentially reduce the probability that the commercial ACL would be met or exceeded in any given season as well as aid law enforcement efforts, which is original intent of this action. At the very least a prohibition on tailing would slow thae pace at which Caribbean spiny lobster are harvested due to storage capacity issues onboard participating vessels.

Current regulations do not explicitly state that a vessel must be associated with either a Florida Restricted Species Endorsement, Crawfish Endorsement, Commercial Diving Permit, and/or a federal Spiny Lobster Permit in order to harvest spiny lobster in excess of the bag limits, leaving open the possibility of a non-commercially permitted vessel to obtain a tailing permit, which may affect enforcement of the minimum size requirements, the spear fishing prohibition, and illegal sales. A revision to the regulations may clarify that non-commercially permitted fishermen may not obtain a Tail-Separation Permit regardless of how long a trip is or how much of their earned income is derived from other types of commercial fishing. Revising the regulations in this way would not require an amendment action. The Council would have the option to approve or disapprove the change in regulations when they deem the proposed rule. Currently there are 334 active Tail-Separation Permits.

Several fishery participants that attended the scoping meetings were in favor of requiring all Caribbean spiny lobster be either landed all whole or landed all tailed. The rationale for proposing this alternative is that requiring spiny lobster to be landed all whole or all tailed would prevent the anecdotally reported practice of tailing select lobsters in order conceal their undersized status. Not all fishery participants and dealers noted this as a significant problem, and some did support maintaining the current tailing provisions. The magnitude of illegal tailing is not known, and it is important to note that the ability to tail Caribbean spiny lobsters is a very important contributor to the viability of fishing operations conducted on board vessels with limited storage capacity on long trips. However, requiring that all Caribbean spiny lobsters be landed tailed or whole would close the regulatory loophole for those who attempt to circumvent the three-inch carapace length minimum size requirement, while not prohibiting the practice all together for those who rely on the tailing provision to make profitable trips.

Alternative 1 would not modify the current Tail-Separation Permit regulations for Caribbean spiny lobster. A Tail-Separation Permit would still be required in order to land spiny lobsters

tailed, and the trips would still be required to be 48 hours or longer in duration. Under **Alternative 1** the problem of some recreational fishermen obtaining Tail-Separation Permits, and some commercial and recreational fishermen tailing only undersized lobster and keeping the legal sized lobster whole for landing would persist. There would be no biological benefit realized under **Alternative 1**. **Alternative 2** would be the most biologically conservative of all the alternatives being considered under this action. Removing the ability for fishermen to land any Caribbean spiny lobster tailed would increase the probability that most lobster landed would be of legal size since they could easily be measured. According to Witham et al. (1968), spiny lobsters reach sexual maturity at lengths of approximately 2.8-3.2 inches. Legal sized lobsters are likely to have reached their reproductive potential and are able to contribute to the overall stock abundance. Therefore, ensuring that spiny lobsters are able to mature enough to reproductively contribute to the population by making it more difficult for fishermen to profit off of undersized harvest would remove the incentive for the practice to continue.

Preferred Alternative 3 alone would address the issue of recreational fishermen obtaining Tail-Separation Permits, but it would not address the issue of commercial fishermen landing undersized lobster by tailing them. **Preferred Alternative 3** would result in negligible biological impacts since, based on anecdotal information from NOAA Fisheries Service Office of Law Enforcement, it is thought that there are very few recreational fishermen who have in their possession a Tail-Separation Permit. However, clarifying the regulations now would prevent even more recreational fishermen from trying to obtain the Tail-Separation Permit in the future, which would reduce the risk that undersized lobster could be kept onboard in a tailed condition.

Preferred Alternative 4 would address the issues associated with some fishermen landing part of their catch whole and part of it tailed; presuming anecdotal information is correct and several of those engaging in the practice do so in order to land sub-legal spiny lobsters for profit. If vessels were to consistently land all Caribbean spiny lobster tailed rather than whole the chance that a portion of that harvest is sub-legal is higher than if fishermen chose to land their entire harvest whole. However, whole lobster may be more desirable in the market, and therefore, this measure may reduce the incentive to land all spiny lobster tailed even though it may result in storage issues on long trips. If under **Preferred Alternative 4**, most fishermen choose to land all of their Caribbean spiny lobster harvest whole, the action would be expected to benefit the biological environment by slowing the rate of harvest and potentially reducing the probability of ACL overages. If the majority of fishermen choose to land their harvest tailed, there is an increased risk that more undersized lobster would be taken. Additionally, **Preferred Alternative 4** alone does not address the issue of recreational fishermen obtaining Tail-Separation Permits. However, if **Preferred Alternative 3** were implemented in combination with **Preferred Alternative 4**, the issue of recreational fishermen obtaining Tail-Separation Permits would be addressed, and could; therefore, result in greater biological benefit than if **Preferred Alternative 4** were chosen alone.

Alternative 1 would perpetuate the existing level of risk for interactions between ESA-listed species and the fishery. Requiring that all Caribbean spiny lobster be landed whole or all spiny lobster be landed tailed is unlikely to alter fishing behavior in a way that would cause new adverse effects to *Acropora*. The impacts from **Alternatives 2** through **4,** on sea turtles and

smalltooth sawfish are unclear. If they perpetuate the existing amount of fishing effort, but causes effort redistribution, any potential effort shift or increase in fishing effort is unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. If these alternatives reduce the overall amount of fishing effort in the fishery, the risk of interaction between sea turtles and smalltooth sawfish will likely decrease.

4.8.2 Direct and Indirect Effect on the Economic Environment

Among the alternatives for Action 8, **Preferred Alternative 3** would close an unintended loophole in regulations (Section 4.8.1). Compared with **Alternative 1**, **Preferred Alternative 3** would disallow an unknown number of instances wherein individual recreational fishers and/or charter-boat operators reportedly obtained federal tailing permits and could thereby legally possess and land, but not sell, recreationally-caught lobster tails.

Alternative 2 would reverse a long-standing Council decision that provided an economic incentive to engage in multi-day, deep-water fishing for spiny lobster in the EEZ. Assuming that **Preferred Alternative 3** is approved, **Alternative 2** would have an economic impact exclusively on the commercial sector when compared with **Alternative 1**, because lobster tails could not be held onboard fishing vessels in the EEZ, thereby ending what is now a much reduced economic activity (Figure 4.8.2.1).

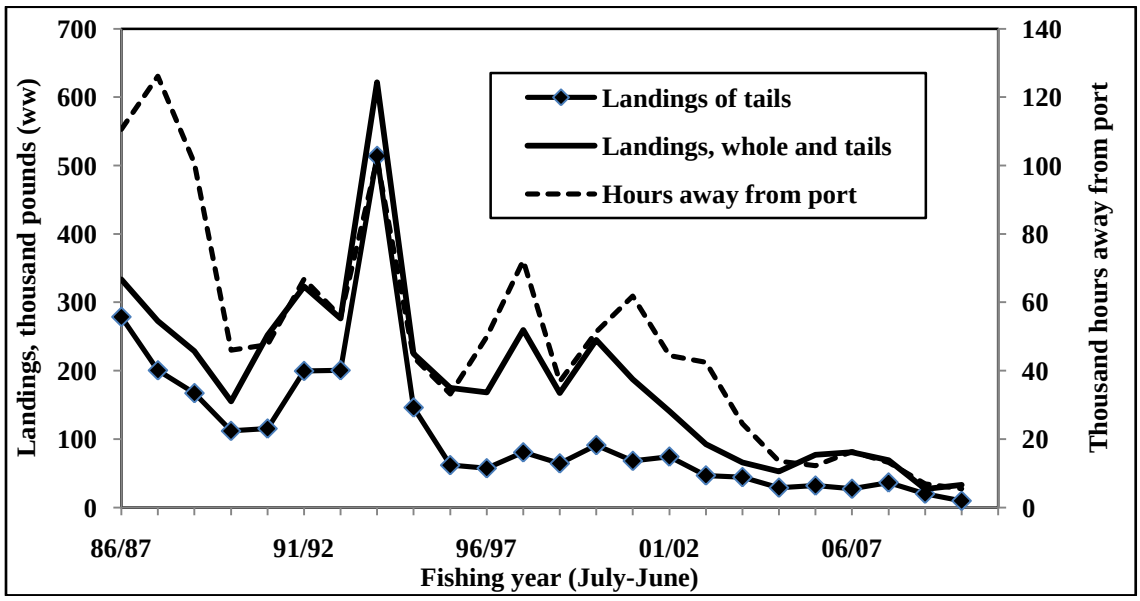

Figure 4.8.2.1 Spiny lobster tail trips, landings and fishing effort in Florida

The long-term decline in multi-day, deep-water fishing for spiny lobster may be attributed to several factors, many of which have increased the cost of fishing.[15] Comparisons of gross

[15]The long-term decline in multi-day, deep-water fishing for spiny lobster may be attributed to such factors as the expansion of no-take areas, "gentrification" of the Florida Keys, gentrification-related land-use regulations (such as respecting trap storage), reduced access to water front land and higher docking fees, a decline in the number of dealers (who provide docking and other services to fishermen), the cost of living (fishing) in the Florida Keys, especially in Key West, and high vessel-operating and trip costs (Shivlani et al., 2004; Shivlani, 2009).

revenue and costs using available data suggest that fishermen are even less likely to cover their costs for multi-day, deep-water fishing for spiny lobster than for other fishing for spiny lobster (see last paragraph under “Survey Data” in this section).

Table 4.8.2.1 Florida spiny lobster, landings and effort indicators

Data shown represent annual averages for fishing years 2005/06 - 2009/10	Florida, all trips	Florida, trips landing whole lobster	Florida, trips landing lobster tails	
			Landings of tails	All lobster landings
	1	2	3	4
Total landings of spiny lobster, pounds (ww)	3,671,381	3,646,331	25,050	57,210
Total ex-vessel value of lobster, 2008$	$22,226,899	$22,081,439	$145,458	$333,682
Vessel gross, all FTT-reported landings, 2008$	$23,532,683			$542,636
Trips	15,568	15,470	129.8	na
Spiny lobster, pounds (ww) / trip	242.2	241.8	189.4	433.2
Spiny lobster, 2008$ / trip	$1,386	$1,386	$1,073	$2,386
Trip gross, all species landed, 2008$ / trip	$1,468	$1,457	na	$4,098
Vessels	780.8	769.4	34.8	na
Trips per year	19.94	20.11	3.73	na
Spiny lobster, pounds (ww) / vessel	4713.6	4752.4	711.2	1593.8
2008$ / vessel for spiny lobster	$28,305	$28,564	$4,063	$8,921
Vessel gross, 2008$ / vessel	$29,960	$30,027	na	$15,384
Traps hauled / trip	275.6	276.0	na	421.4
Time away from port, average hours / trip	15.2	14.4	na	82.4
Median--50th percentile--hours / trip	8.0	8.0	na	57.6
90th percentile, hours / trip	22.0	21.6	na	192.0
Gear soaktime, hours / trip	241.4	241.2	na	496.8
Trap lines set per trip	8.0	8.0	na	34.8
Depth fished in feet, average for trips	33.4	33.4	na	84.8
90th percentile, depth fished	148.0	139.0	na	150.0

Source: NMFS, SEFSC, FTT (19Mar10), data and methods as in Vondruska 2010a. Data for landings and ex-vessel value of lobster tails and whole lobster are separated into two data sets based on FTT data record fields for whole weight, landed weight and conversion factors (this table, columns 2 and 3). Second, categorical variables in the data set for lobster tails (this table, column 3; month, year, vessel id and trip ticket number) are used to select data records (from data set for column 1, this table) so as create another data set with landings of both lobster tails and whole lobster (this table, column 4). There are some caveats; e.g., vessel and trip totals in columns 2 and 3 are not mutually exclusive, i.e., their sums exceed the respective totals in column 1 because some vessels and trips land whole lobsters and tails.

Preferred Alternative 4 may seem at first glance to have a less onerous economic impact on commercial fishing than **Alternative 2,** but either would affect the economic viability of remnant multi-day, deep-water fishing for spiny lobster tails in the EEZ, notably fishing in Monroe County (Figure 4.8.2.1; Table 4.8.2.1). [16]

Alternative 2 and Preferred Alternative 4 would, respectively, disallow or restrict fishermen's choices in vessel-based, market-oriented production of spiny lobsters in accord with changing

[16]Any economic impacts of Amendment 10 would occur largely in Monroe County. That is, even though the FMP applies to all southeastern coastal states (North Carolina through Texas), practically all of the landings of Caribbean spiny lobster occur in Florida, largely in Monroe County, which accounts for 90% for Florida's commercial landings and 67% of Florida's recreational landings (averages for 2005/06-2009/10). Relatively small amounts have been reported for other states since 1977, in most instances for fewer than three dealers, in which case the data are confidential (unpublished analysis of NMFS, SEFSC, ALS data as of 31Aug10, John Vondruska, 13Dec10).

economic and global-market conditions. Shore-based production of tails from whole lobsters would occur, and this would transfer the associated economic value added (net income) away from fishermen. It is estimated that a significant proportion of Florida's spiny lobsters are exported (Vondruska 2010b). U.S. exports include frozen, shell-on tails, as for the U.S. market, but market preferences mean that relatively more live, fresh whole, and frozen whole spiny lobsters are imported by other countries. U.S. exports of spiny lobster go to Canada, France, Japan, China and many other countries in Asia, Europe and the Western Hemisphere.

Estimated commercial landings of spiny lobster tails and the associated fishing effort in Florida have declined substantially since the late 1980s and early 1990s (Figure 4.8.2.1). Landings of tails are relatively low, an estimated 0.025 mp (ww) on average in the last five years compared with 3.646 mp for whole lobsters (Table 4.8.2.1, columns 2 and 3). Strictly speaking, the associated fishing effort is not for lobster tails alone. More whole lobsters were landed on the trips with landings of lobster tails in the last five years, though the proportions have varied over time (Figure 4.8.2.1; see methodological note in Table 4.8.2.1).

According to several indicators, average effort on trips with landings of spiny lobster tails is higher (compare column 4 with columns 1 and 2, Table 4.8.2.1). For example, hours away from port are greater (82 hours per trip versus 14-15 hours); depth fished is greater (85 feet versus 33 feet); more traps are hauled (421 traps per versus 275-276 traps); gear soaktime is greater (497 hours versus 241 hours); and the number of trap lines set is higher (34.8 versus 8.0). Also, trip landings, the ex-vessel value of spiny lobster landed, and trip gross are higher, along with the share of other species in trip gross. If FTT-reported data represents all of their fishing activity, then vessel gross is lower (i.e., assuming no landings are reported in other states).

The characteristics of multi-day, deep-water fishing trips in the EEZ depicted in Table 4.8.2.1 and the implied trip costs most closely fit sample data for Key West and the Lower Keys, two of five sampling areas for a cost-and-returns survey covering the 2001/02 season (Shivlani et al., 2004). According to the survey, the average number of traps hauled per trip is highest for Key West (410 traps), and this is close to what is shown in Table 4.8.2.1 (421 traps). For two of the five areas, Key West and Lower Keys, trip costs are higher, notably because of purchases of fuel/oil, ice, bait, and food. The Key West fishermen's trip costs averaged $459, compared with $242 per trip for all fishermen in the survey (data include crew shares; data are not adjusted to 2008$). Most of the higher trip costs for Key West relate to trip length. Higher costs for purchased bait for Key West relate to fishermen's perceptions about the efficacy of different bait. Bait costs were much lower elsewhere, because own-caught "shorts" (meaning live lobsters smaller than market size that are placed in traps as attractants) tended to be used more in the Middle Keys, Upper Keys and Miami River (Shivlani et al., 2004).

Other survey results for the 2001/02 season (Shivlani et al., 2004) indicate that commercial fishermen operating in the Keys tended to have long tenure (mostly more than 20 years), to be full-time operators, to derive 83% of their personal income from commercial fishing, and to have considerable investment in vessels and traps. For example, the average cost of vessels exceeded $107,000 ($131,000 for Key West) and an average of 1,142 traps was worth more than $29,000

(vessel operating costs, *Ibid*, pp. 9 and 34-44). [17] Vessels were slightly longer in Key West and tended to have more powerful engines (*Ibid*, p. 46). Docking costs were highest for Key West, $5,951 versus a survey average of $3,316, as were the number of traps built each year, 492 traps versus a survey average of 434 traps, given the differences in trap life span (4.11 years versus a survey average of 3.31 years) (*Ibid*, p. 44). Trip length affected how crew members were paid, and vessels that engaged in multi-day trips were more likely to use shareholder arrangements, wherein crew members take on more responsibilities and risks, and they are paid accordingly (*Ibid*., pp. 77-78).

Cost and revenue comparisons suggest that fishermen on average are more likely to cover trip costs than they are to cover vessel-operating costs for multi-day, deep-water fishing for spiny lobster in the EEZ. Significant statistical variability among observations in the 2001/02 survey implies that some fishermen are more likely to cover trip and vessel-operating costs than others. Fishermen are not likely to make a trip if they expect trip revenue to fall short of trip costs. If they cannot also cover annual vessel-operating costs with what remains of gross revenue after covering trip costs, there is an economic disincentive to continue fishing. A few may be able to cover fishing costs with income from other sources, but this seems unlikely for most, because surveyed vessel owners derived 83% of their personal income from commercial fishing, and 86.5% claimed to be full-time (not part-time) fishery participants (Shivlani et al., 2004, p. 8).

Comparing annual average trip costs ($459) and trip gross ($4,049) suggests an economic incentive to make trips with landings of lobster tails in Florida (Table 4.8.2.1, column 4, data in 2008$; Shivlani et al., 2004, Key West sample, data in 2001/02 dollars). The same is not true for vessels, because the vessel gross ($15,384 in 2008$) falls well short of estimated vessel-operating costs (approximately $38,000 per year in 2001/02 dollars, not counting trip costs for a vessel, perhaps $1,700 per year) (Table 4.8.2.1, column 4; Shivlani et al., 2004, Key West sample). On average, trip gross for all trips with landings of spiny lobster in Florida ($1,468) exceeds estimated trip costs ($242), but vessel gross ($29,960) falls short of vessel-operating costs (approximately $42,000, not counting trip costs for a vessel, perhaps $4,800; Table 4.8.2.1, column 1; Shivlani et al., 2004, data for whole sample).

Any excess of fish costs over gross revenue would help explain the decline in the number of vessels engaged in landing lobster tails in Florida (Figure 4.8.2.2). An average of 315 vessels per year engaged in this activity 1986/87 – 1990/91 and 35 did so in 2005/06 – 2009/10. Over the same period of time, the average number trips per year declined from 931trips to 130. Among the factors affecting trip costs since the 2001/2002 survey was completed by Shivlani et al. (2004), it is noted that fuel prices increased sharply in the mid to late 2000s and then declined. However, it now appears that they may reach new highs as the 2011/12 commercial lobster season gets underway in August 2011. Fuel costs could have contributed to the decline in effort since the mid to late 2000s (Figures 4.8.2.1 and 4.8.2.2).

[17]Shivlani et al. (2004, p. 42) state: "Key West, from where most multiple-day trips are taken and which is closest to the fishing grounds of the Dry Tortugas and eastern Gulf of Mexico, requires a longer distance fleet, and the higher average vessel value may reflect that."

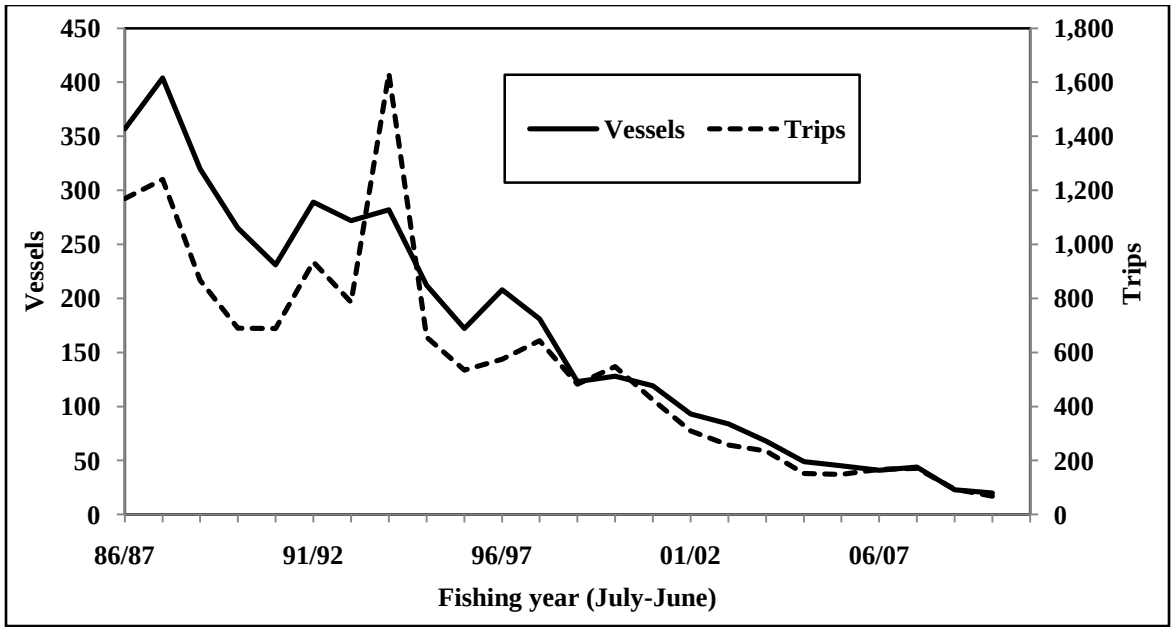

Figure 4.8.2.2 Spiny lobster tail trips, vessels and trips

Section 4.8.1 appears to suggest that **Alternative 2** or **Preferred Alternative 4** may help address some law enforcement issues. These alternatives would reverse a long-standing Council decision that provided an economic incentive to engage in commercial multi-day, deep-water fishing for spiny lobster in the EEZ. Even with this Council approved incentive, other factors have greatly reduced the number of vessels landing lobster tails commercially to an average of 35 per year in 2005/06 – 2009/10 (Table 4.8.2.1 and Figure 4.8.2.2). There are more vessels with landings of spiny lobster in Florida, 2,175 on average in 1987/88 – 1991/92 and 781 vessels in 2005/06 – 2009/10 (Section 3.4.1; Table 3.4.1.1).

4.8.3 Direct and Indirect Effect on the Social Environment

Modifying the tailing requirements can certainly benefit the social environment; yet, the alternatives do not provide a complete solution to the problem. **Alternative 1** would provide no solution as no action would be taken. While **Alternative 2** would solve most of the law enforcement issues, it would not provide the benefits of the original intent which allows for fishermen who take longer fishing trips to accommodate space issues with whole lobsters. By requiring recreational fishermen to obtain state commercial permits to obtain a tailing permit under **Preferred Alternative 3** would remove some of the uncertainty for law enforcement, yet still impose some ambiguity in the regulations making it difficult to regulate harvest of undersized lobster. By requiring fishermen to either land all tailed or whole product in **Preferred Alternative 4** would remove some of the difficulty in prosecuting the harvest of undersized lobster and in conjunction with **Preferred Alternative 3** and may be the best solution to a difficult problem while continuing to provide for fishermen's concerns of space on long trips.

4.8.4 Direct and Indirect Effect on the Administrative Environment

Under **Alternative 1**, the current level of administrative time and cost burdens would be maintained. Enforcement concerns related to the harvest of undersized Caribbean spiny lobsters would persist and recreational fishermen may continue to acquire Tail Separation Permits, which was an unintended consequence of previously implemented regulations. **Alternative 2** would have a positive impact on the administrative and law enforcement environments since the Tail-Separation Permit would no longer exist and the practice of tailing Caribbean spiny lobsters would be prohibited. **Preferred Alternative 3** would create a very small administrative burden when compared to the status quo because some updates to the current regulatory text would be necessary. **Preferred Alternative 4** would also require a modification to the regulations; however, the administrative burden would be very low. If the majority of fishermen chose to land their harvest whole the burden on law enforcement officers would be reduced for those trips. Law enforcement issues may still exist for those fishermen who may choose to land their entire harvest tailed under **Preferred Alternative 4**.

4.9 Action 9: Limit Spiny Lobster Fishing in Certain Areas in the EEZ off Florida to Protect Threatened Staghorn and Elkhorn Corals (*Acropora*)

Alternative 1: No Action – Do not limit spiny lobster fishing in certain areas in the EEZ off Florida to address ESA concerns for *Acropora*.

Alternative 2: Prohibit spiny lobster trapping on all known hardbottom in the EEZ off Florida in water depths less than 30 meters.

Alternative 3: Expand existing and/or create new closed areas to prohibit spiny lobster trapping in the EEZ off Florida.

Preferred Option a: Create 25 ―large closed areas to protect threatened *Acropora* corals.

Option b: Create 37 ―medium closed areas to protect threatened *Acropora* corals.

Option c: Create 52 ―small closed areas to protect threatened *Acropora* corals.

Alternative 4: Expand existing and/or create new closed areas to prohibit all spiny lobster fishing in the EEZ off Florida.

Option a: Create 25 ―large closed areas to protect threatened *Acropora* corals.

Option b: Create 37 ―medium closed areas to protect threatened *Acropora* corals.

Option c: Create 52 ―small closed areas to protect threatened *Acropora* corals.

4.9.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

Spiny lobster traps are generally not deployed on coral or hardbottom (Lewis et al. 2009), and most fishers appear to drop traps on seagrass, rubble, or sandy habitats because these areas are less likely to damage traps (Hill et al. 2003). Traps also appear to move less on these substrates (Uhrin et al. 2005). However, the relatively poor water quality in the Lower and Middle Keys may cause fishers to accidentally deploy traps on habitats that could support elkhorn and staghorn corals (“*Acropora”)*. The ESA biological opinion determined that the deployment and retrieval of traps during normal fishing operations had little impact to *Acropora* relative to traps moved from their original locations during storms.

Lewis et al. (2009) analyzed the impacts to benthic habitat in the Florida Keys of trap movement during storms. The study documented the distance traps moved during non-tropical storm events. Buoyed traps moved an average of 15 ft during each storm and as much as 98 ft from their original location (Lewis et al. 2009). The movement of buoyed spiny lobster traps following a tropical storm or hurricane has never been measured during a trap impact study, largely because those traps move so far from their original locations that they are rarely, if ever, recovered. However, anecdotal evidence indicates that fishermen have found traps several miles from their original location after tropical storms and/or hurricanes (FWC unpublished data).

The movement of traps during storms poses the greatest threat to *Acropora.* Because of *Acroporas*’ branching morphology, colonies of any size are susceptible to fragmentation/breakage and abrasion from traps and trap lines. Even traps initially placed by fishermen in locations devoid of *Acropora* colonies can be moved by storms into reef habitats

and cause damage. Creating closed areas would reduce the likelihood of traps contacting colonies even if they are moved by storms by creating buffers between the closest traps and *Acropora* colonies. Closed areas approximately 200 ft or more across would likely be sufficient to protect *Acropora* colonies from trap movements occurring during typical non-tropical storm conditions.

The **Alternatives 2, 3, and 4** were developed primarily to protect colonies with high conservation value and areas of high *Acropora* density. The largest "super colonies" were designated as the highst conservation priority because of their importance to sexual reproduction. *Acropora* corals are generally considered sexually mature when the surface area of live tissue exceeds 100 cm^2. Elkhorn corals with a living tissue surface area of 1000 cm^2 could be considered "super colonies." A similar distinction could be made for staghorn corals with a living tissue surface area of 500 cm^2. Colonies of this size have exponentially higher reproductive potential compared to other sexually mature colonies, and represent essential sources of gamete production. Colonies of this size are also exceedingly rare. Sampling at over 1,000 locations throughout the Florida Keys and the Dry Tortugas identified only 17 super colonies (6 staghorn colonies and 9 elkhorn colonies). The same level of sampling has also identified 62 sexually mature colonies (32 staghorn colonies and 30 elkhorn colonies) and 61 non-sexually mature colonies (58 staghorn colonies and 3 elkhorn colonies).
Alternative 1 (No Action) would have the least biological benefit to *Acropora*, and would perpetuate the existing level of risk of interaction between these species and the fishery. **Alternative 1** would not meet the requirement established under the biological opinion. **Alternative 2** would provide the greatest biological benefit to *Acropora* and other hardbottom/coral resources. This alternative would greatly minimize any risk of interaction between *Acropora* and spiny lobster traps in federal waters. Relative to **Alternative 2**, **Alternatives 3 and 4** would be less biologically beneficial to *Acropora* colonies located outside the closed areas. **Alternative 3 Options a-c** would reduce the risk of trap damage to *Acropora* by prohibiting the use of traps near areas of high *Acropora* density or near colonies with high conservation value. **Preferred Alternative 3 Option a** would likely provide the greatest biological benefit because it closes approximately 14 square miles of hardbottom habitat to trapping. **Alternative 3 Option b and c** would likely have decreasing biological benefits, closing approximately 8 and 4 square miles of hardbottom habitat to trapping, respectively.. As closed areas get smaller the potential for interactions between trap gear and corals increase. **Alternative 4** and the associated options would provide slightly more biological benefit to *Acropora* colonies than **Preferred Alternative 3** and the associated options because it would prohibit all fishing for spiny lobster in the proposed closed areas. **Alternatives 2, 3, and 4** would fulfill the requirements of the terms and conditions prescribed in the biological opinion. Figures 4.9.1.1 through 4.9.1.3c depict the locations of the proposed closed and existing areas from west to east. **Alternative 1** would perpetuate the existing level of risk for interactions between other ESA-listed species and the fishery. The impacts from **Alternatives 2-4** and their associated options on sea turtles and smalltooth sawfish are unclear. If these closed areas perpetuate the existing amount of fishing effort, but cause effort redistribution, any potential effort shift is unlikely to change the level of interaction between sea turtles and smalltooth sawfish and the fishery as a whole. If these alternatives reduce the overall amount of fishing effort in the fishery, the risk of interaction between sea turtles and smalltooth sawfish would likely decrease.

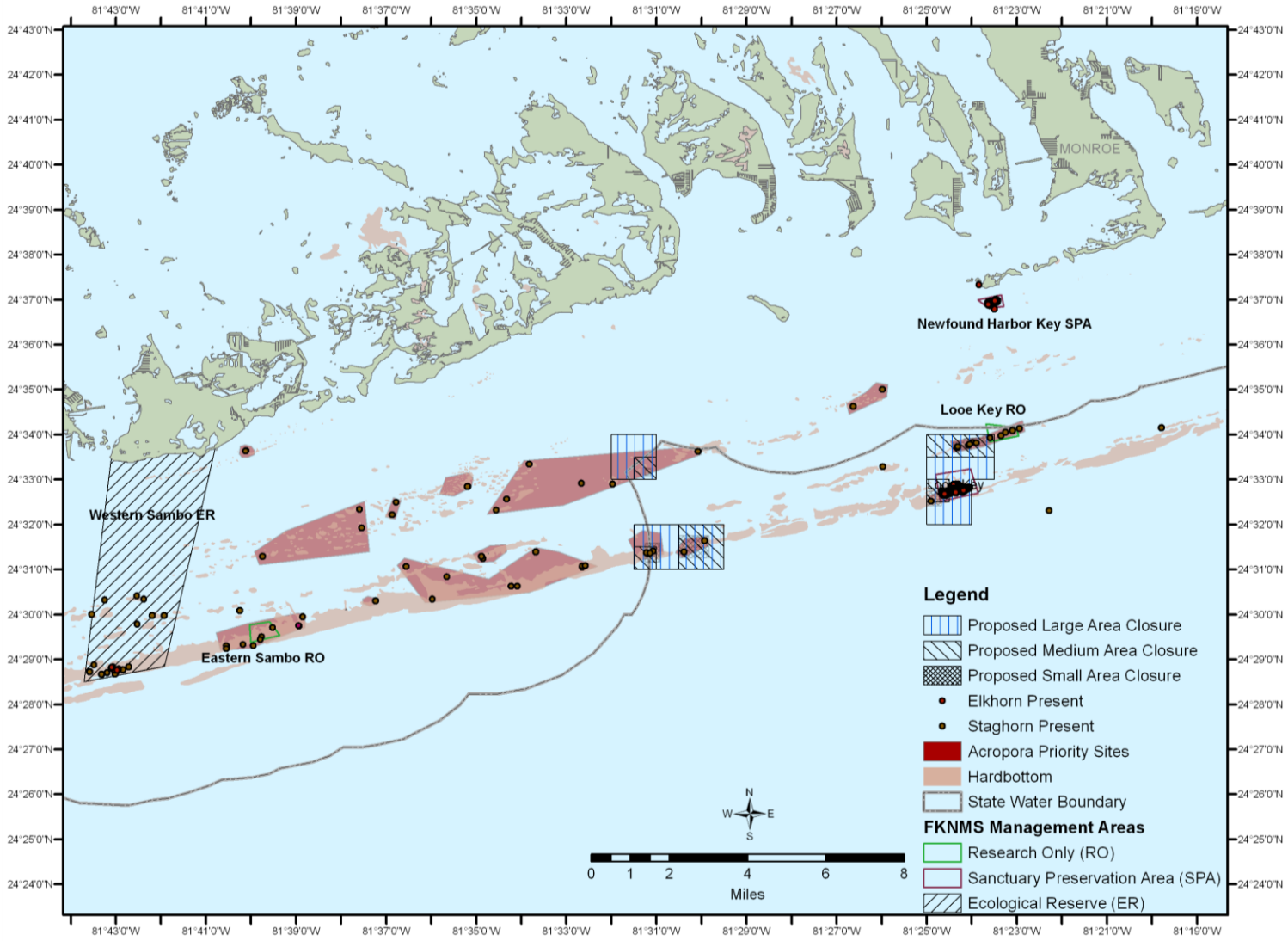

Figure 4.9.1.1. Proposed closed areas in the Lower Keys.

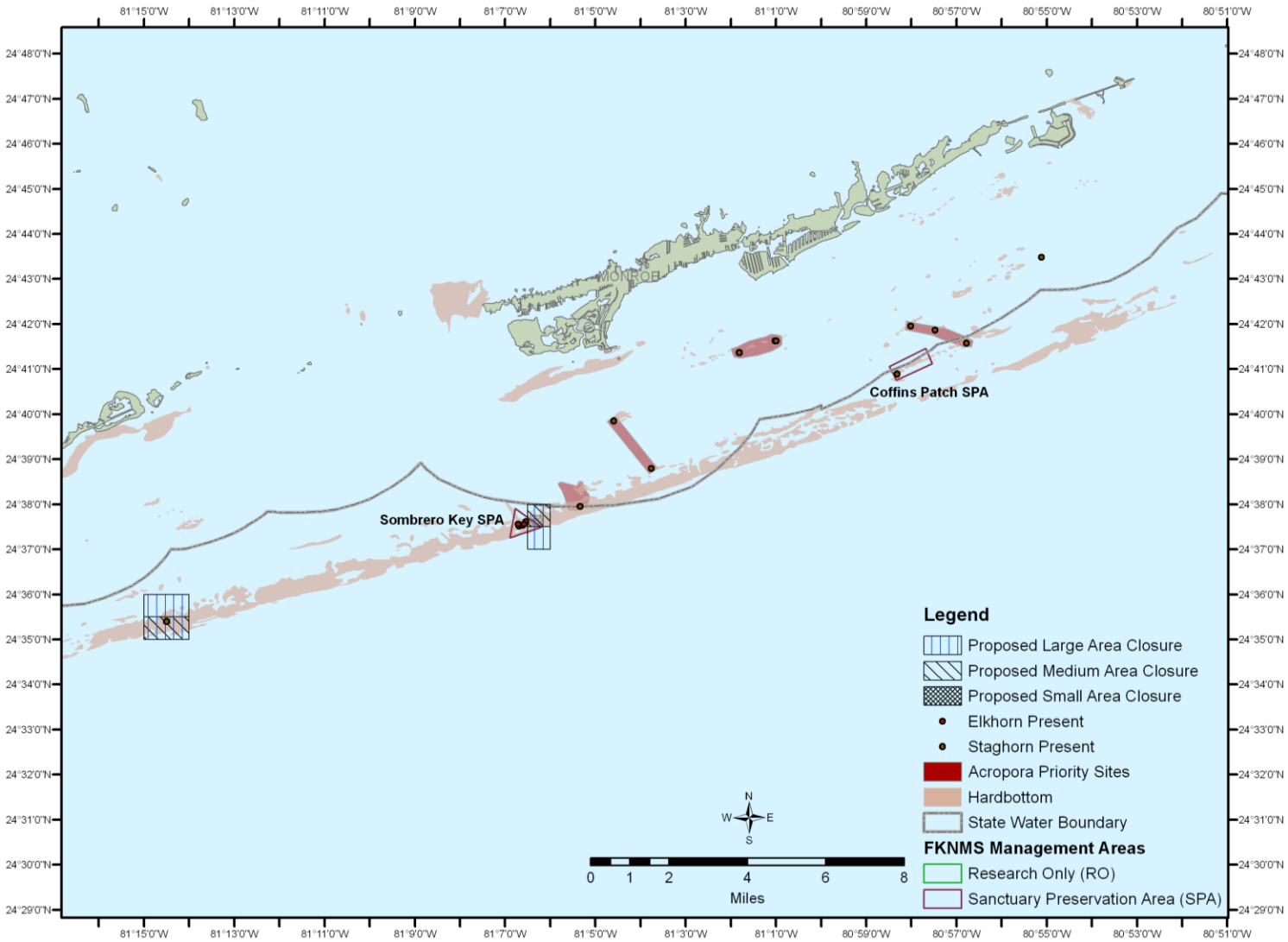

Figure 4.9.1.2. Proposed closed areas in the Middle Keys.

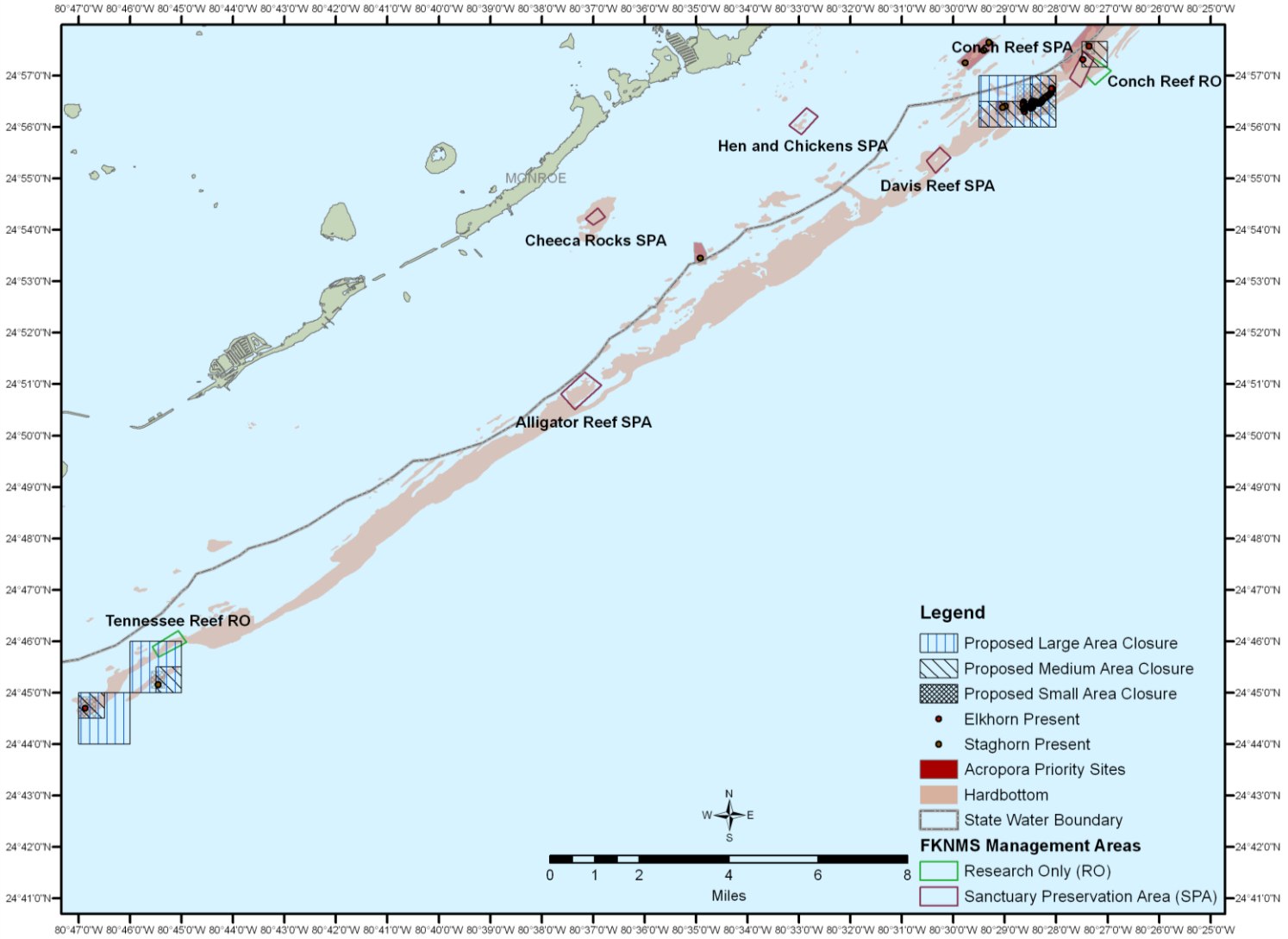

Figure 4.9.1.3a. Proposed closed areas in the Upper Keys.

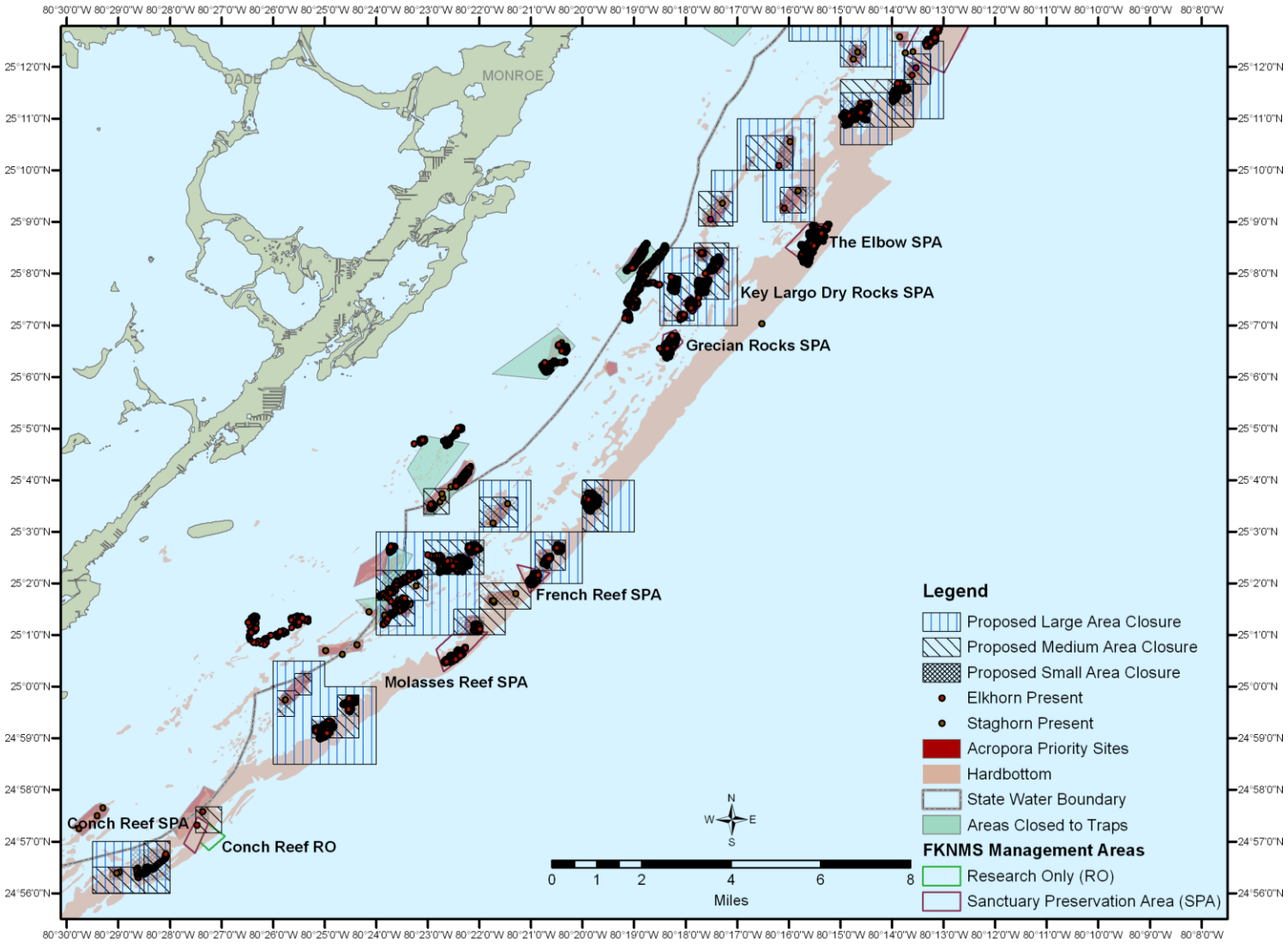

Figure 4.9.1.3b. Proposed closed areas in the Upper Keys con't.

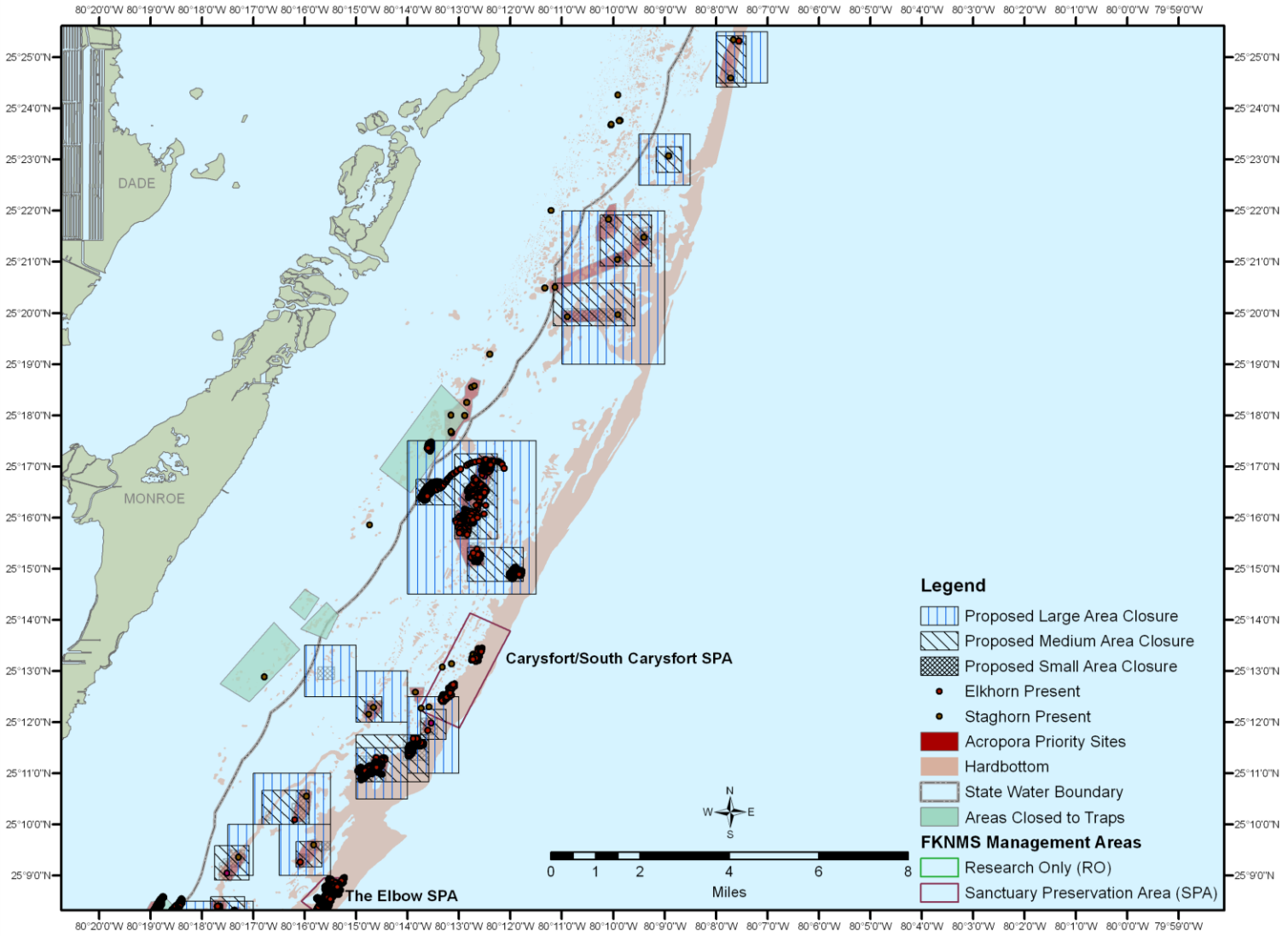

Figure 4.9.1.3c. Proposed closed areas in the Upper Keys con't.

4.9.2 Direct and Indirect Effect on the Economic Environment

As indicated in Sections 2.9 and 4.9.1, the biological opinion on the spiny lobster fishery requires the Councils to protect the indicated coral species by expanding existing closed areas or creating new areas. Section 2.9 succinctly depicts an existing set of alternatives. Section 2.9 also depicts a replacement set of alternatives recommended by the IPT and provides very detailed maps of the related proposed close areas in the Lower Keys, Middle Keys, and Upper Keys. Unfortunately in terms in terms assessing economic impacts, the extent of lobster fishing in these proposed closed does not appear to be known in part because they are relatively small when compared with the areas used in data on commercial available from NMFS, SEFSC. Ideally, choosing the alternatives and options with least economic impact on commercial and/or recreational fishing for Caribbean spiny lobster would be preferred. The biological impacts of alternatives and options are assessed in terms of the indicated coral species, not spiny lobster.

Murray (2005) suggests that fishermen could be a good source of the rather detailed information needed to assess the economic impact of alternatives under Action 9, as for the Dry Tortugas Ecological Reserve. Another study suggests that commercial fishermen operating in the Keys have long tenure, tend to be full-time operators and derive a high percentage of their personal income from commercial fishing, and have considerable investment in vessels and traps (Shivlani et al. 2004). Murray (2005) used data from 88/89 and 04/05 surveys of commercial fishermen that could be used to assess the socioeconomic impacts of the Dry Tortugas Ecological Reserve. Both studies suggest similar economic characteristics of the fishermen and experience-based knowledge of the areas they fish.

It might be assumed that **Alternative 2** could have more economic impact on commercial fishing for Caribbean spiny lobster than **Alternatives 3 and 4**, but the validity of this assumption is unclear. **Alternatives 3 and 4** might expose commercial fishing to further regulation in the future if protection of the indicated coral does not meet expectations. The biological comparison of alternatives in Section 2.9 indicates that **Alternative 2** would be most beneficial protecting the indicated coral in that it covers more area, and it would close an as yet unspecified portion of the EEZ to trap fishing for waters less than 30 m deep. The large number of smaller areas under **Preferred Alternative 3** would be less beneficial in protecting the indicated coral in that traps are more likely to interact with the coral. **Alternative 4** differs from **Preferred Alternative 3** in that it covers all fishing for spiny lobster, but the economic difference may be small if the waters are sufficiently deep that the lobsters are accessible primarily with traps and not diving.

Compared with **Alternative 1** (status quo), it is estimated that **Alternative 2** could preclude virtually all of the trips in Federal (EEZ) waters in the Keys area, referring to trips with landings of spiny lobster (Table 4.9.2.1). This is an upper-end estimate because it assumes that all of the 1,664 trips per year in the EEZ in the Keys area would not occur. These trips have relatively high average landings, and if they do not occur, the landings of Caribbean spiny lobster would be reduced by 0.630 mp compared with 3.67 mp for Florida and 3.28 mp for Monroe County (Table 4.9.2.1). The total for trip gross

revenue for all species landed would be reduced by $3.8 million in 2008$, 16% of the total for Florida and 18% of the total for Monroe County.

A second estimate is provided for the effect of **Alternative 2** in Table 4.9.2.1. It assumes that 1,441 trips per year in the EEZ in the Keys area would not occur, referring to trips with reported depths of less than 100 ft (less than approximately 30 meters). These trips have relatively high average landings, and if they do not occur, the landings of Caribbean spiny lobster would be reduced by 0.486 mp compared with 3.67 mp for Florida and 3.28 mp for Monroe County (Table 4.9.2.1). The total for trip gross revenue for all species landed would be reduced by $2.9 million in 2008$, 12% of the total for Florida and 14% of the total for Monroe County.

Table 4.9.2.1--Caribbean spiny lobster landings, Florida and Keys, all and EEZ

Area	Caribbean spiny lobster					Trip gross		
	Trips	Thousand pounds	Lbs / trip	Thousand 2008$	2008$ / trip	Thousand 2008$	%, Florida	%, Monroe
Florida	15,568	3,671	236	$22,227	$1,428	$23,533	100%	
Florida, EEZ	1,977	670	339	$3,795	$1,919	$4,351	18%	
Monroe	13,237	3,282	248	$19,761	$1,493	$20,724	88%	100%
Keys, EEZ	1,664	630	379	$3,556	$2,137	$3,830	16%	18%
Keys, EEZ, lt-100 ft	1,441	486	337	$2,723	$1,889	$2,908	12%	14%

NMFS, SEFSC, FTT (19Mar10), data and methods as in Vondruska 2010a. Alternative 1 (status quo) is represented by annual averages for fishing years 04/05 - 09/10. The trip averages are computed from unrounded data in this table and may differ from those in other tables where averages for columns (of annual data) are used. A depth of 30 meters is approximately 100 feet (98.425 ft=30 meters * (39.37 inches per meter) /12 inches per foot).

4.9.3 Direct and Indirect Effect on the Social Environment

Closure of fishing areas is always a controversial management strategy and can have numerous direct and indirect effects to the social environment. Yet, to meet the mandates of the biological opinion, closed areas may be the most viable solution. The proposed options for closed areas attest to the difficulty in balancing the impact to the fishery and impacts to the endangered species. **Alternative 1**, the no action alternative, would not meet the requirement in the biological opinion, so is not a viable option. The most restrictive, **Alternative 2** would prohibit traps on all hard bottom in the South Atlantic EEZ and likely have the most direct impacts on the social environment. **Alternatives 3 and 4** offer a broad array of options which provide less negative social impacts than **Alterative 2**, but may introduce other inefficiencies with regard to enforcement and compliance. Choosing smaller closed areas, as in **Alternative 3 Option b and c** may provide more flexibility for trap fishermen, but may make it more difficult to monitor and enforce compliance. **Alternative 4 Option b and c** would have similar social effects but for both commercial and recreational fishermen. Larger closed areas, like those in **Preferred Alternative 3 Option a** and **Alternative 4 Option a** may enhance

enforcement, but could have more negative social effects on fishermen as they find less area to fish which could reduce harvests. Closed areas to fish could also create crowding as fishermen move more traps into areas closer to where others are already placing traps or as recreational divers are also forced into areas that become congested. It is difficult to outline what the social effects of the preferred alternatives would be without knowing exactly how fishing would be affected. At this time there are no data on trap placement with sufficient detail to analyze such effects. The impacts will be better known, once fishermen have had an opportunity to examine the proposed closures and how they may be affected.

4.9.4 Direct and Indirect Effect on the Administrative Environment

Alternative 1 would maintain the current closed areas and would not meet the requirements of the biological opinion. This lack of action may precipitate legal action under the ESA against NOAA Fisheries Service and the Councils. Thus this alternative could greatly increase the administrative burden. Any alternative that creates new closed areas will increase the administrative burden over the current level due to changes in maps, outreach and education of the public, and greater enforcement needs. **Alternative 2** would be the most inclusive and require enforcement over the largest area. **Alternatives 3 and 4** are similar except **Preferred Alternative 3** applies to trap fishing only, and **Alternative 4** applies to all lobster fishing. **Alternative 4** would be easier to enforce because any boat in a closed area with lobster on board would be in violation of regulations. **Preferred Option a** under each alternative would create large areas around *Acropora* colonies, **Option b** would create medium areas, and **Option c** would create small areas. Larger areas could incorporate multiple colonies and thereby reduce the actual number of closed areas. Thus, the expectation is **Preferred Option a** would result in fewer, larger closed areas; **Option c** would result in more, small areas; and **Option b** would be between the two. Therefore, **Preferred Option a** would create less administrative and enforcement burden than **Option b or c**.

4.10 Action 10: Require Gear Markings so All Spiny Lobster Trap Lines in the EEZ off Florida are Identifiable

Alternative 1: No Action – Do not require gear marking measures for spiny lobster trap lines.

Preferred Alternative 2: Require all spiny lobster trap lines in the EEZ off Florida to be COLOR, or have a COLOR marking along its entire length. All gear must comply with marking requirements no later than August 2014.

Alternative 3: Require all spiny lobster trap lines in the EEZ off Florida to have a permanently affixed 4-inch COLOR marking every 15 ft along the buoy line or at the midpoint if less than 15 ft. All gear must comply with marking requirements no later than August 2014.

4.10.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

Lines are consistently found as marine debris and most frequently without buoys or traps still attached. These conditions make it extremely difficult to determine if line found in the environment, or entangling protected species, originated from the spiny lobster fishery. A lack of uniquely identifiable markings also makes monitoring incidental take by the fishery difficult. Trap line marking requirements would allow for greater accuracy in identifying fishery interactions with protected species, leading to more targeted measures to reduce the level and severity of those impacts. Trap line marking requirements would allow for greater accuracy in determining, or ruling out, fishery-based sources of marine debris.

Alternative 1 (No Action) would have no biological benefit for protected species and would not satisfy the line marking requirements of the biological opinion. **Preferred Alternative 2** would likely have slightly more biological benefit than **Alternative 3.** Requiring gear markings along the entire length of trap lines would minimize the likelihood that a portion of a spiny lobster trap line is recovered without an identifiable mark. **Alternative 3** would provide greater biological benefit than **Alternative 1** but the benefits would likely be less than **Preferred Alternative 2** for the reason described above. **Alternatives 2 and 3** would fulfill the requirements of the biological opinion. **Alternative 1** would have the least biological benefit to sea turtles and smalltooth sawfish and would perpetuate the existing level of risk for interactions between these species and the fishery. The trap marking requirements under **Alternatives 2 and 3** would provide indirect benefits to sea turtles and smalltooth sawfish. Trap marking requirements would provide better understanding of the frequency of interactions between these species and the fishery. These requirements could also help rule out the spiny lobster fishery as a potential source of entanglement with protected species. By better understanding of which fisheries are interacting with sea turtles and smalltooth sawfish, ways to reduce those interactions can be developed.

4.10.2 Direct and Indirect Effect on the Economic Environment

The biological opinion requires that incidental take protected resources in the EEZ be monitored, Differences economic impact on commercial fishing for Caribbean spiny lobster among the alternatives for marking trap lines are not immediately apparent. All appear to have an August 2014 compliance date, and this would appear to allow enough for fishermen to purchase the required lines as part their ongoing repair and replacement work.

4.10.3 Direct and Indirect Effect on the Social Environment

Marking trap lines should not have significant effects on the social environment other than imposing some added costs to modify the gear. The no action **Alternative 1** would not meet requirements of the biological opinion and therefore is an unlikely preferred option. **Alternative 2 and 3** would require some type of marking on trap lines which are required in other fisheries and would resolve any future problems with identification of trap lines being associated with interactions with endangered species. **Preferred Alternative 2** may allow for more efficient marking of lines as fishermen would not have measure each line marking pattern and therefore save time and money.

4.10.4 Direct and Indirect Effect on the Administrative Environment

Alternative 1 would maintain the current closed areas and would not meet the requirements of the biological opinion. This lack of action may precipitate legal action under the ESA against NOAA Fisheries Service and the Councils. Thus this alternative could greatly increase the administrative burden. **Alternatives 2-4** would increase the need for enforcement to check if trap lines are properly colored or marked. On the other hand, the ability to identify lines entangled with endangered species would reduce the difficulty in determining assignment of incidental take to a particular fishery by NOAA Fisheries Protected Resources Division. In general, none of the alternatives would be more or less burdensome than the other.

4.11 Action 11: Allow the Public to Remove Derelict or Abandoned Spiny Lobster Traps Found in the EEZ off Florida

Alternative 1: No Action – Do not allow the public to remove any derelict or abandoned spiny lobster trap found in the EEZ off Florida.

Alternative 2: Allow the public to completely remove from the water any derelict or abandoned spiny lobster trap found in the EEZ off Florida from the end of lobster season trap removal period (usually April 5) until the beginning of the next season's trap deployment period (August 1).

Alternative 3: Allow the public to completely remove from the water any derelict or abandoned spiny lobster trap found in the EEZ off Florida during the closed seasons for both spiny lobster and stone crab (May 20-July 31).

Alternative 4: Allow the public to remove spiny lobster trap lines, buoys, and/or throats, but otherwise leave in place, any trap found in the EEZ off Florida from the end of season trap removal period (usually April 5) until the beginning of the next season's trap deployment period (August 1).

Alternative 5: Allow the public to remove spiny lobster trap lines, buoys, and/or throats, but otherwise leave in place, any trap found in the EEZ off Florida during the closed seasons for both spiny lobster and stone crab (May 20-July 31).

Preferred Alternative 6: Delegate authority to regulate the removal of derelict or abandoned spiny lobster traps occurring in the EEZ off Florida to the Florida FWC.

4.11.1 Direct and Indirect Effect on the Physical and Biological/Ecological Environments

The biological opinion on the spiny lobster fishery requires the Councils explore allowing the public to remove derelict trap gear from the EEZ off Florida. Lost traps pose multiple threats to the environment and protected species. Lost traps can "ghost" fish for a year or more (FWC unpubl. data, Lewis et al. 2009). Trailing trap lines can become entangled in the reef, damaging corals and sponges (Chiappone et al. 2005). Marine mammals and ESA-listed sea turtles and marine fish can become entangled in trailing ropes (Guillroy et al. 2005, Seitz and Poulakis 2006; Lewis et al. 2009). Derelict traps and trap lines can also causing fragmentation/breakage and abrasion of *Acropora* colonies; particularly when derelict traps are moved during storms. Wooden traps eventually degrade after many months, but plastic trap throats and polystyrene buoys persist indefinitely in the marine environment. Seagrass meadows can be damaged when traps are lost or left for periods longer than six weeks (Uhrin et al. 2005). Thousands of lost and abandoned traps can have a significant effect on the reef environment and benthic habitats.

Alternative 1 (No Action) would have no biological benefit for protected species or benthic habitat and would perpetuate the existing level of risk for interactions between these protected species and lost trap gear. **Alternative 2** would likely have the greatest biological benefits. This alternative would allow for the complete removal of all derelict or abandoned traps for the longest period of time, potentially increasing the number of derelict or abandoned traps removed. **Alternative 3** would also allow for the complete removal of derelict or abandoned trap gear, but for a shorter period. As a result, the biological benefit of **Alternative 3** may be less than **Alternative 2**. **Alternatives 4 and 5** would likely have less biological benefit than **Alternatives 2 and 3**. Allowing the public to remove trap line, buoys, and throats, would help reduce the potential impacts from ghost fishing and entanglement. However, traps remaining in the environment still have the potential to cause damage to benthic habitat. **Alternative 4** would allow more time for the public to remove trap line, buoys, and throats from derelict or abandoned traps, potentially increasing the biological benefit. Compared to **Alternatives 2-4**, **Alternative 5** would likely have the least biological benefit. It is currently unclear what type of biological impact **Preferred Alternative 6** would have. The State of Florida currently removes a limited number of derelict traps in the EEZ under certain situations. Given the difficulty of identifying derelict traps in the deeper waters of the EEZ, as well the additional costs and time associated with transporting recovered derelict traps from the EEZ to disposal sites on shore, it is unlikely that the number of traps removed under this alternative will increase. Instead, the number of traps removed under the **Preferred Alternative 6** will most likely be very similar to number currently being removed. Thus, the biological benefit of **Preferred Alternative 6** is likely to be similar to the benefit anticipated under **Alternative 1**. **Alternative 1** would perpetuate the existing level of risk for interactions between other ESA-listed species and derelict traps and trap debris. The impacts from **Alternatives 2-6** on sea turtles and smalltooth sawfish are unclear. If these alternative lead to the removal of more derelicts traps and trap debris they would likely benefit sea turtles and smalltooth sawfish. However, if the alternatives result in no change in the number of derelict traps or trap debris removed, then they would likely perpetuate the existing level of risk for interactions with sea turtles and smalltooth sawfish. If the alternatives actually lead to the removal of fewer derelict traps or trap debris, they could actually increase the likelihood of adverse impacts occurring to sea turtles and smalltooth sawfish.

4.11.2 Direct and Indirect Effect on the Economic Environment

The IPT provided recommendations for changes in wording of the alternatives in Section 2.1l, and Section 4.11 documents current State of Florida regulations. It is indicated in Section 2.11 that biological opinion on the commercial fishery for spiny lobster requires the Councils to explore options to allow the public to remove derelict spiny lobster gear in the EEZ off Florida.

Fishermen's views about removal traps being legally fished someone other than themselves are discussed in Section 4.11.1. It is also indicated that high proportions of the licensed traps were lost during the 05/06 season because of hurricanes, far more than normally lost. Apparently only a small proportion the traps lost, 10%-20%, is ever

recovered, meaning that the rest, 80%-90% become derelict. Retrieval of derelict by FWC employees and other government employees at times specified by the FWC.

Under Action 11, **Alternatives 2-5** would allow the public to remove derelict traps during different portions of the closed season for commercial fishing (following wording suggested by the IPT in Section 2.11). **Preferred Alternative 6** would delegate authority for removal the EEZ to the Florida FWC, as now occurs in waters under State jurisdiction.

Though none of these five alternatives would affect ongoing commercial fishing activity during the open season, fishermen's perception about any trap removal can impact their economic activity, wellbeing, and willingness to support regulations. Thus, **Preferred Alternative 6** may have the least economic impact. Federal and/or state outreach programs could change fishermen's perceptions over time, but change in attitudes may be a long time in coming and not as supportive as fishery managers may hope, as for the Florida Trap Certificate Program (Shivlani et al. 2004).

4.11.3 Direct and Indirect Effect on the Social Environment

Allowing the public to remove spiny lobster traps, lines or buoys could have indirect effects on the social environment. Trap fishermen are often very protective of their traps. Indeed, there are federal regulations involving the disturbance and molestation of traps while in season. Yet, the number of derelict traps does pose problems of both biological impacts and public perception. Because derelict traps degrade the habitat and can continue to ghost fish, the removal of derelict traps can have positive social benefits. Fishermen are supportive of trap removal programs but are often suspect of having the general public involved. **Alternative 1**, the no action alternative, may be the most desirable for some trap fishermen. Trap molestation is always a concern for trap fishermen and if the public is provided with an opportunity to clear derelict traps during the closed season, there may be a perception that they may conclude that their duty extends to other times and areas. Yet, public involvement in trap cleanup can be very effective as it increases the number of individuals who can remove traps. **Alternative 2** would allow for a more lengthy time period for the public to participate than **Alternative 3** which is limited to the closed season for spiny lobster and stone crab. The negative effects of allowing the public to participate are that there is no guarantee that legal traps might be removed by someone unfamiliar with the regulations. **Alternatives 4 and 5** would remedy some of the above concerns by allowing for removal of only parts of the trap, but there are still concerns about the public's knowledge and familiarity with the regulations. **Preferred Alternative 6** would allow the FWC to develop a program for trap removal that might address the concerns mentioned with previous alternatives and would likely have the fewest negative social effects.

4.11.4 Direct and Indirect Effect on the Administrative Environment

Alternative 1 would have no impacts on the administrative environment. **Alternatives 2 and 3** would allow members of the public to remove derelict traps from the water. These

alternatives may create enforcement problems because someone with a trap aboard their vessel may have been removing it from the water because they found it abandoned or because they were illegal fishing. **Alternatives 4 and 5** would only allow the public to disable traps and would not allow them to retain the traps on board; thus enforcement would be easier. **Alternatives 2 and 4** would allow removal or disabling of traps during the closed season for lobster. Enforcement would need to be vigilant during this time to ensure the public did not unintentionally remove other traps, such as stone crab traps, which may be legally fishing. **Alternatives 3 and 5** would allow removal or disabling of traps only when both lobster and stone crab seasons are closed. These alternatives would create a much lower burden on enforcement because all similar traps would be prohibited during this time and could be considered derelict if in the water. **Preferred Alternative 6** would allow the state of Florida to administer the clean-up of derelict traps in the EEZ off Florida. Florida currently has a program to remove abandoned traps in state waters. This alternative would have no impacts on the administrative environment for the federal government, but would increase the burden on the state government.

4.12 Cumulative Effects Analysis (CEA)

As directed by the National Environmental Policy Act (NEPA), federal agencies are mandated to assess not only the indirect and direct impacts, but cumulative impacts of actions as well. The 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 occurs when the combined effects are greater than the sum of the individual effects.

This section uses an approach for assessing cumulative effects based upon guidance offered by the CEQ publication "Considering Cumulative Effects" (1997). The report outlines 11 items for consideration in drafting a CEA for a proposed action.

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

Cumulative effects on the biophysical environment, socio-economic environment, and administrative environments are analyzed below.

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

The CEQ cumulative effects guidance states this step is accomplished through three activities as follows:

I. The direct and indirect effects of the proposed actions (Section 4.1-4.11);
II. Which resources, ecosystems, and human communities are affected (Section 3); and
III. Which effects are important from a cumulative effects perspective (information revealed in this CEA)

Valued ecosystem components (VECs) are "any part of the environment that is considered important by the proponent, public, scientists and government involved in the assessment process. Importance may be determined on the basis of cultural values or scientific concern" (CEAA 1999). The important VECs for this analysis are as follows:

1. Managed Resource
2. Habitat
3. Protected Resources
4. Human Communities

2. Establish the geographic scope of the analysis.

The immediate areas affected by this action and analyzed in this CEA are the federal waters of the Gulf of Mexico and South Atlantic. These waters extend from the seaward side of the state waters of Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina to 200 miles. In practice, the waters off south Florida are the primary area where this species is fished in the U.S. and that will be affected by actions in this amendment. Other affected VECs including non-target species, habitat, and protected species are also within this geographic scope. The human community includes the fishing community which coincides with the managed species' geographic range, as well as the areas where processing, importing, and shipping of lobster tails takes place.

3. Establish the timeframe for the analysis

The temporal scope of impacts of past and present actions for managed resources, non-target species, habitat, and human communities is primarily focused on actions that have occurred after FMP implementation (1982). The most recent spiny lobster stock benchmark assessment was SEDAR 8 (2005). An update to that assessment was conducted in 2010; however, the review panel rejected that assessment. The update included data for analysis of stock status from the 1985/1986 season to the 2009/2010 season for commercial and recreational landings.

No reasonably foreseeable future actions have been identified.

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

a. Past federal actions affecting the spiny lobster fishery are summarized in Section 1.4. The following list identifies more recent actions.

- The Tortugas South marine reserve (60 square nautical miles) was sited in the

Gulf EEZ to encompass a spawning aggregation site for mutton snapper. The Tortugas North marine reserve (120 square nautical miles) included part of the fishery jurisdiction of the FKNMS, Dry Tortugas National Monument, Gulf EEZ, and the state of Florida, and was cooperatively implemented by these agencies. Both of these marine reserves encompass spiny lobster habitat.

- Regulatory amendment 3 specified that the holder of a valid crawfish license or trap number, lobster trap certificate, and state saltwater products license issued by the Florida FWC may harvest and possess, while in the EEZ off Florida, undersized lobster not exceeding 50 per boat or1 per trap aboard each boat, if used exclusively for luring, decoying or otherwise attracting non-captive lobster into traps. This action is being reconsidered in this amendment.
- Amendment 8 set a minimum size limit for importation of spiny lobster, disallowed importation of spiny lobster tail meat which is not in whole tail form with the exoskeleton attached, and disallowed the importation of spiny lobster with eggs attached or importation of spiny lobster where the eggs, swimmerets, or pleopods have been removed or stripped.
- Amendment 9 (CEBA-1) provided a presentation of spatial information for EFH and EFH-Habitat Areas of Particular Concern designations for species in the Spiny Lobster FMP.

b. The following are recent Florida actions important to the spiny lobster fishery.

- In 2001, the Florida FWC set the target number of spiny lobster traps at 400,000 and implemented a 4% annual reduction in traps. The Florida FWC suspended the annual trap reduction in 2003; nonetheless, the program resulted in a significant reduction in the annual numbers of traps set. In 2010, new regulations became effective that reduce the number of certificates by 10% if sold to a non-family member. This reduction will continue until the number of certificates is reduced to 400,000.
- As of January 1, 2005, and until July 1, 2015, no new commercial dive permits will be issued and no commercial dive permit will be renewed or replaced except those that were active during the 2004-2005 fishing season.
- In 2010, new regulations were enacted to remove latent trap certificates. Prior to the 2010-2011 season, any certificate for which the fee was not paid for three years shall be considered abandoned, revert to the state, and become permanently unavailable. Beginning with the 2010-2011 season, reversion will occur if the fee is not paid for two consecutive years.

c. The following are non-FMP actions which can influence the spiny lobster fishery.

A naturally occurring, pathogenic virus, PaV1, infects juvenile Caribbean spiny lobsters. This virus is lethal to lobsters. Infection is highest in smaller juveniles; mortality occurs after larval settlement but before recruitment to the fishery. PaV1 was first detected in the U.S. spiny lobster population around 1996. No evidence shows PaV1 has increased

in prevalence or virulence since around 2000, so mortality from PaV1 may explain why landings declined beginning about that time while the post-larval recruitment index remained steady.

The Deepwater Horizon MC252 oil spill has affected more than one-third of the Gulf from western Louisiana east to the panhandle of Florida and south to the Campeche Bank in Mexico. The impacts of the oil spill on the physical and biological environment are expected to be significant and may be long-term. However, the oil remained outside most of the area where spiny lobsters are abundant. Oil on the surface has largely evaporated or been removed. Heavy use of dispersants resulted in oil suspended within the water column, in some cases even deeper than the location of the broken well head. Floating and suspended oil has washed onto shore in several areas of the Gulf as non-floating tar balls. Whereas suspended and floating oil degrade over time relatively quickly, tar balls are more persistent in the environment and can be transported hundreds of miles.

The hurricane season is from June 1 to November 30, and accounts for 97 percent of all tropical activity affecting the Atlantic Basin (NOAA 2007). These storms, although unpredictable in their annual occurrence, can devastate areas when they occur. Direct losses to the fishing industry and businesses supporting fishing activities included: loss of vessels, loss of revenue due to cancelled fishing trips, and destruction of marinas and other fishery infrastructure (Walker et al. 2006). However, while these effects may be temporary, those fishing-related businesses whose profitability is marginal may go out of business if a hurricane strikes.

Because of the continuing rise in the cost of fishing, including increases in the cost of fuel and insurance, along with other increases in operating costs, more fishermen are having difficulty making a living fishing. For example, fuel prices have increased more than 2.2 times since January 2000 according to the U.S. Department of Energy. Communities that are dependent on jobs that support the spiny lobster fishery could also be negatively impacted. If an ACL is set below current catch levels, accountability measures may curtail the fishery. This in turn may impact businesses dependent on commercial and recreational spiny lobster fishing because of fewer days to sell charter services, ice, fuel, tackle, hotel rooms, and other services to people participating in the fishery.

How global climate changes will affect Gulf 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).

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

This step should identify the trends, existing conditions, and the ability to withstand stresses of the environmental components. According to the CEQ guidance describing stress factors, two types of information are needed: the socioeconomic driving variables identifying the types, distribution, and intensity of key social and economic activities within the region; and the indicators of stress on specific resources, ecosystems, and communities.

Caribbean Spiny Lobster

Trends in landings and the status of Caribbean spiny lobster are summarized in Section 3.1 and 3.3. Caribbean spiny lobster are considered to not be undergoing overfishing and the overfished status is unknown. This amendment would redefine the overfished and overfishing thresholds, so both Councils would use the same definition. Whichever definition is chosen, the stock likely would not be considered in an overfished condition. SEDAR 8 (2005) and the rejected 2010 update defined the overfishing level as fishing mortality (F) at 20% SPR. For SEDAR 8, that level was 0.49 per year and for the update was 0.45 per year. Only once since 2005/2006 season did the full F exceed either level. The mean F for 2007-2009 is 0.21 per year. However, the assessment analysts for the update cautioned that F may be underestimated for recent years.

Ecosystem

Changes in the spiny lobster fishery are not likely to create additional stress on the environment. Traps and trap lines can damage habitat through snagging or entanglement; however, these impacts are generally minimal. Changes in the population size structure as a result of shifting spiny lobster fishing selectivity and changes in stock abundance could lead to changes in the abundance of other species that compete with spiny lobster for shelter and food. Predators of spiny lobster could increase if spiny lobster abundance increased, and species competing for similar resources as spiny lobster could potentially decrease in abundance if less food and/or shelter are available. If spiny lobster abundance decreased, the opposite effects would take place. Efforts to model these interactions are still in their development stages, and so predicting possible stresses on the ecosystem in a meaningful way is not possible at this time.

Spiny Lobster Fishery

Florida trip ticket data used to monitor commercial spiny lobster effort include the number of vessels with landings, the number of trips taken, and trip duration. Trends are described in Sections 3.1, 3.4, and briefly summarized here.

Florida commercial landings of Caribbean spiny lobster increased from the late 1940s then fell from 2001 onward (Figure 3.1.1.1). The estimated number of traps used for commercial fishing for Caribbean spiny lobster in Florida approximately doubled every 10 years during 1950-1990, reached nearly a million traps in the early 1990s, and was reduced to less than a half million traps by the late 2000s. These declines can largely be credited to the trap limitation program which began in 1993. Commercial diving

landings increased rapidly in the first decade of the trap limitation program and then declined thereafter (see landings by gear in Table 4.3.1.1). Estimated recreational landings of Caribbean spiny lobster and fishing effort in Florida (based on surveys of recreational permit holders) were more consistently low from 2001/2002 onward than in the 1990s (Figure 3.1.2.3).

Other reasons for the decline in effort include increases in fishing costs, increases in harvesting efficiency, and even improvements in the stock status. However, data currently are inadequate to determine which of these factors may have contributed to the decline in fishing effort.

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

This section examines whether resources, ecosystems, and human communities are approaching conditions where additional stresses could have an important cumulative effect beyond any current plan, regulatory, or sustainability threshold (CEQ 1997). Sustainability thresholds, which are levels of impact beyond which the resources cannot be sustained in a stable state, can be identified for some resources. Other thresholds are established through numerical standards, qualitative standards, or management goals. The CEA should address whether thresholds could be exceeded because of the contribution of the proposed action to other cumulative activities affecting resources.

Caribbean Spiny Lobster

Currently, the Gulf of Mexico and the South Atlantic Councils have different definitions for biological reference points, and the South Atlantic Council does not have an overfished threshold definition (GMFMC 1999, SAFMC 1998, SEDAR 8 2005). Transitional SPR is used for the definitions of MSY, OY, overfishing, and overfished threshold by the Gulf Council. Generally, static SPR is more frequently used than transitional SPR. The SEDAR 8 (2005) benchmark assessment terms of reference suggest static SPR was used as in the South Atlantic Fishery Management Council's Spiny Lobster Amendment 6 (SAFMC 1998).

MSY is unknown but the landings data from 1991/1992 through 2009/2010 fishing years (Table 2.4.1) can be used to provide an indication of the productivity of the portion of the stock within the area of the Spiny Lobster FMP. Total landings provide an index of MSY and have ranged from a high of 10.1 million pounds in 1999/2000 to a low of 4.1 million pounds in 2005/2006, with an average of 7.0 million pounds.

Caribbean spiny lobster were not undergoing overfishing based on the SEDAR 8 (2005) benchmark assessment. The 2010 assessment update reached the same conclusion; however, the assessment update was rejected by the review panel. Because of the long planktonic larval stage for this species and hydrodynamic characteristics of the Gulf, South Atlantic, and Caribbean basins, Caribbean spiny lobsters in the U.S. fishery are believed to originate from spawning stocks outside of the U.S. Thus stressors on the population include fishing and other human activities outside the jurisdiction of the U.S.

If all recruitment is from areas outside of NOAA Fisheries Service authority, then fishing levels in this country may have no effect on stock biomass.

Ecosystems

In the biological opinion, NOAA Fisheries Service determined the spiny lobster trap fishery as it currently operates (e.g., number of traps, fishing techniques, gear types, etc.) may adversely affect the green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles, *Acropora*, or smalltooth sawfish, but is not likely to jeopardize their continued existence. The current cap on the number of traps available to the fishery is extremely unlikely to increase over the next three years [FAC. 68B-24.009(1)]. Additionally, an action to increase the number of traps available in the fishery would represent a modification to the proposed action and an ESA section 7 consultation may need to be reinitiated to evaluate any new risks to protected species not previously considered.

The biological opinion stated it is reasonable to assume the level of take estimated to have occurred over the last three years (2004-2005 through 2006-2007 fishing seasons) is likely to continue into the future. Therefore, the biological opinion anticipated that over any consecutive three-year period, spiny lobster trap fishing would incidentally take up to three loggerhead, three green sea turtles, and one hawksbill, Kemp's ridley, or leatherback sea turtle; two smalltooth sawfish (non-lethal); and 482.09 m^2 of *A. cervicornis* and 7.41 m^2 of *A. palmata*.

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

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

Although the 2010 stock assessment update was rejected by the review panel, the assessment report shows trends in biomass and fishing mortality dating to the 1985/1986 fishing season. Within this timeframe, spiny lobster have not been considered to have been undergoing overfishing. Because spawning stock biomass cannot be determined without a Caribbean-wide assessment, the overfished condition could not be determined. These results are consistent with SEDAR 8 (2005).

The spiny lobster fishery was primarily a bait fishery (Labisky et al. 1980), until the development of freeze processing enabled the expansion of the retail market in the 1940's. The development of SCUBA further expanded the commercial fishery as well as the recreational fishery in the 1960's. Baseline information is lacking on the social environment of these fisheries, although some economic data are available. Ex-vessel revenues and numbers of traps in the water are available dating to the early 1960s. For further details on the history of the spiny lobster fishery, please see Section 3.0.

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities. Cause-and–effect relationships are presented in Table 4.12.1.

Table 4.12.1. The cause and effect relationship of fishing and regulatory actions for Caribbean spiny lobster within the time period of the CEA.

Time period	Cause	Observed and/or expected effects
1975	Florida enacted legislation creating the Special Two-Day Sport Season	Increased/concentrated recreational effort; "lobstermania"
1970's-80's	Increased number of traps in the water	Increased user conflicts on the water, excessive mortality of shorts, declining yield per trap
1988	Requirement and specification of live wells for holding undersized attractants	Reduced mortality of undersized attractants from 26% to 10%
1993	Florida implemented the spiny lobster Trap Certificate Program	Reduction from 750,326 traps in 1993 to 492,253 traps in 2010
1993	Florida implemented the restricted species endorsement	Reduced the adverse impacts caused by the two-day sport season by restricting recreational fishers to the bag limit

9. Determine the magnitude and significance of cumulative effects.

The objectives of this amendment and associated EIS are to: bring the Spiny Lobster FMP into compliance with Magnuson-Stevens Act requirements for ACLs and AMs to prevent overfishing (Actions 1, 3-5); update biological reference points (Action 2), and policies and procedures (Action 6); and consider adjustment of management measures to aid law enforcement (Actions 7-8) and comply with measures to protect threatened and endangered species established under a biological opinion (Action 9-11). The short- and long-term direct and indirect effects of each these actions are provided in Section 4.

To examine the magnitude and significance of the cumulative effects, important VECs were identified for the overall action to be taken with this amendment. For purposes of this analysis, five categories of VECs were identified (Table 4.12.2), and the consequences of each alternative proposed in this amendment on each VEC were evaluated. Some of these VECs were combined because the impacts of many of the past and current actions were similar.

Table 4.12.2. Evaluated VECs considered for further analysis and VECs consolidated for analysis.

VECs considered for further evaluation	VECs consolidated for further evaluation
Managed resource Adult Caribbean spiny lobsters Sub-legal Caribbean spiny lobsters	
Habitat	Hard bottom EFH
Protected resources *Acropora* Endangered/threatened species	Marine mammals Sea turtles Sawfish
Human communities	Commercial harvesters Recreational harvesters Dealers Fishing communities
Administration	Federal rulemaking Federal enforcement Federal education State rulemaking State education

The following discussion refers to the effects of past and present actions on the various VECs.

Managed Resources

Adult Caribbean Spiny Lobsters

SEDAR 8 (2005) found the Caribbean spiny lobster was not undergoing overfishing, but the overfished status could not be determined. However, much evidence exists that recruitment is almost entirely from outside of the U.S. To obtain a true estimate of spawning stock biomass, a Caribbean-wide assessment is needed. Further, management and harvest practices in other countries may have a substantial impact on recruitment to the U.S. fishery. The import size restrictions may increase the size of the spawning stock in countries that previously harvested lobsters at or below reproductive size.

Non-fishing activities are likely to adversely affect spiny lobster stocks. Products from the Deepwater Horizon MC252 oil spill could potentially make their way into spiny lobster habitat in the Florida Keys. Effects could be minimal because of weathering, or effects could be more detrimental, especially impacting reproductive output and larval survival. These impacts may or may not influence the Caribbean spiny lobster stock, as most of the larvae produced in the Keys are believed to be lost to the population. Global warming could also have a detrimental effect on spiny lobsters; however, those effects cannot be quantified at this time.

Sub-legal Caribbean Spiny Lobsters

The practice of using undersized attractants in traps may facilitate the spread of PaV1 by moving infected juveniles into new areas. In addition, although lobsters are generally gregarious, they avoid infected lobsters (Behringer et al. 2008). By putting potentially infected lobsters in traps as bait, fishermen may artificially create a condition that increases the infection rate of PaV1.

Habitat

EFH is defined in the Gulf Council's Generic Essential Fish Habitat Amendment (GMFMC 2004) and in the South Atlantic Council's Fishery Ecosystem Plan (SAFMC 2009). Sections 3.2 and 3.3 of this amendment describe the physical environment inhabited by Caribbean spiny lobsters. In general, Caribbean spiny lobster can be found among rocks, on reefs, in grass beds or in any habitat that provides protection. A planktonic larval stage lives in the water column for six to seven months and feeds on zooplankton and phytoplankton. Young benthic stages of Caribbean spiny lobster will typically inhabit branched clumps of red algae (*Laurencia sp*.), mangrove roots, seagrass banks, or sponges where they feed on invertebrates found within the microhabitat. Individuals two to four years show nomadic behavior, emigrating out of the shallows and moving to deeper, offshore reef environments.

From fishing, the most detrimental effects to the environment are caused by traps. Deployment of traps and movement of traps can damage both soft and hard bottom habitats. The development of marine reserves around the Dry Tortugas and the Florida Keys National Marine Sanctuary has helped protect some critical habitat. Florida's trap limitation program reduced the number of traps by about 50% during the 10 years of implementation. Derelict traps may also impact habitat. Florida has a trap clean-up program in state waters that would be extended to federal waters in this amendment through Action 11. Hurricanes are not uncommon in the Florida Keys where most of the lobster population lives. Storms can move both active and derelict traps over sensitive habitat even more than under normal conditions.

Although impacts to habitat are less for fishermen using gears other than traps, damage can still be done. Boats carrying recreational or commercial divers may drive through sea grass beds creating the ubiquitous prop scars visible in the Keys. Boats are sometimes anchored over hard bottom, and inexperienced divers sometimes stand on or grab bottom structures with living organisms. The illegal use by commercial divers of casitas, artificial dens to attract lobsters, can damage or alter bottom structure.

Damage caused by spiny lobster fishing is associated with the level of fishing effort. Therefore, actions reducing levels of effort would result in greater benefits to the physical environment because fishing related interactions with habitat would be reduced. Thus, if actions in this amendment to set annual catch limits and accountability measures result in decreased effort, the impacts on habitat would be beneficial.

The 2009 biological opinion determined the spiny lobster fishery is not likely to adversely affect *Acropora* critical habitat. The physical feature essential to the conservation of *Acropora* critical habitat (typically referred to as the essential feature(s))

is substrate of suitable quality and availability to support larval settlement and recruitment, as well as reattachment and recruitment of asexual fragments. Effects to the essential feature identified for *Acropora* critical habitat from bully netting and diving for spiny lobster either do not occur or occur so rarely that any affect on the essential feature is discountable. Commercial trapping may affect *Acropora* critical habitat, but any affects will be temporary and insignificant. Traps do not cause consolidated hardbottom to become unconsolidated, nor do they cause growth of macroalgae or increased sedimentation.

EFH, particularly coral reefs, sea grasses, and algae, are susceptible to non-fishing activities. Anything that suspends sediments, such as tropical storms, can block sunlight and decrease photosynthesis. Dramatic climate change in the future could alter temperatures to an extent to exceed the viable range for the organisms that make up these habitats.

Protected Resources

Acropora

Commercial and recreational bully net use is not likely to adversely affect *Acropora*, based on the low likelihood of interactions between these species and this gear type. The reliance upon visual contact with a target species reduces the potential for fragmentation or abrasion of *Acropora* caused by bully nets. *Acropora* are extremely unlikely to occur on the seagrass and mud flats where the vast majority of bully nets are used.

Commercial and recreational diving for spiny lobster is not likely to adversely affect *Acropora* species. *Acropora* occurs only rarely and in discrete locations within the Gulf of Mexico and South Atlantic regions, and is not found in the Gulf of Mexico portion of the Florida Keys. Where they do occur, fisheries could cause fragmentation or abrasion resulting from: 1) fishing gear/marine debris, 2) damaging fishing practices, 3) vessel groundings, 4) anchoring, and 5) diver/snorkeler interactions (*Acropora* BRT 2005).

Traps may affect *Acropora* via fragmentation and abrasion if they become mobilized during storm events and collide with colonies. The deployment of spiny lobster traps may adversely affect *Acropora* as traps drop toward the sea floor or when traps are retrieved and pulled to the surface. Abrasion may occur when traps or trap lines contact *Acropora* during storm events or normal fishing activities. However, *Acropora* is only rarely, if ever, observed in the Gulf of Mexico off south Florida where the majority of trap fishing occurs because of relatively poor water quality. For this reason, any adverse affects from abrasion/fragmentation due to interactions with commercial spiny lobster trap gear are only likely to occur in the South Atlantic waters off south Florida. The Florida trap limitation program, although suspended at this time, reduced the number of traps by Florida fishermen by about 34%. Fewer traps in the water reduce the likelihood of *Acropora* suffering adverse impacts.

Localized adverse affects on *Acropora* in the action area have resulted from many of the same stressors affecting *Acropora* throughout its range, namely anthropogenic breakage, disease, and intense weather events (i.e., hurricanes and extreme cold-water disturbances). These stressors have led to declines of *Acropora* in the action area commensurate with declines seen elsewhere in the species' range (*Acropora* BRT 2005).

Stresses associated with climate change have been documented worldwide and are expected to increase. For example, increased temperatures can lead to bleaching (loss of algal symbionts). Researchers predict bleaching threshold temperatures will be exceeded at least once per year on the majority of the world's coral reefs by 2030-2050 (IPCC 2007).

Increases in atmospheric carbon dioxide leading to ocean acidification are also of concern for *Acropora.* As atmospheric CO_2 is dissolved in surface seawater, seawater becomes more acidic shifting the balance of inorganic carbon away from CO_2 and carbonate (CO_3^{-2}) toward bicarbonate (HCO_3^{-1}). This shift decreases the ability of corals to calcify because corals are believed to use CO_3^{-2} as the source of carbonate to build their aragonite ($CaCO_3$) skeletons (*Acropora* BRT 2005).

Sea Turtles and Smalltooth Sawfish
Commercial and recreational bully net use is not likely to adversely affect sea turtles or smalltooth sawfish based on the low likelihood of interactions between these species and this gear type. Bully nets require an active fishing technique that is only effective when target prey can be seen and the net is tended constantly. Thus, sea turtles or smalltooth sawfish are extremely unlikely to become entangled in these gears.

The distribution of spiny lobster diving effort overlaps spatially with areas known to be inhabited by sea turtles and smalltooth sawfish. However, divers only occasionally encounter sea turtles and rarely encounter smalltooth sawfish, if at all.

Sub-adult and adult loggerhead sea turtles are primarily coastal dwelling and typically prey on benthic invertebrates such as mollusks and decapod crustaceans in hardbottom habitats. As such, loggerhead sea turtles may be attracted to spiny lobster traps when lobsters are inside. They are also known to feed on epibionts growing on traps, trap lines, and floats and may be attracted to spiny lobster traps for this reason as well (NMFS and USFWS 1991). Commercial lobster traps may adversely affect sea turtles via entanglement and forced submergence. Sea turtles released alive may later succumb to injuries sustained at the time of capture. Of the entangled sea turtles that do not die from their wounds, some may suffer impaired swimming or foraging abilities, altered migratory behavior, or altered breeding or reproductive patterns. Smalltooth sawfish feed primarily on fish, such as mullet, jacks, and ladyfish (Simpfendorfer 2001). There is currently no data available on the attraction of smalltooth sawfish to spiny lobster trap gear.

The biological opinion requires NOAA Fisheries Service to work with the Councils to minimize impacts of spiny lobster traps on *Acropora* and other protected species. Actions 9-11 address the reasonable and prudent measures outlined in the opinion.

<u>Human Communities</u>
Adverse or beneficial effects of actions to vessel owners, captains, crew, and associated shoreside businesses are tied to the ability of individuals to earn income and pursue traditional and culturally significant livelihoods. In commercial fisheries, income benefits are usually derived in terms of shares awarded after fishing expenses are

accounted for. The greater the difference between expenses and payment for caught fish, the more revenue is generated by the fishing vessel. For the for-hire sector, revenues are generated by the number of trips sold for charter businesses, and by the number of paying passengers for headboat businesses.

Fishing communities include the infrastructure, which refers to fishing-related businesses and includes marinas, rentals, snorkel and dive shops, boat dockage and repair facilities, tackle and bait shops, fish houses, and lodgings related to recreational fisheries industry. This infrastructure is tied to the commercial and recreational fisheries and can be affected by adverse and beneficial economic conditions in those fisheries. Therefore, the effects of past and present actions on communities should reflect responses by the fisheries to these actions.

Current management measures have had a negative, short-term impact on the commercial fishery. The trap limitation program and the moratorium on commercial dive permits both restricted access to this fishery. On the other hand, Amendment 8 to establish a minimum size limit for imported spiny lobster should, in the long run, improve the status of the domestic and foreign stocks and the associated economic benefits. The restrictions are expected to affect people who had been damaged economically by the illegal importation of Caribbean spiny lobster, particularly in Florida, Puerto Rico, and the U.S. Virgin Islands.

Non-management stressors can have large effects on fishing communities. Although the Deepwater Horizon MC252 oil spill did not directly impact south Florida, fishermen and dealers may have experienced hardship from reduced consumer confidence in seafood from the region. Because of the continuing rise in the cost of fishing, including increases in the cost of fuel and insurance, many fishermen are having a more difficult time making a living fishing. Accountability measures could result in shorter seasons for the recreational and/or commercial sectors. This may also impact the businesses that are dependent on the commercial and recreational fishery in that they will have fewer days to sell charter services, ice, fuel, tackle, hotel rooms, and other services to people participating in the fishery.

Tropical storms can have both positive and negative economic impacts on spiny lobster fishermen, especially those that use traps. The beneficial impact is that a storm can cause lobsters to move and enter traps, which increases landings. However, the negative impacts include damages to and losses of traps, other gear, and vessels and associated losses of landings and revenues. One of the worst hurricane seasons on record was the 2005 season. Of those that hit the coast of Florida, the four of Dennis (July), Katrina (August), Rita (September), and Wilma (October) had a significant adverse impact on spiny lobster trap fishers. In the Florida Keys, one-fourth to one-half of all commercial spiny lobster traps were estimated as tangled or destroyed by the passage of Katrina alone (Buck 2005). According to an article at *keysnews.com*, Florida Keys lobster trap fishermen "reported losing up to 70 percent of their traps in the four hurricanes that skirted the Keys in 2005. Officials have estimated that the hurricanes cost lobster fishermen $35 million in lost traps and catch" (O'Hara, May 1, 2006).

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

The cumulative effects of the actions in this amendment on the biological/ecological, physical and social and economic environments are positive because they will ultimately maintain the stocks at a level that will protect the resource and allow the maximum benefits in yield and fishing opportunities to be achieved. However, short-term negative impacts on the social and economic environment may occur to the fishery if accountability measures are triggered. The chance of triggering these measures is minimized by the size limits, season closures, and effort control programs that are already in use. Further, modification of the framework procedure (Action 6) will allow more timely response if those management measures need to be changed. If significant effects are identified after this document is completed, an additional amendment could be developed under this framework procedure to achieve the goals in the purpose and need if they are not achieved through this amendment, or as new information becomes available.

11. Monitor the cumulative effects of the selected alternatives and modify management as necessary.

The effects of the proposed actions are, and will continue to be, monitored through stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations.

NOAA Fisheries Service will need to develop programs to monitor recreational and commercial landings of spiny lobster to determine if landings are approaching, meeting, or exceeding specified ACLs. Currently, commercial landings are monitored through state trip tickets, which may take up to six months to be complete and available. If in-season accountability measures are chosen by the Councils, a more timely system would be needed. Recreational landings are estimated through a Florida survey that does not include the entire fishing year; currently neither MRFSS nor MRIP collect data on crustacean species. All other species managed under a federal FMP also require ACLs by the end of 2011. For the Southeast region, that includes 38 species under management by the Gulf Council, 42 species under management by the South Atlantic Council, and 17 species under management by the Caribbean Council. Some of these species may additionally have separate ACLs for the commercial and recreational sectors. The immense burden of monitoring all these ACLs will be borne by the Southeast Fisheries Science Center. Although a monitoring plan is being planned while the associated FMP amendments are being developed, limited resources could strain NOAA Fisheries Service's ability to implement the program.

Monitoring and tracking the level of take of protected species by the spiny lobster fishery is imperative. NOAA Fisheries Service must ensure that measures to monitor and report any sea turtle or smalltooth sawfish encounters, or any *Acropora* interactions: 1) detect any adverse effects resulting from the spiny lobster fishery; 2) assess the actual level of

incidental take in comparison with the anticipated incidental take; and 3) detect when the level of anticipated take is exceeded.

4.13 Other Effects

4.13.1 Unavoidable Adverse Effects

Setting ACLs for the spiny lobster fishery may result in negative short-term effects on the social and economic environments if those limits constrain catch below recent levels. This fishery has never been controlled by limits on landings; rather, the commercial fishery has been managed for effort through trap limitation programs. These potential effects are unavoidable because the Magnuson-Stevens Act requires setting ACLs and AMs for all federally managed species.

The continued prosecution of the Caribbean spiny lobster fishery is not likely to jeopardize the continued existence of any protected species. The three-year anticipated take of protected species is as follows: sea turtles (9), small-tooth sawfish (2), and *Acropora* sp. (489.5 m^2).

Undersized lobsters ("shorts") are used widely throughout the trapping component of the fishery as attractants for legal-sized lobster because Caribbean spiny lobsters are gregarious by nature. About 10% of shorts die despite requirements for live wells to keep them healthy. Thus the larger the number of shorts allowed per vessel, the higher the mortality would be. Conversely, disallowing the use of shorts would create a hardship for commercial fishermen because other baits are more costly and less effective.

Merely refining the requirements for tailing permits would not impact commercial fishermen who are fishing legally. However, eliminating the federal tailing permit may have negative impacts for some commercial fishermen. The ability to tail spiny lobsters is important to fishermen who do not have the storage capacity to hold large amounts of whole spiny lobster onboard over long trip durations. Tailing allows such fishermen to safely store more product without compromising quality, thus maximizing the profitability of each trip.

Limiting spiny lobster fishing in area to protect *Acropora* corals would necessarily reduce the open fishing area. Large closed areas may better protect corals but would close more area to fishing. The requirement to mark trap lines would incur costs to fishermen, although NOAA Fisheries Service staff have worked closely with industry representatives to choose methods that would be less expensive. Fishermen have until August 2014 to comply, before which time many trap lines would need to be replaced anyway. Both of these actions are required by the biological opinion and are therefore unavoidable.

Actions considered in this amendment should not adversely affect public health or safety because these measures should not alter fishing practices in a substantial way. Unique characteristics of the geographic area are highlighted in Section 3.2. Adverse effects of fishing activities on the physical environment are described in detail in Sections 4.1-4.13. These sections conclude little adverse impact on the physical environment should occur from actions proposed in this document. Uncertainty and risk associated with the

measures, as assumptions underlying the analyses, are described in detail in the same sections as well.

4.13.2 Relationship Between Short-Term Uses and Long-Term Productivity

The objectives of this amendment are to bring the Spiny Lobster FMP into compliance with Magnuson-Stevens Act requirements for ACLs and AMs to prevent overfishing; update biological reference points, policies, and procedures; and consider adjustment of management measures to aid law enforcement and comply with measures to protect endangered species established under a biological opinion. In achieving these objectives, the fishery may encounter short-term economic impacts, such as reduced catch or increased equipment costs, but experience long-term economic productivity due to protection of the resources, as discussed in previous sections.

The process of managing the spiny lobster stock is expected to have a negative short-term effect on the social and economic environment, and will create a burden on the administrative environment. No alternatives are being considered that would avoid these negative effects because they are a necessary cost associated with managing this stock. The ranges of alternatives have varying degrees of economic costs and administrative burdens. Some alternatives have relatively small short-term economic costs and administrative burdens, but would also provide smaller and more delayed long-term benefits. Other alternatives have greater short-term costs, but provide larger and more immediate long-term benefits. Therefore, mitigating these measures would be difficult, and managers must balance the costs and benefits when choosing management alternatives for the fishery.

4.13.3 Mitigation, Monitoring, and Enforcement Measures

Available data do not allow the determination if the characteristics of affected fishery participants trigger environmental justice considerations and the need for special mitigation measures to respond to environmental justice concerns. Nevertheless, the proposed actions would apply equally to all fishery participants regardless of minority or income status, and no information has been identified that would indicate differential costs on or benefits to minority or low income persons distinct from those expected to accrue to other constituencies involved in the fishery. Therefore, no environmental justice issues have been identified and no mitigation measures in response to environmental justice issues have been considered.

National Standard 1 guidelines state that if catch exceeds the ACL for a given stock or stock complex more than once in the last four years, the system of ACLs and AMs should be re-evaluated, and modified if necessary, to improve its performance and effectiveness. Additionally, NOAA Fisheries Service annually reports on the status of stocks in its Report to Congress.

To ensure the spiny lobster stock is managed for OY, periodic reviews of stock status are needed. These reviews are designed to incorporate new information and to address

unanticipated developments in the respective fisheries, and would be used to make appropriate adjustments in regulations should harvest not achieve OY objectives. Reviews would be based on periodic stock assessments. These assessments would be requested as needed by the SEDAR Steering Committee. A SEDAR assessment update conducted in 2010 was rejected by the review panel. No baseline assessment is scheduled for spiny lobster; however, the both the assessment panel and the review panel for the update recommended a baseline assessment for this species in the near future. This assessment would benefit from use of a more appropriate model and updated landings information through state and federal fishery monitoring programs. Depending on the outcome of assessments, the Councils may determine further management action should be taken. Actions the Councils could employ to further restrict harvest include, but would not be limited to, changes in size limits, bag limits, seasonal closures, or area closures.

The Councils have four options for implementing these measures. The first is to amend the Spiny Lobster FMP to include new information and management actions. Recent plan amendments put forth by the Councils have taken between two and three years from conception to implementation. The second method is a regulatory amendment based on the framework established in Action 6 of this amendment. Recent regulatory amendments have taken between nine months and two years from conception to implementation. NOAA Fisheries Service may take management actions through emergency or an interim measures. Emergency actions and interim measures only remain in effect for 180 days after the date of publication of the rule and may be extended by publication in the *Federal Register* for not more than 186 days provided the public has had an opportunity to comment on the measures. The Magnuson-Stevens Act further states when a Council requests that an emergency action and interim measure, the Councils should be actively preparing plan amendments or regulations that address the emergency on a permanent basis.

The type of rule making vehicle NOAA Fisheries Service or the Councils determine is needed is difficult to predict. Actions would be dictated by the severity of overages in harvest and by the time frame needed to implement a regulatory change. If the overage in harvest is small, NOAA Fisheries Service could apply the accountability measures. If the overage is severe, the Councils could ask for an emergency action or interim rule that would severely restrict or halt the harvest of spiny lobster while the Councils explores management measures to bring the harvest to levels consistent with the management objectives of the FMP.

The jeopardy analyses for sea turtles, smalltooth sawfish, and *Acropora* are based on the assumption that the frequency and magnitude of adverse effects that occurred in the past will continue into the future. If estimates regarding the frequency and magnitude of incidental take prove to be underestimates, the potential adverse effects to the sea turtles, smalltooth sawfish, and *Acropora* may be greater than previously thought. Thus, monitoring and tracking the level of take specific to the spiny lobster trap fishery is imperative. NOAA Fisheries Service developed Reasonable and Prudent Measures (RPMs), and implementing Terms and Conditions (T/Cs), to not only help monitor future

incidental takes, but help minimize the impacts of those takes. The RPMs and T/Cs ensure NOAA Fisheries can: 1) detect any adverse effects resulting from the spiny lobster fishery; 2) assess the actual level of incidental take in comparison with the anticipated incidental take documented in the opinion; and 3) detect when the level of anticipated take is exceeded. See Sections 9.3 and 9.4 of Appendix I for the specific RPMs and T/Cs. NOAA Fisheries Service and other government agencies also support research on this species by federal, state, academic, and private research entities.

Current spiny lobster regulations can be labor intensive for law enforcement officials. NOAA Fisheries Service law enforcement officials work cooperatively with other federal and state agencies to keep illegal activity to a minimum. Violators are penalized, and for commercial operators, permits required to operate in their respective fisheries can be sanctioned.

4.13.4 Irreversible and Irretrievable Commitments of Resources

No irreversible or irretrievable commitments of agency resources are proposed herein. The actions to set ACLs, AMs, and other management measures in the spiny lobster fishery are readily changeable by the Councils in the future. There may be some loss of immediate income (irretrievable in the context of an individual not being able to benefit from compounded value over time) to some sectors from the potential limitation of harvest due to accountability measures. No irreversible or irretrievable commitment of natural resources is anticipated.

4.14 Any Other Disclosures

CEQ guidance on environmental consequences [40 CFR 1502.16] indicates the following elements should be considered for the scientific and analytic basis for comparisons of alternatives. These are:

a) Direct effects and their significance.
b) Indirect effects and their significance.
c) Possible conflicts between the proposed action and the objectives of federal, regional, state, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned.
d) The environmental effects of alternatives including the proposed action.
e) Energy requirements and conservation potential of various alternatives and mitigation measures.
f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.
g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.
h) Means to mitigate adverse environmental impacts.

Items a, b, d, e, f, and h are addressed in Sections 2, 3, and 4. Items a, b, and d are directly discussed in Sections 2 and 4. Item e is discussed in the economic analyses. Alternatives that encourage fewer fishing trips would result in energy conservation. Item f is discussed throughout the document as spiny lobster stocks are a natural and depletable resource. A goal of this amendment is to make these stocks sustainable resources for the nation. Mitigations measures are discussed in Section 4.13.3. Because this amendment concerns the management of spiny lobster stocks, it is not in conflict with the objectives of federal, regional, state, or local land use plans, policies, and controls (Item c).

Urban quality and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures (Item g), are not a factor in this amendment. The actions taken in this amendment will affect a marine stock and its fishery, and should not affect land-based, urban environments. The proposed actions are not expected to result in substantial impacts to unique or ecologically critical areas.

In the South Atlantic, several notable shipwrecks can be found along the southeast coast in federal and state waters including Lofthus (eastern Florda), SS Copenhagen (southeast Florida), Half Moon (southeast Florida), Hebe (Myrtle Beach), Georgiana (Charleston), Monitor (Cape Hatteras), Huron (Nags Head), and Metropolis (Carolla). In the Gulf, notable shipwrecks in state and federal waters include Hatteras (Galveston), Belle (Matagorda Bay), Josephine (Mississippi), Tecumseh (Alabama), SS Massachusettes (Pensacola), SS Tarpon (Panama City), and City of Hawkinsville (Dixie County). Shipwrecks in the Florida Keys and Dry Tortugas include USCG Cutter Duane, USS Alligator, San Pedro, Windjammer, and Bird Key. Actions within this amendment would not affect any of the above listed historic resources, nor would they alter any regulations intended to protect them.

With respect to the Endangered Species Act (ESA), fishing activities pursuant to the spiny lobster fishery should not affect endangered and threatened species or critical habitat in any manner not considered in prior consultations on this fishery. The most recent biological opinion on the spiny lobster fishery was completed on August 27, 2009. The opinion stated the fishery was not likely to adversely affect ESA-listed marine mammals, Gulf sturgeon or designated critical habitat for elkhorn and staghorn corals. However, the opinion determined the spiny lobster fishery would adversely affect sea turtles, smalltooth sawfish, and elkhorn and staghorn corals, but would not jeopardize their continued existence. An incidental take statement was issued for green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles, smalltooth sawfish, and both species of coral. Reasonable and prudent measures to minimize the impact of these incidental takes were specified, along with terms and conditions to implement them.

With respect to the Marine Mammal Protection Act (MMPA), fishing activities conducted under the Spiny Lobster FMP should have no adverse impact on marine mammals. The 2011 List of Fisheries (75 FR 68468; November 8, 2010) lists the Florida Spiny Lobster Trap/Pot fishery as a Category III Fishery under the MMPA. This

classification indicates the annual mortality and serious injury of a marine mammal stock resulting from any fishery is less than or equal to 1 percent of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock, while allowing that stock to reach or maintain its optimum sustainable population. The proposed actions are not expected to alter existing fishing practices in such a way as to alter the interactions with marine mammals.

Because the proposed actions are directed towards the management of naturally occurring species in the Gulf of Mexico, the introduction or spread of nonindigenous species should not occur.

5.0 FISHERY IMPACT ANALYSIS/SOCIAL IMPACT STATEMENT

6.0 RESPONSE TO COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT

Will be added after the DEIS comment period.

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NMFS = National Marine Fisheries Service, SAFMC = South Atlantic Fishery Management Council, SF = Sustainable Fisheries Division, PR = Protected Resources Division

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GC = General Counsel, SERO=Southeast Regional Office, NEPA=National Environmental Policy Act, HC = Habitat Conservation, SEFSC=Southeast Fisheries Science Center, FWC=Florida Fish and Wildlife Conservation Commission, OLE=NOAA Fisheries Service Office for Law Enforcement

8.0 LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

Department of Commerce Office of General Counsel
Environmental Defense
Florida Fish and Wildlife Conservation Commission
Florida Keys Commercial Fishermen's Association
Monroe County Commercial Fishermen's Association
National Fisheries Institute
National Marine Fisheries Service Office of General Counsel
National Marine Fisheries Service Office of General Counsel Southeast Region
National Marine Fisheries Service Southeast Regional Office
National Marine Fisheries Service Southeast Fisheries Science Center
National Marine Fisheries Service Silver Spring Office
National Marine Fisheries Service Office of Law Enforcement
United States Coast Guard
United States Fish and Wildlife Services

9.0 REFERENCES

Ache, B. W., and D. L. Macmillan. 1980. Neurobiology. Pages 165-213 *in* J. S. Cobb and B. F. Phillips, editors. The Biology and Management of Lobsters. Vol. I: Physiology and Behavior. Academic Press, New York.

Acosta, C.A., T.R. Matthews, and M.J. Butler IV. 1997. Temporal patterns and transport processes in recruitment of spiny lobster (*Panulirus argus*) postlarvae to south Florida. Marine Biology 129:79-85.

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

Adams, W.F., and C. Wilson. 1995. The status of the smalltooth sawfish, *Pristis pectinata* Latham 1794 (Pristiformes: Pristidae) in the United States. Chondros 6(4):1-5.

Alsop, III, F. J. 2001. Smithsonian Handbooks: Birds of North America eastern region. DK Publishing, Inc. New York, NY.

Anderes Alvarez, B.L., Uchida, I., 1994. Study of the hawksbill turtle (*Eretmochelys imbricata*) stomach contents in Cuban waters. Pages 27-40 *in* Study of the hawksbill turtle in Cuba (I). Ministry of Fishing Industry, Cuba.

Atema, J., and J. S. Cobb. 1980. Social behavior. Pages 409-450 *in* J. S. Cobb and B. F. Phillips, editors. The biology and management of lobsters, Vol. I. Academic Press, New York.

Bak, R.P.M., J.J.W.M. Brouns, and F.M.L. Hayes. 1977. Regeneration and aspects of spatial competition in the scleractinian corals *Agaricia agaricites* and *Monastrea annularis*. Proceedings of the 3rd International Coral Reef Symposium, Miami, pp 143-148.

Behringer, D.C., M.J. Butler, and J.D. Shields. 2008. Ecological and physiological effects of PaV1 infection on the Caribbean spiny lobster (*Panulirus argus* Latrielle). Journal of Experimental Marine Biology and Ecology 359: 26-33.

Behringer, D.C. and M.J. Butle. 2010. Disease avoidance influences shelter use and predation in Caribbean spiny lobster. Behavioral Ecology & Sociobiology 64(5): 747-755.

Bertelsen, R.D. and J.H. Hunt. 1991. Results of the 1991 mail surveys of recreational lobster fishermen (special sport season and regular season surveys). Florida Marine Research Institute Mimeo Rpt.

Bertelsen, R. D., and T. R .R. Matthews. 2001. Fecundity dynamics of female spiny lobster (*Panulirus argus*) in a south Florida fishery and Dry Tortugas National Park lobster sanctuary. Marine and Freshwater Research 52(8):1559-1565.

Bigelow, H.B. and W.C. Schroeder. 1953. Sawfishes, guitarfishes, skates and rays, Pages 1-514 i*n* J. Tee-Van, C.M Breder, A.E. Parr, W.C. Schroeder, and L.P. Schultz editors. Fishes of the Western North Atlantic, Part Two. Mem. Sears Found. Mar. Res. I.

Bill, R.G., and W.F. Herrnkind. 1976. Drag reduction by formation movement in spiny lobsters. Science 193 (4258), 1156.

Bill, R.G., and W.F. Herrnkind. 1976. Drag reduction by formation movement in spiny lobsters. Science 193: 1146-1148.

Bjorndal, K.A. 1980. Nutrition and grazing behavior of the green sea turtle, *Chelonia mydas*. Marine Biology 56:147.

Bjorndal, K.A., editor. 1995. Biology and Conservation of Sea Turtles, revised edition. Smithsonian Institute Press, Washington, D.C.

Bjorndal, K.A. 1997. Foraging ecology and nutrition of sea turtles. Pages 199-231 *in* P.L. Lutz and J.A. Musick, editors. The Biology of Sea Turtles. CRC Press, Boca Raton, Florida.

Bliss, D. 1982. Shrimps, Lobsters, and Crabs. New Jersey: New Century Publishers INC.

Blonder, B.I, J.H. Hunt, D. Forcucci, and W.G. Lyons. 1992. Effects of Recreational and Commercial Fishing on Spiny Lobster Abundance at Looe Key National Marine Sanctuary. Proceedings of the Gulf and Caribbean Fisheries Institute 41:487 – 491.

Bolten, A.B. and G.H. Balazs. 1995. Biology of the early pelagic stage – the "lost year." *in* K.A. Bjorndal, K.A., editor. Biology and Conservation of Sea Turtles, Revised edition. Smithsonian Institute Press, Washington, D.C., 579.

Brongersma, L.D. 1972. European Atlantic Turtles. Zoologische verhandelingen Leiden, 121:318

Buck, E.H. 2005. Hurricanes Katrina and Rita: fishing and aquaculture industries – damage and recovery. CRS Report to Congress RS22241. 6p.

Burke, V.J., E.A. Standora, and S.J. Morreale. 1993. Diet of juvenile Kemp's ridley and loggerhead sea turtles from Long Island, New York. Copeia, 1993:1176.

Byles, R.A. 1988. Behavior and Ecology of Sea Turtles from Chesapeake Bay, Virginia. Doctoral dissertation, College of William and Mary, Williamsburg, Virgina.

Cairns, S.D. 1982. Stony corals (Cnidaria: Hydrozoa, Scleractinia) of Carrie Bow Cay, Belize. Pages 271-302 *in* K. Rutzler and I.G. Macintyre, editors. The Atlantic barrier reef ecosystem at Carrie Bow Cay, Belize. Smithsonian Institution Press, Washington, D.C.

California Department of Fish and Game (CA DFG). 2003. California's Living Marine Resources: A Status Report. Spiny lobster information obtained online on March 20, 2006, at http://www.dfg.ca.gov/mrd/status/report2003/spinylobster.pdf.

Carr, A. 1986. Rips, FADS, and little loggerheads. BioScience 36:92.

Carr, A. 1987. New perspectives on the pelagic stage of sea turtle development. Conservation Biology 1:103.

Cascorbi, A. April 15, 2004, updated December 15, 2005. *Caribbean Spiny Lobster: United States, Brazil, Bahamas*, Final Report, Seafood Watch, Monterey Bay Aquarium. Available: http://www.mbayaq.org/cr/cr_seafoodwatch/content/media/MBA_SeafoodWatch_CaribbeanSpinyLobster. (January 26, 2006)

Cascorbi, A. February 10, 2004. California Spiny Lobster, *Panulirus interruptus* Seafood Watch Seafood Report, Spiny Lobsters, Vol. II. Monterey Bay Aquarium. Available: http://www.mbayaq.org/cr/cr_seafoodwatch/content/media/MBA_SeafoodWatch_CaribbeanSpinyLobster. (January 26, 2006)

CEAA (Canadian Environmental Assessment Agency). 1999. *Cumulative Effects Assessment Practitioners Guide*. Section .2.1 *Key terms defined*. *Web site at http://www.ceaa-acee.gc.ca/013/0001/0004/2_e.htm.*

CEQ (Council on Environmental Quality). December 2010.
Website - http://ceq.hss.doe.gov/nepa/reports/1997/index.html.
Home page - http://www.whitehouse.gov/administration/eop/ceq/

CETAP. 1982. A characterization of marine mammals and turtles in the mid- and north Atlantic areas of the U.S. outer continental shelf. Cetacean and Turtle Assessment Program, University of Rhode Island. Final Report #AA551-CT8-48 to the Bureau of Land Management, Washington, DC, 538 pp.

CFMC 1981. Environmental impact Statement/Fishery Management Plan and Regulatory Impact Review for the Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands. CFMC/NMFS/July 1981.

CFRAMP. 1997. Lobster and Conch Subproject Specification and Training Workshop Proceedings. CARICOM Fishery Research Document No. 19: 290.

Chiappone, M., H. Dienes, D.W. Swanson, and S.L. Miller. 2005. Impacts of lost fishing gear on coral reef sessile invertebrates in the Florida Keys National Marine Sanctuary. Biological Conservation 121(2):221–230.

Cochrane, K. L., and Chakalall, B. 2001. The Spiny Lobster Fishery in the WECAFC Region - An Approach to Responsible Fisheries Management. Marine Freshwater Research 52: 1623-1631.

Cocking, S. 2009. Lobster hunters turn out in droves for Florida mini-season. *The Miami Herald*, July 30, 2009.

Cutter, S., L. Byron, J. Boruff, and W. L. Shirley. 2003. Social Vulnerability to Environmental Hazards. Social Science Quarterly, 84(2):242-261.

Davis, G.E. 1982. A century of natural change in coral distribution at the Dry Tortugas: A comparison of reef maps from 1881 and 1976. Bulletin of Marine Science 32(2):608-623.

Davis, G.E., and J.W. Dodrill. 1980. Marine parks and sanctuaries for spiny lobster fishery management. Proceedings of the Gulf and Caribbean Fisheries Institute 32:194-207.

Davis, G.E. and J.W. Dodrill. 1989. Recreational Fishery and Population Dynamics of Spiny Lobsters, *Panulirus argus*, in Florida Bay, Everglades National Park, 1977-1980. Bulletin of Marine Science 44(1):78-88.

Eckert, S.A., K.L. Eckert, P. Ponganis, and G.L. Kooyman. 1989. Diving patterns of two leatherback sea turtles (*Dermochelys coriacea*). Canadian Journal of Zoology, 67:2834.

Eckert, S.A., D.W. Nellis, K.L. Eckert, and G.L. Kooyman. 1986. Diving patterns of two leatherback sea turtles (*Dermochelys coriacea*) during internesting intervals at Sandy Point, St. Croix, U.S. Virgin Islands. Herpetologica 42:381.

Eggleston, D.B, E.G. Johnson, G.T. Kellison, and D.A. Nadeau. 2003. Intense removal and non-saturating functional responses by recreational divers on spiny lobster *Panulirus argus*. Marine Ecology Progress Series 257:197 – 203.

Ehrhardt, N.M. 1994. The lobster fisheries off the Caribbean coast of Central America. Pages 133-142 in B.F. Phillips, J.S. Cobb, and J. Kittaka, editors. Spiny Lobster Management. Blackwell, New York.

Ehrardt, N. and V. Deleveaux. 2005. Analysis of Trap Performance under the Florida Spiny Lobster Trap Certificate Program. Obtained online on January 12, 2006, at http://myfwc.com/marine/workgroups/2005/spinylobster/background/AnalysisofTrap.

Evans and Lockwood, 1995. C.R. Evans and A.P.M. Lockwood, Field studies of the Guinea chick lobster *Panulirus guttatus* (Latreille) at Bermuda: Abundance, catchability and behaviour. *J. Shellfish Res.*

FAO. 2007. Available: FAO (http://www.fao.org/fishery/species/3445).

FAO. 2003. Report to the Second Workshop on the Management of Caribbean Spiny Lobster Fisheries in the WECAFC Area. Rome: FAO. Fisheries Report No. 715.

FAO/WECAFC has organized five workshops on spiny lobster in cooperation with most regional agencies and institutions, dealing with various projects: Belize City, Belize (1997); Merida, Mexico (1998, 2000, and 2006); and Havana, Cuba (2002)

Florida Department of Environmental Protection. 1996. Status of the Spiny Lobster Fishery in Florida, 1996. Report to the Marine Fisheries Commission. Marathon, Florida.

Florida Fish and Wildlife Conservation Commission, Division of Marine Fisheries Management. September 2005. Spiny Lobster: A Report to the Spiny Lobster Advisory Board. Obtained online on January 12, 2006, at http://myfwc.com/marine/workgroups/2005/spinylobster/background/overviewofFloridasspinylobsterfishery.pdf.

Florida Fish and Wildlife Conservation Commission. 2006a. *Fisheries Management Issue: Fishing Effort in the Recreational and Commercial Dive Fisheries*. A report provided to the ad hoc Spiny Lobster Advisory Board, April 11, 2006. Obtained online at http://myfwc.com/docs/RulesRegulations/FishingEffortintheDiveSectorsofFloridasSpinyLobsterFishery.pdf.

Florida Fish and Wildlife Conservation Commission. 2006b. *Fisheries Management Issue: Environmental Effects of Florida's Spiny Lobster Fishery*. A report provided to the ad hoc Spiny Lobster Advisory Board. Obtained online at http://myfwc.com/docs/RulesRegulations/EnvironmentalEffectsofFishery.pdf.

Florida Fish and Wildlife Conservation Commission. 2006c. *Fisheries Management Issue: Special Recreational Lobster Sport Season.* A report provided to the ad Hoc Spiny Lobster Advisory Board.

Florida Fish and Wildlife Conservation Commission, Division of Marine Fisheries Management. June 6, 2007. Spiny Lobster Advisory Board. Update No. 1.

Florida Marine Fisheries Commission. December 5, 1991. "Economic and Small Business Impact Statement for the Proposed Amendments to Rule 46-24, F.A.C. Spiny Lobster and Slipper Lobster." Spiny Lobster Final Public Hearing.

Florida Sea Grant College Program. Lobster Fishery. Sea Grant Report No. 116. Obtained online on January 26, 2006, at http://researchmyfwc.com/features/view_article.asp?id=4808.

Fonteles-Filho, A.A. 1994. State of the lobster fishery in northeast Brazil. Pages 108-118 in B.F. Phillips, J.S. Cobb, J. Kittaka, editors. Spiny Lobster Management. Blackwell, New York.

Frick, J. 1976. Orientation and behaviour of hatchling green turtles (*Chelonia mydas*) in the sea. Animal Behavior 24:849.

Ghiold, J., and S.H. Smith. 1990. Bleaching and recovery of deep-water, reef-dwelling invertebrates in the Cayman Islands, BWI. Caribbean Journal of Science 26:52-61.

Giacobbe, D.V. 1996. A History of the Saltwater Sport Fishing Industry in Florida. Master's Thesis. Florida Atlantic University, Boca Raton, Florida.

Gilmore, M.D. and B.R. Hall. 1976. Life history, growth habits, and constructional roles of *Acropora cervicornis* in the patch reef environment. Journal of Sediment Petrology 46:519-522.

Goldberg, W.M. 1973. The ecology of the coral-octocoral communities off the southeast Florida coast: geomorphology, species composition, and zonation. Bulletin of Marine Science 23(3):465-488.

Gore, C. H. 1992. The Gulf of Mexico. Pineapple Press Inc. Sarasota, Fl. 384 p.

Goreau, T.F., and N.I. Goreau. 1973. Coral Reef Project--Papers in Memory of Dr. Thomas F. Goreau. Bulletin of Marine Science 23:399-464

Goreau, T.F., and J.W. Wells. 1967. The shallow-water Scleractinia of Jamaica: revised list of species and their vertical range. Bulletin of Marine Science 17:442-453.

Granda, A.M. and P. O'Shea. 1972. Spectral sensitivity of the green turtle (*Chelonia mydas*) determined by electrical responses to heterochromatic light. Brain Behav. Evol. 5:143–154.

Guillory,V., A. McMillen-Jackson, L. Hartman, H. Perry, T. Floyd, T. Wadner, and G. Graham. 2001. Blue crab derelict traps and trap removal program. Gulf States Marine Fisheries Commission, Ocean Springs, United States. Publication no. 88. 14 pages.

GMFMC. 2004 . Final Environmental Impact Statement for the Generic Essential Fish Habitat Amendment to the following fishery management plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Stone Crab Fishery of the Gulf of Mexico, Coral and Coral Reef Fishery of the Gulf of Mexico, Spiny Lobster Fishery of the Gulf of Mexico

and South Atlantic, Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council, Tampa, Florida. 118 p.

GMFMC. 2007. Amendment 27 to the Reef Fish FMP and Amendment 14 to the Shrimp FMP to end overfishing and rebuild the red snapper stock. Gulf of Mexico Fishery Management Council, 2203 North Lois Avenue, Suite 1100, Tampa, Florida 33607. 490 pp with appendices

GMFMC and SAFMC. 1982. Fishery Management Plan, Environmental Impact Statement, and Regulatory Impact Review for Spiny Lobster in the Gulf of Mexico and South Atlantic. March. Gulf of Mexico Fishery Management Council, Lincoln Center, Suite 331, 5401 West Kennedy Boulevard, Tampa, Florida 33609. South Atlantic Council, Southpark Building, Suite 306, 1 Southpark Circle, Charleston, South Carolina 29407-4699.

GMFMC and SAFMC. 1990. Amendment 3 to the Fishery Management Plan for the Spiny Lobster Fishery in the Gulf of Mexico and South Atlantic including Environmental Assessment and Regulatory Impact Review. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 881, Tampa, Florida 33609. South Atlantic Fishery Management Council, 1 Southpark Circle, Charleston, South Carolina 29407. 17 p.

GMFMC and SAFMC. 2008. Final Amendment 4 to the Fishery Management Plan for the Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands and Amendment 8 to the Joint Spiny Lobster Fishery Management Plan of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council, Tampa, Florida. 155 p.

Hain, J.H.W., M.J. Ratnaswamy, R.D. Kenney, and H.E. Winn. 1993. The fin whale, *Balaenoptera physalus*, in waters of the northeastern United States continental shelf. Report to the International Whaling Commission 42:653-669.

Harper, D.E. The 1993 Spiny Lobster Monitoring Report on Trends in Landings, CPUE, and Size of Harvested Lobster. NOAA, NMFS, SEFC, MIA-92/93-92.

Harper, D. E. 1994. The 1994 Spiny Lobster Update of Trends in Landings, CPUE, and Size of Harvested Lobster. NOAA, NMFS, SEFSC, MIA-93/94-82.

Harper, D. E. 1995. The 1995 Spiny Lobster Update of Trends in Landings, CPUE, and Size of Harvested Lobster. NOAA, NMFS, SEFC, MIA-94/95-47.

Harper, D.E., and R.G. Muller. 1997. National Report: Spiny Lobster Fisheries of the United States of America. Preparted for CFRAMP/FAO/DANIDA Assessment Workshop on Spiny Lobster, *Panulirus argus*, Fisheries in the WECAFC Area, Belize City, Belize, April 21 to May 2, 1997.

Heatwole, D.W., J.H. Hunt, and F.S. Kennedy, Jr. 1988. Catch efficiencies of live lobster decoys and other attractants in the Florida spiny lobster fishery. Florida Marine Resources Publication 44. 15 pages.

Herrnkind, W F. 1980. Spiny lobsters: patterns of movement. Pages 349-407 *in* J.S. Cob and B.F. Phillips, editors. The Biology and Management of Lobsters. Vol. 1, J., Academic Press, New York.

Herrnkind ,W.F., J. Van Der Walker, and L. Barr. 1975. Population dynamics, ecology and behavior of the spiny lobster, *Panulirus argus*, of St. John, U. S. Virgin Islands: habitation and pattern of movements. Results of the Tektite programme, Vol. 2, Bulletin of Natural History Museum L.A. County Vol. 20**,** pp. 31–45.

Hill, R. P., Sheridan, G. Matthews, and R. Appledorn. 2003. The effects of trap fishing on coralline habitats: What do we know? How do we learn more? Gulf and Caribbean Fisheries Institute 54: 1-12.

Hughes, G.R. 1974. The sea-turtles of south-east Africa. II. The biology of the Tongaland loggerhead turtle *Caretta caretta* L. with comments on the leatherback turtle *Dermochelys coriacea* L. and green turtle *Chelonia mydas* L. in the study region. Oceanographic Research Institute (Durban) Investigative Report. No. 36.

Hunt, J.H. 1994. Status of the fishery for *Panulirus argus* in Florida in Spiny Lobster Management. Pages 158-168 *in* B.F. Phillips, J.S. Cobb and J. Kittaka, editors. Oxford.

Hunt, J.H., R.D. Bertelsen, C. Cox, T.R. Matthews, and W.C. Sharp. Commercial and Recreational Harvest of the Spiny Lobster, *Panulirus argus* (Latreille), in Florida during the 1993-94 Season. Report to the Florida Marine Fisheries Commission.

Hunt, J.H., W.G. Lyons, and F.S. Kennedy. 1986. Effects of exposure and confinement on spiny lobsters, *Panulirus argus*, used as attractants in the Florida trap fishery. Fisheries Bulletin of the United States 84: 69–76.

Hunt, J. H., W. Sharp, M. D. Tringali, R. D. Bertelsen, and S. Schmitt. 2009. Using microsatellite DNA analysis to identify sources of recruitment for Florida's spiny lobster (*Panulirus argus*) stock. Final Report to the NOAA Fisheries Service Marine Fisheries Initiative (MARFIN) Program, Grant no. NA05NMF4331076 from the Florida Fish & Wildlife Conservation Commission, Fish & Wildlife Research Institute, FWC/FWRI File Code: F2539-05-08-F. 52 p.

Intergovernmental Panel on Climate Change (IPCC). 2007. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Jaap, W.C. 1984. The Ecology of South Florida Coral Reefs: A Community Profile. U.S. Fish and Wildlife Service. FWS/OBS-82/08.

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

Johnson, J.C. 1987. A Preliminary Report on Socio-Cultural Aspects of Florida's Spiny Lobster Fishery. East Carolina University Mimeo Report, 132 p.

Johnson, J.C., and M.K. Orbach. 1990. The Impact of Urbanization on Florida's Spiny Lobster Fishery. City and Society 4(1):88-104.

Jones, A.C. 1993. Examination of Spiny Lobster Directed Fishing Effort Data as Contained in the 1991 Marine Recreational Fishery Statistics Survey. SEFSC Memo.

Kanciruk, P., and W. F. Herrnkind. 1976. Autumnal reproduction of *Panulirus argus* at Bimini, Bahamas. Bulletin of Marine Science 26:417-432.

Kanciruk, P., and W.F. Hernnkind. 1978. Mass migration of the spiny lobster, *Panulirus argus* (Crustacea: Palinuridae): behavior and environmental correlates. Bulletin of Marine Science 28: 601-623.

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

Kennedy, V. S., R. R. Twilley, J. A. Kleypas, J. H. Cowan, Jr., S. R. Hare. 2002. Coastal and Marine Ecosystems & Global Climate Change: Potential Effects on U.S. Resources. Pew Center on Global Climate Change. 52 p.

Knowlton, A.R., S.D. Kraus, and R.D. Kenney. 1994. Reproduction in North Atlantic right whales (*Eubalaena glacialis*). Canadian Journal of Zoology 72:1297-1305.

Kraus, S.D., P.K. Hamilton, R.D. Kenney, A. Knowlton, and C.K. Slay. 2001. Reproductive parameters of the North Atlantic right whale. Journal of Cetacean Resource Management (Special Issue) 2:231-236.

Labisky, R.F., D.R.Gregory Jr., and J.A. Conti. 1980. Florida's Spiny Lobster Fishery: An Historical Perspective. Fisheries 5(4):28–37.

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

Larkin, S.L., Milton, J. Walter. 2000. Tradable Effort Permits: A Case Study of the Florida Spiny Lobster Trap Certificate Program. Available: http://smealsearch2.psu.edu/39881.html. (January 12, 2006).

Last, P.R., and J.D., Stevens. 1994. Sharks and Rays of Australia. CSIRO Australia. 513.

Lee, T.N., M.E. Clarke, E. Williams, A.F Szmant, and T. Berger. 1994. Evolution of the Tortugas gyre and its influence on recruitment in the Florida Keys. Bulletin of Marine Science 54: 621-646.

Leeworthy, V.R. 2002. Economic Impact of the Recreational Lobster Fishery on Monroe County, 2001. National Ocean Service, Special Projects, Silver Spring, MD. Obtained online at http://myfwc.org/docs/RulesRegulations/Economic _Impact.pdf.

Leeworthy, V. R., and P.C. Wiley. 2002: Profiles and economic contribution: general visitors to Monroe County, Florida 2000–2001. Silver Spring, MD, National Oceanic and Atmospheric Administration (http://marineeconomics.noaa.gov/Reefs/monroe.pdf).

Leon, Y.M.,and C.E. Diez. 2000. Ecology and population biology of hawksbill turtles at a Caribbean feeding ground. Pages 32-33 *in* F.A. Abreau-Grobois, R. Briseno-Duenas, and L. Sarti, editors. Proceedings of the 18th International Sea Turtle Symposium. NOAA Technical Memorandum NMFS-SEFSC-436.

Levenson, D., S. Eckert, M. Crognale, J.I. Deegan, G. Jacobs. 2004. Photopic spectral sensitvity of green and loggerhead sea turtles. Copeia: 908–911.

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

Lewis, C.E., S.L. Slade, K.E. Maxwell, and T.R. Matthews. 2009. Lobster trap movement and habitat impact. New Zealand Journal of Marine and Freshwater Research 43:271–282.

Liebman P.A. and A.M. Granda. 1971. Microspectrophotometric measurements of visual pigments in two species of turtle, *Pseudemys scripta* and *Chelonia mydas*. Vision Research 11:105–114.

Liebman P.A. and A.M. Granda. 1975. Super dense carotenoid spectra resolved in single cone oil droplets. Nature 253:370–372.

Lighty, R.G., I.G. MacIntyre, and R. Stuckenrath. 1982. *Acropora palmata* reef framework: A reliable indicator of sea level in the western Atlantic for the past 10,000 years. Coral reefs 1(2):125-130.

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

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

Linstone, H.A., and M. Turroff. 1975. The Delphi Method. Reading, MA: Addison-Wesley.

Lipicus, R.N., and J.S. Cobb. 1994. Introduction: Ecology and fishery biology of spiny lobsters. Pages 1-30 *in* B.F. Phillips, J.S. Cobb, and J.K. Kittaka, editors. Spiny Lobster Management. Blackwell Scientific Publications, Oxford.

Lipicus, R. N., and W. F. Herrnkind. 1982. Molt cycle alterations in behavior, feeding and diehl rhythms of a decapod crustacean, the spiny lobster *Panulirus argus*. Marine Biology 68:241-252.

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

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

Lyons, W.G., D.G. Barber, S.M. Foster, F.S. Kennedy, Jr., and G.R. Milano. 1981. The Spiny Lobster, *Panulirus argus*, in the Middle and Upper Florida Keys: Population Structure, Seasonal Dynamics, and Reproduction. Florida Marine Research Publications, 38 pages.

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

Marx, J.M., and W.F. Herrnkind. 1985. Macroalgae (Rhodophyta: Laurencia spp.) as habitat for young juvenile spiny lobsters, *Panulirus argus*. Bulletin of Marine Science 36:423-431.

Mäthger, L.M., L. Litherland, and K.A. Fritsches. 2007. An anatomical study of the visual capabilities of the green turtle, *Chelonia mydas*. Copeia:169–179.

Matthews, T.R. 2001. Trap-induced mortality of the spiny lobster, *Panulirus argus*, in Florida, USA. Marine and Freshwater Research 52:1509-1516.

Matthews, T.R., J.H. Hunt, and D.W. Heatwole. 2003. Morphometrics and Management of the Caribbean Spiny Lobster, *Panulirus argus*. Proceedings of the Gulf and Caribbean Fisheries Institute 54:156–174.

Maxwell, K.E., T.R. Matthews, R.D. Bertelsen, and C.D. Derby. 2009. Using age to evaluate reproduction in Caribbean spiny lobster, *Panulirus argus*, in the Florida Keys and Dry Tortugas, United States. New Zealand Journal of Marine and Freshwater Research. 43: 139-149.

Mayor, P., B. Phillips, and Z. Hillis-Starr. 1998. Results of stomach content analysis on the juvenile hawksbill turtles of Buck Island Reef National Monument, U.S.V.I. pp.230-232. *In* Proceedings of the 17th Annual Sea Turtle Symposium, S. Epperly and J. Braun, Compilers. NOAA Technical Memorandum NMFS-SEFSC-415

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

Menzel D.W.ed. 1993. Ocean processes: U.S. southeast continental shelf. DOE/OSTI -- 11674. U.S. Department of Energy. 112 p.

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

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

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

Miller, S.L., M. Chiappone, and L.M. Rutten. 2007. 2007 Quick look report: Large-scale assessment of *Acropora* corals, coral species richness, urchins and *Coralliophila* snails in the Florida Keys National Marine Sanctuary and Biscayne National Park. Center for Marine Science, University of North Carolina-Wilmington, Key Largo, Florida. 147 pages.

Miller, S.L., M. Chiappone, and L.M. Rutten. 2008. Large-scale assessment of marine debris and benthic coral reef organisms in the Florida Keys National Marine Sanctuary. Quick look report and data summary. Center for Marine Science, University of North Carolina-Wilmington, Key Largo, FL. 271 pages.

Milon, J. L. Walter, S.L. Larkin, D.J. Lee, K.J. Quigley, and C.M. Adams. 2005. The Performance of Florida's Spiny Lobster Trap Certification Program. Alternative Title: Bioeconomic Models of the Florida Commercial Spiny Lobster Fishery. Florida Sea Grant College Program, Sea Grant Report No. 116. Obtained online on January 26, 2006, at http://research.myfwc.com/features/view_article.asp?id=4808.

Moe, M.A. Jr. 1991. Lobsters: Florida, Bahamas, the Caribbean. Green Turtle Publications, Plantation, FL. 510 pages.

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

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

Muller, R.G., W.C. Sharp, T.R. Matthews, R. Bertelsen, and J.H. Hunt. 2000. The 2000 update of the stock assessment for spiny lobster, Panulirus argus, in the Florida Keys. Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute.

Muller, R.G., W.C. Sharp, T.R. Matthews, R. Bertelsen, and J.H. Hunt. 1999. The 1999 update of the stock assessment for the Florida Keys spiny lobster, *Panulirus argus*. Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute.

NMFS/Office of Science and Technology. Fisheries Statistics Division. 2007. Fisheries of the United States 2006.

NMFS. 2009. Endangered Species Act – Section 7 Consultation on the Continued Authorization of the Gulf of Mexico/South Atlantic Spiny Lobster Fishery. Biological Opinion, August 27.

NMFS and USFWS. 1991. Recovery Plan for U.S. Population of Loggerhead Turtle. National Marine Fisheries Service, Washington, D.C.

Noetzel, B.G. and M.G. Wojnowski. 1975. Costs and Earnings in the Spiny Lobster Fishery, Florida Keys. Marine Fisheries Review 37 (4):25-31.

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

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

OSPESCA Regional Workshop Lobster Fisheries in Central America. December 10-11, 2007, Managua, Nicaragua.

Paredes, R.P. 1969. Introduccion al Estudio Biologico de *Chelonia mydas agassizi* en el Perfil de Pisco, Master's thesis. Universidad Nacional Federico Villareal, Lima, Peru.

Parsons, D.M. 2006. Indirect Effects of Recreational Fishing on Spiny Lobster (Panulirus Agus) Behavior, Mortality and Population Dynamics. Doctoral Dissertation. North Carolina State University, Raleigh, North Carolina.

Pendleton, L.H. 2002. A preliminary study of the value of coastal tourism in Rincon, Puerto Rico. Environmental Defense Surfer's Environmental Alliance. The Surfrider Foundation.

Phillips, B. F., J.S. Cobb, and R.W. George. 1980: General biology. Pages 1-82 *in* J.S. Cobb and B.F. Phillips, editors. The biology and management of lobsters, Vol. 1.

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

Poulakis, G. R., and J. C. Seitz. 2004. Recent occurrence of the smalltooth sawfish, *Pristis pectinata* (Elasmobranchiomorphi: Pristidae), in Florida Bay and the Florida Keys, with comments on sawfish ecology. Florida Scientist 67(27):27-35.

Prochaska, F.J., and J.R. Baarda. February 1975. Florida's Fisheries Management Programs: Their Development, Administration, and Current Status. Agricultural Experiment Stations. Institute of Food and Agricultural Sciences. Bulletin 768. University of Florida, Gainesville.

Rogers, C.S., T.H. Suchanek, and F.A. Pecora. 1982. Effects of Hurricanes David and Frederic (1979) on shallow *Acropora palmata* reef communities: St. Croix, U.S. Virgin Islands. Bulletin of Marine Science 32:532-548.

Rylaarsdam, K.W. 1983. Life histories and abundance patterns of colonial corals on Jamaican reefs. Marine Ecology Progress Series 13:249-260.

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

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

Sarver SK, J.D. Silberman, P.J. Walsh. 1998. Mitochondrial DNA sequence evidence supporting the recognition of two subspecies or species of the Florida spiny lobster *Panulirus argus*. Journal of Crustacean Biology 18(1):177–186.

Saul, S. 2005. A review of the literature and life history study of the Caribbean spiny lobster, *Panulirus argus*. SEDAR 8. NMFS SEFSC

Scott, T.M., and S.S. Sadove. 1997. Sperm whale, *Physeter macrocephalus*, sightings in the shallow shelf waters off Long Island, New York. Marine Mammal Science. 13:317-321.

Schmied, R. 1992. Memorandum, January 21, 1992. NMFS, SERO.

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

SEDAR 8, 2005. Assessment of spiny lobster, *Panulirus argus*, in the Southeast United States Stock Assessment Report. SEDAR 08 U.S. Stock Assessment Panel 29 April 2005.

Seitz, J.C., and G.R. Poulakis. 2006. Anthropogenic effects on the smalltooth sawfish (*Pristis pectinata*) in the United States. Marine Pollution Bulletin 52:1533–1540.

Sharp, W.C.; Hunt, J.H.; Teehan, W.H. 2007. Observations on the ecology of Scyllarides aequinoctialis, Scyllarides nodifer, and Parribacus antarcticus and a description of the Florida scyllarid lobster fishery. Chapter 11 in: Kari L. Lavalli and Ehud Spanier, eds. The Biology and Fisheries of the Slipper Lobster, p.231-242.

Sharp, W.C. R.D. Bertelsen, and V.R. Leeworthy. 2005. Long-term trends in the recreational lobster fishery of Florida, United States: landings, effort, and implications for management. New Zealand Journal of Marine and Freshwater Research 39:733-747.

Sharp, W.C. R.D. Bertelsen, V.R. Leeworthy, and J.H. Hunt. 2004. "The 1994 Florida Recreational Spiny Lobster Fishing Season: Results of a Mail Survey". Proceedings of the Gulf and Caribbean Fisheries Institute 48:93-110.

Sharp, W.C., R.D. Bertelsen and J.H. Hunt. 2004b. The 1994 Florida Recreational Spiny Lobster Fishing Season: Results of a Mail Survey.

Sharp, W.C.; Hunt, J.H.; Lyons, W.G. 1997. Life history of the spotted spiny lobster, *Panulirus guttatus*, an obligate reef-dweller. Marine and Freshwater Research 48: 687-698.

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

Shivlani, M. 2009. Examination of non-fishery factors on the welfare of fishing communities in the Florida Keys: A focus on the cumulative effects of trade, economic, energy, and aid policies, macroeconomic (county and regional) conditions and coastal development on the Monroe County commercial fishing industry. MARFIN Grant NA05NMF4331079.

Shivlania, M., N. Ehrardt, J. Kirkley, and T. Murray. May 14, 2004. Assessment of the Socioeconomic Impacts of the Spiny Lobster Trap Certificate Program, Spiny Lobster Fishery Management Efforts, and Other Spiny Lobster User Groups on Individual Commercial Spiny Lobster Fishers. Available: http://myfwc.com/marine/workshops/2005/spinylobster/background/Spiny_Lobster_Trap Certificate_Program.pdf. (January 12, 2006).

Shivlani, M., N. Ehrnardt, J. Kirkley, and T. Murray. 2004. Assessment of the socioeconomic impacts of the Spiny Lobster Trap Certificate Program, spiny lobster fishery management efforts, and other spiny lobster user groups on individual commercial spiny lobster fishers.

Shivlani, M.P., and J.W. Milon. 2000. Sociocultural effects of a market-based fishery management program in the Florida Keys. Coastal Manage 28:133–147.

Silberman, J. D., S. K. Sarver, and P. J. Walsh. 1994. Mitochondrial DNA variation and population structure in the spiny lobster *Panulirus argus*. Mar. Biology 120:601-608.

Silberman, J. D., and P. J. Walsh. 1994. Population genetics of the spiny lobster *Panulirus argus*. Bulletin Marine Science 54:1084.

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

Simpfendorfer, C.A. 2002. Smalltooth sawfish: The USA's first endangered elasmobranch? Endangered Species Update 19:53-57.

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

Social Vulnerability Index for the United States. http://webra.cas.sc.edu/hvri/products/sovi.aspx#. accessed July 8, 2010

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

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

Spanier, E.; Lavalli, K.L. 2006. Scyllarides Species. Chapter 14 in: Bruce F. Phillips, ed. Lobster: Biology, Management, Aquaculture and Fisheries, p. 462-496.

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

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

Tchernia, P. 1980. Descriptive Regional Oceanography. Pergamon Press INC., Maxwell House, Fairview Park, Elmsford, New York 10523.

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

Tormalin, T. Marine biologist studies impacts of lobstermania. *St. Petersburg Times*, July 28, 1991.

Uhrin, A.V., M.S. Fonseca, and G.P. DiDomenico. 2005. Effects of spiny lobster on seagrass beds: damage assessment and evaluation of recovery. American Fisheries Society Symposium 41:579–588.

U.S. Department of Energy, Energy Information Administration. December 29, 2010. http://www.eia.doe.gov/oog/info/gdu/gaspump.html

Van Dam, R. and C. Diéz. 1997. Predation by hawksbill turtles on sponges at Mona Island, Puerto Rico. pp. 1421-1426, Proceedings of the 8th International Coral Reef Symposium, vol. 2.

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

Vanderbilt Television News Archive. "NBC Evening News for Thursday, Sep 11, 1975". Obtained online on February 28, 2006, at http://openweb.tvnews.vanderbilt.edu/1975-9/1975-09-11-NBC-20.html.

Vondruska, John. September 3, 1998. Florida's Spiny Lobster Fisheries. National Marine Fisheries Service, Fisheries Economics Office, St. Petersburg, FL.

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

Walker, B. M., R. F. Zales II, and B. W. Rockstall. 2006. Charter fleet in peril: losses to the Gulf of Mexico charter fleet from hurricane storms during 2005. National Association of Charterboat Operators. 208 pp.

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

Waring, G.T., J. M. Quintal1, and C.P. Fairfield, editors. 2002. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2002. NOAA Technical Memorandum NMFS-NE-169. Northeast Fisheries Science Center, Woods Hole, Massachusetts 02543-1026.

Waring, G.T, R.M. Pace, J.M. Quintal, C.P. Fairfield, and K. Maze-Foley, editors. 2004. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2003. NOAA Technical Memorandum NMFS-NE-182. Northeast Fisheries Science Center, Woods Hole, Massachusetts 02543-1026.

Watkins, W.A., M.A. Daher, G.M. Reppucci, J.E. George, D.L. Martin, N.A. DiMarzio and D.P. Gannon. 2000. Seasonality and distribution of whale calls in the North Pacific. Oceanography 13:62-67.

Wenzel, F., D.K. Mattila, and P.J. Clapham. 1988. *Balaenoptera musculus* in the Gulf of Maine. Marine Mammal Science 4(2):172-175.

Western Central Atlantic Fishery Commission (WECAFC). 2007. Summary Report of the Intercessional Activities and FAO Projects in the WECAFC Region. October.

Western Central Atlantic Fishery Commission (WECAFC). 2006. Fifth Regional Workshop on the Assessment and Management of the Caribbean Spiny Lobster. *FAO Fisheries Report No. 826.*

Wetherell, V.B. October 1998. Letter Before the State of Florida Department of Environmental Protection. OGC No. 98-2660. Tallahassee.

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

Williams, J.S. 1976. An Economic Analysis of Alternative Management Strategies for the Spiny Lobster Industry. Doctoral Dissertation. Food and Resource Economics Department, University of Florida, Gainesville.

Williams, J. S., and F.J. Prochaska. February 1976. The Spiny Lobster Fishery: Landings, Prices, and Resource Productivity. Florida Sea Grant Program Report No. 12. University of Florida.

William, A.B. 1984. Shrimps, Lobsters, and Crabs of the Atlantic Coast of the Eastern United States. Maine to Florida. Washington, D.C.: Smithsonian Institution Press.

Witham, R. R., R. M. Ingle, and E. A. Joyce. 1968. Physiological and ecological studies of *Panulirus argus* from the St. Lucie estuary. *Fla. Board Conserv. Mar. Res. Lab. Tech. Ser.* 53: 31 pp.

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

Zuboy, J.R. 1980. The Delphi Technique: A Potential Methodology for Evaluating Recreational Fisheries. Southeast Fisheries Center Contribution Number 80-14M. Presented at the International Symposium on Fishery Resources Allocation, Vichy, France, April 20 -24, 1980.

10.0 INDEX

Will be added prior to public hearings.

Appendix A. Alternatives Considered but Eliminated from Detailed Analyses

Action: Delegate management of the Spiny Lobster FMP to Florida FWC

Alternative 1: No Action – Continue the current state and federal management system

Alternative 2: Delegate all management to Florida FWC, except establishment of an annual catch limit (ACL)

Alternative 3: Delegate certain management criteria to Florida FWC, except establishment of an ACL

Management criteria to delegate include:
Options a: Numerical specification of ACL and breakdown into sector-specific ACLs based on the definitions later in document
Options b: Commercial quotas and recreational allocations based on the allocations specified later in this document
Options c: Size limits
Options d: Recreational bag limits
Options e: Commercial trip limits
Options f: Permit endorsements
Options g: Fishing seasons
Options h: Application of the accountability measures, including closing the fishery when a sector reaches its quota and/or allocation
Options i: Rules and regulations for traps, including gear marking, tagging, etc.
Options j: Data collection and reporting requirements
Options k: Closed areas

Comparison of Alternatives: The Fishery Management Plan for Spiny Lobster in the Gulf of Mexico and South Atlantic (Spiny Lobster FMP) has been jointly managed by the Gulf of Mexico and South Atlantic Fishery Management Councils (Councils) since 1982. In 1989, the Spiny Lobster FMP was amended to establish compatible regulations between the federal and state fisheries. Thereafter, the Florida Fish and Wildlife Conservation Commission (FWC) has taken the lead in Caribbean spiny lobster fishery management, with NOAA Fisheries Service establishing compatible regulations when applicable. The commercial fishery is currently managed with a trap limitation and permitting program, minimum size limits, closed fishing seasons, gear restrictions, and other prohibitions. The recreational fishery is currently managed with minimum size limits, bag limits, closed fishing seasons, gear restrictions, and other prohibitions (Table 2.1.1).

The joint jurisdiction of the two Councils extends from the North Carolina/Virginia border in the South Atlantic to the Texas/Mexico border in the Gulf of Mexico. A majority of the commercial and recreational landings for Caribbean spiny lobster occurs in the waters off Florida (Table 2.1.1). Caribbean spiny lobster are also found in waters off other states within the Councils' jurisdiction, but in these areas, low abundance results in low levels of harvest. For example in the Gulf of Mexico, Alabama reported no commercial landings of spiny lobster species (C. Denson, Alabama Marine Resources Division, Alabama Department of Conservation and Natural Resources, personal communication). There were no reported commercial landings for spiny lobster in

Mississippi, Louisiana, and Texas and no program currently in place to document recreational landings in any of the states but Florida (Source: http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html).

Off Georgia there were no commercial landings of Caribbean spiny lobster species from state or federal waters for the years 1999-2008 (J. Califf, Commercial Fisheries Statistics Coordinator, Coastal Resources Division, Georgia Department of Natural Resources, personal communication). Similarly, in the state waters off South Carolina there were no recorded landings of spiny lobster species. In federal waters off South Carolina, commercial landings by divers between 1991 and 2003 included 6 pounds landed one year, and between 2004 and 2008, 15 pounds was landed in one year (G. Steele, Biological Statistician, South Carolina Department of Natural Resources, personal communication).

In state waters off North Carolina, there were no recorded landings of Caribbean spiny lobster. However, in federal waters off North Carolina there were low landings for Caribbean spiny lobster in 2001, 2003, 2004, 2006, 2007, and 2008. The average landings were 100 pounds or less live whole animal weight by commercial divers. The ex-vessel value for Caribbean spiny lobster species during this time period (1999-2008) ranged from $50 to $3,500 (A. Bianchi, Trip Ticket Coordinator, North Carolina Division of Marine Fisheries, personal communication). In 1999, 2000, 2002, and 2005 commercial landings for those species were not recorded by the North Carolina Division of Marine Fisheries.

Because of the low landings from states other than Florida, the federal fishery is currently managed through regulations affecting the EEZ off states in three areas: the South Atlantic states not including Florida (North Carolina, South Carolina, and Georgia), the State of Florida, and the Gulf of Mexico states not including Florida (Texas, Louisiana, Mississippi, and Alabama). This division of regulations reflects differences in Caribbean spiny lobster abundance and fishing effort in these regions (Table 2.1.2).

Table 2.1.2. Average commercial landings of Caribbean spiny lobsters 1999-2008 for Gulf federal waters, South Atlantic federal waters, and state of Florida waters (both coasts). Average pounds landed are live whole animal weight.

Caribbean Spiny Lobster	Gulf federal	Atlantic federal	Florida state waters
Average Pounds	164,912	998,218	1,709,646
Average # Trips	413	2,976	8,903
Average $ Value	$828,149	$4,878,155	$8,827,990

Source: Florida FWC, Marine Fisheries Information System 2009.

Note: This data is based on the trip ticket program. There is only one space available for waters fished. Fishers could fish in both state and federal waters within one day, based on the season and other fishing behaviors. This table should be viewed with some caution, because there could be additional unaccounted variability, due to the way the data is recorded and analyzed.

Alternative 1, no action, would continue the current state and federal management system and set an ACL and accountability measures as determined in actions later in this amendment for Caribbean spiny lobster. If this alternative was selected as the preferred

alternative, the National Standard 1 guideline would still need to be met in 2011. Alternative 2 or 3 would set an ACL and accountability measures (AMs), but delegate all or certain management measures, respectively. Delegation to Florida would require agreement from Florida FWC to accept the responsibility of Caribbean spiny lobster management. Alternative 2, would delegate all management of Caribbean spiny lobster to Florida FWC, but still set an ACL (see Action 4). If Alternative 2 was selected as a preferred alternative, Florida FWC could use various management criteria to maintain the ACL. This method of management is similar to what is occurring presently; Florida FWC has taken the lead in Caribbean spiny lobster fishery management, with NOAA Fisheries Service establishing compatible regulations when applicable through the Council's processes. One modification from the current management process in addition to setting an ACL is establishing AMs. If the ACL was exceeded Florida FWC would need to apply AMs, compatible in federal waters to account for these overages, under the National Standard 1 guidelines.

Alternative 3 would also set an ACL, but delegate certain management criteria to Florida FWC, such as size limits, bag limits, fishing seasons, and trip limits. This alternative could be become more complicated; if and when the ACL was exceeded NOAA Fisheries Service would need to implement the previously established AMs. If Florida FWC only has certain management criteria or vice versa, then the appropriate criteria for management may be split between the Councils and NOAA Fisheries Service and Florida FWC, making it more difficult to prevent the ACL from being exceeded or by initiating AMs, if and when they were exceeded. The public could also become confused, by management changes coming from NOAA Fisheries Service instead of Florida FWC and compatibility with these regulations. The benefit of delegating all or certain management criteria to Florida FWC is that the state can move faster than the federal system when and if, accountability measures need to be implemented. Alternatives 2 and 3 would still allow the Councils to maintain their joint Amendment 4 and 8 with the Caribbean Council (73 FR 1148). This newly implemented amendment prohibits importation of undersized Caribbean spiny lobsters into the U.S.

This action is primarily administrative and alternatives in this action are expected to have little impact on the biological or physical environments. Alternative 2 may be more streamlined than Alternative 3 or Alternative 1 simply due to all management criteria being delegated to Florida FWC. This may create more of an administrative burden for Florida FWC working jointly with NOAA Fisheries Service and the Councils, but be less burdensome to the public keeping up with regulatory changes. If Alternative 3 is selected as preferred, there may be more of an administrative burden for all parties involved, Florida FWC, NOAA Fisheries Service, and the Councils. In addition, by delegating only certain management criteria the process, meant to be streamlined, may become more burdensome for all parties involved. Further, members of the public following regulations for Caribbean spiny lobster may become confused if various management criteria are implemented from different agencies.

Action 1: Other species in the Spiny Lobster FMP

Alternative 2: Set ACLs and AMs for each species using historical landings
Option a: smoothtail spiny lobster, *Panulirus laevicauda*
Option b: spotted spiny lobster, *Panulirus guttatus*

Discussion: Alternative 2 would set ACLs and AMs for each species, which would be very difficult for smoothtail and spotted spiny lobster (Option a and b), because there are no historical landings available for these species. However, the other two species of slipper lobsters, Spanish and ridged (Option c and d) have commercial landings information, but are not targeted species. Positive biological and physical benefits are expected from setting ACLs and AMs; however, if no historical landings information is available, the rationale for setting biological determination criteria may have limited positive impacts on the physical or biological environment.

Action 2: Modify the current definitions of Maximum Sustainable Yield, Optimum Yield, Overfishing Threshold, and Overfished Threshold for Caribbean spiny lobster

2.3.4 Overfished Threshold

Alternative 2**:** Adopt the Gulf Council overfished threshold definition for the South Atlantic. The Gulf of Mexico definition: proxy for MSST of 15% transitional SPR, with the additional modification to static SPR.

Discussion: This action explores various alternatives for establishing biological reference points: MSY, OY, overfishing threshold, and overfished threshold. Currently the Gulf of Mexico and the South Atlantic Councils have different definitions for these biological reference points and the South Atlantic Council does not currently have an overfished threshold definition (GMFMC 1999, SAFMC 1998, SEDAR 8 2005).

Transitional SPR versus static SPR is used for the definitions of MSY, OY, overfishing, and overfished threshold by the Gulf Council. As the name suggests SPR ratio expresses spawning per recruit as a ratio in a fished condition, relative to the maximum theoretical amount of spawning per recruit that occurs when there is no fishing (Slipke and Maceina 2000; MRAG Americas 2001). Due to increased fishing effort reducing the potential reproductive output, the denominator in the spawning potential ratio is always greater than or equal to the numerator, so the resulting values will range between 0 and 1 (MRAG Americas 2001).

Generally, static SPR is more frequently used than transitional SPR. Static SPR requires minimal data inputs, whereas transitional SPR requires data from a full age-based stock assessment (Parkes 2001). Static SPR is calculated on a per-recruit basis assuming equilibrium conditions of recruitment and mortality throughout their life span. Transitional SPR is computed on a yearly basis and uses actual annual variation in population structure and mortality rates therefore it is considered a dynamic measure (MRAG Americas 2001, Slipke and Maceina 2001). The SEDAR 8 (2005) benchmark assessment terms of reference, suggest that static SPR was used is the assessment based

on the South Atlantic Fishery Management Council's Spiny Lobster Amendment 6 (SAFMC 1998).

Alternative 2 under Action 2.3.4 would adopt the Gulf Council's current definition at 15% transitional SPR, with modification for consistency to static SPR. Again, static SPR is generally used when the stock is not overfished and stock assessments are not completed on an annual basis.

Action 3: Establish sector allocations for Caribbean spiny lobster in state and federal waters from North Carolina through Texas

Alternative 2: Allocate the spiny lobster ACL by the following sector and or gear allocations:

Option a: 75% to the commercial trap fishery, 4% to the commercial dive fishery, 1% to the commercial bully net fishery, and 20% to the recreational fishery

Alternative 3: Allocate the spiny lobster ACL by the following sector and or gear allocations:

Option a: 70% to the commercial trap fishery, 6% to the commercial dive fishery, 1% to the commercial bully net fishery, and 23% to the recreational fishery.

Alternative 4: Allocate the spiny lobster ACL by the following sector and or gear allocations:

Option a: 70% to the commercial trap fishery, 3% to the commercial dive fishery, 1% to the commercial bully net fishery, and 26% to the recreational fishery.

Alternative 5: Allocate the spiny lobster ACL by the following sector and or gear allocations:

Option a: 72% to the commercial trap fishery, 5% to the commercial dive fishery, 1% to the commercial bully net fishery, and 22% to the recreational fishery.

Alternative 6: Allocate the spiny lobster ACL by the following sector and or gear allocations:

Option a**:** 72% to the commercial trap fishery, 4% to the commercial dive fishery, 1% to the commercial bully net fishery, and 23% to the recreational fishery.

Discussion: The Florida Fish and Wildlife Conservation Commission (FWC) invited representatives of stakeholder groups participating in Florida's Lobster Fishery to serve as members of the Spiny Lobster Ad Hoc Advisory Board (Advisory Board). The Advisory Board was made up of five commercial trappers, three commercial divers, three recreational fishers, two wholesale dealers, two environmental groups, and one FWC representative on the board.

The Advisory Board was designed to bring together a group of stakeholder representatives from around the state who represent the diversity of the lobster fishery community and included commercial lobster trappers, commercial lobster divers, recreational lobster fishers, a special recreational license holder, wholesale lobster

dealers, an environmental group, and a representative from the FWC. The goal was to provide constructive comments and guidance to the FWC in the form of proposed refinements to the management of Florida's spiny lobster fishery. Over a period of sixteen months the Advisory Board met approximately eight times for approximately two days each to focus on reviewing and discussing lobster fishery issues and proposals for refinements to Florida's spiny lobster fishery.

The Councils chose to combine all gear types when determining allocations for each sector. After this was accomplished for each of the alternatives, the alternatives moved to considered but rejected were identical or very similar to alternatives retained under the action.

2.4.2 Set annual catch limits (ACLs) for Caribbean Spiny Lobster

Alternative 3: Set separate state and federal ACLs based on landings.
Option a: sum of ACLs = ABC
Option b: sum of ACLs = x% of ABC

Discussion: The Caribbean spiny lobster fishery occurs mainly off the state of Florida. Commercial landings data are available from 1984; starting in this year, commercial fishermen were required to sell their catch to licensed dealers who were required to submit trip tickets. Separate state and federal ACLs (Alternative 3) may be appropriate because a large amount of harvest is in state waters. However, distinguishing between landings from these areas is difficult. In addition, federal management would be limited to the portion of the fishery under federal authority. The sum of the state and federal ACLs could equal ABC (Option a) or be reduced from the ABC for management uncertainty (Option b).

2.4.3 Set Annual Catch Targets for Caribbean Spiny Lobster

Alternative 3: Set separate state and federal ACTs (If Action 4.2, Alternative 2 or 3 chosen).

Discussion: Separate federal/state ACTs (Alternative 3) would be appropriate if separate ACLs are set (Action 4.2, Alternative 3), or if a single ACL is set (Action 4.2, Alternative 2). However, the federal government does not have authority to manage harvest of Caribbean spiny lobster in state waters. Unless the states adopt the ACTs as quotas, and institute accountability measures, any ACT set by the Councils could be exceeded without consequence. In an extreme case, landings in state waters could exceed the ABC under these circumstances.

2.5 Action 5: Accountability Measures (AMS) by Sector

Alternative 2: Establish in-season AMs.
Option b: Recreational
Sub-option i: quota closure

Sub-option ii: reduce the bag limit when 75% of the recreational ACL or ACT is projected to be met.
Option c: Recreational and commercial combined AM

Sub-option i: prohibit both recreational and commercial harvest when the commercial ACL or ACT, or combined ACL or ACT is projected to be met.
Sub-option ii: reduce the recreational and commercial bag/trip limits when 75% of the commercial ACL or ACT is projected to be met.

Discussion: Under Alternative 2, in-season AMs would be triggered to prevent the ACL from being exceeded. The efficacy of in-season AMs is largely reliant upon in-season monitoring of landings, which may be especially difficult for the recreational sector. The Marine Recreational Fishing Statistics Survey and the newly implemented Marine Recreational Information Program does not collect landings information on crustaceans. Therefore, in-season tracking of Caribbean spiny lobster landings in the recreational sector would be based on the Marine Recreational Fishing Statistics Survey program and state landings reports. An additional obstacle to tracking recreational harvest in-season is that there is a lag time between when the Caribbean spiny lobsters are landed and when those landings are reported in the landings database. This lag time means that projections of when the ACL is expected to be met would need to be employed. Landings projections are not always 100% accurate, thus using such estimates could lead to an in-season AM being triggered prematurely, or not soon enough causing an ACL overage.

2.8 Action 8: Modify Tailing Requirements for Caribbean Spiny Lobster for Vessels that Obtain a Tailing Permit

Alternative 4: Modify the requirements for obtaining a Tail-Separation Permit.

Discussion: Alternative 4 would modify the prerequisites needed for obtaining a Tail-Separation Permit in a way that would make them more restrictive and specific. The regulations could be modified in such a way that would address the issue of recreational fishermen obtaining Tail-Separation Permits, as well as the issue of some fishermen landing undersized lobster tailed and legal sized lobster whole. However, Alternative 4, unless the modification includes the complete removal of the Tail-Separation Permit, would not be as biologically beneficial as Alternative 2.

Appendix B. Regulatory Impact Review (RIR, economic impacts of preferred alternatives)

Appendix C. Regulatory Flexibility Analysis (RFA, economic impacts of proposed regulatory actions)

Appendix D. Bycatch Practicability Analysis

Appendix E. Other Applicable Laws

The Magnuson-Stevens Act (16 U.S.C. 1801 et seq.) provides the authority for U.S. fishery management. But fishery management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems within which those fisheries are conducted. Major laws affecting federal fishery management decision making are summarized below.

Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NOAA Fisheries 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.

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq.) encourages state and federal cooperation in the development of plans that manage the use of natural coastal habitats, as well as the fish and wildlife those habitats support. When proposing an action determined to directly affect coastal resources managed under an approved coastal zone management program, NOAA Fisheries is required to provide the relevant state agency with a determination that the proposed action is consistent with the enforceable policies of the approved program to the maximum extent practicable at least 90 days before taking final action.

Information Quality Act

The Data Quality Act (DQA) (Public Law 106-443), which took effect October 1, 2002, requires the government for the first time to set standards for the quality of scientific information and statistics used and disseminated by federal agencies. Information includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, cartographic, narrative, or audiovisual forms (includes web dissemination, but not hyperlinks to information that others disseminate; does not include clearly stated opinions).

Specifically, the Act directs the Office of Management and Budget (OMB) to issue government wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." Such guidelines have been issued, directing all federal agencies to create and issue agency-specific standards to 1) ensure Information Quality and develop a pre-dissemination review process; 2) establish administrative mechanisms allowing affected persons to seek and obtain correction of information; and 3) report periodically to OMB on the number and nature of complaints received.

Scientific information and data are key components of FMPs and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Act. To be consistent with the Act, FMPs and amendments must be based on the best information available, properly reference all supporting materials and data, and should be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data should also undergo quality control prior to being used by the agency.

Endangered Species Act

Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 U.S.C. Section 1531 et seq.) requires that federal agencies use their authorities to conserve endangered and threatened species, and that they ensure actions they authorize, fund, or carry out are not likely to harm the continued existence of those species or the habitat designated to be critical to their survival and recovery. The ESA requires NOAA Fisheries Service, when proposing a fishery action that "may affect" critical habitat or endangered or threatened species, to consult with the appropriate administrative agency (itself for most marine species, the U.S. Fish and Wildlife Service for all remaining species) to determine the potential impacts of the proposed action. Consultations are concluded informally when proposed actions "may affect but are not likely to adversely affect" endangered or threatened 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" endangered or threatened species or designated critical habitat. If jeopardy or adverse modification is found, the consulting agency is required to suggest reasonable and prudent alternatives.

On August 27, 2009, formal consultation was completed on the continued authorization of the spiny lobster fishery in the South Atlantic and Gulf of Mexico (NMFS 2009). The biological opinion concluded the fishery would not affect ESA-listed marine mammals, or adversely affect Gulf sturgeon and Acropora critical habitat. The biological opinion did determine the continued authorization of the fishery was likely to adversely affect sea turtles, smalltooth sawfish and Acropora, but is not likely to jeopardize the continued existence of these species. An incidental take statement authorizing a limited amount of take for these species was issued.

Rivers and Harbors Act of 1899

The Rivers and Harbors Act was created in 1899 to prevent navigable waters of the United States from being obstructed. Section 10 of the Act requires that anyone wishing to dredge, fill, or build a structure in any navigable water and associated wetlands obtain a permit from the ACOE. An activity affecting wetlands may require a Section 404 and Section 10 permit, thus both sections are often included together in a permit notice. When these activities are permitted, and there is direct loss of submerged habitat, such as seagrasses, then mitigation is often required to compensate for this loss.

Clean Water Act

In 1972, Congress passed the Clean Water Act (CWA) - also known as the Water Pollution Prevention and Control Act - to protect the quality of the nation's waterways including oceans, lakes, rivers and streams, aquifers, coastal areas, and aquatic resources. The law sets out broad rules for protecting the waters of the United States; Sections 404 and 401 apply directly to waters and aquatic resources protection.

Section 404 of the CWA (often referred to as "Section 404" or simply "404") forbids the unpermitted "discharge of dredge or fill material" into waters of the United States. Section 404 does not regulate every activity in aquatic resources or coastal areas, but requires anyone seeking to fill any area to first obtain a permit from the Army Corps of Engineers (ACOE). Constructing bridges, causeways, piers, port expansion, or any other construction or development activity along a waterway or in aquatic resources generally requires a 404 permit. When a fill project is permitted, there may be mitigation required to replace lost aquatic resources.

Section 401 of the Clean Water Act requires that an applicant for a Section 404 permit obtain a certificate from their state's environmental regulatory agency (if the state has delegated such authority to the agency) that the activity will not negatively impact water quality. This permit process is supposed to prevent the discharge of pollutants (pesticides, heavy metals, hydrocarbons) or sediments into waters, which may be above acceptable levels, because decreased water quality may endanger the health of the people, fish, and wildlife. However, acceptable pollutant levels have not been established for many aquatic resources, which make it difficult for state agencies to fully assess a project's impact on water quality.

National Marine Sanctuaries Act

Under the National Marine Sanctuaries Act (also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972), as amended, the 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 Sanctuaries are administered by NOAA's National Ocean Service. The Act provides authority for comprehensive and coordinated conservation and management of these marine areas. The National Marine Sanctuary System 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. A complete listing of the current sanctuaries and information about their location, size, characteristics, and affected fisheries can be found at http://www.sanctuaries.nos.noaa.gov/oms/oms.html.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act protects the quality of the aquatic environment needed for fish and wildlife resources. The Act requires consultation with the Fish and Wildlife Service (FWS) and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be

impounded, diverted . . . or otherwise controlled or modified" by any agency (except TVA) under a Federal permit or license. NOAA Fisheries was brought into the process later, as these responsibilities were carried over, during the reorganization process that created NOAA. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources", and to ensure that the environmental value of a body of water or wetland is taken into account in the decision-making process during permit application reviews. Consultation is most often (but not exclusively) initiated when water resource agencies send the FWS or NOAA Fisheries a public notice of a Section 404 permit. FWS or NOAA Fisheries may file comments on the permit stating concerns about the negative impact the activity will have on the environment, and suggest measures to reduce the impact.

Executive Orders

E.O. 12114: Environmental Assessment of Actions Abroad

The purpose of this Executive Order is to enable responsible officials of Federal agencies having ultimate responsibility for authorizing and approving actions encompassed by this Order to be informed of pertinent environmental considerations and to take such considerations into account, with other pertinent considerations of national policy, in making decisions regarding such actions. While based on independent authority, this Order furthers the purpose of the National Environmental Policy Act and the Marine Protection Research and Sanctuaries Act and the Deepwater Port Act consistent with the foreign policy and national security policy of the United States, and represents the United States government's exclusive and complete determination of the procedural and other actions to be taken by Federal agencies to further the purpose of the National Environmental Policy Act, with respect to the environment outside the United States, its territories and possessions.

Agencies in their procedures shall establish procedures by which their officers having ultimate responsibility for authority and approving actions in one of the following categories encompassed by this Order, take into consideration in making decisions concerning such actions, a document described in Section 2-4(a):

(a) major Federal actions significantly affecting the environment of the global commons outside the jurisdiction of any nation (e.g., the oceans or Antarctica);

(b) major Federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action;

(c) major Federal actions significantly affecting the environment of a foreign nation which provide to that nation:

> (1) a product, or physical project producing a principal product or an emission or effluent, which is prohibited or strictly regulated by Federal law in the United States because its toxic effects on the environment create a serious public health risk; or
>
> (2) a physical project which in the United States is prohibited or strictly regulated by Federal law to protect the environment against radioactive substances.

(d) major Federal actions outside the United States, its territories and possessions which significantly affect natural or ecological resources of global importance designated for

protection under this subsection by the President, or, in the case of such a resource protected by international agreement binding on the United States, by the Secretary of State. Recommendations to the President under this subsection shall be accompanied by the views of the Council on Environmental Quality and the Secretary of State.

The purpose of this amendment/EIS is to increase the spawning biomass of the spiny lobster population in the waters of the Caribbean and tropical western Atlantic (the oceans). It has been determined in section 6 there will be significant biological affects in a positive form; and as indicated numerous times throughout the document, the restrictions considered in this document were developed in accordance with a number of international agreements and accords passed by foreign nations.

E.O. 12866: Regulatory Planning and Review

Executive Order 12866: Regulatory Planning and Review, 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, NOAA Fisheries prepares a Regulatory Impact Review (RIR) for all fishery regulatory actions that either implement a new fishery management plan or 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 has other major economic effects.

E.O. 12630: Takings

The Executive Order on Government Actions and Interference with Constitutionally Protected Property Rights, which became effective March 18, 1988, requires that each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment. Management measures limiting fishing seasons, areas, quotas, fish size limits, and bag limits do not appear to have any taking implications. There is a takings implication if a fishing gear is prohibited, because fishermen who desire to leave a fishery might be unable to sell their investment, or if a fisherman is prohibited by federal action from exercising property rights granted by a state.

E.O. 13089: Coral Reef Protection

The Executive Order on Coral Reef Protection (June 11, 1998) requires federal agencies whose actions may affect U.S. coral reef ecosystems to identify those actions, utilize their programs and authorities to protect and enhance the conditions of such ecosystems; and, to the extent permitted by law, ensure that actions they authorize, fund or carry out not

degrade the condition of that ecosystem. By definition, a U.S. coral reef ecosystem means those species, habitats, and other national resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States (e.g., federal, state, territorial, or commonwealth waters).

E.O. 13112: Invasive Species

The Executive Order requires agencies to use authorities to prevent introduction of invasive species, respond to and control invasions in a cost effective and environmentally sound manner, and to provide for restoration of native species and habitat conditions in ecosystems that have been invaded. Further, agencies shall not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere unless a determination is made that the benefits of such actions clearly outweigh the potential harm; and that all feasible and prudent measures to minimize the risk of harm will be taken in conjunction with the actions. The actions undertaken in this amendment will not introduce, authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere.

E.O. 13132: Federalism

The Executive Order on federalism requires agencies in formulating and implementing policies that have federalism implications, to be guided by the fundamental federalism principles. The Order serves to guarantee the division of governmental responsibilities between the national government and the states that was intended by the framers of the Constitution. Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people. This Order is relevant to FMPs and amendment given the overlapping authorities of NOAA Fisheries, the states, and local authorities in managing coastal resources, including fisheries, and the need for a clear definition of responsibilities. It is important to recognize those components of the ecosystem over which fishery managers have no direct control and to develop strategies to address them in conjunction with appropriate state, tribes and local entities (international too). The proposed management measures in this Amendment to the Spiny Lobster FMPs of the Caribbean and the South Atlantic/Gulf of Mexico have been developed with the local, federal and international officials.

E.O. 13141: Environmental Review of Trade Agreements

This Executive Order requires the U.S. Trade Representative, through the interagency Trade Policy Staff to conduct environmental reviews of three of the most common agreements: comprehensive multilateral trade rounds, bilateral or multilateral free-trade agreements, and major new trade liberalization agreements in natural resource sectors. Although the procedures for environmental impact assessment in Executive Order 13141 are not subject to NEPA, they follow similar guidelines. Understanding the importance of this E.O. in relation to this Amendment/EIS, NOAA Fisheries Service has made a concerted effort to involve the USTR and other agencies involved with trade negotiations to inform them of the intention of the actions being undertaken by the Councils and NOAA Fisheries Service.

E.O. 13158: Marine Protected Areas
Executive Order 13158 (May 26, 2000) requires federal agencies to consider whether their proposed action(s) will affect 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 or cultural resource within the protected area.

E.O. 12898: Environmental Justice
This Executive Order mandates that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions. Federal agency responsibilities under this Executive Order include conducting their programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefit of, or subjecting persons to discrimination under, such, programs policies, and activities, because of their race, color, or national origin. Furthermore, each federal agency responsibility set forth under this Executive Order shall apply equally to Native American programs.

Specifically, federal agencies shall, to the maximum extent practicable; conduct human health and environmental research and analysis; collect human health and environmental data; collect, maintain and analyze information on the consumption patterns of those who principally rely on fish and/or wildlife for subsistence; allow for public participation and access to information relating to the incorporation of environmental justice principals in Federal agency programs or policies; and share information and eliminate unnecessary duplication of efforts through the use of existing data systems and cooperative agreements among Federal agencies and with State, local, and tribal governments. The proposed actions would be applied to all participants in the fishery, regardless of their race, color, national origin, or income level, and as a result are not considered discriminatory. Additionally, none of the proposed actions are expected to affect any existing subsistence consumption patterns. Therefore, no environmental justice issues are anticipated and no modifications to any proposed actions have been made to address environmental justice issues.

Marine Mammal Protection Act (MMPA)
The Marine Mammal Protection Act 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.

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), the must accommodate an observer if requested (50 CFR 229.7(c)) and comply with any applicable take reduction plans.

The 2011 List of Fisheries (LOF) classifies the Florida spiny lobster trap/pot fishery as a Category III fishery (75 FR 68468; November 8, 2010). The 2011 LOF also classifies the bully net and commercial dive portions of the fishery (called the "Atlantic Ocean, Gulf of Mexico, Caribbean shellfish dive, hand/mechanical collection" fishery) as a Category III because there has never been a documented interaction with marine mammals.

Paperwork Reduction Act

The Paperwork Reduction Act (PRA) of 1995 (44 U.S.C. 3501 et seq.) regulates the collection of public information by federal agencies to ensure that the public is not overburdened with information requests, that the federal government's information collection procedures are efficient, and that federal agencies adhere to appropriate rules governing the confidentiality of such information. The PRA requires NOAA Fisheries to obtain approval from the Office of Management and Budget before requesting most types of fishery information from the public. This action contains no PRA requirements.

Small Business Act

The Small Business Act of 1953, as amended, Section 8(a), 15 U.S.C. 634(b)(6), 636(j), 637(a) and (d); Public Laws 95-507 and 99-661, Section 1207; and Public Laws 100-656 and 101-37 are administered by the Small Business Association (SBA). 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 the firms to achieve competitive viability. Because most businesses associated with fishing are considered small businesses, NOAA Fisheries Service, in implementing regulations, must make an assessment of how those regulations will affect small businesses. Implications to small businesses are discussed in the RIR herein (Section 7).

Magnuson-Stevens Act Essential Fish Habitat (EFH) Provisions
The Magnuson-Stevens Act includes EFH requirements, and as such, each existing, and any new, FMPs must describe and identify EFH for the fishery, minimize to the extent practicable adverse effects on that EFH caused by fishing, and identify other actions to encourage the conservation and enhancement of that EFH. The Council and NMFS have determined there are no adverse effects to EFH in this amendment as discussed in the Environmental Consequences section (Section 4).

Migratory Bird Treaty Act
Under the Migratory Bird Treaty Act (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 United States and Great Britain, Mexico, Japan, or the former Union of Soviet Socialists Republics, 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. To date, the MBTA has been applied to the territory of the United States and coastal waters extending three miles from shore. Furthermore, Executive Order 13186 was issued in 2001, which directs federal agencies, including NOAA Fisheries, to take certain actions to further implement the MBTA.

National Environmental Policy Act
The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.) requires federal agencies to consider the environmental and social consequences of proposed major actions, as well as alternatives to those actions, and to provide this information for public consideration and comment before selecting a final course of action. Because NOAA Fisheries Service is proposing a major fishery action that may significantly affect the quality of the human environment, NOAA Fisheries Service has prepared this EIS to comply with NEPA and its implementing regulations.

Regulatory Flexibility Act
The purpose of the Regulatory Flexibility Act (RFA 1980, 5 U.S.C. 601 et seq.) is to ensure that federal agencies consider the economic impact of their regulatory proposals on small entities, analyze effective alternatives that minimize the economic impacts on small entities, and make their analyses available for public comment. The RFA does not seek preferential treatment for small entities, require agencies to adopt regulations that impose the least burden on small entities, or mandate exemptions for small entities. Rather, it requires agencies to examine public policy issues using an analytical process that identifies, among other things, barriers to small business competitiveness and seeks a level playing field for small entities, not an unfair advantage.

After an agency determines that the RFA applies, it must decide whether to conduct a full regulatory flexibility analysis (IRFA or Final Regulatory Flexibility Analysis) or to certify that the proposed rule will not "have a significant economic impact on a

substantial number of small entities. To make this determination, the agency conducts a threshold analysis, which has the following 5 parts: 1) Description of small entities regulated by proposed action, which includes the SBA size standard(s), or those approved by the Office of Advocacy, for purposes of the analysis and size variations among these small entities; 2) Descriptions and estimates of the economic impacts of compliance requirements on the small entities, which include reporting and recordkeeping burdens and variations of impacts among size groupings of small entities; 3) Criteria used to determine if the economic impact is significant or not; 4) Criteria used to determine if the number of small entities that experience a significant economic impact is substantial or not; and 5) Descriptions of assumptions and uncertainties, including data used in the analysis. If the threshold analysis indicates that there will not be a significant economic impact on a substantial number of small entities, the agency can so certify.

Public Law 99-659: Vessel Safety

Public Law 99-659 amended the Magnuson-Stevens Act 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.

Appendix F. Scoping Summary

SUMMARY MINUTES
PUBLIC HEARING – MARATHON, FL
SPINY LOBSTER AMENDMENT 10
JOINT AMENDMENT FOR THE GULF OF MEXICO AND
SOUTH ATLANTIC FISHERY MANAGEMENT COUNCILS

September 22, 2009

Attendance:
Bob Gill, Gulf Council
Dr. Gregg Waugh, SAFMC
Dr. Carrie Simmons, Gulf Council Staff
Phyllis Miranda, Gulf Council Staff

36 Members of the Public

The public hearing was convened by Chairman Bob Gill at 6:00 p.m. Dr. Carrie Simmons reviewed the PowerPoint presentation with the public. The public was then invited to provide their comments.

Karl Lessard, Florida Keys Commercial Fishermen's Association. He read into the record from two written letters which had previously been provided to the Council at the June Council meeting and which are attached. In summary, these letters stated that they do not want the Councils to repeal the Spiny Lobster FMP, because it is felt that the state is not able to do a stock assessment alone. In addition, the size limit requirements on imports are crucial to maintain an economically viable fishery. The FKCFA is in support of the following allocation: 72% commercial trap fishery, 22% recreational divers, 5% commercial divers, and 1% bully net fishing. He requested that the Council set the ACL using a quota instead of using landing records. He added that they are mainly concerned about spiny lobster and the Council should do what they think is appropriate for the other lesser landed species in the FMP. He stated that mortality of short lobsters is estimated to be low, 8-10%; which is lower than fishing mortality on most other species.

Tim Daniels, Marathon, FL. He stated that the fishermen are scared that the catch limit on the lobster would be limited because of the data resulting from hurricanes and illegal fishing. The population has been reduced due to the hurricanes and this has caused them to not be able to catch as many lobsters. He stated that he would like to see the historical data to go back 20-30 years and that data be considered when setting an ACL. He felt that management of spiny lobster or stone crab should not be turned over to the state of Florida. He was in agreement with the previous allocation for Monroe County that Karl Lessard stated. He noted that the recreational diver mini-season is difficult to measure and control. He added that the use of shorts as an attractant is a necessary component of

lobster fishing. He added that economic and social impact studies should be done on all the fisheries that are mandated under the MSA.

Hal Osburn, Florida Keys Commercial Fishermen's Association. He stated that sociological cultural information needs to be a focus of the studies and that ACLs and AMs should be based on the current stock assessment, not a future stock assessment as it is the best available data. He felt that the spiny lobster FMP should remain under the joint jurisdiction of the GMFMC, the SAFMC, and the FFWC. He added that the state cannot keep up with the requirements of managing the spiny lobster fishery and that the restriction on the importation of illegal size spiny lobster is very important and would not exist anymore under state management. He was of the opinion that all Caribbean spiny lobster landed should be landed either all whole or all tailed, and that having that regulation would prevent the abuse of having a short carapace but a long tail.

Gary Nichols, Nichols Seafood, Islamorada, FL and Organized Fishermen of Florida. He stated that lobster catch can historically be sustained to 6 million pounds. He would like to see an allocation that is closest to the 6 million pounds. He felt that the ACL should be based on the current stock assessment. He believed that the Councils should retain management of the spiny lobster. He stated that he is in favor of modifying the tailing permit to all tailed or all whole lobster landed. He added that the coral needs to be protected and that the coral working group and the Sanctuary were trying to identify more areas that needed to be closed to achieve that goal. He noted that he lobsters in deeper water and catches ridged slipper lobster, and he felt that whatever is appropriate to protect the spawning stock, such as egg bearing females, is important.

Jeff Cramer, Organized Fishermen of Florida. He stated that the current stock assessment should be used instead of using an updated assessment that may not reflect the true condition of the spiny lobster stock because of the hurricanes and other issues. He added that about a dozen fishermen in the coral workgroup were working with NOAA's Protected Species Division to identify areas that the corals are located. He said that the fishermen were willing to do anything to protect the corals and that the lobsters are not typically located near the corals. He felt that the Councils should maintain control over the FMP. He felt that the trip ticket system was flawed because on any given day he may fish in three areas, but only records one on the trip ticket. In general, he felt that fishing in federal waters was underreported and traps were moved between federal and state waters based on season and movement of the lobster. He stated that undersized lobsters imported from other countries were a big problem for local fishers. He indicated that he uses shorts as an attractant and that they were kept in good condition before going into the trap. He added that often the shorts escape the trap indicating that they could leave the trap at any time.

Richard Stiglitz, commercial fisherman, Monroe County, FL. He indicated that he has used shorts for 40 years. He stated that he takes care of the lobsters on his boat that he uses for shorts and that there is next to no short mortality on their boats. He felt that the ACLs need to be set high on the spiny lobster because a number set too low would be devastating to the Keys communities. He also stated that in the northern Gulf (Naples to

Tampa) is a population of large spawning females and it should always be protected. He did not think any fishers were currently targeting this area, but it should be protected. He was in agreement with other speakers, that federal management should stay involved.

Additional attendees who chose not to speak on Spiny Lobster:
Chris Johnson, charter boat captain, Marathon, FL
Christy Johnson, Seasquared Charters
John Bartus, Marathon Chamber of Commerce
Rick Turner, charter boat captain, Marathon, FL
Don Moll, charter boat captain
Michelle Owen, Environmental Defense Fund
David McKinney, Environmental Defense Fund
Elizabeth Prieto, Marathon, FL
Edwin Prieto, Marathon, FL
Barbara Maddox, Captain Pip's Marina & Hideaway, Marathon, FL
Leda Dunmire, Pew Environmental Group
Dawn Ward, University of Florida, Gainesville, FL
Toby Kight, Marathon, FL
John Harrison, Marathon, FL
Gigi Harrison, Marathon, FL
Donald Beechum, Marathon, FL
Paul Lebo, Marathon, FL
Gene Trag, Marathon, FL
Capt. Don Muller
Richard Turner, Marathon, FL

SUMMARY MINUTES
PUBLIC HEARING – KEY WEST, FL
SPINY LOBSTER AMENDMENT 10
JOINT AMENDMENT FOR THE GULF OF MEXICO AND
SOUTH ATLANTIC FISHERY MANAGEMENT COUNCILS

September 21, 2009

Attendance:
Bob Gill, Gulf Council
Dr. Gregg Waugh, SAFMC
Dr. Carrie Simmons, Gulf Council Staff
Phyllis Miranda, Gulf Council Staff

43 Members of the Public

The public hearing was convened by Chairman Bob Gill at 6:00 p.m. Dr. Carrie Simmons reviewed the PowerPoint presentation with the public. The public was then invited to provide their comments.

John Coffin, Big Pine Key, FL. He read into the record a written statement, which is attached. In summary, he said the spiny lobster fishery should be left to Florida FWC. They are vested in dealing with allocation issues and knowledgeable of the history of the fishery as well as the diverse groups of people competing in the fishery. He listed several positive and negative reasons for the Florida FWC to take over management of the fishery. He noted that the federal management system would have a lot do deal with as far as allocation issues in the fishery if management was not given to Florida FWC.

Jim Sharpe, Jr., Big Pine Key, FL. He read into the record a written statement which is attached. In summary, he felt that Florida FWC should have full and unrestricted management of the spiny lobster fishery, because 95% of the lobster fishery occurs in state waters. He added that the state has been studying and managing the lobster fishery for years and should continue managing the fishery. He noted that the state had received money to study casitas to see if it can be used as a viable commercial gear in a portion of the commercial fishery. He indicated that the state is also studying new trap designs to decrease wind driven trap movement.

George Niles, Florida Keys Commercial Fishermen's Association. He stated that he felt that the ACL for lobster should be set using the data from SEDAR. He added that the federal government should retain management of lobster, because the resources they had access to were of more value to the fishery than those that the state government had.

Bobby Pillar, Summerland Key, FL. He stated that he supported Mr. Niles' position with regard to lobster being federally managed as opposed to state managed. He felt that something needed to be done about lobster being imported from other countries into the

states before lobster season actually opens. He noted that in agreement with spiny lobsters being landed all tailed or all whole, the tailing permit could be modified.

Peter Bacle, Stock Island Lobster Co. He stated that neither state nor federal would do a good job of managing spiny lobster. He recommended no action on splitting the recreational and charterboat sectors. He felt that the ACL should be set for the fisheries in which there is an identifiable catch, i.e. the commercial industry. He added that there was no way to identify amounts of recreational catch. He was in agreement that short mortality was not a problem, because shorts really have lower mortality inside the traps because it is safer than outside the traps. He believes that the tailing permit should be kept, and that it was not an issue because his fish house handles very few tailed lobsters.

Lee Starling, commercial diver and spear fisherman, Key West, FL. He felt that the Gulf Council should retain management of spiny lobster. He stated that he was against the use of casitas, because he felt that they do impact migration patterns. He wanted to note that all types of fisheries have bycatch or potentially unintended consequences on other species, even divers. He felt that short lobsters used as attractants can get out of the traps and that mortality is not a problem.

<u>Additional attendees who chose not to speak on Spiny Lobster</u>:
Billy Wickers III, Big Coppit Key, FL
Capt. Bill Wickers, Key West Charter Boat Assoc.
Richard Gomez, Capt. Conch, Key West, FL
Robert Nevius, charter boat captain
Daniel Padron, Key West, FL
Craig Jiovani, C&J Ent. Co. Inc. d/b/a Charter Boat Grand Slam
Brice Barr, Double Down Sportfishing
Mimi Stafford, Key West, FL
Rob Harris, Conchy Joe's Marine & Tackle
Steven Lamp, Dream Catcher Charters
Gennifer Lamp, Key West, FL
Ron Meyers, Little Torch Key, FL
David McKinney, Environmental Defense Fund
Michelle Owen, Environmental Defense Fund
Kari MacLauchlin, University of Florida
Marlin Scott, Keys Radio Group
Chuck Coleman, Key West, FL
Josh Nicklaus, Key West, FL
Juan Blanco, Key West, FL

Appendix G. Public Hearing Summary

Appendix H. Maps showing proposed area closures

This appendix includes 15 maps, similar to those seen in section 4. The maps in that section superimposed all proposed closed areas on top of one another in an attempt to conserve space and allow for a direct comparison of relative size. However, there was also some concern that those maps may not be entirely clear because of all the information provided. Therefore, these maps present the same information as the maps in section 4 with the exception that the large, medium, and small proposed area closures appear separately. Each map depicts the identified locations of *Acropora* from 1996-2010; the location and size of the proposed closed area; the boundary between state and federal waters; known areas of hardbottom habitat; any areas currently closed to trapping for spiny lobster; along with any existing Florida Keys National Marine Sanctuary (FKNMS) Management Areas. "*Acropora* Priority Sites" also appear on these maps. These areas represent locations requiring high priority response from individuals responding to an environmentally damaging event, such as an oil spill, because of the nature of the natural resources occurring there. These priority sites are included here only for reference and do not have any regulatory impact of fishing. The charts also show hardbottom areas that may support *Acropora,* even if the presence of *Acropora* has not been confirmed there. *Acropora* is not anticipated in non-hardbottom habitat. Since *Acropora* are only known to occur on hardbottom habitat and south of U.S. Highway 1, only the maps have been truncated to only show those areas. Some overlap exists between charts.

Maps of Proposed Large Area Closures

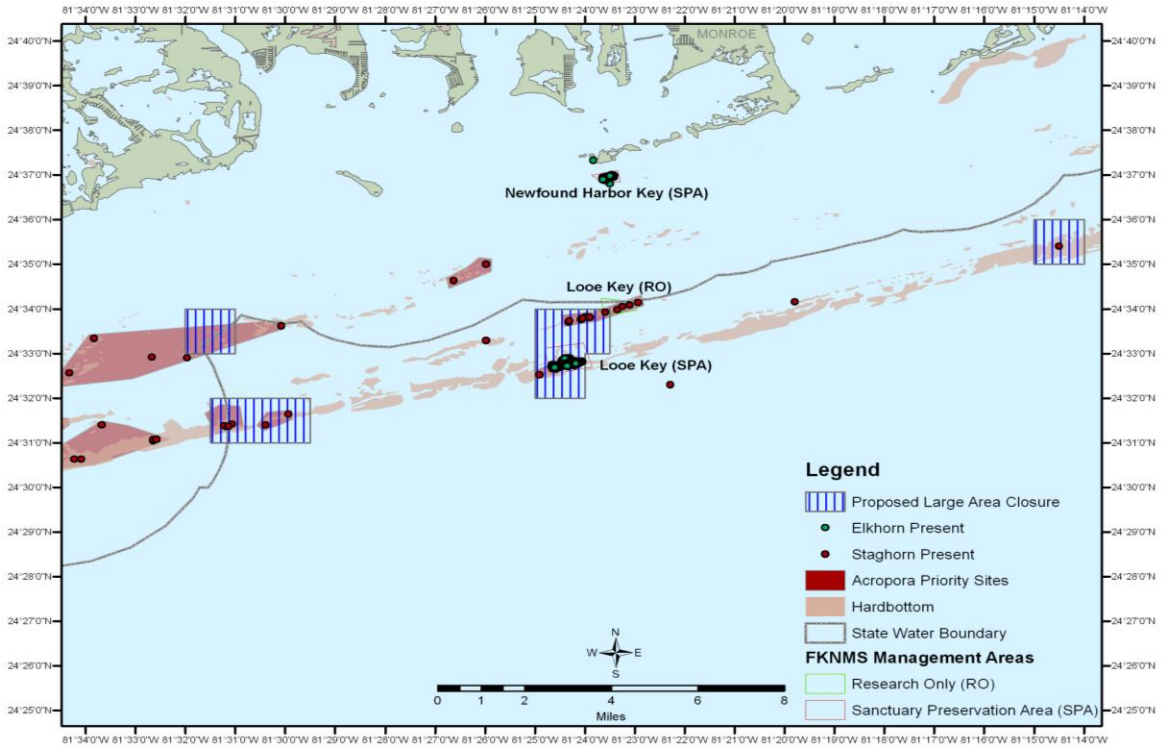

Figure 1 Proposed Large Area Closures in the Lower Keys

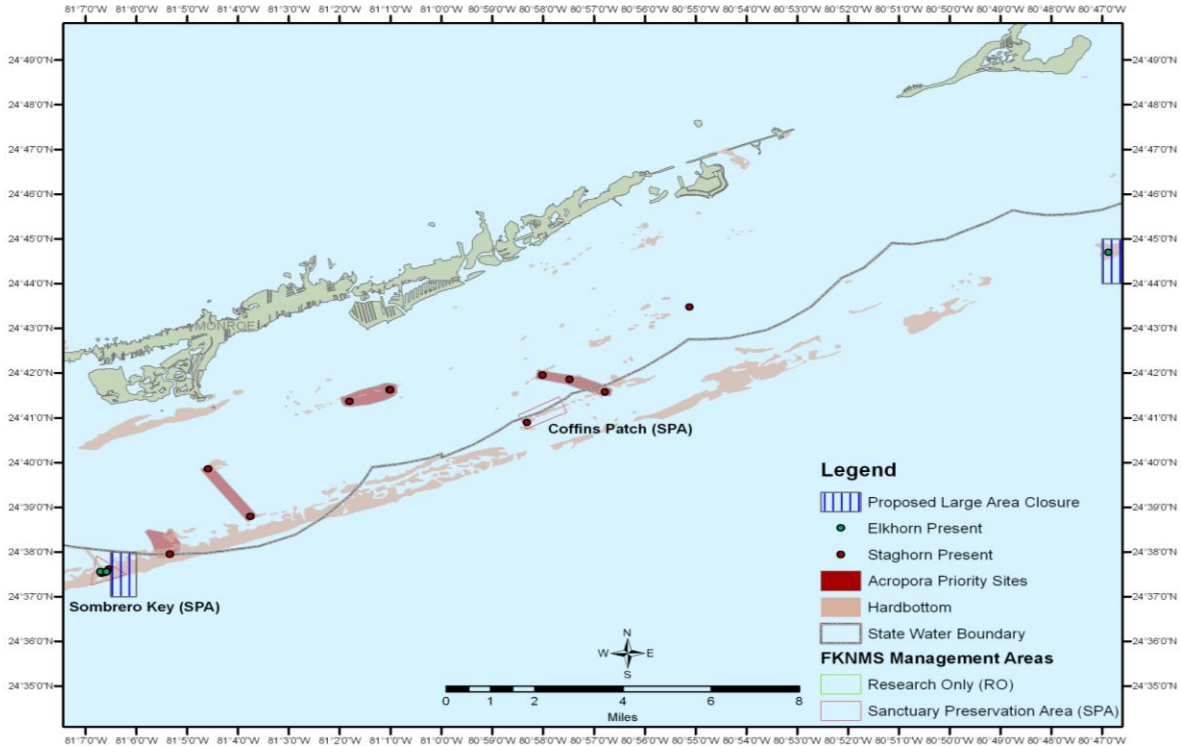

Figure 2 Proposed Large Area Closures in the Middle Keys

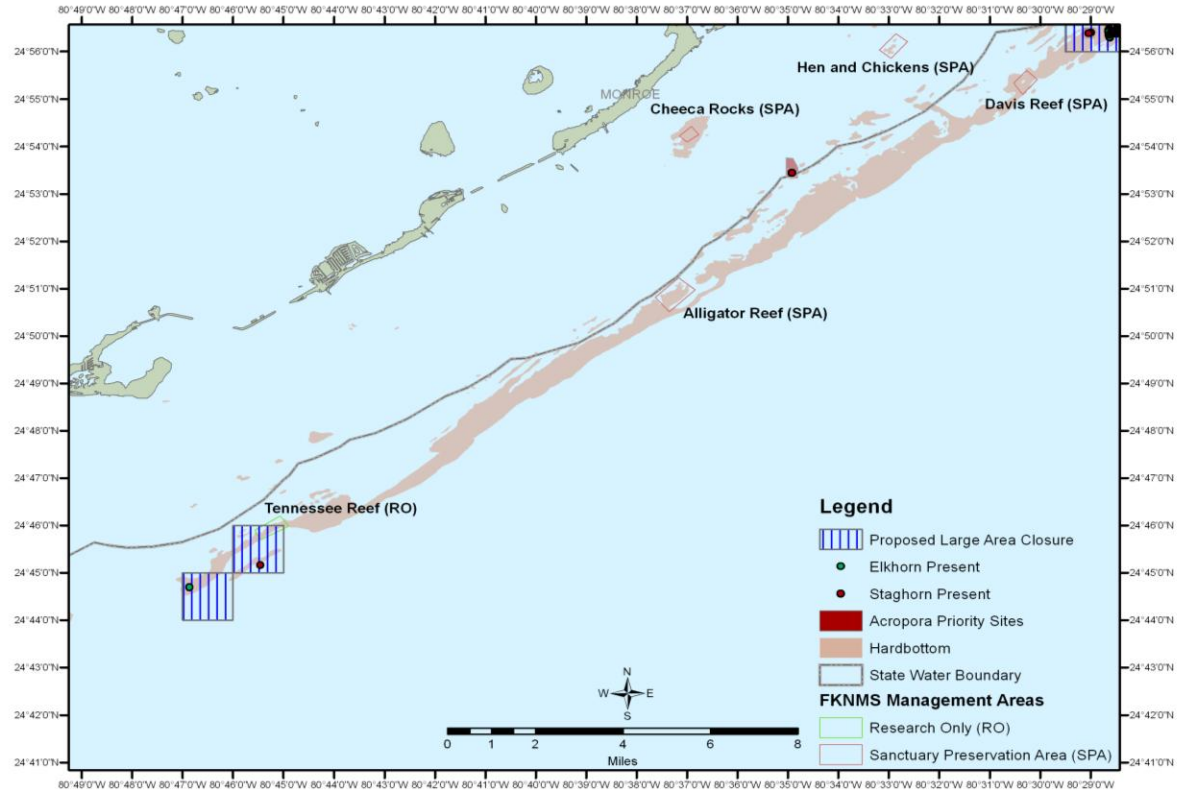

Figure 3 Proposed Large Area Closures in the Upper Keys

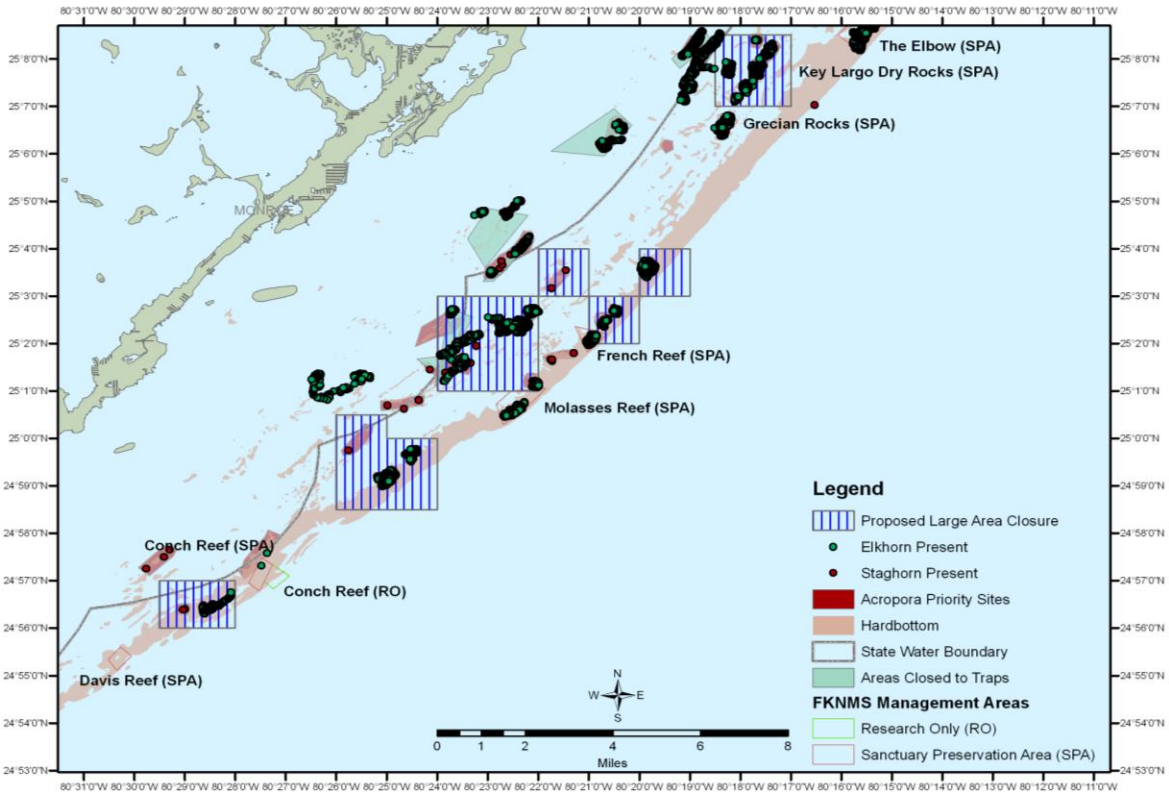

Figure 4 Proposed Large Area Closures in the Upper Keys (cont'd)

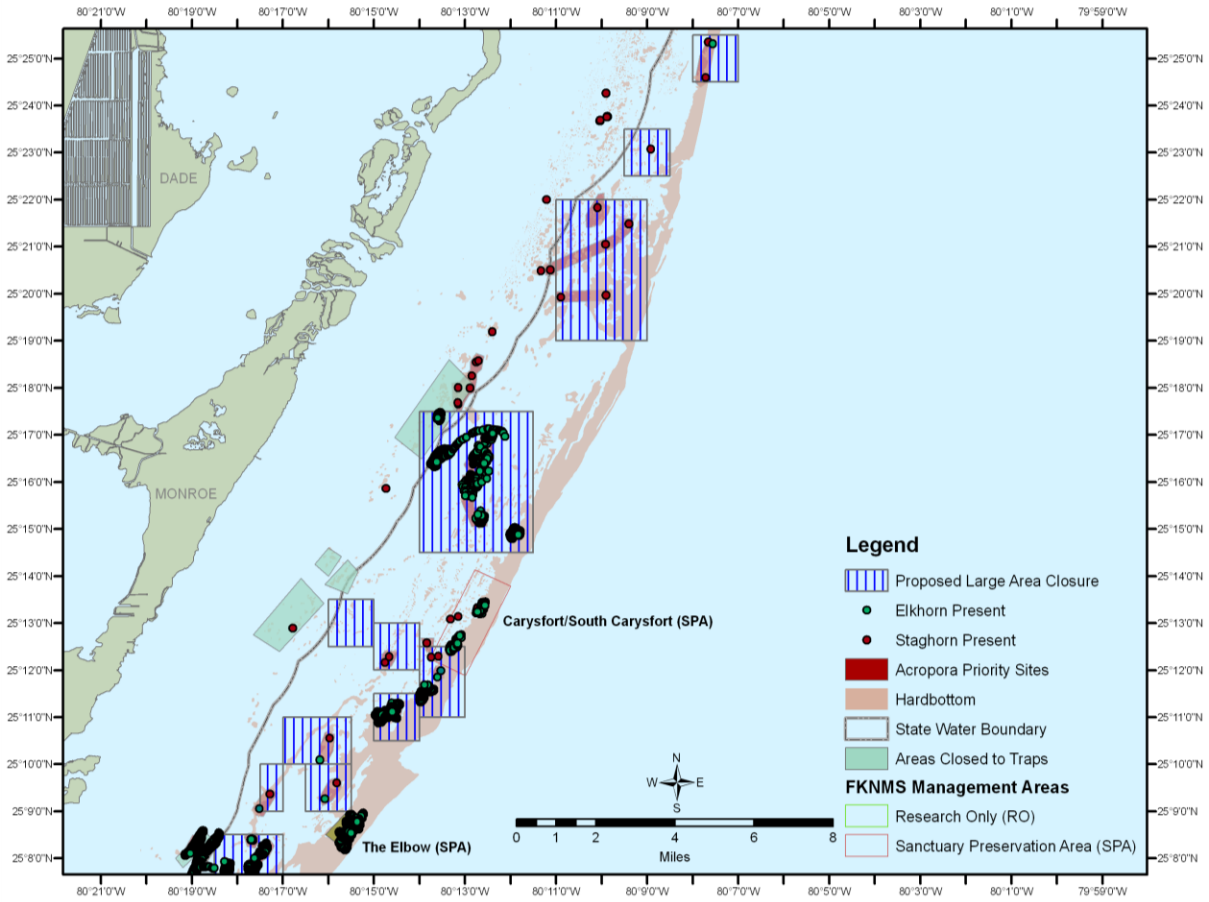

Figure 5 Proposed Large Area Closures in the Upper Keys (cont'd)

Maps of Proposed Medium Area Closures

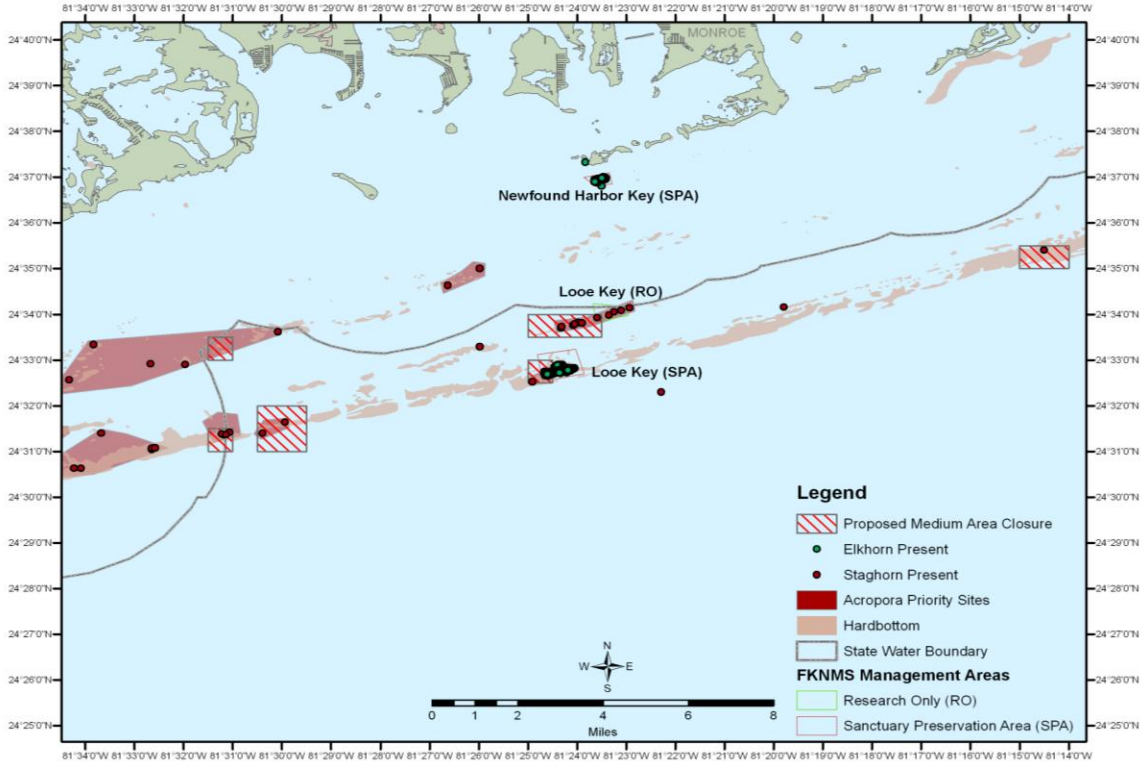

Figure 6 Proposed Medium Area Closures in the Lower Keys

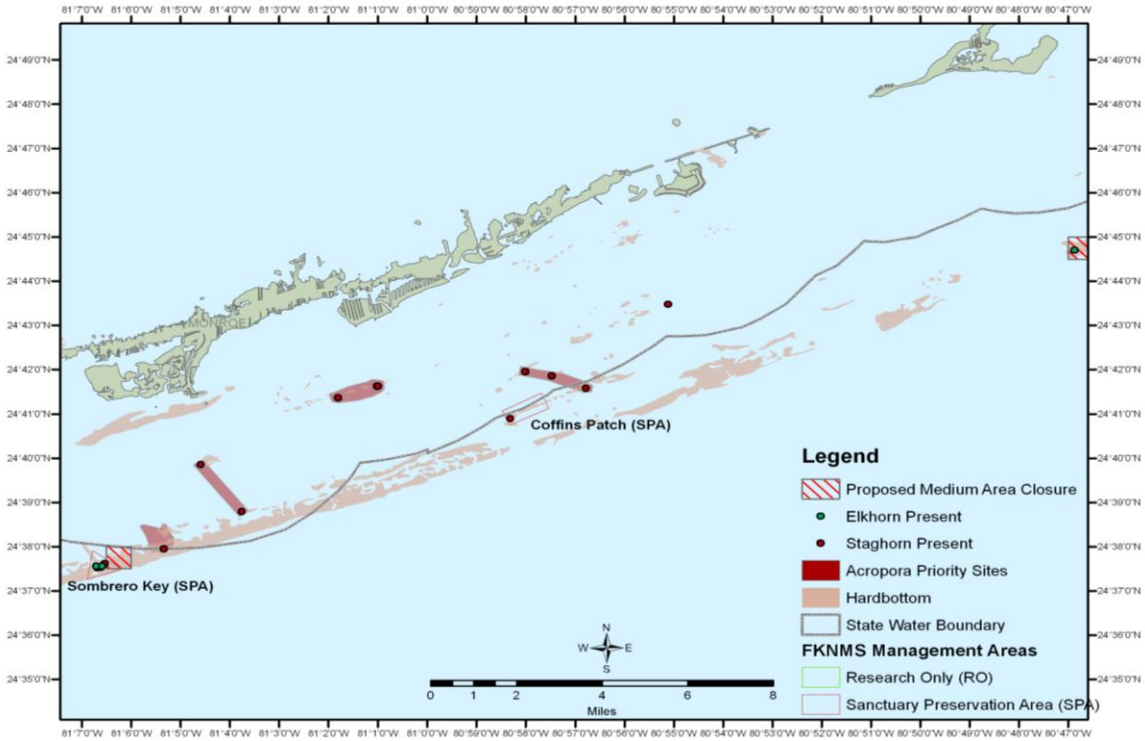

Figure 7 Proposed Medium Area Closures in the Middle Keys

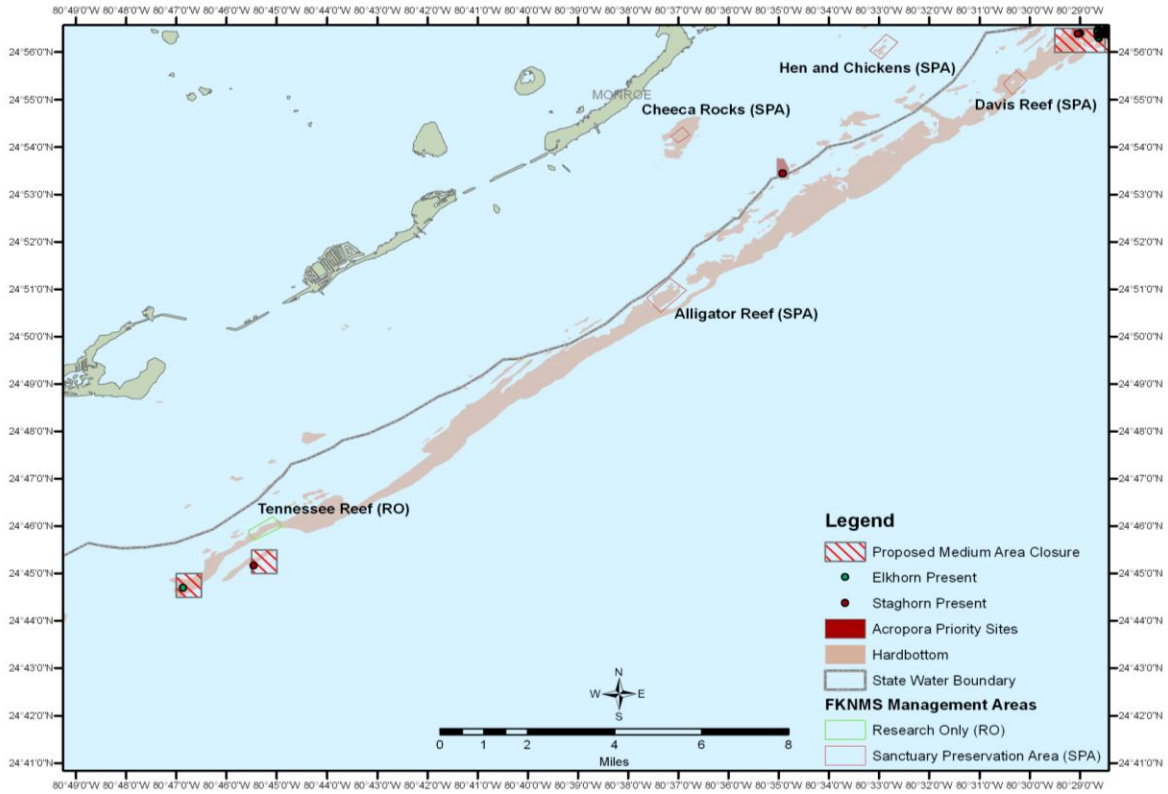

Figure 8 Proposed Medium Area Closures in the Upper Keys

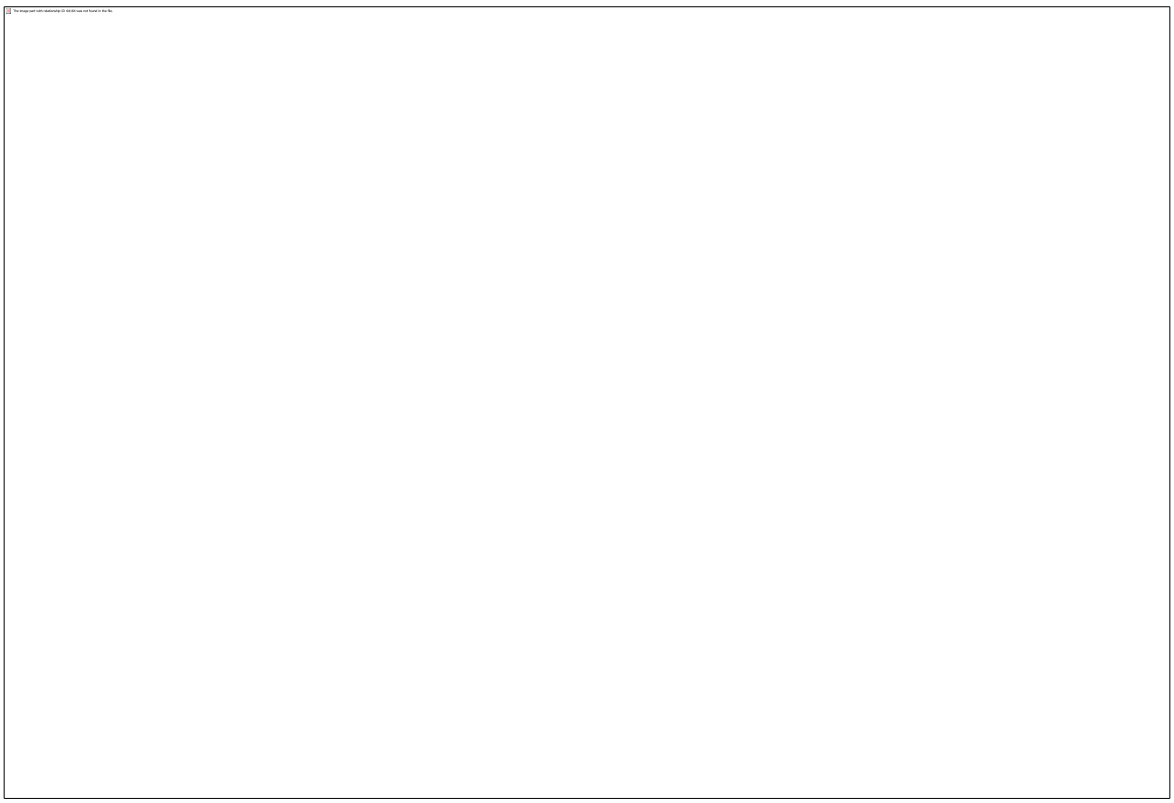

Figure 9 Proposed Medium Area Closures in the Upper Keys (cont'd)

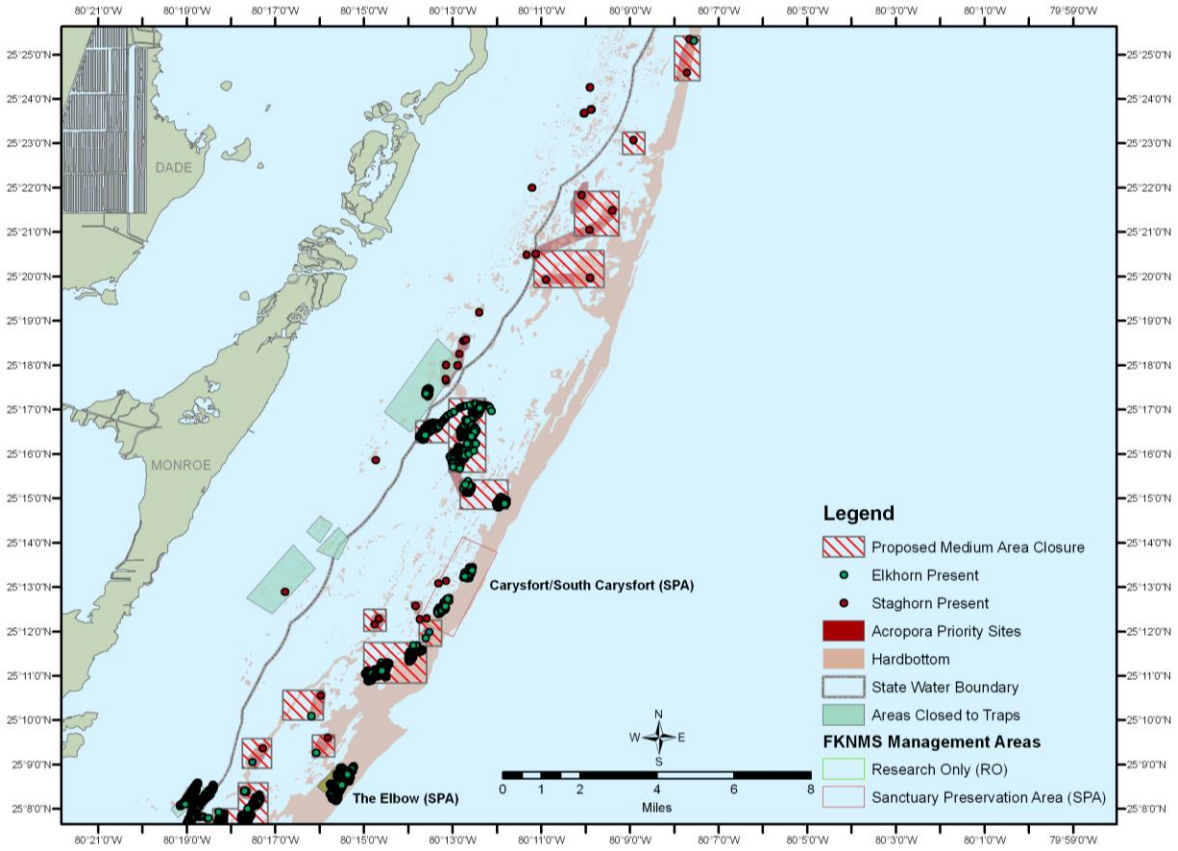

Figure 10 Proposed Medium Area Closures in the Upper Keys (cont'd)

Maps of Proposed Small Area Closures

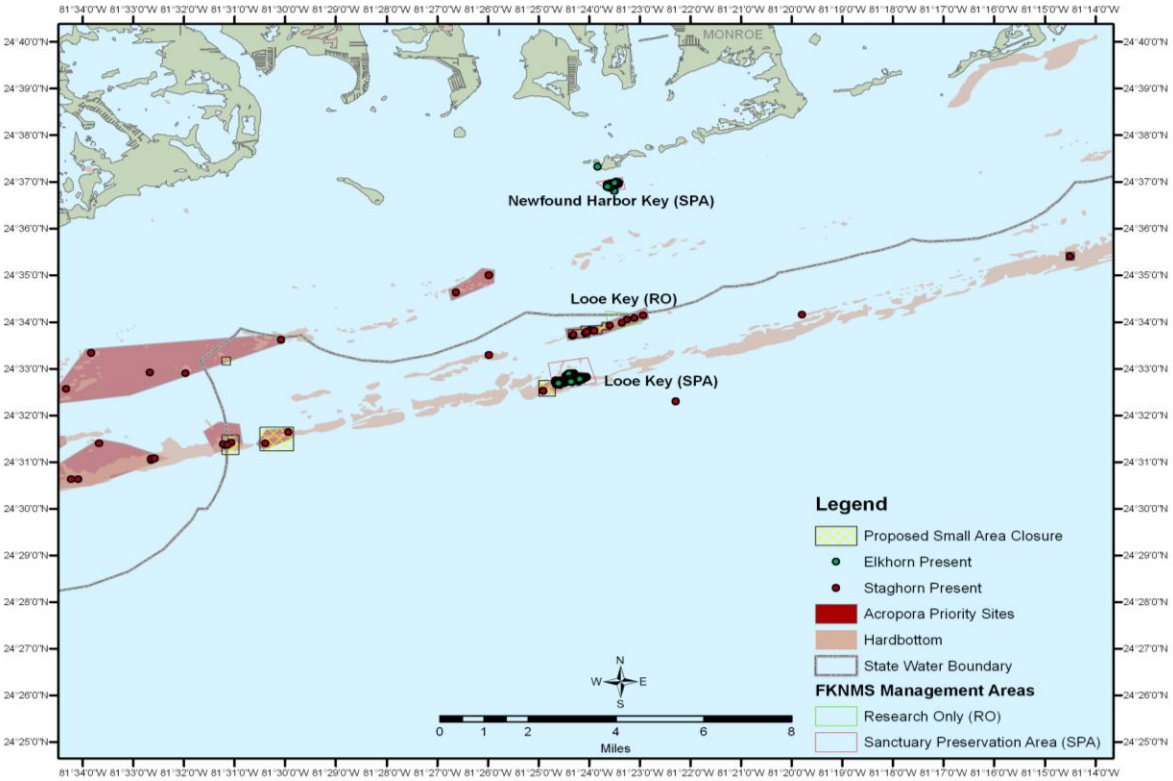

Figure 11 Proposed Small Area Closures in the Lower Keys

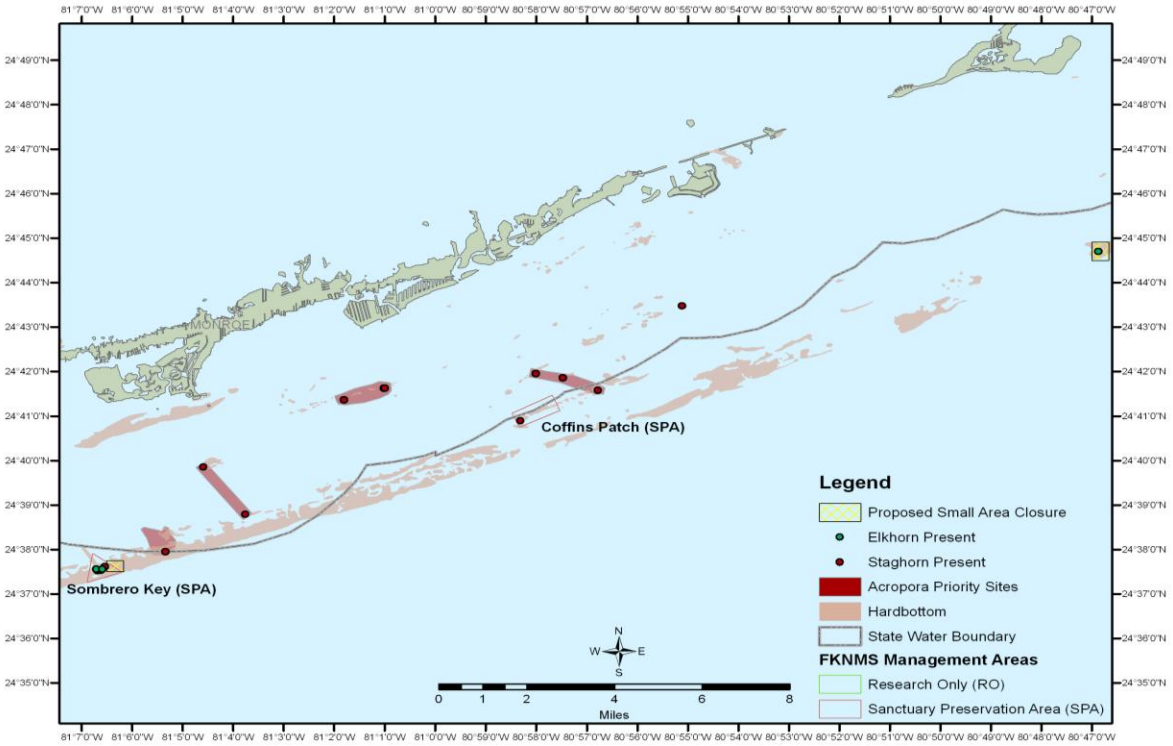

Figure 12 Proposed Small Area Closures in the Middle Keys

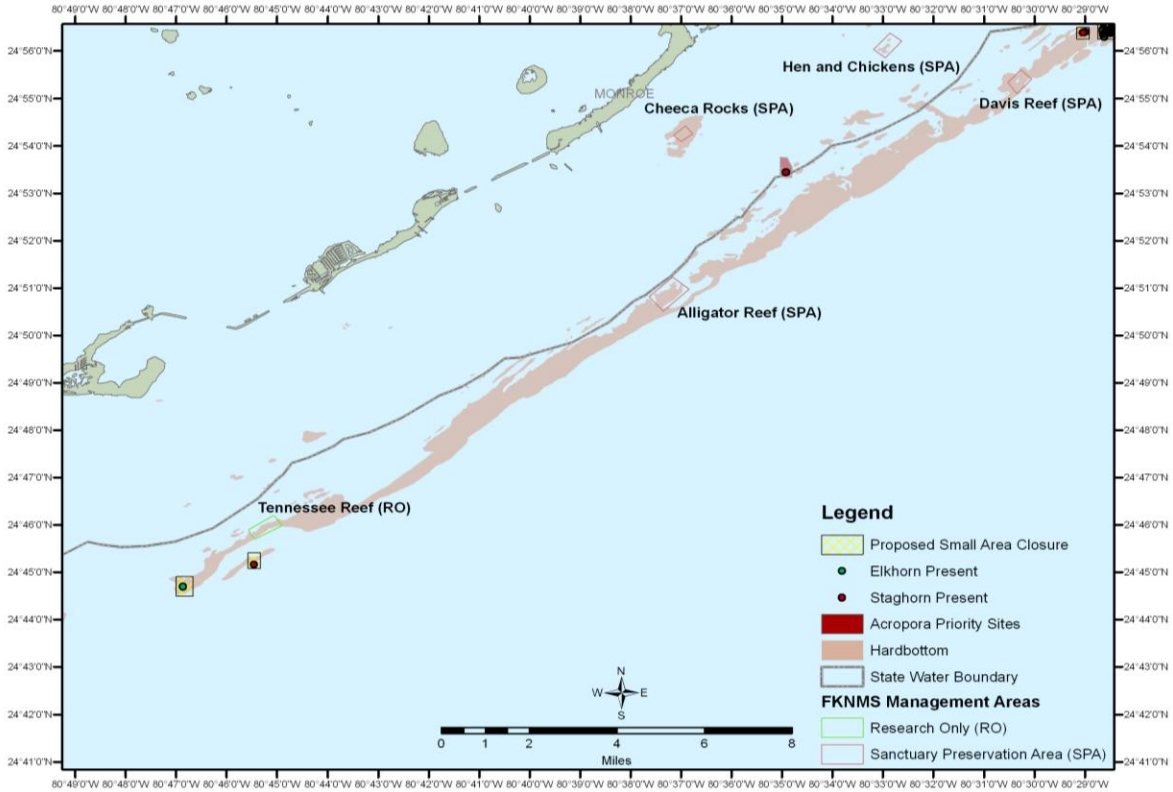

Figure 13 Proposed Small Area Closures in the Upper Keys

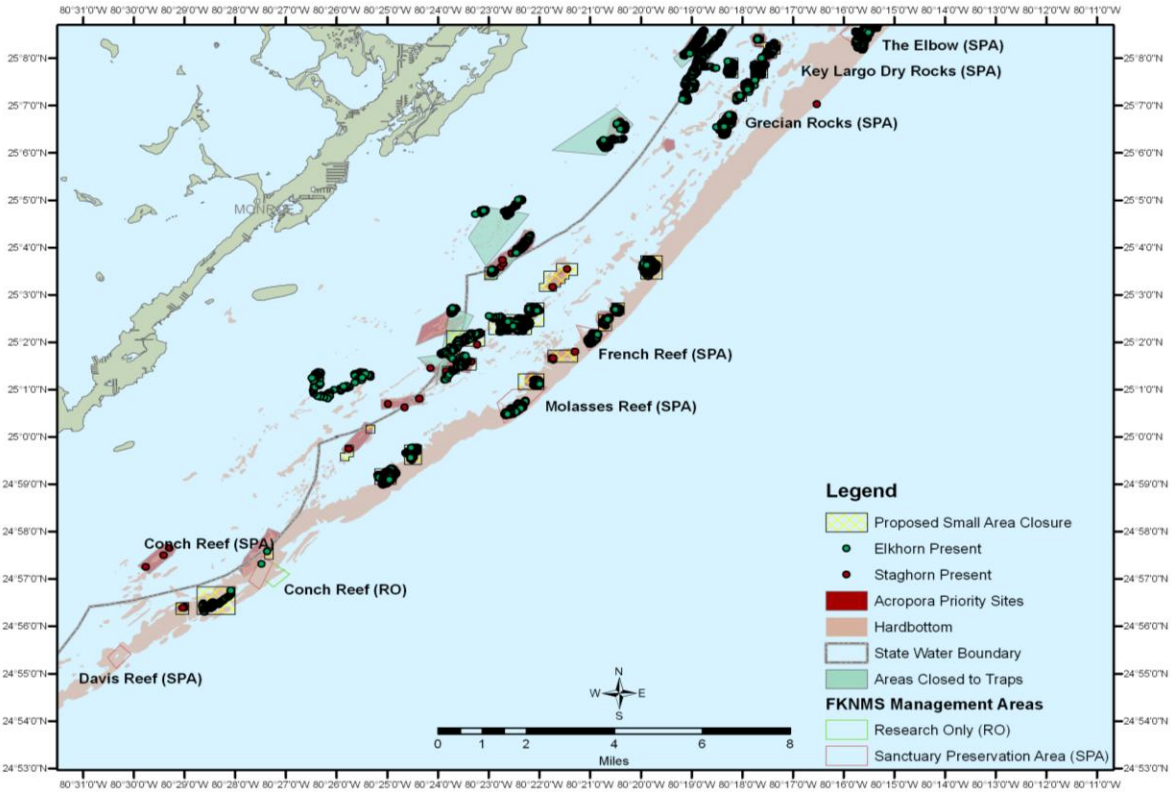

Figure 14 Proposed Small Area Closures in the Upper Keys (cont'd)

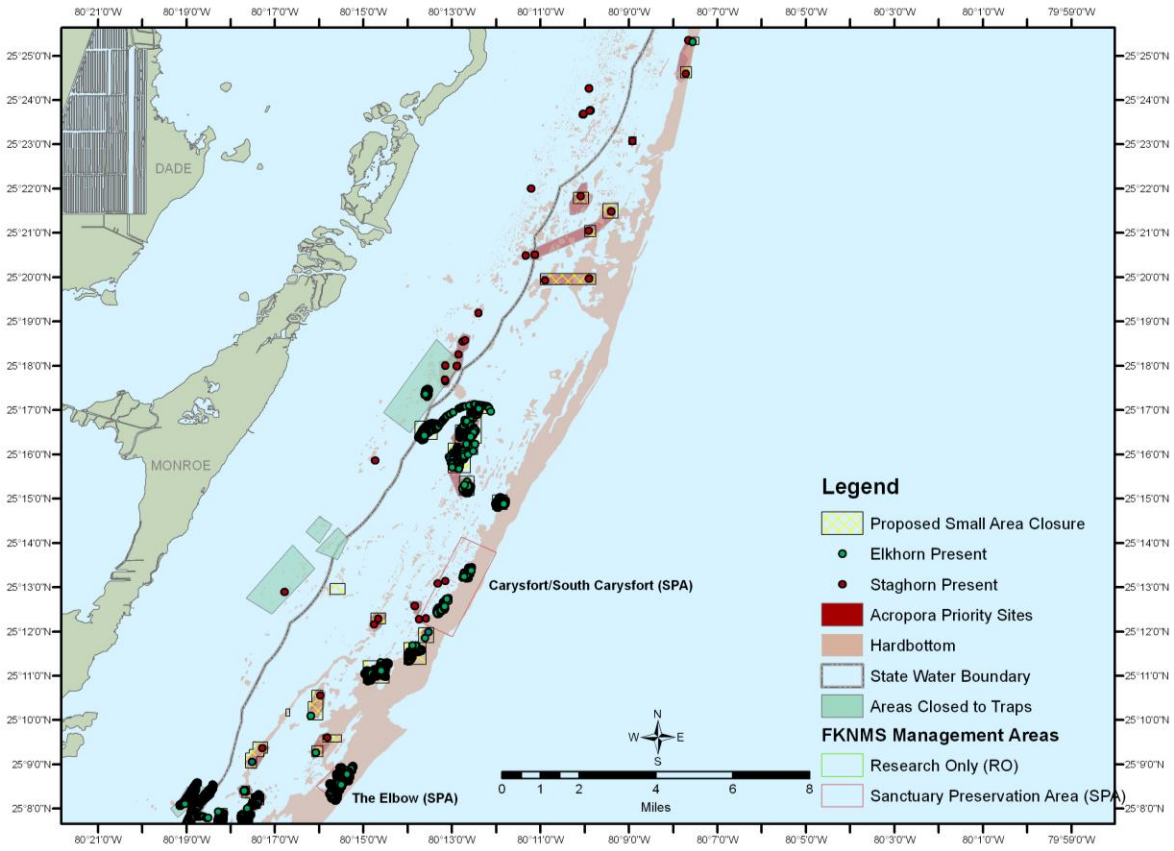

Figure 15 Proposed Small Area Closures in the Upper Keys (cont'd)