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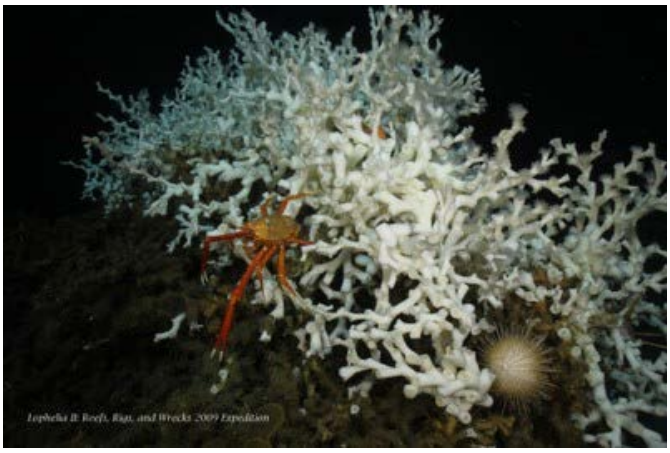
Coral Habitat Areas Considered for Management in the Gulf of Mexico



Public Hearing Draft for Amendment 9
to the Fishery Management Plan for the Coral and Coral Reefs of the Gulf of Mexico, U.S. Waters

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Gulf of Mexico Coral Amendment 9

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ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
ALS	Accumulated Landings System
AM	accountability measure
AP	advisory panel
BRD	bycatch reduction device
CIOERT	NOAA Cooperative Institute for Ocean Exploration, Research and Technology
Coral FMP	Fishery Management Plan for Coral and Coral Reefs of the Gulf of \ Mexico
Council	Gulf of Mexico Fishery Management Council
CS	consumer surplus
DPS	distinct population segment
DSCRTP	NOAA Deep Sea Coral Research and Technology Program
DWH	Deepwater Horizon Oil Spill
EA	Environmental Assessment
EEZ	exclusive economic zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ELB	electronic logbook
EJ	Environmental Justice
ESA	Endangered Species Act
FAC	Florida Administrative Code
Federal shrimp permit	federal commercial Gulf shrimp moratorium permit
FEIS	final environmental impact statement
FGBNMS	Flower Garden Banks National Marine Sanctuary
FKNMS	Florida Keys National Marine Sanctuary
FMP	Fishery Management Plan
FMU	fishery management unit
FTE	full time equivalent
FWC	Florida Fish and Wildlife Conservation Commission
GSAD	Gulf and South Atlantic Dealer
GRRS	royal red shrimp endorsement
Gulf Council	Gulf of Mexico Fishery Management Council
Gulf	Gulf of Mexico
HAPC	habitat area of particular concern
HMS	Highly Migratory Species
IFQ	individual fishing quota
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MFMT	maximum fishing mortality threshold
MLB	marine life bycatch endorsement
MLD	Marine life transferable dive endorsement
MLN	Marine life non-transferable dive endorsement

MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Survey and Statistics
MRIP	Marine Recreational Information Program
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOR	net operating revenue
OFL	overfishing limit
OY	optimum yield
PS	producer surplus
ROV	remotely operated vehicle
RQ	Regional Quotient
SEIS	Supplemental Environmental Impact Statement
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office of NMFS
SFA	Sustainable Fisheries Act
SPR	spawning potential ratio
SPGM	Federal shrimp permit
SRD	Science and Research Director
SRHS	Southeast Regional Headboat Survey
SSC	Scientific and Statistical Committee
South Atlantic Council	South Atlantic Fishery Management Council
VMS	vessel monitoring systems
WFS	West Florida Shelf

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[This statement is completed after selection of all preferred alternatives.]

CHAPTER 1. INTRODUCTION

1.1 Background

There are over 100 species of coral included in the Fishery Management Plan (FMP) for Coral and Coral Reefs of the Gulf of Mexico (Coral FMP). Only stony and black corals are included in the fishery management unit (FMU); octocorals were removed from the FMU in the Generic Annual Catch Limit (ACL)/Accountability Measures (AM) amendment (GMFMC 2011), and Florida now manages octocorals in the federal waters off Florida as well as state waters. Only species in the FMU are managed by the Gulf of Mexico Fishery Management Council (Council). Species managed by the Council are managed through FMPs.

Black Coral *– corals of the taxonomic order Antipatharia. These corals have a black skeleton and occur from shallow to deep water.*

Deepwater Coral *– also known as "cold water corals" are those corals found in waters 164 ft (27 fathoms) or deeper.*

Hermatypic Coral *– a coral competent of building reef structure, and can be species that occur in shallow water and contain symbiotic zooxanthellae, or those species that build reef structures in water depths below the photic zone that are azooxanthellate.*

Mesophotic Coral *– corals that exist in low light to no light conditions generally in depths between 100 and 500 feet (16 and 83 fathoms). These corals can include both shallow and deepwater coral.*

Octocoral *– corals of the taxonomic order Alcyonacea. These corals are non-reef building corals that are diverse in habitat and structure, but provide vertical relief over soft bottoms.*

Stony Coral *– corals of the taxonomic order Scleractinia. These corals are the primary reef building corals, though there are solitary species.*

In 2013, the Council hosted a workshop that brought together scientists associated with both fisheries and corals to discuss how corals may be affected by fisheries. From this workshop, a book was released titled "*Interrelationships Between Coral Reefs and Fisheries*" (Bortone et al. 2014). One of the recommendations from that workshop was to reevaluate coral areas in the Gulf of Mexico (Gulf) that might warrant special protections. Methods of protecting coral and coral habitats from activities unrelated to direct harvest include designating deep-water coral areas via section 303(b)(2)(B) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) or designating particular sites within existing coral essential fish habitat (EFH) as habitat areas of particular concern (HAPCs).

Deep-water coral areas are designated to protect those corals from physical damage from fishing gear or to prevent loss of or damage to fishing gear from interactions with corals. HAPCs are a subset of EFH. An EFH designation requires the Council to include in its FMPs measures to minimize, to the extent practicable, adverse effects on these habitats caused by fishing. Other federal agencies are also required to consult with the National Marine Fisheries Service (NMFS)

> ***Essential Fish Habitat (EFH)*** *– those waters and substrate necessary to fish (including coral) for spawning, breeding, feeding, or growth to maturity.*
>
> ***Habitat Area of Particular Concern (HAPC)*** *– a subset of EFH that meets one or more of the following criteria: 1) importance of ecological function provided by the habitat; 2) area or habitat is sensitive to human induced degradation; 3) the habitat is stressed; 4) is considered rare.*

and Council regarding non-fishing activities that may adversely affect EFH. HAPC designation does not confer any additional specific protections to designated areas, but can be used to focus attention on those areas when the Council considers the measures to minimize adverse impacts from fishing and when NMFS conducts the required consultations.

Under the definition of coral EFH, wherever coral (that are FMU-listed species) exists is considered coral EFH (GMFMC 2004). Areas in which corals exist in sufficient numbers or diversity would be considered for establishment as an HAPC as long as it meets one of the HAPC requirements: significantly ecologically important, habitat that is sensitive to human induced degradation, located in an environmentally stressed area, or considered rare. All corals are sensitive to human-induced habitat degradation by fishing and non-fishing activities. Some black corals have been aged in excess of one thousand years and have slow growth rates; thus, these species are unlikely to fully recover from destruction or degradation.

In 2014, the Council convened a working group of scientists to discuss which areas in the Gulf warrant specific coral protection. The group identified 47 areas, including existing HAPCs, in need of protection and recommended that these areas be designated as HAPCs (Appendix A). The Council's Special Coral Scientific and Statistical Committee (SSC) and Coral Advisory Panel (AP) reviewed these areas at their May 2015 meeting along with members of the shrimping community. Some of these areas were identified as needing further refinement of the boundaries based on available fishing information. These reports were presented to the Council at its June 2015 meeting. The Council asked staff to present these areas to affected user groups. The Shrimp AP, Reef Fish AP, Spiny Lobster AP, and Law Enforcement Technical Committee have provided input.

At the Council's June 2016 meeting, the Council directed staff to convene the Coral SSC and Coral AP with the Shrimp AP; staff also invited royal red shrimp fishermen and bottom longline fishermen to the meeting to provide input. The meeting was held in August 2016. The group narrowed the focus to 15 priority areas (Table 1.1.1) that were recommended to have fishing regulations. All priority areas were identified through known abundance of coral, extensive coral fields, and/or species richness or diversity indices that differed from areas in a similar geographic location. The group also suggested eight deep-water areas (Table 1.1.1) that

warranted consideration as HAPCs; however, the group did not recommend these areas have fishing regulations. Two of the areas identified as priority areas (Pulley Ridge and Viosca Knoll 862/906) were also recommended to have boundary revisions which were based on the topography of the bottom features known to have corals and the historical fishing that has been documented in the area. Council staff convened a working group to discuss Pulley Ridge and consulted with biologists and fishermen for Viosca Knoll 862/906. Neither the Pulley Ridge working group nor the group discussing Viosca Knoll 862/906 was able to reach any agreed upon modifications to these boundaries, so the Council will have to decide the appropriate course of action without a recommendation.

Table 1.1.1. Areas identified as priority for HAPC consideration in the Gulf of Mexico.

Site	Area (nm^2)	Depth in fathoms (feet)
Florida Banks		
Long Mound	13.6	164-383 (985-2300)
Many Mounds	13.0	109-383 (650-2300)
North John Reed Site	13.6	164-492 (985-3000)
Pulley Ridge South Expansion	194.2	27-109 (160-660)
Northeastern Banks		
Alabama Alps Reef	2.7	27-109 (160-660)
L& W Pinnacles and Scamp Reef	14.3	55-164 (325-985)
Mississippi Canyon 118	11	437-820 (2620-4925)
Roughtongue Reef	13.6	27-109 (160-660)
Viosca Knoll 826	10.3	273-492 (1640-2955)
Viosca Knoll 862/906	18.8	164-383 (980-2300)
Northwest Banks		
AT 047	6.8	437-820 (3280-4925)
AT 357	6.8	547-820 (2620-4925)
Green Canyon 852	3.8	820-1094 (4920-6565)
South Texas Banks		
Southern Bank	0.8	27-55 (160-330)
Unnamed Bank (Harte Bank)	10.8	27-82 (160-330)
Areas that were recommended to be HAPCs with no fishing regulations		
South John Reed Site	6.8	219-820 (1310-4925)
Garden Banks 299	6.5	219-328 (1310-1970)
Garden Banks 535	6.8	273-328 (1640-1970)
Green Canyon 140 and 272	81.6	164-547 (980-3285)
Green Canyon 234	13.6	219-492 (1310-2955)
Green Canyon 354	6.8	273-547 (1640-3285)
Mississippi Canyon 751	6.8	328-383 (1310-1970)
Mississippi Canyon 885	6.8	219-328 (1970-2300)

Deepwater corals, or cold water corals, are defined by the Deepsea Coral Program of the National Oceanic and Atmospheric Administration (NOAA) as corals occurring in depths of 50 m (164 ft) or deeper (as cited in Hourigan et al. 2007). In keeping with NOAA's definition, in this document deepwater corals are any corals that exist below 50 m (164 ft). Mesophotic corals are those in depth ranges from 30 m (98 ft) to approximately 150 m (492 ft) (Pugilese et al. 2009; Hinderstein et al. 2010). The most diverse and numerous deepwater coral reef tracts known occur in the Southeastern US and Gulf (Hourigan et al. 2017). Options for including species found deeper than the accepted depth range of mesophotic corals into the FMU are also included as mesophotic corals typically span between deep water and shallow water depth ranges.

Description of Coral

Deep-water corals can live for hundreds to thousands of years and occur in light-limited environments (i.e., depths greater than 150 ft). Stony corals can exist as either solitary cups or as colonial species that can build reefs (sometimes over 300 ft tall). Black corals and octocorals may be shaped like whips, bushes, or fans and provide structural habitat in environments that may be lacking three dimensional habitats. Many species of deep-water coral grow slowly and can take decades to centuries to recover from damage. Growth rates are different for each species and are dependent on environmental conditions. Deep-water corals provide complex habitat for many species of grouper, snapper, shrimp, and crabs. For example, *Lophelia pertusa* is a known habitat for many deep-water fishes and invertebrates (e.g., Kilgour and Shirley 2008).

Unlike shallow-water corals, deep-water corals do not require sunlight. They live in cold waters and derive nutrients from organisms in the water. Corals appear on hard substrates (such as salt domes, cold seeps, basalt, etc.) that have oceanic conditions (e.g., temperature, nutrients, and current flow) suitable for survival. Many times, canyon walls, steep escarpments, seamounts, and other areas with vertical relief are the prime areas where corals occur. Compared to the species that exist on these hard substrates with some sort of slope, there are fewer species prevalent in soft substrates. Thus, areas of hard substrate with vertical relief are more likely to have deep-water corals. The Gulf is predominantly soft sediment; naturally existing hard substrate, and subsequently coral coverage, is rare. Deep-water coral distributions are also depth dependent, meaning that the corals that are prevalent in one depth range are different than the predominant corals existing in a different depth range. To account for species differences in depth, various depth ranges should be considered for protecting different coral species.

Mesophotic corals are corals that exist in low light to no light conditions, generally in depths between 100 and 500 ft (16 and 83 fathoms). These corals exist at or below scuba diver depths, but are in water depths too shallow to warrant industrial underwater remotely operated vehicle (ROV) operations. However, there have been many research expeditions in the Gulf in recent years to investigate the presence of mesophotic corals. Mesophotic coral ecosystems can have both shallow-water corals (usually at the deepest range of their depth limits) and some deep-water coral species (usually at the shallower range of their depth limits). Several of the HAPCs that have been proposed encompass these unique ecosystems. Appendix C summarizes the recorded depth distributions in the Gulf for observed octocorals in NOAA's Deepsea Coral Database (NOAA 2015).

Currently, no take of black or stony coral is allowed in the Gulf exclusive economic zone (EEZ); coral may only be taken when authorized as a scientific research activity, exempted fishing permit activity, or exempted educational activity. In the Generic ACL/AM amendment[1] (GMFMC 2011), octocorals were removed from the FMU because the harvest of these corals occurred primarily off of the coast of Florida, in state waters, and Florida was managing the quota for harvestable octocorals for the aquarium trade. In Florida, individuals with the appropriate permits may harvest octocorals in the Gulf EEZ adjacent to Florida (Florida Administrative Code [FAC] 68B-42). Individuals landing octocorals from Florida state and federal waters must abide by Florida's regulations as follows: the quota of octocorals for all persons who harvest allowable octocorals (those which are not allowable are listed below) is 70,000 colonies and harvest of attached substrate within 1 inch of base is permitted; harvest of Venus sea fan (*Gorgonia flabellum*) and common (purple) sea fan (*Gorgonia ventalina*) and harvest of non-erect or encrusting octocorals is prohibited; for recreational anglers, a recreational fishing license is required and harvest of no more than six octocoral colonies per person per day is allowed; for commercial harvest, possession of a valid salt-water products license, a valid restricted species endorsement, a valid marine life tiered endorsement is required; all applicable Florida gear restrictions apply.

However, there are many deep-water octocorals that are not harvested for the aquarium trade and the importance and vulnerability of deepwater coral ecosystems makes them of particular conservation concern in need of protection from bottom tending gear from fishing, as well as other extractive purposes such as mining and oil and gas exploration. The Council only has the authority to regulate fishing activity. Additionally, information about deep-water octocorals has significantly increased as has our understanding of where they are located and what ecological services they provide. The Council's Special Coral SSC and Coral AP have recommended the Council incorporate deep-water octocorals (those primarily in waters deeper than 164 ft [50 m]) into the FMU so that these can be considered when designating HAPCs; allowable octocorals in federal waters off Florida's coast could remain managed by Florida. The Council would need to identify which species to add to the FMU and provide rationale for doing so. Additionally, the Council would need to decide management benchmarks and stock status criteria for octocorals, should these be included in the FMU.

Description of Data Used to Estimate Fishing Activity

For analyses and discussion in this document for existing fishing pressure, two datasets were used: the shrimp electronic logbook (ELB) dataset and vessel monitoring system (VMS) data from vessels with bottom tending gear. Each of these datasets will be discussed in detail here. Each of these datasets are collected by different methods and have different caveats.

VMS are required on all vessels with commercial reef fish permits. VMS data from vessels with bottom tending gear were used for analyses in this document. Gear types that were considered as bottom tending were the following gear types: bottom longlines, trawl nets, sea bass pots, traps, automatic reels, bandit rigs, spears, and diving Primarily, VMS data came from allowable gear

[1]Generic annual catch limits/accountability measures amendment for the Gulf of Mexico Fishery Management Council's red drum, reef fish, shrimp, coral and coral reefs fishery management plans including environmental impact statement, regulatory impact review, and regulatory flexibility act analysis, fishery impact statement. Gulf of Mexico Fishery Management Council. Tampa, Florida.

types in the Gulf and only the following gear types were observed in the proposed HAPCs (traps [from 2008-2010], bottom longlines, trawl nets, bandit rigs, and spears). Some gear types are directly bottom-contact gear while others use bottom anchoring. Additionally, date, time, latitude, and longitude were requested data. VMS ping vessel identification and location information to a centralized database maintained by NOAA's Office of Law Enforcement every hour, with increasing frequency of pings if a vessel nears a closed area. Because of the infrequency of pings (once an hour), it is very difficult to separate fishing activity from non-fishing activity. Thus, we used all ping data from VMS in analyses from March 2007 through July 2015.

Shrimp ELB data were also used from vessels with federal shrimping permits from 2004 until 2013 that were selected by NMFS to carry an ELB, but only approximately 1/3 of all federally permitted shrimp vessels have an ELB. In 2004, the ELB program began, but it took several years for NMFS to place ELBs on approximately one-third (~500) of the Gulf federal commercial shrimp fleet; thus, early years in the program are not very representative of shrimping activity. Data points from Shrimp ELBs are collected every ten minutes. Because of the frequency of data points, NMFS is able to determine likely fishing activity from non-fishing activity based on vessel speed (derived from the distance between two points), among other factors, using a calibrated algorithm. All shrimping activity presented in this amendment is from what has been determined to be active fishing and has not been extrapolated (meaning we did not multiply effort to account for the whole fishery as only 1/3 of the federally permitted shrimp boats have an ELB). Thus, the difference between the presented VMS data and ELB data is that VMS data include both fishing and non-fishing points and are on all commercially permitted reef fish boats, while the ELB data includes only fishing points from approximately one third of the fleet.

Description of the Regions of Gulf

The 15 prioirty coral areas recommended to have fishing regulations fall into distinct regions of the Gulf. For purposes of this amendment, the Gulf was divided into four quadrants to separate the actions (Figure 1.1.1). Eight additional areas were recommended to be designated as HAPCs without fishing regulations; these areas are addressed in Action 6.

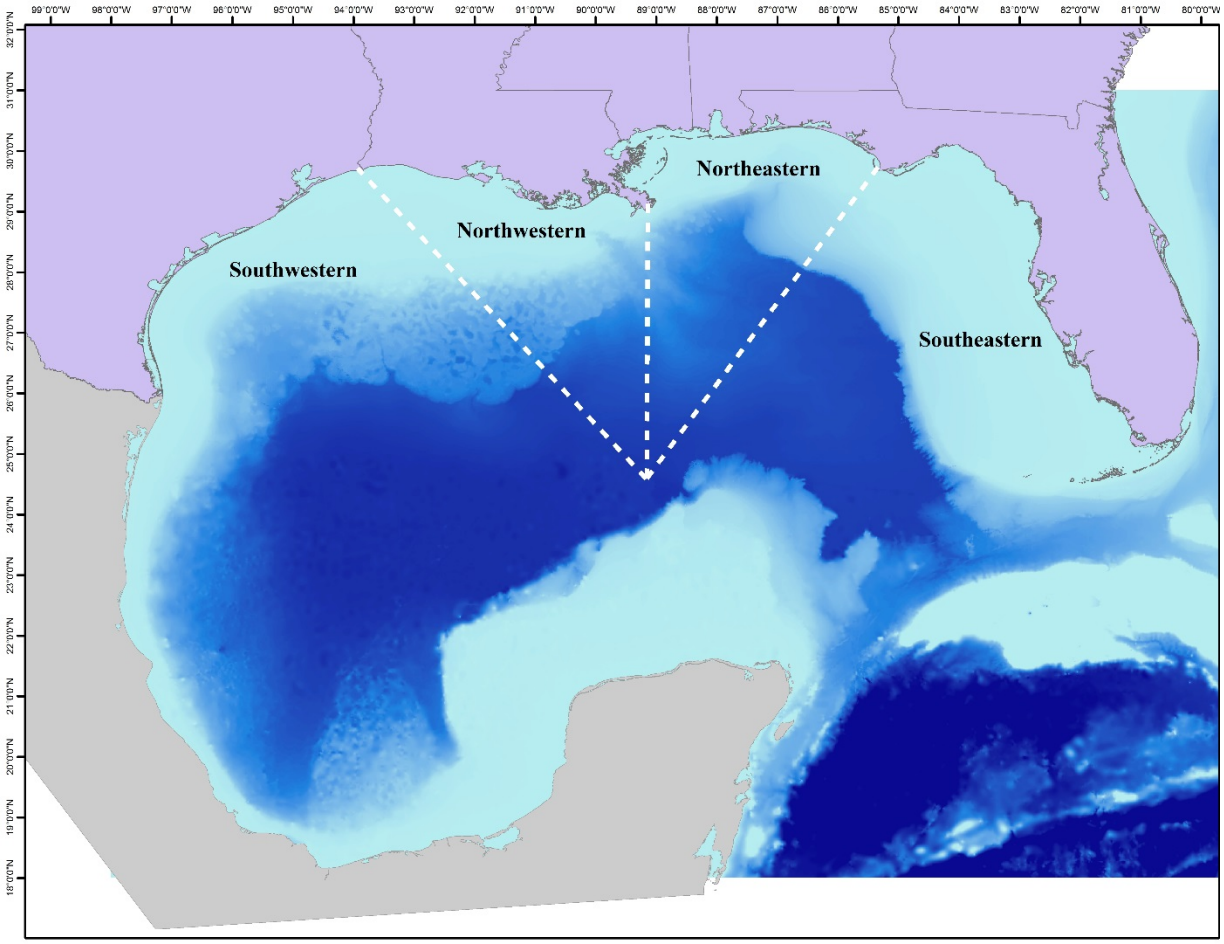

Figure 1.1.1. The four quadrants used to divide the Gulf for Actions 3-7.

Southeastern Gulf: The West Florida Shelf has the deepest known hermatypic (reef-building coral with zooxanthellae [symbiotic algae]) coral in U.S. waters. Pulley Ridge has the most species that have been observed for any of the proposed HAPCs, and there are distinct habitat differences between northern and southern Pulley Ridge. Specifically, areas in the northern section of the Pulley Ridge HAPC were characterized as sand, pavement (carbonate substrate created by microbes), or low relief outcrops, with the pavement and low relief outcrops containing several species of sessile and encrusting invertebrates and algae (GMFMC 2010). Recent work by Reed et al. (2017) has provided new information that warrants re-examination of the existing boundaries of the Pulley Ridge HAPC and perhaps warrants the inclusion of a new area to the south of the Pulley Ridge HAPC. Corals have been found outside the existing boundaries of the Pulley Ridge HAPC that has regulations, but within the broader Pulley Ridge HAPC. Many of these corals are plate corals that are zooxanthellate (containing symbiotic algae) and thus require light. In deeper areas, black corals and other types of stony corals have been observed. Moving north along the west Florida Shelf is primarily hard bottom that consists of relic shorelines with low to moderate relief (6.5- 26 ft) limestone ledges (Smith 1976; Hine et al. 2008). Up to 14 coral species have been identified in the Long Mound, North Reed, and Many Mounds areas.

Northeastern Gulf: Off the coast of Louisiana, Mississippi, and Alabama, in the northeastern Gulf, a series of features of low to high relief (6.5 ft to more than 65 ft) have either clusters of features, or linear ridges (Rezak et al. 1985; Schroeder et al. 1989). One of the areas, Viosca Knoll 826, is one of the best-studied deep reefs in the Gulf. Corals contained within proposed areas in this region range from mesophotic corals to deep-water corals and the number of species in some proposed areas exceeds 20 (including octocorals).

Northwestern Gulf: The northwestern Gulf is very broad and predominantly comprised of soft sand and clays from riverine sediments and is divided from the northeastern Gulf by the DeSoto Canyon (Gittings et al. 1992; Brooke 2017). In the northwestern Gulf, salt domes dominate the hard substrate north of Matagorda Bay, Texas (e.g., the Flower Garden Banks National Marine Sanctuary) (Rezak et al. 1990; Roberts 2011).

Southwestern Gulf : Drowned barrier reefs provide the hard substrate south of Matagorda Bay for south Texas Banks (Southern Bank and Harte Bank) (Rezak et al. 1990; Roberts 2011). Many species of black coral, stony coral, and sea fans (octocorals) are present in this region. Some areas have deep-water species, but most of the corals that are present on the south Texas banks would be characterized as mesophotic. These areas have between five and six different species of black corals, two to four species of stony corals, and a handful of octocorals.

Current Closed Areas, Fishing Regulations, and Existing HAPCs

Not all existing HAPCs have regulations (Table 1.1.2) and not all regulations are consistent across HAPCs. For example, Stetson and McGrail Banks do not prohibit dredges. The Council may wish to standardize all bottom-tending gear regulations for existing HAPCs or at least apply similar language to all HAPCs for gear it does not want deployed in these areas. The Council may evaluate the existing fishing regulations in the HAPCs and determine if standardization is warranted.

Table 1.1.2. Existing National Marine Sanctuaries, Marine Reserves, and HAPCs in the Gulf. Regulations for each area are summarized. Area is in square nautical miles.

Site	Area (nm^2)	Current Status	Regulations
Stetson Bank	1.7	Sanctuary/ HAPC	No fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels year round.
East and West Flower Garden Banks	64.6	Sanctuary/ HAPC	No fishing with bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels year round.
McGrail Bank	14.1	HAPC	No fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels year round.
Madison-Swanson	115.2	Reserve/ HAPC	No possession of Gulf reef fish except aboard a vessel in transit with fishing gear appropriately stowed year round. No fishing for any species from November through April, and possession of any fish species is prohibited except for such possession aboard a vessel in transit with fishing gear appropriately stowed. Surface trolling is the only allowable fishing activity May through October. These provisions do not apply to highly migratory species.
Florida Middle Grounds	339.3	HAPC	No fishing with bottom longline, bottom trawl, dredge, and pots or traps year round.
Pulley Ridge	100.7/ 2302.4 *	HAPC	*No fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels year round.*
Steamboat Lumps	106.7	Reserve	No possession of Gulf reef fish except aboard a vessel in transit with fishing gear appropriately stowed year round. No fishing for any species from November through April, and possession of any fish species is prohibited except for such possession aboard a vessel in transit with fishing gear appropriately stowed. Surface trolling is the only allowable fishing activity May through October. These provisions do not apply to highly migratory species.
The Edges	390	Reserve	No fishing for any species from January through April, and possession of any fish species is prohibited except for such possession aboard a vessel in transit with fishing gear appropriately stowed. These provisions do not apply to highly migratory species
Tortugas Marine Reserves	66.7	Reserve/ HAPC	No fishing for any species and anchoring by fishing vessels year round.
Alderdice Bank	5	HAPC	None
Bouma Bank	11	HAPC	None
29 Fathom Bank	11.0	HAPC	None
Geyer Bank	13.1	HAPC	None
Jakkula Bank	35	HAPC	None
MacNeil Bank	8.1	HAPC	None
Rankin-Bright Banks	81.1	HAPC	None
Rezak-Sidner Banks	20	HAPC	None
Sonnier Bank	9.0	HAPC	None

Note: *Only a small portion of Pulley Ridge currently has regulations, though there is a larger rectangle that does not have regulations.

1.2 Purpose and Need

Purpose for Action

The purpose of this amendment is to protect coral species and habitat under federal management in the Gulf of Mexico.

Need for Action

The need for this action is to conserve the Gulf of Mexico coral resources and essential fish habitat and to maintain suitable marine fishery habitat quality and quantity to support sustainable fisheries.

1.3 History of Management

On August 22, 1984, NOAA issued the final rule to implement the original Coral FMP. The rule was prepared jointly by the Council and South Atlantic Fishery Management Council (South Atlantic Council) due to the susceptibility of coral and coral reefs to physical and biological degradation, and the need to optimize the benefits from these resources while conserving the coral and coral reefs. The original FMP addressed three objectives:

1) established unique HAPC for coral which were currently or potentially threatened;
2) prohibited the taking or destruction of stony corals and sea fans (*Gorgonia flabellum* and *Gorgonia ventalina*) except under scientific permit; and
3) provided permit systems for the taking of certain corals for scientific and educational purposes and harvesting fish or other marine organisms using toxic chemicals in coral habitat.

The management unit consisted of the coral and coral reefs in federal waters including hard bottom, deep-water banks, patch reefs, and outer bank reefs. It specifically established four HAPCs-- East and West Flower Garden Banks and Florida Middle Grounds in the Gulf, and the Oculina Banks in the South Atlantic -- where the use of any fishing gear interfacing with the bottom (i.e., bottom trawls, traps, pots, and bottom longlines) was prohibited.

In 1989, NMFS published revised guidelines for FMPs that addressed the Magnuson-Stevens Act national standards. These guidelines require each FMP to include a scientifically measurable definition of overfishing and an action plan to prevent or stop overfishing should it occur. The Council and South Atlantic Council reviewed these requirements and concluded that because harvest of prohibited corals was limited to scientific and educational purposes, overfishing of corals could not occur. NMFS review determined that an amendment to the plan was necessary because it did not include a measurable definition of overfishing, which was addressed in Amendment 1 (GMFMC and SAFMC 1990).

Amendment 1/Environmental Assessment (EA) (1990)

Amendment 1 defined the management unit to include octocorals. Specifically the management unit was defined as consisting of coral reefs, stony corals, and octocorals including the two sea fans *Gorgonia ventalina* (venus sea fan) and *Gorgonia flabellum* (common [purple] sea fan) in the Gulf and South Atlantic EEZ. The amendment defined coral reefs as including hard bottom, deep-water banks, patch reefs, and other outer bank reefs; stony corals included species belonging to Class Hydrozoa (fire corals and other hydrocorals) and Class Anthozoa, Subclass Zoantharia (stony corals and black corals); and octocorals included in Class Anthozoa, Subclass Octocorallia (GMFMC and SAFMC 1990).

This amendment also established permit and reporting requirements for the harvest of octocorals for scientific or educational purposes and limited the recreational and commercial harvest of allowable octocorals not to exceed 50,000 colonies per year. Recreational harvest permits were implemented that limited the harvest of octocorals other than sea fans to a bag limit of six colonies per person per day, and commercial harvest permits were implemented that had no bag limit. Amendment 1 also defined the optimum yield (OY) as zero for coral reefs, stony corals, sea fans, and octocorals in the EEZ except as authorized for scientific or educational purposes, with harvest expected to be approximately 308 lbs (140 kg) per year; and overfishing was defined as an annual level of harvest that exceeded the OY (GMFMC and SAFMC 1990).

The incidental take of corals in other fisheries was addressed by implementing the requirement that those colonies be returned to the water in the general area of capture as soon as possible. An exception was provided for groundfish, scallop, and other similar fisheries where the entire unsorted catch is landed. In such instances, the corals could be landed but not sold, and allowable octocorals taken as bycatch without a state or federal permit were to be treated as prohibited species (GMFMC and SAFMC 1990).

Emergency Rule (1994)

To manage the harvest of live rock and prevent serious damage to habitat in the Gulf until long-term measures could be implemented through Amendment 2, NMFS published an emergency rule effective May 16 through August 18, 1994, and extended the rule, with modifications, through November 12, 1994 (59 FR 42533; August 18, 1994). At the request of the South Atlantic Council, NMFS published an emergency interim rule to manage harvest of live rock on June 27, 1994 (59 FR 32938), effective through September 26, 1994, and extended the rule through December 25, 1994 (59 FR 47563; September 16, 1994). When the 1994 quota was reached, the live rock fishery in the South Atlantic EEZ was closed November 1, 1994, through December 25, 1994 (59 FR 54841; November 2, 1994).

Amendment 2/Supplemental Environmental Impact Statement (SEIS) (1994)

Amendment 2 to the Coral FMP, addressed management of the harvest of live rock, and defined live rock as living marine organisms or an assemblage thereof attached to a hard substrate (including dead coral or rock, including the substrate to which it is attached), and added it to the FMU (GMFMC 2001). In the South Atlantic EEZ the substrate was defined as within 1 inch of the octocoral base, whereas in the Gulf it was within 3 inches of the base (GMFMC and SAFMC

1994). This amendment contained a phase-out of wild live rock harvest and prohibited all wild live rock harvest in the South Atlantic EEZ from north of Dade County, Florida as of January 1, 1996; prohibited chipping throughout the jurisdiction of the South Atlantic Council immediately; established the prohibition of all wild live rock harvest in the Gulf EEZ as of January 1, 1997 (and specified the prohibition of harvest for personal use); and prohibited chipping in the Gulf EEZ north and west of the Pasco-Hernando County line to the Florida-Alabama border. (GMFMC and SAFMC 1994).

In the final rule implementing Amendment 2, the joint FMP was separated into two FMPs; the FMP for Coral, Coral Reefs, and Live/Hard Bottom Habitats of the South Atlantic Region under the jurisdiction of the South Atlantic Council and the FMP for Coral and Coral Reefs of the Gulf of Mexico under the jurisdiction of the Council.

Amendment 3/EA (1995)

Amendment 3, established additional live rock regulations including an annual quota during phase-out, revision of trip limits, a closed area off Florida's Panhandle, redefinition of allowable octocorals, and limited personal use harvest.

The amendment clarified that allowable octocorals were erect, non-encrusting species of Subclass Octocorallia, except the prohibited sea fans *Gorgonia flabellum* (venus sea fan) and *Gorgonia ventalina* (common [purple] sea fan), including only the substrate covered by and within 1 inch of the base, and that this applied only to allowable octocorals in areas where live rock harvest was prohibited (GMFMC 1995).

Generic Amendment for Addressing Essential Fish Habitat Requirements (Generic EFH Amendment) (1998)[2].

The Generic EFH Amendment identified and described EFH based on known distributions of corals specified in the Coral FMP, and for 26 representative managed fish species. In marine waters of the Gulf, EFH is defined as all marine waters and substrates (mud, sand, shell, rock, hard bottom, and associated biological communities) from the shoreline to the seaward limit of the EEZ, where those species commonly occur.

The amendment identified threats to EFH from fishing and non-fishing activities, proposed options to conserve and enhance EFH, and identified research needs. No management measures were implemented through this amendment (GMFMC 1998).

Generic Sustainable Fisheries Act Amendment (1999)

The Generic Sustainable Fisheries Act Amendment provided scientific definitions for stocks managed by the Council including: maximum sustainable yield (MSY), OY, maximum fishing

[2] Amendments to the Coral FMP that were implemented through the Generic EFH and Generic Sustainable Fisheries Act amendments were not given numbers at the time of their development. The Generic Tortugas Amendment was incorrectly identified as the fourth amendment to the Coral and Coral Reef Fishery management plan.

mortality thresholds (MFMT) and minimum stock size thresholds (MSST). The OY was set to zero for all stony and black coral species, so no overfishing or overfished thresholds were set.

Generic Amendment Addressing the Establishment of the Tortugas Marine Reserves (Generic Tortugas Amendment) (2001)

The Generic Tortugas Amendment established marine reserves in the vicinity of the Dry Tortugas, Florida, based on the significant marine resources. The Tortugas Marine Reserves lie within federal waters and in the jurisdiction of the National Park Service and the Florida Keys National Marine Sanctuary (FKNMS). The amendment established fishery regulations under the Magnuson-Stevens Act within portions of the reserve that resides in federal waters. Those regulations were then adopted as Sanctuary regulations, as outlined in the Protocol for Cooperative Fisheries Management of the FKNMS Final Management Plan (NOAA 1996). The regulations prohibit fishing for any species and anchoring by fishing vessels is prohibited within the Tortugas marine reserves.

Generic Amendment 3 Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of Fishing in the Gulf of Mexico (2010)

This amendment addressed a court finding that the original amendment EA did not comply with the requirements of the National Environmental Policy Act, requiring NMFS to prepare a more thorough analysis. The amendment established additional HAPCs, restricted fishing activities within HAPCs to protect EFH, and required a weak link in bottom trawl gear to protect EFH.

The amendment established the East and West Flower Garden Banks HAPC and prohibited fishing with a bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels within those areas. It also established Pulley Ridge HAPC, Stetson Bank HAPC, and McGrail Bank HAPC, and prohibited fishing with a bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels in those areas (GMFMC 2005).

Generic Annual Catch Limits and Accountability Measures Amendment (Generic ACL/AM Amendment) (2011)

The Generic ACL/AM Amendment was Amendment 8 to the Coral FMP. The amendment removed octocorals (Class Anthozoa, Subclass Octocorallia, Family Gorgoniidae) from the FMP. The removal of octocorals as a federally managed species in the Gulf provided the opportunity for states to manage the resources in federal waters adjacent to their state waters.

In April 2011, the Gulf Council and South Atlantic Council received a letter from Florida Fish and Wildlife Conservation Commission (FWC), stating the FWC agreed to manage the allowable octocoral fishery in both Florida state waters and federal waters adjacent to the state. The South Atlantic Council decided to retain allowable octocorals in their Coral FMP but allow Florida FWC to assume management of octocorals off Florida. The FWC extended Florida's octocoral regulations into federal waters and the regulations were modified to establish an annual quota for allowable harvest in state and federal waters off Florida (GMFMC 2011).

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1 – Modify Existing HAPC Boundary for Regulations in Pulley Ridge

Pulley Ridge North and Pulley Ridge South were established as HAPCs in Generic Essential Fish Habitat (EFH) Amendment 3 in 2005 (GMFMC 2005). In the amendment, a larger rectangle (Pulley Ridge North) was established as a HAPC, but only a small portion in the southern portion of the rectangle (Pulley Ridge South) was given fishing regulations (Figure 2.1.1). The previous borders of Pulley Ridge South encompassed all known coral habitat.

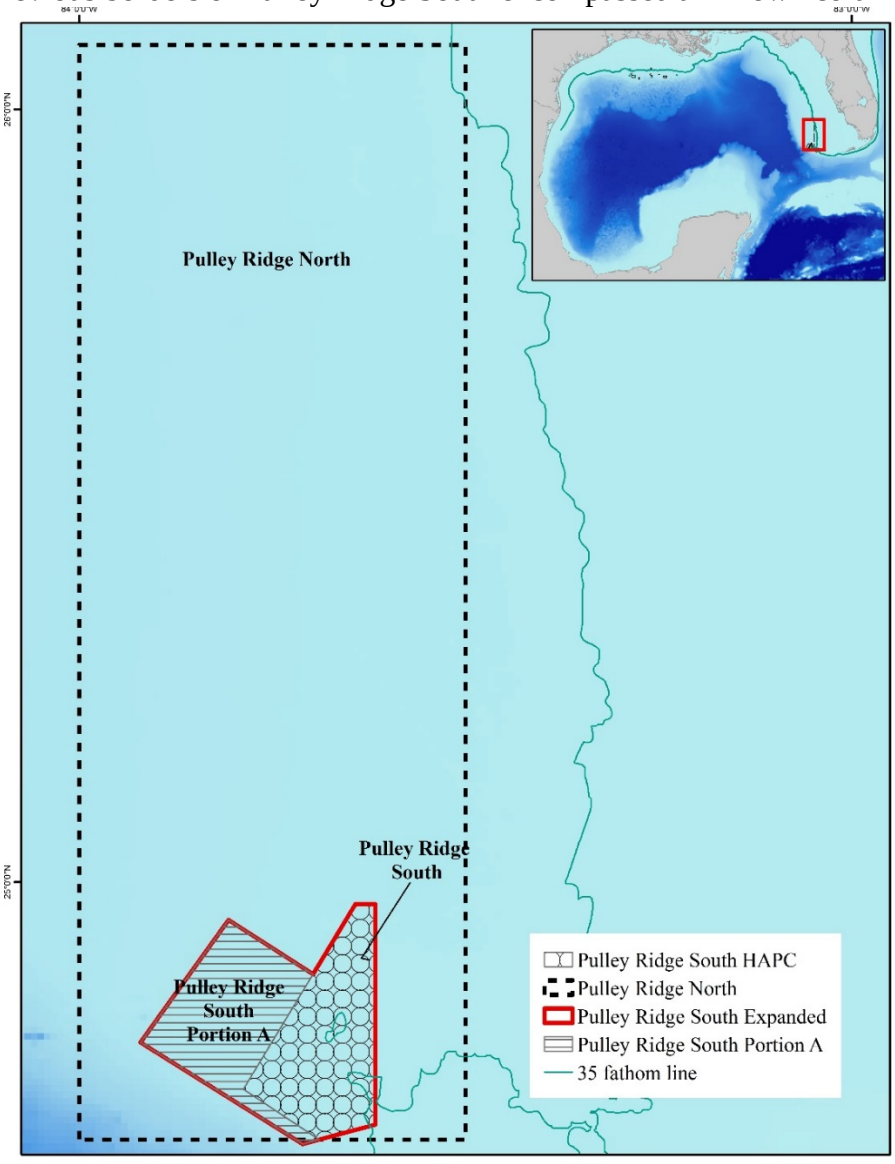

Figure 2.1.1. The existing Pulley Ridge North HAPC, Pulley Ridge South HAPC (with regulations), and the Coral SSC recommended expansion of Pulley Ridge South, labeled Pulley Ridge South Portion A.

Alternative 1: No Action – Do not modify the existing Pulley Ridge South HAPC or change the area subject to fishing regulations. Current regulations to include: fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC (50 CFR 622.74(d)). Pulley Ridge South HAPC is currently bound by the following coordinates (converted from degrees, minutes, seconds to degrees, decimal minutes), connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Depth Range: 27-109 fathoms Area: 100.7 nm^2	A	83°38.550’	24°58.600’
	B	83°37.000’	24°58.600’
	C	83°37.000’	24°41.367’
	D	83°41.367’	24°40.000’
	E	83°47.250’	24°44.833’
	A	83°38.550’	24°58.600’

Alternative 2: Expand the fishing regulations for Pulley Ridge South HAPC (fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC) to the entire Pulley Ridge North HAPC to be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge North Depth Range: 27-109 fathoms Area: 2302.4 nm^2	A	84°0.000’	24°40.000’
	B	84°0.000’	26°05.000’
	C	83°30.000’	26°05.000’
	D	83°30.000’	24°40.000’
	A	84°0.000’	24°40.000’

Alternative 3: Modify the existing Pulley Ridge South HAPC to include Pulley Ridge South Portion A, with the same regulations throughout (fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC). The new Pulley Ridge South HAPC will be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Expansion Depth Range: 27-109 fathoms Area: 194.2 nm^2	A	83°38.550’	24°58.300’
	B	83°37.000’	24°58.300’
	C	83°37.000’	24°41.183’
	D	83°41.366’	24°40.000’
	E	83°42.648’	24°39.666’
	F	83°55.240’	24°47.555’
	G	83°48.405’	24°57.065’
	H	83°41.841’	24°52.859’
	A	83°38.550’	24°58.300’

Preferred Alternative 4: Add a new area, Pulley Ridge South Portion A, within the Pulley Ridge North HAPC adjacent to Pulley Ridge South HAPC with separate regulations. Pulley Ridge South A will have the following regulations: fishing with a bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC. Pulley Ridge South Portion A will be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Portion A Depth Range: 27-109 fathoms Area: 93.6 nm^2	A	83°41.366’	24°40.000’
	B	83°42.648’	24°39.666’
	C	83°55.240’	24°47.555’
	D	83°48.405’	24°57.065’
	E	83°41.841’	24°52.859’
	F	83°47.250’	24°44.833’
	A	83°41.366’	24°40.000’

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

Discussion:

At the meeting of the Coral Working Group in 2014, new information about coral presence in Pulley Ridge was provided. This information stemmed from a multi-year study characterizing the coral reefs at Pulley Ridge conducted by a group of scientists and is summarized in detail in the NOAA Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT) Final Cruise Report (Reed et al. 2017); this report and the references therein are summarized below. The different alternatives expand the regulated area of Pulley Ridge South up to an additional area of 2200 nm^2 (Table 2.1.1).

Table 2.1.1. Sites proposed in Action 3 for Pulley Ridge with the area of each proposed alternative. Minimum and maximum depths are provided.

Site	Minimum depth (fathoms)	Maximum depth (fathoms)	Area (nm^2)
Pulley Ridge South (Alternative 1)	27	109	100.7
Pulley Ridge North (Alternative 2)	27	109	2302.4
Pulley Ridge South Expansion (Alternative 3)	27	109	194.2
Pulley Ridge South Portion A (Preferred Alternative 4)	27	109	93.6

The CIOERT study randomly sampled areas both within Pulley Ridge South and in the surrounding areas (Figure 2.1.2). In this study, plate corals (e.g. *Agaricia* spp., *Helioseris cucullata*, *Madracis* spp., and *Oculina diffusa*) were found in high densities outside the boundaries of Pulley Ridge South but mostly within the boundaries of Pulley Ridge North (a small corner to the south is outside of this boundary; see Figure 2.1.1). Densities of more than 15 colonies/m^2 were found in the Central Basin Region (Pulley Ridge South Portion A), which is to the west of the existing Pulley Ridge South boundary (Figure 2.1.1 and 2.1.2) and hard bottom

was upwards of 88% of the bottom habitat. Twelve scleractinian corals, seven black coral species, and 92 sponge taxa were identified in the Pulley Ridge study. Pulley Ridge South Portion A is also home to significant algal coverage and is known to have red grouper pits. The Central Basin (in Pulley Ridge South Portion A) (Figure 2.1.2) had higher percent coral cover than the main ridge in the existing Pulley Ridge South. There has been a dramatic decline in the percent of living coral from 2003 to 2015 on the main ridge of Pulley Ridge South, though reasons for this decline are unknown. With this new information, it was proposed that the existing Pulley Ridge South be expanded to include more of the area with newly documented coral (Pulley Ridge South Portion A). This expanded area is dominated by newly settled colonies of plate coral less than 2 inches in diameter.

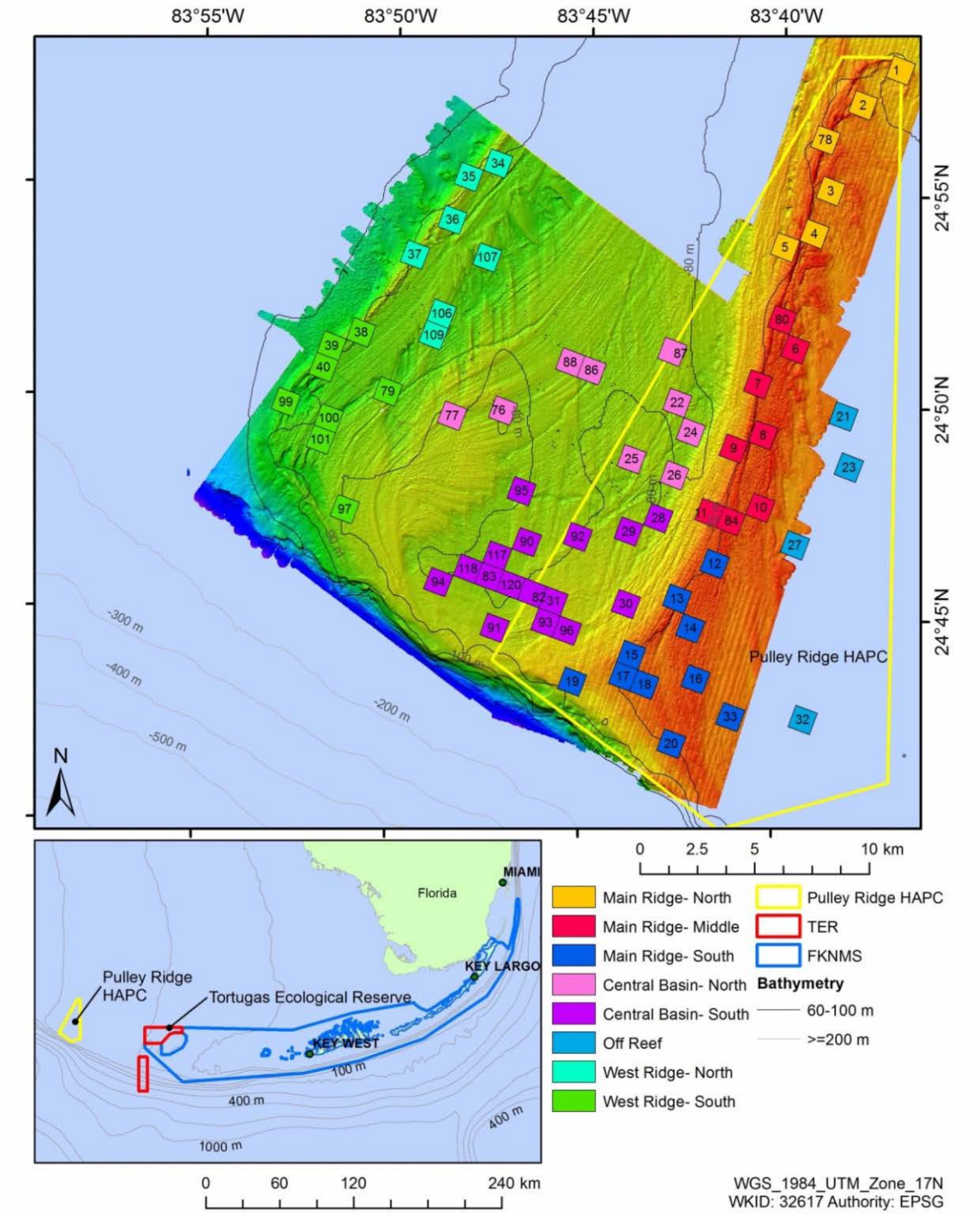

Figure 2.1.2. The random 1 km (approximately 0.5 nm) blocks surveyed with remotely operated vehicles (ROVs) during the CIOERT study (figure from Reed et al. 2017).

The highest species diversity of fish has been observed on the main ridge of Pulley Ridge South-including the highest densities of red grouper. Fish densities on the main ridge of Pulley Ridge South were nearly four times higher than those observed in Pulley Ridge South Portion A. Areas

sampled just off the main reef (within Pulley Ridge South) had fish densities more than twice those of the main ridge. Red grouper pits were found in high densities in Pulley Ridge South Portion A, and lionfish were found throughout the region.

Proposals to modify the boundaries of the existing Pulley Ridge South have been met with contention, as the proposed area in Pulley Ridge South Portion A is an area frequently used by longline fishermen when the seasonal 35-fathom closure goes into effect. Vessel monitoring system (VMS) data from vessels with bottom tending gear were overlaid on the proposed expansion, and there is evidence that this area is used by fishermen (Figure 2.1.3). These VMS data were from the years 2007 until 2015 and more explanation about the data can be found in Section 1.1.

A working group was convened in January 2017 to determine if there could be a suitable compromise on the expansion of Pulley Ridge South to extend all its current regulations to an expanded area (i.e., some modification to the proposed boundaries of Pulley Ridge South Portion A). After reviewing information from fishermen and from scientists, there were few modifications that could be made to accommodate both groups, given that current fishery participants generally use area all the way up to the existing boundary of Pulley Ridge South.

Alternative 1 (No Action) would maintain the existing Pulley Ridge South HAPC regulations and boundaries. The existing larger rectangle of Pulley Ridge North would still be a HAPC with no regulations, and Pulley Ridge South would still have the associated regulations of no bottom tending gear. This alternative would provide no additional coral protections to areas outside of the existing Pulley Ridge South.

Alternative 2 would extend the regulations that are currently in place for Pulley Ridge South to the entire rectangle of Pulley Ridge North. This alternative would expand the fishing regulations to an area of 2302.4 nm^2 (Table 2.1.1) and would include nearly all of Pulley Ridge South Portion A. **Alternative 2** would include areas of Pulley Ridge North that have not been documented to have significant coral communities. There are several areas within this rectangle that are known to have significant fishing activity with bottom tending gear including bottom trawling and bottom longlines.

Alternative 3 is the recommendation of the 2014 Coral Working Group. This would extend the regulations to the west and south of the existing Pulley Ridge South to encompass both Pulley Ridge South and Pulley Ridge South Portion A (Figure 2.1.1) and increase the area with regulations from 100.7 nm^2 to 194.2 nm^2 (Table 2.1.1). **Alternative 3** would affect the bottom longline sector because it extends Pulley Ridge South and its fishing regulations to an area that is currently used by fishermen.

Preferred Alternative 4 would extend most of the Pulley Ridge South fishing regulations to Pulley Ridge South Portion A (Figure 2.1.1), but would not include a restriction on bottom longlining in the extended portion. **Preferred Alternative 4** would allow a fishery that has historically used this area to continue to do so, but would include protections to prevent use of other types of bottom tending gear including bottom trawling, buoy gear, pots, or traps, and prohibit anchoring by fishing vessels.

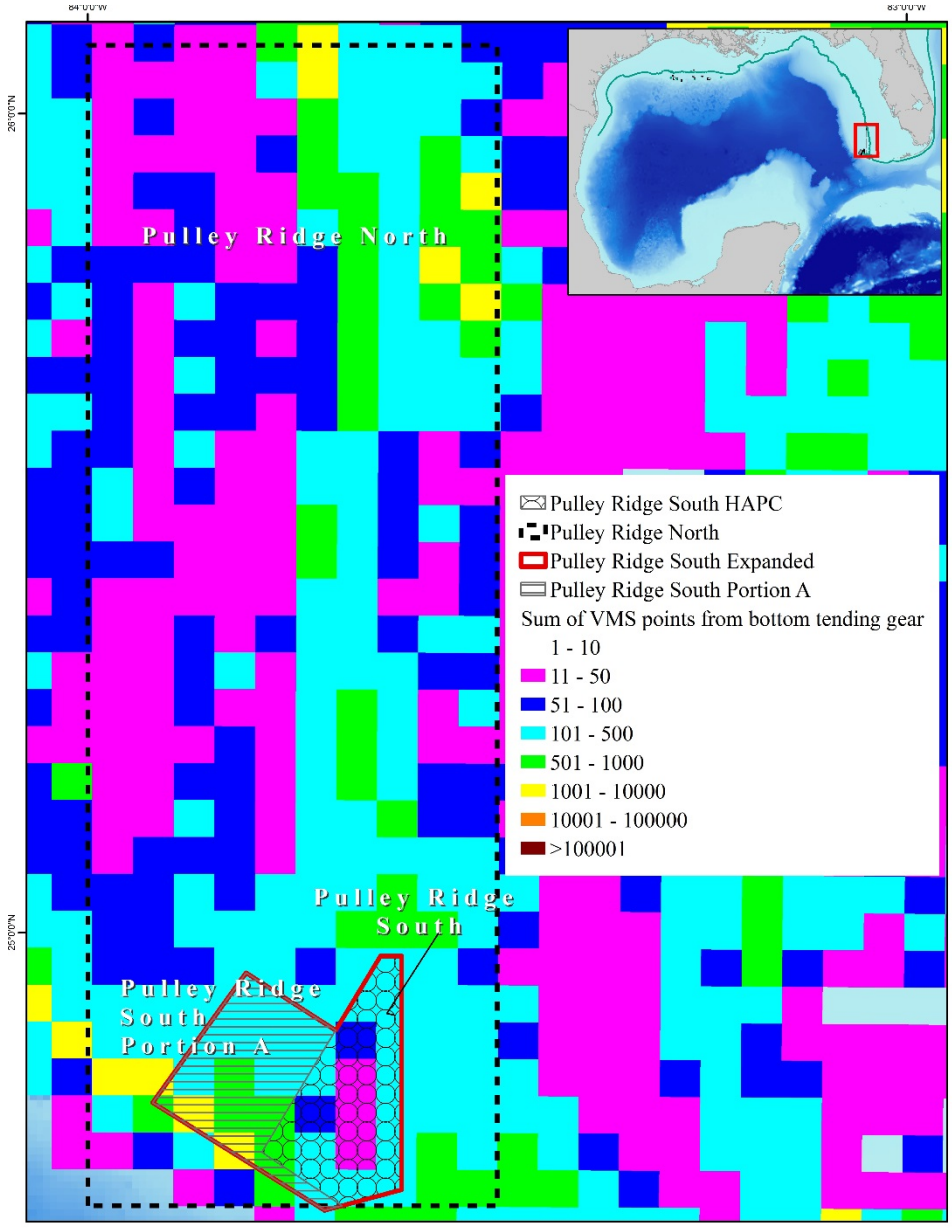

Figure 2.1.3. VMS data overlaid on the existing and proposed expansions of Pulley Ridge. VMS data include all bottom tending gear and span the time from March 2007 until July 2015. VMS data area on 2.5 nm by 2.5 nm grids. VMS locations are collected once every hour regardless of fishing activity. These data do not include shrimp electronic logbook (ELB) data. Purple and dark blue indicate areas with few VMS pings.

2.2 Action 2 – New Areas for HAPC Status in the Southeastern Gulf

Alternative 1: No Action. Do not establish any HAPCs in the Southeastern Gulf.

Preferred Alternative 2: Establish a new HAPC named Long Mound bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Long Mound	A	84°47.955’	26°28.835’
Depth Range:	B	84°45.051’	26°28.790’
164-383 fathoms	C	84°45.153’	26°23.562’
Area: 13.6 nm^2	D	84°48.055’	26°23.607’
	A	84°47.955’	26°28.835’

Option a. Do not establish fishing regulations in the Long Mound HAPC
Preferred Option b. Prohibit bottom tending gear in the Long Mound HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named Many Mounds bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Many Mounds	A	84°45.246’	26°13.000’
Depth Range:	B	84°39.559’	26°13.015’
109-383 fathoms	C	84°39.611’	26°10.401’
Area: 13.0 nm^2	D	84°45.435’	26°10.565’
	A	84°45.246’	26°13.000’

Option a. Do not establish fishing regulations in the Many Mounds HAPC
Preferred Option b. Prohibit bottom tending gear in the Many Mounds HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 4: Establish a new HAPC named North Reed bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
North Reed	A	84°48.104’	26°20.993’
Depth Range:	B	84°42.302’	26°20.902’
164-492 fathoms	C	84°42.354’	26°18.289’
Area: 13.6 nm^2	D	84°48.154’	26°18.380’
	A	84°48.104’	26°20.993’

Option a. Do not establish fishing regulations in the North Reed HAPC
Preferred Option b. Prohibit bottom tending gear in the North Reed HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

Discussion:

Since the implementation of Generic EFH Amendment 3 (GMFMC 2005), there have been many new research cruises that have explored the WFS. Many of these cruises have taken ROVs to explore ridges and mounds that have been previously identified using multi-beam and side-scan sonar remote sensing methods. Long Mound, Many Mounds, and the North Reed are all on the WFS in depths of 100-500 fathoms (Table 2.2.1, Figure 2.2.1). These areas were identified as priority areas by the 2014 Coral Working Group. Six research cruises using multi-beam sonar and ROV found hundreds of mounds and ridges on the WFS over an extensive rocky scarp more than 123.7 nautical miles long (Ross et al. 2017). Shallower mounds and ridges (those less than 273 fathoms [1638 feet]) had stony coral (*L. pertusa*) caps in higher densities than the rocky scarp, but overall, results from these research expeditions indicate that the WFS may have more deep-coral coverage that other areas in the Gulf (Ross et al. 2017). In 2017, the NOAA Deep Sea Coral Research and Technology Program (DSCRTP) identified these areas as priorities for research to help facilitate coral management and to provide information to the Council (Wagner et al. 2017). This research expedition confirmed that in the proposed areas [in this action] there are extensive deepwater coral banks with *L. pertusa* and numerous fields of *Leiopathes* spp. which is a genus of black corals that are extremely long-lived. In the Gulf, specimens have been aged to 500 years or more with growth rates of 0.0008 cm/year to 0.0017 cm/year (Prouty et al. 2011). In the 2017 expedition, numerous individuals were identified with bases of at least 1 cm, indicating the individual colonies observed were potentially hundreds to thousands of years old (unpublished data). VMS data do not indicate that these areas are frequently visited by vessels with bottom tending gear (Figure 2.2.1). However, there have been observations of golden crab fishing occurring here (Drs. Etnoyer and Brooke, NOAA and Florida State University, pers. comm.) despite regulations that prohibit such fishing activity.

Table 2.2.1. Sites proposed in Action 4 for Long Mound, Many Mounds and North Reed with the area of each proposed alternative. Minimum and maximum depths are provided.

Site	Minimum depth (fathoms)	Maximum depth (fathoms)	Area (nm^2)
Long Mound (Preferred Alternative 2)	164	383	13.6
Many Mounds (Preferred Alternative 3)	109	383	13.0
North Reed (Preferred Alternative 4)	164	492	13.6

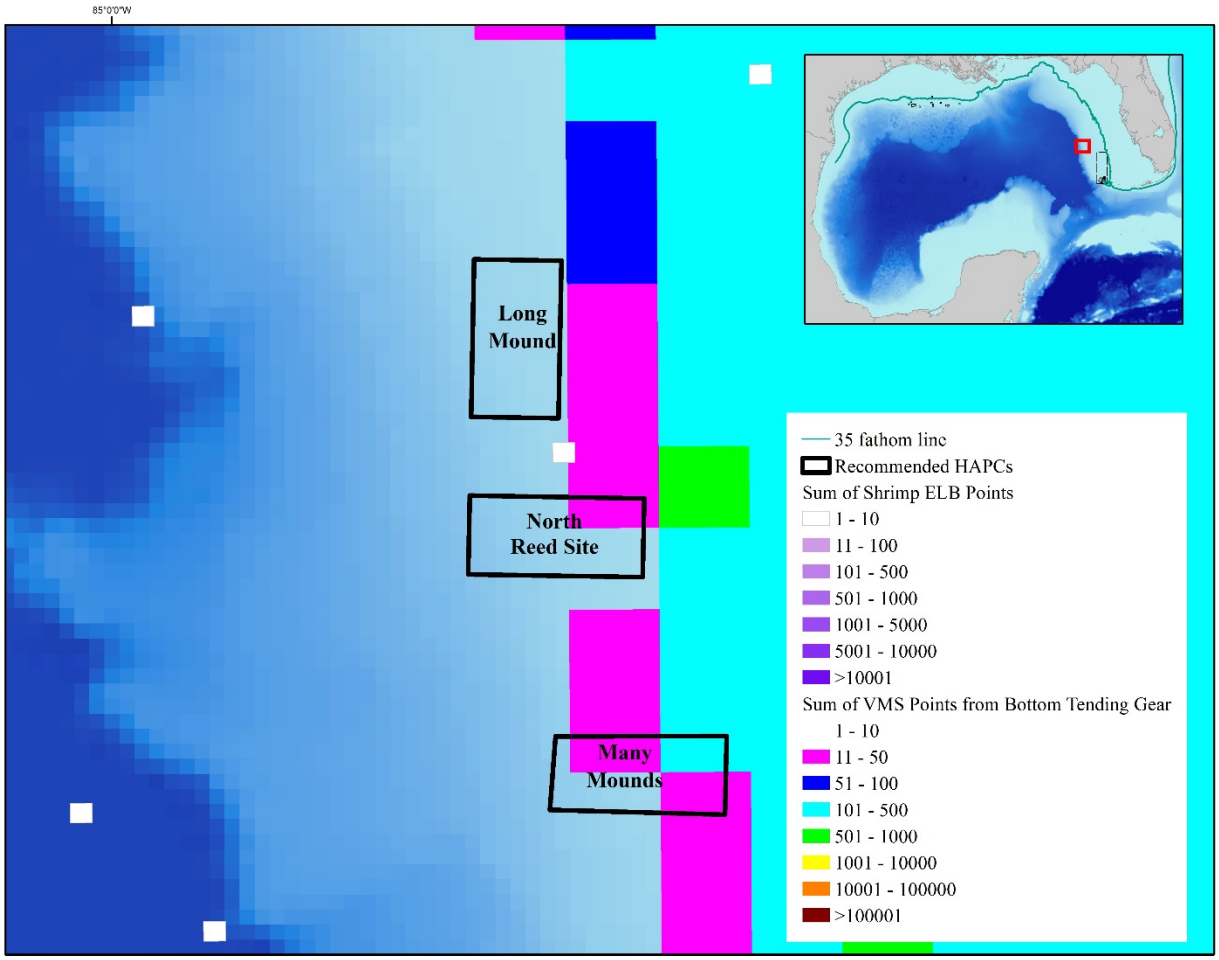

Figure 2.2.1. Fishing data overlaid on the proposed HAPCs Long Mound, North Reed, and Many Mounds. VMS data include all bottom tending gear and span March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm grids (the larger squares). VMS locations are collected once every hour regardless of fishing activity. ELB data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm grids (the smaller squares). ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at: http://portal.gulfcouncil.org/coralhapc.html. Purple and dark blue indicate areas with few VMS pings; any ELB grid that is not white in ELB data indicates significant shrimping activity (see description of data used in Section 1.1).

Alternative 1 would not create any new HAPCs in the southeastern Gulf. Currently, in the eastern Gulf there are three marine reserves, Madison-Swanson, Steamboat Lumps, and the Edges, which were put in place to protect reef fish. The existing Pulley Ridge North and Pulley Ridge South are HAPCs, but only Pulley Ridge South has regulations in place to protect corals from bottom tending gear (see discussion on Action 3). Lastly, to the south, there are the Tortugas Marine Reserves and the Florida Keys National Marine Sanctuary, which both protect areas mostly outside of the Council's jurisdiction.

Preferred Alternative 2 would create a HAPC around the area that has been identified as Long Mound. Long Mound contains a series of mounds and ridges that have many stony corals (e.g. *Lophelia pertusa, Madrepora oculata*, etc.), black corals (e.g., *Leiopathes* spp.), octocorals and sponges (Brooke 2017). ROVs have been used to evaluate these areas in 2010 and 2012 (Lophelia II cruises; http://oceanexplorer.noaa.gov/explorations/explorations.html). Golden crab and royal red shrimp are closely associated with these deep reefs, though there is little evidence to suggest that royal red shrimping occurs here; ELB data do not indicate significant shrimping effort here (Figure 2.2.2). The DSCRTP database lists two species of stony coral and three species of black coral that have been documented in this area. **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** is unlikely to affect current bottom tending gear fisheries and would protect corals from damage caused by bottom tending gear.

Preferred Alternative 3 would create a HAPC in the area identified as Many Mounds. This site has been surveyed more than both Long Mounds and North Reed and has a large number of documented mounds which provide vertical relief. This site has a high percentage cover of *L. pertusa*, black corals, octocorals, and sponges. Large numbers of golden crabs have been observed at this site (Brooke 2017). Both VMS and shrimp ELB data do not show that this is currently heavily fished with bottom tending gear (Figure 2.2.2). The DSCRTP database lists at least four species of stony coral and at least four species of black coral that have been documented in this area. **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** is unlikely to affect current bottom tending gear fisheries and would protect corals from damage caused by bottom tending gear.

Preferred Alternative 4 would create a HAPC at the site labeled North Reed. This site is topographically similar to Long Mound with mounds on a deeper slope, and supports an octocoral dominated community (Brooke 2017). There are also many mounds within this site with high cover of *L. pertusa* and black coral species such as *Leiopathes* sp. (Brooke 2017). Both VMS and shrimp ELB data indicate that this area is not fished with bottom tending gear (Figure 2.2.2). The DSCRTP database lists at least five species of stony coral and two species of black coral have been documented that have been document in this area. **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** is unlikely to affect current bottom tending gear fisheries and would protect corals from damage caused by bottom tending gear.

2.3 Action 3 – New Areas for HAPC Status in the Northeastern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Northeastern Region

Preferred Alternative 2: Establish a new HAPC named Alabama Alps Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Alabama Alps Reef Depth Range: 27-109 fathoms Area: 2.7 nm^2	A	88°20.525’	29°16.160’
	B	88°18.990’	29°15.427’
	C	88°19.051’	29°13.380’
	D	88°20.533’	29°14.140’
	A	88°20.525’	29°16.160’

Option a. Do not establish fishing regulations in the Alabama Alps Reef HAPC.
Preferred Option b. Prohibit bottom tending gear in the Alabama Alps Reef HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit the following bottom tending gear in the Alabama Alps HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 3: Establish a new HAPC named L&W Pinnacles and Scamp Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
L&W Pinnacles and Scamp Reef Depth Range: 55-164 fathoms Area: 14.3 nm^2	A	87°48.757’	29°18.595’
	B	87°50.688’	29°18.484’
	C	87°52.484’	29°19.754’
	D	87°51.449’	29°20.401’
	E	87°50.933’	29°20.095’
	F	87°46.631’	29°20.832’
	G	87°46.326’	29°21.473’
	H	87°45.535’	29°21.314’
	I	87°43.465’	29°22.518’
	J	87°42.632’	29°21.144’
	K	87°45.525’	29°19.269’
	A	87°48.757’	29°18.595’

Option a. Do not establish fishing regulations in the L&W Pinnacles and Scamp Reef HAPC.
Preferred Option b. Prohibit bottom tending gear in the L&W Pinnacles and Scamp Reef HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit the following bottom tending gear in the L&W Pinnacles and Scamp Reef HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 4: Establish a new HAPC named Mississippi Canyon 118 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 118 Depth Range: 437-820 fathoms Area: 11.0 nm^2	A	88°30.789’	28°53.183’
	B	88°27.819’	28°53.216’
	C	88°27.782’	28°50.602’
	D	88°27.759’	28°48.944’
	E	88°30.727’	28°48.962’
	A	88°30.789’	28°53.183’

Option a. Do not establish fishing regulations in the Mississippi Canyon 118 HAPC.
Preferred Option b. Prohibit bottom tending gear in the Mississippi Canyon 118 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 5: Establish a new HAPC named Roughtongue Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Roughtongue Reef Depth Range: 27-109 fathoms Area: 13.6 nm^2	A	87°37.527’	29°27.596’
	B	87°31.552’	29°27.621’
	C	87°31.539’	29°25.007’
	D	87°37.510’	29°24.981’
	A	87°37.527’	29°27.596’

Option a. Do not establish fishing regulations in the Roughtongue Reef HAPC.
Preferred Option b. Prohibit bottom tending gear in the Roughtongue Reef HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit the following bottom tending gear in the Roughtongue Reef HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 6: Establish a new HAPC named Viosca Knoll 826 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Viosca Knoll 826 Depth Range: 273-492 fathoms Area: 10.3 nm^2	A	88°3.509’	29°10.920’
	B	87°59.460’	29°10.877’
	C	87°59.448’	29°7.974’
	D	88°3.532’	29°8.017’
	A	88°3.509’	29°10.920’

Option a. Do not establish fishing regulations in the Viosca Knoll 826 HAPC.
Preferred Option b. Prohibit bottom tending gear in the Viosca Knoll 826 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 7: Establish a new HAPC named Viosca Knoll 862/906 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Viosca Knoll 862/906 Depth Range: 164-383 fathoms Area: 18.8 nm^2	A	88°23.608’	29°7.640’
	B	88°20.590’	29°7.603’
	C	88°20.554’	29°3.749’
	D	88°22.016’	29°3.734’
	E	88°21.998’	29°2.367’
	F	88°24.972’	29°2.281’
	G	88°25.044’	29°7.568’
	H	88°25.044’	29°7.592’
	I	88°25.045’	29°7.676’
	A	88°23.608’	29°7.640’

Option a. Do not establish fishing regulations in the Viosca Knoll 862/906 HAPC.

Option b. Prohibit bottom tending gear in the Viosca Knoll 862/906 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Option c. Prohibit bottom tending gear in the Viosca Knoll 862/906 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels. Provide an exemption to the bottom tending gear for fishermen possessing a royal red shrimp endorsement and is fishing with royal red shrimp fishing gear.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

Discussion:

Hard bottom in the northeastern Gulf is comprised of drowned fossil reefs, scattered hardgrounds, and an area that is commonly referred to as “the Pinnacles” (Brooke 2017); sites in this action are primarily off the coast of Mississippi and Alabama (Figure 2.3.1). In the Pinnacles, there are patch reefs, high pinnacle type reefs, and large, flat-topped summits that can have vertical relief up to 65.4 ft (Gittings et al. 1992). The Pinnacles have increasing species richness in coral taxa from west to east, likely due to the increase in nutrients available from the Mississippi River (Gittings et al. 1992; Mienis et al. 2012). Other taxa with high species richness are sponges and fishes (Gittings et al. 1992; Weaver et al. 2002). One important division off the coast of Alabama is the DeSoto Canyon, which divides the Gulf into two parts: a riverine sediment regime to the west and carbonate sediments to the east (Brooke 2017).

There is significant fishing in this general area by bandit gear and shrimpers, and a low level of fishing with bottom longlines (Figure 2.3.1 and 2.3.2). In this region, there are deep-drop recreational fishers as well (Brooke 2017). In an effort to accommodate existing fishing practices, the size of these areas and borders were slightly modified at the joint meeting of the Shrimp AP, Coral AP, and Coral SSC in 2016. Site depths ranged from 162 to 4,920 ft (27 to 820 fathoms), and the area of each site was between 2.7 nm^2 and 18.8 nm^2 (Table 2.3.1). Thus,

none of the alternatives are likely to affect commercial shrimping except in the Viosca Knoll 862/906 site (**Preferred Alternative 7**).

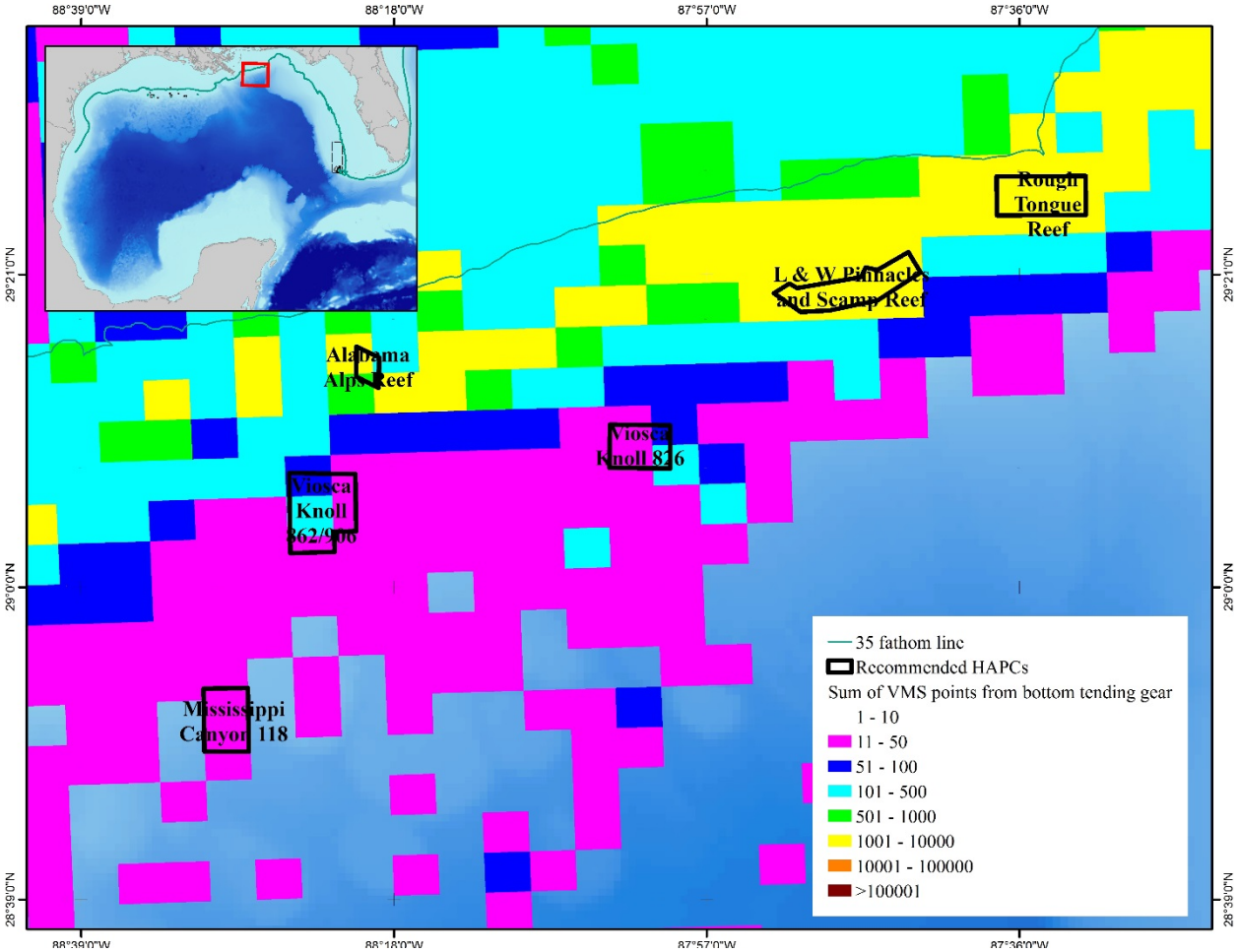

Figure 2.3.1. VMS data overlaid on the proposed HAPCs Mississippi Canyon 118, Viosca Knoll 862/906, Alabama Alps Reef, Viosca Knoll 826, L&W Pinnacles and Scamp Reef, and Roughtongue Reef. VMS data include all bottom tending gear and span the time from March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm grids. VMS locations are collected once every hour regardless of fishing activity. Purple and dark blue indicate areas with few VMS pings.

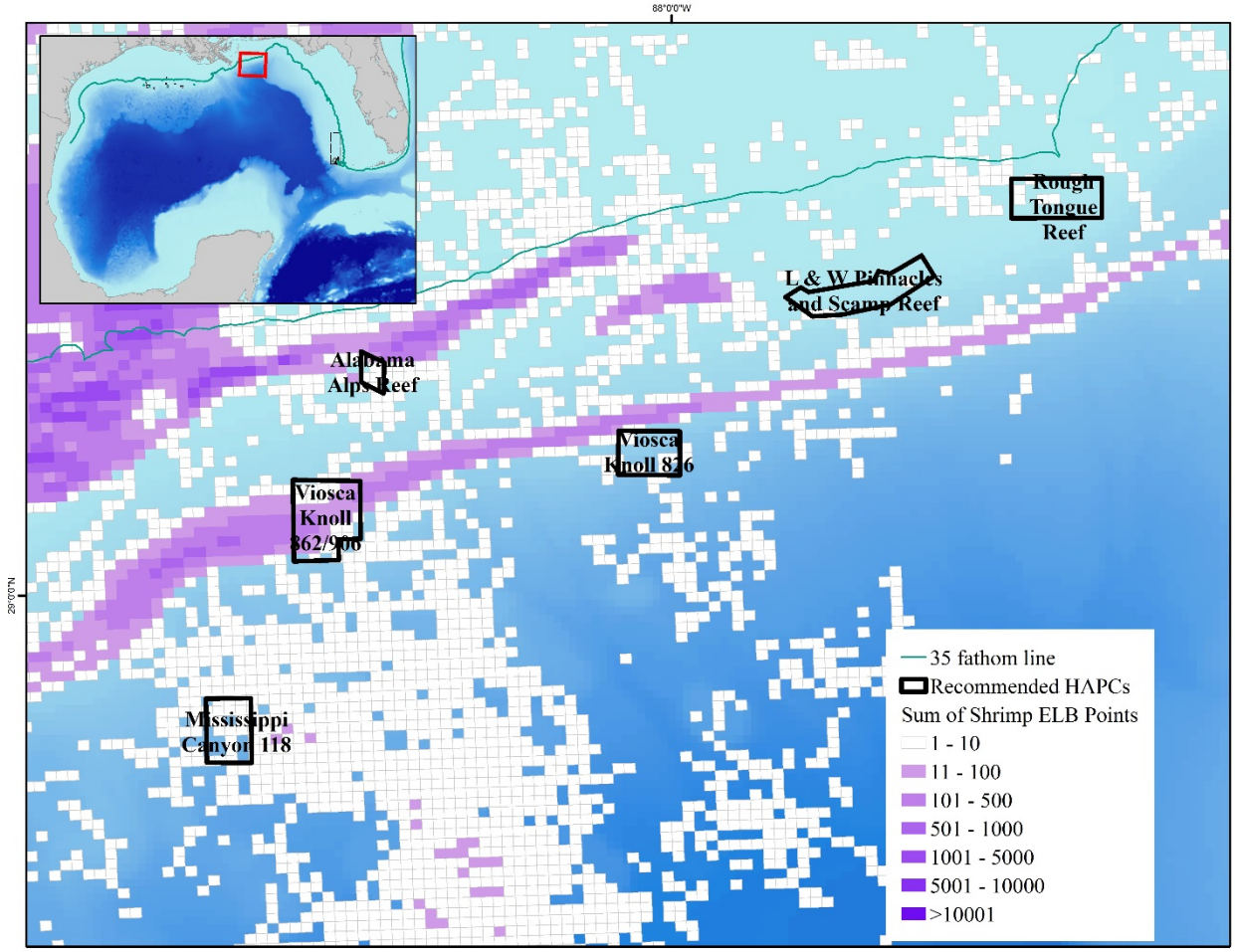

Figure 2.3.2. ELB data overlaid on the proposed HAPCs Mississippi Canyon 118, Viosca Knoll 862/906, Alabama Alps Reef, Viosca Knoll 826, L&W Pinnacles and Scamp Reef, and Roughtongue Reef. These data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm grids. ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at: http://portal.gulfcouncil.org/coralhapc.html. Any ELB grid that is not white in ELB data indicate significant shrimping activity (see description of data used in Section 1.1).

Table 2.3.1. Sites proposed in Action 5 for the northeastern HAPCs with the area of each proposed alternative. Minimum and maximum depths in fathoms are provided.

Site	Minimum depth (fathoms)	Maximum depth (fathoms)	Area (nm^2)
Alabama Alps (Preferred Alternative 2)	27	109	2.7
L & W Pinnacles and Scamp Reef (Preferred Alternative 3**)**	55	164	14.3
Mississippi Canyon 118 (Preferred Alternative 4)	437	820	11.0
Roughtongue Reef (Preferred Alternative 5)	27	109	13.6
Viosca Knoll 826 (Preferred Alternative 6)	273	492	10.3
Viosca Knoll 862/906 (Preferred Alternative 7)	164	383	18.8

Alternative 1 would not create any new HAPCs in the northeastern Gulf. There are currently no other HAPCs in this region. This alternative would provide no additional coral protections to the northeastern Gulf.

Preferred Alternative 2 would create a HAPC at the site named Alabama Alps. Since the recommendation from the Coral Working Group in 2014, the boundaries of this feature have been modified to better surround the topographic feature while minimizing impacts to the shrimp fishery (using ELB data) (Figure 2.3.2). Alabama Alps is heavily fished by fishing vessels with VMS (Figure 2.3.1). Further analysis indicates that over 80% of the activity from VMS data are from vessels with bandit gear (vertical line fishing); thus, only the anchoring prohibition would be likely to affect the fishermen using this area. Six species of black coral, 10 species of stony coral, and numerous octocoral species have been documented from this area**. Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** would prevent bottom tending gear from damaging corals at this site, but could affect fishermen using bandit gear by preventing bottom anchoring. **Option c** would allow bottom anchoring by fishing vessels, thereby allowing bandit rigs, but prohibit all other bottom tending gear from fishing vessels.

Preferred Alternative 3 would create an HAPC at L&W Pinnacles and Scamp Reef. This area was originally mapped in 1957 and has steep pinnacles that are colonized by black cup corals and stony corals (Brooke 2017). Other low relief features within this site have black corals and octocorals (Gittings et al. 1992). Scamp reef was named for its abundance of scamp grouper observed on the feature (Brooke 2017). The DSCRTP database lists 13 species of stony coral and three species of black coral in this area.

Though there is little evidence of shrimping in this region (Figure 2.3.2), there is a high occurrence of VMS points within this polygon (Figure 2.3.1). When the VMS data were further analyzed for gear type used, more than 86% of the VMS points were from bandit gear. **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** could affect fishermen using bandit gear by preventing bottom anchoring. **Preferred Option b** would prevent bottom tending gear from damaging corals at this site. **Option c** would allow bottom anchoring by fishing vessels, thereby allowing bandit rigs, but prohibit all other bottom tending gear from fishing vessels.

Preferred Alternative 4 would create a HAPC at Mississippi Canyon 118. There are no documented stony or black corals in the DSCRTP database but other reports have indicated there are thickets of the stony coral *Madrepora oculata* housing red crabs. VMS and Shrimp ELB data do not indicate that this is a heavily fished area (Figure 2.3.1 and 2.3.2). **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** would be unlikely to affect current fishing practices and would prohibit bottom tending gear from damaging the corals in this area in the future.

Preferred Alternative 5 would create a HAPC at Roughtongue Reef. Roughtongue Reef is a steep feature that is also known to fishermen as 40-fathom fishing ground or Easter Delta Mounds (CSA and TAMU 2001; Brooke 2017). Steep regions are dominated by black cup coral and stony corals. Other invertebrate assemblages include sponges, octocorals, and echinoderms. High numbers of roughtongue bass observed at this location are what provided this area its name (Brooke 2017). The DSCRTP database lists eight species of stony coral and six species of black coral that have been documented in this area. Though there is little evidence for shrimping in this region (Figure 2.3.2), there is a high occurrence of VMS points within this polygon. (Figure 2.3.1). Over 85% of the VMS points are from vessels using bandit gear. **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** could affect fishermen using bandit gear by preventing bottom anchoring. **Preferred Option b** would prevent bottom tending gear from damaging corals at this site. **Option c** would allow bottom anchoring by fishing vessels, thereby allowing bandit rigs, but prohibit all other bottom tending gear from fishing vessels.

Preferred Alternative 6 would create a HAPC at Viosca Knoll 826. VK 826 is perhaps the most extensive and well-known deep-water reef documented in the Gulf (Brooke and Schroeder 2007). The mounds have colonies of coral up to 1 m (3 ft) in diameter with dense black and stony coral colonies on other portions of the knoll (Brooke 2017). This site also contains an active cold seep. Five species of black coral and three species of stony coral have been documented from this region as have ten species of octocoral. Fish species include blackbelly rosefish, hakes, conger eels, and alfonsinos (Brooke 2017). There is minimal fishing effort in this region, and most of the effort from the VMS data is from vessels using bandit gear (Figure 2.3.1 and 2.3.2). **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** would be unlikely to affect current fishing practices and would prohibit bottom tending gear from damaging corals in this area in the future.

Preferred Alternative 7 would create a HAPC at Viosca Knoll 862/906. Viosca Knoll 862/906 has thickets of black corals and stony coral *Lophelia pertusa*. There are several bioherms (i.e. carbonate structures formed by living organisms) that are on the east of the canyon, and on soft substrates between the exposed carbonates there are large numbers of bamboo coral (*Acanella* sp.) (Brooke 2017). Mounds at the south of the canyon have some of the densest live coral documented in the Gulf (Brooke 2017) with high fish densities (Brooks et al 2016). Fish species that have been documented at Viosca Knoll 862/906 include: snowy grouper, barrelfish, conger eels, blackbelly rosefish, roughies, alfonsinos, and tinselfish (Brooke and Schroeder 2007;

Brooks et al. 2016; Brooke 2017). At least four species of black coral, two species of stony coral, and nine octocoral species have been documented in this area.

Viosca Knoll 862/906 is a well-studied deep-water reef in the Gulf. It is also an area that is commonly used to retrieve nets for royal red shrimp. Based on personal communications with shrimp fishermen who fish in this area, trawling is not occurring on the actual reef, but to the west on the soft bottom area around it. Nets are brought up from the bottom before reaching the reef area, but it takes up to a few miles of continuous forward movement to retrieve nets through the water column to the vessel. Thus, if the boundaries of this area are set to the boundaries recommended by the 2014 Coral Working Group, royal red shrimp fishermen would have to begin net retrieval miles from the boundary to have all nets on board by the time that the proposed boundary is crossed. This would essentially eliminate these prime shrimping grounds, as it is evident from ELB that the royal red shrimp fishermen use a narrow swath of bottom. As such, the Coral SSC/AP in 2015 recommended that there be an exemption for people prosecuting this fishery. **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Option b** would affect royal red shrimpers and limit their ability to prosecute their fishery in an effect and efficient manner. **Option b** would also eliminate any bottom tending gear from damaging the corals in this area. **Preferred Option c** would allow a fishery that has historically used this area to continue to do so, but would include protections to prevent use of other types of bottom tending gear including bottom longlines, buoy gear, pots, or traps, and prohibit anchoring by fishing vessels. Currently, a federal commercial Gulf shrimp moratorium permit (federal shrimp permit) is required to commercially shrimp in the Gulf. To fish for royal red shrimp, a royal red shrimp endorsement is required in addition to the federal shrimp permit. Anyone with a federal shrimp permit is eligible for a royal red shrimp endorsement, and the gear set up for royal red shrimp is essentially the same as that used in shallow waters with the exception of the length of cable. Royal red shrimpers need to have at least ¾ mile of cable on a winch to be able to reach the bottom (J. Nelson, Royal Red Shrimper, pers. comm.). It is not feasible to have a gear requirement attached to the royal red endorsement for exemption in this area as there is no easily identifiable gear marking for royal red shrimping. Therefore, there is potential for the royal red fishery to expand within the confines of the shrimp fishery, but the fishermen must possess both a royal red shrimp endorsement and a federal commercial Gulf shrimp moratorium permit. The federal commercial Gulf shrimp moratorium permit is a limited access permit- one must either already possess or purchase a permit from an existing permit holder as no new permits will be distributed be NMFS until either August 2026 or the Council takes action to lift the moratorium.

2.4 Action 4 – New Areas for HAPC Status in the Northwestern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Northwestern Gulf.

Preferred Alternative 2: Establish a new HAPC named AT 047 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
AT 047 Depth Range: 437- 820 fathoms Area: 6.8 nm^2	A	89°49.404’	27°54.426’
	B	89°46.464’	27°54.486’
	C	89°46.397’	27°51.874’
	D	89°49.336’	27°51.814’
	A	89°49.404’	27°54.426’

Option a. Do not establish regulations in the AT 047 HAPC.
Preferred Option b. Prohibit bottom tending gear in the AT 047 Bank HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named AT 357 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
AT 357 Depth Range: 547-820 fathoms Area: 6.8 nm^2	A	89°43.068’	27°36.259’
	B	89°40.136’	27°36.315’
	C	89°40.073’	27°33.703’
	D	89°43.004’	27°33.646’
	A	89°43.068’	27°36.259’

Option a. Do not establish regulations in the AT 357 HAPC.
Preferred Option b. Prohibit bottom tending gear in the AT 357 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 4: Establish a new HAPC named Green Canyon 852 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 852 Depth Range: 820-1094 fathoms Area: 3.8 nm^2	A	91°8.929’	27°8.354’
	B	91°8.963’	27°5.740’
	C	91°10.610’	27°5.762’
	D	91°10.567’	27°8.376’
	A	91°8.929’	27°8.354’

Option a. Do not establish regulations in the Green Canyon 852 HAPC.
Preferred Option b. Prohibit bottom tending gear in the Green Canyon 852 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

Discussion:

The northwestern Gulf generally has two bottom habitats types: hard bottom features, which are usually salt domes capped with carbonate, and shallow banks with high sediments and turbidity (Brooke 2017). All alternatives in this action have areas named after the coinciding lease block area. These areas are in deep water, and two of the proposed alternatives are in depths more than 3000 ft (500 fathoms) (Table 2.4.1).

Table 2.4.1. Sites proposed in Action 5 for the proposed HAPCs AT 047, AT 357, and Green Canyon 852 with the area of each proposed alternative. Minimum and maximum depths in fathoms are provided.

Site	Minimum depth (fathoms)	Maximum depth (fathoms)	Area (nm^2)
AT 047 (Preferred Alternative 2)	437	820	6.8
AT 357 (Preferred Alternative 3)	547	820	6.8
Green Canyon 852 (Preferred Alternative 4)	820	1094	3.8

Alternative 1 would not establish any new HAPCs in the northwestern Gulf. Currently, in the northwestern Gulf there are 6 HAPCs. Only one of these HAPCs has fishing regulations associated with it (McGrail Bank). The HAPC specific regulations for McGrail Bank are as follows: fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring from fishing vessels are prohibited year round (CFR §622.74). The existing HAPC with regulations is at least 80 nm from the proposed sites in Action 4.

Preferred Alternative 2 would create a HAPC in the area that has been identified as AT 047. This area has many mounds and depressions and is an active cold seep (Brooke 2017). There are several colonies of the stony coral *Madrepora oculata* and numerous octocoral colonies. *Chaceon* spp. (golden and red deep-sea crabs) crabs have been observed in conjunction with the octocorals. There is little evidence that there are conflicts with fishing (with bottom tending gear) in this area (Figure 2.4.1). **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** would be unlikely to affect current fishing practices and would prohibit bottom tending gear from damaging corals in this area in the future.

Preferred Alternative 3 would create a HAPC in the area identified as AT 357. This site was discovered after the Deepwater Horizon MC252 oil spill (Brooks et al. 2016) and consists primarily of pavement. This site has a unique invertebrate assemblage compared to other deep-water sites explored in the Gulf. The DSCRTP database lists numerous *Paramuricea* sp. octocoral colonies, the stony coral *Madrepora oculata,* and the black coral *Bathypathes* sp. in this area. Other species of octocorals have also been reported (Brooks et al. 2016). Both VMS and shrimp ELB data do not indicate that this is currently an area heavily fished with bottom tending gear (Figure 2.4.1). **Option a** would not impose any fishing regulations on this area and

would not provide protections to corals from bottom tending gear. **Preferred Option b** would be unlikely to affect current fishing practices and would prohibit bottom tending gear from damaging corals in this area in the future.

Preferred Alternative 4 would create a HAPC in the area identified at Green Canyon 852. This site has a broad ridge that is densely colonized by corals of different species than those found at shallower sites (Brooks et al. 2016). The range of coral taxa (octocoral, black coral, and stony coral) contribute to a high species diversity. This is the only site that has documented precious coral, or coral that is harvested elsewhere for the jewelry trade. Precious corals typically grow slowly compared to other species and are extremely vulnerable to impacts and degradation. Green Canyon 852 has three species of stony coral, one species of black coral, and several different octocoral species associated with this bank. **Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Preferred Option b** would prevent fishing from expanding into this area and would protect corals from damage caused by bottom tending gear.

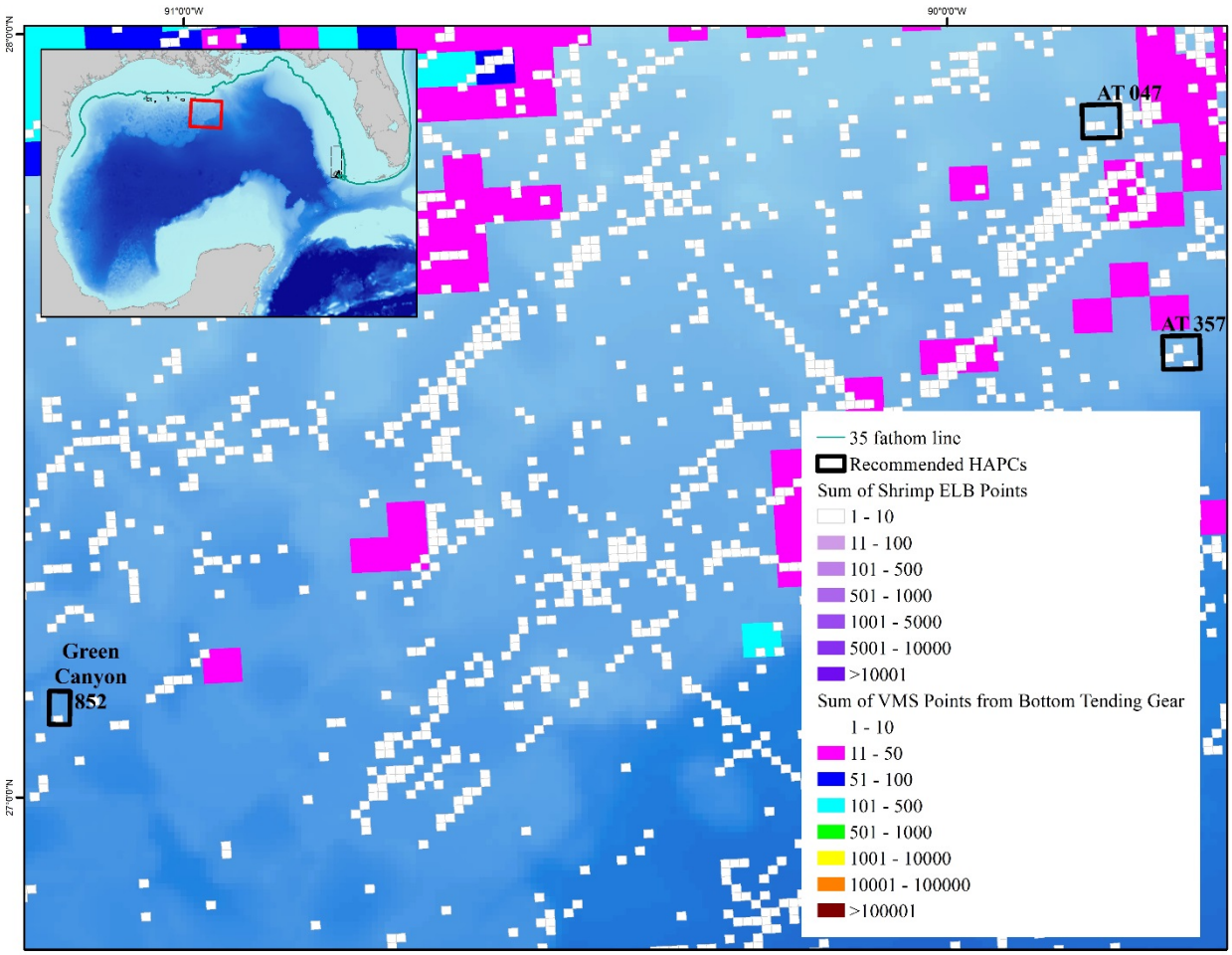

Figure 2.4.1. Fishing data overlaid on the proposed HAPCs AT 047, AT 357, and Green Canyon 852. VMS data include all bottom tending gear and span March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm grids (the larger squares). VMS locations are collected once every hour regardless of fishing activity. ELB data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm grids (the smaller squares). ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at: http://portal.gulfcouncil.org/coralhapc.html. Purple and dark blue indicate areas with few VMS pings; any ELB grid that is not white in ELB data indicates significant shrimping activity (see description of data used in Section 1.1).

2.5 Action 5 – New Areas for HAPC Status in the Southwestern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Southwestern Gulf.

Preferred Alternative 2: Establish a new HAPC named Harte Bank bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Harte Bank Depth Range: 27-82 fathoms Area: 10.8 nm^2	A	96°36.590’	26°40.826’
	B	96°32.220’	26°40.789’
	C	96°32.308’	26°37.992’
	D	96°36.636’	26°38.043’
	A	96°36.590’	26°40.826’

Preferred Option a. Do not establish fishing regulations in the Harte Bank HAPC.
Option b. Prohibit bottom tending gear in the Harte Bank HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named Southern Bank bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Southern Bank Depth Range: 27-55 fathoms Area: 0.8 nm^2	A	96°31.902’	27°26.923’
	B	96°30.881’	27°26.989’
	C	96°31.134’	27°25.958’
	D	96°31.892’	27°25.958’
	A	96°31.902’	27°26.923’

Preferred Option a. Do not establish fishing regulations in the Southern Bank HAPC.
Option b. Prohibit bottom tending gear in the Southern Bank HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

Discussion:

Banks along the Texas shelf were identified by researchers at the Coral Working Group in 2014 as warranting HAPC consideration and are commonly referred to in the literature as “South Texas Banks.” The continental shelf off Texas is largely a flat shelf with a few hard banks that have been historically well-known (Nash et al. 2013). This reef chain has been described as providing biotic stepping stones for organisms migrating from the southern Gulf to the northern Gulf (Tunnell et al. 2007). These reefs are relict features from the Pleistocene Epoch. Since 2006, there have been at least four research cruises that have mapped these features using ROVs and collection tools. The two proposed alternatives are in depths of 162 to 492 ft (27 to 82 fathoms) and range in area of 0.8 nm^2 to 10.8 nm^2 (Table 2.5.1). Fishing with bottom tending

gear in the two sites is relatively low (Figure 2.5.1 and 2.5.2) though there is evidence of effort from vessels with VMS within the Harte Bank boundaries (Figure 2.5.1).

Table 2.5.1. Sites proposed in Action 7 for the proposed HAPCs Harte Bank and Southern Bank with the area of each proposed alternative. Minimum and maximum depths in fathoms are provided.

Site	Minimum depth (fathoms)	Maximum depth (fathoms)	Area (nm^2)
Harte Bank (Preferred Alternative 2)	27	82	10.8
Southern Bank (Preferred Alternative 3)	27	55	0.8

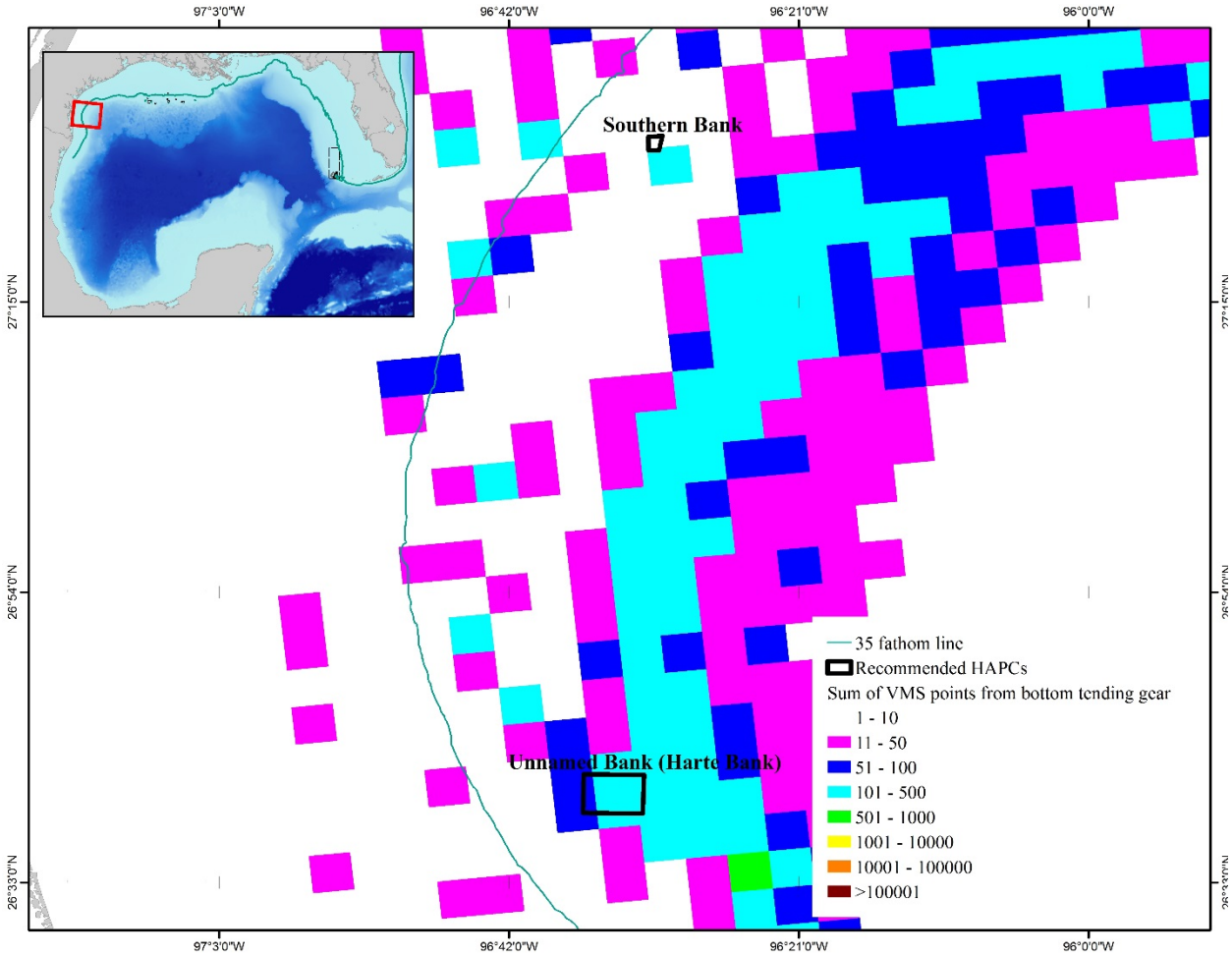

Figure 2.5.1. VMS data overlaid on the proposed HAPCs Harte Bank and Southern Bank. Purple and dark blue indicate areas with few VMS pings. VMS data include all bottom tending gear and span the time from March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm grids. VMS locations are collected once every hour regardless of fishing activity. Interactive maps and data are provided at: http://portal.gulfcouncil.org/coralhapc.html.

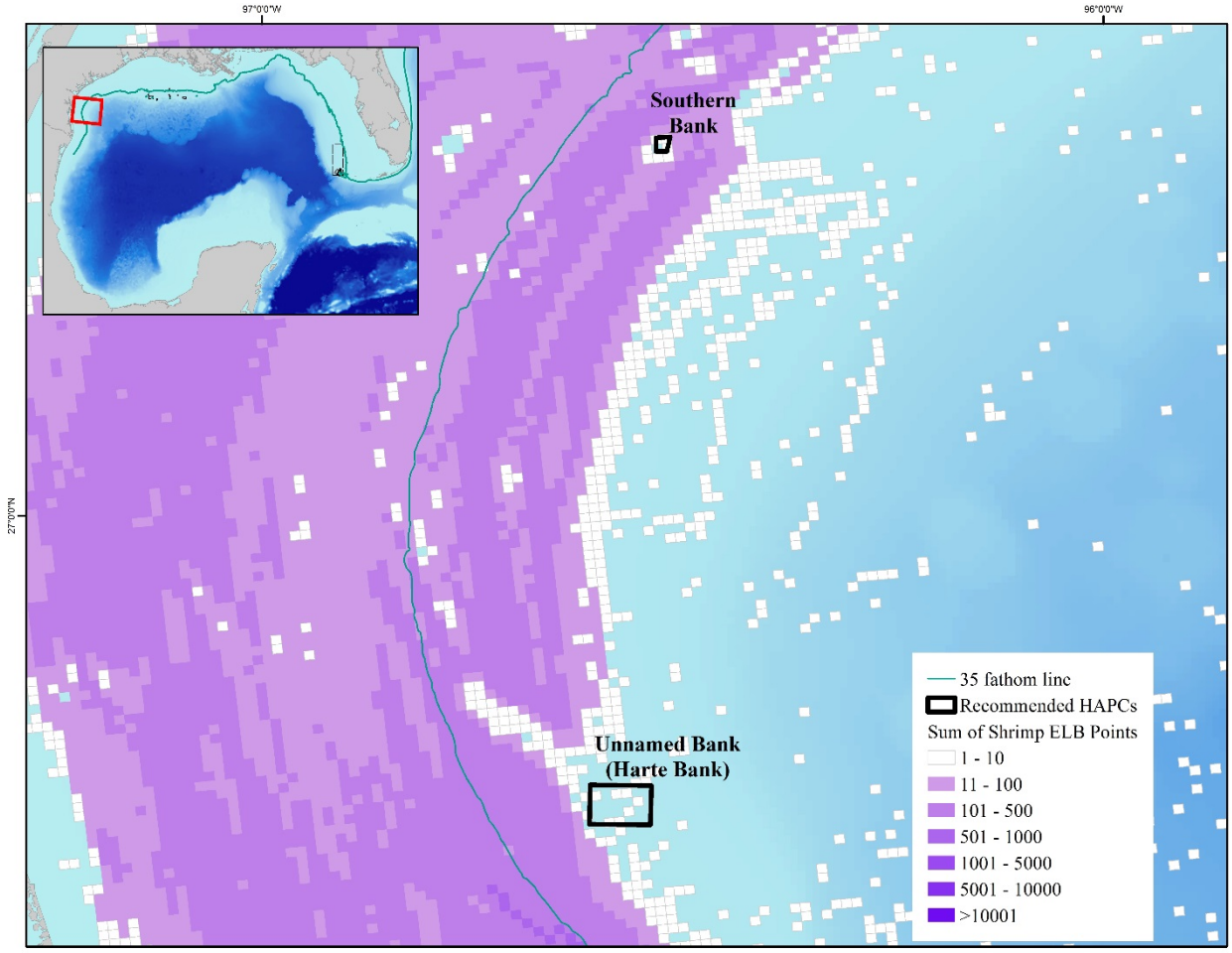

Figure 2.5.2. ELB data on the proposed HAPCs Harte Bank and Southern Bank. These data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm grids. ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at: http://portal.gulfcouncil.org/coralhapc.html. Any ELB grid that is not white in ELB data indicates significant shrimping activity (see description of data used in Section 1.1).

Alternative 1 would not create any new HAPCs in the southwest region and would maintain the status quo. Currently, in the southwestern Gulf there are 7 HAPCs. Of these, three have fishing regulations associated with them (East and West Flower Garden Banks and Stetson Bank). The three HAPCs with regulations are part of the Flower Garden Banks National Marine Sanctuary (FGBNMS). The FGBNMS does not allow fishing except by hook-and-line (this includes bandit gear) and does not allow any anchoring. The HAPC specific regulations for East and West Flower Garden Banks and Stetson Bank are as follows: fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring from fishing vessels are prohibited year round; East and West Flower Garden Banks also prohibit the use of dredges (CFR §622.74). This would be the least protective alternative for deep-sea corals.

Preferred Alternative 2 would create a HAPC around the area that has been identified as Harte Bank. The DSCRTP database and new studies conducted by Texas universities have documented at least four species of black coral. Prior to research cruises in 2012, this area was poorly documented and unknown. The turbidity on this reef is not as high as that observed on other South Texas Banks (Hicks et al. 2014). It has one of the highest documented densities of black coral from the South Texas Banks (D. Hicks, University of Texas-Rio Grande Valley, pers. comm.). Harte Bank has high densities of roughtongue bass, greater amberjack, and red snapper relative to other species present on the bank (Hicks et al. 2014). It is also unique from other South Texas Banks in habitat and species assemblage (Hicks et al. 2014). This bank has little to no shrimping effort (Figure 2.5.2), but does have a moderate number of pings from vessels with VMS. However, when these data are further analyzed, most of the pings are from vessels with shrimp permits (Figure 2.5.1). As shrimp ELB data only contain points that are for actual fishing (non-fishing data are filtered out), it is likely that this area is not a shrimping ground and that the VMS data reflect transit and not fishing. The northeastern corner polygon has moderate effort (more than 100 points in the polygon) from vessels with bottom longlines. **Preferred Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Option b** would prevent fishing from bottom tending gear in this area and would protect corals from damage caused by bottom tending gear.

Preferred Alternative 3 would create a HAPC in the area identified as Southern Bank. Southern Bank, approximately 29.7 nm east of Corpus Christi, Texas, is perhaps the best studied South Texas Bank with the most data available (Nash et al. 2013). The boundary of Southern Bank was modified from the Coral Working Group (2014) proposal after the input from the Shrimp AP in 2016; the boundary is now very close to the topographic features which are two distinct peaks. The DSCRTP database and new studies conducted by Texas universities have documented three species of stony coral and four species of black coral in this area. Southern Bank has had 268 species of organisms identified, and of those, 49 species were not found on any other south Texas bank. It is likely that the high number of species at Southern Bank is because of topographic highs of the peaks (Nash et al. 2013).

Both VMS and shrimp ELB data do not provide evidence of heavy fishing with bottom tending gear (Figure 2.5.1). **Preferred Option a** would not impose any fishing regulations on this area and would not provide protections to corals from bottom tending gear. **Option b** would likely not be contentious for fishermen fishing with bottom tending gear, other than the anchoring prohibition by fishing vessels, which could affect recreational fishermen.

2.6 Action 6 – New Areas for HAPC Status Not Recommended to Have Fishing Regulations.

Alternative 1: No Action. Do not establish any new deep-water coral HAPCs.

Preferred Alternative 2: Establish a new HAPC named South Reed bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
South Reed Depth Range: 219-820 fathoms Area: 6.8 nm^2	A	83°56.220’	24°40.870’
	B	83°53.360’	24°40.926’
	C	83°53.300’	24°38.313’
	D	83°56.159’	24°38.257’
	A	83°56.220’	24°40.870’

Preferred Alternative 3: Establish a new HAPC named Garden Banks 299 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Garden Bank 299 Depth Range: 219-328 fathoms Area: 6.5 nm^2	A	92°14.635’	27°42.963’
	B	92°11.697’	27°42.946’
	C	92°11.703’	27°40.457’
	D	92°14.652’	27°40.435’
	A	92°14.635’	27°42.963’

Preferred Alternative 4: Establish a new HAPC named Garden Banks 535 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Garden Banks 535 Depth Range: 273-328 fathoms Area: 6.8 nm^2	A	93°36.825’	27°27.314’
	B	93°33.894’	27°27.326’
	C	93°33.880’	27°24.711’
	D	93°36.811’	27°24.699’
	A	93°36.825’	27°27.314’

Preferred Alternative 5: Establish a new HAPC named Green Canyon 140 and 272 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 140/272 Depth Range: 164-547 fathoms Area: 81.6 nm^2	A	91°36.342’	27°50.510’
	B	91°30.460’	27°50.448’
	C	91°30.496’	27°47.834’
	D	91°24.616’	27°47.768’
	E	91°24.654’	27°45.154’
	F	91°27.593’	27°45.187’
	G	91°27.666’	27°39.959’
	H	91°36.475’	27°40.052’
	I	91°36.442’	27°42.666’
	J	91°39.379’	27°42.695’
	K	91°39.347’	27°45.310’
	L	91°36.408’	27°45.281’
	M	91°33.470’	27°45.251’
	N	91°33.435’	27°47.865’
	O	91°36.375’	27°47.895’
	A	91°36.342’	27°50.510’

Preferred Alternative 6: Establish a new HAPC named Green Canyon 234 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 234 Depth Range: 219-492 fathoms Area: 13.6 nm^2	A	91°15.798’	27°47.662’
	B	91°12.859’	27°47.625’
	C	91°12.944’	27°42.397’
	D	91°15.881’	27°42.434’
	A	91°15.798’	27°47.662’

Preferred Alternative 7: Establish a new HAPC named Green Canyon 354 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 354 Depth Range: 273-547 fathoms Area: 6.8 nm^2	A	91°51.185’	27°37.572’
	B	91°48.249’	27°37.547’
	C	91°48.278’	27°34.932’
	D	91°51.212’	27°34.957’
	A	91°51.185’	27°37.572’

Preferred Alternative 8: Establish a new HAPC named Mississippi Canyon 751 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 751 Depth Range: 328-383 fathoms Area: 6.8 nm^2	A	89°49.883’	28°12.710’
	B	89°46.934’	28°12.770’
	C	89°46.866’	28°10.158’
	D	89°49.814’	28°10.098’
	A	89°49.883’	28°12.710’

Preferred Alternative 9: Establish a new HAPC named Mississippi Canyon 885 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 885 Depth Range: 219-328 fathoms Area: 6.8 nm^2	A	89°43.787’	28°4.993’
	B	89°40.841’	28°5.051’
	C	89°40.777’	28°2.439’
	D	89°43.721’	28°2.381’
	A	89°43.787’	28°4.993’

Discussion:

There are currently several HAPCs that do not have fishing regulations in the northwestern Gulf (see Table 1.1.2). The areas for consideration identified in this action are not areas that are fished but do contain communities that are rare and could be heavily degraded if damaged. These areas range in size from 6.5 nm^2 to just under 82 nm^2 and are in depths more than 984 ft (164 fathoms) (Table 2.6.1). These areas are in depths which are unlikely to have active fishing with bottom tending gear, but are still unique enough to warrant HAPC consideration. The joint meeting of the Shrimp AP, Coral AP, and Coral SSC recognized the uniqueness of these areas, but the group did not feel that fishing regulations were necessary, at this time.

Table 2.6.1. Sites proposed in Action 5 for the proposed deep-water HAPCs in Action 8 with the area of each proposed alternative. Minimum and maximum depths in fathoms are provided.

Site	Minimum depth (fathoms)	Maximum depth (fathoms)	Area (nm^2)
South Reed (Preferred Alternative 2)	219	820	6.8
Garden Banks 299 (Preferred Alternative 3)	219	328	6.5
Garden Banks 535 (Preferred Alternative 4)	273	328	6.8
Green Canyon 140/272 (Preferred Alternative 5)	164	547	81.6
Green Canyon 234 (Preferred Alternative 6)	219	492	13.6
Green Canyon 354 (Preferred Alternative 7)	273	547	6.8
Mississippi Canyon 751 (Preferred Alternative 8)	328	383	6.8
Mississippi Canyon 885 (Preferred Alternative 9)	219	328	6.8

Alternative 1 would not create any new HAPCs in deep-water and would maintain the status quo.

Preferred Alternative 2 would establish a HAPC at the site South Reed. This site was identified by the CIOERT cruise as having numerous black corals and sponges as well as many octocorals. Other hard bottom habitat was colonized by both *Lophelia pertusa* and *Madrepora* sp. (Brooke 2017; Reed et al. 2017; DSCRTP database). Golden crabs, finfish, and other invertebrates were also found at this site. This site is located southwest of Pulley Ridge and can be seen on the Coral HAPC viewer at: http://portal.gulfcouncil.org/coralhapc.html. There are currently no fishing points documented for this area from VMS and ELB data.

Preferred Alternative 3 would create a HAPC at Garden Banks 299. This site consists of carbonate rubble and pavement on a large feature with large black corals and thousands of octocorals (Brooke 2017). VMS data are likely not from fishing activity, as there are only 15 VMS points over the course of the entire time series (Figure 2.6.1). Shrimp ELB points are likely vessels in transit and not actively fishing as there is only one point in each grid and the depths are too deep (Figure 2.6.2).

Preferred Alternative 4 would create a HAPC at Garden Banks 535. This site has high vertical relief and mounds with a variety of hard substrates (Brooks et al. 2016). Black whip corals and octocorals, including a new species, and live *Lophelia pertusa* thickets have been documented at this site Brooks et al. 2016). No bottom tending gear fishing effort has been documented for this site (Figure 2.6.1 and 2.6.2).

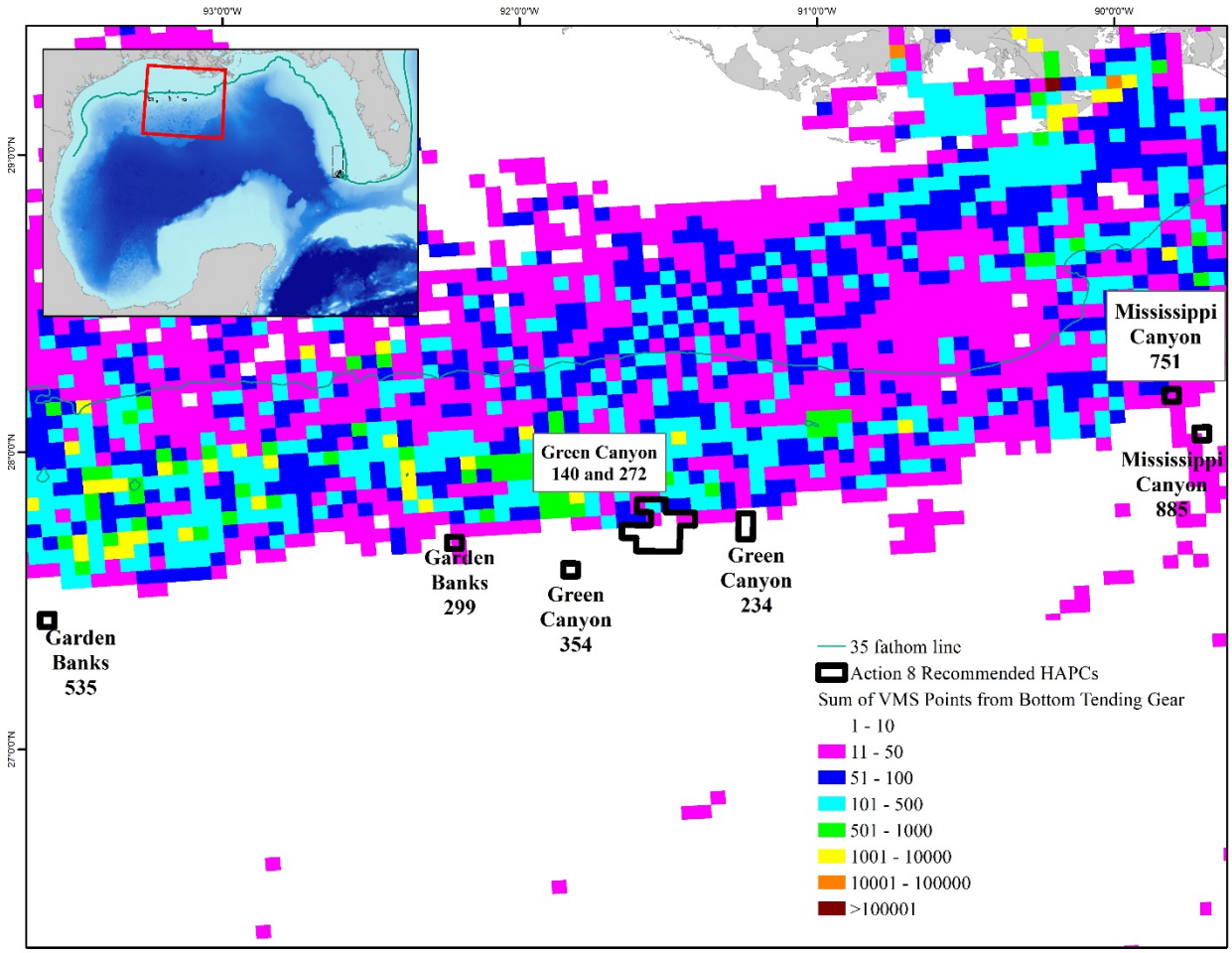

Figure 2.6.1. VMS data overlaid on the proposed HAPCs Garden Banks 535, Garden Banks 299, Green Canyon 354, Green Canyon 140 and 272, Green Canyon 234, Mississippi Canyon 751, and Mississippi Canyon 885. South Reed is not on this figure. VMS data include all bottom tending gear and span the time from March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm grids. VMS locations are collected once every hour regardless of fishing activity.

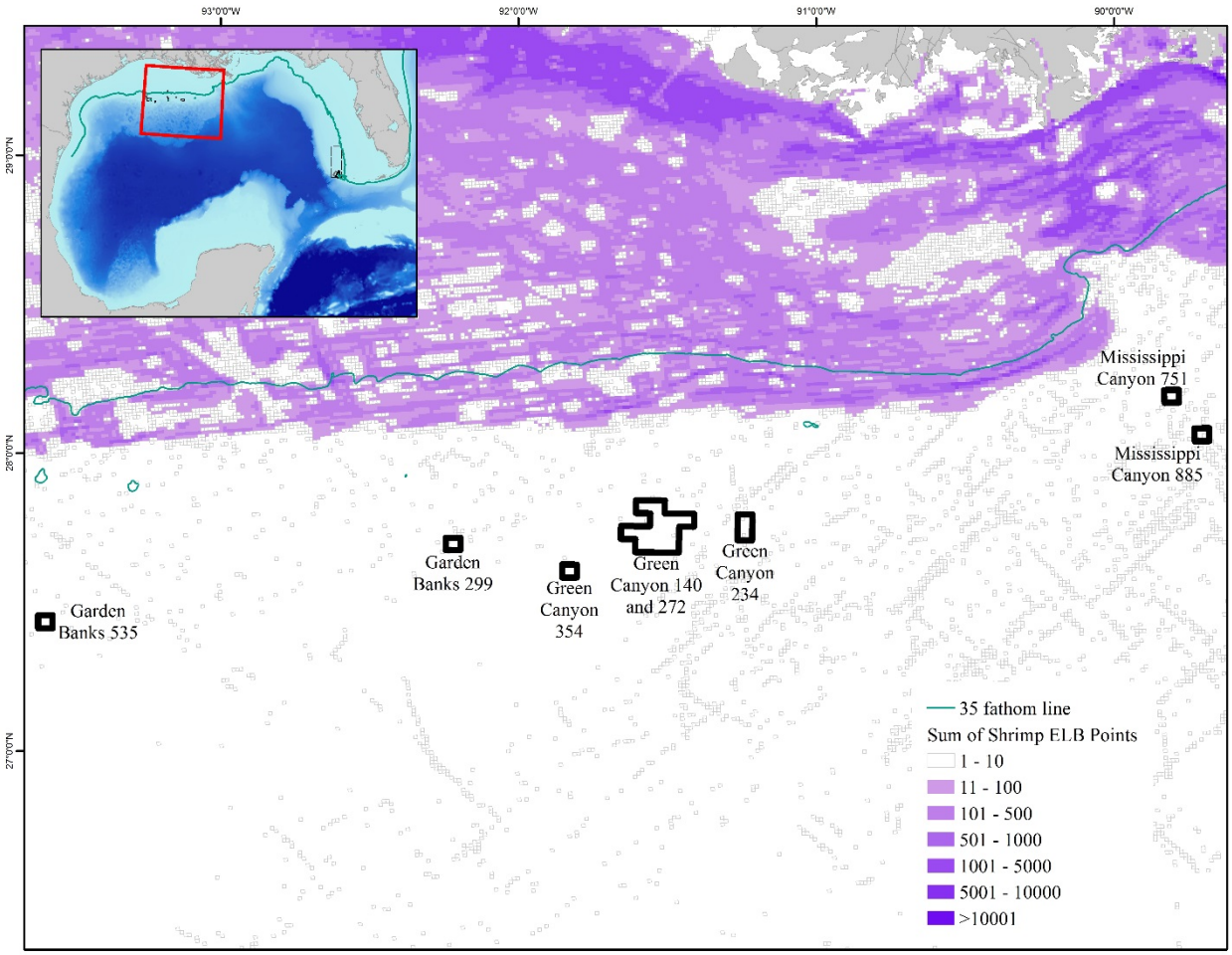

Figure 2.6.2. ELB data overlaid on the proposed HAPCs Garden Banks 535, Garden Banks 299, Green Canyon 354, Green Canyon 140 and 272, Green Canyon 234, Mississippi Canyon 751, and Mississippi Canyon 885. South Reed is not on this figure. ELB data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm grids. ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at: http://portal.gulfcouncil.org/coralhapc.html. Any ELB grid that is not white in ELB data indicate significant shrimping activity (see description of data used in Section 1.1).

Preferred Alternative 5 would create a HAPC at the site of Green Canyon 140/272. This site overlaps 12 lease blocks and is the largest in terms of square nautical miles in this action. There is a significant set of topographic features that were all incorporated into this site because they were all geographically connected. A large salt dome capped with carbonate slabs and boulders is home to old black corals (some aged to 1,500 years) and large octocorals. As depths increase to the southern end of this site, more stony coral and octocoral species are present, such as *Lophelia pertusa*. This site has had several research dives including one by a submersible, two by ROVs and has also had a scientific trawl to collect organisms. There is little fishing effort at this site (Figure 2.6.1 and 2.6.2) and the concentrated effort in the north central portion is nearly evenly divided by bandit gear and bottom trawl gear (approximately 50-60 points each). This area was not recommended to have fishing regulations.

Preferred Alternative 6 would establish a new HAPC in the area identified at Green Canyon 234. Coral cover at this site is dominated by gorgonians which have colonized a carbonate ridge at 1476-1638 ft (246-273 fathoms) depth and the scattered carbonate boulders in this area (Brooke 2017). The most abundant gorgonian species observed at this site was *Callogorgia americana delta*, and other gorgonians observed included *Paragorgia johnsoni*, *Paramuricea* sp, *Cheliodonisis* sp., *Muriceides* cf *hirta*, *Acanthogorgia aspera*, *Thesea* sp., and *Scleracis* sp. The carbonate ridge is also inhabited by colonies of live and dead *Lophelia* (Brooke 2017). Abundant fish species in this area included schools of roughy (*Hoplostethus occidentalis*), hakes (*Urophysis* sp), and tinselfish (*Grammicolepis brachiusculus*) (Brooke 2017). This area would not have any fishing regulations.

Preferred Alternative 7 would establish a new HAPC in the area identified at Green Canyon 354. This site is a large mound with approximately 180 feet of vertical relief (1902 ft [317 fathoms] deep at base, 1722 ft [287 fathoms] at top). Boulders at the top of the mound are colonized by *Lophelia pertusa*. These *Lophelia* mounds are primarily dead accumulations that are capped with live coral (CSA International 2007; Brooks et al. 2016). Schools of roughy (*Hoplostethus occidentalis*) seemed to be attracted to large sponges that are common at Green Canyon 354 (Brooke 2017). Invertebrates (primarily galatheid crabs) were associated with colonies of gorgonians including *Acanthogorgia aspera*, *Muriceides* cf *hirta*, *Nicella* sp., *Paramuricea* sp., *Swiftia exserta, Cheliodonisis a. mexicana* and *Paracalyptrophora carinata* which colonized carbonate boulders and outcrops on the sides of the mound at this site (Brooke 2017). Green Canyon 354 would not have any fishing regulations.

Preferred Alternative 8 would establish a new HAPC in the area identified at Mississippi Canyon 751. This site features an oblong area with about 65 feet of relief that is composed of exposed authigenic carbonate blocks, slabs, and outcroppings (Brooks et al. 2016). *Lophelia pertusa* and a diversity of large gorgonians have colonized these carbonate areas. Gorgonian species and genera documented here include *Callogorgia americana delta, Paramuricea* sp., *Muriceides* cf *hirta, Swiftia exserta,* and *Cheliodonisis a. mexicana.* Additionally, a species of bubblegum coral *Paragorgia johsoni*, rare in the Gulf, was documented at Mississippi Canyon 751 (Brooke 2017). Another unusual aspect of this site was the abundance of live corals and chemosyntheic tubeworms located near active seepage. The black corals *Bathypathes* sp. and

Stichopathes sp. were present at this site, as were golden crabs (*Chaceon fenneri*), blackbelly rosefish, and codlings (*Laemonema* sp.) (Brooke 2017). This site would not have any fishing regulations.

Preferred Alternative 9 would establish a new HAPC in the area identified at Mississippi Canyon 885. Mississippi Canyon 885 is characterized by a number of small mounds (salt domes) that are colonized by *Lophelia pertusa* and *Madrepora oculata*. These mounds, with up to 98 feet of vertical relief, are the only location in the northern Gulf where these species coexist. The octocoral *Callogorgia americana delta* was observed with catshark egg cases were frequently attached at this site (Brooke 2017). Mississippi Canyon 885 would not have any fishing regulations.

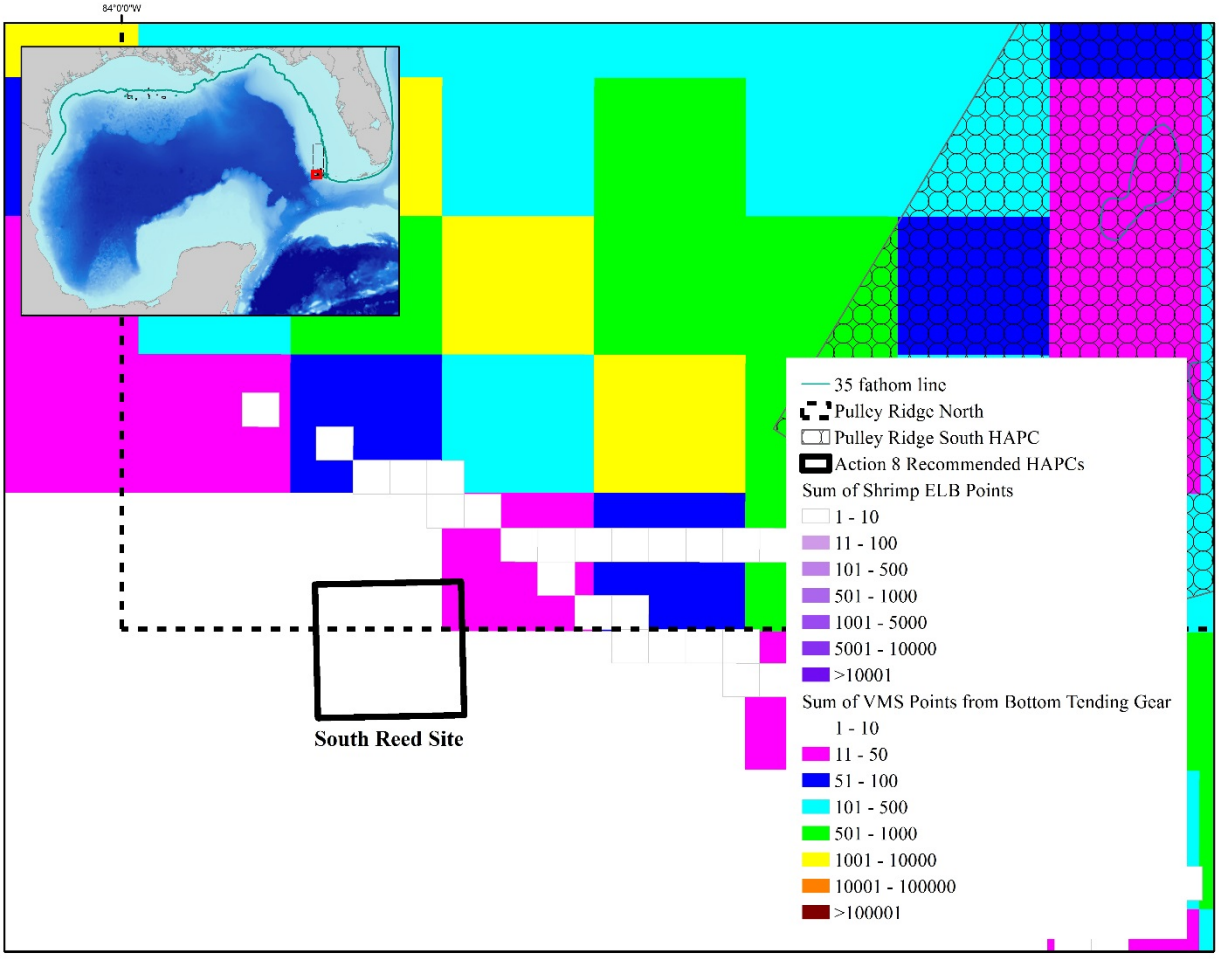

Figure 2.6.3. Fishing data overlaid on the proposed South Reed. VMS data include all bottom tending gear and span March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm grids (the larger squares). VMS locations are collected once every hour regardless of fishing activity. ELB data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm grids (the smaller squares). ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at: http://portal.gulfcouncil.org/coralhapc.html. Purple and dark blue indicate areas with few VMS

pings; any ELB grid that is not white in ELB data indicates significant shrimping activity (see description of data used in Section 1.1).

2.7 Action 7 – Prohibit Dredging In All Existing HAPCS That Have Fishing Regulations

Alternative 1: No Action. No new dredging-specific management measures will be implemented in currently established HAPCs. Areas with dredging restrictions already in place will retain those restrictions.

Preferred Alternative 2: Prohibit dredging in all existing HAPCs that have fishing regulations.

Discussion:

Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels. These gear types can interact with the benthic substrate damaging or removing corals, octocorals, and sponges indiscriminately. This action proposes to add a prohibition on dredging, as it is incorporated in the definition of bottom tending gear, to existing HAPCs that do not currently prohibit dredging but do prohibit other bottom tending gear.

Currently West and East Flower Garden Banks HAPC, Florida Middle Grounds HAPC, the Tortugas Marine Reserve, have prohibitions on bottom tending gear (including dredging) within their boundaries. However, the current Pulley Ridge HAPC, Stetson Bank HAPC, and McGrail Bank HAPC only prohibit bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels; there is no explicit prohibition on dredging.

Dredging is most commonly used in shellfish fisheries but is not known to occur in the Gulf EEZ. This action would allow for the implementation of consistent management measures across all currently existing HAPCs with fishing regulations.

This action would have no effect on the regulations placed on HAPCs that could be established through this amendment (Actions 3-8), and no other fishing regulation changes would be made to existing HAPCs.

Alternative 1 would retain the current regulations on existing HAPCs and would not impact the regulations placed on HAPCs implemented through this amendment. The inconsistencies in regulations outlined in the discussion would remain in place.

Preferred Alternative 2 would add dredging to those types of bottom tending gear that are prohibited within existing HAPCs with fishing regulations. **Preferred Alternative 2** would create regulatory consistency regarding dredging across existing HAPCs with regulations and wouldn't impact any fisheries as dredging is not a type of fishing that occurs in the Gulf.

CHAPTER 3. AFFECTED ENVIRONMENT

3.1 Description of the Fishery

3.1.1 Coral Fishery

Currently, only black coral and stony coral are managed under the Gulf of Mexico Fishery Management Council's (Gulf Council) Coral Fishery Management Plan (FMP). Black coral and stony coral harvest is prohibited in the exclusive economic zone (EEZ) of the Gulf of Mexico (Gulf). Octocorals are harvested in Florida state waters and in the EEZ off Florida, but this harvest is managed by Florida. Live rock harvest is also part of the FMP, though harvest of wild live rock is prohibited in the Gulf.

Currently Florida manages the harvest of octocorals in state and adjacent federal waters through several requirements. Recreational collectors must possess a state saltwater fishing license and are limited to six colonies per day. Commercial collectors must possess a Saltwater Products License with the Restricted Species and Marine Life Tiered endorsements. Collection of octocoral must be by hand and all applicable gear restrictions apply. The quota for octocorals is 70,000 colonies annually. Harvest of attached substrate is limited to within one inch of the base; and harvest of *Gorgonia flabellum* (venus sea fan) and *Gorgonia ventalina* (common [purple] sea fan) and harvest of non-erect or encrusting octocorals is prohibited (Florida Administrative Code 68B-42) (http://myfwc.com/fishing/saltwater/recreational/aquarium-species). Florida specifies that harvest is not to occur in HAPCs in the Atlantic (Florida Administrative Code 68B-42.0036). In the years 2011-2016, between 28,000 and 70,000 colonies have been harvested, and the number of dealers has ranged between 41 and 55 (see Table 2.1.2). Most octocoral harvest occurs in state waters in the South Atlantic; the Gulf harvest is a mere fraction of the total reported for Florida (see Table 2.1.3)

Live rock is an assemblage of marine organisms attached to a hard substrate. Live rock harvest was first marketed in the 1970s after technical advances in aquarium filtration systems enabled invertebrate dominated aquaria. Live rock harvest is now heavily regulated in the EEZ by a memorandum of understanding between the National Marine Fisheries Service (NMFS) and the Army Corps of Engineers, and wild live rock harvest is prohibited. To harvest aquacultured live rock in the Gulf or South Atlantic EEZ, a federal live rock permit must have been issued for a specific site. Any aquacultured live rock material must be deposited and harvested by hand, be distinguishable from surrounding substrates, and if endangered or threatened coral species are present on the substrate, harvest is prohibited. Specific requirements and regulations of aquacultured live rock are contained in 50 CFR Part 622, Subpart F. Additionally, appropriate Florida permits and endorsements are required for landing live rock.

3.1.2 Shrimp Fishery

The three species of penaeid shrimp managed by the Council (brown, white and pink) are short-lived and provide annual crops; royal red shrimp live longer, and several year classes may occur on the fishing grounds at one time. The condition of each penaeid shrimp stock is monitored

annually, and none has been overfished for more than 40 years. Cooperative management of penaeid shrimp species includes: simultaneous closure in both state and federal waters off the coast of Texas, the Tortugas Shrimp Sanctuary, and seasonally closed zones for the shrimp and stone crab fisheries off the coast of Florida. The royal red shrimp fishery is only prosecuted in deeper waters of the EEZ. An endorsement to the federal permit is required for vessels engaging in royal red shrimp fishing.

As of September 7, 2017, there were 1,428 valid or renewable federal Gulf shrimp permits and 292 endorsements for royal red shrimp. There has been a moratorium on the issuance of new Gulf shrimp permits since 2007. Permits are fully transferrable, and renewal of the permit is contingent upon compliance with recordkeeping and reporting requirements. State licensing may vary and vessels may have more than one state license. If selected, a vessel with a federal Gulf shrimp permit must carry a NMFS approved observer. The size of the shrimp industry and its total effort has been substantially reduced since the benchmark 2001-2003 time period established in Amendment 14 (GMFMC 2007). This effort reduction reflects both a reduction in the number of vessels estimated to be participating in the fishery, and a reduction in the level of activity for those vessels remaining in the fishery. Approximately 500 vessels with a federal Gulf commercial shrimp permit have electronic logbooks (ELBs) which help monitor shrimping effort in the Gulf.

Various types of gear are used to capture shrimp, including but not limited to: cast nets, haul seines, stationary butterfly nets, wing nets, skimmer nets, traps, and beam trawls. The otter trawl, with various modifications, is the dominant gear used in offshore waters, and there has been a decline in the number of otter trawls in recent years (NMFS 2014). Details about the specifics of each gear type as well as the historical development of the fishery can be found in Shrimp Amendments 13 and 14 (GMFMC 2007). Royal red shrimp have been a small component of Gulf shrimp landings since the early 1960s. A few vessels in the Gulf shrimp fishery have targeted royal red shrimp, but fishing effort has been variable and inconsistent. Participation in this fishery requires larger vessels and heavier gear than that used for shallow-water penaeid shrimp. Although the industry continuously works to develop more efficient gear designs and fishing methods, the quad rig is still the primary gear used in federal waters. In recent years, the skimmer trawl has become a major gear in the inshore shrimp fishery in the northern Gulf. All trawls used in federal waters are required to have bycatch reduction devices (BRDs) unless: the vessel is fishing for and catching more than 90% royal red shrimp; the vessel is using a try net; the trawl is a rigid frame roller trawl; or the vessel is testing the efficacy of a BRD under an authorization by NMFS

3.1.3 Reef Fish Fishery

The commercial reef fish sector is managed through, but not limited to, annual catch limits (ACLs), annual catch targets (ACTs), accountability measures (AMs), size limits, trip limits, individual fishing quota (IFQ) programs, seasonal closures, time and area/gear restrictions, and gear requirements. Primary commercial gear types in the fishery are vertical lines (handlines and bandit gear) and bottom longlines. However, for some species such as hogfish, the primary harvest method is spearfishing (GMFMC 2016a).

Commercial vessels fishing for Gulf reef fish must have a Gulf reef fish permit, which is a limited access permit. As of September 7, 2017, a total of 842 vessels have valid or renewable commercial reef fish permits. These vessels combine to make up the federal Gulf reef fish fleet, and any vessel in the fleet must have a vessel monitoring system onboard. Only vessels with a valid Gulf reef fish permit can harvest reef fish in the Gulf EEZ, and those that use bottom longline gear in the Gulf EEZ east of 85º30'W. longitude must also have a valid Eastern Gulf longline endorsement. As of September 7, 2017, 62 of the permit holders have the longline endorsement, and all but one of the endorsement holders have a mailing address in Florida. In addition to these restrictions, operators of reef fish fishing vessels who want to harvest red snapper or grouper and tilefish species, must participate in the red snapper or grouper-tilefish IFQ programs. To harvest IFQ species, a vessel permit must be linked to an IFQ account and possess sufficient allocation for the species to be harvested.

The recreational sector is managed through, but not limited to, annual catch limits, annual catch targets, accountability measures, size limits, bag limits, seasonal closures, time and area/gear restrictions, and gear requirements. The primary gear type in the fishery is vertical line gear (rod-and-reel); however, for some species such as hogfish, the primary harvest method is spearfishing (GMFMC 2016a).

Private recreational fishing vessels are not required to have a federal permit to harvest individual species or species complexes in the reef fish fishery from the Gulf EEZ. Anglers aboard these vessels, however, must either be federally registered or licensed in states that have a system to provide complete information on the states' saltwater anglers to the national registry. Any for-hire fishing vessel that takes anglers into the Gulf EEZ where anglers harvest species or complexes in the reef fish fishery must have a limited-access charter vessel/headboat (for-hire) permit for reef fish that is specifically assigned to that vessel. As of September 7, 2017, a total of 1,278 vessels have valid or renewable for-hire reef fish permits.

Saltwater anglers in the Gulf region caught approximately 140.7 million finfish in 2014. Approximately 10% of those fish were caught in the EEZ. The top four species groups by number of fish caught in all areas were herrings (34.9 million), drums (24.1 million), porgies (15.5 million), and jacks (11.9 million). Snappers ranked sixth (9.4 million). In the EEZ, the top five species groups by number of fish caught were snappers, sea basses, grunts, jacks, and herrings. Forty percent of snappers and 43% of sea basses that were caught by anglers in the Gulf in 2014 were caught in federal waters.

3.2 Description of the Physical Environment

The Gulf is 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 (Figure 3.2.1), the discharge of freshwater into the Northern Gulf, and a semi-permanent, anti-cyclonic gyre in the western Gulf. The Gulf is both a warm temperate and a tropical body of water (McEachran and Fechhelm 2005). Based on satellite derived measurements from 1982 through 2009, mean annual sea surface temperature ranged from 73 through 83º F (23-28º C) including bays and bayous (Figure 3.2.1). In general, mean sea surface temperature increases from north to south depending on time of year with large seasonal variations in shallow waters (NODC 2012: http://accession.nodc.noaa.gov/0072888). Physical environments in different regions of the Gulf are described in detail in the 2004 Essential Fish Habitat Final Environmental Impact Statement (EFH FEIS) and are summarized below.

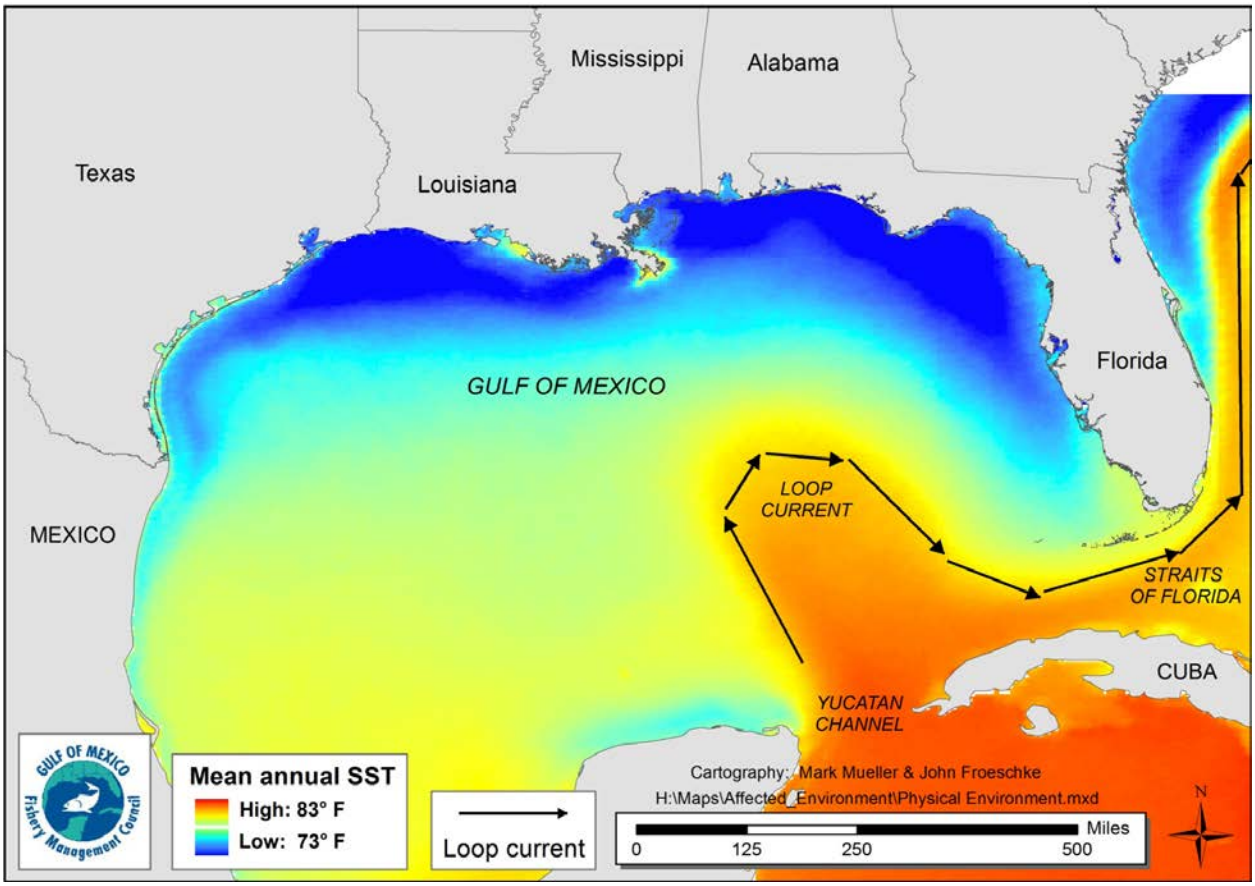

Figure 3.2.1. Physical environment of the Gulf including major feature names and mean annual sea surface temperature as derived from the Advanced Very High Resolution Radiometer Pathfinder Version 5 sea surface temperature data set (http://accession.nodc.noaa.gov/0072888).

The Gulf continental shelf varies in width across the Gulf, and is widest in southern Florida (186 miles) and narrowest off the Mississippi River Delta (6 miles). The shelf also varies in depth of

0-654 ft (0-109 fathoms) and occupies about 35.2% of the surface area of the Gulf. Beyond the shelf, the depth of the Gulf drops off to a maximum depth of 12,630 ft (2,105 fathoms) in the Sigsbee Deep (Figure 3.2.2).

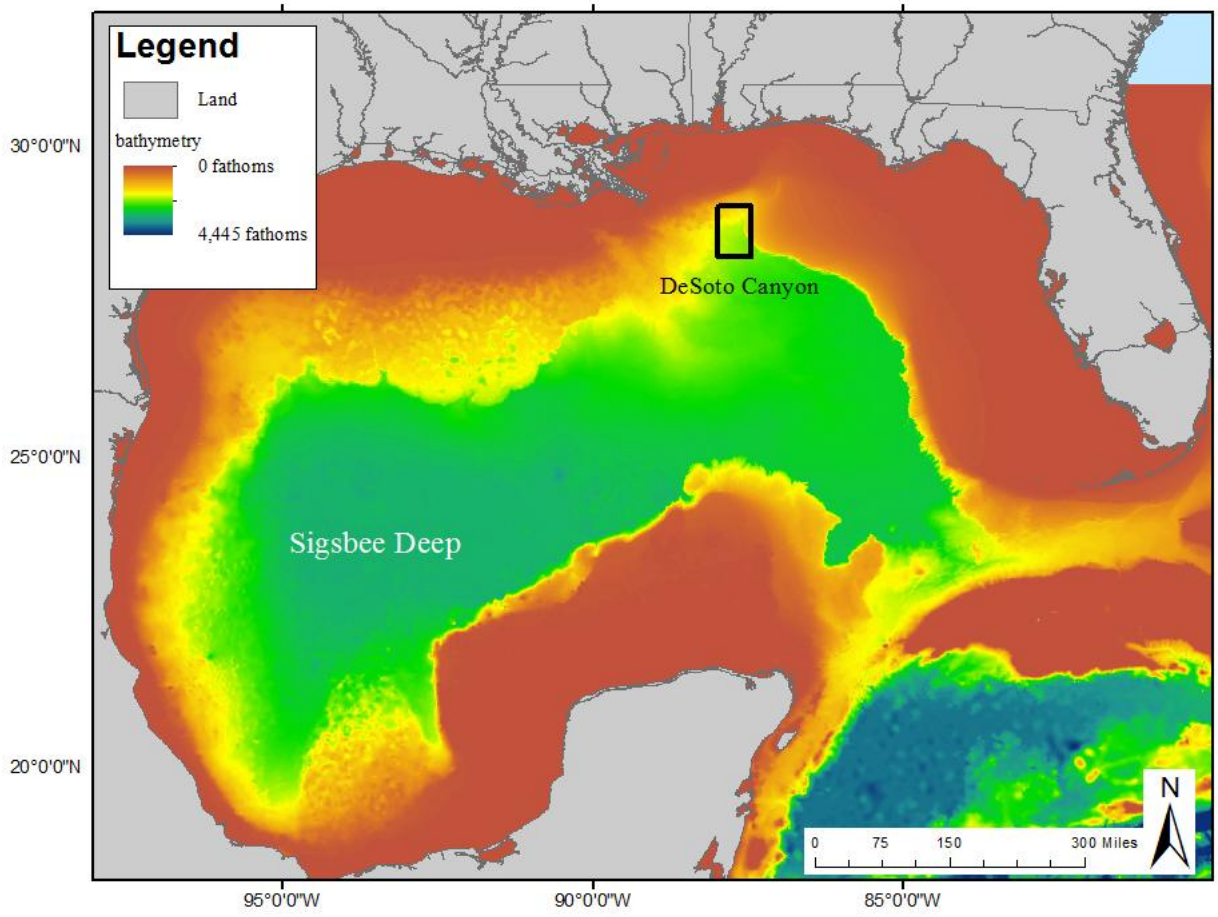

Figure 3.2.2. Bathymetry map of the Gulf of Mexico indicating the location of Sigsbee Deep and DeSoto Canyon.

Sediment makeup in the Gulf varies, but can generally be divided into two main zones, carbonate to the east of DeSoto Canyon (Figure 3.2.2.) and southward along the Florida coast, and terrigenous (made of material eroded from the land) to the west of DeSoto Canyon, past Louisiana to the Mexican border. Course sediments (sand and mixed sand) are present in shallow nearshore bottoms from the Rio Grande River to central Louisiana and are the dominant bottom type from shore to deeper water throughout the central third of the shelf. Course sediments are also present in the nearshore environment to a depth of 33 to 66 ft (5.5 to 11 fathoms) from the Everglades northward along the coast of Florida and covers the entire shelf out to a depth of 396 ft (66 fathoms) from Apalachicola Bay to Mobile Bay.

Fine sediments (silt and clay) are the dominant bottom type along the eastern and southwestern third of the continental shelf), which are areas influenced by the Mississippi and Atchafalaya Rivers and the present or ancestral Rio Grande river. Fine sediments are also strongly represented on the outer shelf beyond the 44 fathom isobaths. These sediments can affect shrimp

and fish distributions directly in terms of feeding and burrowing activities or indirectly through food availability, water column turbidity, and related factors. Another tongue of fine sediment runs southwestward from the Everglades, extending the full length of the Florida Keys.

The West Florida Shelf

The West Florida Shelf bottom consists of a flat limestone table with localized relief due to relict reef or erosional structures. The benthic habitat types include low relief hard bottom, thick sand bottom, coralline algal nodules, coralline algal pavement, and shell rubble. The west Florida slope forms the edge of a sequence of carbonates intercalated with salt deposits more than 3 miles thick (Doyle and Holmes 1985). The West Florida Shelf provides a large area of scattered hard substrates, some emergent, but most covered by a thin veneer of sand, that allow the establishment of a tropical reef. The only high relief features are a series of shelf edge prominences that are themselves the remnants of extensive calcareous algal reef development prior to sea level rise.

In water depths of 228 to 294 ft (38 to 49 fathoms) along the southwest Florida shelf, a series of carbonate structures forms a series of steps along the shelf (Holmes 1981). This area corresponds to the partially buried, 3 mile wide reef complex known as Pulley Ridge.

The Florida Middle Grounds is a hard bottom area approximately 100 miles west-northwest of Tampa, Florida. This region is characterized by steep profile limestone escarpments and knolls rising 32 to 43 feet above the surrounding sand and sand-shell substrate, with overall depths varying from 84 to 156 ft (14 to 26 fathoms) (Smith 1976).

Madison-Swanson is an area south of Panama City, Florida, containing high-relief hard bottom habitat. Depths run between 198 and 330 ft (33 and 55 fathoms), with habitats ranging from low-relief drowned patch reefs (1.6 to 8.2 feet vertical relief) to high-relief ridges and pinnacles (30-52 feet vertical relief).

The Dry Tortugas refers to an area of carbonate banks situated in open-ocean, approximately 70 miles west of Key West and 140 miles from mainland Florida. One of the banks is emergent with seven small, sandy islands (GMFMC 2000). The banks are roughly circular in pattern and are considered an atoll (Vaughan 1914). The shallow rim of the atoll is discontinuous and consists of Holocene (less than 10,000 years old) coral and the sandy islands. The Holocene reefs are approximately 46 feet thick, and are situated upon a preexisting high of the Key Large Limestone, formed approximately 125,000 years ago (Shinn et al. 1977).
Two significant carbonate banks are situated in close proximity to the Dry Tortugas, known as Tortugas Bank and Riley's Hump. Tortugas Bank is directly west of the Dry Tortugas reefs, separated by a northeast-southwest trending channel. The channel is about 120 ft (20 fathoms) deep and 3 miles wide. The bank has a 98 foot escarpment on the west, a 49 foot face on the east, and crests at approximately 66 feet. Studies indicate that Tortugas Bank is contemporary with the outlier reefs seaward of the Keys reef tract (Lidz et al. 1991; Ludwig et al. 1996).

Riley's Hump is a carbonate bank situated south-southwest of the Tortugas Bank. Based on its position, it is estimated to be equivalent in age to the Florida Middle Grounds (GMFMC 2000).

It crests at about 100 feet, and the southern face exhibits a 66 foot escarpment situated at the shelf/slope break. Thick sedimentary deposits fill a trough separating Riley's Hump from Tortugas Bank.

Mississippi-Alabama Shelf

The Mississippi-Alabama Shelf is a small area extending from the Mississippi River Delta to DeSoto Canyon. The sediments found here are terrigenous to the west, integrating to carbonate sediments near DeSoto Canyon. The outer shelf is dominated by topographic features, which represent the remains of ancient reefs or shorelines. Pinnacles, made of hard, rigidly-cemented, irregularly-shaped aggregates of calcareous organic structures (Continental Shelf Associates, Inc. 1992) are found on the shelf and shelf break off the coasts of Alabama and Mississippi. These calcareous shelf edge and upper slope prominences are present in a wide band (approximately one mile) along the shelf edge from 85° to 88° W longitude (Ludwick and Walton 1957). The average pinnacle height has been measured at 30 feet with some pinnacles exceeding 49 feet in relief and the average water depth to the top of the pinnacles to be 54 fathoms. Pinnacles ranged in water depths from 330 to 588 ft (55 to 98 fathoms) and water depths to the top of the pinnacles were found in two zones. In the shallower zone, the depth to the top of the pinnacles ranged from 222 to 276 ft (37 to 46 fathoms and in the deeper zone the depth to the top of the pinnacles ranged from 318 to 330 ft (53 to 55 fathoms). The greatest number of pinnacles were in water depths of 336 to 372 ft (56 to 62 fathoms) (Ludwick and Walton 1957).

Hard bottoms are found in several locations on the inner continental shelf adjacent to Florida and Alabama, in depths of 60 to 132 ft (10 to 22 fathoms) (Schroeder et al. 1988a). These hard bottom areas lie south of the mouth of Mobile Bay and south of the Alabama/Florida state line. They have a vertical relief of 2 to 16 feet. Schroeder et al. (1988a) identified these areas as either 1) massive to nodular sandstones and mudstones, 2) slabby aragonite-cemented limestone of broken shells and sandstone, 3) sandstone occurring in small irregular outcrops and 4) calcite-cemented algal reef-like knobs.

Louisiana-Texas Shelf

The Mississippi River has had a profound effect on the landforms of coastal Louisiana (Louisiana Coastal Restoration, no date). The entire area is the product of sediment deposition following the latest rise in sea level about 5,000 years ago. For the last 1,200 years, sediment deposition has occurred primarily at the mouth of the Mississippi River on the edge of the continental shelf, in the area defined as the Mississippi River Delta Basin (Louisiana Coastal Restoration, no date). Its "bird's foot" configuration is characteristic of alluvial deposition, and as the large volumes of sediment required to maintain the delta are lacking, land is being lost rapidly (i.e. wetland loss is occurring). The Louisiana shelf varies in width from less than 12 miles off the passes of the "birdfoot" delta to nearly 124 miles off central and western Louisiana with little dramatic changes in topographic relief (Louisiana Coastal Restoration, no date). There is a tremendous fine-grain sediment load from the Mississippi River. The western portion of this shelf receives much less sediment, and instead has Holocene muds up to 30 feet thick. There are carbonate banks present, created during times of low sea level. About 300 miles upstream from

its main outlet to the Gulf, the Lower Mississippi River is partly diverted into the Atchafalaya River.

The Louisiana/Texas Shelf is dominated by muddy or sandy, terrigenous sediments deposited by the Mississippi River. These terrigenous sediments cover over 2 miles of rock salt (Louann Salt) that has been deposited since the formation of the Gulf basin. Nearly 10 miles of sediment cover the Louann salt deposit south of the Louisiana/Texas state line. This huge sediment load has caused the deposits of salt to flow and form salt domes that now dot the inner shelf and adjacent coastal plain. Many large isolated salt stacks interconnected by intricate networks of growth faults characterize the middle shelf and lower Mississippi River delta region. More than 130 calcareous banks exist as a result of active salt domes in the northwest Gulf (MMS 1983). Banks of the northwestern Gulf have been grouped into two categories. The first are the mid-shelf banks, defined as those that rise from depths of 24 ft (4 fathoms) or less, have a relief of 13 to 164 feet, and have outcrops of relatively bare, bedded Tertiary limestones, sandstones, claystones, and siltstones. There second are also shelf-edge banks, located on salt dome structures, and have well developed carbonate caps with local areas of bare, bedded rocks (Rezak et al. 1985).

The continental shelf south of Matagorda Bay, Texas contains an area of drowned reefs on a relict carbonate shelf (Rezak et al. 1985). The banks vary in relief from 3 to 72 feet, are composed of carbonate substrata overlain by a veneer of fine-grained sediment, and the bottom sides of these reefs are immersed in a nepheloid layer that varies in thickness (up to 66 feet) (Rezak et al. 1985). Carbonate rubble is the predominant sediment on the terrace and peaks of the banks. The sediments around the reef consist of three main components: clay, silt, and coarse carbonate detritus. Several shallow water reefs also occur on the south Texas shelf.

3.3 Description of the Biological/Ecological Environment

The Gulf contains both coral reef communities and solitary coral colonies. These exist from nearshore environments to continental slopes and canyons, including intermediate shelf zones. Corals may dominate a habitat (coral reefs), be a significant component (hard bottom), or be individuals within a community characterized by other fauna (solitary corals).
A description of the biological/ ecological environments of each of the proposed HAPCs is described in detail in the discussion of each action in Chapter 2 and a more general description of the biological/ecological environments in the Gulf is thoroughly covered in 2004 EFH EIS (GMFMC 2004) and summarized here.

Geologically and ecologically, the range of coral assemblages and habitat types is in the Gulf are very diverse. The coral reefs of shallow, warm waters are typically built upon coralline rock and support a wide array of hermatypic and ahermatypic corals, finfish, invertebrates, algae, plants and microorganisms. Hard bottoms and hard banks, found on a wider bathymetric and geographic scale, often possess high species diversity but may lack hermatypic corals, the supporting coralline structure, or some of the associated biota. In deeper waters, large elongate mounds called deepwater banks, hundreds of feet in length, often support a rich fauna compared with adjacent areas. Lastly are communities including solitary corals; this category often lacks a topographic relief as its substrate, but may use a sandy bottom instead. Solitary corals are a minor component of the bottom communities and comprise a minor percentage of the total coral stocks in the Gulf.

The West Florida Shelf

The West Florida Shelf supports the growth of coralline algae at mid-shelf depths (198 to 264 ft [33 to 44 fathoms]), which creates algal nodules and a crustose algal pavement, allowing the development of deepwater hermatypic corals. Hard bottom areas along the shelf are colonized by seasonal algae, sponges, and other filter feeders of mixed warm temperate and tropical affinities.
At the Florida Middle Grounds, *Millepora* sp. is a primary frame builder, and populations of hermatypic scleractinians (*Porites, Dichocoenia, Madracis*) are present, as are alcyonaceans (*Muricea, Plexaura, Eunicea*).

The waters of Tampa Bay on the north and Sanibel Island on the south bound another west Florida shelf region with notable coral communities. The area consists of a variety of bottom types. Rocky bottom occurs at the 10 fathom isobath where sponges, alcyonarians, and the scleractinians *Solenastrea hyades* and *Cladocora arbuscula* are especially prominent.
The West Florida Shelf is an area known to support commercially important fish and shellfish populations, including mullet, spotted sea trout, Spanish mackerel, king mackerel, Florida pompano, snappers and groupers.

The Mississippi-Alabama Shelf

The northeastern portion of the Central Gulf exhibits a region of topographic relief, known as the "pinnacle trend," at the outer edge of the Mississippi-Alabama shelf between the Mississippi

River and DeSoto Canyon. The region contains a variety of features from low-relief rocky areas to major pinnacles, as well as ridges, scarps, and relict patch reefs. The pinnacles in this area provide a substantial amount of surface area for the growth of sessile invertebrates and attract large numbers of fish. Additional hard-bottom features are located nearby on the continental shelf, outside the actual pinnacle trend.

The pinnacle-trend region was described in detail in the Mississippi-Alabama Continental Shelf Ecosystems Study: Data Summary and Synthesis (Brooks 1991), and includes an outline of the present-day biological assemblages. It states that these features are dominated by suspension feeding invertebrates. At pinnacle summits with extensive reef flats, sponges, sea fans, crinoids, and bryozoans can be found. Fishes associated with these flats include rough tongue bass, streamer bass, and vermillion snapper. On the vertical faces of the pinnacles, ahermatypic corals, crinoids, sea urchins, and basket stars are frequently observed. Other fishes observed on the pinnacles include red porgy, amberjack, tattler, red snapper, gag, dolphin, short bigeye, and Spanish flag (Continental Shelf Associates, Inc. 1992).

The presence of the Mississippi-Alabama hard banks may serve the function of "island hopping" for important reef species and may present the key habitat link between the reef fauna of the northwestern and northeastern Gulf. In these respects the hard bottoms and topographic features are important in terms of the larger Gulf ecosystem as a whole.

The Louisiana-Texas Shelf

Vertical relief of the banks on the Louisiana-Texas Shelf varies from less than three feet to over 492 feet. These banks exist in water depths of 72 to 984 ft (12 to 164 fathoms). Hard bottom areas in shallow water (less than 114 ft [19 fathoms]) off the coast of central Louisiana are associated with sessile epibiota including hydroids, bryozoans, ascidians, encrusting sponges, and some ahermatypic stony corals. Fish species commonly seen in this area include Atlantic spadefish, red snapper, sheepshead, gray triggerfish, blue runner, vermilion snapper, rock hind, grouper species, and tomtate (Putt et al. 1986).

Hard bottom areas in deeper waters (144 to 192 ft [24 to 32 fathoms]) included epibiota such as bryozoans, hard corals, octocorals, fire corals, sponges, sea whips, gastropods, hydroids, sea urchins, and lobsters. Over 47 species of fish were identified with the major species being greater amberjack, vermilion snapper, bigeye, blue runner, blue angelfish, French angelfish, queen angelfish, spotfin butterflyfish, , and yellowtail reeffish (Putt et al. 1986).

Shelf-edge banks (e.g., East and West Flower Gardens, Geyer Bank, McGrail Bank, etc.) provide habitat for a diverse assemblage of fishes, with 95 species of reef fish observed by Dennis and Bright (1988). The Algal-Sponge Zone assemblage is the most important clear water community on these banks (Rezak et al. 1985). The Algal-Sponge Zone is dominated by coralline algae and supports deepwater alcyonarians, sponges, echinoderms, and small gastropods and pelecypods. Fish species common in this zone include yellowtail reeffish, sand tilefish, cherubfish, and orangeback bass.

Mid-shelf banks (e.g., Sonnier, 29 Fathom, and Stetson) in the central and western Gulf contain the *Millepora*-Sponge Zone. This assemblage includes crusts of hydrozoan coral, *Millepora alcicornis*, and sponges. There are also sparsely distributed hermatypic and ahermatypic coral species found at Stetson Bank. Also on Stetson Bank, 140 species of reef and schooling fishes, 108 mollusks, and 3 predominant echinoderms have been reported. It attracts pelagics (e.g., manta rays, devil rays, whale sharks) that travel across the continental shelf, using various banks, for seasonal feeding, mating, and as nursery ground.

3.3.1 Bycatch

The Coral and Coral Fishery is not monitored for bycatch purposes. There should be minimal impacts from the harvest of coral colonies conducted by hand. Rather, corals are subject to bycatch in bottom tending gear fisheries.

3.3.2 Protected Species

Species in the Gulf protected under the Endangered Species Act (ESA) include: marine mammal species (sei, fin, humpback, sperm whales, and manatees); sea turtles (Kemp's ridley, loggerhead (North Atlantic distinct population segment (DPS)), green (North Atlantic and South Atlantic DPSs), leatherback, and hawksbill); fish species (Gulf sturgeon, smalltooth sawfish, and Nassau grouper); and coral species (elkhorn coral, lobed star coral, boulder star coral, and mountainous star coral). Seven species of fish and invertebrates in the Gulf are currently listed as species of concern. Additionally, Marine Mammal Protection Act (MMPA) protected dolphins are also present in the Gulf.

3.4 Description of the Economic Environment

This amendment would potentially affect several fisheries in the Gulf. The following discusses the economic environment of major fisheries in the Gulf that this amendment would potentially affect.

3.4.1 Octocorals

The Generic ACL/AM Amendment removed octocorals from the Coral and Coral Reefs FMP, leaving the opportunity for states to manage the resources in federal waters adjacent to their state waters (GMFMC 2011). The Florida Fish and Wildlife Conservation Commission (FWC) currently manages the allowable octocoral fishery in both Florida state waters and federal waters adjacent to the state. At present, Florida has established an octocoral quota of 70,000 colonies. This quota has never been reached before and after Florida assumed the management of octocorals in both state and adjacent EEZ waters. The average annual number of colonies commercially landed during 2000-2016 was 39,200 colonies off both coasts of Florida combined.

The octocoral industry is part of the broader marine life industry. Larkin et al. (2001) provides a brief description of the Florida marine life industry:

"*The marine life industry in Florida – as defined by the Florida Administrative Code (F.A.C.) – pertains to the non-lethal harvest of saltwater fish, invertebrates, and plants for commercial purposes (F.A.C. Rule 46-42). Products are landed live and sold to wholesalers, retailers, or direct to individual aquarium owners (foreign and domestic). Some products, such as sand dollars, are dried and destined for the shell/curio market. The vast majority of products, however, are destined for the hobby aquaria industry. According to the Pet Industry Joint Advisory Council (PIJAC 1999), tropical fish-keeping is the second most popular hobby (after photography) in the United States. Aside from fish, the successful establishment of an "artificial reef" requires colonization by invertebrates (Loiselle and Baensch 1995).*

Live "tropical" aquatic products include both marine and freshwater species. In Florida, the marine component of the larger industry – for live ornamental aquatic products – is derived almost exclusively from the capture of wild specimens (exceptions include the culture of clown fish and live rock).1 Conversely, the freshwater species (primarily fish) are cultured or "farmed." According to the PIJAC (1995), Florida produces and supplies 95 percent of the tropical fish sold in North America. In addition, tropical fish and plants are the number one air freight commodity for the state of Florida; each week an estimated 15,000 to 20,000 boxes leave Tampa International Airport alone (PIJAC 1999). The PIJAC estimates the annual value of tropical species collected and farmed in Florida at approximately $60 million. For comparison, the worldwide wholesale market for marine (i.e., saltwater) ornamental products – wild and farmed – is estimated at more than $100 million (Aquaculture Development Program 1999; National Sea Grant Office 1999)".

Harvest of marine life species is subject to certain permitting requirements. For recreational anglers, a recreational fishing license is required. For harvest of commercial quantity for most

marine life species, a saltwater product license with restricted species endorsement and marine life tiered endorsement is required. Table 3.4.1.1 shows the types of marine life endorsements for commercially harvesting marine life species. Marine life transferable dive endorsement (MLD) has significantly increased from 71 in 2010/2011 to 175 in 2016/2017 while the non-transferable type (MLN) has remained about the same. The marine life bycatch endorsement (MLB) has also increased and almost doubled over the same period. The increasing number of endorsements may indicate more interest and potentially more active participation in the marine life industry.

Table 3.4.1.1. Marine life endorsements.

Year	MLD	MLN	MLB
2010/11	71	14	18
2011/12	78	15	18
2012/13	91	15	18
2013/14	102	15	21
2014/15	113	15	27
2015/16	122	16	31
2016/17	175	17	34
Average	107	15	24

MLD: marine life transferable dive endorsement.
MLN: marine life non-transferable dive endorsement.
MLB: marine life bycatch endorsement.

Table 3.4.1.2 shows certain landings characteristics of the marine life industry in Florida at the harvest level. For the period 2010-2016, an average of approximately 23,000 trips for marine life species were taken that landed approximately 11.6 million individual units worth about $3.3 million (2016 dollars). Octocorals are a relatively small segment of the entire marine life industry, with an average of 711trips and landings of approximately 33,000 colonies worth approximately $133,000 (2016 dollars).

In terms of the dollar value of landings, octocorals consistently rank high among the various marine life species. Table 3.4.1.3 shows the top ten species by landings value from 2010 through 2016. The highest rank for octocorals was fifth in 2010 and 2015 and the lowest was eighth in 2011 and 2012. As shown in Table 3.4.1.2, landings of octocorals are a relatively small percentage of total marine life landings (0.2% to 0.4%), but the relatively high price of octocorals boosted its ranking by dollar value.

Table 3.4.1.2. Selected characteristics of marine life landings.

	Landings (number)	Trips	Revenues (2016 Dollars)
All Marine Life Species			
2010	8,157,635	21,728	$2,906,764
2011	8,920,676	22,010	$3,060,382
2012	9,763,413	21,851	$3,404,309
2013	10,924,015	25,707	$4,005,263
2014	12,377,084	25,660	$3,649,736
2015	15,323,710	24,582	$3,414,531
2016	16,178,753	20,946	$2,822,287
Average	11,663,612	23,212	$3,323,324
Octocorals			
2010	32,339	695	$144,927
2011	28,942	699	$109,744
2012	33,228	625	$135,351
2013	37,320	770	$145,093
2014	36,398	830	$145,030
2015	33,173	712	$131,772
2016	30,202	643	$119,930
Average	33,086	711	$133,121
Percent of Octocorals to All Marine Life Species			
2010	0.4%	3.2%	5.0%
2011	0.3%	3.2%	3.6%
2012	0.3%	2.9%	4.0%
2013	0.3%	3.0%	3.6%
2014	0.3%	3.2%	4.0%
2015	0.2%	2.9%	3.9%
2016	0.2%	3.1%	4.2%
Average	0.3%	3.1%	4.0%

Source: FL FWC Commercial Fisheries Landings Summaries, August 25, 2017.

Table 3.4.1.3. Top ten species in the marine life industry by dollar value of landings.

Rank	2010	2011	2012	2013	2014	2015	2016
1st	Crabs	Crabs	Crabs	Crabs	Crabs	Crabs	Crabs
2nd	Snails	Snails	Snails	Snails	Snails	Snails	Snails
3rd	Shrimp	Shrimp	Shrimp	Shrimp	Angelfish	Shrimp	Shrimp
4th	Angelfish	Angelfish	Angelfish	Angelfish	Shrimp	Angelfish	Angelfish
5th	**Octocorals**	Sand dollars	Anemones, c.	Anemones, c.	Anemones, c.	**Octocorals**	Anemones
6th	Sand dollars	Urchins	Sand dollars	Urchins	Sand dollars	Sand dollars	**Octocorals**
7th	Urchins	Anemones, c.	Anemones	**Octocorals**	**Octocorals**	Grunts	Sand dollars
8th	Anemones, c.	**Octocorals**	**Octocorals**	Sand dollars	Anemones	Anemones	Urchins
9th	Anemones	Grunts	Urchins	Anemones	Urchins	Plants	Plants
10th	Sponges	Anemones	Grunts	Plants	Plants	Urchins	Seahorses

Source: FL FWC Commercial Fisheries Landings Summaries, August 25, 2017.

3.4.2 Shrimp Fishery

The Gulf shrimp fisheries consist of 3 major sectors: harvesting sector, dealer/wholesaler sector, and processing sector. The following discussion provides summary statistics and selected characteristics for the harvesting sector only.

In 2003, a federal shrimp permit (SPGM) was instituted requiring vessels to possess the permit when fishing for penaeid shrimp in the Gulf EEZ. A moratorium on the issuance of new federal shrimp permits became effective in March 2007. Currently, vessels must possess a SPGM when fishing for penaeid shrimp in the Gulf EEZ. In addition, a royal red shrimp endorsement (GRRS), which is an open-access permit for those holding a SPGM, is required for harvesting royal red shrimp in the Gulf EEZ.

Selected Characteristics of Participating Vessels in the Gulf of Mexico Shrimp Fisheries

Selected characteristics of participation in the Gulf shrimp fisheries from 2010 through 2014 are summarized in Table 3.4.2.1. The latest data on the economics and financial conditions of the Gulf shrimp fishery are for 2014. Data for later years are still being processed and compiled (Travis, NMFS-SERO, pers. comm. 2017). The number of permitted and non-permitted active vessels (i.e., vessels reporting landings in the Gulf shrimp fisheries) has been well above 4,000 from 2010 through 2014 (Table 3.4.2.1). Although approximately one-third of the active vessels were federally permitted (vessels with SPGM) at the beginning of the moratorium, less than 25 percent of active vessels had federal permits in each of the last 4 years (i.e., vessels without a federal permit are representing an increasing percentage of active vessels in the fisheries over time). Despite being fewer in number, federally-permitted vessels accounted for as high as 67 percent of shrimp landings and 78 percent of shrimp revenues in the fisheries between 2010 and 2014. However, the permitted vessels' shares of the fisheries' landings and revenues have declined noticeably in the last 3 years, to only 56 percent and 68 percent, respectively, in 2014.

Thus, vessels without permits have been accounting for a greater percentage of the fisheries' production and revenues in recent years.

The royal red shrimp sector is a relatively small segment of the Gulf shrimp fisheries. As of August 25, 2017, there were 1,374 valid SPGM permits and 292 GRRS endorsements. On average (2010-2014), royal red shrimp accounted for less than 1% of total Gulf shrimp landings and ex-vessel revenues. The deep-water nature of the fishery, the limited geographic location of known fishing grounds, and the equipment needed to fish for royal red shrimp may have contributed to the relatively low share of the royal red shrimp landings and revenues to the overall shrimp landings and revenues in the Gulf. A more detailed discussion of vessels participating in the royal red shrimp fishery is provided in Shrimp Amendment 16 (GMFMC 2015) and Shrimp Amendment 17A (GMFMC 2016).

Table 3.4.2.1. Selected characteristics of participation in the Gulf of Mexico food shrimp fisheries, 2010-2014.

	2010	2011	2012	2013	2014
Number of active vessels[1]	4,510	5,285	5,191	4,669	4,916
Percent of active vessels with a federal permit	25	22	22	24	23
Number of active vessels with a federal permits	1,132	1,187	1,148	1,110	1,116
Percent of active vessels without a federal permit	75	78	78	76	77
Number of active vessels without a federal permits	3,378	4,098	4,043	3,559	3,800
Number of federally-permitted vessels	1,685	1,641	1,587	1,544	1,515
Percent active	67	72	72	72	74
Percent inactive	33	28	28	28	26
Food shrimp landings (million lbs, heads-off)	111	137	134	128	131
Gross revenues (2014 dollars)	$354,000,000	$441,000,000	$389,000,000	$504,000,000	$557,000,000
Percent of food shrimp landings by federally-permitted vessels	63	67	63	60	56
Percent of food shrimp gross revenues by federally-permitted vessels	74	78	72	72	68

[1] Active means a vessel had at least 1 lb of Gulf of Mexico shrimp landings in a year based on GSS data (R. Hart, NMFS, pers. comm., April 25, 2016). These are likely overestimates of the actual number of active vessels because of vessel identification errors in the GSS data.

Key Economic and Financial Characteristics of Active Federally-Permitted Gulf Shrimp Vessels

The following descriptions are based on a series of annual reports on the economics of the federal Gulf shrimp fishery for the years 2010 through 2014 (Liese 2011, 2013a, 2013b, 2014, 2016; Liese and Travis 2010; Liese et al. 2009a, 2009b). These reports present the results of the Annual Economic Survey of Federal Gulf Shrimp Permit Holders. The first survey, which was administered in 2007, collected data for the 2006 fishing year.

The type of economic data the survey collects is based on an accounting framework of money flows and values associated with the productive activity of commercial shrimping. With these data, 3 financial statements (the balance sheet, the cash flow statement, and the income statement) are prepared to give a comprehensive overview of the financial and economic situation of the offshore shrimp fishery[3].

Table 3.4.2.2 provides a summary of the financial statements for active vessels. Active vessels are defined as vessels with at least one pound of Gulf shrimp landings in a year based on GSS data (R. Hart, NMFS, pers. comm., April 25, 2016). Equity for an average active vessel has been increasing, particularly in 2014 when it increased by 19%. However, averages focusing on active vessels highlight the fragile economic state of shrimp harvesters between 2010 and 2014, as illustrated by average net revenue from operations and economic returns for active vessels. However, economic conditions for vessels active in the fishery improved dramatically in 2014. Ex-vessel shrimp prices increased significantly, most likely due to a decrease in shrimp imports caused by diseases (early mortality syndrome) that affected cultured shrimp in some major exporting countries (e.g., Thailand). In addition, fuel prices, a major cost item for shrimp vessel operation, decreased in 2014. In fact, the difference between the average ex-vessel shrimp price and the average fuel price for active, federally permitted vessels in the Gulf was greater in 2014 by far than in any other year during the moratorium, and likely since the early 2000s (Liese, NMFS-SEFSC, pers. comm. 2016). The difference was $0.96 in 2010 and increased to $1.27 in 2013 and $1.97 in 2014. According to data sources other than the Annual Economic Survey, fuel prices paid by commercial shrimpers likely continued to decline and then stabilized in 2015 and 2016,[4] while preliminary data suggests shrimp prices initially reverted to their lower levels in 2015 but subsequently began to rebound in 2016.[5] Thus, economic conditions in 2014 may reflect a "best case" scenario for the harvesting sector, with future economic conditions in the short term similar to those experienced on average between 2011 and 2014.

[3] For more detailed descriptions of these three financial statements, see Liese et al. 2009a.
[4] See recent trends in diesel fuel prices according to the Energy Information Administration (EIA) at: https://www.eia.gov/outlooks/steo/report/ Diesel fuel prices actually paid by commercial fishers, including commercial shrimpers, however, are less than the prices reported by the EIA as they do not pay federal or state excise taxes on fuel.
[5] See archives of Gulf of Mexico monthly shrimp statistics for preliminary shrimp price estimates at: http://www.st.nmfs.noaa.gov/commercial-fisheries/market-news/related-links/market-news-archives/index.

Table 3.4.2.2. Economic and financial characteristics of an average active vessel with a federal Gulf of Mexico commercial shrimp permit, 2007-2014. Dollar values are averages in 2014 dollars (Liese 2011, 2013a, 2013b, 2014, pers. comm., September 12, 2016; Liese and Travis 2010; Liese et al. 2009a, 2009b).

	2010[1]	2011	2012	2013[2]	2014[2]
Number of observations	332	368	370	293	333
Balance sheet					
Assets	224,083	235,021	244,911	249,398	272,193
Liabilities	54,259	42,939	51,250	37,095	19,825
Equity	169,823	192,082	193,661	212,303	252,368
Cash flow					
Inflow	250,988	330,645	399,822	417,630	376,594
Outflow	251,799	303,563	332,571	353,654	321,793
Net cash flow	-811	27,082	67,251	63,976	54,801
Income statement					
Revenue (commercial fishing operations)	248,753	312,141	324,557	361,229	373,490
Expenses	253,481	310,702	334,713	359,662	333,314
Variable costs: non-labor	50.8%	52.4%	55.6%	49.8%	49.7%
Variable costs: labor	27.2%	27.7%	25.1%	29.2%	32.2%
Fixed costs	21.9%	19.9%	19.2%	20.9%	18.1%
Net revenue from operations	-4,728	1,439	-10,155	1,567	40,176
Net receipts from non-operating activities	-730	15,833	71,991	52,961	1,221
Net revenue before tax (profit or loss)	-5,458	17,273	61,836	54,528	41,397
Returns					
Economic return	-2.1%	0.6%	-4.1%	0.6%	14.8%
Return on equity	-3.2%	9.0%	31.9%	25.7%	16.4%

[1] 2010 numbers are adjusted to remove payments and costs (cleanup activities) related to DWH.
[2] 2013 and 2014 numbers are preliminary.

Because of the difference in economic conditions and performance in the years before and after the Deepwater Horizon (DWH) oil spill, as well as the year to year differences in the years after the oil spill, Table 3.4.2.3 provides an average of financial and economic conditions for active permitted vessels between 2011 and 2014. Most importantly, average gross revenue from fishing operations was approximately $343,000, but net revenue from operations was only about $8,300. These estimates best approximate expected financial and economic conditions for these vessels in the foreseeable future.

Table 3.4.2.3 Average economic and financial characteristics for active vessels with a federal Gulf of Mexico commercial shrimp permit, 2011-2014. Dollar values are averages in 2014 dollars.

Number of observations	**1,364**
Balance sheet	
Assets	250,381
Liabilities	37,777
Equity	212,604
Cash flow	
Inflow	381,172
From shrimp (any)	91.1%
Outflow	327,895
Net cash flow	53,277
Income statement	
Revenue (commercial fishing operations)	342,854
Expenses	334,597
Variable costs: non-labor	51.9%
Variable costs: labor	28.6%
Fixed costs	19.5%
Net revenue from operations	8,257
Net receipts from non-operating activities	35,501
Net revenue before tax (profit or loss)	43,758
Returns	
Economic return	3.0%
Return on equity	20.8%

Key Economic and Financial Characteristics of Non-Federally-Permitted Shrimp Vessels

Some aggregate information regarding the non-federally-permitted vessel component of the fisheries is in Table 3.4.2.1. Detailed information regarding the financial and economic performance of non-federally-permitted vessels is not available on an annual basis. However, economic surveys that collected such information from this fleet were conducted in 2008 (Miller and Isaacs 2011) and 2012 (Miller and Isaacs 2014). The following is a very brief summary of the latter report's more important findings regarding these vessels' financial and economic performance in 2012.

About 92% of these vessels are owner-operated. The average vessel was about 37 ft long, 24 years old, and had a current market value of about $60,000. Because only 7.7% of respondents had loan balances in 2012, average debt was relatively low ($2,354), and average equity was relatively high at approximately $58,000. The average non-federally-permitted vessel took about 53 trips and spent an average of 97 days at sea in 2012. Most non-federally-permitted shrimpers (approximately 72%) harvested only shrimp and no other type of seafood. Most of their shrimp was sold to dealers or processors. About 85% sold no shrimp to retailers and 60% claimed to have sold no shrimp directly to the public. Average cash inflows were about $85,000,

considerably less than federally-permitted vessels, while average cash outflows were approximately $59,000, about two-thirds of which was related to fuel, repairs and maintenance, and overhead. Average net cash flows were about $26,000, but median cash inflows were only $6,000. Net cash flows were zero or negative for about 40% of these vessels. When non-cash expenses like depreciation and owner's vessel time (opportunity cost) are included, and revenues unrelated to commercial fishing operations are excluded, average net income from operations falls to about -$5,000. Net income before taxes, which considers all sources of revenue, averaged $16,000. Net income before taxes was negative for the majority of these vessels.

Gulf Dealers and Processors

Between 2007 and 2014, the number of food shrimp dealers ranged from 600 (2013) to 896 (2011) in a given year. [6] In 2014, there were 627 dealers. Between 2011 and 2014, there were 1,427 dealers that purchased food shrimp at some point in time in the Gulf.[7] Most shrimp dealers in the Gulf are very specialized. Between 2007 and 2014, annual food shrimp purchases account for around 83% of their total annual seafood purchases. Between 2007 and 2014, annual Gulf food shrimp purchases by dealers averaged about $423 million per year (in 2014 dollars), while total seafood purchases by these dealers averaged almost $489 million. However, as in the harvesting sector, the value of these dealers' food shrimp and total seafood purchases increased significantly in 2013 and 2014 as a result of the increases in shrimp prices, with the value of shrimp purchases increasing by more than 50% between 2012 and 2014. The value of food shrimp purchases per dealer also increased by more than 50% during this time. Estimates of net revenue or profit specific to Gulf shrimp dealers are not currently available.

Although the average value of food shrimp and total seafood purchases per dealer appears relatively small, $24,000 and $50,000 in 2014 respectively based on the median, Gulf food shrimp dealers are a very heterogeneous group. Many, if not most, "dealers" are actually vessel owners and fishers who have chosen to act as their own dealers and bypass so-called "middlemen" so they can reduce costs and retain more of their net revenue (profit). So, as vessels move in and out of the fisheries, so do dealers to a large degree. A much smaller number of these dealers are also shrimp processors, and their operations generate much larger revenues on average (see below).

Between 2007 and 2014, the number of Gulf shrimp processors was relatively stable (except for 2012), averaging 53 during this time. Thus, the consolidation seen in this sector in previous years appears to have largely abated. During the same time period, the annual value of processed shrimp averaged more than $639 million (in 2014 dollars). Like dealers, shrimp processors are also very specialized. Shrimp products accounted for more than 90% of the total value processed between 2007 and 2014. However, processors are much larger businesses on average than

[6] A Gulf of Mexico shrimp dealer is a dealer located in a Gulf of Mexico port that purchased shrimp regardless of where shrimp were harvested.

[7] This estimated number of Gulf of Mexico shrimp dealers could be slightly overestimated because the estimates are based on a compilation of unique dealer codes across the GSS and Accumulated Landings System (ALS) databases. Although most codes could be matched across the databases, there are a relatively small number of inconsistencies in the codes within and across the databases over time.

dealers, with the value of processed shrimp and the value of all processed products averaging $4.46 million and $5.3 million per processor, respectively, between 2007 and 2014.

Economic trends in the processing sector do not exactly mirror trends in the harvesting and dealer sectors. For example, for the sector as a whole, there were increases in the value of processed shrimp and all processed products by these processors in 2013 and 2014. But they were relatively minor in the aggregate, and those values were still below values seen in 2010. The reason for this difference is because processors process imported product as well as domestic product, whereas the dealer data only represents domestic production. A comparison of the dealer and processor data indicates that processors in the Gulf relied heavily on imported shrimp in 2010, and were able to increase the value of their processed products as a result. Conversely, in 2014, processors appear to have been much more dependent on domestic product. And although the value of the processed shrimp was somewhat less in 2014 relative to 2010, the average value of processed shrimp per processor was considerably greater in 2014 than in 2010, increasing by 189% from $2.8 million in 2010 to more than $8 million per processor in 2014. What this finding suggests is that, while imported product can and has been important for this sector as a whole, imports are important to a relatively small number of shrimp processors. Conversely, all Gulf shrimp processors are somewhat if not highly reliant on domestic production. Thus, when the value of domestic production increases, as it did in 2013 and 2014, such increases benefit all processors rather than only a relatively few.

3.4.3 Reef Fish Fishery

Commercial Sector

Vessel Activity

Tables 3.4.3.1 and 3.4.3.2 contain information on vessel performance for commercial vessels that harvested any reef fish species in the Gulf in 2010-2016. The tables contain vessel counts from the NMFS Southeast Fisheries Science Center (SEFSC) logbook (logbook) data (vessel count, trips, and landings). Dockside values were generated using landings information from logbook data and price information from the NMFS SEFSC Accumulated Landings System (ALS) data. The data in Tables 3.4.3.1-3.4.3.2 cover all vessels that harvested any reef fish species anywhere in the Gulf, regardless of trip length or species target intent. Landings are presented in gutted weight and dollar values are expressed in 2016 dollars using the GDP price deflator. Federally permitted vessels required to submit logbooks generally report their harvest of most species regardless of whether the fish were caught in state or federal waters.

On average, 554 vessels per year landed any reef fish species in the Gulf (Table 3.4.3.1). These vessels, combined, averaged 6,608 trips per year in the Gulf on which reef fish were landed and 810 other trips (i.e., trips in the Gulf on which no reef fish were caught or trips taken in the South Atlantic. The average annual total dockside revenue (2016 dollars) was approximately $52.1 million from reef fish, approximately $1.31 million from other species co-harvested with reef fish (on the same trips), and approximately $1.5 million from other trips by these vessels on trips in the Gulf on which no reef fish were harvested or occurred in the South Atlantic (Table

3.4.3.2). Total average annual revenue from all species harvested by vessels harvesting reef fish in the Gulf was approximately $54.9 million, or approximately $99,593 per vessel.

Table 3.4.3.1. Summary of vessel counts, trips, and logbook landings (pounds gutted weight (lbs gw)) for vessels landing at least one pound of reef fish[1], 2010-2016.

Year	Number of Vessels	Number of Gulf Trips that Caught Reef Fish	Reef Fish Landings (lbs gw)	"Other Species" Landings Jointly Caught with Reef Fish (lbs gw)	Number of Other Trips[2]	Landings on Other Trips (lbs gw)
2010	577	5,981	10,338,604	679,635	593	592,400
2011	561	6,541	13,344,918	944,170	767	787,665
2012	554	6,593	13,983,396	968,920	904	741,806
2013	531	6,288	13,625,944	768,890	799	789,777
2014	576	6,979	15,279,827	895,524	1,010	848,153
2015	548	6,997	15,385,266	738,966	784	800,444
2016	529	6,878	14,532,146	684,206	810	932,554
Average	554	6,608	13,784,300	811,473	810	784,686

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.
[1]Reef fish includes only species managed under the Gulf Reef Fish FMP.
[2]Includes Gulf trips on which no reef fish were harvested as well as trips in the South Atlantic regardless of what species were harvested, including reef fish (snapper/grouper).

Information similar to those in Table 3.4.3.1 and Table 3.4.3.2 are shown in Table 3.4.3.3 and Table 3.4.3.4, respectively, with focus on certain reef fish species complex—all reef fish, snappers, groupers, tilefishes, and jacks. Snappers and groupers are the two major components of the reef fish fishery, with tilefishes and jacks showing relatively low landings and revenues. Vessels harvesting snappers or groupers also harvest about the same amount of other species. Vessels harvesting tilefish or jacks, on the other hand, harvest more of other species. Vessels harvesting snappers or groupers generate more revenues from these species, but revenues from other species are not too far behind. For vessels harvesting tilefishes or jacks, revenues from other species are substantially higher than those from tilefishes or jacks, indicating that these vessels are not as dependent on tilefish or jacks as those harvesting snappers or groupers on these species.

Table 3.4.3.2. Summary of vessel counts and revenue (2016 dollars) for vessels landing at least one pound of reef fish, 2010-2016.

Year	Number of Vessels	Dockside Revenue from Gulf Reef Fish	Dockside Revenue from "Other Species" Jointly Caught with Reef Fish	Dockside Revenue on Other Trips	Total Dockside Revenue	Average Total Dockside Revenue per Vessel
2010	577	$34,717,646	$1,050,262	$877,808	$36,645,716	$63,511
2011	561	$45,328,460	$1,410,373	$1,315,769	$48,054,602	$85,659
2012	554	$49,760,147	$1,469,879	$1,454,395	$52,684,421	$95,098
2013	531	$52,954,318	$1,344,204	$1,640,058	$55,938,580	$105,346
2014	576	$60,527,559	$1,488,010	$1,906,147	$63,921,716	$110,975
2015	548	$62,524,673	$1,289,604	$1,461,367	$65,275,644	$119,116
2016	529	$59,092,632	$1,165,635	$1,869,070	$62,127,337	$117,443
Average	554	$52,129,348	$1,316,852	$1,503,516	$54,949,717	$99,593

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.

Table 3.4.3.3. Average (2010-2016) vessel counts, trips, and logbook landings (pounds gutted weight (lbs gw)) for vessels landing at least one pound of selected reef fish species complex, 2010-2016.

Species Complex	Number of Vessels	Number of Gulf Trips that Caught Fish in the Complex	Species Complex Landings (lbs gw)	"Other Species" Landings Jointly Caught with a Species in the Complex (lbs gw)	Number of Other Trips*	Landings on Other Trips (lbs gw)
All Reef Fish	554	6,608	13,784,300	811,473	810	784,686
Snappers	528	5,817	6,815,666	6,516,164	1,406	1,891,608
Groupers	456	4,756	6,001,244	5,937,697	1,627	2,295,028
Tilefish	121	395	403,575	1,561,987	1,550	5,309,510
Jacks	281	1,425	477,600	4,009,483	3,127	6,932,897

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.

Table 3.4.3.4. Average (2010-2016) vessel counts and revenue (2016 dollars) for vessels landing at least one pound of selected reef fish species complex.

Species Complex	Number of Vessels	Dockside Revenue from Fish in the Species Complex	Dockside Revenue from "Other Species" Jointly Caught with Species in the Species Complex	Dockside Revenue on Other Trips	Total Dockside Revenue	Average Total Dockside Revenue per Vessel
All Reef Fish	554	$52,129,348	$1,316,852	$1,503,516	$54,949,717	$99,593
Snappers	528	$26,438,465	$22,619,144	$5,525,408	$54,583,018	$103,575
Groupers	456	$23,678,128	$20,301,422	$7,786,467	$51,766,017	$114,095
Tilefish	121	$1,112,451	$6,202,630	$19,631,413	$26,946,495	$221,261
Jacks	281	$675,178	$14,719,152	$25,486,492	$40,880,822	$145,362

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.

Table 3.4.3.5 and Table 3.4.3.6 also have similar information as the former tables but focus on vessels using selected gear types. The gears selected are bottom longline, buoy gear (excluding HMS buoy gear), electric rod & reel, pots/traps, diving gear, hook-and-line. The numbers do not differ much from those for all reef fish species because only few gears are excluded.

Table 3.4.3.5. Summary of vessel counts, trips, and logbook landings (pounds gutted weight (lbs gw)) for vessels landing at least one pound of reef fish using certain gears[1], 2010-2016.

Year	Number of Vessels	Number of Gulf Trips that Caught Reef Fish Using Certain Gears	Reef Fish Landings Using Certain Gears (lbs gw)	"Other Species" Landings Jointly Caught with Reef Fish Using Certain Gears (lbs gw)	Number of Other Trips*	Landings on Other Trips (lbs gw)
2010	557	5,525	9,913,243	658,198	271	186,262
2011	539	6,181	13,165,785	921,008	363	323,760
2012	533	6,219	13,822,540	933,986	500	393,268
2013	513	6,020	13,517,568	742,944	385	317,187
2014	547	6,541	15,064,398	852,348	577	442,281
2015	520	6,557	15,209,770	696,020	371	295,186
2016	504	6,445	14,387,502	648,238	418	306,549
Average	530	6,213	13,582,972	778,963	412	323,499

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.
[1]Gears include: Longlines, buoy gear, electric rod & reel, pots/traps, diving gear, hook-and-line.

Ex-vessel Prices

The dockside or ex-vessel price is the price the vessel receives at the first sale of harvest. Over the period 2010-2016, the average annual ex-vessel price per lb of reef fish harvested in the Gulf was $3.78 (2016 dollars) and ranged from $3.36 in 2010 to $4.07 in 2016. For the various species complex, the average prices per lb were $3.88 for snappers, $3.95 for groupers, $2.76 for tilefishes, and $1.41 for jacks.

Individual Fishing Quota

There are two IFQ programs that apply to certain species of reef fish in the Gulf. The Grouper-Tilefish IFQ program is a multi-species program with five share categories: gag, red grouper, other shallow-water groupers, deep-water groupers, and tilefishes. The Red Snapper IFQ program is a single-species, single-share category program. Details of these programs may be found at: http://sero.nmfs.noaa.gov/sustainable_fisheries/lapp_dm/index.html.

Table 3.4.3.6. Summary of vessel counts and revenue (2016 dollars) for vessels landing at least one pound of reef fish using certain gears[1], 2010-2016.

Year	Number of Vessels	Dockside Revenue from Reef Fish Using Certain Gears	Dockside Revenue from "Other Species" Jointly Caught with Reef Fish Using Certain Gears	Dockside Revenue on Other Trips	Total Dockside Revenue	Average Total Dockside Revenue per Vessel
2010	557	$33,255,543	$1,014,099	$254,772	$34,524,414	$61,983
2011	539	$44,666,622	$1,361,835	$519,977	$46,548,434	$86,361
2012	533	$49,158,059	$1,369,901	$681,022	$51,208,982	$96,077
2013	513	$52,535,811	$1,284,765	$752,633	$54,573,209	$106,381
2014	547	$59,714,333	$1,393,637	$984,861	$62,092,831	$113,515
2015	520	$61,862,116	$1,203,448	$541,543	$63,607,107	$122,321
2016	504	$58,500,690	$1,081,828	$591,684	$60,174,202	$119,393
Average	530	$51,384,739	$1,244,216	$618,070	$53,247,026	$100,862

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.
[1]Gears include: Longlines, buoy gear, electric rod & reel, pots/traps, diving gear, hook-and-line.

Commercial Sector Business Activity

Estimates of the business activity (economic impacts) in the U.S. associated with the commercial harvests of Gulf reef fish and certain species complexes were derived using the model developed for and applied in NMFS (2015) and are provided in Table 3.4.3.7. Business activity for the commercial sector is characterized in the form of full-time equivalent (FTE) jobs, output (sales) impacts (gross business sales), income impacts (wages, salaries, and self-employed income), and value added impacts (difference between the sales price of a good and the cost of the goods and services needed to produce it). Income impacts should not be added to output (sales) impacts because this would result in double counting. 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).

Table 3.4.3.7. Average annual business activity (thousand 2016 dollars) associated with the harvests of vessels that harvested reef fish in the Gulf, 2010-2016. Dollar values are in thousand 2016 dollars.

Species	Average Annual Dockside Revenue	Jobs	Output (Sales) Impacts	Income Impacts	Value Added Impacts
Reef fish	$52,129	6,959	$516,957	$189,845	$268,229
Snappers	$26,438	3,529	$262,185	$96,284	$136,038
Groupers	$23,678	3,161	$234,812	$86,231	$121,834
Tilefishes	$1,112	149	$11,032	$4,051	$5,724
Jacks	$675	90	$6,696	$2,459	$3,474
All species*	$54,949	7,336	$544,926	$200,116	$282,741

Source: Revenue data from SEFSC-SSRG Socioeconomic Panel v.4 July 2017 and economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).
*Includes dockside revenues and economic activity associated with the average annual harvest of all species, including reef fish, harvested by vessels that harvested reef fish in the Gulf.

In addition to the business activities generated by commercial vessel landings of reef fish or certain species groups, business activities associated with commercial vessel landings of all other species landed by commercial vessels are also presented in the tables above. Vessels that harvested reef fish or species group also harvested other species on trips where reef fish or a species group were harvested, and some took other trips in the Gulf on which no reef fish were harvested, as well as trips in the South Atlantic. All revenues from all species harvested on all of these trips contributed towards making these vessels economically viable and contribute to the economic activity associated with these vessels.

Dealers

Commercial vessels landing reef fish can only sell their catch to seafood dealers with valid Gulf and South Atlantic Dealer (GSAD) permit. On March 3, 2017, there were 412 dealers with valid GSAD permit. There are no income or sales requirements to acquire a GSAD permit. As a result, the total number of dealers can vary over the course of the year and from year to year.

Imports

Information on the imports of all snapper and grouper species, either fresh or frozen, are available at: http://www.st.nmfs.noaa.gov/st1/trade/cumulative_data/TradeDataProduct.html. Information on the imports of individual snapper or grouper species, including golden tilefish, is not available. In 2016, imports of all snapper and grouper species (fresh and frozen) were approximately 57.20 million pounds valued at approximately $176.86 million. The dominance of imports is apparent when contrasted with reef fish landings in the Gulf of approximately 15.21 million pounds, with an ex-vessel value of approximately $60.25 million, in 2016.

Recreational Sector

Angler Effort

Recreational effort derived from the Marine Recreational Information Program (MRIP) database can be characterized in terms of the number of trips as follows:

- Target effort – The number of individual angler trips, regardless of duration, where the intercepted angler indicated that the species or a species in the species group was targeted as either the first or second primary target for the trip. The species did not have to be caught.
- Catch effort – The number of individual angler trips, regardless of duration and target intent, where the individual species or a species in the species group was caught. The fish did not have to be kept.
- Total recreational trips – The total estimated number of recreational trips in the Gulf, regardless of target intent or catch success.

Other measures of effort are possible, such as directed trips (the number of individual angler trips that either targeted or caught a particular species). Estimates of the number of reef fish target trips and catch trips for the shore, charter, and private/rental boat modes in the Gulf for 2010-2016 are provided in Table 3.4.3.8. Florida has the highest number of target and catch trips for reef fish, followed by Alabama. The other two states show much lower number of target and catch trips for reef fish but nonetheless are not negligible. Over the period examined, reef fish were most commonly targeted by private/rental anglers, and average reef fish target effort totaled approximately 1.37 million trips per year across all modes. Although more trips caught reef fish, approximately 2.85 million trips per year from all modes, than targeted reef fish, the difference between target and catch trips is not substantially large.

Similar analysis of recreational effort is not possible for the headboat mode because headboat data are not collected at the angler level. Estimates of effort by the headboat mode are provided in terms of angler days, or the number of standardized 12-hour fishing days that account for the different half-, three-quarter-, and full-day fishing trips by headboats. The stationary "fishing for demersal (bottom-dwelling) species" nature of headboat fishing, as opposed to trolling, suggests that most, if not all, headboat trips and, hence, angler days, are demersal or reef fish trips by intent. Estimates of headboat effort (angler days) are provided in Table 3.4.3.9. Headboat data is collected by the NMFS Southeast Region Headboat Survey (SRHS).

Permits

The for-hire sector is comprised of charter vessels and headboats (party boats). Although charter vessels tend to be smaller, on average, than headboats, the key distinction between the two types of operations is how the fee is determined. On a charter boat trip, the fee charged is for the entire vessel, regardless of how many passengers are carried, whereas the fee charged for a headboat trip is paid per individual angler.

Table 3.4.3.8. Average (2010-2016) number of reef fish recreational target and catch trips, by mode and by state*.

	Shore Mode	Charter Mode	Private/Rental Mode	All Modes
Target Trips				
Alabama	5,440	21,564	125,254	152,257
Florida	153,990	120,013	894,790	1,168,793
Mississippi	nr	5,594	30,365	35,959
Louisiana	nr	315	15,191	15,506
Total	159,429	147,487	1,065,599	1,372,515
Catch Trips				
Alabama	15,634	46,320	159,184	221,138
Florida	495,809	356,192	1,678,604	2,530,605
Mississippi	4,960	9,182	58,243	72,385
Louisiana	2,722	593	30,688	34,002
Total	519,124	412,287	1,926,719	2,858,130

Source: MRIP database, NMFS, SERO.
*"nr" = none recorded. Averages based on positive entries; "nr" entries are not assumed equivalent to "0" trips; Texas is not covered in the MRFSS/MRIP, so no target or catch trips are available for the state.

Table 3.4.3.9. Headboat angler days and percent distribution, by state, 2011-2015.

	Angler Days				Percent Distribution			
	FLW	**NWFL -**	**MS-LA****	**TX**	**FLW**	**FL-AL**	**MS-LA**	**TX**
2010	70,424	40,594	715	47,154	44.3%	25.5%	0.5%	29.7%
2011	79,722	77,303	3,657	47,284	38.3%	37.2%	1.8%	22.7%
2012	84,205	77,770	3,680	51,776	38.7%	35.8%	1.7%	23.8%
2013	94,752	80,048	3,406	55,749	40.5%	34.2%	1.5%	23.8%
2014	102,84	88,524	3,257	51,231	41.8%	36.0%	1.3%	20.8%
2015	107,91	86,473	3,587	55,135	42.6%	34.2%	1.4%	21.8%
2016	109,09	90,875	2,952	54,077	42.5%	35.4%	1.1%	21.0%
Averag	92,707	77,370	3,036	51,772	41.2%	34.4%	1.4%	23.0%

Source: NMFS Southeast Region Headboat Survey (SRHS).
*Beginning in 2013, HBS data was reported separately for NW Florida and Alabama, but has been combined here for consistency with previous years.
**Headboats from Mississippi and Louisiana are combined for confidentiality purposes.

A federal charter/headboat (for-hire) vessel permit is required for fishing in federal waters for Gulf reef fish. On March 3, 2017, there were 1,179 vessels with a valid (non-expired) or renewable Gulf for-hire reef fish permit (including historical captain permits). A renewable permit is an expired limited access permit that may not be actively fished, but is renewable for up to one year after expiration. The Gulf reef fish for-hire permits are limited access permits. Most for-hire vessels possess more than one for-hire permit.

Although the for-hire permit application collects information on the primary method of operation, the permit itself does not identify the permitted vessel as either a headboat or a charter vessel and vessels may operate in both capacities. However, if a vessel meets certain selection criteria used by the SRHS and is selected to report by the Science Research Director (SRD) of the Southeast Fisheries Science Center (SEFSC), it is determined to operate primarily as a headboat and is required to submit harvest and effort information to the SRHS. As of February 2017, 73 Gulf headboats were registered in the SRHS (K. Fitzpatrick, NMFS SEFSC, pers. comm.).

Information on Gulf charter vessel and headboat operating characteristics is included in Savolainen et al. (2012) and is incorporated herein by reference. The average charter vessel operation took 46 full-day (9 hours) and 55 half-day (5 hours) trips per year, carried 4.8 and 4.6 passengers per trip type, respectively, targeted reef fish and pelagic species on 64% and 19% of all trips, respectively, and took 68% of all trips in the EEZ. The average headboat operation took 83 full-day (10 hours) and 37 half-day (6 hours) trips per year, carried 13.1 and 14.6 passengers per trip type, respectively, targeted reef fish and pelagic species on 84% and 6% of all trips, respectively, and took 81% of all trips in the EEZ.

There are no specific federal permitting requirements for recreational anglers to fish for or harvest reef fish. Instead, anglers are required to possess either a state recreational fishing permit that authorizes saltwater fishing in general, or be registered in the federal National Saltwater Angler Registry system, subject to appropriate exemptions. For the for-hire sector, customers are authorized to fish under the charter or headboat vessel license and are not required to hold their own fishing licenses. As a result, it is not possible to identify with available data how many individual anglers would be expected to be affected by this amendment.

Economic Value

Economic value can be measured in the form of consumer surplus (CS) per additional fish kept on a trip for anglers (the amount of money that an angler would be willing to pay for a fish in excess of the cost to harvest the fish). The CS value per fish for all reef fish species or species complex is unknown but a proxy may be used to approximate the CS per fish. Haab et al. (2012) estimated a CS for an additional snapper caught and kept of $12.25 (2016 dollars), with bounds of $8.17 and $17.69 at the 95 percent confidence interval.

Economic value for for-hire vessels can be measured by producer surplus (PS) per passenger trip (the amount of money that a vessel owner earns in excess of the cost of providing the trip). Estimates of the PS per for-hire passenger trip are not available. Instead, net operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. For vessels in the Gulf, the estimated NOR value is $155 (2016 dollars) per charter angler trip (Liese and Carter 2011). The estimated NOR value per headboat angler trip is $54 (2016 dollars) (C. Liese, NMFS SEFSC, pers. comm.).

Business Activity

Recreational fishing generates economic activity as consumers spend their income on various goods and services needed for recreational fishing. This spurs economic activity in the region where recreational fishing occurs. It should be clearly noted that, in the absence of the opportunity to fish, the income would presumably be spent on other goods and services and these expenditures would similarly generate economic activity in the region where the expenditure occurs. As such, the analysis below represents a distributional analysis only.

Estimates of the business activity (economic impacts) associated with recreational angling for reef fish were derived using average impact coefficients for recreational angling for all species, as derived from an add-on survey to the Marine Recreational Fisheries Statistics Survey (MRFSS) to collect economic expenditure information, as described and utilized in NMFS (2016). Estimates of the average expenditures by recreational anglers are also provided in NMFS (2016) and are incorporated herein by reference.

Recreational fishing generates business activity (economic impacts). Business activity for the recreational sector is characterized in the form of full-time equivalent jobs, output (sales) impacts (gross business sales), income impacts, and value-added impacts (difference between the value of goods and the cost of materials or supplies). Estimates of the average reef fish target effort (2010-2016) and associated business activity (2016 dollars) are provided in Table 3.4.3.10.

The average annual target effort for reef fish over the period 2010-2016 supported an estimated 970 jobs in Florida and generated approximately $115.6 million in output (sales) impacts, $65.4 million in value added impacts, and $41.0 million in income impacts. The corresponding numbers for the other states are: 181 jobs, $20.1 million in output impacts, $10.5 million in value added impacts, and $6.7 million in income impacts in Alabama; 29 jobs, $3.5 million in output impacts, $1.6 million in value added impacts, and $1.1 million in income impacts in Mississippi; 9 jobs, $1.2 million in output impacts, $0.6 million in value added impacts, and $0.3 million in income impacts in Louisiana.

Estimates of the business activity associated with headboat effort are not available. Headboat vessels are not covered in the MRFSS/MRIP so, in addition to the absence of estimates of target effort, estimation of the appropriate business activity coefficients for headboat effort has not been conducted. For the same reason, estimation of business activity for Texas has not been conducted.

Table 3.4.3.10. Summary of reef fish target trips (2010-2016 average) and associated business activity. Dollar values are in thousand 2016 dollars. Output, value added, and income impacts are not additive.

	Impacts			
	Florida	**Alabama**	**Mississippi**	**Louisiana**
	Shore Mode	**Shore Mode**	**Shore Mode**	**Shore Mode**
Target Trips	153,990	5,440		
Value Added Impact	$2,549	$196		
Output Impact	$4,197	$354		
Income Impact	$1,459	$116		
Jobs	41	4		
	Priv/Ren Mode	**Priv/Ren Mode**	**Priv/Ren Mode**	**Priv/Ren Mode**
Target Trips	894,790	125,254	30,365	15,191
Value Added Impact	$19,732	$3,477	$428	$536
Output Impact	$33,299	$6,716	$986	$1,105
Income Impact	$11,442	$2,019	$256	$290
Jobs	304	67	8	8
	Charter Mode	**Charter Mode**	**Charter Mode**	**Charter Mode**
Target Trips	120,013	21,564	5,594	315
Value Added Impact	$43,139	$6,830	$1,258	$98
Output Impact	$78,190	$13,080	$2,536	$170
Income Impact	$28,160	$4,663	$873	$66
Jobs	626	110	21	1
	All Modes	**All Modes**	**All Modes**	**All Modes**
Target Trips	1,168,793	152,258	35,959	15,506
Value Added Impact	$65,421	$10,503	$1,686	$634
Output Impact	$115,685	$20,150	$3,521	$1,275
Income Impact	$41,061	$6,798	$1,129	$355
Jobs	970	181	29	9

Source: Effort data from the MRIP, economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).

3.5 Description of the Social Environment

This amendment affects the management of deep-water octocorals in the Gulf, as well as fishermen and communities associated with fisheries in the Gulf, particularly the shrimp and reef fish fisheries.

This section includes a description of permits, endorsements, and licenses related to the commercial and recreational harvesting of octocorals, commercial shrimp fishing, and commercial and recreational reef fish fishing. Permits, endorsements, and licenses are presented by state in order to provide a geographic distribution of fishing involvement. Top communities based on the number of permits, endorsements, or licenses are presented.

In addition, descriptions of communities include information about the top communities based on a 'regional quotient' (RQ) of commercial landings and value for shrimp or reef fish. The RQ is the proportion of landings and value out of the total landings and value of that species for that region, and is a relative measure. These communities would be most likely to experience the effects of the proposed actions that could change the shrimp and reef fish fisheries and impact participants, associated businesses, and communities within the region. If a community is identified as a shrimp or reef fish community based on the RQ, this does not necessarily mean that the community would experience significant impacts due to changes in the fishery if a different species or number of species was also important to the local community and economy. Additional detailed information about communities with the highest RQs can be found for Gulf communities on the Southeast Regional Office (SERO)'s Community Snapshots website at http://sero.nmfs.noaa.gov/sustainable_fisheries/social/community_snapshot/.

Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Lastly, social vulnerability data are presented to assess the potential for environmental justice concerns.

3.5.1 Octocorals

The harvest of octocorals is known to occur in the waters adjacent to Florida. From 1990 to 2016, landings of octocorals have ranged from 6 colonies to 7,110 colonies per year in state waters and 357 colonies to 8,706 colonies per year in federal waters (FWC, pers. comm.). As described in Section 2.1, the harvest of octocorals is currently managed by Florida in state and federal waters, with a state saltwater fishing license required for recreational collectors and a marine life endorsement required for commercial collectors.

Commercial

From 2011 to 2016, Gulf commercial landings of octocorals have ranged from a total of 6,724 colonies to 13,813 colonies per year in state and federal waters (Appendix Table 1). During the same time period, the number of harvesting trips in the Gulf has ranged from 201 to 293 trips per year (Appendix Table 1).

Recreational

In 2016, a total of 1,457,278 saltwater fishing licenses were sold (J. Torres, FWC, pers. comm.). Because of the large number of saltwater fishing licenses issued and the likelihood of octocoral harvests being conducted by a relatively small subset of these license holders, saltwater fishing license holders are not detailed here.

3.5.2 Shrimp

Commercial

As of August 23, 2017, there were a total of 1,429 federally-permitted Gulf shrimp vessels (SERO permit office). Gulf shrimp permits are issued to individuals in Texas (approximately 38% of Gulf shrimp vessels), Louisiana (approximately 27%), Florida (14%), Alabama (7.4%), and Mississippi (approximately 7%, SERO permit office, August 23, 2017). Residents of other states (Alaska, California, Georgia, Hawaii, Massachusetts, Michigan, Minnesota, North Carolina, New Jersey, New Mexico, New York, Oklahoma, South Carolina, Tennessee, and Virginia) also hold commercial shrimp permits, but these states represent a smaller percentage of the total number of issued permits.

Gulf shrimp permits are held by individuals with mailing addresses in a total of 245 communities (SERO permit office, August 23, 2017). Communities with the most commercial shrimp permits are located in all Gulf states (Table 3.5.2.1). The communities with the most shrimp permits are Brownsville, Texas (5.9% of shrimp permits), followed by Port Isabel, Texas (5.1%), and Palacios, Texas (4.8%).

The top shrimp communities ranked by pounds of commercial landings are dominated by Texas and Louisiana communities, though Bayou La Batre, Alabama, ranks first in terms of pounds of overall shrimp landings (brown, white, pink, royal red, rock, and seabob, Figure 3.5.2.1). Palacios, Texas, ranks second in terms of value RQ for total shrimp and Chauvin, Louisiana is third. Many Louisiana communities have a lower RQ for value, which indicates lower prices for smaller shrimp in most cases.

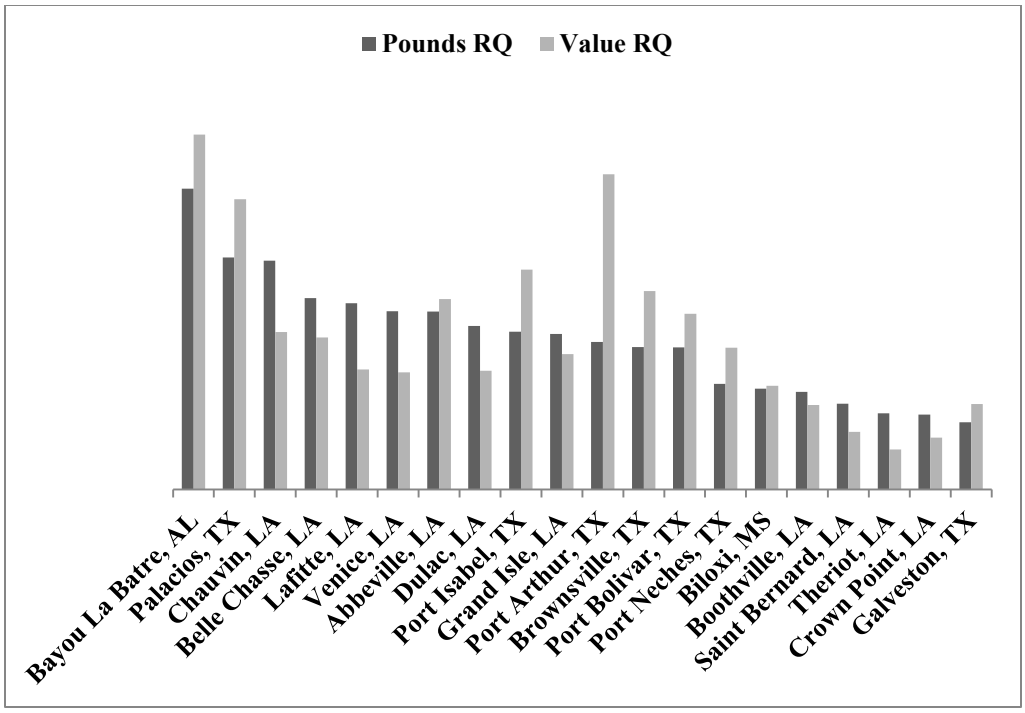

Figure 3.5.2.1. Top 20 Gulf communities ranked by pounds and value RQ for total shrimp. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS 2014.

A valid Gulf shrimp permit is required for a Gulf royal red shrimp endorsement. As of August 23, 2017, there were a total of 291 federally-endorsed Gulf royal red shrimp vessels (SERO permit office). Gulf royal red shrimp endorsements are issued to individuals in Texas (36%), Florida (16%), Alabama (14%), Louisiana (13.8%), North Carolina (approximately 9%), and Mississippi (approximately 5%, SERO permit office, August 23, 2017). Residents of other states (California, Georgia, Massachusetts, New Jersey, and Virginia) also hold royal red shrimp endorsements, but these states represent a smaller percentage of the total number of issued permits.

Royal red shrimp endorsements are held by individuals with mailing addresses in a total of 88 communities (SERO permit office, August 23, 2017). Communities with the most royal red shrimp endorsements are located in all Gulf states, as well as North Carolina and Virginia (Table 3.5.2.1). The communities with the most royal red shrimp endorsements are Brownsville, Texas (15.1% of royal red endorsements), followed by Port Isabel, Texas (11.7%), and Bayou La Batre, Alabama (5.5%).

Gulf royal red shrimp is landed primarily in Alabama and Florida (Figure 3.5.2.2). Royal red shrimp is also landed in Texas and Louisiana, but communities in these states represent a smaller proportion of the total landings. The communities of Bon Secour, AL; Port St. Joe, FL; and Bayou La Batre, AL are the top ports in terms of commercial landings.

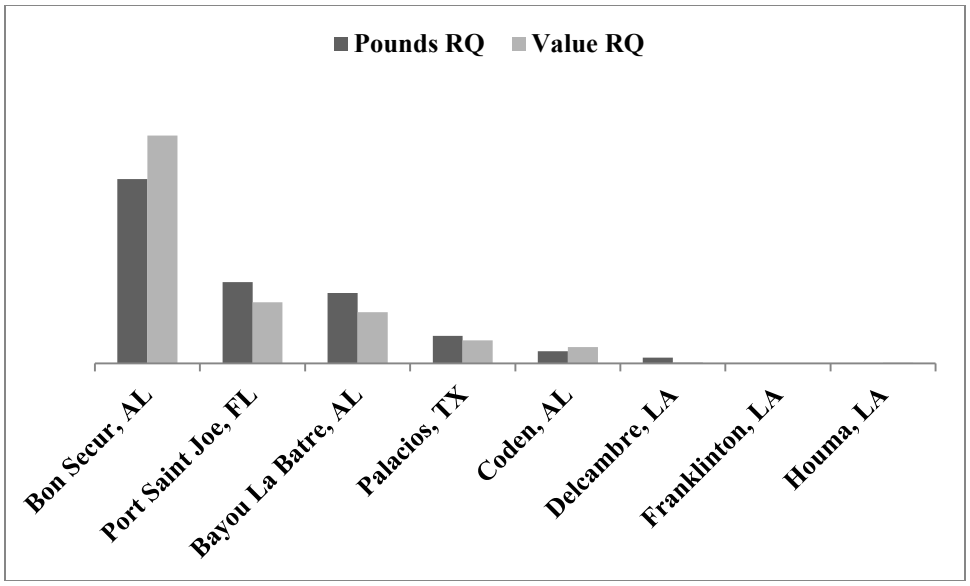

Figure 3.5.2.2. All Gulf communities ranked by pounds and value RQ for royal red shrimp. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS 2014.

Table 3.5.2.1. Top communities by number of Gulf shrimp permits and Gulf royal red shrimp endorsements.

State	Community	Shrimp Permits (SPGM)	State	Community	Royal Red Shrimp Endorsements (GRRS)
TX	Brownsville	84	TX	Brownsville	44
TX	Port Isabel	73	TX	Port Isabel	34
TX	Palacios	69	AL	Bayou La Batre	16
LA	Chauvin	42	NC	Oriental	14
TX	Houston	38	FL	Fort Meyers Beach	13
LA	Cut Off	36	AL	Irvington	9
TX	Port Lavaca	33	FL	Jacksonville	9
AL	Bayou La Batre	30	LA	Chauvin	7
FL	Fort Meyers Beach	29	FL	Pensacola	6
TX	Port Arthur	28	AL	Mobile	5
AL	Mobile	25	LA	Abbeville	5
TX	Nederland	25	MS	Ocean Springs	5
LA	Abbeville	24	NC	New Bern	5
MS	Biloxi	24	VA	Newport News	5
LA	Houma	23	NC	Hobucken	4
LA	New Orleans	23			

Source: SERO permit office, August 23, 2017.

3.5.3 Reef Fish

Commercial

As of August 23, 2017, there were a total of 842 federally-permitted commercial Gulf reef fish vessels (SERO permit office). Gulf reef fish permits are issued to individuals in Florida (approximately 79% of Gulf reef fish vessels), Texas (9%), Louisiana (4.6%), Alabama (4.3%), and Mississippi (less than 1%, SERO permit office, August 23, 2017). Residents of other states (California, Georgia, Maine, North Carolina, New Jersey, New York, Ohio, Oregon, South Carolina, and Wisconsin also hold commercial reef fish permits, but these states represent a smaller percentage of the total number of issued permits.

Gulf reef fish permits are held by individuals with mailing addresses in a total of 220 communities (SERO permit office, August 23, 2017). Communities with the most commercial reef fish permits are located in Florida and Texas (Table 3.5.3.1). The communities with the most reef fish permits are Panama City, Florida (approximately 8% of reef fish permits), followed by Key West, Florida (4.4%), and St. Petersburg, Florida (3.4%).

Table 3.5.3.1. Top communities by number of Gulf reef fish permits and Eastern Gulf reef fish bottom longline endorsements.

State	Community	Reef Fish Permits (RR)	State	Community	Eastern Gulf Reef Fish Bottom Longline Endorsements (RRLE)
FL	Panama City	67	FL	Seminole	8
FL	Key West	37	FL	Cortez	7
FL	St. Petersburg	29	FL	Largo	6
FL	Largo	23	FL	Lecanto	4
TX	Galveston	23	FL	Palm Harbor	4
FL	Destin	19	FL	St. Petersburg	4
FL	Pensacola	19	FL	Indian Shores	3
FL	Seminole	18	FL	Panama City	3
FL	Cortez	17			
FL	Apalachicola	15			
FL	Clearwater	14			
TX	Corpus Christi	14			
FL	Naples	13			
FL	Fort Meyers	12			
FL	Steinhatchee	12			
FL	Tarpon Springs	12			

Source: SERO permit office, August 23, 2017.

A valid Gulf reef fish permit is required for a commercial Eastern Gulf reef fish bottom longline endorsement. As of August 23, 2017, there were a total of 62 federally-endorsed commercial Eastern Gulf reef fish bottom longline vessels (SERO permit office). Nearly all Eastern Gulf

reef fish bottom longline endorsements are issued to individuals in Florida, with one endorsement issued to an individual in Texas. Longline endorsements are held by individuals with mailing addresses in 25 communities and a large portion of these communities are located in the greater Tampa Bay area in Pinellas County and Manatee County (about 60% of communities with bottom longline endorsements, SERO permit office, August 23, 2017). The communities with the most longline endorsements are Seminole, Florida (approximately 13% of longline endorsements), followed by Cortez, Florida (11.3%), and Largo, Florida (9.7%; Table 3.5.3.1).

The top reef fish communities ranked by pounds of commercial landings are dominated by Florida communities, though Galveston, Texas, ranks first in terms of pounds of overall reef fish landings (snappers, groupers, tilefishes, jacks, triggerfish, and hogfish, Figure 3.5.3.1). Madeira Beach, Florida, ranks second in terms of value RQ for total reef fish and Panama City, Florida is third.

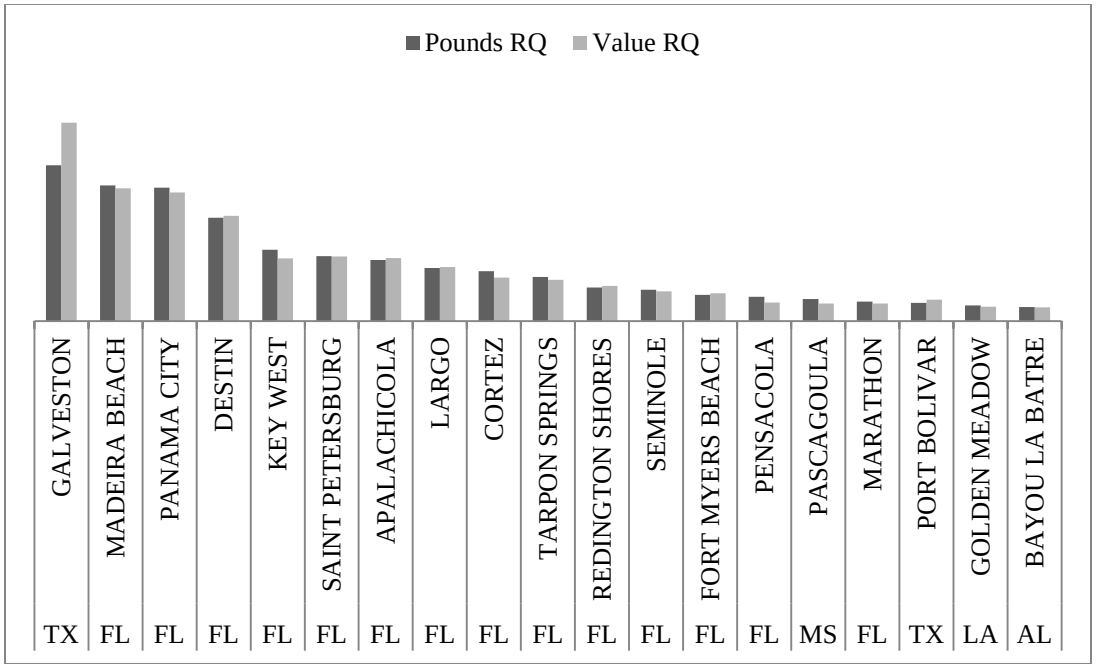

Figure 3.5.3.1. Top 20 Gulf communities ranked by pounds and value RQ for total reef fish. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS 2014.

Recreational

As of August 23, 2017, there were a total of 1,279 federally-permitted charter/headboat for reef fish vessels (SERO permit office). Charter/headboat for reef fish permits are issued to individuals in Florida (approximately 58% of charter/headboat for reef fish vessels), Texas (17.4%), Alabama (10.2%), Louisiana (8.2%), and Mississippi (2.7%, SERO permit office, August 23, 2017). Residents of other states (Connecticut, Delaware, Georgia, Iowa, Illinois, Maine, Michigan, Montana, North Carolina, New Jersey, New York, Ohio, Oklahoma, Tennessee, Virginia, and Wisconsin) also hold charter/headboat permits, but these states represent a smaller percentage of the total number of issued permits.

Charter/headboat for reef fish permits are held by individuals with mailing addresses in a total of 349 communities (SERO permit office, August 23, 2017). Communities with the most commercial reef fish permits are located in Florida, Texas, Alabama, and Louisiana (Table 3.5.3.2). The communities with the most reef fish permits are Destin, Florida (5% of charter/headboat permits), followed by Orange Beach, Alabama (3.8%), and Panama City, Florida (approximately 3.8%).

Table 3.5.3.2. Top communities by number of Gulf charter/headboat for reef fish permits.

State	Community	Charter/Headboat for Reef Fish Permits (RCG)
FL	Destin	64
AL	Orange Beach	49
FL	Panama City	48
FL	Naples	45
FL	Key West	43
FL	Pensacola	26
FL	St. Petersburg	23
TX	Galveston	22
FL	Sarasota	19
TX	Corpus Christi	19
FL	Panama City Beach	18
FL	Clearwater	17
FL	Fort Myers	16
LA	Metairie	16
TX	Houston	16
TX	Port Aransas	16

Source: SERO permit office, August 23, 2017.

As of August 23, 2017, there were a total of 32 federally-permitted historical captain charter/headboat for reef fish vessels (SERO permit office). Historical captain charter/headboat permits are issued to individuals in Florida (approximately 53% of historical captain charter/headboat vessels), Louisiana (19%), Texas (12.5%), Alabama (9.4%), and Mississippi (6.3%, SERO permit office, August 23, 2017).

Historical captain charter/headboat for reef fish permits are held by individuals with mailing addresses in a total of 21 communities (SERO permit office, August 23, 2017). Communities with the most commercial reef fish permits are located in Florida, Alabama, Louisiana, and Mississippi (Table 3.5.3.3). The communities with the most reef fish permits are Naples, Florida, followed by Port St. Joe, Florida, and Orange Beach, Alabama.

Table 3.5.3.3. Top communities by historical captain Gulf charter/headboat for reef fish permits.

State	Community
FL	Naples
FL	Port St. Joe
AL	Orange Beach
FL	Destin
FL	Fort Walton Beach
FL	Panama City
LA	Houma
LA	Metairie
MS	Biloxi

Source: SERO permit office, August 23, 2017.

3.5.4 Environmental Justice

Executive Order 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of Executive Order 12898 is to consider "the 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…" This executive order is generally referred to as environmental justice (EJ).

Commercial and recreational harvesters, fishermen, and associated industries could be impacted by the proposed actions. However, information on the race and income status for groups at the different participation levels is not available. Although information is available concerning communities overall status with regard to minorities and poverty (e.g., census data), such information is not available specific to fishermen and those involved in the industries and activities, themselves. To help assess whether any environmental justice concerns arise from the actions in this amendment, a suite of indices were created to examine the social vulnerability of coastal communities. The three indices are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and households with children under the age of five, disruptions such as higher separation rates, higher crime rates, and unemployment all are signs of populations experiencing vulnerabilities. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Figures 3.5.4.1 and 3.5.4.2 provide the social vulnerability of the top commercial and recreational shrimp and reef fish communities. Several communities exceed the threshold of one standard deviation above the mean for all three indices (Bayou La Batre, Alabama; Brownsville, Texas; Port Arthur, Texas, and Port Isabel, Texas). Several other communities exceed the threshold of one standard deviation above the mean for any of the indices (Fort Myers, Florida; Abbeville, Louisiana; Chauvin, Louisiana; New Orleans, Louisiana; Hobucken, North Carolina; Houston, Texas; Palacios, Texas; and Port Lavaca, Texas). These communities would be the most likely to exhibit vulnerabilities to social or economic disruption due to regulatory change.

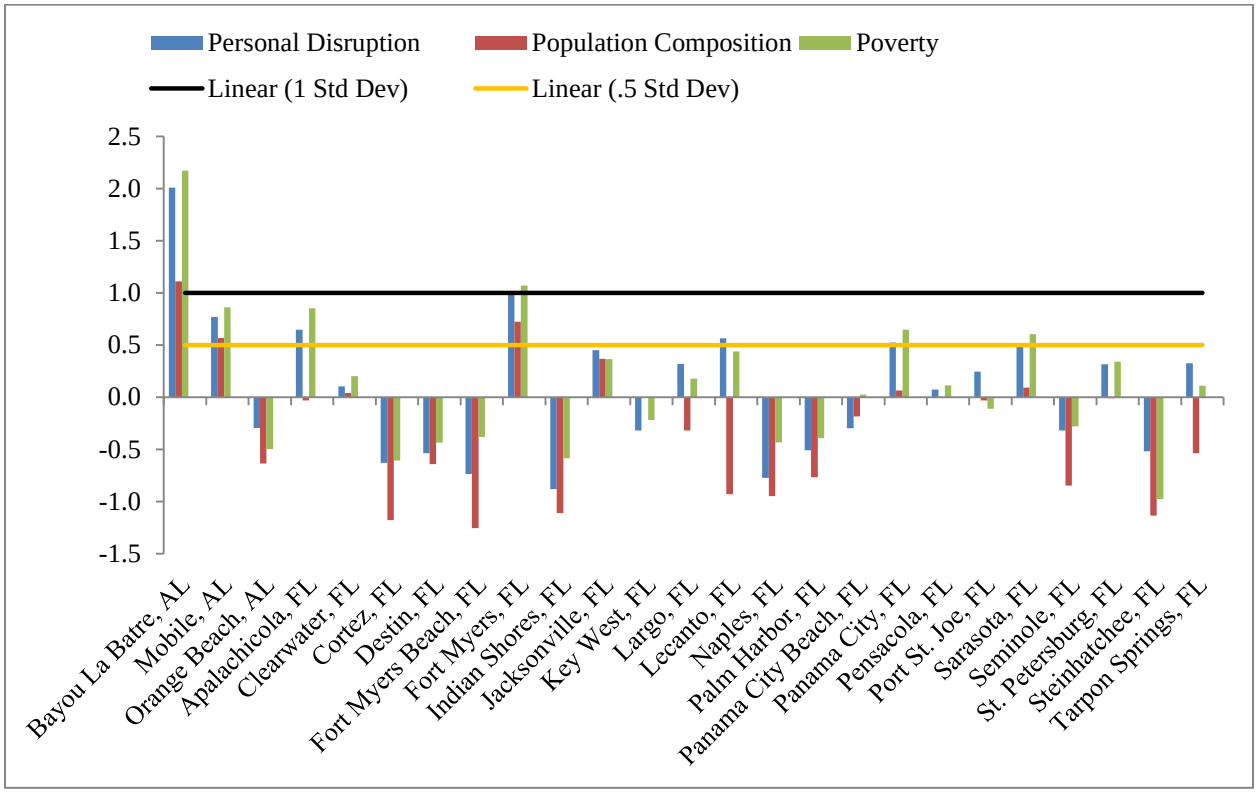

Figure 3.5.4.1. Social vulnerability indices for top commercial and recreational shrimp and reef fish communities based on the number of permits and endorsements.
Source: SERO, Social indicators database (2012).

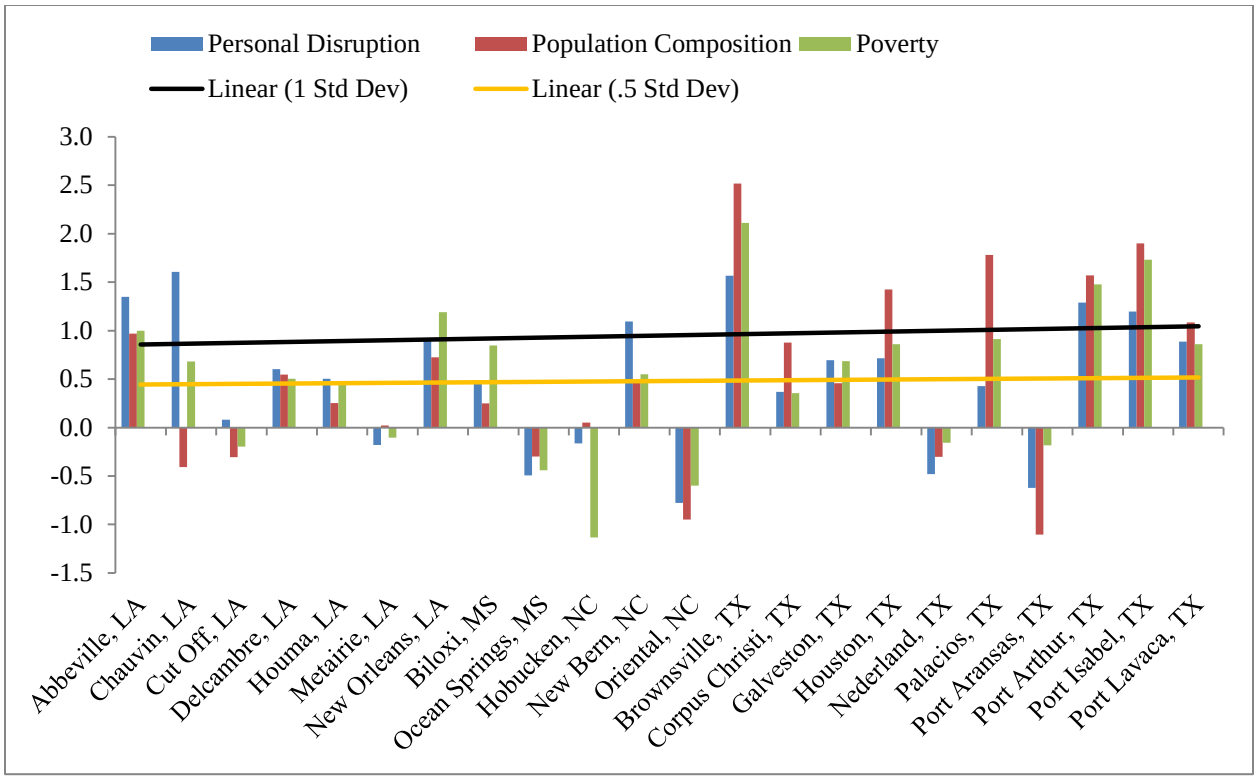

Figure 3.5.4.2. Social vulnerability indices for top commercial and recreational shrimp and reef fish communities based on the number of permits and endorsements continued.
Source: SERO, Social indicators database (2012).

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although these communities may have the greatest potential for EJ concerns, data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on octocorals, shrimp, or reef fish specifically (participation). Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

3.6 Description of the Administrative Environment

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

Responsibility for federal fishery management is shared by 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 FMPs 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 Appendix D. In most cases, the Secretary has delegated this authority to NMFS.

The Council is responsible for fishery resources in federal waters of the Gulf. These waters extend to 200 nautical miles offshore from the nine-mile seaward boundary of the states of Florida and Texas, and the three-mile seaward boundary of the states of Alabama, Mississippi, and Louisiana. The length of the Gulf coastline is approximately 1,631 miles. Florida has the longest coastline of 770 miles along its Gulf coast, followed by Louisiana (397 miles), Texas (361 miles), Alabama (53 miles), and Mississippi (44 miles).

The Council consists of seventeen voting members: 11 public members appointed by the Secretary; one each from the fishery agencies of Texas, Louisiana, Mississippi, Alabama, and Florida; and one from NMFS. The public is also involved in the fishery management process through participation on advisory panels (APs) and through Council meetings that 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 National Oceanic and Atmospheric Administration's Office of Law Enforcement, the United States 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. These activities are being coordinated by the Council's Law Enforcement AP and the Gulf States Marine Fisheries Commission's Law Enforcement Committee, which have developed joint enforcement agreements and cooperative enforcement programs (www.gsmfc.org).

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 of Texas, Louisiana, Mississippi, Alabama, and Florida have the authority to manage their respective state fisheries. Each of the five Gulf States exercises legislative and regulatory authority over their respective state's natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the states' natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources. A more detailed description of each state's primary regulatory agency for marine resources is provided in Reef Fish Amendment 22 (GMFMC 2004b).

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

4.1 Action 1 – Modify Existing HAPC Boundary for Regulations in Pulley Ridge

Pulley Ridge North and Pulley Ridge South were established as HAPCs in Generic Essential Fish Habitat (EFH) Amendment 3 in 2005 (GMFMC 2005). In the amendment, a larger rectangle (Pulley Ridge North) was established as a HAPC, but only a small portion in the southern portion of the rectangle (Pulley Ridge South) was given fishing regulations (Figure 2.1.1). The previous borders of Pulley Ridge South encompassed all known coral habitat.

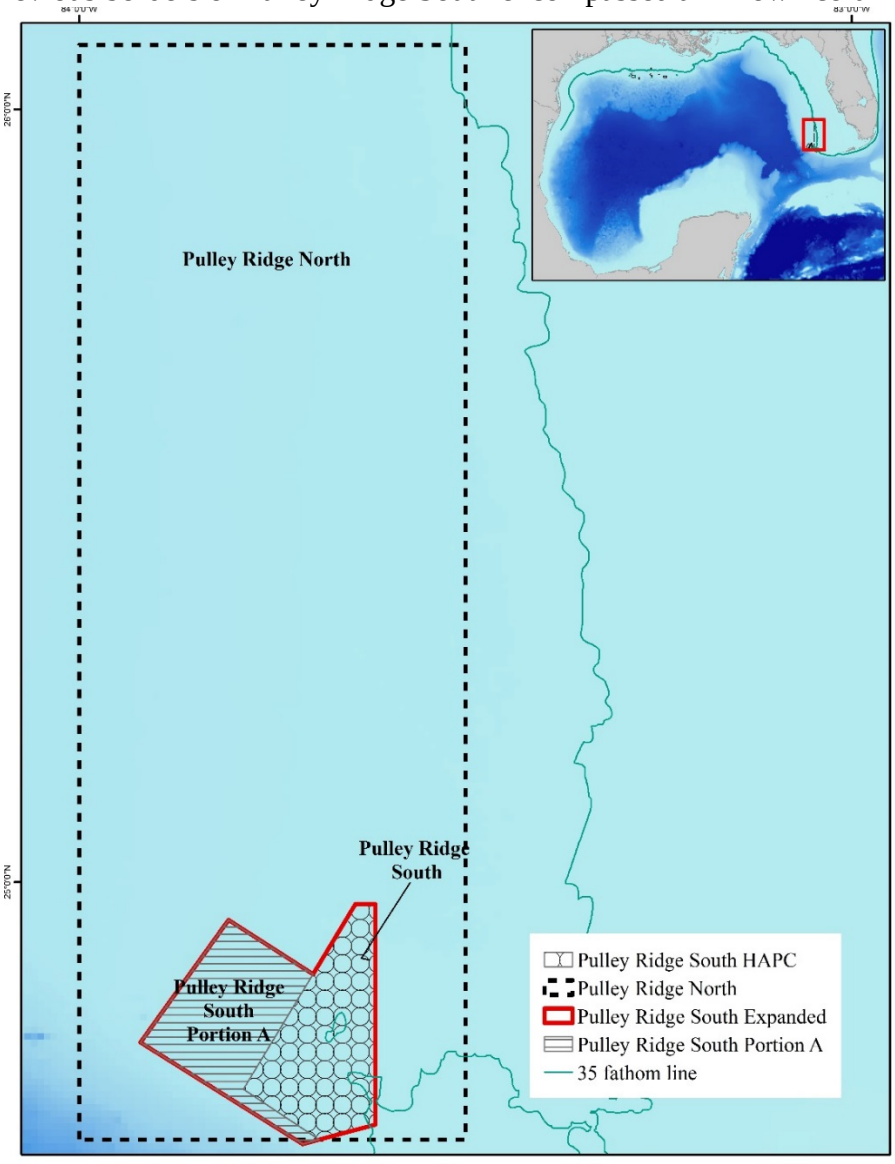

Figure 2.1.1. The existing Pulley Ridge North HAPC, Pulley Ridge South HAPC (with regulations), and the Coral SSC recommended expansion of Pulley Ridge South, labeled Pulley Ridge South Portion A.

Alternative 1: No Action – Do not modify the existing Pulley Ridge South HAPC or change the area subject to fishing regulations. Current regulations to include: fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC (50 CFR 622.74(d)). Pulley Ridge South HAPC is currently bounded by the following coordinates (converted from degrees, minutes, seconds to degrees, decimal minutes), connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Depth Range: 27-109 fathoms Area: 100.7 nm^2	A	83°38.550’	24°58.600’
	B	83°37.000’	24°58.600’
	C	83°37.000’	24°41.367’
	D	83°41.367’	24°40.000’
	E	83°47.250’	24°44.833’
	A	83°38.550’	24°58.600’

Alternative 2: Expand the fishing regulations for Pulley Ridge South HAPC (fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC) to the entire Pulley Ridge North HAPC to be bounded by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge North Depth Range: 27-109 fathoms Area: 2302.4 nm^2	A	84°0.000’	24°40.000’
	B	84°0.000’	26°05.000’
	C	83°30.000’	26°05.000’
	D	83°30.000’	24°40.000’
	A	84°0.000’	24°40.000’

Alternative 3: Modify the existing Pulley Ridge South HAPC to include Pulley Ridge South Portion A, with the same regulations throughout (fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC). The new Pulley Ridge South HAPC will be bounded by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Expansion Depth Range: 27-109 fathoms Area: 194.2 nm^2	A	83°38.550’	24°58.300’
	B	83°37.000’	24°58.300’
	C	83°37.000’	24°41.183’
	D	83°41.366’	24°40.000’
	E	83°42.648’	24°39.666’
	F	83°55.240’	24°47.555’
	G	83°48.405’	24°57.065’
	H	83°41.841’	24°52.859’
	A	83°38.550’	24°58.300’

Preferred Alternative 4: Add a new area, Pulley Ridge South Portion A, within the Pulley Ridge North HAPC adjacent to Pulley Ridge South HAPC with separate regulations. Pulley Ridge South A will have the following regulations: fishing with a bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC. Pulley Ridge South Portion A will be bounded by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Portion A Depth Range: 27-109 fathoms Area: 93.6 nm^2	A	83°41.366’	24°40.000’
	B	83°42.648’	24°39.666’
	C	83°55.240’	24°47.555’
	D	83°48.405’	24°57.065’
	E	83°41.841’	24°52.859’
	F	83°47.250’	24°44.833’
	A	83°41.366’	24°40.000’

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

4.1.1 Direct and Indirect Effects on the Physical and Biological Environments

As this action is responsible for closing an area to bottom tending gear, **Alternative 1** (No Action) would maintain the status quo. The portion of Pulley Ridge that is closed to bottom tending gear would continue to be closed and the portion open to bottom tending gear would continue to be open. **Alternative 1** would have the most negative effects on the physical and biological environments when compared to other alternatives in this action, but would have no effects when compared to the status quo (as it would be maintaining the status quo).

Alternative 2 would have the most positive effects on the physical environment because it would prohibit bottom tending gear in the largest area. This alternative would allow areas that have been affected by bottom tending gear to recover, and would prevent future bottom tending gear from entering. Biologically, **Alternative 2** would have the most positive effect by eliminating bottom tending gear fishing in the largest area, thereby preventing any potential damage to sedentary benthic organisms. However, mapping and scientific evidence suggests that much of this area encompassed in **Alternative 2** is likely soft substrate, and may not be home to many of the long-lived organisms and corals that are the objective of the HAPC protection. Indirect effects from **Alternative 2** could be increased fishing effort in areas outside of the Pulley Ridge HAPC encompassed by the coordinates in **Alternative 2**. As **Alternative 2** includes many areas that are subject to intense fishing, it is likely that this alternative could have negative effects on surrounding areas that may not currently be the target of fishing pressure. Thus, **Alternative 2** could increase damage to the physical environment by increasing use of bottom tending gear in other areas.

Alternative 3 would have positive effects by extending protections from bottom tending gear to an area that has been documented to have coral by recent scientific survey. This alternative would prevent any future damage to the area from bottom tending gear. **Alternative 3** would have direct positive effects on the area encompassed by the coordinates outlined, but could have

indirect negative effects if fishing effort shifted and concentrated in an area outside of this proposed alternative. Currently, there is heavy fishing with bottom longlines in the area identified as having corals and within the coordinates of **Alternative 3**. Fishing gear interacting with the corals within this area has also been documented, though many of the damaged corals were caused by traps and not bottom longlines. There have been instances of monofilament becoming entangled in corals that have been documented.

Preferred Alternative 4 would have the least positive direct effects when compared with **Alternative 2** and **Alternative 3**, but may have the least indirect negative effects when compared with those two alternatives. **Preferred Alternative 4** would maintain the extent of fishing so that historical fishing with bottom tending gear activity that has been documented either via vessel monitoring system (VMS) or electronic logbook (ELB) would continue to be allowed, but no other bottom-tending gear could be used. Since there has been no documented ELB activity, and the VMS activity that has been documented is from vessels that use bottom longlines, **Preferred Alternative 4** would continue to allow bottom longlining while eliminating potential damage from other types of bottom tending gear.

4.1.2 Direct and Indirect Effects on the Economic Environment

This action considers modifying the existing HAPC boundary for regulations in Pulley Ridge. **Alternative 1** (No Action) would not modify the existing Pulley Ridge South HAPC or change the area subject to fishing regulations. **Alternative 2** would expand the fishing regulations for Pulley Ridge South HAPC to the entire Pulley Ridge North HAPC. **Alternative 3** would modify Pulley Ridge South HAPC to include Pulley Ridge South Portion A and utilize the existing regulations from Pulley Ridge South HAPC throughout the area. **Preferred Alternative 4** would add Pulley Ridge South Portion A within Pulley Ridge North, but with separate regulations from Pulley Ridge South HAPC; the one distinction in regulations between the two areas is that Pulley Ridge South HAPC would not allow the use of bottom longline, whereas Pulley Ridge South Portion A would allow the use of that gear.

Alternatives 2, **3**, and **4** would be expected to result in negative direct economic impacts due to the expansion of fishing regulations. **Alternative 2** would be expected to result in the greatest negative direct economic impacts, followed by **Alternative 3** and then **Preferred Alternative 4**, due primarily to the area of expansion. **Preferred Alternative 4**, while having the same area of expansion as **Alternative 3**, would still allow bottom longline gear, thereby having less of an impact on fishermen.

The negative direct economic impacts expected to result from **Alternatives 2**, **3**, and **Preferred Alternative 4** would be due to areas closed for certain gear types, which would affect both commercial and recreational fishing. Some of these losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC areas for continuous fishing. Some positive indirect economic impacts may result from **Alternatives 2**, **3**, and **Preferred Alternative 4** by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

4.1.3 Direct and Indirect Effects on the Social Environment

Additional effects would not be expected from retaining **Alternative 1**, as the existing regulations prohibiting gear that interacts with the bottom would continue to be prohibited within Pulley Ridge South, only. Negative effects would be expected from expanding the area with associated fishing and gear prohibitions. The scope of these effects would relate to the spatial extent of areas that would be covered with new prohibitions, and the types of fishing or bottom gear that would be prohibited in the respective area expansions.

The greatest negative effects would be expected under **Alternative 2**, which would expand the prohibition on all bottom tending gear to the largest area, totaling 2,302.4 nm^2. The intent of this action is to protect significant coral communities, which have not been documented in much of this area. On the other hand, this area is used substantially by fishermen employing bottom longlines and bottom trawling. Thus, negative social impacts from this alternative may not be offset as any coral protection may be minimal. All bottom tending gear, including anchoring would be prohibited under **Alternative 2** resulting in direct negative effects on fishermen.

Alternative 3 would extend the regulations in place under **Alternative 1** to an area nearly twice the size of the existing Pulley Ridge South totaling 194.2 nm^2. This expansion area was found to contain high densities of red grouper pits. Negative effects would be expected for those fishermen who currently use the area, especially bottom longliners who target red grouper. This area is beyond the 35-fathom curve within which bottom longlining is prohibited from June through August each year, and longliners report the area contains important fishing grounds during the months of the 35-fathom curve longline closure.

Preferred Alternative 4 is similar to **Alternative 3**, except there would not be a prohibition on bottom longlining in the expansion area. This would allow bottom longlining for red grouper to continue in the expansion area, where the hard bottom contains plate coral that is not susceptible to breakage as are branching corals. The prohibition on anchoring within the existing boundaries of Pulley Ridge South would continue, along with the prohibition on all other bottom tending gear. Thus, **Preferred Alternative 4** would be expected to result in the fewest direct negative effects among **Alternatives 2**-**4**.

4.1.4 Direct and Indirect Effects on the Administrative Environment

As **Alternative 1** would have no effect on the administrative environment because nothing further would be required. **Alternative 2** and **Alternative 3** would have analogous effects on the administrative environment because they would both require that the boundaries for the existing Pulley Ridge HAPC be updated in the *Federal Register*. **Preferred Alternative 4** would require that an additional set of regulations be proposed and implemented for the extended area outside of Pulley Ridge that are different from the regulations of the existing HAPC; however, it would be unlikely that Alternative 4 would be more of administrative burden than either **Alternative 2** or **Alternative 3**. **Alternative 2**, **Alternative 3**, and **Preferred Alternative 4** would all require more extensive consultations by the National Marine Fisheries Service (NMFS) should any other action (non-fishing activities) be proposed in the area identified. Identification of EFH, HAPCs

or potential restrictions on fishing activities may have some impact on other Federal laws and policies. The implementation of a number of Federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires other Federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.2 Action 2 – New Areas for HAPC Status in the Southeastern Gulf

Alternative 1: No Action. Do not establish any HAPCs in the Southeastern Gulf.

Preferred Alternative 2: Establish a new HAPC named Long Mound bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Long Mound	A	84°47.955’	26°28.835’
Depth Range:	B	84°45.051’	26°28.790’
164-383 fathoms	C	84°45.153’	26°23.562’
Area: 13.6 nm^2	D	84°48.055’	26°23.607’
	A	84°47.955’	26°28.835’

Option a. Do not establish fishing regulations in the Long Mound HAPC
Preferred Option b. Prohibit bottom tending gear in the Long Mound HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named Many Mounds bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Many Mounds	A	84°45.246’	26°13.000’
Depth Range:	B	84°39.559’	26°13.015’
109-383 fathoms	C	84°39.611’	26°10.401’
Area: 13.0 nm^2	D	84°45.435’	26°10.565’
	A	84°45.246’	26°13.000’

Option a. Do not establish fishing regulations in the Many Mounds HAPC
Preferred Option b. Prohibit bottom tending gear in the Many Mounds HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 4: Establish a new HAPC named North Reed bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
North Reed	A	84°48.104’	26°20.993’
Depth Range:	B	84°42.302’	26°20.902’
164-492 fathoms	C	84°42.354’	26°18.289’
Area: 13.6 nm^2	D	84°48.154’	26°18.380’
	A	84°48.104’	26°20.993’

Option a. Do not establish fishing regulations in the North Reed HAPC
Preferred Option b. Prohibit bottom tending gear in the North Reed HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

4.2.1 Direct and Indirect Effects on the Physical and Biological Environments

As this action is responsible for closing an area to bottom tending gear, **Alternative 1** (No Action) would maintain the status quo. None of the areas proposed in this action would be considered HAPCs. **Alternative 1** would have the most negative effects on the physical and biological environments when compared to other alternatives in this action, but would have no effects when compared to the status quo (as it would be maintaining the status quo).

Preferred Alternative 2, **Option a** would not be different for the biological or physical environments than the status quo or **Alternative 1** as the establishment of an HAPC with no regulations does not have any effect on the area. The area proposed for protection in **Preferred Alternative 2** is already considered coral EFH, any extractive purpose would require consultation with NMFS. **Preferred Alternative 2**, **Preferred Option b** would implement bottom tending gear regulations to protect benthic corals from potential damage from bottom-tending gear in the area identified as Long Mound. **Preferred Alternative 2**, **Preferred Option b** would have positive effects by extending protections from bottom tending gear to an area that has been documented to have coral by recent scientific survey. This option would prevent any future damage to the area from bottom tending gear. **Preferred Alternative 2**, **Preferred Option b** would have direct positive effects on the area encompassed by the coordinates outlined, but could have indirect negative effects if fishing effort shifted and concentrated in an area outside of this proposed alternative. However, a shift in fishing effort is unlikely as heavy fishing activity by vessels with bottom tending gear has not been documented in the area proposed for protection under **Preferred Alternative 2**.

Preferred Alternative 3, **Option a** would not be different than the status quo or **Alternative 1** as the establishment of an HAPC with no regulations does not have any effect on the area. The area proposed in **Preferred Alternative 3** is already considered coral EFH, any extractive purpose would require consultation with NMFS**. Preferred Alternative 3**, **Preferred Option b** would have positive effects because it would extend protections from bottom tending gear to an area that has been documented to have coral by recent scientific survey in the area identified as Many Mounds. This option would prevent any future damage to the area from bottom tending gear. **Preferred Alternative 3**, **Preferred Option b** would have direct positive effects on the area encompassed by the coordinates outlined, but could have indirect negative effects if fishing effort shifted and concentrated in an area outside of this proposed alternative. The northeastern corner of the Many Mounds area has some fishing by bottom longlines, but fine-scale data analyses indicate that this is minimal. Thus, the Many Mounds is not an area that has been identified as having much bottom tending gear used and a shift in fishing effort is unlikely.

Preferred Alternative 4, **option a** would not be different than the status quo or **Alternative 1** as the establishment of an HAPC with no regulations does not have any effect on the area. The area proposed in **Preferred Alternative 4** is already considered coral EFH, any extractive purpose would require consultation with NMFS**. Preferred Alternative 4**, **Preferred Option b** would have direct positive effects on the area encompassed by the North Reed site coordinates outlined, but could have indirect negative effects if fishing effort shifted and concentrated in an area outside of this proposed alternative. However, a shift in fishing effort is unlikely as the North

Reed Site is not an area that has been identified as having much bottom tending gear used. The southeastern corner has some fishing by bottom longlines, but fine-scale data analyses indicate that fishing in this area is minimal.

4.2.2 Direct and Indirect Effects on the Economic Environment

This action considers establishing new HAPCs in the Southeastern Gulf, either with or without fishing gear regulations. **Alternative 1** (No Action) would not establish new HAPCs. **Preferred Alternatives 2**, **3**, and **4** would establish, respectively, new HAPCs named Long Mound, Many Mounds, and North Reed. **Preferred Alternatives 2**, **3**, and **4** each contain an **Option a**, which would not establish fishing gear regulations, and an **Preferred Option b**, which would prohibit bottom tending gear.

Selection of **Alternative 1** would not be expected to result in any direct or indirect economic impacts. Selection of **Preferred Alternatives 2**, **3**, or **4** with **Option a** would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Preferred Alternative 2 with **Preferred Option b** would create the new HAPC named Long Mound, with a prohibition on bottom tending gear. Minor negative direct economic effects would be expected to result, as ELB data does not indicate significant shrimping effort in the area. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 3 with **Preferred Option b** would create the new HAPC named Many Mounds, with a prohibition on bottom tending gear. Minor negative direct economic effects would be expected to result, as neither VMS nor shrimp ELB data indicates significant shrimping effort in the area. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 4 with **Preferred Option b** would create the new HAPC named North Reed, with a prohibition on bottom tending gear. Minor negative direct economic effects would be expected to result, as neither VMS nor shrimp ELB data indicates significant shrimping effort in the area. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the

new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

4.2.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established on the West Florida Shelf (WFS). Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2**, **3**, and **4** would each create a new HAPC on the WFS, which do not include prohibitions on bottom tending gear (**Options a**) or do include prohibitions on all bottom tending gear (**Preferred Options b**), including anchoring by fishing vessels. The fewest effects would be expected from **Option a** under each of the alternatives, as an HAPC would be established with no attending restrictions to human activity within each area. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

The potential for negative effects is greater under **Preferred Options b**, as all bottom tending gear would be prohibited within the boundaries of each new HAPC. However, in contrast with the potential expansion of the Pulley Ridge HAPC, the proposed WFS HAPCs are deeper and farther from shore and each covers a smaller area of roughly 13 nm^2. Further, there is little evidence of human activity that would be affected by the fishing and gear restrictions under **Preferred Options b**. From March 2007 until July 2015, there is no record of shrimping or use of bottom tending gear by reef fish fishermen within the proposed Long Mound HAPC (**Preferred Alternative 2**; Figure 2.2.1), suggesting there would be no additional effects in establishing the HAPC compared to **Alternative 1**. Over the same time period, bottom tending gear or shrimp trawls have not been used within the proposed North Reed Site HAPC (**Preferred Alternative 4**). Many Mounds HAPC (**Preferred Alternative 3**) has the greatest record of fishing activity within the proposed site compared to Long Mound and North Reed Site, suggesting the potential for negative effects would be greatest from establishing the Many Mounds HAPC (**Preferred Alternative 3**). Nevertheless, the recorded activity over eight years suggests that any effects may be minimal. It is possible that some fishing effort could shift, although any effects from such effort shifting remain unknown.

4.2.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would have no effect on the administrative environment because nothing further would be required. **Option a** for **Preferred Alternatives 2**, **3**, **4** would have analogous effects on the administrative environment to because they would both require that the new HAPC boundaries be incorporated for EFH consultations, but would not require any associated fishing regulations. As HAPCs are a subset of EFH, and these areas are already considered coral EFH, it is unlikely that there would be much additional administrative burden. **Preferred Option b** for **Preferred Alternatives 2**, **3**, and **4** would require an additional administrative burden of developing and implementing regulations for prohibiting bottom contact gear. Identification of EFH, HAPCs or potential restrictions on fishing activities may have some impact on other

Federal laws and policies. The implementation of a number of Federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires other Federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.3 Action 3 – New Areas for HAPC Status in the Northeastern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Northeastern Region

Preferred Alternative 2: Establish a new HAPC named Alabama Alps Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Alabama Alps Reef Depth Range: 27-109 fathoms Area: 2.7 nm^2	A	88°20.525’	29°16.160’
	B	88°18.990’	29°15.427’
	C	88°19.051’	29°13.380’
	D	88°20.533’	29°14.140’
	A	88°20.525’	29°16.160’

Option a. Do not establish fishing regulations in the Alabama Alps Reef HAPC.
Preferred Option b. Prohibit bottom tending gear in the Alabama Alps Reef HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit the following bottom tending gear in the Alabama Alps HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 3: Establish a new HAPC named L&W Pinnacles and Scamp Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
L&W Pinnacles and Scamp Reef Depth Range: 55-164 fathoms Area: 14.3 nm^2	A	87°48.757’	29°18.595’
	B	87°50.688’	29°18.484’
	C	87°52.484’	29°19.754’
	D	87°51.449’	29°20.401’
	E	87°50.933’	29°20.095’
	F	87°46.631’	29°20.832’
	G	87°46.326’	29°21.473’
	H	87°45.535’	29°21.314’
	I	87°43.465’	29°22.518’
	J	87°42.632’	29°21.144’
	K	87°45.525’	29°19.269’
	A	87°48.757’	29°18.595’

Option a. Do not establish fishing regulations in the L&W Pinnacles and Scamp Reef HAPC.
Preferred Option b. Prohibit bottom tending gear in the L&W Pinnacles and Scamp Reef HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit the following bottom tending gear in the L&W Pinnacles and Scamp Reef HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 4: Establish a new HAPC named Mississippi Canyon 118 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 118 Depth Range: 437-820 fathoms Area: 11.0 nm^2	A	88°30.789’	28°53.183’
	B	88°27.819’	28°53.216’
	C	88°27.782’	28°50.602’
	D	88°27.759’	28°48.944’
	E	88°30.727’	28°48.962’
	A	88°30.789’	28°53.183’

Option a. Do not establish fishing regulations in the Mississippi Canyon 118 HAPC.
Preferred Option b. Prohibit bottom tending gear in the Mississippi Canyon 118 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 5: Establish a new HAPC named Roughtongue Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Roughtongue Reef Depth Range: 27-109 fathoms Area: 13.6 nm^2	A	87°37.527’	29°27.596’
	B	87°31.552’	29°27.621’
	C	87°31.539’	29°25.007’
	D	87°37.510’	29°24.981’
	A	87°37.527’	29°27.596’

Option a. Do not establish fishing regulations in the Roughtongue Reef HAPC.
Preferred Option b. Prohibit bottom tending gear in the Roughtongue Reef HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit the following bottom tending gear in the Roughtongue Reef HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 6: Establish a new HAPC named Viosca Knoll 826 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Viosca Knoll 826 Depth Range: 273-492 fathoms Area: 10.3 nm^2	A	88°3.509’	29°10.920’
	B	87°59.460’	29°10.877’
	C	87°59.448’	29°7.974’
	D	88°3.532’	29°8.017’
	A	88°3.509’	29°10.920’

Option a. Do not establish fishing regulations in the Viosca Knoll 826 HAPC.
Preferred Option b. Prohibit bottom tending gear in the Viosca Knoll 826 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 7: Establish a new HAPC named Viosca Knoll 862/906 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Viosca Knoll 862/906 Depth Range: 164-383 fathoms Area: 18.8 nm^2	A	88°23.608’	29°7.640’
	B	88°20.590’	29°7.603’
	C	88°20.554’	29°3.749’
	D	88°22.016’	29°3.734’
	E	88°21.998’	29°2.367’
	F	88°24.972’	29°2.281’
	G	88°25.044’	29°7.568’
	H	88°25.044’	29°7.592’
	I	88°25.045’	29°7.676’
	A	88°23.608’	29°7.640’

Option a. Do not establish fishing regulations in the Viosca Knoll 862/906 HAPC.
Option b. Prohibit bottom tending gear in the Viosca Knoll 862/906 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Option c. Prohibit bottom tending gear in the Viosca Knoll 862/906 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels. Provide an exemption to the bottom tending gear for fishermen possessing a royal red shrimp endorsement and is fishing with royal red shrimp fishing gear.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

4.3.1 Direct and Indirect Effects on the Physical and Biological Environments

Alternative 1 (No Action) would maintain the status quo and would not propose any new HAPCs. This alternative would have the most negative physical and biological effects on the physical and biological environments when compared to other alternatives in this action, but would have no effects when compared to the status quo (as it would be maintaining the status quo).

Preferred Alternative 2, **Option a** would not be different from **Alternative 1** with regard to the biological and physical environment. **Preferred Alternative 2**, **Option a** compared to **Preferred Alternative 2**, **Preferred Options b** and **c** would have negative physical and biological effects, but would not have negative effects when compared to the status quo (**Alternative 1**). **Preferred Alternative 2**, **Preferred Option b** would have the most positive direct effects as it would eliminate all bottom fishing from Alabama Alps. However, there could be indirect effects if fishing effort were to concentrate in other areas because it has been displaced from this area. **Preferred Alternative 2**, **Option c** would freeze the footprint of fishing so that fishing documented either via VMS or ELB may continue, but prevent other bottom-tending gear from entering the area. Since there has been no documented ELB activity, and the VMS activity that has been documented is from vessels that use bandit rigs, **Preferred**

Alternative 2, **Option c** would continue to allow anchoring by fishing vessels while eliminating potential damage from other types of bottom-tending gear.

Preferred Alternative 3, **Option a** would establish a new HAPC named L&W Pinnacles and Scamp Reef, but would have no effects on the biological or physical environments because it would not be different from the status quo (**Alternative 1**). Compared to **Preferred Alternative 3**, **Preferred Options b** and **c** , **Preferred Alternative 3**, **Option a** would have the least positive direct physical and biological effects because it would not establish any protections from bottom tending fishing gear to the benthic coral community. **Preferred Alternative 3**, **Preferred Option b** would have the most direct positive effects on the physical and biological environment because it would prevent the use of bottom contact gear from within the HAPC (if established) and, therefore, would prevent potential removal of corals or disturbance of the habitat and benthos. **Preferred Alternative 3**, **Option c** would freeze the footprint of fishing so that fishing documented either via VMS or ELB may continue to be allowed, but no other bottom-tending gear would be allowed. Since there has been no documented ELB activity, and the VMS activity that has been documented is from vessels that use bandit rigs, **Preferred Alternative 3**, **Option c** would continue to allow anchoring by fishing vessels while eliminating potential damage from other types of bottom tending gear.

Preferred Alternative 4, **Option a** would establish a new HAPC named Mississippi Canyon 118, but would have no effects on the biological or physical environments because it would not be different from the status quo (**Alternative 1**) other than having the title of HAPC. Compared to **Preferred Alternative 4**, **Preferred Option b**, **Preferred Alternative 4**, **Option a** would have the least positive direct physical and biological effects because it would not establish any protections from bottom tending fishing gear to the benthic coral community that has been documented at Mississippi Canyon 118. **Preferred Alternative 4**, **Preferred Option b** would have the most direct positive effects on the physical and biological environment because it would prevent the use of bottom contact gear from within the HAPC and therefore would prevent removal or disturbance of the habitat and benthos. It is unlikely that **Preferred Alternative 4**, **Preferred Option b** would have indirect effects to the physical or biological environments as it is not an area where much fishing occurs; therefore, it is unlikely to shift effort to other areas if this area is closed to bottom tending fishing gear.

Preferred Alternative 5, **Option a** would establish a new HAPC named Roughtongue Reef, but would have no effects on the biological or physical environments because it would not be different from the status quo (**Alternative 1**). Compared to **Preferred Alternative 5**, **Preferred Option b**, **Preferred Alternative 5**, **Option a** would have the least positive direct physical and biological effects because it would not establish any protections from bottom tending fishing gear to the benthic coral community. **Preferred Alternative 5, Preferred Option b** would have the most direct positive effects on the physical and biological environment because it would prevent the use of bottom contact gear from within the HAPC and therefore would prevent removal or disturbance of the habitat and benthos. **Preferred Alternative 5**, **Option c** would freeze the footprint of fishing so that fishing documented either via VMS or ELB may continue to be allowed, but no other bottom-tending gear could be used. Since there has been no documented ELB activity, and the VMS activity that has been documented is from vessels that

use bandit rigs, **Preferred Alternative 5**, **Option c** would continue to allow anchoring by fishing vessels while eliminating potential damage from other types of bottom tending gear.

Preferred Alternative 6 would establish a new HAPC named Viosca Knoll 826. **A Preferred lternative 6**, **Option a** would have no effects different than the status quo because it would not impose any regulations on the area. Therefore, when compared to **Preferred Alternative 6**, **Preferred Option b**, **Option a** would have potential negative direct effects on the physical and biological environment. **Preferred Alternative 6, Preferred Option b** would have the most direct positive effects on the physical and biological environment because it would prevent bottom tending fishing gear from being used in Viosca Knoll 826. **Preferred Alternative 6**, **Preferred Option b** is unlikely to have any indirect effects because it is not an area that is currently fished with bottom tending gear, therefore it is unlikely that closing this area to bottom tending fishing gear would redistribute fishing effort.

Preferred Alternative 7 would establish a new HAPC named Viosca Knoll 862/906. **Preferred Alternative 7, Option a** would have no effects on the physical and biological environment when compared with **Alternative 1.** When compared with **Preferred Alternative 7**, **Option b** and **Preferred Option c**, **Option a** would have negative effects because it would not protect bottom benthic habitats and corals from potential damage caused by bottom tending gear. There are likely negative indirect effects of **Option b** because it would shift effort from a common royal red shrimp ground to other areas. This could lead to prosecuting deep royal red shrimping in new areas which could harm other sensitive areas that were previously unfished. Currently, the area trawled for royal red shrimp is very narrow, and the royal red shrimp fishermen are well acquainted with the corals in the area and avoid them. Closing this area to royal red shrimping would force those shrimp fishermen to either stop operating or to find new royal red shrimp grounds, which would be expected to have negative effects on the physical and biological environments of those new areas. **Preferred Alternative 7**, **Preferred Option c** would allow the existing fisheries using the area to continue to do so, and thus would have direct positive effects because it would be preventing future use of the area by other bottom tending gear. **Preferred Alternative 7**, **Preferred Option c** would have more negative effects than **Option b** because it would continue to allow bottom trawling by shrimp fishermen. There are no anticipated indirect effects to the physical or biological environment as **Preferred Option c** would freeze the footprint of fishing, but not cause effort to shift to other areas.

4.3.2 Direct and Indirect Effects on the Economic Environment

This action considers establishing new HAPCs in the Northeastern Gulf, either with or without fishing gear regulations. **Alternative 1** (No Action) would not establish new HAPCs. **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** would establish, respectively, new HAPCs named Alabama Alps Reef, L&W Pinnacles and Scamp Reef, Mississippi Canyon 118, Roughtongue Reef, Viosca Knoll 826, and Viosca Knoll 862/906. **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** each contain an **Option a**, which would not establish fishing gear regulations, and a **Preferred Option b** (for all alternative except **Preferred Alternative 7**, which has a **Preferred Option c**) would prohibit bottom tending gear. **Preferred Alternatives 2**, **3**, and **5** contain an **Option c** to prohibit certain bottom tending gear; **Preferred Alternative 7** contains an **Preferred Option c**

to prohibit bottom tending gear while providing an exception for fishermen possessing a royal red shrimp endorsement and fishing with royal red shrimp fishing gear.

Selection of **Alternative 1** would not be expected to result in any direct or indirect economic impacts. Selection of **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** with **Option a** would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Preferred Alternative 2 with either **Preferred Option b** or **Option c** would create the new HAPC named Alabama Alps Reef. Selection of **Preferred Option b** would implement a prohibition on bottom tending gear; selection of **Option c** would prohibit some bottom tending gear while allowing for the use of bottom anchoring by fishing vessels. VMS data indicates that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear and would thereby only be affected by **Preferred Option b**'s prohibition on bottom tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from selection of either **Preferred Option b** or **Option c**. The negative effect would be greater with **Preferred Option b**. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 3 with either **Preferred Option b** or **Option c** would create the new HAPC named L&W Pinnacles and Scamp Reef. Selection of **Preferred Option b** would implement a prohibition on bottom tending gear; selection of **Option c** would prohibit some bottom tending gear while allowing for the use of bottom anchoring by fishing vessels. VMS data indicates that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear and would thereby only be affected by **Preferred Option b**'s prohibition on bottom tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from selection of either **Preferred Option b** or **Option c**. The negative effect would be greater with **Preferred Option b**. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 4 with **Preferred Option b** would create the new HAPC named Mississippi Canyon 118 and prohibit the use of bottom tending gear. Minimal negative direct economic effects would be expected to result, as VMS and Shrimp ELB data indicate that this is not a heavily fished area. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these

activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 5 with either **Preferred Option b** or **Option c** would create the new HAPC named Roughtongue Reef. Selection of **Preferred Option b** would implement a prohibition on bottom tending gear; selection of **Option c** would prohibit some bottom tending gear while allowing for the use of bottom anchoring by fishing vessels. VMS data indicates that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear and would thereby only be affected by **Preferred Option b**'s prohibition on bottom tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from selection of either **Preferred Option b** or **Option c**. The negative effect would be greater with **Preferred Option b**. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 6 with **Preferred Option b** would create the new HAPC named Viosca Knoll 826 and prohibit the use of bottom tending gear. VMS data indicates that this area is minimally fished, and further analysis of the data indicates that most of the fishing occurs with bandit gear. As a result, while not quantifiable, minimal negative direct economic effects would be expected to result from selection of **Preferred Option b**. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 7 with either **Option b** or **Preferred Option c** would create the new HAPC named Viosca Knoll 862/906. Selection of **Option b** would implement a prohibition on bottom tending gear; selection of **Preferred Option c** would also prohibit bottom tending gear while providing an exemption for fishermen with a royal red shrimp endorsement and utilizing royal red shrimp gear. The exemption provided for in **Preferred Option c** is due to nets commonly being retrieved from the bottom in this area, although trawling itself does not generally occur here.

While not quantifiable, negative direct economic effects would be expected to result from selection of either **Option b** or **Preferred Option c**. The negative effect would be greater with **Option b**, as vessels would need to begin net retrieval farther from the new HAPC area than currently occurring. As a result, additional prime shrimping grounds would be fished far less frequently. **Preferred Option c** would lessen these negative effects by allowing a fishery that has historically used the area to continue to do so. The potential remains that expansion of

federal shrimp permit holders into the royal red shrimp fishery could occur, which could negatively impact the biological environment in the new HAPC.

Recreational fishing could also be impacted by the gear restriction. Some of the commercial and recreational losses under **Option b** or **Preferred Option c** would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

4.3.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established in the northeastern region. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2-7** would each create a new HAPC in the northeastern region. The fewest effects would be expected from **Option a** under each of the alternatives, as an HAPC would be established with no attending restrictions on fishing or gear within each area. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

Prohibiting all bottom tending gear including anchoring (**Preferred Options b** except **Preferred Alternative 7** which has a **Preferred Option c**) would be expected to result in negative effects. The effects would be greater for those proposed HAPCs in which there is substantial human activity, and effects would be less for those proposed HAPCs in which there is less human activity. There is substantial fishing activity with bottom tending gear, including bottom longlines and anchoring by both commercial and recreational vertical line fishermen within the proposed sites of Roughtongue Reef (**Preferred Alternative 5**) and L&W Pinnacles and Scamp Reef (**Preferred Alternative 3**), followed by Alabama Alps Reef (**Preferred Alternative 2**), which is smaller and has evidence of less fishing activity. Thus, establishing these HAPCs with a prohibition on all bottom tending gear, including anchoring (**Preferred Options b**), would be expected to result in the greatest negative effects among the alternatives. There is no evidence of shrimp activity within these three proposed HAPCs, so effects are not expected for fishermen engaged in shrimping. In contrast to **Preferred Alternatives 2**, **3**, and **5**, very little shrimp or bottom tending gear is used in the proposed HAPCs of Mississippi Canyon 118 (**Preferred Alternative 4**), Viosca Knoll 826 (**Preferred Alternative 6**), and Viosca Knoll 862/906 (**Preferred Alternative 7**). Thus, negative effects are not expected for those shrimping or fishing with bottom tending gear in these areas. An exception is royal red shrimpers, who retrieve their nets in the waters above the reef but within the proposed boundaries of Viosca Knoll 862/906 and would be negatively affected by **Option b**.

An exception to the prohibition on all bottom tending gear is provided for anchoring (**Options 2c**, **3c**, and **5c**) within three proposed HAPCs: Alabama Alps Reef (**Preferred Alternative 2**),

L&W Pinnacles and Scamp Reef (**Preferred Alternative 3**), and Roughtongue Reef (**Preferred Alternative 5**). Given the substantial fishing activity with vertical line gear in these areas, allowing anchoring would allow this fishing activity to continue. Thus, negative effects would not be expected from **Options c** for **Alternatives 2**, **3**, and **5** compared to the greatest effects expected under **Preferred Options b** for those using vertical line fishing gear. Although there is not a substantial amount of bottom longlining within these proposed HAPCs, for bottom longliners, the effects would be the same between **Preferred Option b** and **Option c**, as bottom longline gear is prohibited under both options.

An exception is also proposed for royal red shrimpers to finish retrieving their nets over the reef area in the proposed Viosca Knoll 862/906 HAPC (**Preferred Alternative 7**, **Preferred Option c**). All other bottom tending gear would be prohibited, resulting in the same effects for all other fishermen as under **Option b**. Using nets in very deep water, royal red shrimpers begin pulling their nets up well outside the boundaries of the proposed Viosca Knoll 862/906 HAPC, but the nets have not reached the surface and would still be in the water within the HAPC, if established. Because these shrimpers do not catch royal reds within the coral area of the proposed HAPC, exempting their nets from the prohibition on bottom tending gear (**Preferred Option c**) would alleviate the potential negative effects on royal red shrimpers while retaining the protections for the coral.

4.3.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would have no effect on the administrative environment because nothing further would be required. **Option a** for **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** would have analogous effects on the administrative environment to because they would both require that the new HAPC boundaries be incorporated for EFH consultations, but would not require any associated fishing regulations. As HAPCs are a subset of EFH, and these areas are already considered coral EFH, it is unlikely that there would be much additional administrative burden. **Preferred Options b** and **c** for **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** would require an additional administrative burden of developing and implementing regulations for prohibiting bottom contact gear. The only difference between **Preferred Options b** and **c** for **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** would be the regulations that are proposed and implemented. Identification of EFH, HAPCs or potential restrictions on fishing activities may have some impact on other Federal laws and policies. The implementation of a number of Federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires other Federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.4 Action 4 – New Areas for HAPC Status in the Northwestern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Northwestern Gulf.

Preferred Alternative 2: Establish a new HAPC named AT 047 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
AT 047 Depth Range: 437- 820 fathoms Area: 6.8 nm^2	A	89°49.404’	27°54.426’
	B	89°46.464’	27°54.486’
	C	89°46.397’	27°51.874’
	D	89°49.336’	27°51.814’
	A	89°49.404’	27°54.426’

Option a. Do not establish regulations in the AT 047 HAPC.
Preferred Option b. Prohibit bottom tending gear in the AT 047 Bank HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named AT 357 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
AT 357 Depth Range: 547-820 fathoms Area: 6.8 nm^2	A	89°43.068’	27°36.259’
	B	89°40.136’	27°36.315’
	C	89°40.073’	27°33.703’
	D	89°43.004’	27°33.646’
	A	89°43.068’	27°36.259’

Option a. Do not establish regulations in the AT 357 HAPC.
Preferred Option b. Prohibit bottom tending gear in the AT 357 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 4: Establish a new HAPC named Green Canyon 852 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 852 Depth Range: 820-1094 fathoms Area: 3.8 nm^2	A	91°8.929’	27°8.354’
	B	91°8.963’	27°5.740’
	C	91°10.610’	27°5.762’
	D	91°10.567’	27°8.376’
	A	91°8.929’	27°8.354’

Option a. Do not establish regulations in the Green Canyon 852 HAPC.
Preferred Option b. Prohibit bottom tending gear in the Green Canyon 852 HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

4.4.1 Direct and Indirect Effects on the Physical and Biological Environments

Alternative 1 (No Action) would maintain the status quo, no new HAPCs would be established in the northwestern Gulf. This alternative is the least conservative, and would have the most negative effects on the physical and biological environment compared to the other alternatives in this action. Any bottom tending gear fishing effort that occurs on the sites proposed in Action 6 would continue, as would the potential harm to coral habitat and associated fauna inflicted by such fishing gear at these locations. However, it would have no effects when compared to the current management scheme, as there are no regulations on the areas in this action at this time.

Preferred Alternative 2, **Option a** would have the same effects on the physical and biological environment as Alternative 1. While a HAPC would be established at AT 047, there would be no regulations associated with it. **Preferred Alternative 2**, **Preferred Option b** would prohibit bottom tending gear on AT 047, which would protect benthic corals at this site from fishing gear interactions. There would be direct positive physical and biological effects on the coral species identified during scientific survey on the area encompassed by the coordinates outlined. **Preferred Alternative 2**, **Preferred Option b** would also have indirect positive effects on the fish and invertebrate populations located within the coordinates outlined, as the protection to corals inherently protects the habitat used by some of these species. There is a risk of indirect negative effects on areas outside of this proposed alternative if fishing effort shifts in response to the bottom tending gear restrictions at AT 047. However, this risk is low as there is minimal bottom tending gear fishing occurring in this area.

Preferred Alternative 3, **Option a** would have the same effects on the physical and biological environment as Alternative 1. While a HAPC would be established at AT 357, there would be no regulations associated with it. **Preferred Alternative 3**, **Preferred Option b** would prohibit bottom tending gear on AT 357, which would protect benthic corals at this site from fishing gear interactions. There would be direct positive effects on the coral species identified during scientific survey on the area encompassed by the coordinates outlined. **Preferred Alternative 3**, **Preferred Option b** would also have indirect positive effects on the fish and invertebrate populations located within the coordinates outlined, as the protection to corals inherently protects the habitat used by some of these species. There is a risk of indirect negative effects on areas outside of this proposed alternative if fishing effort shifts in response to the bottom tending gear restrictions at AT 357. However, this risk is low as there is minimal bottom tending gear fishing occurring in this area.

Preferred Alternative 4, **Option a** would have the same effects on the physical and biological environment as Alternative 1. While a HAPC would be established at Green Canyon 852, there would be no regulations associated with it. **Preferred Alternative 4**, **Preferred Option b** would prohibit bottom tending gear on Green Canyon 852, which would protect benthic corals at this site from fishing gear interactions. There would be direct positive effects on the coral species identified during scientific survey in the area encompassed by the coordinates outlined. **Preferred Alternative 4**, **Preferred Option b** would also have indirect positive effects on the

fish and invertebrate populations located within the coordinates outlined, as the protection to corals inherently protects the habitat used by some of these species. There is a risk of indirect negative effects on areas outside of this proposed alternative if fishing effort shifts in response to the bottom tending gear restrictions at Green Canyon 852. However, this risk is low as there is minimal bottom tending gear fishing occurring in this area.

For each of the **Preferred Alternatives 2-4**, **Option a** is the least conservative and would have the same negative impacts to the physical and biological environment as **Alternative 1** (continued potential harm to corals due to bottom tending gear). **Preferred Option b** would provide the most protection to corals in **Preferred Alternatives 2-4,** as **Preferred Option b** restricts bottom tending gear and would eliminate interactions between this type of gear and any benthic species or habitats found in the sites proposed in Action 6.

4.4.2 Direct and Indirect Effects on the Economic Environment

This action considers establishing new HAPCs in the Northwestern Gulf, either with or without fishing gear regulations. **Alternative 1** (No Action) would not establish new HAPCs. **Preferred Alternatives 2**, **3**, and **4** would establish, respectively, new HAPCs named AT 047, AT 357, and Green Canyon 852. **Preferred Alternatives 2**, **3**, and **4** each contain an **Option a**, which would not establish fishing gear regulations, and an **Preferred Option b**, which would prohibit bottom tending gear.

Selection of **Alternative 1** would not be expected to result in any direct or indirect economic impacts. Selection of **Preferred Alternatives 2**, **3**, or **4** with **Option a** would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Preferred Alternative 2 with **Preferred Option b** would create the new HAPC named AT 047, with a prohibition on bottom tending gear. Minor negative direct economic effects would be expected to result, as there is little evidence of bottom tending gear use in the area. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 3 with **Preferred Option b** would create the new HAPC named AT 357, with a prohibition on bottom tending gear. Minor negative direct economic effects would be expected to result, as neither VMS nor shrimp ELB data indicates that the area is heavily fished with bottom tending gear. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic

impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 4 with **Preferred Option b** would create the new HAPC named Green Canyon 852, with a prohibition on bottom tending gear. Minor negative direct economic effects would be expected to result, as there is little evidence of bottom tending gear use in the area. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

4.4.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established in the northwestern region. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2**-**4** would each create a new HAPC in the northwestern region. Minimal to no effects would be expected from **Option a** under each of the alternatives, as an HAPC would be established with no attending restrictions on fishing or gear within each area. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

The potential for negative effects is greater under **Preferred Options b**, as all bottom tending gear would be prohibited within the boundaries of each new HAPC. However, the proposed HAPCs are deep (from 2622 to 6564 ft [437 to 1,094 fathoms]), far from shore, and each covers a small area of either 3.8 nm^2 or 6.8 nm^2. Further, there is little evidence of human activity that would be affected by the fishing and gear restrictions under **Preferred Options b**. From March 2007 until July 2015, there are minimal shrimp ELB points recorded, and there is no use of the area by reef fish fishermen within any of the proposed HAPCs (Figure 2.4.1), suggesting there would be minimal to no effects in establishing the AT 047 (**Preferred Alternative 2**), AT 357 (**Preferred Alternative 3**) or Green Canyon 852 (**Preferred Alternative 4**) HAPCs compared to **Alternative 1**.

4.4.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would have no impact on the administrative environment as it maintains the status quo. The same is true for **Option a** in **Preferred Alternatives 2**, **3**, and **4** as this option for these alternatives attaches an HAPC label to these sites, but would not confer any fishing regulations.

Preferred Option b for **Preferred Alternatives 2**, **3**, and **4** would require an additional administrative burden of developing and implementing regulations for prohibiting bottom contact gear. Identification of EFH, HAPCs or potential restrictions on fishing activities may have some impact on other Federal laws and policies. The implementation of a number of

Federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires other Federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.5 Action 5 – New Areas for HAPC Status in the Southwestern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Southwestern Gulf.

Preferred Alternative 2: Establish a new HAPC named Harte Bank bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Harte Bank Depth Range: 27-82 fathoms Area: 10.8 nm^2	A	96°36.590’	26°40.826’
	B	96°32.220’	26°40.789’
	C	96°32.308’	26°37.992’
	D	96°36.636’	26°38.043’
	A	96°36.590’	26°40.826’

Preferred Option a. Do not establish fishing regulations in the Harte Bank HAPC.
Option b. Prohibit bottom tending gear in the Harte Bank HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named Southern Bank bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Southern Bank Depth Range: 27-55 fathoms Area: 0.8 nm^2	A	96°31.902’	27°26.923’
	B	96°30.881’	27°26.989’
	C	96°31.134’	27°25.958’
	D	96°31.892’	27°25.958’
	A	96°31.902’	27°26.923’

Preferred Option a. Do not establish fishing regulations in the Southern Bank HAPC.
Option b. Prohibit bottom tending gear in the Southern Bank HAPC. Bottom tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom tending gear.

4.5.1 Direct and Indirect Effects on the Physical and Biological Environments

Alternative 1 (No Action) would maintain the status quo, no new HAPCs would be established in the Southwestern Gulf. This alternative is the least conservative, and would have the most negative effects on the physical and biological environment compared to the other alternatives in this action; however, it would have no effects when compared to the current management scheme, as there are no regulations on the area in this action at this time.

Preferred Alternative 2, **Preferred Option a** would have the same effects on the physical and biological environment as Alternative 1. While a HAPC would be established at Harte Bank, there would be no regulations associated with it. **Preferred Alternative 2**, **Option b** would

prohibit bottom tending gear on Harte Bank, which would protect benthic corals at this site from fishing gear interactions. There would be direct positive effects on the coral species identified during scientific survey on the area encompassed by the coordinates outlined. **Preferred Alternative 2**, **Option b** would also have indirect positive effects on the fish and invertebrate populations located within the coordinates outlined, as the protection to corals inherently protects the habitat used by some of these species. There is a risk of indirect negative effects on areas outside of this proposed alternative if fishing effort shifts in response to the bottom tending gear restrictions at Harte Bank. Based on ELB data, closing this area is unlikely to displace shrimp fishing effort as it is minimal within the outlined coordinates. However the VMS data indicates moderate fishing effort on Harte Bank, so there is a possibility that closing this area to bottom tending gear would shift effort from these fisheries elsewhere in the region.

Preferred Alternative 3, **Preferred Option a** would have the same effects on the physical and biological environment as Alternative 1. While a HAPC would be established at Southern Bank, there would be no regulations associated with it. **Preferred Alternative 3**, **Option b** would prohibit bottom tending gear on Southern Bank, which would protect benthic corals at this site from fishing gear interactions. There would be direct positive effects on the coral species identified during scientific survey on the area encompassed by the coordinates outlined. **Preferred Alternative 3**, **Option b** would also have indirect positive effects on the fish and invertebrate populations located within the coordinates outlined, as the protection to corals inherently protects the habitat used by some of these species. There is a risk of indirect negative effects on areas outside of this proposed alternative if fishing effort shifts in response to the bottom tending gear restrictions at Southern Bank. Despite the risk, this is unlikely as there is minimal bottom tending gear fishing effort in within the coordinates outlined in **Preferred Alternative 3**.

4.5.2 Direct and Indirect Effects on the Economic Environment

This action considers establishing new HAPCs in the Southwestern Gulf, either with or without fishing gear regulations. **Alternative 1** (No Action) would not establish new HAPCs. **Preferred Alternatives 2** and **3** would establish, respectively, new HAPCs named Harte Bank and Southern Bank. **Preferred Alternatives 2** and **3** each contain an **Preferred Option a**, which would not establish fishing gear regulations, and an **Option b**, which would prohibit bottom tending gear.

Selection of **Alternative 1** would not be expected to result in any direct or indirect economic impacts. Selection of **Preferred Alternatives 2** or **3** with **Preferred Option a** would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Preferred Alternative 2 with **Option b** would create the new HAPC named Harte Bank, with a prohibition on bottom tending gear. Minimal negative direct economic effects would be expected to result. Examination of VMS pings along with shrimp ELB data suggests that the area is not a primary shrimping ground but rather a transit area. Recreational fishing could also

potentially be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

Preferred Alternative 3 with **Option b** would create the new HAPC named Southern Bank, with a prohibition on bottom tending gear. Minimal negative direct economic effects would be expected to result, as neither VMS nor shrimp ELB data indicates that the area is heavily fished with bottom tending gear. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishing could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source.

4.5.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established in the southwestern region. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2** and **3** would each create a new HAPC in the southwestern region. Minimal to no effects would be expected from **Preferred Option a** under each alternative, as an HAPC would be established with no attending restrictions on fishing or gear within each area. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

The potential for negative effects is greater under **Options b**, as all bottom tending gear would be prohibited within the boundaries of each new HAPC. There is evidence of some limited use in the proposed Harte Bank HAPC (**Preferred Alternative 2**) by vessels with shrimp permits, but these vessels may be transiting the area rather than trawling and would not be affected as long as bottom tending gear was not in use. There is even less evidence of human activity that would be affected by the fishing and gear restrictions under **Options b** within the proposed Southern Bank HAPC (**Preferred Alternative 3**). Thus, any effects would be minimal to none in establishing the Harte Bank (**Preferred Alternative 2**) or Southern Bank (**Preferred Alternative 3**) HAPCs with attending prohibitions on bottom tending gear compared to **Alternative 1**.

4.5.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 (No Action) would have no impact on the administrative environment as it maintains the status quo. The same is true for **Preferred Option a** in **Preferred Alternatives 2** and **3** as this option for these alternatives attaches an HAPC label to these sites, but would not confer any fishing regulations.

Option b for **Preferred Alternatives 2** and **3** would require an additional administrative burden of developing and implementing regulations for prohibiting bottom contact gear. Identification of EFH, HAPCs or potential restrictions on fishing activities may have some impact on other Federal laws and policies. The implementation of a number of Federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPC to the fish species managed by the Council and NMFS. The designation of EFH requires other Federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.6 Action 6 – New Areas for HAPC Status Not Recommended to Have Fishing Regulations.

Alternative 1: No Action. Do not establish any new deep-water coral HAPCs.

Preferred Alternative 2: Establish a new HAPC named South Reed bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
South Reed Depth Range: 219-820 fathoms Area: 6.8 nm^2	A	83°56.220’	24°40.870’
	B	83°53.360’	24°40.926’
	C	83°53.300’	24°38.313’
	D	83°56.159’	24°38.257’
	A	83°56.220’	24°40.870’

Preferred Alternative 3: Establish a new HAPC named Garden Banks 299 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Garden Bank 299 Depth Range: 219-328 fathoms Area: 6.5 nm^2	A	92°14.635’	27°42.963’
	B	92°11.697’	27°42.946’
	C	92°11.703’	27°40.457’
	D	92°14.652’	27°40.435’
	A	92°14.635’	27°42.963’

Preferred Alternative 4: Establish a new HAPC named Garden Banks 535 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Garden Banks 535 Depth Range: 273-328 fathoms Area: 6.8 nm^2	A	93°36.825’	27°27.314’
	B	93°33.894’	27°27.326’
	C	93°33.880’	27°24.711’
	D	93°36.811’	27°24.699’
	A	93°36.825’	27°27.314’

Preferred Alternative 5: Establish a new HAPC named Green Canyon 140 and 272 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 140/272 Depth Range: 164-547 fathoms Area: 81.6 nm^2	A	91°36.342’	27°50.510’
	B	91°30.460’	27°50.448’
	C	91°30.496’	27°47.834’
	D	91°24.616’	27°47.768’
	E	91°24.654’	27°45.154’
	F	91°27.593’	27°45.187’
	G	91°27.666’	27°39.959’
	H	91°36.475’	27°40.052’
	I	91°36.442’	27°42.666’
	J	91°39.379’	27°42.695’
	K	91°39.347’	27°45.310’
	L	91°36.408’	27°45.281’
	M	91°33.470’	27°45.251’
	N	91°33.435’	27°47.865’
	O	91°36.375’	27°47.895’
	A	91°36.342’	27°50.510’

Preferred Alternative 6: Establish a new HAPC named Green Canyon 234 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 234 Depth Range: 219-492 fathoms Area: 13.6 nm^2	A	91°15.798’	27°47.662’
	B	91°12.859’	27°47.625’
	C	91°12.944’	27°42.397’
	D	91°15.881’	27°42.434’
	A	91°15.798’	27°47.662’

Preferred Alternative 7: Establish a new HAPC named Green Canyon 354 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 354 Depth Range: 273-547 fathoms Area: 6.8 nm^2	A	91°51.185’	27°37.572’
	B	91°48.249’	27°37.547’
	C	91°48.278’	27°34.932’
	D	91°51.212’	27°34.957’
	A	91°51.185’	27°37.572’

Preferred Alternative 8: Establish a new HAPC named Mississippi Canyon 751 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 751 Depth Range: 328-383 fathoms Area: 6.8 nm^2	A	89°49.883’	28°12.710’
	B	89°46.934’	28°12.770’
	C	89°46.866’	28°10.158’
	D	89°49.814’	28°10.098’
	A	89°49.883’	28°12.710’

Preferred Alternative 9: Establish a new HAPC named Mississippi Canyon 885 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 885 Depth Range: 219-328 fathoms Area: 6.8 nm^2	A	89°43.787’	28°4.993’
	B	89°40.841’	28°5.051’
	C	89°40.777’	28°2.439’
	D	89°43.721’	28°2.381’
	A	89°43.787’	28°4.993’

4.6.1 Direct and Indirect Effects on the Physical and Biological Environments

Alternative 1 (No Action) would have the same effects on the physical and biological environments as each of the other alternatives in this action; specifically, any bottom tending fishing effort that occurs in the areas proposed in Action 8 would continue to negatively impact the coral and associated species at these sites. However, due to the depths, it’s unlikely that any fishing takes place on these sites, therefore changes to the physical or biological environments are similarly unlikely.

Preferred Alternatives 2 through **9** each have the same effects on the physical and biological environments in their corresponding areas. These HAPCs would not have fishing regulations, but are under consideration for HAPC status because they contain communities considered rare. There would be no changes to the physical and biological environments in these areas if any or all of **Preferred Alternatives 2** through **9** were selected. The depths of these areas restrict fishing effort with bottom tending gear.

4.6.2 Direct and Indirect Effects on the Economic Environment

This action considers establishing new areas for HAPC status, without fishing regulations. **Alternative 1** (No Action) would not establish new HAPCs. **Preferred Alternatives 2** through **9** would establish new HAPCs that would not have fishing regulations associated with them. Establishing these proposed new HAPCs would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

4.6.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established in the southwestern region. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2-9** would each create a new HAPC in the Gulf. Minimal to no effects would be expected from each alternative, as no attending restrictions on fishing or gear would be established for any of the proposed HAPCs. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

4.6.4 Direct and Indirect Effects on the Administrative Environment

As **Alternative 1** would have no effect on the administrative environment because nothing further would be required. **Preferred Alternatives 2** through **9** would have analogous effects on the administrative environment because they would both require that the new HAPC boundaries be incorporated for EFH consultations, but would not require any associated fishing regulations. As HAPCs are a subset of EFH, and these areas are already considered coral EFH, it is unlikely that there would be much additional administrative burden.

4.7 Action 7 – Prohibit Dredging In All Existing HAPCS That Have Fishing Regulations

Alternative 1: No Action. No new dredging-specific management measures will be implemented in currently established HAPCs. Areas with dredging restrictions already in place will retain those restrictions.

Preferred Alternative 2: Prohibit dredging in all existing HAPCs that have fishing regulations.

4.7.1 Direct and Indirect Effects on the Physical and Biological Environments

Dredging, as a fishing gear type that interacts with the seafloor, has the potential to damage or remove benthic resources indiscriminately. Therefore prohibition of this type of activity within areas identified as HAPCs would inherently be beneficial and reduce or eliminate direct and indirect impacts to the physical and biological environment. **Alternative 1** would retain status quo. At this time dredging, as a fishing method, is not known to occur in the Gulf, and it is not anticipated to be used in the future. **Preferred Alternative 2** would be a proactive measure to prevent fishing via dredging in HAPCs should that method become viable in the Gulf.

4.7.2 Direct and Indirect Effects on the Economic Environment

This action considers prohibiting dredging in currently established HAPCs. **Alternative 1** (No Action) would retain dredging restrictions already in place in HAPCs but not expand those restrictions to other currently established HAPCs without dredging restrictions. **Preferred Alternative 2** would prohibit dredging in all existing HAPCs that have fishing regulations.

The decision to prohibit dredging in currently established HAPCs is not expected to result in direct or indirect economic effects, as dredging is not a type of fishing that occurs in the Gulf EEZ. Thus, this action is administrative in nature, such that it provides consistent management measures across all currently existing HAPCs with fishing regulations.

4.7.3 Direct and Indirect Effects on the Social Environment

Currently, there is no known dredging known to occur in the Gulf EEZ. Thus, no effects would be expected from either adding dredging to the list of bottom tending gear that are prohibited in existing HAPCs (**Preferred Alternative 2**) or allowing the list of bottom tending gear to continue to not include dredging (**Alternative 1**).

4.7.4 Direct and Indirect Effects on the Administrative Environment

Because dredging as a fishing method does not currently occur in the Gulf, prohibiting that fishing method it is unlikely to have negative effects on the administrative environment. **Alternative 1** would be the least beneficial because HAPC management in the Gulf would continue to be inconsistent. **Preferred Alternative 2** would be beneficial due to the improved

consistency of HAPC management in the Gulf. Instating the same management measures across all HAPCs, reduces confusion for fishermen, law enforcement, and resource managers.

4.8 Cumulative Effects

The analysis in Chapter 4 of this amendment concluded that the direct and indirect effects of these actions would be minimal. The impacts to the physical and biological environments are likely beneficial for these actions by increasing protection. The impacts to the economic environment could be negative related to the increasing restrictions for fishing activities in these areas. The impacts to the social environment would likely be minimal for these actions. The impacts to the administrative environment are also expected to be minimal. Cumulatively, the direct and indirect effects of these actions are likely to be minimal because it is not likely that any of these actions would greatly vary from status quo. The HAPCs are relatively small in comparison to the available fishing area in the EEZ resulting in minimal disruption to the way the fisheries are prosecuted.

Action 1 considers incorporating the deep-water octocorals into the FMU. This action could allow for additional protections for these species and cumulatively with HAPCs provide a benefit to the physical and biological environments. The economic and social effects would be negligible as these corals as this is an administrative action. Action 2 would set the management benchmarks for the octocorals if included by Action 1. The physical and biological environments would benefit in relation to minimal harvest levels. The economic and social environments would be negatively impacted if the harvest levels are restricted by the management benchmarks at a level lower than status quo.

Actions 2-7 would modify or establish new areas for HAPCs throughout the Gulf. Cumulatively, as the area of protection increases the benefit to the resource would also increase. However, these benefits are likely to be slightly more than status quo. In turn, the greater the HAPC area and fishing restrictions could result in slightly negative effects on the economic and social environments. Additionally, the greater the HAPC area with fishing restrictions could affect the administrative environment pertaining to additional enforcement effort. Action 8 would not likely vary from status quo as the HAPC designations would not have any additional fishing restrictions. Action 9 prohibits the use of dredging gear in the HAPCs. This action is mainly administrative as dredging gear is not currently used for fishing in the Gulf.

This framework action is not likely to result in significant effects when considered in combination with other relevant past, present, and reasonably foreseeable actions. However, any additional deep sea coral protections by the Flower Garden Banks National Marine Sanctuary (FGBNMS) and the Florida Keys National Marine Sanctuary would beneficially contribute to the physical and biological environments. The potential impacts of the FGBNMS expansion are detailed in the draft environmental impact statement and incorporated here by reference (2016). Past actions are summarized in the History of Management in Section 1.3. Reasonably foreseeable regulatory actions are not expected to have significant cumulative effect. The Council intends to review and possibly modify additional areas for HAPCs in a future amendment. If the deep-water octocorals are incorporated into the fishery management unit, then further analysis and protection may be considered. Overall, these actions would not likely result in significant changes to the effected environments

There are several environmental considerations which may contribute to the cumulative effects including the *Deepwater Horizon* MC252 oil spill and potential climate change impacts. The impacts from these environmental influences are not necessarily quantifiable at this time; however, the potential effects are described below.

As described in the NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems (2010), the *Deepwater Horizon* MC252 oil spill severely impacted the mesophotic and deep-sea coral communities in the Gulf. Several studies have focused on assessing the damage including White et al (2012) and Fisher et al (2014). In both studies, sites near the MC252 well location were significantly affected by the oil spill with some survey sites showing damage to 90% of the colonies. Fisher et al (2014) did note that while the survey sites near the MC252 well location were acutely affected; however, known deepsea coral sites further away were not acutely affected. The extent of damage to the deep-water coral communities may never be fully quantifiable.

The potential of impacts of climate change on the deepsea coral community is qualitatively discussed in the NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems (2010). These slow-growing long-lived organisms have a carbonaceous or proteinaceous skeleton. It is likely that changes in ocean acidification could impact the growth rate and composition of the skeleton in addition to the geographic range of suitable habitat and depth for colonization. While the potential impacts are not quantifiable at this time, it further contributes to the cumulative effects on the resource and should be considered for management strategies and conservation planning.

The effects of the proposed actions are, and would continue to be, monitored through stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations.

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APPENDIX A. CORAL WORKING GROUP SUMMARY

Coral Working Group Summary
Gulf Council Office, Tampa, FL
December 4th and 5th, 2014
9:00 a.m. - 5:00 p.m.

Coral Working Group
Sandra Brooke
Erik Cordes
Peter Etnoyer
John Reed
Judith Lang
Paul Sammarco
George (GP) Schmahl

Others
David Dale
David Hicks
Sharon McBreen
Tom Wheatley

Council and Council staff
Roy Williams
Beth Hager
Morgan Kilgour
Phyllis Miranda
Mark Mueller
Carrie Simmons

The overall recommendations from the Coral Working Group are as follows:

- The group recommends several "broad areas" to be recognized as the presumed, logical extent of deep-water coral habitat, based on topography, depth, and other observations incorporated through predictive habitat suitability models.
- The group recommends several "discrete areas" to be recognized as the confirmed, documented presence of deep-water coral communities.
- The group recommends that these areas be considered as Coral HAPCs as opposed to deep-sea coral areas.
- The group recommends that within the discrete zones, there be restrictions on bottom tending gear (pots, traps, trawls, bottom longlines, deep dropping) and anchoring.
- The group recommends that the Council consider the effects of aquaculture on HAPCs and other coral areas.
- The group recommends that deepwater octocorals (defined here as species known to occur 50 m and deeper, e.g. *Swiftia exserta, Callogorgia delta, and Paramuricea biscaya*) be reconsidered in the FMU.

The group recognized that this process was a prime opportunity for interagency collaboration for the cooperative protection/evaluation of these areas, particularly as other Councils along the eastern US seaboard have already established deep coral HAPCs (SAFMC) or are moving towards protection for deep coral habitats (MAFMC, NEFMC). Before deciding on appropriate areas, the group discussed in great detail the appropriate methodology for drawing the boundaries of both discrete and broad areas. When adequate data were available on coral

abundance, extent and community type, the group would encompass the entire feature (such as in the BOEM lease block Viosca Knoll 826) as a 'discrete' zone. Broad areas were those without survey data, were larger than discrete zones and were based on high likelihood of coral presence (similar underlying geology as known coral areas, predictive habitat models or other data that provided strong evidence of coral presence).

Each area was discussed in detail. Following are: maps of the discrete areas and an itemized list, maps of the broad areas and an itemized list. Still to come will be a detailed summary of all areas the group discussed including: size of area, species present in each area (richness), presence of protected species, fish species (if applicable) and any other useful information. These detailed reports will be geographically separated and will focus on: South Texas Banks, Northwest Gulf of Mexico, Northeast Gulf of Mexico, and West Florida. Several areas were also removed from consideration because there were not enough data.

Drs. Cordes, Brooke, and Etnoyer all contributed new information on coral presence, abundance and diversity in the northeastern Gulf of Mexico.

Mr. Schmahl and Drs. Sammarco and Cordes had new information on many areas of the northwestern Gulf of Mexico including new information on rugosity as a metric predicting species richness, increasing the information about several HAPCs (habitat areas of particular concern), and information about several new banks for consideration. There was also some discussion of the Flower Garden Banks National Marine Sanctuary's ongoing efforts to expand to include some of the banks discussed by the group in this region.

Mr. Reed and Drs. Brooke and Etnoyer provided new information about *Lophelia pertusa* and black coral areas that have been recently surveyed on the west Florida shelf and Pulley Ridge.

Dr. Hicks presented new information about the south Texas Banks and identified banks with known high densities of coral for the group. Some of these banks are Pleistocene relict reefs and others are relict barrier island features.

The meeting adjourned at December 5th at 3:30 pm.

Discrete Areas include (Figure 1):

South Texas Banks

Blackfish Ridge
Big Adam Rock
Unnamed Bank (Harte Bank)
Mysterious Banks
Dream Bank
Southern Bank
Hospital, North Hospital and Aransas Banks
Baker Bank

Northeast Gulf of Mexico

Viosca Knoll 862/906
Viosca Knoll 826
Mississippi Canyon 751 and 885
AT 357
AT 047
Mississippi Canyon 118
Roughtongue Reef and Yellowtail Reef
Patch Reef Field and Solitary Mound
L & W Pinnacles and Scamp Reef
Shark Reef, Triple Top Reef, Double Top Reef
Mountain Top Bank 3
Pinnacle 1 Near West and West Pinnacle 2
Far Tortuga
Alabama Alps Reef

Northwest Gulf of Mexico

Garden Banks 535
Green Canyon 354
Green Canyon 140 and 272
Garden Banks 299
Green Canyon 234
Horseshoe Banks
Elvers Bank
Parker Bank
Green Canyon 852
MacNeil Banks
Rankin Bright Bank
Geyer Bank
29 Fathom Bank
Bouma Bank
Rezak Sidner Bank
Sonnier Bank
Alderdice Bank
Jakkula Bank

West Florida

Long Mound
2 unnamed sites surveyed by John Reed
Many Mounds
Okeanos Ridge
Pulley Ridge

Broad Areas include (Figure 2):

South Texas Banks

South Texas Banks North Polygon
South Texas Banks South Polygon

Northeast Gulf of Mexico

Viosca Knoll 862/906
Viosca Knoll 826
Mississippi Canyon 751 and 885
AT 357
AT 047
Mississippi Canyon 118
The Pinnacles

West Florida

West Florida Slope North
West Florida Slope South

Northwest Gulf of Mexico

Garden Banks 535
Green Canyon 354
Green Canyon 140 and 272
Garden Banks 299
Green Canyon 234
Horseshoe Banks
Elvers Bank
Parker Bank
Green Canyon 852
MacNeil Banks
Rankin Bright Bank
Geyer Bank
29 Fathom Bank
Bouma Bank
Rezak Sidner Bank
Sonnier Bank
Alderdice Bank
Jakkula Bank

Figure 1. Broad overview of the discrete coral areas identified by the Coral Working Group. Note: this map does not include HAPCs or other areas with fishing regulations. This map is only the discrete areas that are not currently identified as HAPCs or coral areas, or are identified as HAPCs but have no restrictions.

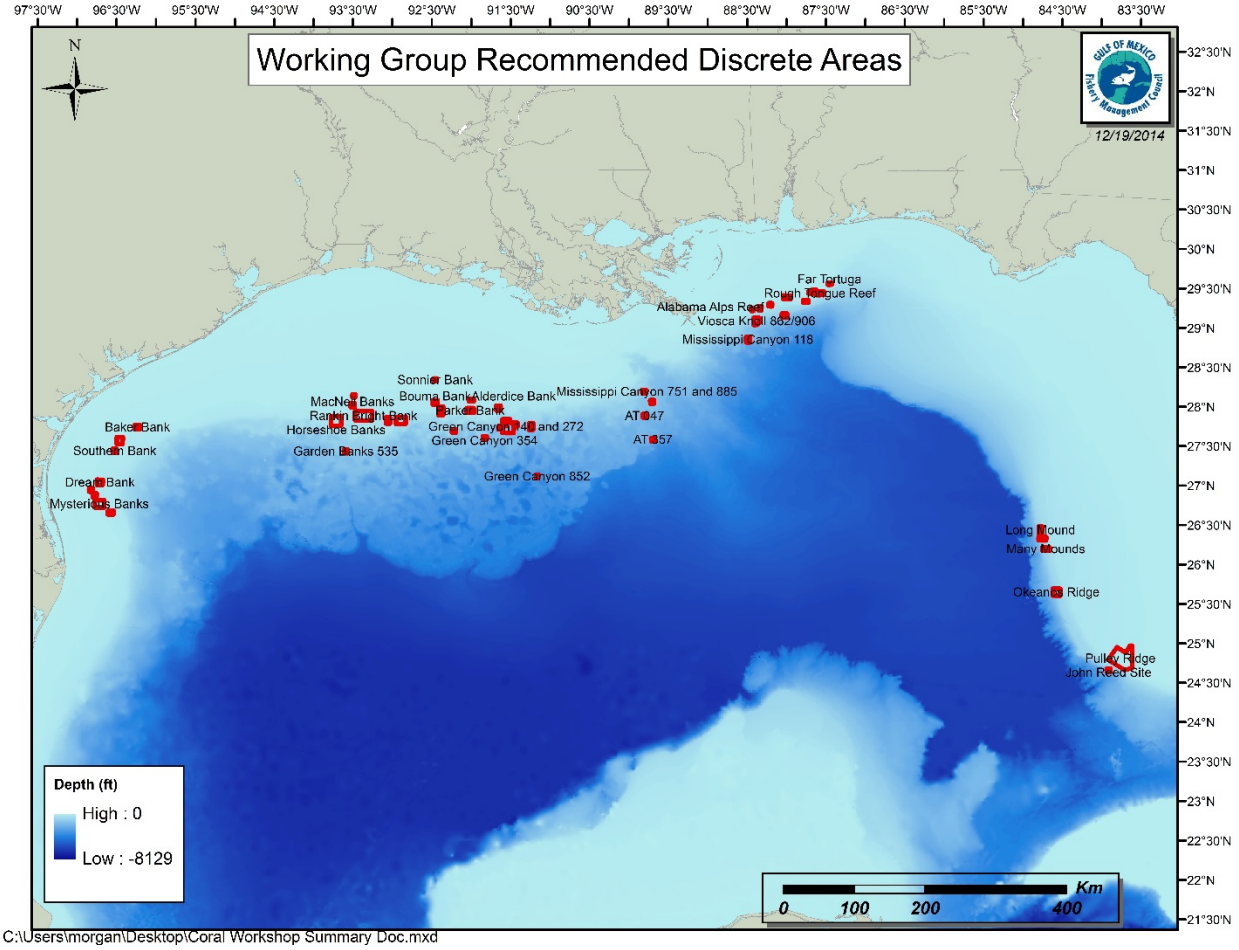
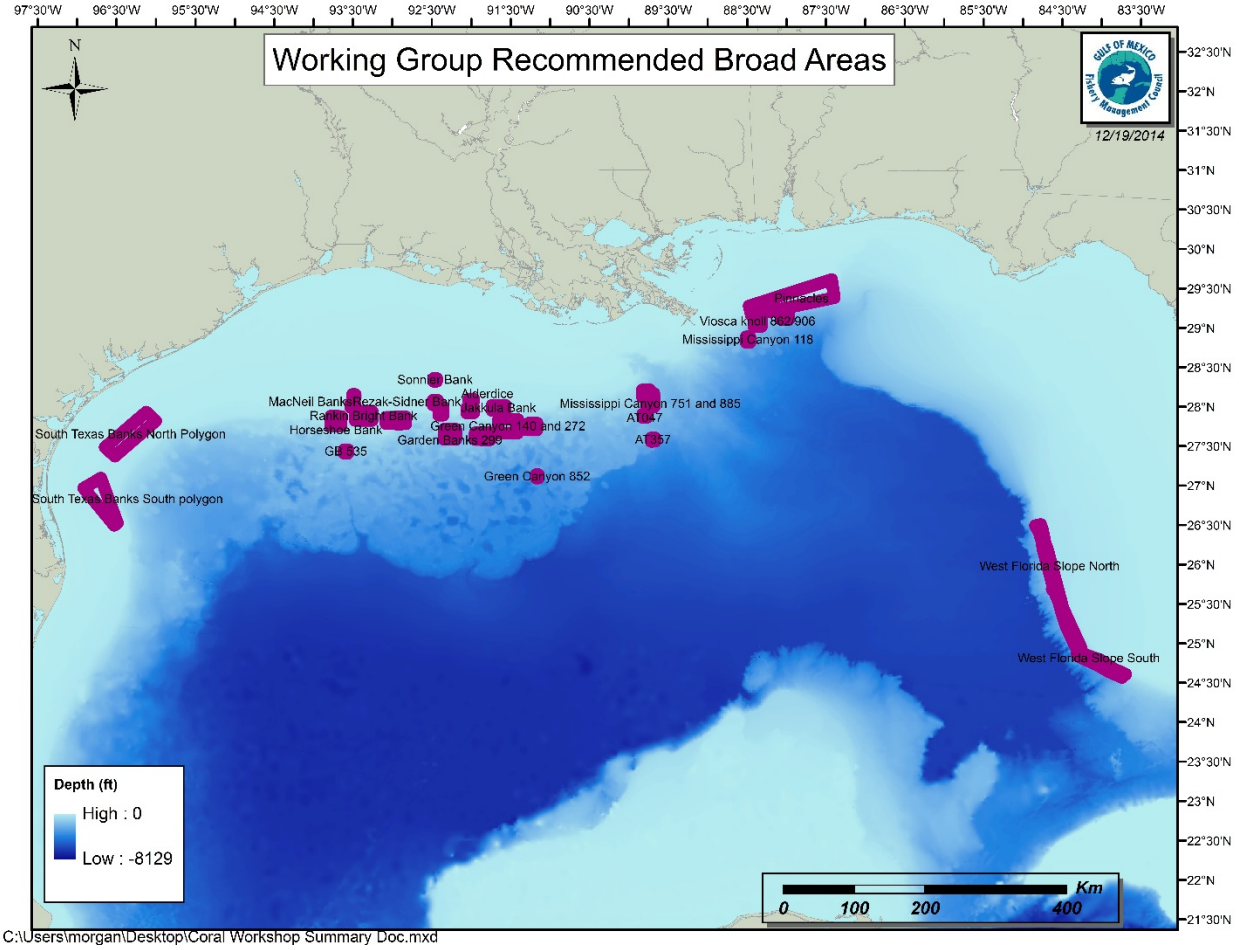


Figure 2. Broad overview of the broad coral areas identified by the Coral Working Group. Note: this map does not include HAPCs or other areas with fishing regulations. This map is only the discrete areas that are not currently identified as HAPCs or coral areas, or are identified as HAPCs but have no restrictions.



APPENDIX B. CONSIDERED BUT REJECTED

Incorporation of Deep-Water Octocoral Species into the Gulf of Mexico (Gulf) Fishery Management Unit (FMU)

Alternative 1: No Action. Do not incorporate deep-water octocorals into the Gulf FMU.

Alternative 2: Incorporate into the Gulf FMU, all genera of octocorals (members of Order Alcyonacea) that have been recorded in the Gulf and are in the National Oceanic and Atmospheric Administration (NOAA) Deep-sea coral database[8].*

Option a. Federal management applies to octocorals throughout entire Gulf exclusive economic zone (EEZ).

Option b. Federal management excludes octocorals in the EEZ off Florida.

Alternative 3: Incorporate into the Gulf FMU, only those deep-water octocoral genera (members of Order Alcyonacea) that have been recorded in the NOAA Deep-sea coral database[2] from a depth of 50 m (164 feet) or deeper in the Gulf.*

Option a. Federal management applies to octocorals throughout entire Gulf EEZ.

Option b. Federal management excludes octocorals in the EEZ off Florida.

Alternative 4: Incorporate into the Gulf FMU, only those deep-water octocoral genera (members of Order Alcyonacea) that have been recorded in the NOAA Deep-sea coral database[2] from a depth of 150 m (492 feet) or deeper in the Gulf.*

Option a. Federal management applies to octocorals throughout entire Gulf EEZ.

Option b. Federal management excludes octocorals in the EEZ off Florida.

***Note:** See Table 2.1.1 for a complete list of genera that would be included within each alternative. These depths are the depths recorded in the database from observed corals and are not the minimum recorded depths based on scientific literature, because some species have depth descriptions from waters not in the Gulf. Additionally, these alternatives are not instituting a regulation regarding depth at which a coral can be harvested, but are using a minimum depth as a metric to establish which octocorals would be incorporated into the FMU. Genera that are known to be harvested (but are not in the database as occurring in depths shallower than 50 m) have also been removed from the table for Alternatives 3 and 4.

Discussion:

Regional fishery management councils are required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to prepare a fishery management plan (FMP) for each fishery under its authority that requires or is in need of conservation and management; this can include stocks that are an important component of the environment. While octocorals were originally included in the Fishery Management Plan for Coral and Coral Reefs of the Gulf of Mexico (Coral FMP) (GMFMC and SAFMC 1990), they were removed from the

[8] The NOAA deep sea coral database can be found at https://deepseacoraldata.noaa.gov/

Coral FMP through the Generic Annual Catch Limits and Accountability Measures Amendment (Generic ACL/AM Amendment) (GMFMC 2011). The goal of that action was to reduce redundancy in management as Florida was already monitoring the quota for harvestable octocorals for the aquarium trade. However, there are many deep-water octocorals that are not harvested.

While scientific research is still sparse, information about the importance of deep-water octocorals as habitat for species like catsharks (Family Scyliorhinidae) and redfishes (*Sebastes* spp.) has significantly increased since their removal from the FMU (Baillon et al. 2012). The importance and vulnerability of deep-water coral ecosystems makes them of particular conservation concern. Many gorgonians are susceptible to impacts such as oil and gas exploration and bottom trawling. If impacted, many gorgonian species are slow growing, so recovery takes longer than in shallow waters where nutrients are more abundant. Habitats formed by, and associated with, corals and sponges have been identified as priorities for deep-sea conservation in the U.S. (NOAA, 2010) and internationally (Convention on Biological Diversity, 2008; Food and Agriculture Organization, 2009). Octocoral diversity peaks at depths between 50 m and 800 m depth, with several recent studies increasing information about species diversity at different depths and bottom types, as well genetic differentiation throughout the Gulf (Boland et al. 2016). The ecosystem services provided by deep-sea octocorals are numerous, including providing food for higher trophic levels and habitat for commercially important species (Thurber et al., 2014). The sediment fauna found adjacent to corals are also influenced by their presence (Demopoulos et al. 2014), and the influence of deep-sea octocorals on the ecology and biodiversity of the surrounding habitats is extensive.

The Gulf of Mexico Fishery Management Council's (Council) Special Coral Scientific and Statistical Committee (Coral SSC) and Coral Advisory Panel (Coral AP) met in December 2014, and recommended that the Council add deep-water octocorals (those primarily in waters deeper than 164 ft [50 m]) back into the FMU so that those octocoral species can be considered when designating habitat areas of particular concern (HAPCs). A comprehensive list of octocorals and their associated depth ranges recorded in NOAA's Deep-sea Coral Database documented in the Gulf is contained in Appendix C.

Currently, there is no federal management of the harvest or take of octocorals in the Gulf EEZ because they are not part of the FMU, and those octocorals deeper than 492 ft (150 m) are not considered within the definition of EFH for Council-managed species. Reefs and hard bottom occurring shallower than 600 ft (100 fathoms) are currently identified and described as necessary for spawning, feeding, breeding, or growth to maturity for Council-managed species; thus, octocorals deeper than that are not currently part of listed EFH for species in the Gulf. Species must be part of the FMU to have management measures developed.

Table 2.1.1. List of octocoral genera and the minimum depth have been recorded in the Gulf of Mexico as reported by the NOAA Deep-sea coral database or are listed in the comprehensive compilation of Etnoyer and Cairns 2017. The listing of the shallowest depth was used to eliminate genera from Alternatives. An "X" indicates it will be included genera in the alternative.

Octocoral Family	Octocoral Genus and Species	Depth of Recorded Occurrence		
		All genera (Alternative 2)	≥ 50 m (Alternative 3)	≥ 150 m (Alternative 4)
Acanthogorgiidae				
	Acanthogorgia spp. (*A. armata, A. aspera, A. schrammi, A.* sp.)	**X**		
Alcyoniidae				
	Anthomastus sp.	**X**	**X**	
	Bathyalcyon robustum	**X**	**X**	
	Bathyalcyon sp.	**X**	**X**	**X**
	Bellonella sp.	**X**	**X**	
Anthothelidae				
	Anthothela spp. (*A. grandiflora, A. tropicalis, A.* sp.)	**X**	**X**	**X**
	Iciligorgia schrammi	**X**		
Chrysogorgiidae				
	Chrysogorgia spp. (*C. elegans, C. fewkesii, C.* sp.)	**X**	**X**	**X**
	Iridogorgia spp (*I. magnispiralis, I. pourtalesii, I. splendens, I.* sp.)	**X**	**X**	**X**
	Trichogorgia sp.	**X**	**X**	
Clavulariidae				
	Carijoa spp. (*C. operculata, C. riisei)*	**X**		
	Clavularia sp. (*Clavularia rudis*)	**X**	**X**	**X**
	Scleranthelia rugosa	**X**	**X**	
	Telesto spp. (*T. flavula, T. fruticulosa, T. nellaea, T. sanguinea)*	**X**		
	Telestula tubaria	**X**	**X**	**X**
Corallidae				
	Hemicorallium spp.	**X**	**X**	**X**
Elliselidae				
	Ellisella spp. (*E. atlantica, E. barbadensis, E. elongata, E. funiculina, E. schmitti, E.* sp.)	**X**		
	Nicella spp. (*N. americana, N. deichmannae, N. flagellum, N. goreaui, N. guadalupensis, N. hebes, N. obesa, N. robusta, N. spicula, N. toeplitzae, N.* sp.)	**X**		
	Riisea paniculata	**X**	**X**	
Gorgoniidae				
	Leptogorgia spp. (*L. barbadensis, L. cardinalis, L. euryale, L. medusa, L. stheno, L.* sp.)	**X**		

Octocoral Family	Octocoral Genus and Species	Depth of Recorded Occurrence		
		All genera (Alternative 2)	≥ 50 m (Alternative 3)	≥ 150 m (Alternative 4)
	Phyllogorgia dilatata	X	X	
	Pterogorgia sp.	X		
Isididae				
	Acanella spp. (*A. eburnea*, *A. arbuscula*, *A.* sp.)	X	X	X
	Chelidonisis spp. (*C. aurantiaca*, *C.* sp.)	X	X	X
	Isidella sp.	X	X	X
	Keratoisis spp (*K. flexibilis*, *K.* sp.)	X	X	X
	Lepidisis spp. (*L. caryophyllia*, *L.* sp.)	X	X	X
	Stenisis humilis	X	X	X
Keroeididae				
	Thelogorgia spp. (*T. stellata*, *T. studeri*, *T.* sp.)	X	X	
Nephtheidae				
	Pseudodrifa spp. (*P. nigra*, *P.* sp.)	X	X	X
Nidaliidae				
	Chironephthya spp (*C. agassizii*, *C. caribaea*, *C.* sp.)	X		
	Nidalia spp. (*N. dissidens*, *N. occidentalis*, *N.* sp.)	X		
	Siphonogorgia spp. (*S. agassizii*, *S.* sp.)	X	X	
Paragorgiidae				
	Paragorgia spp. (*P. johnsoni*, *P. regalis*, *P.* sp.)	X	X	X
	Sibogagorgia spp. (*S. cauliflora*, *S.* sp.)	X	X	X
Plexauridae				
	Acanthacis sp.	X	X	
	Bebryce spp. (*B.cinerea*, *B. grandis*, *B. parastellata*, *B.* sp.)	X		
	Diodogorgia spp. (*D. nodulifera*, *D.* sp.)	X		
	Heterogorgia sp.	X	X	
	Hypnogorgia spp. (*H. pendula*, *H.* sp.)	X		
	Lytreia spp. (*L. plana*, *L.* sp.)	X		
	Muricea spp (*M. atlantica*, *M. pendula*, *M.* sp.)	X		
	Muriceides spp. (*M. hirta*, *M. kenthali*, *M.* sp)	X	X	
	Paramuricea spp. (*P. biscaya*, *P. multispina*, *P.* sp.)	X	X	
	Placogorgia spp. (*P. mirabilis*, *P. rudis*, *P. tenuis*, *P. tribuloides*, *P.* sp.)	X	X	
	Plexaurella nutans	X	X	

Octocoral Family	Octocoral Genus and Species	Depth of Recorded Occurrence		
		All genera (Alternative 2)	≥ 50 m (Alternative 3)	≥ 150 m (Alternative 4)
	Scleracis spp. (*S. guadalupensis, S. petrosa, S.* sp.) 50-540 m	**X**	**X**	
	Spinimuricea atlantica	**X**	**X**	
	Swiftia spp. (*S. casta, S. exserta, S. koreni, S. pallida, S.* sp.)	**X**		
	Thesea spp. (*T. citrina, T. grandiflora, T. granulosa, T. guadalupensis, T. nivea, T. nutans, T. parviflora, T. rubra, T. rugosa , T.* sp.)	**X**		
	Villogorgia spp. (*V. nigrescens, V.* sp)	**X**	**X**	
Primnoidae				
	Acanthoprimnoa spp. (*A. goesi, A. pectinata*)			
	Callogorgia spp. (*C. americana, C. delta, C. gracilis, C. linguimaris, C. verticillata, C.* sp.)	**X**	**X**	
	Calyptrophora trilepis	**X**	**X**	**X**
	Candidella imbricata	**X**	**X**	**X**
	Narella sp.	**X**	**X**	**X**
	Paracalyptrophora spp. (*P. carinata, P.* sp.)	**X**	**X**	**X**
	Plumarella spp. (*P. dichotoma, P. pourtalesii, P.* sp.)	**X**	**X**	**X**

Octocorals, by family, that are under consideration for incorporation into the FMU are presented in Table 2.1.1. Scientific experts and harvesters recognize that identifying octocorals to the species level while in the water is impossible for some species; some species can only be identified using laboratory techniques. Thus, it has been recommended that the Council consider adding higher level taxonomic groups (such as genus or family as presented in Table 2.1.1) when considering whether or not to incorporate octocorals into the FMU, to alleviate potential errors from harvesters of shallow-water species. Table 2.1.1 and Appendix C list the species that have been documented in the Gulf and the minimum depths in which they occur (in NOAA's Deep-sea Coral Database) relative to **Alternatives 2**, **3**, and **4**.

Currently, Florida manages the harvest of octocorals in state and adjacent federal waters. Recreational collectors must possess a state saltwater fishing license and are limited to six colonies per day. Commercial collectors must possess a Saltwater Products License with the Restricted Species and Marine Life Tiered endorsements. Collection of octocoral must be by hand and all applicable gear restrictions apply. The quota for octocorals is 70,000 colonies annually with harvest closing if the state quota is met. Harvest of attached substrate is limited to within 1 inch of the base; and harvest of *Gorgonia flabellum* (venus sea fan), *Gorgonia ventalina* (common [purple] sea fan), and non-erect or encrusting octocorals is prohibited (Florida

Administrative Code 68B-42)[9]. Florida specifies that harvest is not to occur in HAPCs in the Atlantic (Florida Administrative Code 68B-42.0036). Appendix C provides detailed information on historic commercial octocoral harvest as report to the Florida Fish and Wildlife Conservation Commission (FWC) (https://publictemp.myfwc.com/FWRI/PFDM/; S. Brown, FWC, pers. comm.).

The most common species collected include those that are likely to survive in an aquarium and are easy to collect (i.e. relatively close to shore and inhabiting shallow (less than 164 ft [50m]) areas) (N. Sheridan, FWC, pers. comm). Table 2.1.2 provides information on the minimum, maximum, and mean average depth that octocorals have been collected in Florida state and adjacent federal waters. The maximum reported depth of harvest in federal waters was approximately 103 ft (31 m) in 1996, and the deepest average depth of harvest was approximately 60 ft (16 m) in 2007.

Alternative 1 would maintain the status quo and be the least protective measure. Octocorals would not be part of the FMU, and harvest of octocorals in federal waters of the Gulf, would not be managed by the Council and the National Marine Fisheries Service (NMFS). It is unknown if octocorals are harvested in other parts of the EEZ. If the Council selects any alternative other than **Alternative 1**, it will be necessaryto establish management threshholds and stock status criteria (see Action 2).

Alternative 2, **Option a** would incorporate all octocoral genera that have been recorded from the Gulf and are included in NOAA's deep-sea coral database into the FMU (Table 2.1.1). This would be the most protective measure for octocorals allowing for management of all deep-sea species found throughout federal waters. There are nine genera in **Alternative 2** (*Diodogorgia*, *Ellisella*, *Iciligorgia*, *Nicella*, *Leptogorgia*, *Hypnogorgia*, and *Muricea*, *Pterogorgia*, *Swiftia*) that occur both above and below depths shallower than 50 m (164 ft), and are possibly currently harvested. **Alternative 2**, **Option a** would remove Florida's authority to manage harvest of the listed octocoral genera in the Gulf EEZ adjacent to state waters. This would not necessarily change the harvest within federal waters adjacent to Florida, because while several species within **Alternative 2** exist above and below 50 m (164 ft), the Council could set harvest limits to allow for collection (see Action 2). **Alternative 2**, **Option b** would incorporate all octocoral genera that have been recorded from the Gulf and are included in NOAA's deep-sea coral database into the FMU, but would exclude those octocoral colonies in the EEZ adjacent to Florida state waters from federal management. **Alternative 2**, **Option b** would allow Florida to continue to manage the ocotocorals in the EEZ adjacent to state waters and would be unlikely to change the current harvest of octocorals in the Gulf EEZ since the only known harvest occurs off the state of Florida.

Alternative 3, **Option a** would incorporate into the FMU, only those octocoral genera that have been documented in the Gulf in NOAA's Deep-sea coral database in depths equal to or deeper than 50 m (164 ft) (Table 2.1.1). At its December 2014, meeting, the Coral Working Group recommended that octocorals documented at 50 m (164 ft) or deeper be included in the FMU. The genera listed in **Alternative 3** are not known to be harvested as this alternative includes

[9] http://myfwc.com/fishing/saltwater/recreational/aquarium-species

genera that have only been recorded at depths below recommended diving levels (greater than 130 feet) (Brylske 2006); and technical diving (those not using compressed air, but instead using

Table 2.1.2. Depth, in feet (ft), octocorals were harvested from within the Gulf according to commercial trip ticket reports from 1996 – 2016.

	Gulf Waters	Mean Depth (ft)	Minimum Depth (ft)	Maximum Depth (ft
1996	Federal Waters	35.4	7.9	103.0
	State Waters	11.5	3.9	20.0
1997	Federal Waters	38.7	3.0	75.1
	State Waters	12.1	3.9	33.1
1998	Federal Waters	38.7	29.9	89.9
	State Waters	19.7	2.0	44.9
1999	Federal Waters	37.4	29.9	47.9
	State Waters	19.0	3.0	44.9
2000	Federal Waters	35.1	20.0	46.9
	State Waters	17.1	3.0	44.9
2001	Federal Waters	37.4	24.9	49.9
	State Waters	14.1	1.0	40.0
2002	Federal Waters	38.7	12.1	49.9
	State Waters	16.4	1.0	46.9
2003	Federal Waters	42.3	29.9	65.0
	State Waters	12.1	1.0	44.9
2004	Federal Waters	41.3	24.9	55.1
	State Waters	16.4	1.0	44.9
2005	Federal Waters	42.0	24.9	75.1
	State Waters	13.1	1.0	44.9
2006	Federal Waters	49.9	24.9	69.9
	State Waters	11.8	2.0	45.9
2007	Federal Waters	53.5	29.9	60.0
	State Waters	12.1	1.0	44.9
2008	Federal Waters	49.9	20.0	100.1
	State Waters	12.8	2.0	45.9
2009	Federal Waters	44.9	29.9	69.9
	State Waters	17.1	3.0	60.0
2010	Federal Waters	42.7	19.0	69.9
	State Waters	12.5	1.0	89.9
2011	Federal Waters	40.7	20.0	49.9
	State Waters	10.2	1.0	44.9
2012	Federal Waters	40.4	29.9	60.0
	State Waters	9.8	1.0	44.9
2013	Federal Waters	36.7	27.9	69.9
	State Waters	10.8	2.0	46.9
2014	Federal Waters	33.8	27.9	75.1
	State Waters	9.8	1.0	45.9
2015	Federal Waters	34.1	24.9	80.1
	State Waters	10.5	1.0	44.9
2016	Federal Waters	32.2	20.0	60.0
	State Waters	10.8	1.0	29.9

Source: S. Brown, FWC, pers.comm.

a mix) is recommended below 190 feet (AAUS as accessed on August 20, 2017). Furthermore, octocorals are required to be harvested by hand and the genera listed in **Alternative 3** have only been recorded at depths below those reported in commercial landings data provided by FWC (Table 2.1.2). Therefore it is unlikely that **Alternatives 3** will affect the current harvesting off Florida. **Alternative 3**, **Option b** would incorporate only those octocoral genera that have been documented in the Gulf in NOAA's Deep-sea coral database in depths equal to or deeper than 50 m (164 ft), but would exclude those octocoral colonies in the EEZ adjacent to Florida state waters from federal management. It is unlikely this would change the current harvest of octocorals in the Gulf EEZ since the only known harvest occurs off the state of Florida.

Alternative 4, **Option a** would incoporate in the FMU, only those octocoral genera that have been documented in NOAA's deep-sea coral database to exist at 150 m (492 ft) or deeper in the Gulf (Table 2.1.1). At its December 2014, meeting, the Coral Working Group recommended that octocorals documented at 50 m (164 ft) or deeper be included in the FMU. The genera listed in **Alternative 4** are not known to be harvested as this alternative includes genera that have only been recorded at depths below recommended diving levels (greater than 130 feet) (Brylske 2006); and technical diving (those not using compressed air, but instead using a mix) is recommended below 190 feet (AAUS as accessed on August 20, 2017). Furthermore, octocorals are required to be harvested by hand and the genera listed in **Alternative 4** have only been recorded at depths below those reported in commercial landings data provided by FWC (Table 2.1.2). Therefore it is unlikely that **Alternatives 4** will affect the current harvesting off Florida. **Alternative 4**, **Option b** would incorporate only those octocoral genera that have been documented in the Gulf in NOAA's Deep-sea coral database in depths equal to or deeper than 150 m (492 ft), but would exclude those octocoral colonies in the EEZ adjacent to Florida state waters from federal management. It is unlikely this would change the current harvest of octocorals in the Gulf EEZ since the only known harvest occurs off the state of Florida.

If the Council selects any of **Alternatives 2**, **3**, or **4** as preferred, it will be necessary, in accordance with the Magnuson-Stevens Act, to establish management thresholds and stock status criteria (see Action 2).

Establish Management Benchmarks for Octocoral Species.

Alternative 1: No Action. Management benchmarks will not be established for octocorals.

Alternative 2: Do not allow harvest of octocorals in the FMU (established in Action 1) in the EEZ. ACL = 0 and maximum sustainable yield (MSY) = 0. Maximum fishing mortality threshold (MFMT) and minimum stock size threshold (MSST) are not set, as harvest is prohibited.

Alternative 3: Allow harvest of octocorals in the FMU (established in Action 1) in the EEZ. *One suboption from each option below should be selected by the Council*:

Option a: Establish MSY

Suboption a: MSY proxy= OFL

Suboption b: MSY proxy = OFL reduced for uncertainty based upon SSC recommendations.

Option b: Establish an overfishing threshold (MFMT)

Suboption a: MFMT= the harvest rate that results in the annual yield equal to the biomass MSY proxy

Suboption b: MFMT proxy = OFL; if the OFL is exceeded, then overfishing is occurring

Option c: Establish an overfished threshold (MSST)

Suboption a: MSST= 0.75* B_{MSY} (or proxy)

Suboption b: MSST= 0.5* B_{MSY} (or proxy)

Option d: ACL

Suboption a: ACL= annual biological catch (ABC)

Suboption b: ACL = ABC reduced for uncertainty based upon SSC recommendations

Discussion:

This action is dependent on the Council selecting an alternative to manage octocorals in Action 1 (Alternatives 2, 3, or 4). The Magnuson-Stevens Act requires each FMP to include a scientifically measurable definition of overfishing and an action plan to stop overfishing should it occur. Since 2007, to prevent overfishing, fishery management councils within the U.S. have developed and implemented ACLs and accountability measures (AMs) under all fishery management plans for species with life histories that exceed 12 months (unless the average age of spawners is less than 12 months) and are not under international cooperative management. Should the Council select Alternative 2, Alternative 3, or Alternative 4 in Action 1, management benchmarks would need to be established. Additionally, all octocorals listed in the Council's preferred alternative in Action 1 (Table 2.2.1) will be treated as a stock complex as it is impossible to do single species assessments. At this time, the Council has neither a recommendation for management benchmarks nor an SSC approved OFL and ABC for octocorals. However, it is appropriate to discuss the methodology regarding the management benchmarks and how these benchmarks (**Alternatives 2** and **3**) should be set in the absence of hard number recommendations from the SSC.

Table 2.2.1. Total colonies landed in Atlantic (state and federal) waters and Gulf (state and federal) waters, from 1996 to 2016.

Year	Region (state and federal)	Landings (# colonies)	Trips	Value ($)	Total Landings (# colonies)
1996	Atlantic	34,734	542	92,295.61	
	Gulf	2,323	160	11,456.47	37,057
1997	Atlantic	38,792	598	84,727.69	
	Gulf	6,075	127	20,139.75	44,867
1998	Atlantic	34,583	620	74,824.42	
	Gulf	6,160	212	16,224.35	40,743
1999	Atlantic	29,429	531	65,307.45	
	Gulf	7,192	259	16,362.34	36,621
2000	Atlantic	33,633	619	85,277.49	
	Gulf	9,467	378	22,636.08	43,100
2001	Atlantic	35,056	626	89,535.34	
	Gulf	10,838	330	29,768.86	45,894

2002	Atlantic	29,375	570	70,470.93	
	Gulf	8,763	311	25,259.75	38,138
2003	Atlantic	34,817	643	88,764.74	
	Gulf	9,667	283	28,374.17	44,484
2004	Atlantic	33,725	707	90,217.38	
	Gulf	10,033	312	29,760.13	43,758
2005	Atlantic	31,408	646	90,770.21	
	Gulf	10,044	259	28,745.25	41,452
2006	Atlantic	39,626	740	119,173.69	
	Gulf	8,954	266	24,404.55	48,580
2007	Atlantic	35,075	593	112,359.26	
	Gulf	9,198	271	33,400.00	44,273
2008	Atlantic	33,270	544	115,314.80	
	Gulf	9,372	282	36,714.61	42,642
2009	Atlantic	34,378	527	91,059.38	
	Gulf	8,103	257	33,473.50	42,481
2010	Atlantic	22,069	479	77,665.85	
	Gulf	10,270	218	54,021.12	32,339
2011	Atlantic	22,218	476	75,991.35	
	Gulf	6,724	225	25,789.00	28,942
2012	Atlantic	24,442	383	88,814.00	
	Gulf	8,786	242	39,025.25	33,228
2013	Atlantic	23,507	479	88,969.29	
	Gulf	13,813	293	50,343.10	37,320
2014	Atlantic	27,160	572	99,570.50	
	Gulf	9,238	258	42,103.75	36,398
2015	Atlantic	25,027	512	102,709.89	
	Gulf	8,159	201	27,422.25	33,186
2016	Atlantic	22,323	437	85,008.30	
	Gulf	8,106	203	35,889.00	30,429

Source: S. Brown, FWC, pers. comm.

The original Coral FMP established no harvest (ACL = 0) of stony corals, black corals, and sea fans for several reasons. It was known that stony corals and sea fans had slow growth and their value was based in non-consumptive capacities, additionally impacts to these species came from multiple sources due to sedentary nature and inability to escape human impacts. So for practical purposes these were considered to be non-renewable resources which should not be harvested (GMFMC and SAFMC 1982). Also it was acknowledged that there was a lack of information for the management unit to calculate MSY or other management benchmarks. However, there was an allowable octocoral harvest because there was an existing fishery that was considered relatively small and not likely to significantly increase (GMFMC and SAFMC 1982). Amendment 1 of the Coral FMP set the allowable annual harvest of 50,000 colonies of gorgonians for both the South Atlantic and Gulf (except prohibited sea fans [see Section 1.3]) (GMFMC and SAFMC 1990). Currently, Florida allows 70,000 octocoral colonies to be harvested annually from both state and federal waters in the Gulf and Atlantic. Total reported commercial landings from 1996 to 2016 indicates that harvest has never exceeded the previous federal quota of 50,000 colonies, or the Florida state quota of 70,000 colonies (Table 2.2.1). The

average landings of octocorals in the Gulf over the past ten years is 9,177, with an average of 5,052 colonies harvested in federal waters, and 4,125 harvested in state waters.

Alternative 1 would comply with the requirements of the Magnuson-Stevens Act only in the event that the Council chooses to maintain status quo and selects Alternative 1 in Action 1. **Alternative 1** would not comply with the requirements of the Magnuson-Stevens Act if the Council selects Alternative 2, 3, or 4 in Action 1.

Alternative 2 would prohibit the harvest of the octocoral genera selected in Action 1 and establish an ACL = 0 and MSY = 0. The MFMT and MSST would not be necessary to set, as harvest is prohibited.

Should the Council decide upon Alternatives 2, 3, or 4 in Action 1, the SSC would need to set an overfishing limit (OFL) and an ABC. The acceptable biological catch control rule (ABC control rule) developed by the Council's SSC to set OFL and ABC for a stock (Appendix D) determines the appropriate level of risk and/or buffer to set between the OFL and ABC based on the amount of information for a given stock. The OFL, is the point at which fishing seriously compromises the octocoral communities' sustained productivity and is the annual amount of catch that corresponds to the estimate of MFMT. Stocks with less information have greater scientific uncertainty, so the buffer between the OFL and ABC should be more. The ABC may not exceed the OFL. At this time there has been no stock assessment of octocorals in the Gulf, and scientific research on stock status, spawning, etc. is limited. If the Council chooses to establish these management benchmarks, the SSC would need to review the existing information on octocoral stocks to provide recommendations on these benchmarks. The SSC may also make recommendations regarding the ACL, MSY, overfishing threshold (MFMT or proxy), and overfished threshold (MSST or proxy).

MSY serves as a maximum limit on harvest which cannot be exceeded. The lack of sufficient data on biomass and mortality prevents any meaningful calculation of MSY; thus an SPR based proxy would be meaningless as there is no way to quantify the MSST or MFMT with respect to SPR. Under the national standard 1 guidelines, MSST and MFMT must be measureable. Some measurement other than spawning potential ratio (SPR) is needed to evaluate MSY. One possibility is to set the MSY proxy equal to the constant catch OFL as determined by either Tier 3 of the ABC control rule or by a data-limited method. When data are insufficient to estimate MSY directly, the Council can use other measures of productive capacity as proxies for MSY. Therefore, establishing an MSY proxy either equal to the OFL, or an OFL that has been reduced based on uncertainty (as recommended by the SSC) are appropriate metrics for the Council to consider. **Alternative 3**, **Option a**, **Suboption a** or **b** would meet the criteria of being equal to or less than the OFL. **Alternative 3**, **Option a**, **Suboption a** would set a higher overfishing limit than **Alternative 3**, **Option a**, **Suboption b**.

The Sustainable Fisheries Act (SFA) guidelines provide that each FMP must specify, to the extent possible, objective and measurable status determination criteria for each stock or stock complex and provide an analysis of how the criteria were chosen and how they relate to reproductive potential. The guidelines provide that the status determination criteria must have both an MFMT or reasonable proxy thereof, and an MSST or reasonable proxy thereof.

The MFMT is the level of fishing mortality on an annual basis, above which overfishing is occurring. The MFMT, or reasonable proxy, may be expressed either as a single number (a fishing mortality rate), or as a function of spawning biomass or other measure of reproductive potential. **Alternative 3**, **Option b**, **Suboption a** would set an MFMT to harvest rate that would result in the annual yield equal to the biomass MSY proxy (set by **Alternative 3**, **Option a**). Alternatively, since the OFL is the annual amount of catch (expressed in terms of numbers or weight of harvest) that corresponds to the estimate of MFMT, **Alternative 3**, **Option b**, **Suboption b** would set an MFMT proxy equal to the OFL, and if the OFL is exceeded then overfishing is occurring. **Alternative 3**, **Option b**, **Suboption a** would require calculating a harvest rate that would correspond to the OFL which has not yet been reviewed by the SSC.

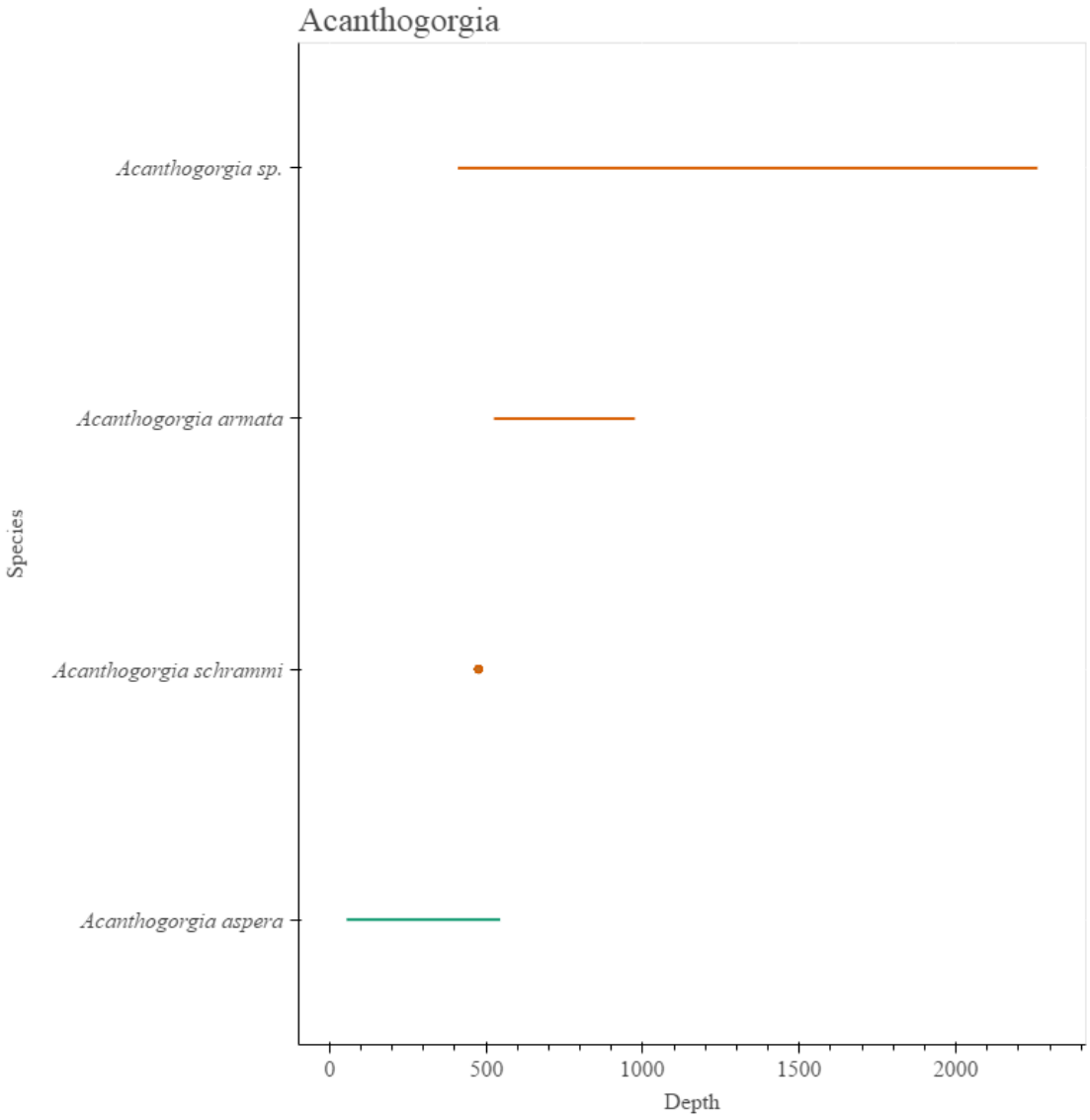
The MSST is the level of biomass below which the capacity of the stock or stock complex to produce MSY on a continuing basis has been jeopardized. The MSST should be expressed in terms of spawning biomass or other productive capacity, and that to the extent possible, the stock size threshold should be no less than one-half MSY stock size. The current stock size of octocorals (B_{MSY}, where B is the biomass of the stock at MSY) is unknown, and a stock assessment would be necessary as well as guidance from the SSC on appropriate MSST or proxy. Until a stock assessment is conducted/possible, the MSST definition is a placeholder until B_{MSY} (or proxy) can be calculated. **Alternative 3**, **Option c**, **Suboptions a** and **b** would fulfill the provisions of the SFA, with **Alternative 3**, **Option c**, **Suboption b** being the least conservative.

The SSC will be provided with information and asked to recommend an ABC and other parameters at its January 2018 meeting. In accordance with national standard 1 guidelines the ACL cannot exceed the ABC. **Alternative 3**, **Option d** provides two avenues for establishing an ACL that is based upon the ABC. The Council may consider setting the ACL equal to the ABC (**Alternative 3**, **Suboption a**) which would be consistent with how the Council has approached other data-poor species (such as spiny lobster and coastal migratory pelagics; GMFMC 2017). If the Council would like to reduce the ACL based on uncertainty **Alternative 3**, **Option d**, **Suboption b** provides this alternative based on the best scientific advice of the SSC. The Council must also establish AMs if it sets an ACL.

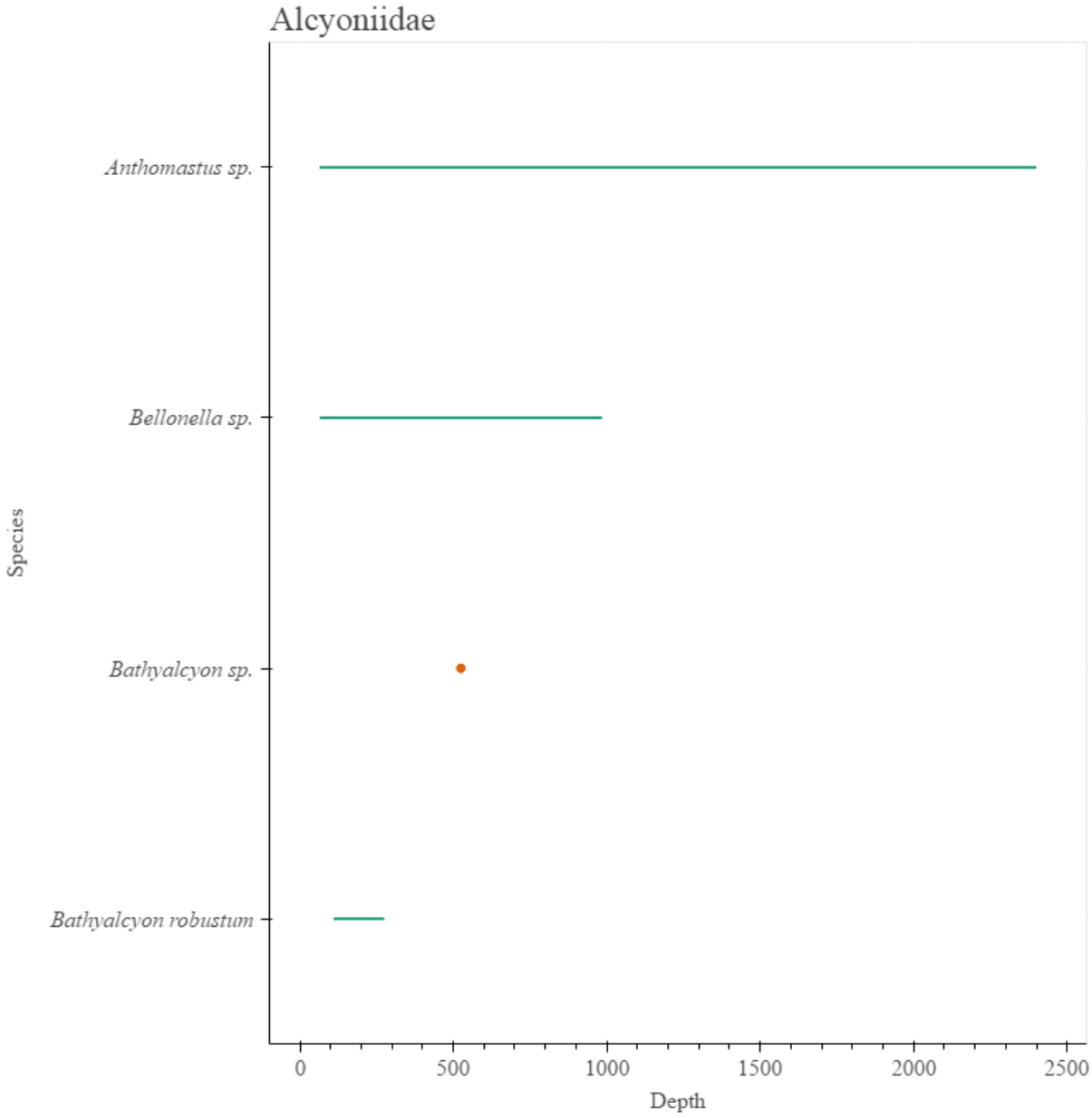
An allowance for harvest of octocorals for research and scientific purposes and unintentional harvest would be consistent with other coral complexes and should be discussed by the Council at the time that it discusses codified text.

DEPTH CHARTS FOR GULF OCTOCORALS

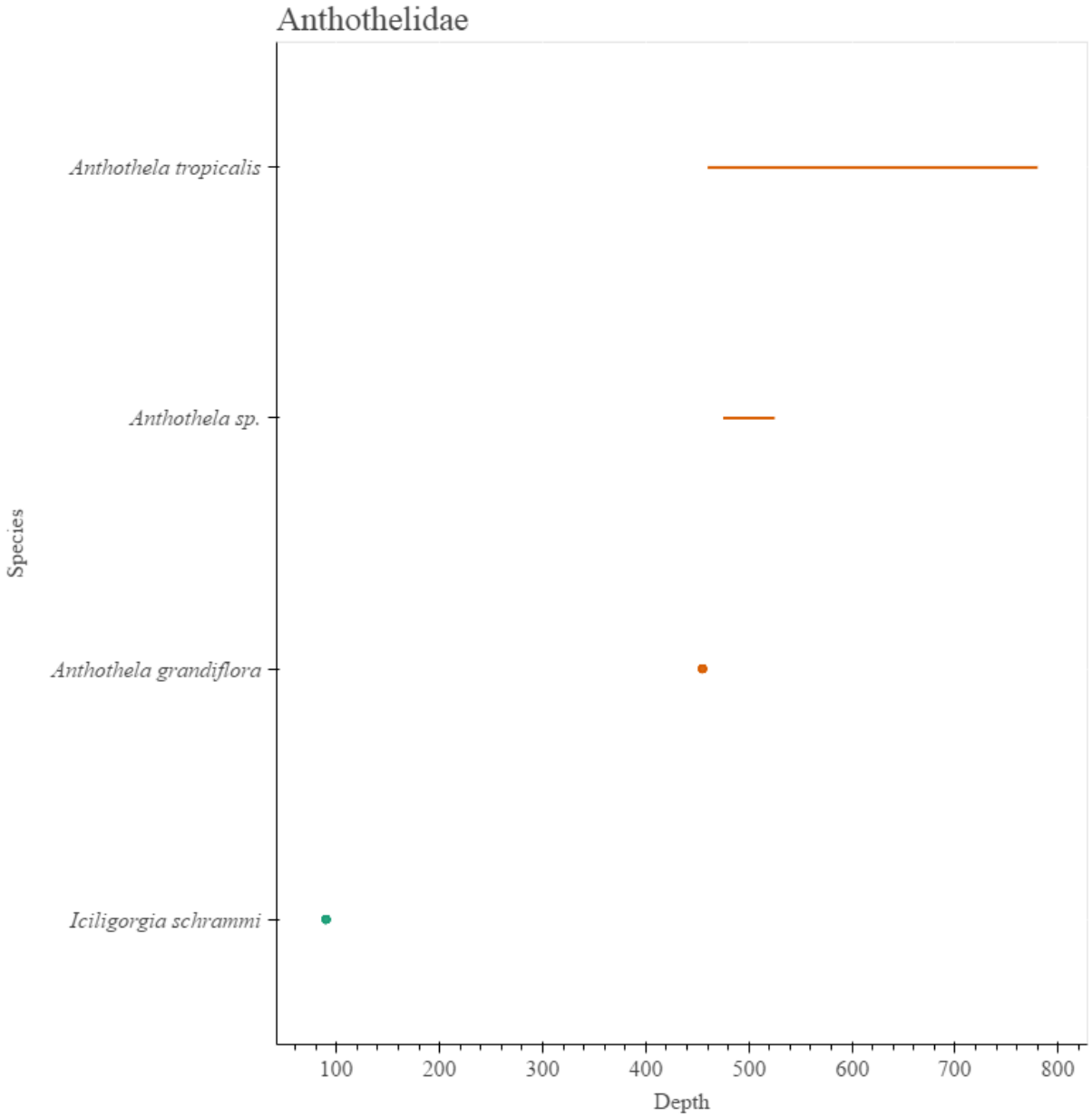
Appendix Figure 1. Species documented in the Gulf from the octocoral family Acanthogorgiidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



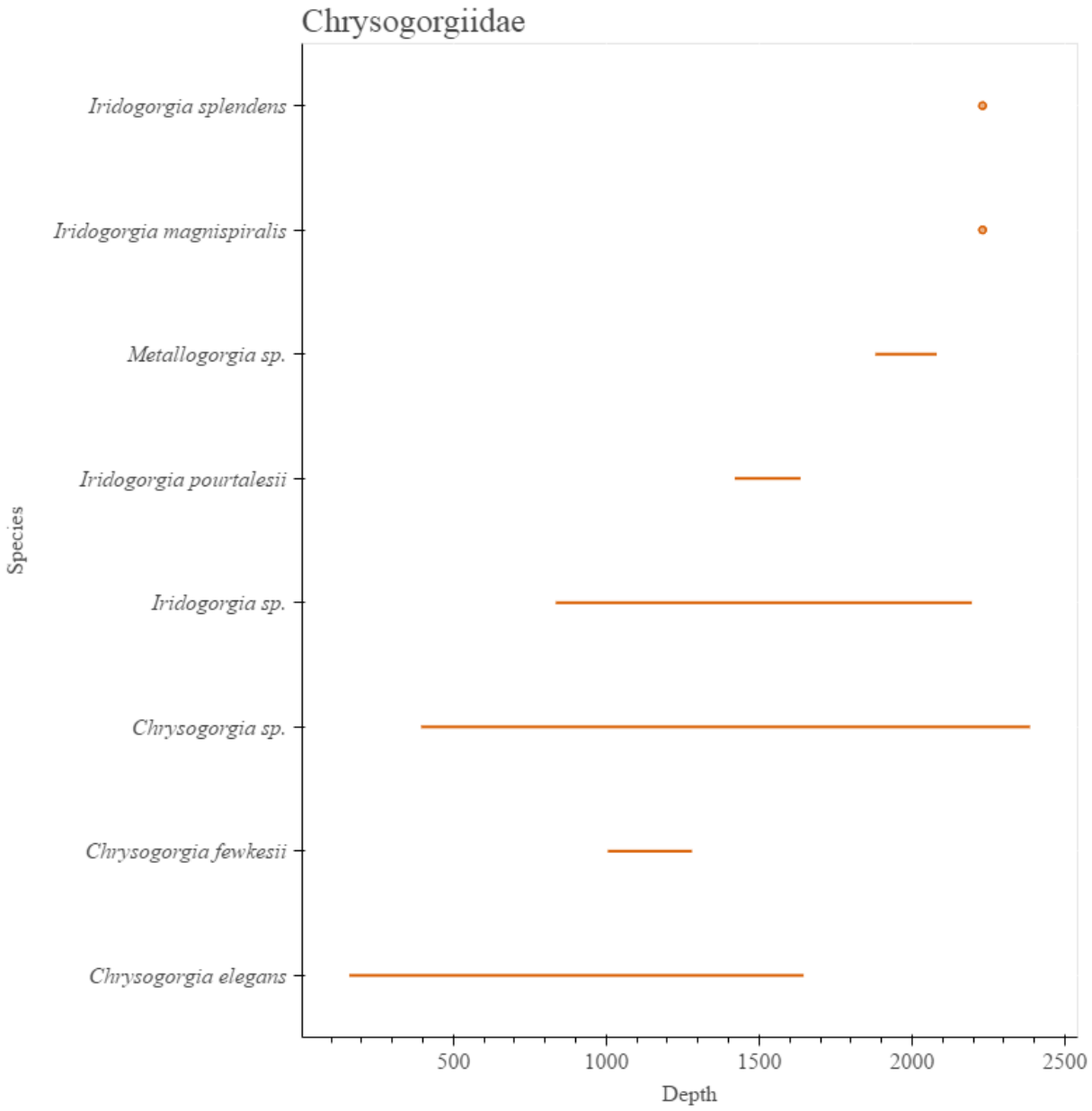
Appendix Figure 2. Species documented in the Gulf from the octocoral family Alcyoniidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



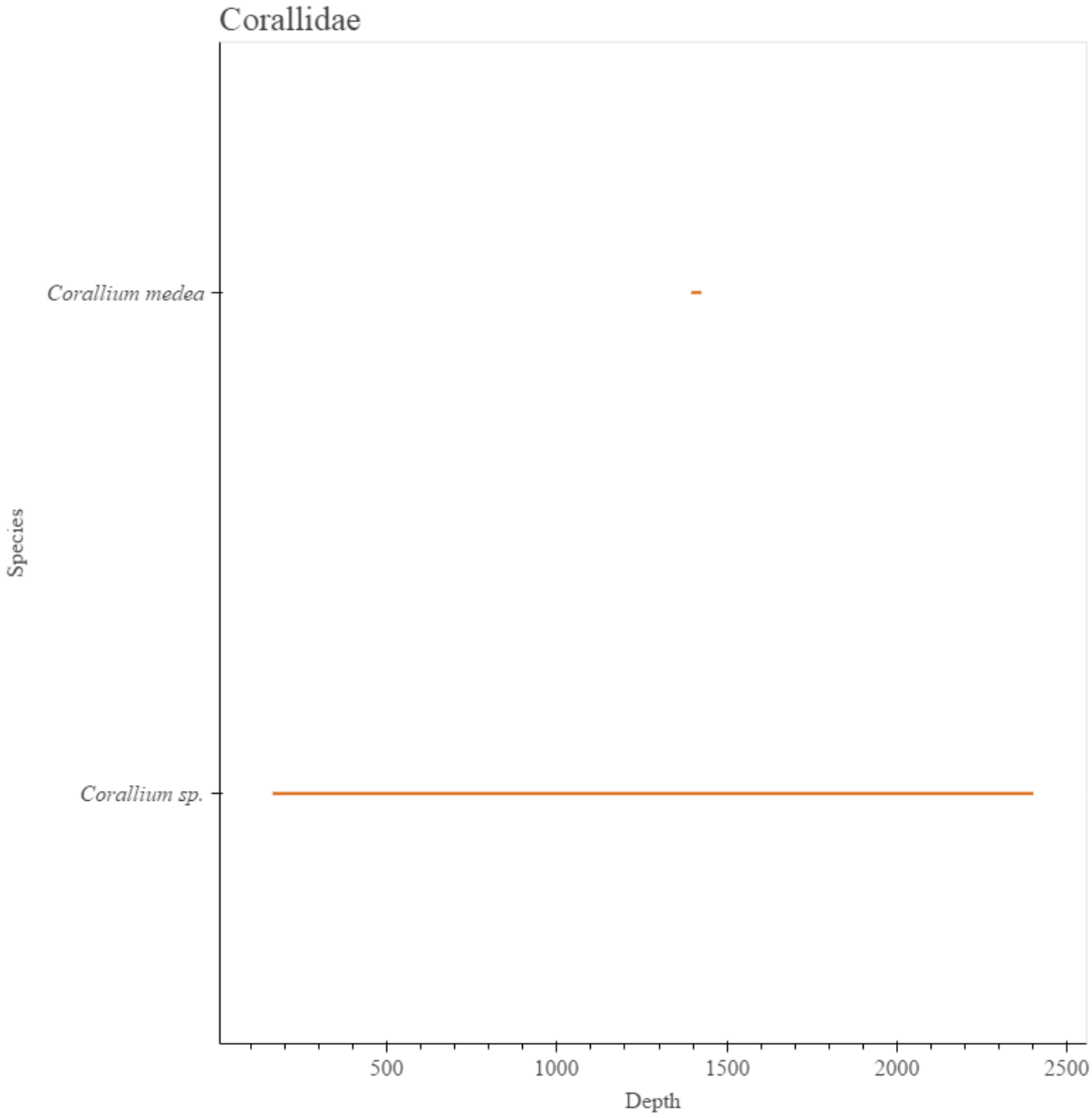
Appendix Figure 3. Species documented in the Gulf from the octocoral family Anthothelidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



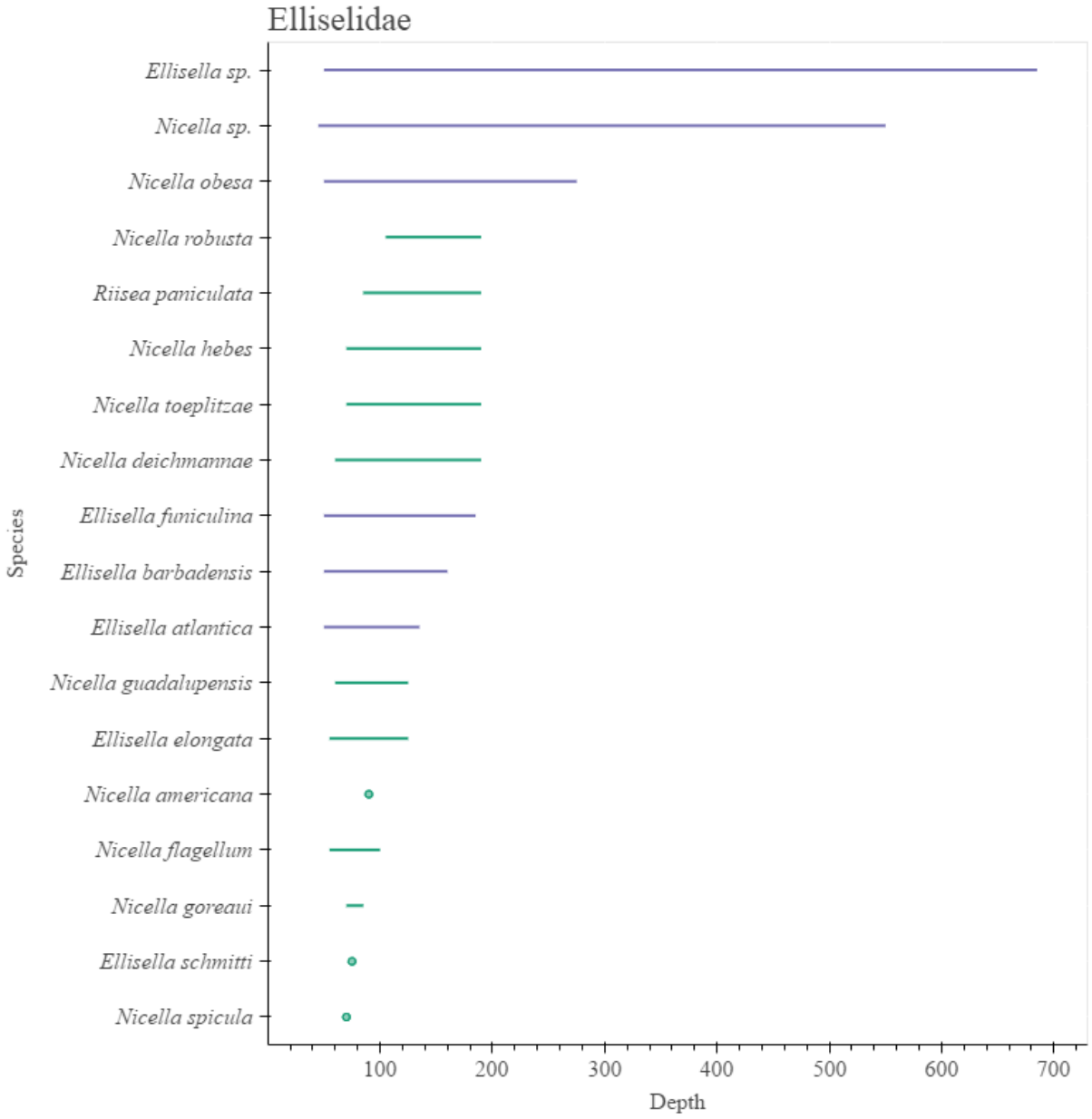
Appendix Figure 4. Species documented in the Gulf from the octocoral family Chrysogorgidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



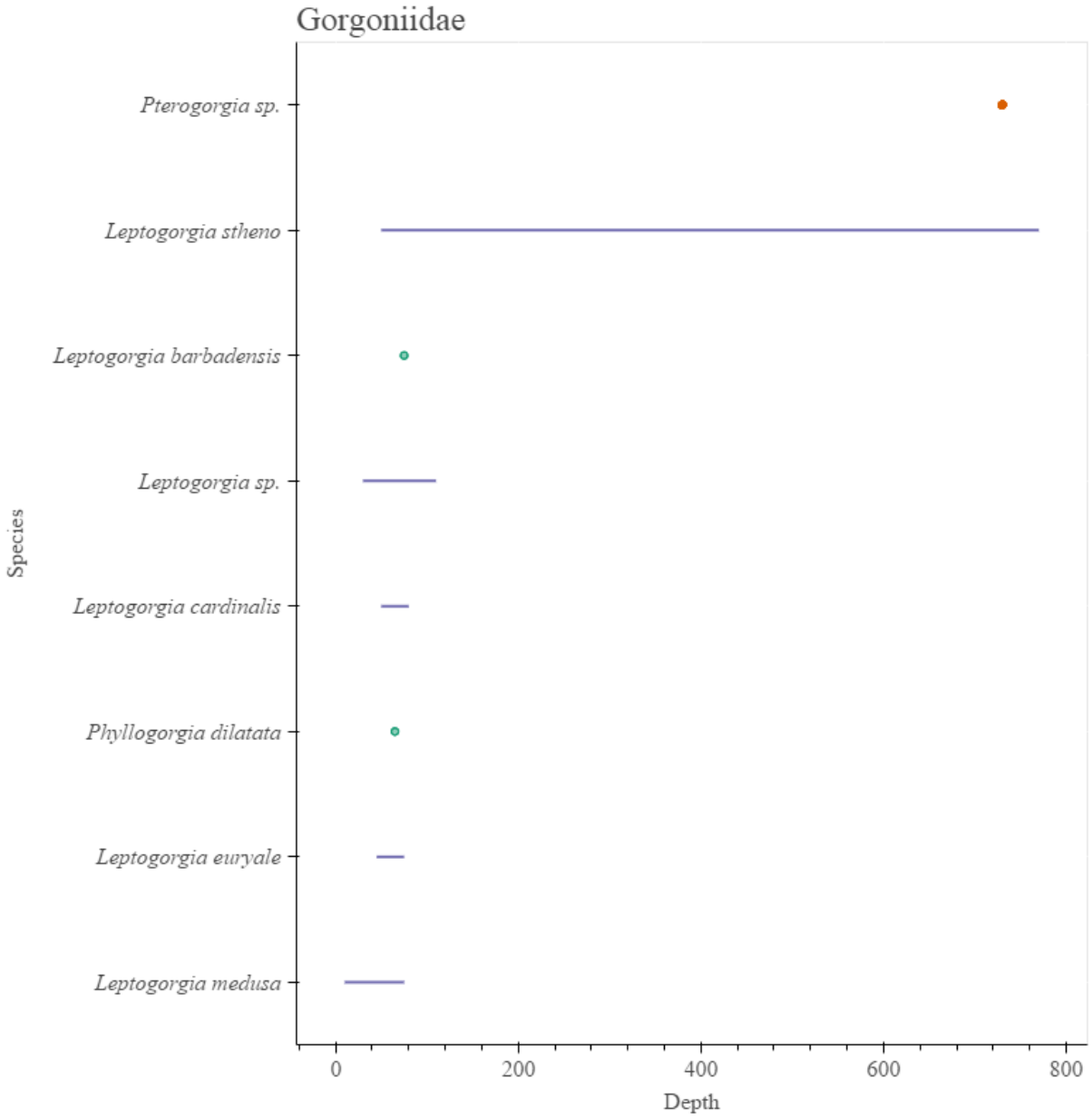
Appendix Figure 5. Species documented in the Gulf from the octocoral family Corallidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



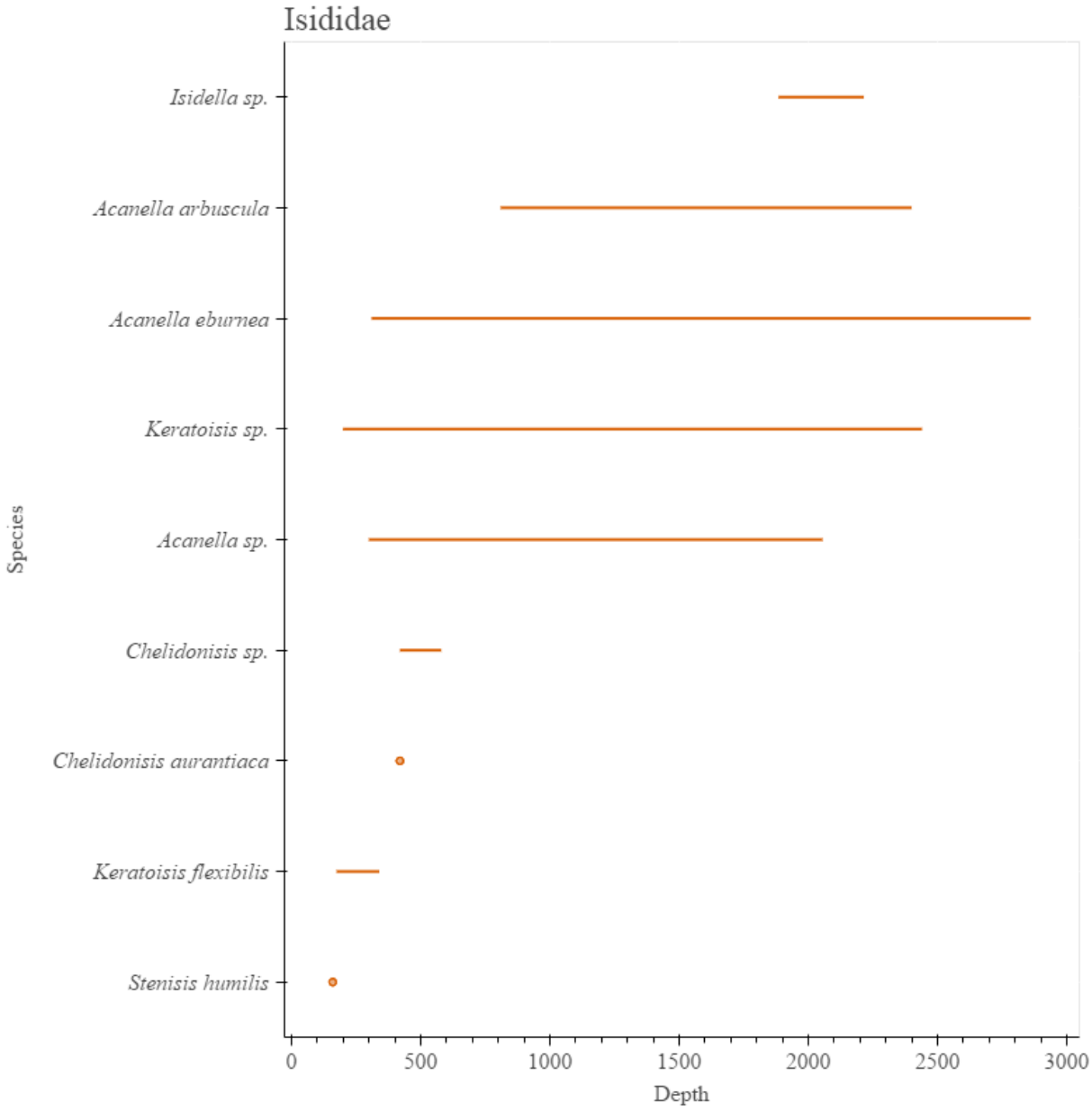
Appendix Figure 6. Species documented in the Gulf from the octocoral family Elliselidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



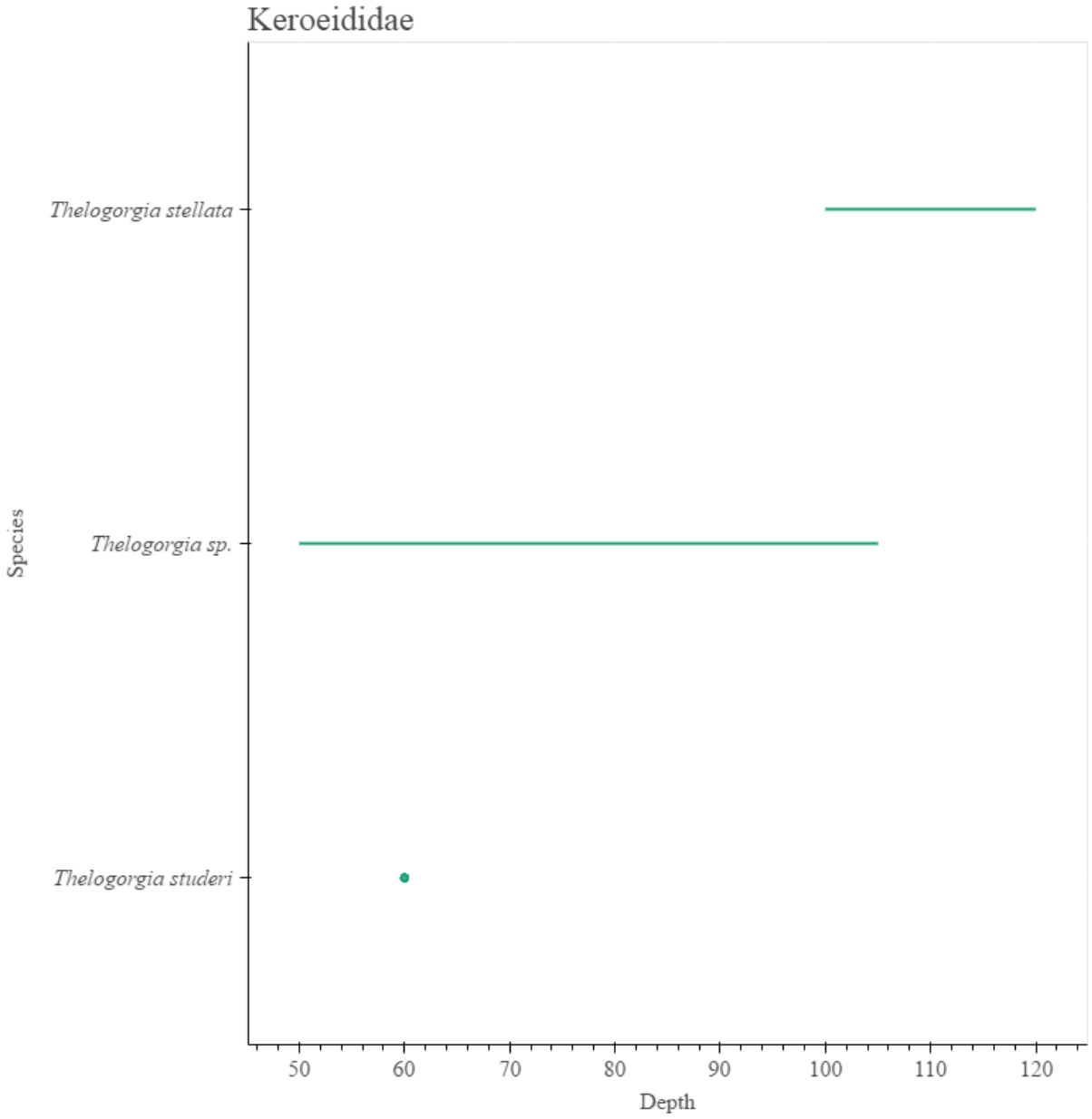
Appendix Figure 7. Species documented in the Gulf from the octocoral family Gorgoniidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



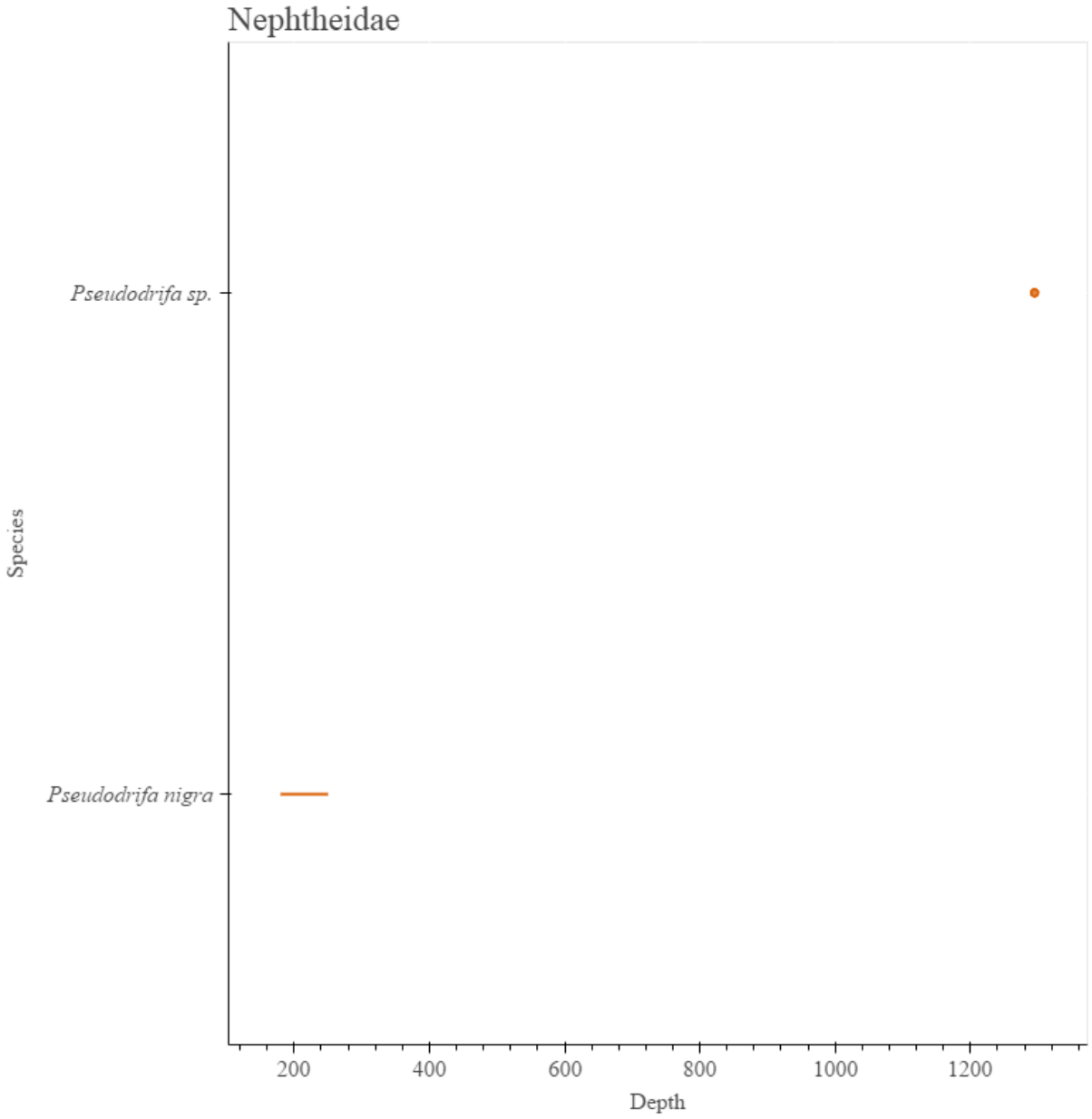
Appendix Figure 8. Species documented in the Gulf from the octocoral family Isididae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



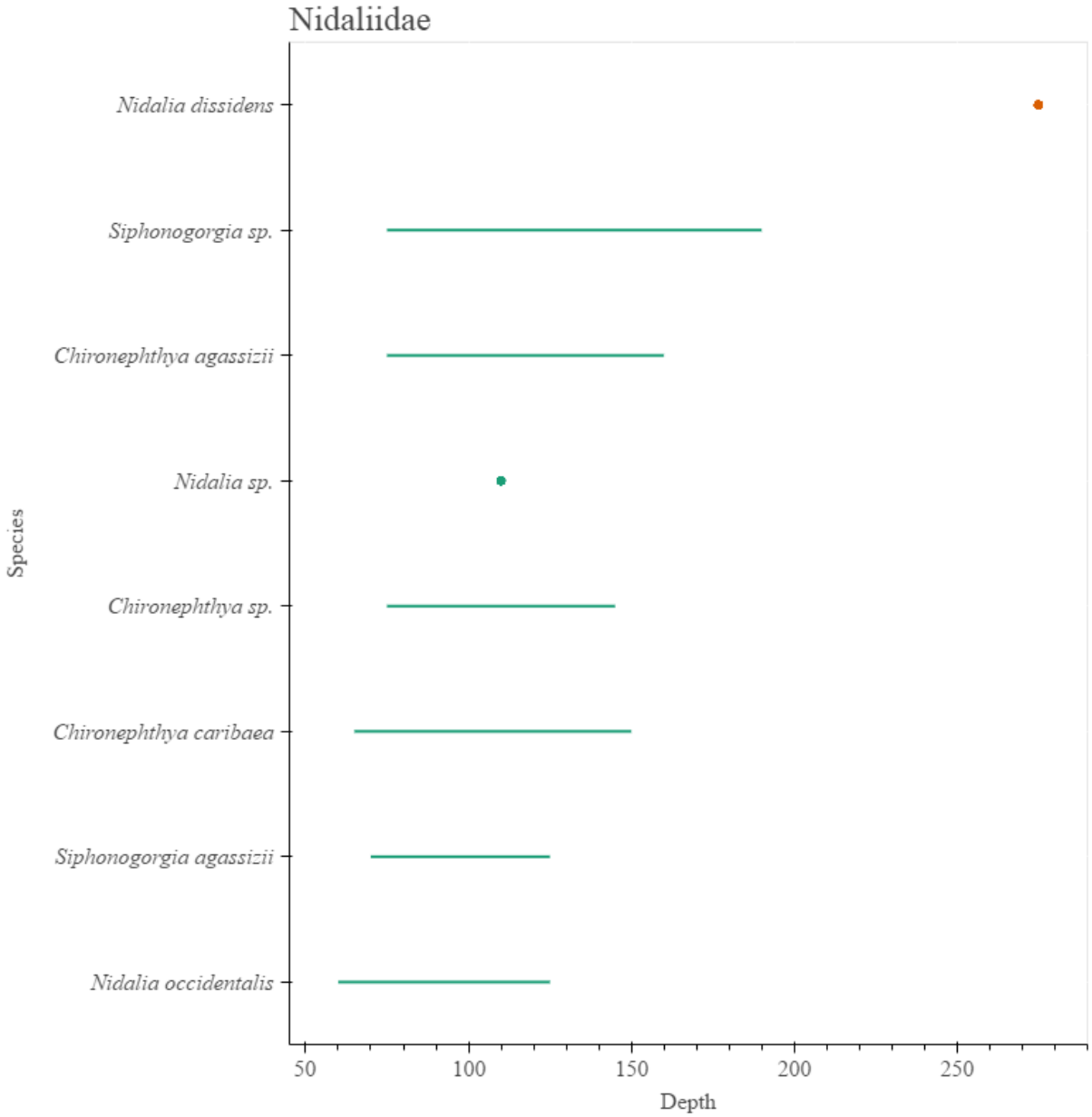
Appendix Figure 9. Species documented in the Gulf from the octocoral family Keroeididae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



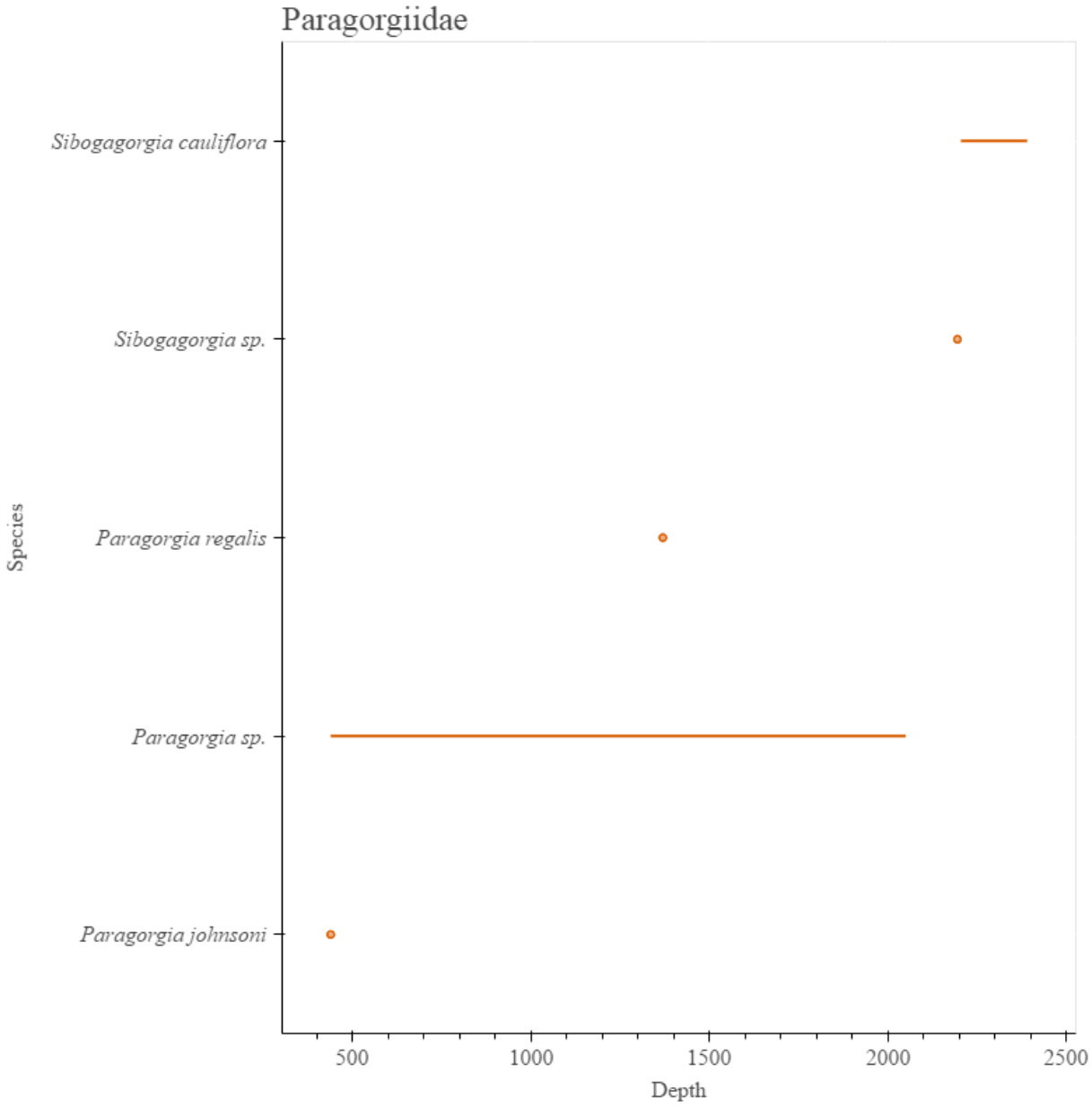
Appendix Figure 10. Species documented in the Gulf from the octocoral family Nephtheidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



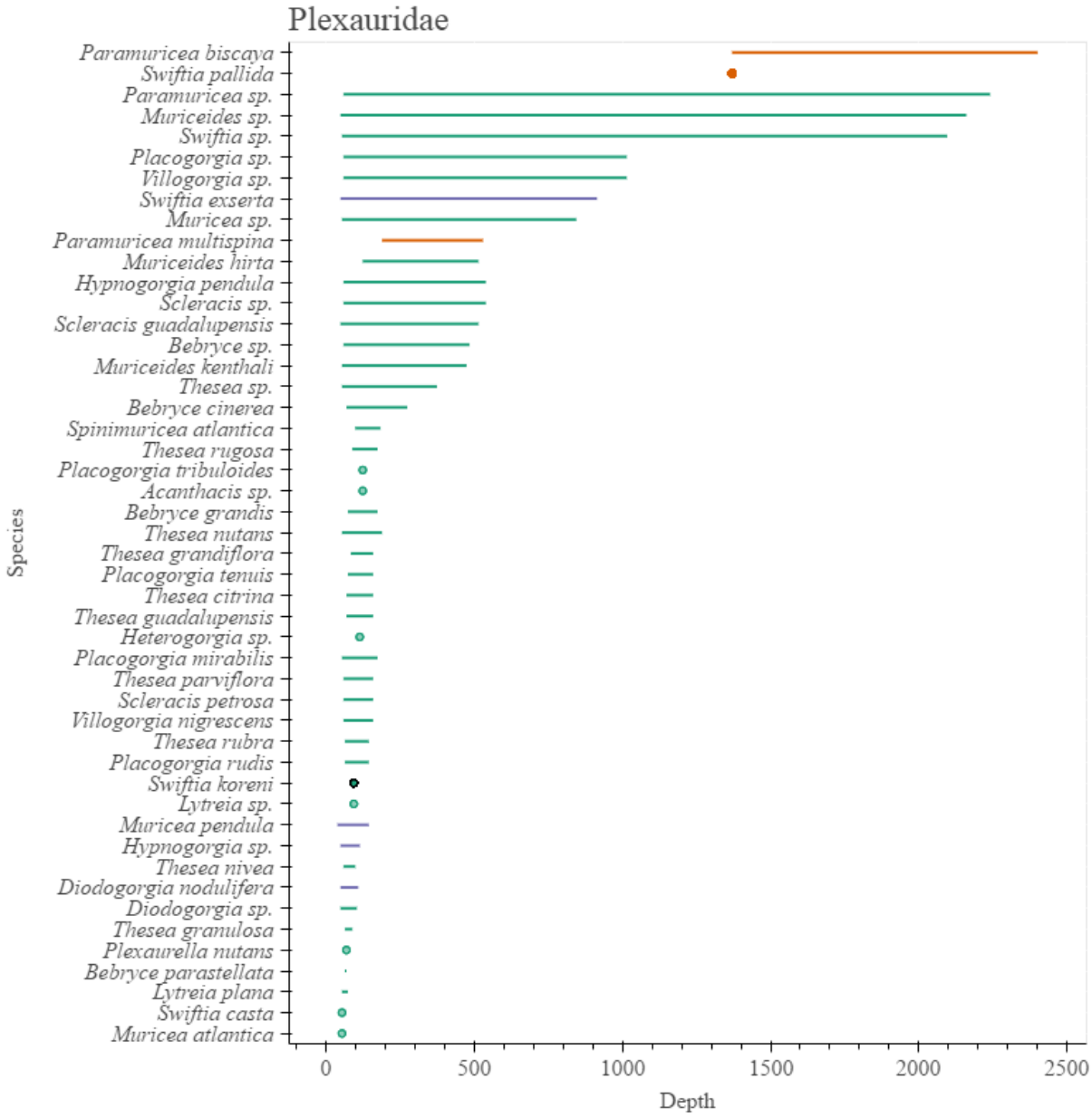
Appendix Figure 11. Species documented in the Gulf from the octocoral family Nidaliidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



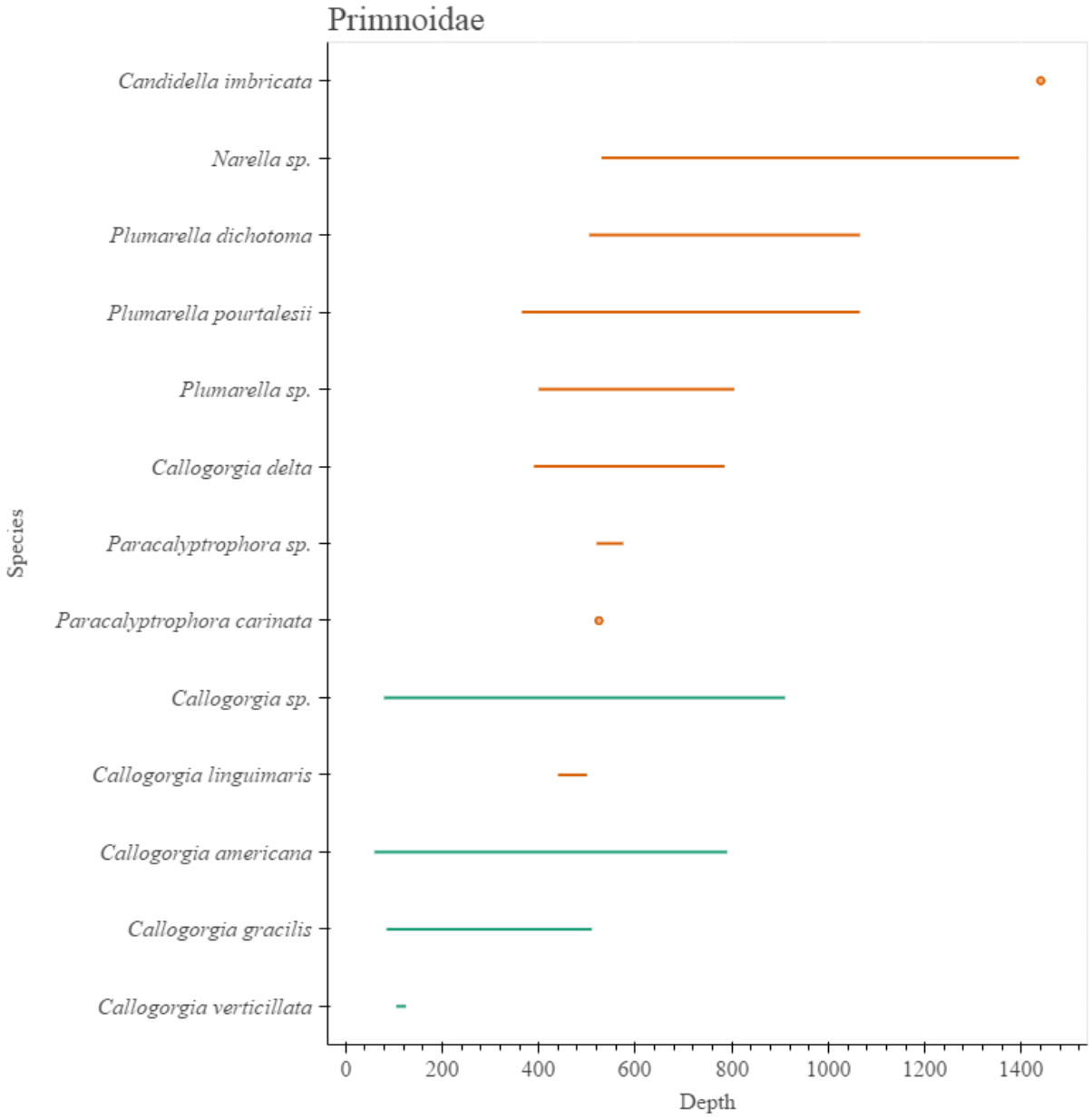
Appendix Figure 12. Species documented in the Gulf from the octocoral family Paragorgiidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



Appendix Figure 13. Species documented in the Gulf from the octocoral family Plexauridae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



Appendix Figure 14. Species documented in the Gulf from the octocoral family Primnoidae. Min depth: <= 50 purple, 51-150 green, > 150 orange.



APPENDIX C. COMMERCIAL OCTOCORAL LANDINGS 1990-2016

Appendix Table 1. Commercial octocoral harvest from 1996-2016, by region, as reported to the FWC. Area fished was not a requirement of reporting before 1995, the County landed was used to assign a coast.

Year	Jurisdiction	Region	Landings (# colonies)	Trips	Value ($)	% Total landings
1996	Federal	Atlantic	33,225	517	87,294	89.66
		Gulf	1,776	150	9,968	4.79
	State	Atlantic	1,509	25	5,001	4.07
		Gulf	547	10	1,489	1.48
	TOTAL	Atlantic	34,734	542	92,296	
		Gulf	2,323	160	11,456	
1997	Federal	Atlantic	27,740	435	60,391	61.83
		Gulf	3,753	90	13,469	8.36
	State	Atlantic	11,052	163	24,337	24.63
		Gulf	2,322	37	6,671	5.18
	TOTAL	Atlantic	38,792	598	84,728	
		Gulf	6,075	127	20,140	
1998	Federal	Atlantic	10,033	221	17,994	24.63
		Gulf	2,493	86	6,758	6.12
	State	Atlantic	24,550	399	56,830	60.26
		Gulf	3,667	126	9,467	9.00
	TOTAL	Atlantic	34,583	620	74,824	
		Gulf	6,160	212	16,224	
1999	Federal	Atlantic	8,425	176	16,119	23.01
		Gulf	3,955	128	7,810	10.80
	State	Atlantic	21,004	355	49,189	57.36
		Gulf	3,237	131	8,552	8.84
	TOTAL	Atlantic	29,429	531	65,307	
		Gulf	7,192	259	16,362	
2000	Federal	Atlantic	7,278	186	15,135	16.89
		Gulf	3,975	139	10,374	9.22
	State	Atlantic	26,355	433	70,142	61.15
		Gulf	5,492	239	12,262	12.74
	TOTAL	Atlantic	33,633	619	85,277	
		Gulf	9,467	378	22,636	
2001	Federal	Atlantic	5,432	173	10,733	11.84
		Gulf	3,728	102	7,502	8.12
	State	Atlantic	29,624	453	78,802	64.55
		Gulf	7,110	228	22,267	15.49
	TOTAL	Atlantic	35,056	626	89,535	
		Gulf	10,838	330	29,769	
2002	Federal	Atlantic	10,407	189	26,829	27.29
		Gulf	2,707	82	6,287	7.10
	State	Atlantic	18,968	381	43,642	49.74
		Gulf	6,056	229	18,973	15.88
	TOTAL	Atlantic	29,375	570	70,471	
		Gulf	8,763	311	25,260	
2003	Federal	Atlantic	5,049	114	13,100	11.35
		Gulf	4,331	102	12,810	9.74
	State	Atlantic	29,768	529	75,664	66.92
		Gulf	5,336	181	15,564	11.99
		Atlantic	34,817	643	88,765	

	TOTAL	Gulf	9,667	283	28,374	
2004	Federal	Atlantic	4,386	92	11,901	10.02
		Gulf	2,966	100	9,469	6.78
	State	Atlantic	29,339	615	78,317	67.05
		Gulf	7,067	212	20,291	16.15
	TOTAL	Atlantic	33,725	707	90,217	
		Gulf	10,033	312	29,760	
2005	Federal	Atlantic	4,007	89	11,774	9.67
		Gulf	3,693	97	14,125	8.91
	State	Atlantic	27,401	557	78,997	66.10
		Gulf	6,351	162	14,620	15.32
	TOTAL	Atlantic	31,408	646	90,770	
		Gulf	10,044	259	28,745	
2006	Federal	Atlantic	4,024	81	11,408	8.28
		Gulf	2,721	75	9,336	5.60
	State	Atlantic	35,602	659	107,766	73.29
		Gulf	6,233	191	15,069	12.83
	TOTAL	Atlantic	39,626	740	119,174	
		Gulf	8,954	266	24,405	
2007	Federal	Atlantic	5,250	107	15,780	11.86
		Gulf	5,747	151	21,547	12.98
	State	Atlantic	29,825	486	96,579	67.37
		Gulf	3,451	120	11,854	7.79
	TOTAL	Atlantic	35,075	593	112,359	
		Gulf	9,198	271	33,400	
2008	Federal	Atlantic	4,890	112	15,734	11.47
		Gulf	4,951	142	19,101	11.61
	State	Atlantic	28,380	432	99,581	66.55
		Gulf	4,421	140	17,614	10.37
	TOTAL	Atlantic	33,270	544	115,315	
		Gulf	9,372	282	36,715	
2009	Federal	Atlantic	3,786	90	11,359	8.91
		Gulf	4,584	123	18,519	10.79
	State	Atlantic	30,592	437	79,701	72.01
		Gulf	3,519	134	14,955	8.28
	TOTAL	Atlantic	34,378	527	91,059	
		Gulf	8,103	257	33,474	
2010	Federal	Atlantic	2,071	49	7,437	6.40
		Gulf	4,108	75	23,941	12.70
	State	Atlantic	19,998	430	70,229	61.84
		Gulf	6,162	143	30,081	19.05
	TOTAL	Atlantic	22,069	479	77,666	
		Gulf	10,270	218	54,021	
2011	Federal	Atlantic	2,557	88	8,605	8.83
		Gulf	3,464	71	11,877	11.97
	State	Atlantic	19,661	388	67,386	67.93
		Gulf	3,260	154	13,912	11.26
	TOTAL	Atlantic	22,218	476	75,991	
		Gulf	6,724	225	25,789	
2012	Federal	Atlantic	2,261	52	7,787	6.80
		Gulf	4,715	93	17,010	14.19
	State	Atlantic	22,181	331	81,027	66.75
		Gulf	4,071	149	22,015	12.25
	TOTAL	Atlantic	24,442	383	88,814	
		Gulf	8,786	242	39,025	
2013	Federal	Atlantic	1,915	60	7,076	5.13
		Gulf	8,706	113	25,358	23.33
	State	Atlantic	21,592	419	81,894	57.86
		Gulf	5,107	180	24,985	13.68

	TOTAL	Atlantic	23,507	479	88,969	
		Gulf	13,813	293	50,343	
2014	Federal	Atlantic	2,706	37	10,754	7.43
		Gulf	5,303	92	16,694	14.57
	State	Atlantic	24,454	535	88,817	67.19
		Gulf	3,935	166	25,410	10.81
	TOTAL	Atlantic	27,160	572	99,571	
		Gulf	9,238	258	42,104	
2015	Federal	Atlantic	1,996	46	7,975	6.01
		Gulf	4,444	74	12,956	13.39
	State	Atlantic	23,031	466	94,735	69.40
		Gulf	3,715	127	14,467	11.19
	TOTAL	Atlantic	25,027	512	102,710	
		Gulf	8,159	201	27,422	
2016	Federal	Atlantic	1,729	50	5,717	5.68
		Gulf	4,502	75	19,775	14.80
	State	Atlantic	20,594	387	79,291	67.68
		Gulf	3,604	128	16,115	11.84
	TOTAL	Atlantic	22,323	437	85,008	
		Gulf	8,106	203	35,889	

Source: personal communication S. Brown, FWC, 2017.

APPENDIX D. OTHER APPLICABLE LAW

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.) provides the authority for fishery management in federal waters of the exclusive economic zone. However, 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 that support those fisheries. 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, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider, and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day waiting period from the time a final rule is published until it takes effect.

Coastal Zone Management Act

Section 307(c)(1) of the federal Coastal Zone Management Act of 1972 (CZMA), as amended, requires federal activities that affect any land or water use or natural resource of a state's coastal zone be conducted in a manner consistent, to the maximum extent practicable, with approved state coastal management programs. The requirements for such a consistency determination are set forth in NMFS regulations at 15 C.F.R. part 930, subpart C. According to these regulations and CZMA Section 307(c)(1), when taking an action that affects any land or water use or natural resource of a state's coastal zone, NMFS is required to provide a consistency determination to the relevant state agency at least 90 days before taking final action.

Upon submission to the Secretary, NMFS will determine if this plan amendment is consistent with the Coastal Zone Management programs of the states of Alabama, Florida, Louisiana, Mississippi, and Texas to the maximum extent possible. Their determination will then be submitted to the responsible state agencies under Section 307 of the CZMA administering approved Coastal Zone Management programs for these states.

Data Quality Act

The Data Quality Act (DQA) (Public Law 106-443) effective October 1, 2002, requires the government 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 DQA directs the Office of Management and Budget 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 disseminate 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 Office of Management and Budget on the number and nature of complaints received.

Scientific information and data are key components of fishery management plans (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. They should also properly reference all supporting materials and data, and 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 will also undergo quality control prior to being used by the agency and a pre-dissemination review.

Endangered Species Act

The Endangered Species Act (ESA) of 1973, as amended, (16 U.S.C. Section 1531 et seq.) requires federal agencies use their authorities to conserve endangered and threatened species. The ESA requires NMFS, 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, including a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" endangered or threatened species or adversely modify designated critical habitat. If jeopardy or adverse modification is found, the consulting agency is required to suggest reasonable and prudent alternatives.

On September 30, 2011, the Protected Resources Division released a biological opinion which, after analyzing best available data, the current status of the species, environmental baseline (including the impacts of the recent Deepwater Horizon MC 252 oil release event in the northern Gulf of Mexico), effects of the proposed action, and cumulative effects, concluded that the continued operation of the Gulf of Mexico reef fish fishery is also not likely to jeopardize the continued existence of green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles, nor the continued existence of smalltooth sawfish (NMFS 2011a). On December 7, 2012, NMFS published a proposed rule to list 66 coral species under the ESA and reclassify *Acropora* from threatened to endangered (77 FR 73220). In a memorandum dated February 13, 2013, NMFS determined the reef fish fishery was not likely to adversely affect *Acropora* because of where the fishery operates, the types of gear used in the fishery, and that other regulations protect *Acropora* where they are most likely to occur. In a consultation memorandum dated October 7, 2014,

NMFS assessed the continued operation of the Gulf reef fish fishery's potential impact on the four newly-listed coral species occurring in the Gulf and concluded the fishery is not likely to adversely affect any of the protected coral species. Similarly, in a consultation memorandum dated September 16, 2014, NMFS assessed the continued authorization of South Atlantic and Gulf of Mexico fisheries' potential impacts on loggerhead critical habitat and concluded the Gulf reef fish fishery is not likely to adversely affect the newly designated critical habitat.

Marine Mammal Protection Act

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

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

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. This amendment required the preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction, development and implementation of take-reduction plans for stocks that may be reduced or are being maintained below their optimum sustainable population levels due to interactions with commercial fisheries, and studies of pinniped-fishery interactions.

Under Section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. The categorization of a fishery in the List of Fisheries determines whether participants in that fishery may be required to comply with certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. The primary gears used in the Gulf of Mexico reef fish fishery are still classified in the proposed 2014 MMPA List of Fisheries as Category III fishery (December 6, 2013; 78 FR 73477).

Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501 et seq.) regulates the collection of public information by federal agencies to ensure the public is not overburdened with information requests, the federal government's information collection procedures are efficient, and federal agencies adhere to appropriate rules governing the confidentiality of such information. The PRA requires NMFS to obtain approval from the Office of Management and Budget before requesting

most types of fishery information from the public. This action would likely not have PRA consequences.

Executive Orders

E.O. 12630: Takings

The Executive Order on Government Actions and Interference with Constitutionally Protected Property Rights that became effective March 18, 1988, requires 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. The National Oceanic and Atmospheric Administration Office of General Counsel will determine whether a Taking Implication Assessment is necessary for this amendment.

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, NMFS 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 (See Chapter 5). RIRs provide a comprehensive analysis of the costs and benefits to society of 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 Regulatory Flexibility Analysis. A regulation is significant if it a) has an annual effect on the economy of $100 million or more or adversely affects in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments and communities; b) creates a serious inconsistency or otherwise interferes with an action taken or planned by another agency; c) materially alters the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or d) raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

E.O. 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

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. The Executive Order is described in more detail relative to these actions in Section 3.5.

E.O. 12962: Recreational Fisheries

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

E.O. 13132: Federalism

The Executive Order on Federalism requires agencies in formulating and implementing policies, 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 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 amendments given the overlapping authorities of NMFS, 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.

E.O. 13158: Marine Protected Areas

This Executive Order 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. There are several marine protected areas, habitat areas of particular concern, and gear-restricted areas in the eastern and northwestern Gulf of Mexico.

Essential Fish Habitat

The amended Magnuson-Stevens Act included a new habitat conservation provision known as essential fish habitat (EFH) that requires each existing and any new FMPs to describe and identify EFH for each federally managed species, minimize to the extent practicable impacts

from fishing activities on EFH that are more than minimal and not temporary in nature, and identify other actions to encourage the conservation and enhancement of that EFH. To address these requirements the Council has, under separate action, approved an Environmental Impact Statement (GMFMC 2004) to address the new EFH requirements contained within the Magnuson-Stevens Act. Section 305(b)(2) requires federal agencies to obtain a consultation for any action that may adversely affect EFH. An EFH consultation will be conducted for this action.

References

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.
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