FINAL

Generic Amendment Number 3 for Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of Fishing in the following Fishery Management Plans of the Gulf of Mexico:

Shrimp Fishery of the Gulf of Mexico, United States Waters
Red Drum Fishery of the Gulf of Mexico
Reef Fish Fishery of the Gulf of Mexico
Coastal Migratory Pelagic Resources (Mackerels) in the Gulf of Mexico and South Atlantic
Stone Crab Fishery of the Gulf of Mexico
Spiny Lobster in the Gulf of Mexico and South Atlantic
Coral and Coral Reefs of the Gulf of Mexico

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Abbreviations and Acronyms Used in this Document

APA	Administrative Procedures Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
ComFIN	Commercial Fisheries Information Network
CPD	Coastal Programs Division
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DEIS	Draft Environmental Impact Statement
DQA	Data Quality Act
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
FMU	Fishery Management Unit
FONSI	Finding of No Significant Impact
FWS	Fish and Wildlife Service
GIS	Geographical Information System
GMFMC	Gulf of Mexico Fishery Management Council
GOM	Gulf of Mexico
HAPC	Habitat Areas of Particular Concern
LNG	Liquefied Natural Gas
MHW	Mean High Water
MLW	Mean Low Water
MMPA	Marine Mammal Protection Act
MPA	Marine Protected Area
MRFSS	Marine Recreational Fishery Statistics Survey
M-S Act	Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPMFC	National Pacific Marine Fisheries Commission
OCRM	Office of Ocean and Coastal Resource Management
OMB	Office of Management and Budget
PRA	Paperwork Reduction Act
RecFIN	Recreational Fisheries Information Network
RFA	Regulatory Flexibility Act
RPM	Responsible Program Manager

RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SAFMC	South Atlantic Fishery Management Council
SAV	Submerged Aquatic Vegetation
SBA	Small Business Administration
SEFSC	Southeast Fisheries Science Center of NMFS
SEIS	Supplemental Environmental Impact Statement
SPL	Saltwater Product License
VMS	Vessel Monitoring System

Fishery Impact Statement/Social Impact Assessment

The proposed actions to describe and identify essential fish habitat (EFH) and habitat areas of particular concern (HAPC) for fisheries of the Gulf of Mexico are mainly administrative in nature and have no direct impact on fishing participants or fishing communities. However, these proposed actions for EFH and HAPC have relevance to the determination of impacts on fishing participants in that they provide a benchmark for the proposed actions in this amendment that are regulatory measures to prevent, mitigate, or minimize to the extent practicable adverse effects of fishing on such EFH that is more than minimal and not temporary in nature. The impacts of these latter actions are discussed in sections 4.1.4, 4.2.4, 4.3.4 and the Regulatory Impact Review (Section 5) and Regulatory Flexibility Act Analysis (Section 6).

Marginal changes in habitat protection and/or enhancement due to any reduction of adverse fishing impacts will likely translate into only minor increases in producer surplus in the commercial fishing sector (primarily through increases in inframarginal rents) and in theory, increases in consumer surplus in the recreational sector, if the proposed actions result in increases in carrying capacity of relevant fish stocks and stock size. However, there is insufficient information at this time to determine how much these fish stocks will be enhanced as a result of additional protection of EFH.

Additionally, a portion of the increased consumer surplus may be dissipated over time as a result of the open-access nature of all recreational fisheries in the Gulf of Mexico. Specifically, if increasing stocks result in an increased demand for recreational trips, there would be an increase in the quantity being taken, at a given cost per trip. As the number of trips increases, catch per trip among all participants is expected to decline and would, in theory, suggest declining consumer surplus in the long run (though potentially higher than prior to habitat protection/ enhancement).

The Gulf of Mexico Fishery Management Council (GMFMC) concluded that existing fishery management measures minimize (to the extent practicable) the majority, but not all, adverse impacts to habitat caused by fishing. The measures outlined in the Proposed Action would effectively deal with the remaining impacts in a way that protects EFH and HAPC, while accounting for the practicability of the actions with respect to fishermen. The Proposed Action for minimizing fishing impacts contains four regulatory measures.

The first two measures prohibit bottom anchoring and the use of trawls, bottom longlines, buoy gear, and all traps/pots on coral reefs in HAPC. The outcome of these actions expand current restrictions in areas adjacent to the East and West Flower Garden Banks and Stetson Bank, which are all part of the Flower Garden Banks National Marine Santuary, and imposes new restrictions on McGrail Bank and Pulley Ridge. The Flower Garden Banks National Marine Sanctuary and Tortugas North and South Ecological Reserves are already designated as no anchoring zones and prohibit the use of all bottom tending fishing gears., However, benefits will only accrue if (a) anchoring over coral reefs in these HAPC is significant and results in degradation and (b) degradation results in reduction in the size of fish stocks and/or non-use values. In general, available information does suggest that anchors cause damage and can result in a reduction in ecosystem services provided by coral reefs. However, the magnitude of the

potential problems from anchoring practices has not been evaluated in the Gulf of Mexico. Without additional detailed information, there is no means by which to establish even a range of possible costs to habitat from anchoring damage.

Stone crabs and lobsters are often associated with coral formations yet traps are not generally placed directly on coral but close to coral, thus dislocation costs should be relatively minor (particularly since most stone crab activities occur in state waters not subject to this measure).

Restriction of bottom longlines, buoy gear, and fish traps on coral reefs in these HAPC would result in dislocation costs if there are significant amounts of these activities. However, benefits would also accrue if the gear causes any significant amount of degradation to the coral reefs. Without additional information regarding exactly where these fishing activities occur (with better precision than is available), there is no means of determining whether the benefits associated with enactment of the measure would exceed costs.

Economic benefits will accrue from the prohibition of bottom trawling on coral reefs only if damage to coral reefs translates to a loss in economic benefits and trawling presently occurs on corals. The validity of this assumption appears to be more tenuous since there appears to be little economic incentive for shrimp fishermen to trawl on coral reefs since (a) shrimp are generally not abundant over coral reefs and (b) costs to the shrimp fishermen, expressed in damage to gear would be large. Much of the coral reef bottom in the Gulf of Mexico is already protected under regulations enacted in the Coral FMP, thus displacement of shrimp fishermen would be negligible. However, the measure will help protect newly discovered live coral reef areas as they are discovered, which is the case for the southern portion of Pulley Ridge. Additionally, areas under current study may be classified as coral in the near future; however, the extent of potential coral reef habitat is unknown at this time. Given these facts, the actions to prohibit trawling over coral reefs should have only minor costs to fishermen and will provide relatively minor economic benefits to the nation.

Measure 3 requires a weak link in the tickler chain of bottom trawls on all habitats. This could be costly to the trawling fleet if it results in loss of catch associated with tows where the weak link breaks. The 'stronger' the weak link, the lower the costs to the commercial fishing sector. Likewise, benefits would proportionately be reduced. Many fishermen, but not all, currently use weak links; however, more research is needed to fully assess costs and benefits.

The fourth measure, which will develop an education program for recreational and commercial fishermen regarding how to protect coral reefs when using vertical fishing gear, will not have any direct costs to fishermen.

Any social impacts that would result from the modification of gear included within this action are considered nominal if any. While coral reef habitat can be identified, the extent that the prohibitions included in this action will impact fishing practices is not entirely clear. However, some of the extended social impacts are discussed in the EFH FEIS (under Section 4.4.6 Administrative Impacts). The communities that would be affected most by this action (most vulnerable) are those with both reef fish and shrimp vessels that actively fish over coral reef areas (i.e., communities in the Florida Keys and along the west central coast of Florida) and are listed in the EFH FEIS (Section 3.3.2.7). However, it is important to recognize that coral reef

habitat in the entire Gulf of Mexico is very small compared to all fishable areas, they are scattered around the Gulf, and most are already closed to the type of gears listed in this Action. Thus, it is unlikely that any community will be unduly impacted.

The Proposed Action selects management measures most likely to result in substantial benefits to EFH while not causing undue economic or social burdens on fishermen; therefore, it is considered practicable. This Action is likely to provide economic benefits to the nation. However, to determine definitively if these benefits exceed costs requires considerably more detailed analysis, including: (a) a quantitative estimate of damage caused by gears, (b) the impact of this damage on the size of fish stocks, and (c) changes in producer and consumer surplus. The GMFMC considers these actions to be precautionary and the measures will prevent or minimize possible or potential adverse fishing impacts on essential fish habitat.

1 Executive Summary

The purpose of this action is to amend each of the seven Gulf of Mexico Fishery Management Plans (FMP) to: (1) describe and identify essential fish habitat (EFH) for the fisheries; (2) minimize to the extent practicable the adverse effects of fishing on such EFH; and (3) encourage the conservation and enhancement of such EFH. This is pursuant to the mandate contained in section 303(a)(7) of the Magnuson-Stevens Fishery Management and Conservation Act (M-S Act). To support the description and identification of essential fish habitat and to address adverse fishing impacts for all managed Gulf of Mexico species, the GMFMC undertook over a two year period a detailed analysis of the Gulf of Mexico physical environment; oceanographic features; estuarine, nearshore and offshore habitats; all fishery resources; and marine mammals and protected species. The analysis resulted in a Final EFH Environmental Impact Statement (FEIS) (GMFMC 2004) for the seven FMPs.

As a result of analyses from the FEIS, the GMFMC proposed actions: to describe and identify EFH; to establish habitat areas of particular concern (HAPC); and to address adverse effects of fishing on EFH.

1.1 Proposed description of essential fish habitat

EFH consists of areas of higher species density, based on the NOAA Atlas (NOAA 1985) and functional relationships analysis for the Red Drum, Reef Fish, Coastal Migratory Pelagics, Shrimp, Stone Crab, and Spiny Lobster FMPs; and on known distributions for the Coral FMP. A map of the composite EFH resulting from the summed EFH of the seven Gulf of Mexico FMPs is shown in Figure 1. Maps of EFH for the individual FMPs are presented in Figures 2-8, and in Section 9 of the EFH FEIS (GMFMC 2004).

The Proposed Action will reduce the extent of EFH relative to the 1998 Generic Amendment by removing EFH description and identification from waters between 100 fathoms and the seaward limit of the EEZ. However, the habitats most important to managed species (i.e. those shallower than 100 fathoms) will still be designated as EFH, and so the great majority of benefits to the biological environment will remain. Description and identification of EFH through this Action has no direct impact on the biological, social, or administrative environments, so will cause no direct change from the status quo. This Action is likely to result in indirect impacts due to two other provisions of the M-S Act. First, every FMP must minimize to the extent practicable adverse effects of fishing on EFH, pursuant to Section 303(a)(7) of the Act. Second, federal agency actions that may adversely affect EFH will trigger consultation and/or conservation recommendations under Sections 305(b)(2)-(4) of the M-S Act.

1.2 Proposed determination of habitat areas of particular concern

HAPC are identified as the Florida Middle Grounds, Madison-Swanson Marine Reserve (Figure 9 Tortugas North and South Ecological Reserves (Figure 10), Pulley Ridge (Figure 10), and the individual reefs and banks of the Northwestern Gulf of Mexico: East and West Flower Garden Banks, Stetson Bank, Sonnier Bank, MacNeil, 29 Fathom Bank, Rankin Bright Bank, Geyer

Bank, McGrail Bank, Bouma Bank, Rezak Sidner Bank, Alderice Bank, and Jakkula Bank (Figure 11).

The coordinates of the boundary of each site are presented in Table 4.

This Action replaces the sites and all the broad habitat classifications identified as HAPC in the 1998 Generic Amendment. Each proposed site is discrete, and meets one or more HAPC criteria:

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

Description and identification of HAPC through this Action has no direct impact on the biological, social, or administrative environments, so will cause no direct change from the status quo. This Action is likely to result in indirect impacts due to two other provisions of the M-S Act. First, every FMP must minimize to the extent practicable adverse effects of fishing on EFH, pursuant to Section 303(a)(7) of the Act. The action proposed in Section 1.3 to address adverse effects of fishing on EFH is a direct result of this M-S Act provision. Second, federal agency actions that may adversely affect EFH will trigger consultation and/or conservation recommendations under Sections 305(b)(2)-(4) of the M-S Act.

1.3 Proposed measures to address adverse effects of fishing on essential fish habitat

Regulate fishing gears and protect sensitive habitats through the following measures, so as to minimize to the extent practicable the adverse effects of fishing in the U.S. EEZ:

1. Prohibit bottom anchoring over coral reefs in HAPC (East and West Flower Garden Banks, McGrail Bank, Pulley Ridge, and North and South Tortugas Ecological Reserves) and on the significant coral communities on Stetson Bank (as designated by the boundaries presented in Figures 15 and 16 and Table 5).

2. Prohibit use of trawling gear, bottom longlines, buoy gear, and all traps/pots on coral reefs throughout the Gulf of Mexico EEZ (East and West Flower Garden Banks, McGrail Bank, Pulley Ridge, and North and South Tortugas Ecological Reserves) and on the significant coral resources on Stetson Bank (as designated by the boundaries presented in Figures 15 and 16 and Table 5).

3. Require a weak link in the tickler chain of bottom trawls on all habitats. A weak link is defined as a length or section of the tickler chain that has a breaking strength that is less than the chain itself and is easily seen as such when visually inspected.

4. Establish an education program on the protection of coral reefs when using various fishing gears in coral reef areas for recreational and commercial fishermen.

The GMFMC identified the Proposed Action as its preferred action after concluding that existing fishery management measures minimize to the extent practicable the majority, but not all, adverse impacts to habitat caused by fishing. The measures outlined in the Proposed Action would effectively deal with the remaining impacts in a way that protects EFH and HAPC. This Action will primarily benefit newly identified coral reefs, such as the deepwater coral reefs on Pulley Ridge on the southern edge of the West Florida Shelf and McGrail Bank in the northwestern Gulf of Mexico (see Section 3.2.2.2.1of the EFH FEIS, GMFMC 2004) that are not currently protected by existing fishery management actions. The designated areas for which fishing restrictions will occur match the boundaries of the HAPC designation for East and West Flower Garden Banks, McGrail Bank, and the North and South Tortugas Ecological Reserves. However, for Pulley Ridge, the area designated for fishing restrictions is only in the southern portion of the HAPC, as depicted on Figure 16 and defined in Table 5.

Although anchoring and the use of bottom tending fishing gears are currently prohibited in the Flower Garden Banks National Marine Sanctuary, this action expands the areas protected from fishing impacts on the East Flower Garden Bank, West Flower Garden Bank and Stetson Bank by 9.56, 13.14, and 1.12 nm^2, respectively. Within these expanded boundaries are unique physical features and coral communities. The HAPC proposed action causes no changes in protection levels in the North and South Tortugas Ecological Reserves, within which all fishing activities are currently prohibited. The action will provide some benefits to hard bottoms, SAV, sand and soft bottoms by requiring bottom trawls always use a weak link in their tickler chain.

The Proposed Action should result in minor changes in the abundance of managed and non-managed fish and shelfish populations if it results in more productive habitat. In particular, this Proposed Action could improve the carrying capacity of fishes that use coral habitat, such as those in the Coral FMU and Reef Fish FMU. However, these changes would be difficult to measure quantitatively, due to a lack of baseline data.

These gear prohibitions will not likely lead to changes in commercial harvests for fishermen, though, they may lead to some minimal reduction in recreational harvests. This Proposed Action would likely provide economic benefits to the nation. However, to definitively determine if these benefits exceed costs would require considerably more detailed information, including: (a) a quantitative estimate of damage caused by gears, (b) the impact of this damage on fish stocks, and (c) resulting changes in producer and consumer surplus. Such detailed information is currently unavailable due to cost, time constraints, depth and remoteness of some areas. It is unlikely that any fishing communities are dependent upon fishing over coral reef habitat or will be unduly impacted.

The FEIS (Section 4.3.8.1, GMFMC 2004) concluded the costs to commercial and recreational fishers for gear restrictions on coral reefs and weak links on tickler chains for trawls were not overly burdensome, given the benefits to EFH and HAPC from these measures. Therefore, the GMFMC concluded that the measures contained in the Proposed Action minimize fishing impacts on habitat to the extent practicable.

2 Purpose of and Need for Action

The GMFMC prepared a generic amendment for the seven Gulf of Mexico FMPs to: (1) describe and identify essential fish habitat (EFH) for the fisheries; (2) minimize to the extent practicable the adverse effects of fishing on such EFH; and (3) encourage the conservation and enhancement of such EFH (GMFMC 1998). This was pursuant to the mandate contained in section 303(a)(7) of M-S Act Federal courts determined that the Amendment did not meet National Environmental Protection Act (NEPA) requirements, and NOAA Fisheries and the GMFMC prepared an FEIS for the seven FMPs (GMFMC 2004). The purpose of this action is to amend each of the seven FMPs as necessary, based on the results of analyses in the EFH FEIS.

In the M-S Act, Congress recognizes one of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. To ensure habitat considerations receive increased attention for the conservation and management of fishery resources, the M-S Act amendments of 1996 included new EFH requirements.

NOAA Fisheries issued the Final Rule for EFH, effective January 17, 2002 (See 50 CFR Part 600, Subparts J and K). The regulations provide guidelines to fishery management councils for developing the EFH sections of fishery management plans, and establish procedures to be used by NOAA Fisheries and other agencies to consult and coordinate regarding federal and state agency actions that may adversely affect EFH. The regulations provide EFH that is judged to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, should be identified as ‘‘habitat areas of particular concern’’ (HAPC) to help provide additional focus for conservation efforts.

To support the description and identification of essential fish habitat and to address adverse fishing impacts for all managed Gulf of Mexico species, the GMFMC undertook over a two-year period a detailed analysis of the Gulf of Mexico physical environment; oceanographic features; estuarine, nearshore and offshore habitats; all fishery resources; and marine mammals and protected species. The analysis resulted in the EFH Environmental Impact Statement (FEIS) (GMFMC 2004) for the seven FMPs. The analysis and a range of alternatives were developed with full opportunity for public participation to identify EFH and HAPC, and ways to minimize to the extent practicable the adverse effects of fishing on such EFH. The analysis included an extensive review of the potential social and economic consequences of the alternatives on fisheries, fishing communities, and other potentially affected parties. The GMFMC established two unique panels to review the EFH EIS during its development: 1) a User Review Panel comprised of representatives from the recreational, charter, commercial, environmental, oil and gas industry, and wetlands property owner sectors, and 2) a Technical Review Panel that consisted of Council staff and staff from state and federal agencies. The GMFMC convened these panels and previously-established panels and committees (Joint Habitat Advisory Panel, Scientific and Statistical Committee, and Council Habitat Committee) at various steps in the process to review and discuss the methodologies used and subsequent drafts of the EIS to provide advice to the full Council. The entire effort culminated in the FEIS for EFH that was submitted to EPA in August 2004 (GMFMC 2004, 69 Federal Register 35598, June 25, 2004).

The preferred alternatives that resulted from the EIS process are presented here as the proposed management actions. The complete analysis of environmental effects of the alternatives considered by the GMFMC is contained in the FEIS, and is incorporated herein by reference. Through this Generic Amendment, it is the intent of the GMFMC to identify and facilitate long-term protection of essential fish habitats, and, thus, better conserve and manage the Nation's fishery resources.

Section 305(b)(1) of the M-S Act requires the Secretary of Commerce (Secretary) to develop a schedule to review the EFH portions of FMPs. NOAA Fisheries through EFH regulatory guidelines has determined the description and identification of EFH should be reviewed and possibly revised by the GMFMC and NOAA Fisheries every five years (600.815(a)(10)), using the best scientific information available as required by National Standard 2 (600.815(a)(1)(ii)(B)).

EFH regulatory guidelines state that Councils and NOAA Fisheries should periodically review the EFH provisions as warranted based on available information. The review of information should include, but not be limited to, evaluating published scientific literature and unpublished scientific reports; soliciting information from interested parties; and searching for previously unavailable or inaccessible data. Councils should report on their review of EFH information as part of the annual Stock Assessment and Fishery Evaluation (SAFE) report prepared pursuant to 600.315(e). A complete review of all EFH information should be conducted as recommended by the Secretary, but at least every five years.

In addition, Standard 2 of the M-S Act requires conservation measures, including those for EFH, be based on the "best scientific information available" (16 U.S.C. §1851(a)(2)). NOAA Fisheries and others continually conduct research, management analysis, and mapping that provide new information about the distribution of fish and their habitats, the ecological relationships between managed species and their habitats, and the effects of fishing on those habitats. Recently, new information has been obtained about little known habitat types in the Gulf, such as deep seas corals. New data must be reviewed to ensure they are accounted for, in accordance with National Standard 2.

Regulations and policies under the National Environmental Policy Act (NEPA) also support the regular review of information supporting NOAA Fisheries actions. In interpreting the NEPA regulations (40 CFR Parts 1500-1508), the Council on Environmental Quality (CEQ) indicates if an EIS is more than five years old, or if there are significant new circumstances or information relevant to environmental concerns, the EIS should be reexamined to determine if preparation of an EIS supplement is necessary.

Similarly, NOAA's NEPA policy states "where an EIS has been completed on a previous management plan or plan amendment and that EIS or SEIS is more than five (5) years old, the Responsible Program Manager (RPM) should review the EIS to determine if a new EIS or SEIS should be prepared (NAO 216-6)." As indicated by CEQ and NOAA, reviews of prior environmental analyses should be conducted regularly to ensure current information is being considered when making agency decisions. This rationale also applies to the information used to support EFH management decisions in FMPs.

The primary benefit of the five-year review is to ensure EFH management decisions continue to be based on sound science and law. A periodic review of the supporting analyses and data of EFH management measures will determine whether decisions are consistent with current knowledge or need to be amended to reflect advances in the field. The review will allow species distribution and habitat association to be updated with new data and will provide an opportunity to further refine EFH descriptions. Improvements in mapping and modeling capabilities show promise for being powerful tools in refining EFH descriptions and improving EFH consultations. By incorporating new scientific data and methods into EFH management, decisions will be consistent with M-S Act mandates and other legal standards of review that often are used to evaluate such decisions.

The five-year reviews should include a review of the information used to support Council and NOAA Fisheries decisions in FMPs: 1) identify and describe EFH, 2) minimize adverse effects of fishing, 3) identify HAPC, and 4) take any other action to encourage the conservation and enhancement of EFH. Regulatory guidelines on how to conduct five-year reviews are given in 50 CFR 600.815 (a)(10). The results of these reviews will determine whether amending NEPA document(s) or FMP(s) will be necessary to ensure the best available science is used to support EFH management decisions.

3 History of Management

The GMFMC developed seven FMPs between 1979 and 1986. Two of the seven, Coastal Migratory Pelagics and Spiny Lobster, were developed jointly with the South Atlantic Fishery Management Council (SAFMC) because the stocks of the managed species cross into both regions. The other five FMPs are Reef Fish, Shrimp, Stone Crab, Red Drum, and Coral and Coral Reefs. Each FMP has been amended a number of times. A detailed outline of every amendment to each FMP is presented in Appendix A of the Final EIS for EFH (GMFMC 2004) and a review of those amendments including actions having direct benefits for fish habitat in the Gulf of Mexico are presented by FMP in Section 3.4.1.2.2 in the EFH FEIS document. Combined, there are 55 species managed, excluding the coral complex (See EFH FEIS Section 3.4.1.2.2.7). The Coral FMP defines coral as species belonging to the Orders Stolonifera, Telestacea, Alcyonacea (soft corals), Gorgonacea (horny corals, sea fans, sea whips), and Pennatulacea (sea pens) in the Subclass Octocorallia; Orders Scleractinia (stony corals) and Antipatharia (black corals) in the Subclass Zoantharia; and the Orders Milleporina (fire corals, stinging corals) and Stylasterina in the Class Hydrozoa (GMCMC 1982). The FMP does not list individual species as comprising the management unit, but refers to these species as occurring in Gulf of Mexico and/or South Atlantic waters. These species are listed in Table 2.

Several FMPs contain programs for license limitation, license moratoria, and/or trap limitations; other management actions work towards preventing overfishing or rebuilding overfished stocks; and certain actions establish seasonal or area closures to certain gear types. These actions either directly or indirectly reduce fishing effort and potential adverse fishing impacts to segments of EFH.

With respect to gear restrictions and license limitations, some examples from past amendments include: a moratorium and a scheduled phase out of fish traps, a moratorium on reef fish fishing

permits, an endorsement and license limitation for red snapper, and a moratorium on headboats and charter vessels in the Reef Fish FMP; a king mackerel moratorium and a head boat-charter vessel moratorium in the Coastal Migratory Pelagics FMP; a moratorium for traps in the Stone Crab FMP; and a trap reduction program in the Spiny Lobster FMP.

Through the amendment process, the GMFMC has designated a number of sites as marine protected areas (MPA), with closures to fishing activities (Figure 17). Some of these closures are specific to gear, which were established to protect stocks by reducing fishing pressure seasonally or year round. These closures also have the effect of protecting the habitat from the potential adverse effects of these gears. Others closures were established specifically to protect habitat. A description of each site, and the major species it is intended to protect, is provided in Section 3.5.1 of the Final EIS for EFH (GMFMC 2004). A summary of the closures or MPA, and the area (nm^2) it protects is presented in Table 1.

4 Proposed Actions

4.1 Description of Essential Fish Habitat (EFH)

4.1.1 Proposed Action

EFH consists of areas of higher species density, based on the NOAA Atlas (NOAA 1985) and functional relationships analysis for the Red Drum, Reef Fish, Coastal Migratory Pelagics, Shrimp, Stone Crab, and Spiny Lobster FMPs; and on known distributions for the Coral FMP. A map of the composite EFH resulting from the summed EFH of the seven Gulf of Mexico FMPs is shown in Figure 1. Maps of EFH for the individual FMPs are presented in Figures 2-8, and in Section 9 of the EFH FEIS (GMFMC 2004).

EFH consists of the following waters and substrate areas in the Gulf of Mexico:

> Red Drum FMP: all estuaries; Vermilion Bay, Louisiana, to the eastern edge of Mobile Bay, Alabama, out to depths of 25 fathoms; Crystal River, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by the GMFMC and the South Atlantic Fishery Management Council (SAFMC) between depths of 5 and 10 fathoms (Figure 2).
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> Reef Fish and Coastal Migratory Pelagics FMPs: all estuaries; the US/Mexico border to the boundary between the areas covered by the GMFMC and the (SAFMC) from estuarine waters out to depths of 100 fathoms (Figures 3 and 4).
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> Shrimp FMP: all estuaries; the US/Mexico border to Fort Walton Beach, Florida, from estuarine waters out to depths of 100 fathoms; Grand Isle, Louisiana, to Pensacola Bay, Florida, between depths of 100 and 325 fathoms; Pensacola Bay, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC out to depths of 35 fathoms, with the exception of waters extending from Crystal River, Florida, to Naples, Florida,

between depths of 10 and 25 fathoms and in Florida Bay between depths of 5 and 10 fathoms (Figure 5).

Stone Crab FMP: all estuaries; the US/Mexico border to Sanibel, Florida, from estuarine waters out to depths of 10 fathoms; and from Sanibel, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC from estuarine waters out to depths of 15 fathoms (Figure 6)

Spiny Lobster FMP: from Tarpon Springs, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC out to depths of 15 fathoms (Figure 7).

Coral FMP: the total distribution of coral species and life stages throughout the Gulf of Mexico including: coral reefs in the North and South Tortugas Ecological Reserves, East and West Flower Garden Banks, McGrail Bank, and the southern portion of Pulley Ridge; hard bottom areas scattered along the pinnacles and banks from Texas to Mississippi, at the shelf edge and at the Florida Middle Grounds, the southwest tip of the Florida reef tract, and predominant patchy hard bottom offshore of Florida from approximately Crystal River south to the Florida Keys (Figure 8).

4.1.2 Discussion and Rationale

EFH for the Gulf of Mexico is determined as the composite of EFH for all species and life stages in the fishery management units (FMU) of the Gulf of Mexico (Figure 1). Details on EFH for species and life stages in each FMU are provided in Section 3 of the EFH FEIS (GMFMC 2004) and are presented in Figures 2-8. Under the Red Drum, Reef Fish, Coastal Migratory Pelagics, Shrimp, Stone Crab, and Spiny Lobster FMPs, the preferred EFH Alternative describes and identifies EFH using available information on relative densities of species and life stages from both the NOAA Atlas (NOAA 1985) and an analysis of functional relationships between fish and their habitats (Levels 1, 2, and 3 information; Level 4 information is not known; see Table 3 for a description of the information levels). For the Coral FMP, EFH is based on the total known distribution of settled coral species (as individual colonies or reef building colonies; Level 1 and some level 2 information). Because corals are colonial building species, places where the sedentary life stage of corals settle and grow are relatively denser than the dispersed planktonic stage of corals. The best available scientific information was used to describe and identify EFH using these concepts, consistent with National Standard 2 (600.815(a)(1)(ii)(B)) and the Data Quality Act (DQA) (Public Law 106-443), and is described fully in the EFH FEIS (Section 2.3, GMFMC 2004).

Relative density is mapped in the NOAA Atlas for a limited number of federally-managed species and life stages, but the Atlas does not provide density information for most species and life stages in the fishery management units (FMUs). This Action includes as many species and life stages from the FMUs as possible, by combining the density data available in the NOAA Atlas with density information derived from an analysis of functional relationships between fish and their habitats. This action seeks to use the maximum amount of information currently available regarding the relative density and distribution of managed species, and meets the need expressed in the EFH Final Rule to distinguish EFH from *all* habitats potentially occupied by

species and their life stages. The total area this action describes and identifies as EFH for all species in the seven FMPs combined is much smaller relative to that proposed in the GMFMC's1998 Generic Amendment; the latter essentially described and identified all territorial waters and the entire EEZ in the Gulf of Mexico as EFH.

For those species and life stages without density information depicted in the NOAA Atlas, there are no Gulf-wide empirical distribution or density data currently available. However, information from the literature identifies the associations and functional relationships between species and life stages and their habitats. This information can also be used to infer, on an eco-region scale, relative differences in the density of species and life stages from one region to another (see Section 3.1.3.3.2.4, and tables in Section 8 of the EFH FEIS for a discussion of Gulf eco-regions and the functional relationships analysis; GMFMC 2004). Under this concept, the area identified as EFH for species and life stages with no density data in the NOAA Atlas is inferred by plotting the distributions of habitats with which each species/life stage is known to associate at the highest level of known occurrence. Implementation of this methodology requires using information on both habitat utilization and the location and extent of habitats.

The Proposed Action will reduce the extent of EFH relative to the 1998 Generic Amendment by removing EFH identification from waters between 100 fathoms and the seaward limit of the EEZ. The Proposed Action meets the requirements of M-S-Act and the EFH final rule more completely than does the 1998 Generic Amendment. However, the habitats most important to managed species (i.e. those shallower than 100 fathoms) are still described and identified as EFH, and so the majority of benefits to the biological environment will remain. Because of the reduction in identified EFH, the burden to the administrative environment may be reduced; but because most activities requiring EFH consultations occur in areas shallower than 100 fathoms, the reduced administrative burden will likely be minimal. Also, because most fishing and non-fishing activities occur in areas shallower than 100 fathoms, the effects on the socioeconomic environment is nearly the same as described in the 1998 Generic Amendment. Given these considerations, the GMFMC believed that the Proposed Action for EFH description and identification would most effectively accomplish the goals laid out in the M-S Act.

4.1.3 Biological impacts

Description and identification of EFH through this Action has no direct impact on the biological environment, so will cause no direct change from the status quo. This Action is likely to result in indirect impacts due to two other provisions of the M-S Act. First, every FMP must minimize to the extent practicable adverse effects of fishing on EFH, pursuant to Section 303(a)(7) of the Act. The Proposed Action to minimize fishing impacts in Section 3.3 addresses this provision for fishing operations in federal waters. While NOAA Fisheries and the GMFMC do not have the authority to manage fishing gear in state waters, unless the Secretary preempts state management authority; they can make recommendations to the Gulf States to minimize adverse effects of fishing on EFH in state waters as discussed in Section 8.2.1. Second, federal agency actions that may adversely affect EFH will trigger consultation and/or conservation recommendations under Sections 305(b)(2)-(4) of the M-S Act. This is described in the EFH FEIS (Section 4.1.3, GMFMC 2004).

The intent of the EFH requirements is to benefit fish through improved habitat protection. These potential improvements and potential benefits to populations of fish will occur in the future and cannot be completely predicted in advance, particularly because benefits depend on the level at which a managed fish species or life stage relies on the habitats at risk. Additionally, uncertainty in the role specific habitats play in fish production limits the conclusions one may draw on the effects of describing and identifying EFH. The intent of the EFH requirements may equally benefit non-federally managed species and important prey species, because these species utilize the same habitats. While the Proposed Action would identify a smaller total area in the Gulf as EFH compared to the 1998 Generic EFH Amendment, the most important and productive habitats for federally-managed species are contained within the area described in the Proposed Action. Therefore, most of the indirect benefits described in the 1998 Generic Amendment would still be retained. The types of biological and ecological benefits which may result are described in the EFH FEIS (Section 4.1, GMFMC 2004).

No direct or significant indirect positive or negative impacts to marine mammals, sea turtles, sea birds, and other protected species are anticipated as a result of EFH description and identification. The Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) include protections for habitat used by these species that are more protective than those provided under EFH regulations. Indirectly, to the degree consultations or minimization of adverse fishing impacts reduce damage to or enhance habitat used by protected species, these species will benefit from improved habitat.

4.1.4 Economic impacts

This Proposed Action is administrative in nature and will have no direct effects on the economic environment. However, it could result in indirect economic effects by specifying what constitutes EFH and, thus, the area that is subject to M-S Act provisions related to (1) minimizing to the extent practicable the adverse effects of fishing on EFH, and (2) identifying other actions to encourage the conservation and enhancement of EFH (See Section 4.1 in the EFH FEIS; GMFMC 2004). When all seven FMPs are combined, the area described and identified as EFH under the Proposed Action is considerably less than was identified under the status quo. Under the Proposed Action, essentially all waters out to the 100 fathom depth is EFH, while under the 1998 Generic EFH Amendment, EFH goes well beyond 1000 fathoms to the seaward limit of the EEZ. The predominant activity that occurs in water between 100 and 1000 fathoms is oil and gas exploration and mining, as relatively little fishing is done at these depths. Even without EFH description and identification, permitting regulations for oil and gas exploration and mining require consultation with the Habitat Office at NOAA Fisheries. Without EFH description and identification, assessments of these non-fishing activities will continue under the Fish and Wildlife Coordination Act, though possibly not to the same level of scrutiny and without as clearly defined a consultation process. However, the change in indirect economic effects should not be significant.

Description and identification of EFH, in accordance with section 303(a)(7) of the M-S Act, does not, in and of itself, have any direct environmental or socioeconomic impacts. However, EFH description and identification is likely to result in indirect environmental and/or socioeconomic impacts.

First, every FMP must minimize to the extent practicable adverse effects of fishing on EFH, pursuant to section 303(a)(7) of the Act. Under section 303(a)(7) of the Act and the associated provisions of the EFH regulations (50 CFR 600.815(a)(2)), each FMP must contain an evaluation of the potential adverse effects of fishing on EFH. Councils must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature. In determining whether it is practicable to minimize an adverse effect from fishing, Councils should consider the nature and extent of the adverse effect on EFH and the long- and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation. Subsequent amendments to the FMP or to its implementing regulations must ensure the FMP continues to minimize to the extent practicable adverse effects on EFH caused by fishing.

Actions taken by a Council to minimize adverse effects of fishing on EFH may include fishing equipment restrictions, time or area closures, harvest limits, or other measures. Any such measures would be designed to reduce ongoing impacts to fish habitats and/or promote recovery of disturbed habitats. These measures may result in economic impacts for the affected sectors of the fishing industry, but would be designed to promote sustainable fisheries and long-term economic benefits. The environmental consequences of proposed actions would be evaluated in applicable NEPA documents before they are implemented. Section 4.3 of the EFH FEIS (GMFMC 2004) discusses the environmental consequences of the potential measures to minimize effects of fishing on EFH. In general, the larger the area encompassed by EFH, the greater the potential for environmental consequences (both positive and negative) from fishery management measures designed to minimize adverse effects to EFH.

Second, federal and state agency actions that may adversely affect EFH trigger consultation and/or recommendations under sections 305(b)(2)-(4) of the M-S Act. Under section 305(b)(2) of the M-S Act, each federal agency must consult with NMFS regarding any action authorized, funded, or undertaken by the agency that may adversely affect EFH. The EFH regulations require federal agencies prepare EFH Assessments as part of the consultation process (50 CFR 600.920(e)). Under section 305(b)(4)(A) of the Act, NMFS must provide EFH Conservation Recommendations to federal and state agencies regarding any action that would aversely affect EFH. Under section 305(b)(3) of the Act, Councils may comment on and make recommendations to federal and state agencies regarding any action that may affect the habitat, including EFH, of a fishery resource under Council authority.

EFH recommendations from NOAA Fisheries or a Council to federal or state agencies are non-binding. Nevertheless, as a result of EFH coordination, consultations, and recommendations, Federal or state agencies may decide to restrict various activities to avoid or minimize adverse effects to EFH. Such restrictions could result in project modifications that lead to higher costs for the applicants for federal or state permits, licenses, or funding. It would be speculative to predict the specific socioeconomic effects of future restrictions on development that may be imposed by agencies that authorize, fund, or undertake actions that may adversely affect EFH. Moreover, such agencies typically evaluate socioeconomic effects and other public interest factors under NEPA and other applicable laws before taking final action on any given activity. NOAA Fisheries conducts approximately 6,000 EFH consultations and related EFH reviews nationwide every year, and is unaware of substantial project delays or significant increases in costs resulting from EFH consultations. In general, the larger the area encompassed by EFH, the

greater the potential for environmental consequences (both positive and negative) from EFH consultations. Habitat conservation resulting from EFH consultations is expected to support healthier fish stocks and more productive fisheries over the long term, with associated environmental and socioeconomic benefits. EFH consultations may also lead to indirect benefits for other species that use the same habitats as federally-managed species of fish and shellfish.

Federal agencies will incur costs as a result of conducting EFH consultations, because time and resources will be required to develop EFH Assessments, exchange correspondence, and engage in other coordination activities required for effective interagency consultation. In some cases, federal agencies might also request information from applicants for permits, licenses, or funding to assist the agency in completing EFH consultation. However, the EFH regulations encourage agencies to combine EFH consultations with existing environmental review procedures to promote efficiency and avoid duplication of effort. To further streamline EFH consultation, if more than one agency is responsible for a federal action, the consultation requirements may be fulfilled by a single lead agency. State agencies and other non-federal entities are not required to consult with NOAA Fisheries regarding the effects of their actions on EFH.

4.1.5 Social impacts

This Proposed Action is administrative in nature and will have no direct effects on the social environment of the Gulf of Mexico. However, it could result in indirect social effects by specifying what constitutes EFH and, thus, the area that is subject to additional M-S Act provisions related to (1) minimizing to the extent practicable the adverse effects of fishing on EFH, and (2) identifying other actions to encourage the conservation and enhancement of EFH. The social impacts of the Proposed Action addressing potential fishing impacts are described in Section 4.3 of the EFH FEIS (GMFMC 2004). The Proposed Action designates EFH out to the 100 fathom mark, as opposed to the seaward limit of the EEZ (>1000 fathoms) as designated in the 1998 Generic EFH Amendment. Since little fishing occurs between 100 and 1000 fathoms, and oil and gas activities will be scrutinized with or without EFH description and identification, the change in indirect economic effects should not be significant.

4.2 Habitat Areas of Particular Concern

4.2.1 Proposed Action

HAPC are identified as the Florida Middle Grounds, Madison-Swanson Marine Reserve (Figure 9), Tortugas North and South Ecological Reserves (Figure 10), Pulley Ridge (Figure 10), and the individual reefs and banks of the Northwestern Gulf of Mexico: East and West Flower Garden Banks, Stetson Bank, Sonnier Bank, MacNeil Bank, 29 Fathom, Rankin Bright Bank, Geyer Bank, McGrail Bank, Bouma Bank, Rezak Sidner Bank, Alderice Bank, and Jakkula Bank (Figure 11).

The coordinates of the boundary of each site are presented in Table 4.

4.2.2 Discussion and Rationale

The EFH Final Rule encourages regional Fishery Management Councils to designate HAPC within areas identified as EFH to focus conservation priorities on specific habitat areas that play a particularly important role in life cycles of federally- managed fish species. HAPC areas should help focus conservation efforts on localized areas vulnerable to degradation or especially important ecologically. HAPC should be subsets of the total area necessary to support healthy stocks of fish throughout all of their life stages.

The Proposed Action describes the areas identified in Table 4 as HAPC. Each site is discrete, and meets one or more HAPC criteria:

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

The GMFMC chose the Proposed Action to designate HAPC because the areas are discrete and meet all four of the above criteria. These sites predominantly contain living coral reefs or hard bottom areas with known coral colonies. Additionally, the Madison-Swanson Marine Reserve is very important as a known spawning aggregation site primarily for gag and scamp, though other reef fish species also spawn there. Living coral reefs (on patch reefs or as outer bank reefs) are very rare in the Gulf of Mexico; highly sensitive to human induced degradation (from direct physical impact since it is very slow growing, and from degradation of water quality); currently being stressed in many regions; and is important habitat to numerous species of reef fish and shellfish.

For the purposes of this amendment, the definition of living coral reefs is taken from the Coral FMP and has been updated to include new discoveries of coral reefs on McGrail Bank and Pulley Ridge:

> Patch reef: Irregularly distributed clusters of coral and associated biota located in the management area only along the seaward (southeast) coast of the Florida Keys. They occur as dome-type patches on the leeward side of outer bank coral reefs (defined below) or as linear-type patches that parallel bank reefs in acuate patterns. The latter support flora and fauna, including elkhorn coral (*Acropora palmata*), which more nearly resembles the bank reefs. Patch reefs include hermatypic reef-building corals plus ahermatypic species. Most patch reefs occur three to seven kilometers (1.6 to 3.8 nm) offshore between Miami and the Dry Tortugas on the inner shelf (less than about 15 m or 49 ft depth). Vertical relief ranges from less than 1 m to over 10 m (3 to over 33 ft).
>
> Outer bank reef: Includes ahermatypic and hermatypic species in a complex assemblage often with greater vertical relief than patch reefs, but not always, as in the case of Pulley Ridge. They are located in the Florida reef tract primarily shoreward of the 18 m (60 ft) isobath; on three hard banks (East and West Flower Garden Banks and McGrail Bank) on the Texas-Louisiana shelf in much deeper water; and south of 25º N on Pulley Ridge, a

north-south trending, drowned, barrier island approximately 250 km west of Cape Sable, Florida in 60 to 75 m of water (Jarrett et al. in press).

The definition of coral reef is being updated due to new discoveries of a deep-water hermatypic coral reef on Pulley Ridge which are especially noteworthy and have been the subject of intense research the last several years. It is the deepest hermatypic coral reef known in American waters and extends approximately 32 km north-south along the outer margin of the southwest Florida platform. The area identified as coral reef is within the black bounded area depicted in Figure 13, is coded as coral in Figures 10 and 16, and covers approximately 43 nm^2. This delineation was determined by Dr. Robert Halley of the US Geological Survey (USGS), who has been one of the sites' leading researchers. It is supported by video transects and still- camera photographs obtained through the use of ROV and manned submersibles, as well as the use of the USGS Seabed Observation and Sampling System (*SeaBOSS*), all of which has been used to identify coral and percent coral coverage. An example of a *SeaBOSS* transect is portrayed in Figures 14. The site has up to 60% live coral cover dominated by platy scleractinian corals, leafy green algae, and coralline algae in 60-75 m of water. Reef growth is supported by the Loop Current which provides warm, clear, low-nutrient waters (Jarrett *et al*. in press).

Sampling and observations conducted between 26 º 5' North and 25 º 0' North showed a unique mixed hard bottom habitat, but no living coral reef was observed. Dr. Halley (personal communication) has confirmed studies to date confine the living coral reef between 25 º 0' North and 24 º 40' South.

The living coral reef on Pulley Ridge lies east of a deeper ridge which has been depicted as hard bottom on all habitat figures depicted in the EIS for EFH (GMFMC 2004) and this Amendment. Figures 10 and 16 compare the location of the coral reef site with other hard bottom communities.

Similar to Pulley Ridge, new research is underway on the reefs and banks in the northwest Gulf of Mexico. Research here also involves using high resolution multibeam bathymetry, underwater observations, and biological surveys (Ron Hill, NOAA and G.P. Schmahl, FGBNMS, personal communication). Data are portraying more significant coral coverage on McGrail Bank including a true coral reef of major significance. Living coral cover on McGrail comprises up to 30% of the bottom in some areas of the bank. These new research efforts are providing improved scientific information regarding the unique geological features and coral resources on the other banks and reefs of the region including Sonnier, MacNeil, 29 Fathom, Rankin Bright, Geyer, Bouma, Rezak Sidner, Alderdice and Jakkula Banks, which has led to each of these banks to be considered HAPC. For example, Sonnier Bank is very similar to Stetson Bank in its geological origin, is comprised of uplifted claystone and siltstone, upon which significant biological communities have developed. Alderdice is another extremely sensitive geological feature with at least two uplifted basalt (volcanic rock) spires, colonized by a variety of benthic organisms, and serving as an important fishery habitat (G.P. Schmahl, personal communication). Figures 12a and 12b provide views of the detailed bathymetric data for each of these northwest reefs and banks, and was provided by the Flower Garden Banks National Marine Sanctuary.

Additionally, the recent bathymetric and biological surveys has expanded the knowledge of the important geological and coral resources in the immediate areas adjoining the existing Flower Garden Banks National Marine Sanctuary boundaries such that the resulting HAPC designations

for East Flower Garden, West Flower Garden, and Stetson Banks are larger than the sanctuary boundaries by 9.56, 13.14, and 1.12 nm^2, respectively, and incorporate the entire physical area of features (Figures 11, 12a and 15).

This HAPC Action would replace the sites and all the broad habitat classifications identified as HAPC in the 1998 Generic Amendment. For more detail concerning the identification of HAPC, see Sections 2.1.4 and 4.2 in the EFH FEIS (GMFMC 2004).

The Florida Middle Grounds, Madison-Swanson Marine Reserve, Tortugas North and South Ecological Reserves, and the portions of the East and West Flower Garden Banks and Stetson Bank that are National Marine Sanctuary areas are already protected to some degree from adverse fishing impacts. Non-fishing activities affecting any of the listed areas are also already subject to consultations with the Habitat Office of NOAA Fisheries, so the Proposed Action should not substantially increase the Administrative burden of the Agency. The Proposed Action's HAPC description and identification will not have a significant effect on present socioeconomic conditions, in and of itself. However, those restrictions designed to minimize the adverse effects of fishing tied to living coral reefs within HAPC may have some economic impacts on fishermen. The effects of these fishing restrictions are discussed in Section 4.3.

4.2.3 Biological impacts

No direct positive or negative impacts to the physical, biological, or ecological environments will occur as a result of this Proposed Action. However, there will be indirect effects similar to those described under EFH. A higher level of scrutiny is justified for HAPC during conservation consultations. This should result in some additional protection for the resources on Pulley Ridge and McGrail, Sonnier, MacNeil, 29 Fathom, Rankin Bright, Geyer, Bouma, Rezak Sidner, Alderdice and Jakkula Banks – areas not previously protected by some type of marine protected area designation. Each of the identified sites are taken into special consideration with respect to preventing, mitigating, or minimizing adverse fishing actions. The implementation of the Proposed Actions for modifying fishing activities described in Section 3.3 will afford the HAPCs with coral reef resources a greater level of protection from adverse fishing activities. Over time, the elimination of environmentally damaging fishing activities should result in incremental improvements and restoration from any past impacts to these habitats and increase the productivity of managed fish stocks dependent upon these sites. Further information on the type and magnitude of indirect effects resulting from HAPC description and identification can be found in Section 4.3 and in the EFH FEIS (GMFMC 2004).

4.2.4 Economic impacts

No direct positive or negative economic impacts will occur due to the description and identification of these sites as HAPC. However, the Proposed Action is likely to indirectly effect the economic environment because the areas specified as HAPC will receive increased attention in the context of the M-S Act mandate to minimize to the extent practicable the adverse effects of fishing on EFH. The specific economic effects of the GMFMC's Proposed Actions to minimize gear impacts on EFH (including HAPC) are summarized in Section 3.3.4, with additional information on the type and magnitude of such effects in the EFH FEIS (GMFMC 2004).

Otherwise, any activity proposed to occur in an HAPC that requires a federal permit, license, or funding will receive more scrutiny during the consultative review process. This is not expected to increase the costs incurred by the Habitat Office of NOAA Fisheries, though it may increase permitting costs to the applicant, as resource managers and regulators are likely to place a high priority on protecting areas that have been designated as HAPC. There has not been any measure of this potential added burden to the public from current HAPC description and identifications that resulted through the 1998 Generic Amendment. As with EFH, conservation of HAPC is expected to support healthier fish stocks and more productive fisheries in the long-term, which, in turn, will provide added environmental and socioeconomic benefits.

It should be noted at this time, no fishing or other federal activities are allowed within the Tortugas Ecological Reserves; only vertical fishing gear is allowed in the Flower Garden Banks National Marine Sanctuary (including Stetson Bank) and Florida Middle Grounds; and only trolling is allowed in the Madison-Swanson Marine Reserve. There are presently no restrictions on fishing or other activities in the other banks and reefs of the northwestern Gulf of Mexico or Pulley Ridge. The total level of fishing and non-fishing activities (most likely related to oil and gas exploration and drilling) occurring in these HAPC is not clearly known, in part because logbook data and other fishery reporting efforts do not provide adequate detail about the specific location of fishing effort (see more discussion in Section 4.3.).

4.2.5 Social impacts

No direct positive or negative social impacts will occur as a result of this Proposed Action. However, indirect impacts would occur if the GMFMC implements new measures that restrict fishing activities in these HAPC and surrounding EFH. The specific social effects of the GMFMC's Proposed Action to minimize gear impacts on EFH (including HAPC) are summarized in Section 4.3. Some sites in this Proposed Action are currently not under special state or federal management, which could generate opposition (increased controversy) from those who might foresee increased fishing or non-fishing restrictions. Fishing communities along the central and southwest coast of Florida and the Florida Keys are likely to experience the largest indirect impacts, relative to other communities if more restrictive federal fishery management regulations are applied to portions of the Pulley Ridge HAPC. Communities of shrimp and reef fish fishermen located along the Texas and Louisiana coasts could also be indirectly impacted by the Proposed Action because they reportedly fish near the banks and reefs of the northwestern Gulf of Mexico.

4.3 Minimizing Adverse Effects of Fishing on EFH

The EFH Final Rule requires the GMFMC develop actions to prevent, mitigate, or minimize the adverse impacts to EFH of fishing activities or gear use that are more than minimal or temporary.

4.3.1 Proposed Action

Regulate fishing gears and protect sensitive habitats through the following measures, so as to minimize to the extent practicable the adverse effects of fishing in the U.S. EEZ:

1. Prohibit bottom anchoring over coral reefs in HAPC (East and West Flower Garden Banks, McGrail Bank, Pulley Ridge, and North and South Tortugas Ecological Reserves) and on the significant coral resources on Stetson Bank (as designated by the boundaries presented in Figures 15 and 16).

2. Prohibit use of trawling gear, bottom longlines, buoy gear, and all traps/pots on coral reefs throughout the Gulf of Mexico EEZ (East and West Flower Garden Banks, McGrail Bank, Pulley Ridge, and North and South Tortugas Ecological Reserves) and on the significant coral communities on Stetson Bank (as designated by the boundaries presented in Figures 15 and 16).

3. Require a weak link in the tickler chain of bottom trawls on all habitats throughout the Gulf of Mexico EEZ. A weak link is defined as a length or section of the tickler chain that has a breaking strength less than the chain itself and is easily seen as such when visually inspected.

4. Establish an education program on the protection of coral reefs when using various fishing gears in coral reef areas for recreational and commercial fishermen.

The size of each closed areas is presented in Table 5.

Habitat Protection Measures	**Coral**	**Hard bottom**	**SAV**	**Sand/soft sediments**
Prohibit bottom anchoring over coral reefs in HAPC	**X**			
Prohibit use of all trawling gear, bottom longline, buoy gear, and all traps/pots on coral reefs in entire Gulf of Mexico EEZ	**X**			
Require a weak link in the tickler chain of bottom trawls on all habitats	**X**	**X**	**X**	**X**
Establish an education program on coral reef protection for recreational and commercial fishermen	**X**			

4.3.2 Discussion and Rationale

The Proposed Action would augment current fishery management, as described in History of Management, Section 2, with a series of gear regulations or restrictions. The GMFMC reviewed detailed information and maps presented in the EIS for EFH (GMFMC 2004) that showed (1) fishing effort and amount of gear being used in different fisheries and in different Statistical Areas (Figures 3.3.2- 3.3.13), and (2) an index of relative fishing impacts by gear (Figures 3.5.16a – 3.5.26b). The GMFMC identified the Proposed Action as its preferred action after concluding existing fishery management measures minimize (to the extent practicable) the majority, but not all, adverse impacts to habitat caused by fishing, and additional measures were necessary. The measures outlined in the Proposed Action would effectively deal with the remaining impacts in a way that protects EFH and HAPC, while accounting for the practicability of the actions with respect to fishermen. As not all impacts can be foreseen at this time, the

GMFMC and NOAA Fisheries would need to address subsequent management actions on a case-by-case basis within future FMP amendments.

Several measures contained in the Proposed Action were considered by the GMFMC to be very important for coral reef habitats (EFH and in HAPC) that are particularly sensitive to impacts from a variety of gears and enforceable. The GMFMC considers the measures in the Proposed Action to provide the best balance: they are reasonable and capable of being done in light of available technology and should not result in substantial economic hardship on any particular fishery or fishing community. More restrictive measures than those proposed (e.g. a complete ban on the use of gear or fishing activities with adverse impacts in the EEZ) are not practicable because they do not find a balance between what is "reasonable and capable of being done" [to protect EFH and support its functions for managed species] in light of available technology and socioeconomic considerations.

The designated areas for which fishing restrictions will be imposed match the boundaries of the HAPC designation for East and West Flower Garden Banks, McGrail Bank, and the North and South Tortugas Ecological Reserves. However, for Pulley Ridge, the area designated for fishing restrictions is only in the southern portion of the HAPC, as depicted on Figure 16 and defined in Table 5.

One action that was part of the preferred alternative in the EIS was to regulate fishing weights on vertical line fishing gear used over coral reefs in HAPC. This action is not part of the Proposed Action of this amendment due to new information presented and discussed by the GMFMC. There is no clear evidence that fishing weights have caused damage to coral reefs in HAPC, nor did representatives of enforcement agencies consider it a feasible action to regulate on the water. Thus, the GMFMC added the fourth measure, establishment of an education program on the protection of coral reefs when using various (allowed) fishing gears in coral reef areas for recreational and commercial fishermen. The GMFMC felt this was reasonable, and would result in better protection for coral reefs.

This Action will primarily have direct benefits for coral reefs, with some direct benefits to other coral resources, hard bottoms, SAV, sand and soft bottoms. It seems reasonable to conclude if the Proposed Action results in more productive habitat, it should also result in minor indirect positive impacts in the abundance of managed and non-managed finfish populations. The Proposed Action is likely to provide indirect economic benefits to the nation. Long-term habitat recovery is likely to support healthier fish stocks and more productive fisheries, which, in turn, will provide added environmental and socioeconomic benefits.

In the short-term, the fishing communities that might experience direct adverse impacts would be those supported by fishermen who operate over and around coral reef habitat on the reefs and banks in the northwest Gulf of Mexico and along the very southern portion of Pulley Ridge. The potential impacts are anticipated to be greater for fishermen that fish on the coral reef on Pulley Ridge and hail from ports along the central western Coast of Florida, from Pinellas County to Monroe County. However, based on logbook data, the number of boats fishing with vertical gear in this area (NMFS Statistical Area 2) has steadily been declining in recent years, from 127 boats in 2000 to 65 in 2003. Likewise, trap fishermen have also declined from 9 boats to 4 during the same period. The number of longline fishing boats have remained fairly constant, averaging 29,

however, there is currently discussions about a potential limited entry program, IFQ and/or vessel buyback program, each of which will likely result in fewer longline vessels . Currently, each group exerts more fishing effort in neighboring Statistical Areas, and it is anticipated potential displaced fishing effort would also shift to these Areas.

The measures proposed in this Action to address adverse fishing impacts are feasible, but would ideally require additional resources for the education program and for enforcement resources to assure compliance. With respect to compliance, the restrictions on the majority of the areas encompassed within East Flower Garden, West Flower Garden, and Stetson Banks are identical to the restrictions already imposed by the statutes governing this National Marine Sanctuary, thus providing a level of consistency. Additionally, the slightly larger HAPC boundaries endorsed by the Flower Garden Banks National Marine Sanctuary (combined totaling 23.8 nm^2) are based on recent bathymetric and biological surveys, incorporate the entire physical area of these geological features, and will be proposed as the new boundaries for the Sanctuary in the near future.

Because the HAPC areas are mostly far from shore and somewhat remote, making enforcement more challenging, the GMFMC considered it important to include an education program as part of the Action. The goal of an education program for recreational and commercial fishermen is to describe how to protect coral reefs when using vertical fishing gear in coral reef areas to help prevent or mitigate any potential damage, particularly from weights and sinkers, and to encourage compliance with the other fishing and anchoring restrictions to better protect coral reefs overall.

Developing, processing, and implementing this generic Amendment to the seven FMPs of the GMFMC will cost an estimated $200,000 to the GMFMC and NOAA Fisheries. Based on the EFH FEIS, the GMFMC concluded that the costs to commercial and recreational fishers for gear restrictions on coral reefs and weak links on tickler chains for trawls were not overly burdensome, given the benefits to EFH and HAPC from these measures.

4.3.3 Biological impacts

Available information does not provide conclusive evidence any managed species is currently habitat limited. However, habitat limitation could currently occur undetected, or could occur in the future if habitat losses continue. The measures included in the Proposed Action will indirectly benefit fish and may result in higher productivity if they prevent habitat limitation from occurring, or lead to improved habitat. These measures may result in population expansion of some fish species harvested from the Gulf of Mexico.

The Proposed Action would predominantly protect coral reef habitat: it would prohibit the use of anchors, trawls, bottom longlines, buoy gear, and all traps/pots on all coral reefs throughout the Gulf of Mexico and on the significant coral communities of Stetson Bank, but not on hard bottom that may have scattered or intermittent individual or small patches of living coral (such as other northwest reefs and banks). In general, available information suggests anchors damage reef habitat and can result in a reduction in ecosystem services provided by coral reefs (GMFMC 2004). Several studies indicate otter trawls have the potential to seriously impact coral reefs (Moore and Bullis 1960; Wenner 1983; Gomez *et al*. 1987). Tilmant (1979) also found a high

incidence of damage to stony corals in a study that investigated frame trawl impacts. Bottom longlines have the potential to damage habitat when the gear is employed in the vicinity of coral habitat. Longline gear has been documented to damage corals during the retrieval process (NPFMC 1992). Pots/traps may cause the incidental breakage of corals when they fall or settle on corals during deployment, in addition to damage caused to corals during the retrieval process (Gomez *et al*. 1987; Van der Knapp 1993, Appeldoorn *et al*. 2000).

In the Gulf of Mexico, known living coral reefs occur around the Florida Keys, Dry Tortugas, East and West Flower Garden Banks, McGrail Bank, and on the southern portion of Pulley Ridge, a newly identified deepwater coral reef on the southern edge of the West Florida Shelf (see Section 3.2.2.2.1of the EFH FEIS, GMFMC 2004). Additionally, Stetson Bank has significant coral communities. Prohibition of the use of these gears in these HAPCs to protect the coral reefs and Stetson Bank should have positive impacts on these coral areas not currently protected by previous fishery management actions: the live coral areas on the southern portion of Pulley Ridge cover a substantial area approximately 47 nm^2 (Figure 10); the expanded areas around the East Flower Garden, West Flower Garden, and Stetson Bank equaling 23.8 nm^2 combined (Figure 11); and the HAPC on McGrail Bank covering 14.1 nm^2 (Figure 11). Overall potential improvement for coral habitat in the Gulf of Mexico would be primarily on these newly discovered areas, since these gears are already prohibited on the majority of known Gulf coral reef areas.

Trawl gear can cause damage to all types of bottom if its tickler chain gets hung up on natural bottom structures. The goal of the weak link is to allow the tickler chain to drop away to prevent dragging and further damage to the bottom while trying to retrieve the rest of the trawl gear. The biological benefit of this measure cannot be quantified, as we do not have information regarding how frequently snags occur or how many fishermen currently use some type of weak link. Anecdotal information suggests many fishermen already use some type of weak link, so as not to lose their expensive gear. This measure is expected to provide positive benefits to the biological environment by reducing the frequency with which trawl gear snags and damages bottom habitat.

The education program should also have a positive biological impact in all coral reef areas that fishing with vertical gear is still allowed.

Overall, this Proposed Action could improve the carrying capacity of coral reef habitats, which could indirectly benefit the species they support, particularly those in the Coral FMU and Reef Fish FMUs. These gear prohibitions will not likely lead to changes in commercial harvests for fishermen using these gears; however, it may lead to some minimal reduction in recreational harvests. Prohibiting the use of anchors while fishing on coral in HAPC would mostly affect recreational fishers using vertical line gears. For further details see Sections 4.3.2.6, 4.3.3.6, and 4.3.4.6 in the EFH FEIS (GMFMC 2004).

4.3.4 Economic impacts

The first two measures of the Proposed Action prohibit bottom anchoring and the use of bottom-tending gear (trawling gear, bottom longlines, buoy gear, and all traps/pots in the East and West Flower Garden Banks, McGrail Bank, Pulley Ridge, North and South Tortugas Ecological Reserves, and Stetson Bank. Since all fishing (all gear types) is currently prohibited in the

Tortugas Ecological Reserves, and anchoring and bottom tending gears are currently restricted in the Flower Garden Banks National Marine Sanctuary, these measures will impact fishermen who currently fish on/over coral reef areas on Pulley Ridge and McGrail Bank, and will marginally impact fishermen who fish with these gears in the waters adjacent to the Flower Garden Banks National Marine Sanctuary. Essentially, fishing with vertical lines or with diving gear will continue to be allowed, so long as the fishermen do not need to use anchors in these HAPC.

It is not possible to quantify potential economic benefits resulting from a prohibition of anchoring on corals in HAPC. The costs associated with such action depend upon the extent to which anchoring currently occurs over coral reefs in HAPC, which is unknown, and what substitute alternatives to anchoring are available. In other coral areas where anchoring is restricted (e.g. certain areas along the Florida reef tract), mooring buoys have been used. Use of mooring buoys is a proven way to both allow fishing activity and protect delicate coral habitats from the damage of anchoring and the swinging and chafing of anchor chain and line. However, using mooring buoys requires a new level of management. It requires a review of fishing patterns to determine the most useful locations, underwater surveys to identify appropriate specific locations and substrates, the installation of the buoys, and a monitoring and maintenance program. The mooring buoy system in the Florida Keys is partnered with monitoring, maintenance and an enforcement programs. Requiring vessels to use a mooring buoy system would essentially establish a vessel carrying capacity for a reef or reef area, unless vessels can fish without anchoring at all. This was not necessarily the intent of the GMFMC, but such a requirement would equally affect commercial fishing operations, charter or headboats, and private fishing vessels.

Dislocation costs could result from the second action, depending on how much fishing with trawls, bottom longlines, buoy gear, and traps/pots, actually occurs over the currently unprotected live coral reef areas. Since these areas are relatively small, additional costs incurred due to changing fishing routes should not be significant. However, if these areas represent productive fishing areas with no comparable areas nearby, then costs will be increased.

The analyses for the EFH FEIS documented the best available scientific information on fishing effort by gear and NMFS Statistical area, averaged across the years 2000-2001. This effort information does not describe with exact precision the location of fishing activity within each statistical grid; depending on gear type it either is presented as total effort across the entire Statistical Area, or by 5 fathom depth contours. The Pulley Ridge area covers the western edge of NMFS Statistical Grids 2, 3, and 4. Very limited amounts of shrimp trawling were reported in this general area, as well as a substantial amount of bottom longlining (for reef fish and shark) for the entire ridge. Very limited amounts of stone crab fishing was reported, but mostly in areas to the north of the proposed restricted area on Pulley Ridge. Along the reefs and banks in the northwest Gulf of Mexico, there is no trap fishing, but again, a moderate amount of reef fish bottom longlining, some shrimp fishing and a minimal amount of shark bottom longline fishing occurred. Unfortunately, without additional information on the exact location and intensity of these fishing activities in relation to coral reefs, and any resulting habitat damage, there is no means of determining whether the benefits associated with enactment of this measure would exceed costs.

The worst-case scenario of impacts would be equal to the total fishing effort occurring in NMFS Statistical Area 2. The entire coral reef portion of Pulley Ridge occurs south of 25ºN, within this zone. This is described in Section 5.5. The average number of total commercial fishing trips that landed reef fish or sharks using vertical gear for the years 2000 through 2002 in Statistical Area 2 alone that could potentially be impacted by a no anchoring zone was 527. Annual landings averaged 413,000 pounds with a value of $847,000 during the same years, equal to 3.3 percent and 3.1 percent, respectively, of total landings for all Statistical Areas. However, by 2003, only 65 boats were involved in fishing with vertical gear in this area.

Total longline fishing effort for all reef fish and sharks in Statistical Area 2 fluctuated (no trends) from 2000 through 2003 but averaged 107 trips involving 29 boats. Landings for Statistical Area 2 have likewise fluctuated without a clear trend, and averaged 410,500 pounds for all reef fish and sharks valued at $662,000. This was only 5.1% and 4.1% of Gulfwide totals, respectively. The largest portion of the fishery is for grouper: longline landings of all shallow- water and deep-water grouper averaged 194,750 pounds and $484,500 in Statistical Area 2 – equivalent to 47.4% of all reef fish and shark landings in pounds, and 73.2% of all landings in value. Of this, red grouper makes up the largest portion of all grouper landings (62.0%) by longline in Statistical Area 2, averaging 120,750 pounds, with a value of $274,000.

With respect to trawling, there is little economic incentive for shrimp fishermen to trawl on coral reef habitat because of the likelihood the trawling gear will be damaged or lost. Therefore, the measure prohibiting trawling over coral would provide relatively minor economic benefits (i.e. increased fish production long-term due to less coral habitat damage). However, costs associated with such action, excluding monitoring and enforcement activities, are also likely to be relatively minor because anecdotal information suggests that most shrimp fishermen purposely avoid coral reef habitat.

The third measure requires a weak link in the tickler chain of bottom trawls on all habitats. The difference between the weak link and the regular chain should be easily determined by visible inspection. This measure could provide long-term economic benefits if it resulted in reduced habitat damage, which increased the carrying capacity and abundance of fish populations. The cost of modifying trawl gear to include a weak link is considered negligible. However, using a weak link could be costly if breakages result in decreased catches. The 'stronger' the weak link, the lower the costs to the commercial fishing sector, but also the smaller the long-term economic benefits. At this time there is no way to determine the costs and benefits of requiring a weak link because the number of fishermen who already use weak links, the biological benefits of using weak links, and the costs of decreased catches resulting from the use of weak links are not known.

There would be no economic impact to fishermen from the fourth measure, which requires an education program to be established. The cost of an education program to fishery management can vary greatly, depending on whether it can be incorporated into other, existing agency education efforts (including the NOAA National Marine Sanctuary Program). Generally, costs for these types of programs are directly or indirectly outweighed by both the reduced enforcement costs and net economic benefits due to improved biological conditions and fishery resources.

In summary, this Proposed Action is expected to provide long-term economic benefits to the nation. However, to definitively determine if these benefits exceed costs would require considerably more detailed information, including: (a) a quantitative estimate of damage caused by gears, (b) the impact of this damage on fish stocks, and (c) resulting changes in producer and consumer surplus. Such detailed information is currently unavailable due to cost and time constraints. Available data suggests that the measures contained in the Proposed Action are practicable. See Sections 4.3.6 and the EFH FEIS (GMFMC 2004, sections 4.3.6.6.1 and 4.3.8.4) for more details.

4.3.5 Social impacts

The social impacts of the gear regulations contained in the Proposed Action are described in Section 4.3.6 of the EFH FEIS (GMFMC 2004). In summary, the effects of these measures on the social environment are expected to be nominal. Most of the new coral reef areas for which fishing and anchoring restrictions would apply are too far from shore to impact recreational fishing operations such as charter vessels, headboats or guides. The communities affected most by the Proposed Action are those with commercial reef fish and shrimp vessels (i.e., communities along the central west coast of Florida, the Florida Keys and coastal Texas) (see Section 3.3.2.7, EFH FEIS; GMFMC 2004). The vulnerability index scores for fishing communities in the Gulf of Mexico, including those in the Florida Keys and coastal Texas, are listed in Table 8. These scores give an idea of which communities would be most susceptible to short-term negative impacts. However, the amount of coral habitat in the Gulf of Mexico is very small compared to all fishable areas, such habitat is widely dispersed, and most areas where coral habitat is concentrated are already closed to the gear types that would be prohibited from operating in coral habitat under the Proposed Action. Thus, it is unlikely any fishing communities are dependent upon fishing over coral habitat or will be unduly impacted.

4.3.6 Practicability

The EFH provisions at 16 U.S.C. §§ 1853(a)(7) state each FMP shall identify EFH and "minimize to the extent practicable adverse effects on such habitat caused by fishing…." In this context, "practicable" was interpreted to mean "reasonable and capable of being done in light of available technology and economic considerations." In other words, a gear modification is "practicable" if the technology is available and effective, and will not impose an unreasonable burden on the fishers. Criteria to evaluate practicability were developed during the EFH FEIS process (see Sections 2.1.6.3 and 4.3.8, EFH FEIS; GMFMC 2004); how the Proposed Action relates to each criterion is presented below.

Changes to EFH: This Action will primarily benefit coral reefs, with some benefits to hard bottoms, SAV, sand and soft bottoms. Over time, live coral reef areas in HAPC affected by fishing measures 1 (anchoring prohibition) and all live coral reef affected by fishing measure 2 (no use of bottom trawls, bottom longlines, buoy gear, and pots/traps on live coral reef) could recover, although recovery would take some time given the slow growth rate of corals. However, some habitats affected by fishing measure 3 (weak link on bottom trawl tickler chains over all GOM habitats) are dead reefs and geologic formations with vertical relief that will not recover over time because there are no active biogenic processes occurring to rebuild them. However, the measures will eliminate or slow down continued habitat degradation from gears involved in

the HAPCs. In light of current patterns of fishing activity and technology, the coral and hard bottom areas most likely benefiting from this alternative would be the West Florida Shelf, including the Florida Middle Grounds, and Pulley Ridge; the reefs and banks of the northwest Gulf of Mexico; and sand and soft bottoms throughout the Gulf.

Ecosystem changes from changes in EFH: Available information does not provide conclusive evidence that any non-managed species are currently habitat limited. Additionally, available data are not sufficient to describe the extent of habitat damage caused by fishing activities. However, it is reasonable to conclude that the Proposed Action should result in at least minor increases in the abundance of non-managed finfish populations if it results in more and better habitat. Fish populations most likely affected by the Proposed Action would be those that rely on coral and hard bottom habitat (see Section 3.2.5, EFH FEIS). The affected fishes might be prey of managed species. There should be some limited positive benefits to sea turtles, in the offshore environment, and no impact, positive or negative, on other protected species, as a result of the Proposed Action. In comparison, the protections provided to marine mammals, sea turtles, sea birds and other protected species under the Marine Mammal Protection Act and Endangered Species Act are much more stringent and enforceable, prohibit most 'take,' and include protections for habitat used by these species that are more protective than those allowed under EFH regulations.

***Population effects on FMU species from changes to EFH*:** There should be minor increases in fish abundance if habitats that have been degraded are allowed to recover and subsequently provide improved carrying capacity for managed species. If management measures slow down a continuing degradation of habitat, then any abundance declines associated with habitat loss should also slow down. This would most likely affect those species for which coral and hard bottom is ecologically important (see Section 3.2.5, EFH FEIS).

***Net economic change to fishers*:** The net economic effects of the proposed action are expected to be positive. Long-term habitat recovery is likely to support healthier fish stocks and more productive fisheries, which, in turn, will provide added environmental and socioeconomic benefits. Increased production rates would lead to more robust fish stock capacity over the long-term and more income to fishermen who would have to fish less time to catch the same amount of fish. However, to determine definitively if these benefits exceed costs would require a considerably more detailed analysis, including: (a) the spatial distribution of gear use and a quantitative estimate of damage caused by gears, (b) the impact of this damage on the habitats (c) how this impact translates into changes in stock size and/or non-use values, and (d) how changes in stock sizes and/or non-use activities would affect consumer/producer surplus. Such detailed information is currently unavailable due to cost and time constraints.

***Equitability of costs among communities*:** Coral reef habitat in the Gulf of Mexico is very small compared to all fishable areas, such habitat is widely dispersed around the Gulf, and most is already closed to the type of gears listed in this Action. Thus, it is unlikely that any fishing community is dependent upon fishing on coral habitat, or will be unduly impacted. However, those communities that might feel some impact from the Proposed Action would most likely be located in communities along the central west coast of Florida, the Florida Keys and coastal Texas.

Effect on enforcement, management, and administration: The measures proposed in this Action to address adverse fishing impacts are feasible, but would ideally require additional enforcement resources to assure compliance. As additional enforcement resources are unlikely in the near future, enforcement of measures to address adverse fishing impacts may require some diversion from existing activities. Like all management measures, each of these requirements requires a measure of voluntary compliance. This will be encouraged through Action 4, the education component. This amendment to the seven FMPs of the GMFMC will have a cost to NOAA Fisheries and the GMFMC: developing, processing, and implementing this Amendment will cost an estimated $200,000.

Practicability conclusion: The GMFMC identifies the proposed action as the most practicable approach to minimizing the adverse effects of fishing on EFH based on the findings and conclusions of analyses supporting this amendment. With the exception of the weak link requirement and the education component, the management measures included in the proposed action were derived from two of the alternatives evaluated in the EFH FEIS. Analyses in the EFH FEIS and in this amendment indicate the costs of the proposed action to commercial and recreational fishers are not overly burdensome when considered in relation to the expected benefits associated with increasing protections to EFH and HAPC (Section 4.3.8.1, GMFMC 2004). The GMFMC views the least conservative (no action) and most conservative (complete ban on fishing gear/activities with adverse impacts in the EEZ) alternatives evaluated in the EFH FEIS as impracticable in the context of what is "reasonable and capable of being done [to protect EFH and support its functions for managed species] in light of available technology and economic considerations." Additionally, the GMFMC finds the potential harmful effects associated with the remaining management measures evaluated in the EFH FEIS are not likely to be offset by potential, and somewhat speculative, environmental benefits.

5 Regulatory Impact Review

5.1 Introduction

NOAA Fisheries requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest. This is to comply with Executive Order (E.O.) 12866: Regulatory Planning and Review, which 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. The RIR does three things: (1) it provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action; (2) it provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and (3) it ensures the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way.

The RIR also serves as the basis for determining whether any proposed regulations are a significant regulatory action under certain criteria provided in E.O. 12866 and whether the proposed regulations will have a significant economic impact on a substantial number of small business entities in compliance with the Regulatory Flexibility Act of 1980 (RFA).

This RIR analyzes the probable impacts that the Proposed Action in this generic amendment to the Red Drum, Reef Fish, Coastal Migratory Pelagics, Shrimp, Stone Crab, Spiny Lobster, and Coral FMPs would have on the commercial and recreational fishing industries in the GOM.

5.2 Problems and Objectives

The problems and objectives addressed by the amendment and the purpose and need for the amendment, are found in Section 1.0 of this document and are incorporated herein by reference.

This amendment fulfills three specific objectives of the M-S Act amendments of 1996:

1. describe and identify essential fish habitat (EFH) for the fisheries;
2. identify measures to minimize to the extent practicable the adverse effects of fishing on such EFH; and
3. identify other actions to encourage the conservation and enhancement of such EFH.

Furthermore, this amendment is consistent with the GMFMC's habitat policy, as set forth in the GMFMC's Statement of Organization Practices and Procedures, which states:

> Recognizing that all species are dependent on the quantity and quality of their essential habitats, it is the policy of the GMFMC:
> Protect, restore and improve habitats upon which commercial and recreational marine fisheries depend, to increase their extent and to improve their productive capacity for the benefit of present and future generations. (For purposes of this policy, habitat is defined to include all those things physical, chemical and biological necessary to the productivity of the species being managed).

5.3 Methodology and Framework for Analysis

This RIR assesses management measures from the standpoint of determining the resulting changes in costs and benefits to society. To the extent practicable, the net effects should be stated in terms of producer and consumer surplus, changes in profits, employment in the direct and support industries, and participation by commercial fishermen, charter boat fishermen, and private anglers. In addition to these changes, there are public and private costs associated with the process of developing and implementing the rule.

5.4 Description of the Fisheries

A full description of all fisheries associated with the seven FMPs of the Gulf of Mexico are provided in detail in the EFH FEIS in Section 3.3.1, while Section 3.3.2 and Appendices D, E, F, and G describe Gulf of Mexico fishing communities in great detail (GMFMC 2004); these sections are incorporated herein by reference.

The dockside value of the Gulf of Mexico commercial industrial seafood production has tended to fluctuate between $600 and $800 million, though occasionally it has reached $900 million (Table 6). The most valuable commercially harvested species is shrimp, generally accounting

for well in excess of one-half of the total. Other commercially important species (groups) include stone crab, blue crab, oysters, spiny lobsters, reef fish, coastal pelagics, and menhaden.

As stated in a 1996 National Marine Fisheries Service report entitled *Our Living Oceans: The Economic Status of U.S. Fisheries:*

> "[t]he most important factors influencing the economic performance of the commercial fishing industry in the Southeast Region (i.e., the Gulf of Mexico and South Atlantic) can be categorized as follows: (1) A major portion of the stocks are being harvested at less than their long term potential yield; (2) Most of the fisheries are overcapitalized in the sense that more harvesting effort than is necessary is employed to catch a given amount of the stock; (3) There are multiple, competing uses of the stocks, and these competing uses complicate management and raise the cost of management; (4) Most of the management regimes for the stocks feature controls, usually overall quotas, that have been successful in beginning to halt or reverse stock declines; (5) However, in most cases there are no overall controls on effort and a number of gear, trip limit, size, and other regulations tend to reduce harvesting efficiency and redistribute existing fish stocks with the result of increasing the costs of harvesting, management, enforcement, and monitoring; (6) From a marketing viewpoint, a number of stocks face market competition from imports of identical or similar species, and prices are often dictated not only by the supply of imported products but by the state of the world economy as well."

In 2000, 27 Gulf of Mexico ports were listed among the top 91 of ports ranked by dollar amount of commercial fishery landings. The highest ranking was Dulac-Chauvin, Louisiana with $68.1 million, while Houston, Texas was ranked 83rd with $4.5 million (NMFS 2000). Overall, the Gulf of Mexico had landings valued over $910 million.

Total expenditures for marine recreational fishing activities in the Gulf of Mexico during 2001 were estimated at more than $ 2 billion by one survey, while another survey estimated those expenditures during 1999 at more than $ 4 billion (U.S. Fish and Wildlife Service and U.S. Census Bureau 2001; Steinback *et al.* 2004). The highest expenditures on recreational fishing in 2001 occurred in West Florida, followed by Louisiana, Texas, Alabama, and Mississippi (U.S. Fish and Wildlife Service and U.S. Census Bureau 2001).

5.4.1 Commercial Fisheries

The shrimp fishery is by far the most valuable in the Gulf of Mexico; in fact, it is the most valuable in the United States. The Gulf led the nation in 2000 with shrimp landings of 256.6 million pounds that accounted for 77 percent of the national total. Louisiana had the most landings with 133 million pounds, followed by Texas, Alabama, Mississippi and Florida (West Coast), respectively.

A Federal shrimp permit system (begun in 2002) estimates of shrimp vessels in the Gulf may not be completely accurate as all shrimp vessels may not have completed the application process. At present there are approximately 3500 federal shrimp permits and in 2002 there were 1848 other

federally permitted vessels in the Gulf of Mexico. Each permitted vessel may have several permits that allow the captain to fish a particular species or group of species for which the particular permit was established. Current permitted fisheries are: shrimp; king and Spanish mackerel; reef fish and red snapper; shark; spiny lobster; and swordfish. There are also permits required for charter vessels in the reef fish and coastal pelagic fisheries.

5.4.2 Dealers and Processors

According to the NOAA Fisheries permit data for 2002 there were 142 federally permitted dealers in the Gulf region. The majority of them (68) are located in Florida, which includes the Florida Keys, followed by Louisiana with 31 and Texas with 24 (Table 7).

5.4.3 Recreational Fisheries

The recreational fishery of the Gulf of Mexico includes private individuals, rental boats, charter vessels, head boats and party boats. The private recreational sector in the Gulf of Mexico is surveyed through the Marine Recreational Fisheries Statistics Survey (MRFSS) except for the state of Texas. Outside research on the charter and head boat sector provides much of the descriptive data, whereas the MRFSS survey is generally used to describe the private angling sector.

Private Anglers

There were over 20.4 million marine recreational fishing trips in the Gulf of Mexico during 2000 (excluding Texas) (GMFMC 2004). Most of those trips were made in Florida (72%) with Louisiana second (18%) and both Alabama and Mississippi with 5%. There were over 2.6 million participants who caught a total of 149 million fish. The species that were most commonly sought on fishing trips were red snapper, white grunt, dolphin, black sea bass, spotted sea trout, and red drum. Most often, the catch came on trips where individuals fished primarily in inland waters (64%) or in the state territorial sea (27%).

Descriptions of private angler fishing appear in the EFH FEIS in Appendix D under the description of each state's fishing communities (GMFMC 2004).

Charter, Head boats and Party boats

Charter boats are generally defined as for-hire vessels with a fee charged on a small group basis. Head boats and party boats also operate on a for-hire basis but with a per-person base fee charged. Charter boats are usually smaller, carrying six or fewer passengers. Party boats are larger and will carry as many passengers as possible to maximize income. They usually operate on a schedule and require a minimum number of passengers in order to make a trip.

In their recent study of the Charter/Head boat sector for the Gulf States of Alabama, Mississippi, Louisiana, and Texas, Sutton *et al*. (1999) estimated there to be 430 charter vessel operators and 23 party boat operators in the four-state area. Over the past ten years there has been an increase in size and capacity of both charter and party vessels. Since 1987 charter vessels have more than doubled in number from 210-430 and the number of passenger-trips have tripled from 95,000 to

318,716. The state with the largest increase in number of passenger-trips was Mississippi with a 300% increase. Alabama was next with an increase of 165%, since 1987. Party boats have decreased in number since 1987 from 26 to 23. However, the number of passenger-trips, as with charter vessels, has tripled from 37,148 to 117,990. This increase may be attributed to the increase in size of vessels.

Sutton *et al*. (1999) estimated the impact of the charter industry on local economies for the four states in their study in 1997 to be $42.5 million in direct output, $15.6 million in income and 996 jobs.

The charter industry has raised concerns over certain aspects of the above study, specifically certain costs for repair and targeting behavior. The Gulf Socioeconomic Panel has also provided the GMFMC with a critique of the methodology and assumptions made in the report. However, the purpose here is to describe prior research for comparison and discussion purposes only.

Holland *et al*. (1999) estimated there to be 615 charter and head boats on Florida's Gulf coast and approximately 230 in the Florida Keys. Major ports in Florida on the Peninsula Gulf - Naples and Ft. Myers (and Ft. Myers Beach); on Florida's Panhandle Gulf - Destin, Panama City (and Panama City Beach) and Pensacola; and in the Florida Keys - Key West, Marathon and Islamorada. In their sample, most charter boat operators in Florida (90%) operate full-time charter businesses and have been in business for an average of 16 years. The majority (95%) lives near their homeport and has lived in their home county for more than 10 years. Head boat operators also were full time had been in business on average 22 years. Like their charter boat counterparts they too lived near their home port and almost all had lived in their county for more than ten years.

5.4.4 Fishing Communities

The communities described in this section and the EFH FEIS are those that may have substantial fishing activity associated with a certain bounded area for each of the five Gulf States and are recognized by the census as incorporated communities or Census designated places. They do not represent a definitive list of fishing communities within the Gulf of Mexico Fishery Management GMFMC's jurisdiction. By combining secondary data, such as federal permits and other types of information from different levels and concepts of place (zip code, homeport and Census Designated Place) a list of those communities that may be impacted by council regulations was assembled. There are no standard guidelines for delineating the boundaries of a fishing community; thus it is unrealistic to refer to these communities as "fishing communities" in strict terms as outlined in the M-S Act[1]. It is only assumed that these communities may be impacted by GMFMC action because they have some or substantial fishing activity taking place within each community. Additionally, without extensive ethnographic research into social networks and sense of place, the exact boundaries around these communities cannot be identified. Therefore, these communities represent a partial and/or incomplete list of communities that could be potential fishing communities

[1] In 16 U.S.C. 1802 § 3 definitions of the Magnuson-Stevens Act (104-297 (16)), *fishing community* means "a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community."

To assist in understanding the impacts of regulation, an index of vulnerability was created for each community to assess employment opportunities and other sociodemographic variables that offer an indication of the quality of life within a community. The index was developed during similar research conducted in the South Atlantic while identifying fishing communities in that region (Kitner *et al*., 2002). It combines several different variables into an index, which measures employment opportunities, poverty rate, and average wage/salary for a community compared to that of the county. It is used as a rapid assessment tool in lieu of a more rigorous analysis, which is unavailable at this time. This index is but one determinant of the impact of regulations and can only be considered a very broad-spectrum measure of vulnerability. The information presented is just one approach to creating a scale for describing vulnerability. It is described in thorough detail in Section 2.1.6.2.2 of the EHF FEIS (GMFMC 2004).

Each component of the index was given one of three values 1, 0 or -1 depending upon how each contributed to the index. A community index score is the cumulative total of positive or negative values derived from employment opportunities, poverty and average wage compared to county levels. Table 8 summarizes the vulnerability index score for fishing communities identified in detail in the EFH FEIS Appendix D.

5.5 Economic Impacts of Management Measures

Primary benefits from the Proposed Actions to describe and identify EFH are likely to be of four primary types: (1) is increased consumer and/or producer surplus derived from commercial harvesting activities; (2) consumer surplus derived from recreational fishing activities; (3) increased benefits from non-consumptive activities, such as diving (assuming the taking of fish is not a purpose of the trip); and (4) benefits associated with existence value may be enhanced from fishing restrictions.

While producer surplus is being generated in the Gulf of Mexico commercial fishing sector under "normal" conditions, it is likely to be significantly less than would be the case under a rights-based management regime.[2] With a total dockside value of all commercial fishing activities in the Gulf of Mexico generally approximating $700 million annually, however, it seems relatively safe to conclude that annual producer surplus does not exceed the $100 million mark (this would include both federally managed and non-managed species).

Given the management regimes currently in place, marginal changes in habitat protection and/or enhancement will likely translate into only minor increases in producer surplus in the commercial or recreational fishing sectors, primarily through increases in inframarginal rents. This is premised on the hypothesis that further protection/enhancement of essential fish habitat results in an increase in the carrying capacity of commercially and recreationally relevant fish stocks (either directly or indirectly). Whether or not the existing habitat carrying capacity increases, the proposed fishing restrictions on coral reefs in HAPC will essentially create several

[2] The qualification of "normal" conditions is included in this statement because of the current situation in the shrimp fishery, by far the largest commercial component. Specifically, the rapid decline in dockside price in conjunction with an inability of shrimpers to instantaneously exit the fishery suggests that profits in the industry are likely to be negative at present. Through time, however, one would anticipate additional exit from the fishery (assuming prices do not increase) and a return to 'normal' profitability conditions.

new marine reserves where much of the existing fishing activities will either be directly or indirectly limited due to the prohibition of anchoring. Thus, it could be assumed that the local populations of the relevant fish stocks should increase, and 'spill over' into surrounding waters, making them available to fishermen. One might hypothesize, this could result in an increase in demand for recreational fishing trips, however it would likely be more beneficial to commercial fishing activities than recreational. Due to the relative remote location of these sites and current fishing patterns, it is questionable as to whether demand for recreational fishing trips would increase significantly. There is insufficient information to determine quantitatively how much these fish stocks may be enhanced as a result of additional protection of essential fish habitat.

Additionally, any portion of the increased consumer surplus may be dissipated over time as a result of the open-access nature of all recreational fisheries in the Gulf of Mexico. Specifically, increasing stocks that result in an increased demand for recreational trips would translate into an increase in the quantity being taken, at a given cost per trip. As the number of trips increases, catch per trip among all participants is expected to decline. The declining catch per trip, the result of increased participation, would, in theory, suggest declining consumer surplus in the long run (though potentially higher than prior to habitat protection/ enhancement).

Non-consumptive use activities of the Gulf of Mexico fishery resources include activities such as diving (where the purpose of the diving trip does not include the take of fish by spearfishing or powerheads). There is no information pertaining to the consumer surplus of such activities but it is certainly positive. Protection or enhancement of essential fish habitat, particularly coral reefs could increase consumer surplus associated with these activities via at least two mechanisms. First, there may be additional benefits (consumer surplus) from diving in a less disturbed (i.e., more pristine) environment. Second, to the extent that protection of alternative habitats (via gear modifications or restrictions) results in an enhancement of fish stocks, divers and other passive users may receive additional utility (benefits) associated with increased visual sightings of fish.[3] Hence, while there may be an increase in consumer surplus associated with protection/enhancement of essential fish habitat, quantifying it would be impossible without information on the number of passive users and their collective willingness-to-pay for such protection/enhancement. The remoteness (distance from shore) and depth (particularly on Pulley Ridge) of the coral reefs in HAPC make it likely that only a relatively small number of well-trained recreational divers could benefit.

Economic theory suggests that society places a value on the knowing that unique sites remain in a relatively undisturbed state and, as such, would be willing to pay for their protection. To the extent that the unique sites have been negatively impacted as a result of anthropogenic activities, theory would furthermore suggest that society would, in many instances, be willing to pay for at least some level of restoration. This willingness to pay represents the demand for habitat protection/enhancement. The amount that society would be willing to pay depends upon a number of factors, including uniqueness and irreplaceability. While there is undoubtedly some existence value associated with some of the unique habitats in the Gulf of Mexico (e.g., coral reefs and hard bottoms), quantifying it is not possible at this time.

[3] This statement assumes that fish stocks are not driven back down to pre-protection levels via commercial and/or recreational activities.

Anchoring Prohibitions

This measure would prohibit bottom anchoring over coral reefs in HAPC. In and of itself, the benefits associated with adoption of this action would accrue in the form of protection of coral reefs in HAPC. Prohibition of anchoring will restrict, to some degree, other activities such as some vertical gear fishing and certain diving activities which will impact both commercial and recreational fishing.

Although logbook data do not provide the specific location or depth of where fishermen fish, we do know that commercial fishing with vertical gear in certain proposed closed areas must be less than or equal to (being as conservative in estimation as possible) the total vertical gear fishing occurring in the relevant NMFS Statistical Area. In the case of the proposals for Pulley Ridge, both Proposals C and D lie completely in Statistical Area 2. The average number of commercial fishing trips that landed reef fish or sharks using vertical gear for the years 2000 through 2002 in Statistical Area 2 only was 527. Annual landings averaged 413,000 pounds with a value of $847,000 during the same years. This was equivalent to 3.3 percent and 3.1 percent, respectively, of total landings for all Statistical Areas. Trips and landings in pounds and value were all down the following year in 2003, due primarily to the sharp decline in the number of boats involved in these landings. The number declined by nearly half, from 127 boats in 2000 to only 65 in 2003.

One has to assume that much of any displaced fishing effort would relocate to other areas in Statistical Area 2 or other Statistical areas, altogether, and may not actually result in lost fishing effort. In the long run, any reduction in economic efficiency that may result from the prohibition to use anchors may be reduced if protection (and possible future enhancement) of coral reefs in HAPC translates into increased stock sizes of species dependent on coral reefs due to improved carrying capacity or the reserve "spill over" effect, as described above. The increased stock sizes, in turn, would translate into increased catches per unit effort.

However, benefits will only accrue if (a) anchoring over coral reefs in HAPC is significant and results in degradation and (b) degradation results in reduction in the size of fish stocks and/or non-use values. Anchors do cause damage and can result in a reduction in ecosystem services provided by coral reefs (see Section 3.5.2.1 in the EFH EIS (GMFMC 2004)). Certain anchoring practices by vessels can cause problems, and anchoring on hard bottoms, whether or not coral are present, causes some damage to the bottom. Anchoring damage is most likely more prevalent among less experienced boaters and fishermen. Additionally, many fishermen do not retrieve the anchor between sets. Fishermen typically steam ahead, the anchor is pulled out of the sediment or off the bottom, and flies in mid- water above the bottom because the anchor flukes act as a hydrofoil or wing before it is allowed to drop down again on a new site..

The magnitude of the potential problems from anchoring practices has not been evaluated in the Gulf of Mexico. Without additional detailed information, however, there is no means by which to establish even a range of possible costs to habitat from anchoring damage.

The costs associated with this action depend upon the extent to which anchoring currently occurs over coral reefs in HAPCs and what substitutes are available. This information is currently unknown.

Prohibition of trawls, longlines, buoy gear and all traps/pot

The second measure would prohibit use of bottom trawls, bottom longlines, buoy gear, and all traps/pots on coral reefs. Though stone crabs and lobsters are often associated with coral formations, in general, traps are not generally placed directly on coral but, rather, close to coral. However, with respect to the proposed sites to have new restrictions (McGrail and Pulley Ridge) there was no recorded stone crab or lobster fishing effort in 2000 or 2001 in the TIP data (GMFMC 2004), thus there are no expected economic impacts.

With respect to fish traps, the economic impacts should be relatively minor. The majority of fish trap fishing occurs in Statistical Area 6, and only a fraction of the effort occurs in Statistical Area 2 (see Figure 3.3.4 in the EIS for EFH (GMFMC 2004) and logbook data) and no fishing with traps occurs in the western Gulf of Mexico. More than twice as much fishing effort occurs in Statistical Area 3, just to the north of 2. The number of fish trap fishermen that fished in Area 2 dropped from nine (9) to four (4) from 2000 to 2003, though landings of combined reef fish and sharks stayed relatively the same in pounds and value (averaging 61,750 pounds and $227,500). This is approximately 5% total landings in pounds and 9% of value for all trap fishing effort for the Gulf.

Reef fish fishermen reported that grouper landings were particularly important from Pulley Ridge, however they were not specific about where on Pulley Ridge in their comments. The Ridge runs through three Statistical Areas, 2, 3 and 4, going south to north, and reported fishing effort increases significantly as you go north. Similar to the discussion above under vertical gear fishing effort, the logbook data are not specific by depth or location for longline fishing effort within a Statistical Area. However, one can report that total longline fishing effort for all reef fish and sharks in Statistical Area 2 has fluctuated up and down (no trends) from 2000 through 2003 and has averaged 107 trips involving 29 boats. Landings for Statistical Area 2 have likewise fluctuated without a clear trend, and averaged 410,500 pounds for all reef fish and sharks valued at $662,000. This was only 5.1% and 4.1% of Gulfwide totals, respectively. A majority of the 29 boats likely come from the west central Florida coastline (Madeira Beach area), as well as Key West and other ports in between.

Longline landings of all shallow water and deep water grouper average 194,750 pounds and $484,500 in Statistical Area 2 – equivalent to 47.4% of all reef fish and shark landings in pounds, and 73.2% of all landings in value. Of this, red grouper by far makes up the largest portion of all grouper landings by longline in Statistical Area 2, averaging 120,750 pounds (62.0%), with a value of $274,000. This equals 56.6% of all grouper landings. Red grouper landings by longline in Stat Area 2 also are 69.2 % of total red grouper landings (174,500 pounds) by all gear types in Statistical Area 2.

Restriction of bottom longlines and buoy gear on the coral reef in the Pulley Ridge HAPC would result in dislocation costs of that portion of this reported fishing effort that occurs over coral reef, however, there is no exact measurement of how much fishing effort that means at this time. Similar to fishing effort with vertical gear, one would assume that much of any displaced fishing effort would relocate to other areas in Statistical Area 2 or other Statistical areas altogether, and may not actually result in lost fishing effort. In the long run, any economic impacts resulting from lower landings due to this measure may be lessened if protection (and possible future

enhancement) of coral reefs in HAPC translates into increased stock sizes of species dependent on coral reefs due to improved carrying capacity or the reserve "spill over" effect, as described above. Increased stock sizes, in turn, could translate into increased catches per unit effort. Considering the relatively small size of the proposed McGrail HAPC (6 nm^2), the economic impacts are considered negligible. Without additional information, particularly the extent of longlining activities on coral reefs and damage resulting from the activity, there is no means of determining whether the benefits associated with enactment of the measure would exceed costs.

The intent of the prohibition of bottom trawling on coral is to protect the coral resources from damage associated with trawling activities. The premise that benefits would accrue from such action is, of course, conditioned on three primary assumptions: (a) that damage to coral would be forthcoming if trawling were conducted on it, (b) that damage to coral translates to a loss in economic benefits, and (c) that trawling presently occurs on coral. As discussed in detail in the EFH FEIS (Section 3.5.2.1), all gear types that could be used on coral reef habitats cause some degree of damage. Further, the validity of the second assumption appears to be strong given the known importance of coral to a healthy ecosystem and, hence, carrying capacity of some stocks. The validity of the final assumption appears to be somewhat more tenuous for at least two reasons. First, and primary, there appears to be little economic incentive for shrimp fishermen (the primary fishery using trawls) to trawl on coral reef since (a) shrimp are generally not abundant over coral and (b) costs to the shrimp fishermen, expressed in damage to gear, would be large. As such, any trawling on coral would most likely be accidental. Second, much, but not all, of the coral bottom is already protected under regulations enacted in the Coral FMP. However, the measure would help protect newly discovered live coral areas as they are discovered. Areas under current study may be classified as coral in the near future; however, the extent of potential coral habitat is unknown at this time. Given these facts, the actions to prohibit trawling over coral would provide relatively minor economic benefits to the nation.

In regard to hard bottom and coral reefs, it should be recognized that trawlers do not typically operate in these areas due to the potential damage their gear may incur. While trawl nets have been documented to impact coral reefs, typically resulting in lost gear (Bohnsack, personal observation), these incidents are usually accidental.

Benefits associated with taking action to prohibit trawling on coral are likely to be minor, and costs associated with such action, outside monitoring and enforcement, are also likely to be relatively minor since displacement of shrimp fishermen from their "preferred" fishing location appears to be negligible. Finally, one is left with the question of how one would enforce and monitor an activity that is conducted only by accident. Specifically, the randomness (and infrequency) of such an activity suggests that adequate enforcement would be difficult and costly relative to possible gains. However, because trawling on coral is economically detrimental to shrimp fishermen due to potential gear loss, voluntary compliance is likely to be high, especially if coral areas are clearly defined.

Weak link on tickler chain

The third measure would require a weak link in the tickler chain of bottom trawls on all habitats. Certainly, a very weak link would minimize any habitat degradation. This would translate into benefits if trawling does cause any significant damage and if this damage translates into changes

in the size of fish stocks. However, it could also be costly to the trawling fleet since it would result in loss of catch associated with tows where the weak link breaks. The 'stronger' the weak link, the lower would be the costs to the commercial fishing sector. Likewise, however, benefits would proportionately be reduced. More research would be needed to fully assess costs and benefits.

The modification of gear included within this action seems minor and any social impacts that would follow would generally be considered nominal if any. While coral reef habitat can be identified, the extent that the prohibitions included in this action would impact fishing practices is not entirely clear. However, some of the extended social impacts are discussed in the EFH FEIS (under Section 4.4.6 Administrative Impacts).

The communities that would be affected most by this action are those with reef fish and shrimp vessels. Those communities that would be most vulnerable are listed in the EFH FEIS (Section 3.3.2.7). It is important to recognize that some communities with *both* reef fish vessels and shrimp vessels are potentially more vulnerable under this action (i.e., communities in the Florida Keys and the west central Florida coast). However, it is also important to recognize that coral habitat in the entire Gulf of Mexico is very small compared to all fishable areas, they are scattered around the Gulf, and most are already closed to the type of gears listed in this Action. Thus, it is unlikely that any community will be very dependent upon fishing on coral habitat, and unduly impacted.

Education

There would be no direct economic impact to fishermen from the fourth measure, which requires an education program be established to educate recreational and commercial fishermen on the importance of protecting coral reefs for fishery resources and how to use vertical fishing gears in coral reef areas to help prevent or mitigate any potential damage to coral EFH.

The cost of an education program to fishery management can vary greatly, depending on whether it can be incorporated into other, existing agency education efforts (including that of the NOAA National Marine Sanctuary Program). Generally, costs for these types of programs are directly or indirectly outweighed by both the reduced enforcement costs and net economic benefits due to improved biological conditions and fishery resources.

Practicability

This Action selects management measures most likely to result in substantial benefits to EFH while not causing undue economic or social burdens on fishermen; it is considered practicable. This action would have intermediate influence on regulatory requirements. This action would cause some additional administrative requirements; the regulation of weight restrictions for vertical gear used over coral will require additional assessment and analysis and due to the unknown number of recreational and commercial fishermen that fish on these sites. An education and outreach effort might be required to ensure voluntary compliance with such regulations. The resulting measures would apply to the Reef Fish and Coastal Migratory Pelagics FMPs. Measures dealing with prohibition of anchoring would apply to the Reef Fish, Coastal Migratory Pelagics, Spiny Lobster, and Coral FMPs. Measures dealing with prohibition

of bottom longlines and buoy gear would apply to the Reef Fish and Coral FMPs. Measures dealing with prohibition of traps/pots would apply to Reef Fish, Spiny Lobster, Stone Crab, and Coral FMPs. Measures dealing with prohibition of trawling would apply to the Shrimp and Coral FMPs. Measures dealing with tickler chains would apply to the Shrimp FMP.

Enforcement

Increased enforcement activity (beyond status quo) would ideally be required to assure compliance with all measures. Use of legal gears in a partially closed area might increase the difficulty of enforcing prohibitions of other gears (i.e., use of vertical fishing line where bottom-tending gear are prohibited). As always, there might be the anticipation of a certain amount of illegal fishing activity; however, on the water enforcement or patrols should reduce this. This will be feasible since most of the coral reef areas are already in areas protected under other authorities or other fishery management actions.

The most effective way to ensure compliance with fishing restrictions on all coral is to update maps with those small coral areas that appear to be outside of other protected areas, and to continue identification and mapping of potential new coral habitats in deeper waters (see Sections 3.1.1.3 and 3.2.2.2 of the EFH FEIS, GMFMC 2004). For regulatory and enforcement considerations, as well as to make compliance by fishermen as easy as possible, it was considered most appropriate to map the HAPC boundaries around coral reefs following straight latitude and longitude lines, where possible. In the case of Pulley Ridge, the boundaries are not 'square' with latitude and longitude, but are based upon public comments from fishermen and follow the general boundaries of the coral reef.

Establishing an education program is considered

In summary, this Action is likely to provide economic benefits to the nation. However, to determine definitively if these benefits exceed costs would require considerably more detailed analysis, including: (a) a quantitative estimate of damage caused by gears, (b) the impact of this damage on the size of fish stocks, and (c) changes in producer and consumer surplus, would be required before any more definitive analysis of benefits and costs could be presented.

5.6 Private and Public Costs

The preparation, implementation, enforcement, and monitoring of this or any Federal action involve the expenditure of public and private resources which can be expressed as costs associated with the regulations. Costs associated with this amendment include:

Council costs of document preparation, meetings, public hearings, and information dissemination ……$100,000

NOAA Fisheries administrative costs of document preparation, meetings and review $100,000

Annual law enforcement costs.....$ 0

TOTAL $200,000

The Proposed Actions should not result in any additional permitting, logbook, or other paper/application requirements. Law enforcement currently monitors regulatory compliance in these fisheries under routine operations and does not allocate specific budgetary outlays to these fisheries. While increased enforcement might be desirable, the proposed actions do not necessarily require modification or increases in current enforcement practices. Thus, no law enforcement costs are attributable to the proposed action.

5.7 Determination of a Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a significant regulatory action if it: (1) 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 or communities; (2) creates a serious inconsistency or otherwise interferes with an action taken or planned by another agency; (3) materially alters the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in E.O. 12866.

Expected impacts are relatively minor decreases in the catch of some managed species and some dislocation of fishermen in the commercial and recreational fishery sectors. However, the $100 million threshold will not be reached as a result of the Proposed Actions. The majority of current fishing behaviors and practices can continue as they have been. Therefore, productivity, competition, and jobs are not expected to be materially affected by the Proposed Actions.

Measures in this amendment do not interfere or create inconsistency with any action of another agency, including state fishing agencies, or materially alter budgetary entitlements, grants, user fees, or loan programs. The action does not, therefore, raise novel legal or policy issues.

Given the above findings, it is, determined that the rule would not constitute a significant regulatory action.

6 Regulatory Flexibility Act Analysis

6.1 Introduction

The purpose of the Regulatory Flexibility Act (RFA) (5 U.S.C. 601 et seq.) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration. The RFA does not contain any decision criteria; instead, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of various actions contained in the FMP or amendment (including framework management measures and other

regulatory actions) and to ensure that the agency considers actions that minimize the expected impacts while meeting the goals and objectives of the FMP and applicable statutes.

With certain exceptions, the RFA requires agencies to conduct a regulatory flexibility analysis for each proposed rule. The regulatory flexibility analysis is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. In addition to analyses conducted for the RIR, the regulatory flexibility analysis provides: (1) a description of the reasons why action by the agency is being considered; (2) a succinct statement of the objectives of, and legal basis for the proposed rule; (3) an identification, to the extent practicable, of all relevant federal rules which may duplicate, overlap, or conflict with the proposed rule; (4) a description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply; (5) a description of the projected reporting, record-keeping, and other compliance requirements of the final rule, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; (6) a description of significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities.

6.2 Need, objectives, and legal basis for the rule

The purpose and need, issues, problems and objectives of the Proposed Actions are provided in Section 3 of the EFH FEIS (GMFMC 2004) and are incorporated herein by reference. In summary, the action is intended to identify and protect habitat essential to federally managed fish, and to prevent, minimize, or mitigate, adverse fishing impacts to EFH. The M-S Act, as amended, provides the statutory basis for the rule.

6.3 Federal rules which may duplicate, overlap or conflict with the rule

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

6.4 Number of small entities to which the rule applies

The Small Business Administration (SBA) defines a small business as one that is independently owned and operated and not dominant in its field of operation, and has annual receipts not in excess of $3.5 million in the case of commercial harvesting entities or $6 million in the case of for-hire entities, or has fewer than 500 employees in the case of fish processors, or fewer than 100 employees in the case of fish dealers.

The number of shrimp vessels operating in the Gulf of Mexico in the federal shrimp fishery was estimated at between 3,500 and 5,000 and the number of shrimp boats (smaller vessels fishing in state waters) at about 13,000. However, some of these shrimp fishing operations are not currently fishing due to poor economic conditions in the Gulf shrimp fishery. Detailed economic and social information has not been collected from Gulf shrimp fishermen for over 10 years. However, a socioeconomic survey of the Gulf shrimp fishery is presently underway.

Although there are several fleet operations in the shrimp fishery, their actual number is not known. Considering the low likelihood that these operations are dominant in the harvesting

sector, the gross receipts criterion may be used to define small business in the shrimp fishery. Ward *et al.* (1995) reported that the average gross revenues for shrimp vessels at around $82,000 (converted to 1999 prices using producer price index for all commodities). One standard deviation from this average provides a range of $16,000 to $425,000. Even the upper limit of this revenue range is well below the $3.5 million threshold. Since the estimate of Ward *et al.* (1995), the shrimp fishery has experienced economic hardship, and so present revenues are likely even less.

As of October 2003, there are 1,158 active commercial reef fish permits for the Gulf of Mexico. An average vessel generated revenues of $65,200. However, only reef fish and coastal pelagics are required to be reported in logbooks.

An earlier survey of commercial reef fish vessels (Waters 1996) found the following income configuration:

	Gross Income	Net Income
High-volume vessels, vertical lines:		
Northern Gulf:	$110,070	$28,466
Eastern Gulf:	$ 67,979	$23,822
Low-volume vessels, vertical lines:		
Northern Gulf:	$ 24,095	$ 6,801
Eastern Gulf:	$ 24,588	$ 4,479
High-volume vessels, bottom longlines:		
Both areas:	$116,989	$25,452
Low-volume vessels, bottom longlines:		
Both areas:	$ 87,635	$14,978
High-volume vessels, fish traps:	$ 93,426	$19,409
Low-volume vessels, fish traps:	$ 86,039	$21,025

The measures in this amendment could also affect for-hire vessels, potentially in southwest Florida. As of October 2003, there were 1,552 active for-hire recreational vessel permits. Holland *et al*. (1999) conducted a survey of charter boats and headboats in Florida. Charter boats have an average length of 37 feet, while headboats average 62 feet. The major activity centers for charter boats in Florida are: a) Miami and Fort Lauderdale on the Atlantic; b) Naples and Fort Myers/Fort Myers Beach on the Peninsula Gulf; c) Destin, Panama City/Panama City Beach and Pensacola on the Panhandle Gulf; and, d) Key West, Marathon and Islamorada in the Florida Keys. The major activity centers for headboats are: a) Miami on the Atlantic; b) Clearwater and Fort Myers/Fort Myers Beach on the Peninsula Gulf; c) Destin and Panama City/Panama City Beach on the Panhandle Gulf; and, d) Islamorada, Key West and Marathon in the Florida Keys. Sutton *et al*. (1999) conducted a survey of charter boats and headboats in Alabama, Mississippi, Louisiana and Texas. The average charter boat in the four-state area was 39 feet in length with a total passenger capacity of 12 people while the average headboat was 72 feet in length with a total capacity of 60 passengers. Major activity centers for charter boats in the four-state area are:

a) South Padre Island, Port Aransas, and Galveston/Freeport in Texas; b) Grand Isle-Empire-Venice in Louisiana; c) Gulfport-Biloxi in Mississippi; and, d) Orange Beach-Gulf Shores in Alabama. Major activity centers for headboats in the four-state area are: a) South Padre Island, Port Aransas, and Galveston/Freeport in Texas and, b) Orange Beach-Gulf Shores in Alabama.

Based on the works of Holland *et al*. (1999) and Sutton *et al*. (1999), Carter (2003) developed earnings profiles for charter and headboats in the Gulf using information on the number of trips by categories (half-day, full-day, overnight), number of passengers, base fees, and angler days. On average, charter boats generated gross revenues ranging from $58,000 in the eastern Gulf to $81,000 in the western Gulf, or an overall average of $64,000. Headboats generated gross revenues ranging from $281,000 in the eastern Gulf to $550,000 in the western Gulf, or an overall average of $400,000.

Fish dealers are also affected by the measures in this amendment. Currently, a federal permit is required for a fish dealer to purchase reef fish from commercial vessels. According to the NOAA Fisheries permit data there are 142 federally permitted dealers in the Gulf region. The majority of them (68) are located in Florida, which includes the Florida Keys, followed by Louisiana with 31 and Texas with 24 (Table 7).

Average employment information per reef fish dealer is not known. Although dealers and processors are not synonymous entities, Keithly and Martin (1997) reported total employment for reef fish processors in the Southeast at approximately 700 individuals, both part and full time. It is assumed that all processors must be dealers, yet a dealer need not be a processor. Further, processing is a much more labor-intensive exercise than dealing. Therefore, given the employment estimate for the processing sector, it is assumed that the average dealer employment would not surpass the SBA employment benchmark. Based on the gross revenue and employment profiles presented above, all commercial and for-hire fishing vessels and reef fish dealers potentially affected by the proposed regulations are classified as small entities.

The number of fishermen holding spiny lobster trap certificates in 2001 were 2,235 (unpublished data provided by the Florida Fish and Wildlife Commission). None of the spiny lobster fishing operations in the Gulf of Mexico approaches the $3.5 million threshold.

Muller and Bert (1997) estimated the number of participants in the stone crab fishery during 1995-1996 to be about 1,689 (based on the number of Saltwater Product Licenses (SPL) with stone crab endorsements that reported landings). The number of SPLs, however, does not match one to one with the number of vessels/boats; that is, several SPLs may be associated with one vessel/boat or several vessels/boats may be associated with one SPL.

The average number of fishing crafts in the stone crab fishery for the period 1985-1994 was estimated at 720, with an average of 234 being vessels (i.e. fishing crafts greater than 5 net tons) and 486 were boats (Vondruska 1998). The highest ex-vessel revenues from stone crab landings were registered in 1997 at $31.924 million. Using these two numbers, the averaged ex-vessel revenue would amount to $44,339. This number is obviously pulled down by the number of boats vs. vessels in the fishery. If it is assumed that all landings were made only by the 234 participating vessels (average for the 1985-1994 period), then the average gross revenue would amount to about $136,427.

6.5 Projected reporting, record-keeping and other compliance requirements

No duplicative, overlapping, or conflicting federal rules have been identified and none of the measures considered in this amendment would alter existing reporting and recordkeeping requirements. Certain compliance requirements would be introduced, but considering that all the measures considered in this amendment have, in one form or another, been adopted for other fisheries in the Gulf, these new requirements would not require additional professional skills.

6.6 Description of Economic Impacts on Small Entities

The habitats in a number of areas of the Gulf of Mexico are already protected from the adverse effects of fishing activities by previous actions of the GMFMC, as outlined in Table 1 Of the measures in the Proposed Action of this Amendment designed to minimize the adverse impacts of fishing, the anchoring prohibition over live coral in HAPC would primarily affect commercial and recreational fishermen using vertical lines over live coral areas of Pulley Ridge, some additional areas around the the three banks that comprise the Flower Garden Banks National Marine Sanctuary, and McGrail Bank in northwestern Gulf . The prohibition on the use of bottom trawls, bottom longlines, and buoy gear would primarily affect fishermen using these gears in coral reef areas of Pulley Ridge and McGrail Bank. The coral reefs lie completely within NMFS Statistical Area 2, and logbook data for the entire Area shows that the value of all longline landings (all reef fish and shark) from 2000 through 2003 averaged $662,000, equal to 4.1% of the Gulfwide totals. However, it is not anticipated that this amount of landings would be removed from the fishery; rather it is expected that much of this fishing effort will relocate to adjacent areas, where fishing activity already exceeds that of Statistical Area 2 (see Section 5.5).

It is not anticipated that any trap fishermen (fish, lobster, or stone crab) would be impacted from these measures at this time, based on logbook and TIP data. The requirement for a weak link in the tickler chain of bottom trawls used over all habitats might affect fishermen using this gear (primarily shrimp fishermen) across the Gulf, but more acutely in the north-central and northwestern Gulf, based on the relative amount of shrimp trawl fishing effort presented in the EFH FEIS (Figure 3.3.8 in GMFMC 2004).

Fishing communities that are most likely to be affected are those along the west central Florida coast from Pinellas County (Madeira Beach) to Monroe County (Key West), where the majority of active longline fishermen are based. See Appendix D in the EFH FEIS (GMFMC 2004) for further information on particular fishing communities which may be affected by the measures in the Proposed Action. Appendix D contains information on the number of Federal permits issued in each Gulf fishing community by permit type, quantifies the gear types used in each community, and specifies the number of people employed in each community in the various sectors of the fishing industry.

Based on the gross revenue and employment profiles presented above for the various fisheries and additional information in the EFH FEIS (GMFMC 2004), all commercial and for-hire fishing vessels and reef fish dealers potentially affected by the proposed regulations are classified as small entities.

In regards to the question of whether the Proposed Action would affect a substantial number of small entities; because all entities are considered small business entities, the substantial number criterion would be met. In regards to the question of whether the measures place a substantial number of small entities at a significant competitive disadvantage to large entities; since all the entities potentially affected by the proposed rule are considered small business entities, the issue of disproportionality does not arise.

6.7 Description of Significant Alternatives

The FEIS for EFH (GMFMC 2004) developed and analyzed a full range of alternatives to identify EFH, identify HAPC, and to prevent, minimize or mitigate adverse fishing impacts on EFH. This information is incorporated herein by reference.

7 Other Applicable Law

7.1 Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NOAA Fisheries is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it takes effect.

NMFS will publish a notice of proposed rulemaking for the regulations implementing the measures proposed in this amendment. All comments received will be considered and addressed prior to issuing a final rule. NMFS will comply with all of the requirements of the APA in promulgating the regulations.

7.2 Data Quality Act

The Data Quality Act (DQA) (Public Law 106-443), which took effect October 1, 2002, requires the government to set standards for the quality of scientific information and statistics used and disseminated by federal agencies. Specifically, the Act directs the Office of Management and Budget (OMB) to issue government wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." Such guidelines have been issued, directing all federal agencies to create and issue agency-specific standards to 1) ensure Information Quality and develop a pre-dissemination review process; 2) establish administrative mechanisms allowing affected persons to seek and obtain correction of information; and 3) report periodically to OMB on the number and nature of complaints received.

Scientific information and data are key components of FMPs and amendments and the use of best available information is the second national standard under the M-S Act. To be consistent with the Act, FMPs and amendments must be based on the best information available; data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities, and undergo quality control prior to agency use; all supporting materials and data are properly referenced; and should be reviewed by technically competent individuals.

Section 2.1 of the FEIS for Gulf of Mexico EFH (GMFMC 2004) thoroughly documents all data and methodologies used and the analysis that led to the designation of the Preferred Alternatives of the FEIS that became the Proposed Actions of this Amendment. During the development of the FEIS, the Technical Review Panel was regularly convened to review the data used, data sources, and methodologies for the analysis. Adjustments were periodically made based on the comments and direction that the Technical Review Panel provided.

With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data should also undergo quality control prior to being used by the agency and a pre-dissemination review performed. This review will be performed and maintained on file at the NMFS SERO.

7.3 Paperwork Reduction Act

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

This amendment contains no new collection of information subject to the PRA.

7.4 The Fish and Wildlife Coordination Act (16 U.S.C. 661, 666c)

The Fish and Wildlife Coordination Act protects the quality of the aquatic environment needed for fish and wildlife resources. The Act requires the Federal agencies to consult with the FWS or NMFS to ensure that the environmental value of a body of water or wetland is taken into account in the decision-making process as they review permit applications and proposals for Federal construction. Consultation is generally initiated when the agency sends the FWS or NMFS a public notice of an action. FWS or NMFS may file comments on the productivity stating concerns about the negative impact the activity will have on the environment and suggesting measures to reduce the impact.

It is through this mechanism that the NMFS Office of Habitat Conservation reviews actions for their potential impact on fish habitat (since the early 1980s) and since the M-S Act

reauthorization, on EFH as well. NMFS staff makes recommendations to prevent, minimize or mitigate adverse impacts on EFH. In 2000 and 2001, more than 2,700 proposed development actions in the five Gulf States[4] were reviewed annually by the NMFS (Ruebsamen, pers. communication). A historical overview of development activities in each of the Gulf states from 1982 through 2001 that were reviewed annually by the NMFS Office of Habitat Conservation is presented in Table 3.4.1 of the EFH FEIS (GMFMC 2004).

There are no clear trends in amount of activity; the two years with more than 3500 actions reviewed were 1982 and 1997. It does not appear that more actions have been reviewed by NMFS since the changes in the M-S Act. Since 1997, after the peak mentioned, actions reviewed declined to a low of 2630 in 1999, and increased just slightly to more than 2,700 as mentioned above.

7.5 Coastal Zone Management Act (16 U.S.C. Section 1456(c))

In 1972, Congress passed the Coastal Zone Management Act (CZMA) to protect the nation's coasts by helping states regulate activities in the coastal zone. The CZMA encourages states to voluntarily develop management programs to manage and balance competing uses of, and impacts to, coastal resources. The programs are embodied in state Coastal Zone Management Program (CZMP) Plans that are submitted for Federal approval. The program is administered at the Federal level by the Coastal Programs Division (CPD) within NOAA's Office of Ocean and Coastal Resource Management (OCRM). All five of the coastal states bordering the Gulf currently have approved coastal management programs. The coastal zone generally extends 3 miles seaward (state waters) and inland as far as necessary to protect the coast. In the Gulf of Mexico, state waters for both Texas and Florida extend approximately 9 miles (9 nm). States with approved CZMPs receive Federal funding to help them protect and improve the quality of their coastal areas.

Section 307 of the CZMA, called the Federal Consistency provision, is a major incentive for States to join the national coastal management program and is a tool states use to manage coastal uses and resources and to facilitate cooperation and coordination with federal agencies. Federal Consistency is a requirement that federal actions that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone must be consistent with the enforceable polices of a state's federally approved CZMP. Federal actions consist of three categories:

1. Federal agency activities—activities and development projects performed by a federal agency, or a contractor for the benefit of the federal agency (e.g. Fishery Management Plans, disposal of federal land by the General Services Administration, U.S. Army Corps of Engineers beach nourishment projects, etc.);
2. Federal license or permit activities—activities not performed by a federal agency, but requires federal permits, licenses or other forms of federal approval (e.g. Section 404 permits, Corps permits for ocean dump-sites, etc.); and
3. Federal financial assistance to State and local governments. (e.g. Federal Highway Administration funds, Housing and Urban Development grants, etc.)

[4] Numbers for the Gulf coast of Florida are an estimated subset of actions statewide.

Each state has a procedure for Federal Consistency reviews and includes an opportunity to obtain comments from state and local agencies, as well as the public. FMP-related actions are identified as a Federal agency activity and therefore subject to the Federal Consistency provisions. The GMFMC should contact each State CZMP early, prior to taking any action on FMP Amendments, to ensure early coordination and consultation. If coastal effects are reasonably foreseeable, then a Consistency Determination will be submitted to the State CZMP at least 90 days prior to taking any action. The Consistency Determination must include a detailed description of the activity, its expected coastal effects, and an evaluation of the proposed activity in light of applicable enforceable policies in each State's CZMP. If there are no effects, the NOAA Fisheries can provide a Negative Determination. Each State CZMP has 60 days to concur with or object to the Consistency Determination. If the State agrees with the Consistency Determination, then the NOAA Fisheries may proceed immediately with their action. If the State objects, the State must describe how the proposed activity is inconsistent with enforceable CZMP policies. Early contact with State CZMPs should be directed toward resolving any differences.

7.6 Endangered Species (16 U.S.C. Section 1531 et seq.)

The Endangered Species Act (ESA) protects animals and plants threatened with extinction. When a project is proposed that affects a listed threatened or endangered species, the ESA requires all regulatory agencies to consult with the Fish and Wildlife Service (or NMFS) prior to issuing any permit or taking any other action that would harm the listed species. Once a species is listed, the ESA prohibits the 'taking' of that species by direct or indirect actions. The definition of 'taking' may include harming that species through destruction of habitat. The FWS or NMFS complete a formal consultation report after determining the impact of the project on that species and recommend measures, that may include denial of the permit, to reduce or eliminate the threat posed by the project or activity. A consultation will be conducted by the Southeast Region's Protected Resources Division on this FEIS.

Although no species managed under the seven Gulf of Mexico are listed as threatened or endangered, four species are on the NMFS candidate list of species for possible future listing. These species are speckled hind (*Epinephelus drummondhayi*), Goliath grouper (formerly known as jewfish) (*E. itajara*), Warsaw grouper (*E. nigritus*), and Nassau grouper (*E. striatus*).

Species presently listed under the ESA, which occur in the regularly Gulf include sperm whales, fin whales, West Indian manatees, five species of sea turtles (green, hawksbill, Kemp's ridley, leatherback, and loggerhead), Gulf sturgeon, and smalltooth sawfish (see Section 3.2.6). Listed species which occur rarely and are believed to be strays include right whales, blue whales, sei whales, and humpback whales.

7.7 Marine Mammal Protection Act (16 U.S.C. 1361 et seq.)

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.

The MMPA requires all commercial fisheries to be placed in one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals in each fishery. Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing; Category II designates fisheries with occasional serious injuries and mortalities; Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities. The Gulf of Mexico Federal fisheries are presently all listed as Category III fisheries with the following exceptions. The Gulf of Mexico gillnet fishery is a Category II fishery based on documented interactions with Gulf of Mexico stocks of bottlenose dolphins (69 FR 153, August 10, 2004). The Gulf of Mexico gillnet fishery includes the Gulf of Mexico inshore gillnet, Gulf of Mexico coastal gillnet, and the Gulf of Mexico king and Spanish mackerel gillnet fisheries." The Gulf of Mexico king and Spanish mackerel fisheries are managed under the Coastal Migratory Pelagic Resources FMP.

Although it is a state fishery, the menhaden fishery is listed as a Category II. The Gulf of Mexico large pelagics longline fishery is listed as a Category I based on interactions with a number of whale and dolphin species. The Gulf of Mexico butterfish trawl, coastal shrimp trawl, Florida west coast sardine purse seine, Florida spiny lobster trap/pot, and blue crab trap/pot fisheries, while listed as a Category III fishery, do have documented marine mammal takes.

7.8 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires all Federal actions to be evaluated for potential environmental and human environment impacts, and for these impacts to be assessed and reported to the public. NEPA also requires us to consider a reasonable range of alternatives, as described in Section 2 of the EFH FEIS (GMFMC 2004). As it applies to the formulation of fishery management plans, the NEPA process should ensure that the potential environmental ramifications of actions determined necessary to manage a fishery are fully considered. Thus, proposed regulations that may set size or bag limits, limits on the number of permits or vessels, quotas, allowable gears, closed seasons or areas and any other measure is reviewed for its potential effect on the broader marine environment, in addition to its effect on the specific fishery being managed.

Councils may initially conduct an Environmental Assessment (EA), which is a concise statement that determines whether the FMP (and subsequently any proposed amendment to the plan) will have a significant impact on the environment. If there is no potential significant impact, a "Finding of No Significant Impact," or FONSI, is issued.

If there is a determination that the action will result in a significant impact, then a full Environmental Impact Statement (EIS) is required. In this determination, the GMFMC must consider the context and intensity of the action or activity, both short term and long term effects, impacts that may be beneficial or adverse, and effects on locality and society as a whole. Generally, the EIS is drafted concurrently with the FMP/FMP amendment and lays out the proposed action(s), alternatives to the proposed action(s), and the environmental consequences for each alternative. The Draft EIS (DEIS) is provided to the EPA and noticed in the *Federal Register*. The 45-day public comment period on the DEIS generally occurs in association with the public comment period on the associated draft FMP/FMP amendment. The FEIS is submitted to the Secretary of Commerce along with the FMP/FMP amendment for final approval.

The DEIS for the Generic Essential Fish Habitat Amendment to the seven Gulf of Mexico fishery management plans was published on August 29, 2003 in the Federal Register (FR), p.52019, and was given a rating of EC-2 by EPA. The FEIS was published on June 25, 2004, FR, p.35598, and the Record of Decision Notice of Availability (ROD NOAA) was published July 29, 2004, FR, p.45307

7.9 Executive Orders

7.9.1 E.O.12612: Federalism

The Executive Order on Federalism requires agencies in formulating and implementing policies that have federalism implications, to be guided by the fundamental Federalism principles. The Order serves to guarantee the division of governmental responsibilities between the national government and the States that was intended by the framers of the Constitution. Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people. This Order is relevant to FMPs and amendment given the overlapping authorities of NOAA Fisheries, the States, and local authorities in managing coastal resources, including fisheries, an the need for a clear definition of responsibilities. It is important to recognize those components of the ecosystem over which fishery managers have no direct control and to develop strategies to address them in conjunction with appropriate State, Tribes and local entities (international too).

No Federalism issues have been identified relative to the actions proposed in this amendment. Therefore, a Federalism consultation under Executive Order 12612 is not necessary.

7.9.2 E.O.12630: Takings

The Executive Order on Government Actions and Interference with Constitutionally Protected Property Rights, which became effective March 18, 1988, requires that each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and

legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment. Management measures limiting fishing seasons, areas, quotas, fish size limits, and bag limits do not appear to have any taking implications. There is a takings implication if a fishing gear is prohibited, because fishermen who desire to leave a fishery might be unable to sell their investment, or if a fisherman is prohibited by federal action from exercising property rights granted by a state.

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

This Executive Order requires that federal agencies conduct their programs, policies and activities in a manner to ensure that individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. Impacts of commercial and recreational fishing management on subsistence fishing are a concern in fisheries management, however there is no direct impact from these proposed actions on subsistence fishing.

7.9.4 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 evaluating the effects of federally-funded, permitted, or authorized actions on aquatic systems and recreational fisheries, and documenting those effects. The intent of identifying EFH is to help promote the protection and restoration of habitats essential to all federally managed fish, and thus should have a positive impact in the long term to recreational fishing.

8 Other Implications for Management

8.1 Scientific Data Needs

Section 4.4 of the EFH FEIS (GMFMC 2004) provides a detailed overview of research needs and conservation recommendations to address two main objectives:

- improving the understanding of the relationships between species productivity and habitat structure and function to provide Level 3 and 4 information for better precision of the identification of EFH and HAPC; and

- improving the quality of data and understanding of how fishing (and non-fishing) impacts affects the function of habitat.

For the first objective, research is needed to provide knowledge of the ecological processes that affect energy flow leading to fish productivity and responses of living marine resources to habitat and environmental changes. This must be linked with information on the health, distribution, and abundance of ecologically important organisms. Understanding the ecological linkages to the production of fishery stocks will allow better management of living marine resources and their Essential Fish Habitat (EFH). Two modeling projects, one in Florida and the other in Texas, designed to quantify the relationship between estuarine species and habitat are under way for the GOM (Rubec *et al*. 1998, in press; Clark *et al*. 1999). Both use seasonal fishery-independent monitoring of abundance of different life stages in combination with environmental data summarized in seasonal (i.e., salinity, temperature) or overall (i.e., vegetated/non-vegetated, depth) patterns. Both studies use predictive models and Geographical Information Systems (GIS) to test fish-habitat relationships. Several institutional programs exist for obtaining fishery data filling in data gaps. These include:

- RecFIN and ComFIN programs (the Fishery Information Network) to collect Gulf-wide recreational and commercial fishery data;
- Annual Gulf of Mexico Operations Plan, through which the GMFMC and NMFS set priorities and a research program to reach them;
- Periodic reviews of stock assessment procedures, which recently resulted in a Stock Assessment Improvement Plan; and
- Implementation of the NOAA Fisheries Habitat Research Plan developed in 1996.

Detailed descriptions of these programs and plans are provided in Section 4.4 of the EFH FEIS (GMFMC 2004) and are included here by reference.

One of the main requirements to meet the second objective is better data on fishing effort. To determine the impacts to habitat from fishing, it is necessary to have fishing effort data broken down by location on as fine a scale as possible, preferably haul-by-haul, including start and end points for deployed gears. Haul-by-haul data would allow detailed analyses of the proportion of each habitat type actually impacted, and the proportion and frequency of repeat impacts on the same patch of habitat compared to the proportion of impacts on virgin habitat. Effort data for the Gulf of Mexico are available only in an aggregated form, on a trip-by-trip basis. Multiple trips are usually assigned to one of the 21 NOAA Fisheries statistical grid units, or depth sub-divisions within that grid in the case of shrimp trawls. Haul-by-haul data are not available, and therefore the analysis of fishing impacts is restricted to a relatively low level of precision.

The introduction of recording effort data on a haul-by-haul basis, through the use of logbooks (paper or, better still, electronic) would be a major step forward in the analysis of fishing impacts on habitat. An experimental electronic logbook program was conducted for two years by LGL, covering several vessels (some randomly chosen, some not). The preliminary conclusions are that this type of management tool is much more effective in measuring and locating shrimp fishing effort more precisely than the current trip information program used by NOAA Fisheries (Gallaway *et al.* 2003a, 2003b).

Another source of fine-scale fishing effort data is automated vessel monitoring systems (VMS). These systems can record information on vessel position, speed, heading, and a variety of other important parameters that characterize the activity of fishing vessels. While vessel position does not precisely tally with location of fishing gear, data from VMS would go a long way towards enabling a more realistic and accurate portrayal of the interaction between fishing gears and fish habitat.

The SEFSC is funding five projects on the effects of fishing on fish habitat: 1) a study of trawled versus untrawled areas of the western GOM; 2) impacts of lobster traps in the Florida Keys; 3) impacts of finfish traps in the Florida Keys, Puerto Rico, and the Virgin Islands; 4) evaluation of trolling on benthic reef populations; and 5) evaluation of the fish population structure of no-use marine reserves versus control areas where fishing is allowed.

In early November 2000, NMFS hosted a workshop on the effects of gear on essential fish habitat (EFH) to develop a five-year research program on a multi-agency/institution approach. At the meeting, it was concluded that the Tortugas North Marine Reserve would be an ideal area to assess recovery from trawling since trawling had occurred in the area since the mid-1950s. The Tortugas Sanctuary, where trawling has been prohibited, could be contrasted to adjacent areas where trawling is occurring.

Overall, the two most important needs for obtaining adequate data are research vessel surveys designed to produce fishery-independent indices of abundance and to collect related information on spatial and temporal distributions, associated species, habitat, and oceanographic variables; and observer programs that provide information on species composition, amounts of each species kept and discarded, and fishing effort.

To be able to predict organism and habitat response to perturbation, as well as for predicting recovery or restoration success, research is needed on the:

- structure, function, and linkages of natural ecosystems, and the role they play in the distribution, abundance and health of living marine resources;
- relationships between habitat and yield of living marine resources;
- cause-and-effect studies designed to evaluate responses of fishery resources and habitats to physical and chemical modifications (natural and man-made); and
- development of indicators to judge the status or health of an ecosystem, habitat or living marine.

8.2 Management Recommendations

The GMFMC and NOAA Fisheries recognize that managed species are dependent on the quantity and quality of their essential habitats, and it is therefore a policy of the GMFMC to conserve, protect, restore and develop (create) habitats upon which fisheries depend; to increase the extent of their distribution and abundance; and to improve their productive capacity for the benefit of present and future generations. Although the GMFMC and NOAA Fisheries do not manage fishery resources within state waters, they can make recommendations to the Gulf States to promote the protection of EFH.

8.2.1 Recommendations to minimize damage to EFH from fishing activities

States might consider seasonal and area restrictions on the use of specified equipment; equipment modifications to allow escapement of particular species or particular life stages (e.g., juveniles); prohibitions on the use of explosives and chemicals; prohibitions on anchoring or setting equipment in sensitive areas; or prohibitions on fishing activities that cause significant physical damage in EFH. Additional actions states might consider include closing areas to all fishing or specific equipment types during spawning, migration, foraging, and nursery activities; and designating zones for use as marine protected areas to limit adverse effects of fishing practices on certain vulnerable or rare areas/species/life history stages, such as those areas designated as HAPC. Other state actions might include, but are not limited to, limits on the take of species that provide structural habitat for other species assemblages or communities, and limits on the take of prey species.

8.2.2 Recommendations to minimize damage to EFH from non-fishing activities

8.2.2.1 Docks and Piers

Docks and piers, whether built over or floating on the water, are generally acceptable methods of gaining access to deep water and are generally more preferable methods than dredging. Docks and piers should be aligned to avoid existing oyster reefs, marsh grasses, and seagrass beds when possible. Pier walkways should generally be no wider than four feet. Terminal structures should be located in waters deep enough to avoid propwashing of bay bottoms. In areas where either submergent or emergent vegetation cannot be avoided, terminal structures should be limited to 6 feet in width and 20 feet in length to minimize shading impacts to vegetation. If vegetation is in the project area, additional appurtenances on terminal structures or walkways are not recommended. In non-vegetated areas shallower than 4 feet at mean high water (MHW), terminal structures should be limited to a maximum width of 8 feet and length of 20 feet. In non-vegetated waters deeper than -4 feet MHW, terminal structures should be limited to a maximum width of 10 feet and length of 30 feet. No boathouses should be constructed in waters less than -4 feet MHW. Boathouses should be designed without walls to allow sunlight to penetrate the water. Boathouses should be limited to a maximum width of 16 feet. Generally, only one boathouse per pier is recommended for single family residences. Community or group boathouses are preferred. Deck board spacing should be at least one inch to allow sunlight penetration to the water. If oyster reefs, seagrasses, or emergent marshes occur along the shoreline at the project site, parallel structures should not be built along the shoreline. These structures should be built in deeper offshore waters to avoid these resources. A walkway no wider than 4 feet should be utilized to access the deeper water structure. Decks parallel to the shoreline are generally not recommended. Piers should not be constructed within 50 feet of an existing oyster reef. Oyster reefs should be temporarily marked to help avoid impacts during construction. When possible, pilings should be jetted in by hand and the pier should be built out from land using the pier itself as a work platform or using small boats with small outboard motors while exercising extreme care to assure that no propwashing occurs. Support structures in contact with the water should be constructed of non-toxic material.

8.2.2.2 Boat Ramps

Boat ramps are necessary for public use of the Gulf of Mexico bays, and rivers. However, they should be designed to minimize direct and secondary impacts to aquatic resources. Sites should be located in the least environmentally sensitive areas along shorelines that do not support wetland vegetation or seagrasses and where adjacent waters have adequate navigational depths to avoid propwashing. Acceptable sites may include existing marinas, bridge approaches and causeways (with highway agency approval) where construction access channels already exist, and natural and previously created deep- water habitats. Sites should be restricted to areas that do not require dredging to gain access to navigable waters. When located close to seagrass beds and oyster reefs, adequate navigation channels must exist and should be clearly marked and maintained to avoid damage to these areas. Catchment basins for collecting runoff should be included as components of the site development plan. Adequate waste collection facilities should be required at public boat launching facilities. Clearing of brush, trees and riparian vegetation for construction of any component of the project should be avoided

8.2.2.3 Marinas

All marinas have potential to adversely affect aquatic habitats. These effects can be minimized through proper location and design. Marinas are best created from excavated uplands that are designed so that water quality degradation does not occur. Applicants should consider basin flushing characteristics and other design features such as surface and waste water collection and treatment facilities. Catchment basins for collecting and storing runoff should be included as components of the site development plan. Potential sites should be located in areas with suitable navigable depths to avoid dredging or propwashing and away from environmentally sensitive areas such as wetlands, seagrasses, shellfish beds, mud flats, and sandy beach areas. To protect water quality and to provide adequate flushing, turning basins and access channels should not create sumps or other slack-water areas and depths must not exceed those of the connecting waterbody. Consideration should be given to aligning access channels and configuring marinas to take full advantage of circulation from prevailing winds, with emphasis on the hottest months of the year. Permanent dredged material disposal sites (for use in initial and maintenance dredging) that do not impact wetland areas should be acquired. Suitable disposal alternatives include placing dredged material on uplands and using dredged material to create/restore wetlands. Projects that lack permanent disposal sites should not be authorized if maintenance dredging is needed and disposal sites/options are not available. Catchment basins for collecting and storing surface runoff should be included as components of the site development plan. Repair and support facilities should be equipped with hazardous material containment facilities so that biocides such as marine paints, oil and grease, solvents and related materials are not directly or indirectly discharged into the marina. Marinas with fueling facilities should be designed to include measures for reducing oil and gas spillage into the aquatic environment. Spill control plans are required when marina facilities hold more than 55 gallons of petrochemicals per The Oil Spill Prevention and Recovery Act of 1990. Facilities for the collection of trash are required. Where vessels with marine toilets will be moored, pump out facilities and notices regarding prohibition of sewage and other discharges are required.

8.2.2.4 Bulkheads and Seawalls

Bulkheads and other shoreline stabilization structures are used to protect adjacent shorelines from wave and current action and to enhance water access. These projects may adversely impact wetlands through direct filling, isolation, and increase of wave scour. Vegetation plantings, sloping (3:1) riprap or gabions are generally considered to be environmentally compatible as shoreline stabilization methods over vertical seawalls since they provide shoreline protection and also provide good quality fish and wildlife habitat. Riprap material should be clean and free of toxic substances. In areas where marsh exists along the shoreline, vertical structures are not recommended. Where vertical structures are proposed, they should be aligned at or landward of the mean high tide line and above wetland vegetation. Vertical structures should be constructed so that reflective wave energy does not scour or otherwise adversely affect adjacent essential fish habitat or adjacent shorelines. Submerged riprap material should be placed at the toe of bulkheads to protect the integrity of the bulkhead, reduce reflective wave energy, and provide hard substrate for aquatic organisms. Breakwaters should have openings that allow for fish ingress and egress and water circulation. Breakwaters constructed of riprap material with a minimum 3:1 slope are preferred in most cases in lieu of vertical wall structures.

8.2.2.5 Cables, Pipelines, and Transmission Lines

Excavation of wetlands or submerged lands is sometimes required for installing submerged cables, pipelines, and transmission lines. Construction may also require temporary or permanent wetlands filling. Crossings should be aligned along the least environmentally damaging route. Environmentally critical habitats such as submerged aquatic vegetation, oyster reefs, emergent marsh, sand and mud flats, and endangered species habitats should be avoided. Directional drilling, a technique that allows horizontal, subsurface placement of pipelines, is recommended for crossing sensitive wetland habitats, beaches, dunes, or navigation channels. Construction of permanent access channels should be avoided since they disrupt natural drainage patterns and destroy wetlands through excavation, filling, and bank erosion. Construction equipment should be limited to the minimum size necessary to complete the work. Shallow draft equipment should be employed so as to minimize impacts and eliminate the necessity of temporary access channels for construction equipment. The size of the pipeline trench proper should also be minimized. The push-ditch method, in which the trench is immediately backfilled, reduces the impact duration.

Where possible, excavated materials should be stored and contained on uplands. If storage in wetlands or waters cannot be avoided, alternating stockpiles should be used to allow continuation of sheet flow. Stockpiled materials should be stored on construction cloth rather than bare marsh surfaces, seagrasses, or reefs. Excavated wetlands should be backfilled with either the same material as removed or a comparable material that is capable of supporting similar wetland vegetation. Original marsh elevations should be restored. Topsoil and organic surface material such as root mats should be stockpiled separately and returned to the surface of the restored site. Adequate material should be used so that following settling and compaction of the material the proper pre-project elevation is attained. If excavated materials are insufficient to accomplish this, similar grain size material should be used to restore the trench to the required elevation. After backfilling, erosion protection measures should be implemented where needed to prevent EFH degradation and loss. Following backfilling of the trench, planting of the disturbed area may be

required in those areas previously supporting vegetation. Additional off-site mitigation actions may be required to offset unavoidable project impacts. Use of existing rights-of-way is generally preferred to lessen overall encroachment and disturbance of wetlands. Pipelines and submerged cables should be buried and maintained below the water bottom. Inactive pipelines and submerged cables are generally required to be removed unless they are located in environmentally sensitive areas (e.g. marsh, reef, seagrasses, etc.) or when they are located in the Gulf of Mexico and can be shown to present no safety hazard. If allowed to remain in place, pipelines should be properly pigged, purged, filled with seawater, and capped prior to abandonment in place.

If seagrasses or oyster reefs occur at or near the project site, silt curtains or other barriers should be used to reduce turbidity and sedimentation. These silt barriers should extend at least 100 feet beyond the limits of the seagrass beds or oyster reefs. If seagrasses and oyster reefs can not be avoided, pre- and post-construction surveys should be completed to determine project impacts and mitigation needs. Equipment access should be limited to the immediate project area. Tracked vehicles are preferred over wheeled vehicles. Consideration should be given to the use of mats and boards to avoid sensitive areas. Equipment operators should be informed to avoid environmentally sensitive areas, and they should be clearly marked to ensure that they are not traversed by equipment operators. Propwashing is not a recommended backfilling method.

8.2.2.6 Transportation

State and Federal highway agencies have the capacity to conduct advanced planning in association with road, causeway, bridge, and airport runway construction. To the extent possible, NOAA Fisheries Branch Office personnel should participate in early planning efforts. Since highway and airport projects are generally considered to be in the public interest and frequently require wetland crossings, identification of mitigation needs, and development of suitable mitigation plans should be undertaken early in the planning process. Pre-application meetings and site visits should be held before securing and committing resources to a preferred right-of-way. Roadways, railways, and airports should avoid wetlands. Where wetland crossings cannot be avoided, bridging should be used rather than filling, and the least environmentally damaging route, preferably along cleared, existing rights-of-way and road beds should be followed. Suitable erosion control and vegetation restoration methods should be used on bridge approaches. Span bridges are preferred over culverts because they do not disrupt flow. Structures should be designed and maintained to prevent shoaling and alteration of natural water circulation. Suitable erosion control and vegetation restoration should be implemented at wetland crossings. Construction of road improvement projects should follow the existing alignments. Existing causeway and fill areas should be used wherever possible. Clearing of riparian vegetation occurring along rivers, streams, and creeks, as well as brush and trees on the project site, should be avoided. Transportation facilities should be designed to accommodate other public utilities, thus avoiding the need for additional wetland alteration. An example would be using bridges to support transmission lines and pipelines. When possible, temporary board roads are encouraged in sensitive areas in lieu of fill roadways. Transportation facilities should be designed to direct runoff into retention ponds. Other guidelines for housing developments, drainage canals and ditches, and disposal of dredged material may be applicable.

8.2.2.7 Navigation Channels and Boat Access Canals

Construction and maintenance of navigation channels and boat access canals may cause severe environmental harm. In addition to direct habitat losses associated with wetland and deepwater excavation and filling, these activities may significantly modify salinity and water circulation patterns. These changes could greatly modify the distribution and abundance of living marine resources. Alignments of channels and access canals should utilize existing channels, canals, and other deep water areas to minimize dredging requirements. All canals and channels should be clearly marked to avoid damage to adjacent bottoms from propwashing. Alignments should avoid sensitive habitats such as oyster reefs, SAV, and emergent vegetation. Canals and channels should not cut through barrier beaches, barrier islands, or other Gulf shoreline protection features. Access channels and canals should be designed to ensure adequate flushing so as not to create low-dissolved oxygen conditions or sumps for heavy metals and other contaminants. Widths of access channels in open water should be minimized to avoid impacts to aquatic bottoms. In canal subdivisions, channels and canals within the development should be no deeper than the parent body of water and should be of a uniform depth or become gradually shallower inland. Residential canals and navigation channels should be aligned with prevailing summer winds to take advantage of wind driven circulation. Dredge depths should be no greater than necessary for navigation but should not exceed -6 feet MLW unless it can be clearly demonstrated that deeper draft vessels would be utilizing the channel or canal. Permanent dredged material disposal sites should be located in upland areas. Where long-term maintenance is anticipated, upland disposal sites should be acquired and maintained for the entire project life. Construction techniques (e.g. silt curtains) must minimize turbidity and dispersal of dredged materials into sensitive wetland areas (i.e. submerged grasses and shellfish beds). Channels and access canals should not be constructed in areas known to have high sediment contamination levels. If construction must occur in these areas, specific techniques, including the use of silt curtains, will be needed to contain suspended contaminants. Propwashing is not a recommended dredging method. To ensure adequate circulation, confined and dead-end canals should be avoided by utilizing bridges or culverts that ensure exchange of the entire water column. In general, depths should be minimized, widths maximized and canals oriented towards the prevailing summer winds to enhance water exchange. Consideration should be given to the use of locks in navigation channels and access canals which connect more saline areas to fresher areas. To the maximum extent practicable, all navigation channels and access canals should be backfilled upon abandonment and restored to as near pre-project conditions as possible. Plugs, weirs, or other water control structures may also be necessary as determined on a case-by-case basis. To the maximum extent possible, the timing of navigation channel maintenance should be confined to seasons when impacts on larval and juvenile fishes will be minimal. This period of time will vary among geographical areas and based on species life histories.

8.2.2.8 Disposal of Dredged Material

Disposal of dredged material can adversely affect wetlands and water quality if disposal sites are not properly sited and managed. Recognizing that most navigation channels and access canals require periodic maintenance dredging, it is important that long-range maintenance plans be developed and that they provide adequate storage capacity for the life of the channel or marina. Uncontaminated dredged material should be viewed as a potentially reusable resource and beneficial uses of these materials are encouraged. Materials that are suitable for beach

nourishment, marsh construction, or other beneficial purposes should be utilized for these purposes. Deposition of sand for beach renourishment should avoid burying or impacting hard bottom, seagrass, or other nearshore EFH areas. If disposal sites must be located near wetlands, they should be confined with levees and stabilized using vegetation, native hay mulch or other means to eliminate possible wind or water erosion or encroachment onto those wetlands. If no beneficial uses are identified, dredged material should be placed in contained upland sites. The capacity of these disposal areas should be used to the fullest extent possible. This may necessitate dewatering of the material or increasing the elevation of embankments to augment the holding capacity of the site. Techniques could be applied that render dredged material suitable for export, or for use in re-establishing wetland vegetation. Where possible, disposal area outfalls should be positioned so that they discharge into the dredged area or other sites with reduced biological/ecological significance and are not near public water supply intakes. When evaluating potential upland disposal sites, the possibility of saltwater intrusion into ground water and surrounding freshwater habitats should be assessed by the state water quality agency. Toxic and highly organic materials should be placed in impervious containment basins on uplands. Effluent should be monitored to ensure compliance with state and federal water quality criteria and measures should be incorporated to ensure that surface runoff and leachate from dredged material disposal sites do not enter aquatic ecosystems. Potential disposal sites should not contain trees and brush. The clearing of woody or native vegetation should be avoided when possible. Pipes used in the hydraulic dredging process should be placed and moved so as not to damage or destroy sensitive habitats. Where temporary impacts are unavoidable, the impact site should be restored to pre-project conditions as soon as possible.

8.2.2.9 Impoundments and Other Water-level Controls

Thousands of wetland acres are impounded each year in the southeastern United States for purposes such as waterfowl habitat creation, protection or management, mariculture, agriculture, flood control, hurricane protection, mosquito control, and control of marsh subsidence and erosion. Projects range in size from minor, such as repair of existing embankments, to large-scale marsh management projects where constructing dikes and water control structures may affect thousands of wetland acres. Proposals to impound or control marsh water levels should contain water management plans with sufficient detail to determine the accessibility of impounded areas to marine organisms and the degree to which detrital and nutrient export to adjacent estuarine areas will be affected. Proposals to impound or reimpound wetlands are unacceptable unless designed to accommodate (1) access and wetland use by marine fish and invertebrates and (2) continuation of beneficial biological interaction, such as nutrient exchange, and other similarly important physical and chemical interactions.

Water-development agencies sometimes propose impounding rivers, bayous, and tributaries for such purposes as flood control or creation of industrial, municipal, and agricultural water supplies. Activities of this type are usually unacceptable because associated alteration of the quality, quantity, and timing of freshwater flow into estuaries may cause large-scale adverse modification or elimination of estuarine and marine habitats. Such actions also may block fish and invertebrate migrations. Proposals to impound previously unimpounded tidal wetlands or to convert one wetland type to another would not be recommended and should be carefully reviewed. Special consideration should be given to the need for such projects to address adverse wetland impacts resulting from previous manmade hydrologic changes, such as canal induced

saltwater intrusion into fresh or low salinity marshes. Proposals to repair or replace water control structures and/or restore historical conditions should be carefully assessed.

Impoundment levees should only be constructed in wetland areas as part of approved water or marsh management plans or to prevent the release of pollutants. Water or marsh management plans should result in the overall benefit to all forms of fish and wildlife resources currently utilizing the area. Management plans that benefit a certain resource type while adversely impacting another type are not recommended. New water control structures will be assessed separately based on their individual merits and impacts, and in relation to the overall water or marsh management plan of which they are a part. In coastal marshes, new water control structures should be designed to ensure adequate ingress and egress of migratory marine organisms. Impoundments of rivers, bayous, and tributaries are not recommended if they adversely affect the quality, quantity, and timing of freshwater flows into estuaries or block the migration of fishery and wildlife resources. Levees should be planned and sited to avoid isolation or segmentation of wetland areas and systems. Hurricane and flood protection levees should be located in uplands when possible. They should be designed, operated, and maintained to minimize disruptions of existing hydrologic patterns, and to maximize the interchange of water, beneficial nutrients, and aquatic organisms between the enclosed wetlands and those outside the levee system. Borrow material for levee construction should not be taken from wetlands or other sensitive habitats. A monitoring plan for impoundments should be designed to ensure that the objectives of the management area are met and that non-target resources are not unacceptably impacted (e.g. fisheries, wildlife, vegetation, water quality, etc.). Without monitoring, measurement of positive and negative impacts, recommendations for plan revisions, or plan abandonment cannot be properly evaluated.

Estuaries are by definition bodies of water that receive freshwater inflows. Estuaries function as transition zones between the freshwater of a river and the saline environment of the sea. The estuaries of the Gulf of Mexico are highly productive ecosystems that support wildlife and managed fisheries species (such as red drum and shrimp) and contribute substantially to the economy of coastal areas (USEPA, 1994). Estuarine-dependent species comprise more than 95 percent of the commercial fishery harvests from the Gulf of Mexico, and many important recreational fishery species also depend on estuaries during some part of their life cycle. The ability of an estuary to function as a nursery depends upon the quantity, timing, and input-location of freshwater inflows (USEPA, 1994). Estuarine ecosystems are vulnerable to disturbances by man, primarily decreases in seasonal inflow caused by upstream withdrawals of riverine freshwater for agricultural, industrial, and domestic purposes; contamination by industrial and sewage discharges and agricultural runoff carrying pesticides, herbicides and other toxic pollutants, and eutrophication caused by excessive nutrient inputs from a variety of nonpoint and point sources.

8.2.2.10 Drainage Canals and Ditches

The potential for drainage canals to shunt polluted stormwater runoff and fresh water directly into tidal waters requires intermediate connection to retention ponds or wetlands. This allows natural filtration and assimilation of pollutants and dampening for freshwater surges prior to discharge into tidal waters. Canals that drain wetlands, special aquatic sites, or cause other adverse impacts are not recommended. Constructing upland retention ponds and other water

management features such as sheet-flow diffusers is encouraged. A retention pond or other pollution elimination/ assimilation structure may be required in uplands to intercept any effluent-containing materials that are toxic to marsh vegetation or other aquatic life. Excavated materials resulting from canal and retention pond construction should be placed and contained on uplands or used beneficially, such as in approved wetlands restoration or beach restoration projects. Proposed plans should be prepared in accordance with comprehensive flood plain management plan(s) and other plans such as wastewater management, drainage, etc. Applicants are encouraged to consult with the Environmental Protection Agency, Federal Emergency Management Agency, and appropriate state agencies to ensure that federal and state water quality standards are met. Runoff and erosion from agricultural lands should be minimized through the use of best management practices. Allowing natural vegetation to line drainage canals and ditches is encouraged. Vegetation is preferred to concrete lined ditches because it slows flood waters, binds sediments, prevents erosion, and provides fish and wildlife habitats. The clearing of brush, trees, and riparian vegetation for equipment access and/or project design should be avoided. Locating mosquito control ditches in wetlands should be discouraged. If built, they should be designed so that they do not drain coastal wetlands and should not allow for salt water to encroach into lower salinity wetlands. They also should be designed to avoid water stagnation, and they should provide access for aquatic organisms that feed on mosquito larvae. Use of innovative techniques such as rotary ditching, spray dispersal of dredged materials, and open-water marsh management should be encouraged.

8.2.2.11 Oil and Gas Exploration and Production

Exploration and production of oil and gas resources in wetlands usually have adverse impacts since excavation and filling are generally required to accommodate access and production needs. In open marine waters, dredging and filling is usually not necessary, but special stipulations are required to minimize adverse impacts to living marine resources.

Exploration and production activities should be located away from environmentally sensitive areas such as oyster reefs, wetlands, and seagrass beds. Air boats should be used instead of marsh buggies whenever possible. Upon cessation of drilling or production, all exploration/ production sites, access roads, pits, and facilities should be removed, backfilled, plugged, detoxified, revegetated, and otherwise restored to their original condition. A plan should be in place to avoid the release of hydrocarbons, hydrocarbon-containing substances, drilling muds, or any other potentially toxic substance into the aquatic environment and the surrounding area. Storage of these materials should be in enclosed tanks whenever feasible or, if not, in lined mud pits or other approved sites. Equipment should be maintained to prevent leakage. Catchment basins for collecting and storing surface runoff should be included in the project design. Exploration/ production activities and facilities should be designed and maintained in a manner that will maintain natural water flow regimes, avoid blocking surface drainage, and avoid erosion.

Activities in coastal marsh

Activities should avoid wetlands. Drilling should be conducted from uplands, existing drill sites, canals, bayous, or deep bay waters (> 6 feet), rather than dredging canals or constructing board roads. When wetland use is unavoidable, work in previously disturbed wetlands is preferable to work in high quality or undisturbed wetlands. Temporary roads (preferably board roads) to

provide access are more desirable than dredging canals because roads generally impact less acreage and are easier to restore than canals.

Regarding well sites, proposed road alignments and well pads should utilize upland or already disturbed marsh areas and should be no larger than necessary to conduct exploration/ production activities. All borrow material for the ring levees should come from within the leveed areas. Borrow pits for fill material should be dredged adjacent to and on alternate sides of the roads and should be no more than 500 feet long. Continuous borrow pits are to be avoided. Culverts or similar structures should be installed under the road at sufficient intervals to prevent blockage of surface drainage, tidal flow, and sheet flow (at least every 500 feet), with all culverts maintained open for the life of the roadway. Where possible, flowlines should be installed in the roadbed. All streams, bayous, etc., should be bridged or culverted to prevent alteration to the natural drainage patterns. If the well is a producer, the drill pad should be reduced to the minimum size necessary to conduct production activities and the disturbed area should be restored to pre-project conditions. Upon completion or abandonment of wells in wetlands, all unnecessary equipment should be removed and the area restored to pre-project elevations. The well site, various pits, levees, roads, and other work areas should be graded to pre-project marsh elevations and then restored with indigenous wetland vegetation. Abandoned canals frequently need plugging and capping with erosion-resistant material at their origin to minimize bank erosion and to prevent saltwater intrusion. In addition, abandoned canals will frequently need to be backfilled to maximize fish and wildlife production in the area and to restore natural sheet flows. Spoil banks containing uncontaminated materials should be backfilled into borrow areas or breached at regular intervals to re-establish hydrological connections.

Activities in the open bay

Maximum use should be made of existing navigable waters with sufficient width and depth for access to the drill sites. Environmentally sensitive areas such as oyster reefs and seagrass beds should be avoided when siting extraction facilities. Over-water storage facilities and structures are generally not recommended. Unnecessary equipment and structures should be immediately removed upon cessation of drilling or production. Oyster reefs and seagrass beds should be marked to assure that they are not traversed. Equipment access should be limited to the immediate project area. Equipment operators should be closely supervised to avoid damaging environmentally sensitive areas. Propwashing should be strictly avoided. No access channels or floatation canals should be constructed in areas containing seagrasses or oyster reefs if practical alternatives exist. An oil spill response plan should be developed and coordinated with federal and state resource agencies.

Activities on the continental shelf

Drill cuttings should be shunted through a conduit and discharged near the sea floor, or transported ashore. Drilling and production structures, including pipelines, generally should not be located within one mile of the base of a live reef. All pipelines placed in waters less than 200 feet deep should be buried to a minimum of three feet beneath the sea floor. Where this is not possible and in deeper waters where user-conflicts are likely, pipelines should be marked by lighted buoys and/or lighted ranges on platforms to reduce the risk of damage to fishing gear and the pipelines. Pipeline alignments should be located along routes that minimize damage to

marine and estuarine habitat. Buried pipelines should be examined periodically for maintenance of adequate earthen cover. All abandoned oil and gas structures must be cut off at least 15 feet below the mud line. If explosives are to be used, the NOAA Fisheries should be contacted to coordinate marine mammal and endangered species concerns. All natural reefs and banks, as well as artificial reef areas, should be avoided.

8.2.2.12 Other Mineral Mining/ Extraction

Proposals for mining mineral resources (sand, gravel, shell, phosphate, etc.) from or within 1,500 feet of exposed shell reefs and vegetated wetlands, and within 1,500 feet of shorelines should be carefully analyzed in relation to possible environmental impact to these habitats. Borrow sites should be chosen which are downcurrent of important coral resources, live hard bottom and seagrasses.

8.2.2.13 Sewage Treatment and Industrial Wastewater Disposal

Urbanization and high density development of coastal areas has resulted in a substantial increase in proposals to construct sewage treatment and discharge facilities in coastal wetlands. Since many of these facilities utilize gravity flow systems for movement of waste water and materials, wetlands and other low-lying areas are often targeted as sites for placement of treatment facilities. Since treatment facilities are not water dependent with regard to positioning, it is not essential that they be placed in wetlands or other fragile coastal habitats. Sewage treatment facilities should be constructed entirely in uplands. Discharges should be treated to meet State Water Quality Standards. Implementation of up-to-date methodologies for reducing discharges of biocides (e.g. chlorine) and other toxic substances is encouraged. Use of land treatment and upland disposal/storage techniques of solid waste should be implemented where possible. Use of vegetated wetlands as natural filters and pollutant assimilators for large scale wastewater discharges should be limited to those instances where wetlands have been specifically created for this purpose and the overall environmental and ecological suitability of such an action has been demonstrated. Discharging into open ocean waters is generally preferable to discharging into estuarine waters since discharging into estuarine waters has a higher potential to result in living marine resources contamination and nutrient overloading. Discharge points in coastal waters should be located away from critical habitats such as oyster reefs, marshes, sand and mud flats, seagrass beds. Proposals to locate outfalls in coastal waters must be accompanied by hydrographic studies that demonstrate year round dispersal characteristics and provide proof that effluents will not reach or affect fragile and productive habitats. Sewage outfalls should not be located near a public recreational facility.

Point-source discharges from commercial and industrial development and operations follow the same risks imposed for urban and suburban development. Industrial point-source-discharges are of greater concern because of their quantity and content. The recent problems with the disposal of acidic industrial wastewaters at the Piney Point Phosphate Plant in Palmetto, Florida provide a case in point. Industrial wastewaters can alter the diversity, nutrient and energy transfer, productivity, biomass, density, stability, connectivity, and species richness and evenness of ecosystems and the communities at the discharge points and further downstream (Carins, 1980). Growth, visual acuity, swimming speed, equilibrium, feeding rate, response time to stimuli, predation rate, photosynthetic rate, spawning seasons, migration routes, and resistance to disease

and parasites of finfish, shellfish, and related organisms also may be altered. In addition to direct effects on plant and animal physiology, pollution effects may be related to changes in water flow, PH, hardness, dissolved oxygen, and other parameters that affect individuals, populations, and communities (Carins, 1980). Some industries, such as paper mills, are major water users and the effluent dominates the conditions of the rivers where they are located. Usually, parameters such as dissolved oxygen, PH, nutrients, temperature changes, and suspended materials are the factors that have the greatest affect on EFH. The direct and synergistic effects of other discharge components such as heavy metals and various chemical compounds are not well understood, but preliminary results of research is showing that these constituents will be a major concern for the future. More subtle factors such as endocrine disruption in aquatic organisms and reduced ability to reproduce or compete for food are being observed (Scott *et al*., 1997).

8.2.2.14 Water Intakes and Discharges (including steam-electric plants and other water-dependent facilities)

Facilities that require substantial intake and discharge of water, especially heated and chemically-treated discharge water, are generally not suited for construction and operation in estuarine and near-shore marine environments. Major adverse impacts may be caused by impingement of organisms on intake screens; entrainment of organisms in heat-exchange systems or discharge plumes; and through the discharge of toxic materials in discharge waters. The GMFMC recommends that a species and site specific approach to identifying threats and proposing recommendations be utilized, especially with regard to cooling water intake structures.

"Once-through**"** cooling systems should not be located in areas such as estuaries, inlets, or small coastal embayments where fishery organisms are concentrated. Discharge points should be located in areas that have low concentrations of living marine resources, or they should consider incorporating cooling towers and other systems that employ sufficient safeguards to ensure against release of blow-down pollutants into the aquatic environment. Intakes should be designed to minimize impingement. Velocity caps that reduce horizontal intake/discharge currents should be employed and intake velocities across the intake screen should be determined that cause the least acceptable amount of mortality to marine organisms. Past studies have shown that intake velocities less than 0.5 feet per second across intake screens allow adequate protection for fishery resources. Because of this, some resource agencies have recommended this velocity restriction be incorporated into the Corps of Engineers permit conditions on past permit applications. Discharge temperatures (both heated and cooled effluent) should not exceed the thermal tolerance of the majority of the plant and animal species in the receiving body of water. The use of construction materials that may release toxic substances into receiving waters should be prohibited. The use of biocides (e.g., chlorine) to prevent fouling should be avoided and least damaging antifouling alternatives should be implemented. Intake screen mesh should be sized to avoid entrainment of most larval and post-larval marine fishery organisms. Acceptable mesh size is generally in the range of 0.5 to 0.7 mm and rarely exceeds 1.0 mm in estuarine waters or waters that support anadromous fish eggs and larvae. Because of this, some resource agencies have recommended this mesh size be incorporated into the Corps of Engineers permit conditions on past permit applications.

There is also concern over the potential impacts of proposed Liquid Natural Gas (LNG) flow-through processing facilities in waters of the Gulf of Mexico. These facilities take in large

volumes of water to warm LNG. For example, the Port Pelican Liquid Natural Gas (LNG) processing facility is proposed for coastal Louisiana in 25 m (83 ft) of water. During Phase II of its operation, it is projected to take in 176.4 million gallons of seawater per day or 64.4 billion gallons per year. The water will be used to warm the LNG and will undergo a temperature decrease of 11º C (20º F). The intake rate will be around 15 cm/sec (0.5 ft/sec), allowing most larger organisms to avoid impingement at the intake structures, but water passing through the facility will undergo mechanical, pressure, temperature, and chemical (NaOCl) shock. Some entrained eggs and larvae may survive any one of these adverse conditions (Cada et al. 1981, Muessig et al. 1988), but the combination of these stresses will be lethal to almost all organisms passing through the facility.

There is a special concern regarding the siting of flow-through facilities in or near estuarine passes. Most fishery organisms in the Gulf of Mexico use estuaries as nursery grounds, and eggs and larvae recruit into these areas through tidal passes. Locating facilities in or near these tidal passes will be especially damaging to fishery resources, since eggs and larvae of fishery species are often concentrated in these areas. Locating LNG facilities in shallow water also increases the proportional area of impact.

Based on an assessment of LNG facilities, the NOAA Fisheries Southeast Fisheries Science Center recommended that flow-through LNG systems in the Gulf of Mexico should be avoided in favor of closed loop systems. The negative impacts to fishery species and living marine resources in the Gulf from a single flow-through facility could be potentially severe, and cumulative impacts from multiple facilities were considered a threat to fishery resources.

8.2.2.15 Mariculture/ Processing

Recognizing that mariculture presents both potential benefits and negative impacts, it is the policy of the GMFMC to encourage environmentally responsible mariculture.

The GMFMC recommends that native species receive priority as candidate culture species. Exotics should be used only after thorough investigation has demonstrated no detrimental impacts on native species. The GMFMC opposes use of non-native species in mariculture systems unless demonstrated it has no detrimental impacts on native species. The sale of exotic shrimp as bait should be prohibited and an outreach program developed to educate sport fishers and shrimp retailers about the risks of spreading shrimp viruses and encourage retailers to label shrimp as to their point of origin. With respect to habitat, existing shoreline, bottom, and open-water habitats should be protected from physical alterations or degradation. Ingress and egress of native wild organisms in natural and public waters should not be impeded by physical or water quality barriers. Navigation in natural or public waters should not be impeded. The mariculture industry should demonstrate its stewardship of Gulf waters by actively educating its member institutions about the necessary regulations and permits; actively participating in cooperative research and monitoring to improve the understanding of mariculture's relationship to coastal and marine ecosystems; and participation in cooperative research to enhance knowledge of cultured species. Mariculture operations should be located, designed, and operated to reduce, prevent, or eliminate adverse impacts to estuaries and marine habitats and native fishery stocks. Impacts that cannot be eliminated must be fully mitigated in-kind. Mariculture operations should not produce nuisance, toxic, or oxygen-demanding conditions. Standard operating procedures

should contain methods to prevent escapement, accidental transport or release of cultured organisms. Mariculture facilities should be operated in such a manner that minimizes impacts to the local environment by utilizing water conservation practices and discharging effluent that protects existing designated use of receiving water. Mariculture facilities are responsible for developing, implementing, and monitoring best management practices to conserve water and improve effluent water quality. Mariculture activities should have procedures established that: prevent the importation or spread of pathogens or parasites; minimize impacts of disease outbreaks if they occur; and eliminate disease problems wherever possible. On-farm disease control programs should include the following minimum requirements: exclusive use of certified "specific pathogen free" shrimp, a multi-screen system to block escape sites; regular disease monitoring, and cessation of farm discharges when signs of disease are observed. A system similar to a Hazard Analysis Critical Control Point system should be developed and implemented by shrimp processing facilities, with the goal of preventing the spread of exotic shrimp viruses to wild and farmed shrimp.

8.2.2.16 Housing Developments

Housing developments sited along the waterfront have a great potential for adverse impacts to the aquatic environment and to human health if appropriate measures are not taken. Construction of canal subdivisions is discouraged. Such developments commonly result in the degradation of water quality and are often detrimental to fish and wildlife.

Housing developments should be restricted to upland areas. Fill should not be placed in wetlands or other special aquatic sites. Houses on pilings should not be constructed over wetlands or submerged lands. Waterfront housing developments should be situated so that sufficient water depths occur to avoid the need to dredge access channels. If access canals are needed, they should be routed from housing developments to the parent body of water by the shortest and least environmentally damaging courses. If a canal subdivision is planned, such developments may require: 1) a detailed hydrologic study including hydrologic and circulation patterns; 2) inclusion of methods to ensure adequate circulation; 3) inclusion of a water quality monitoring and reporting program; 4) designation of individual(s) to be responsible for the monitoring and reporting program; and 5) designation of a responsible party in the event of problems such as fish kills and contaminant spills. These individuals may be financially responsible for remediation measures. Canal depths for recreational craft should be no deeper than necessary for navigation, but not to exceed 6 feet below mean low water. Width of interior canals should be maximized (minimum 100 feet) in order to provide for better mixing of canal waters and water quality. Canals should be oriented with the predominant summer wind direction to maximize water exchange. Dredging only to obtain fill material is generally not recommended. A waste collection and treatment system infrastructure should be installed in coastal housing developments. The use of septic tanks is generally not a recommended method of waste disposal. Plans should be provided and coordinated with the County Health District for compliance with local and state regulations. Sewage treatment plant effluent or other point-source discharges should not be discharged directly into canal waters or other poorly circulating water bodies. Discharges into surface waters should be a sufficient distance from canals and other small or poorly circulating waterbodies to ensure that the effluent is not carried into these areas by currents. To prevent water quality degradation, surface drainage should be directed away from boat canals. In addition, an education program for residents should be considered which details

why grass cuttings, garbage or other debris should not be dumped into the canal waterways and advising them on the prudent use of fertilizers, herbicides, pesticides and other toxic substances.

8.2.2.17 Mitigation

Compensatory mitigation should be considered only after a project has been demonstrated to be water-dependent, has no feasible alternative, is clearly in the public interest, and all significant impacts are found to be unavoidable. Despite increasing use of mitigation to offset wetland and other losses, there are situations (e.g., projects affecting large, high-quality seagrass beds) where the affected habitats are of such enormous value that the anticipated adverse impacts cannot be offset. In these situations, mitigation should be used only after project relocation or abandonment are fully considered and rejected by the construction/ regulatory agency. Scientific literature suggests that created wetlands do not become functionally equivalent to nearby natural marshes for at least several years after construction. Therefore, it should not be assumed that wetlands created at a comparable acreage will fully mitigate the habitat values and functions of the impacted natural wetland.

Mitigation that restores previously existing habitats is more desirable and likely to succeed than that which seeks to create new habitat. The numerous impacted wetlands that exist in the southeast provide substantial opportunity for wetlands restoration. Restoration may be relatively simple, such as restoring tidal flows to an impounded wetland area, or more complex such as restoring dredged cuts and disposal areas. Restoration of adversely impacted emergent and, to a lesser degree, submerged vegetation is a feasible and recognized option when implemented in association with the services of experienced restoration personnel.

The creation of new wetland habitat involves conversion of uplands or, in some situations, submerged bottom to vegetated wetlands or another desirable habitat such as oyster reef. Generation of wetland habitat should not involve converting one valuable wetland type to another. For example, building emergent wetlands in shallow water is unacceptable unless it can be demonstrated that the site is insignificant with regard to habitat or water quality function(s) or it previously supported wetland vegetation and restoration is desirable in terms of the ecology of the overall hydrological unit (e.g., estuary). A quantitative, biologically-based evaluation should be employed to determine the proper amount of mitigation for each acre of habitat destroyed.

The created habitat should be vegetatively, functionally, and ecologically comparable to that which is being replaced. The principal exception would be those cases where a different habitat is shown to be more desirable based on overall ecological considerations. In no case should marine fishery productivity be diminished from that of the natural marsh that is removed in place of a man-made comparable marsh. Except in the case of overriding ecological considerations, the new site should be located as near as possible to the site that would be eliminated. In any event, the new site should be in the same estuarine system as the habitat that is being replaced. The replacement wetland should consider physical implications such as shoaling and existing circulation and drainage patterns. The habitat to be restored or created should be at least twice the (areal) size of that which would be adversely impacted. This requirement is designed to offset differences in productivity and habitat functions that may exist between established project site wetlands and newly developed replacement wetlands. This size difference also takes into account that the proposed wetlands creation project may fail. The configuration of replacement habitats is

determined by the ecological setting and physical factors such as existing drainage and circulation patterns. Consideration should be given to maximizing edge habitat and to the needs of desirable biota that may inhabit the site. A monitoring plan for a mitigation project site should be implemented to ascertain success rates and project design viability, at a minimum. Time frames of 3 to 5 years are recommended as minimum time frames to allow for project modifications and replantings, if needed.

8.2.2.18 Relative Sea Level Rise and Subsidence

In Louisiana, major public works projects are necessary to offset some of the wetland loss attributable to relative sea level rise and subsidence. Those projects would entail the diversion of freshwater and sediments from the Mississippi and, possibly, Atchafalaya Rivers. Diversions, while they could greatly reduce the loss of Louisiana coastal wetlands, could have negative social impacts by displacing fisheries from traditional fishing grounds. Perceived adverse fishery impacts have resulted in varying levels of resistance to diversion projects by some commercial and recreational fishers. However, many believe that without such major projects, the long-term sustainability of the affected estuarine-dependent fisheries is in clear jeopardy due to continued deterioration of fish habitat. Much less extensive mitigation could be achieved through dedicated dredging and beneficial use of spoil material to restore and renourish wetlands. Opportunities for wetland creation using spoil material are most viable in areas near Federally-maintained navigation channels and privately maintained canals.

8.2.2.19 Pipeline Construction

The best management option for pipeline construction [in wetlands] is to push the pipe under the marsh to eliminate negative impacts from using heavy pieces of equipment. From a cost and logistical viewpoint, this may not always be feasible, therefore measures need to be taken to prevent pipeline routes (particularly the pipeline ditch) from subsiding and/or eroding. One procedure is to periodically place sand-bag barricades to marsh elevation within the pipeline ditch to help combat tidal energies. In addition, surface barricades constructed from hay bales or silt fences could be placed at right angles across pipeline corridor strata to further minimize tidal and wave energies. Decreasing wave and tidal energies would help to minimize erosion and increase water clarity. One final technique would be to construct earthen soil plugs at locations where pipeline ditches intersect other ditches or canals. Plugging oil exploration canals in Louisiana proved successful in increasing submerged aquatic growth within the canal. Double-ditching alone is not sufficient to revegetate pipeline construction routes.

8.3 Vessel Safety

A determination of vessel safety with regard to compliance with 50 CFR 605.15(b)(3) was requested from the U.S. Coast Guard. Actions in this amendment are not expected to affect vessel safety.

9 Public Hearing Locations and Dates

The GMFMC held public hearings for the EFH Amendment on November 12, 2004 in Tampa, Florida and January 4, 2005 in Key West, Florida.

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Tables

Table 1 – Fishery closure areas previously designated by the Gulf of Mexico Fishery Management Council

Closure Area (see Figure 3.3.1 of EFH FEIS)	**Area (nm^2)**	**Gear Closure**	**Area Closure**	**Seasonal Closure**
Gulf-Wide Closures				
Stressed Area Closure	48,400	X	X	
Longline/Buoy Gear Closure		X	X	
Eastern Gulf	24,400			
Central/Western Gulf	47,900			
Total Gulf-Wide	**120,700**			
Florida Closures				
Tortugas Shrimp Sanctuary	3,652	X	X	
Southwest Florida Shrimp/Stone Crab Closure		X	X	X
State waters	2,562			
Federal waters	1,489			
Central Florida Shrimp/Stone Crab Separation Zones	174	X	X	X
Florida Middle Ground HAPC	348	X	X	
Tortugas South Marine Reserve	60		X	
Tortugas North Marine Reserve	90		X	
Madison/Swanson Marine Reserve	115	X	X	
Steamboat Lumps Marine Reserve	104	X	X	
Florida Total	**8,594**			
Texas Closures				
Cooperative Shrimp Closure		X	X	X
Initial 15 miles offshore	5,475			
200 miles	NA			
Flower Gardens Banks HAPC	41	X	X	
Texas Total	**5,516**			
Overall Total	**134,720**			

Table 2. Coral and Coral Reefs FMP (Gulf and South Atlantic Councils joint Plan)

Species in the Management Unit
corals of the class Hydrozoa (stinging and hydrocorals)
corals of the class Anthozoa (sea fans, whips, precious coral, sea pen, stony corals)

Note: The FMP does not list individual species comprising the management unit. The following species are referred to in the FMP as occurring in Gulf of Mexico and/or South Atlantic waters:

Class Hydrozoa
Order Milleporina (fire, stinging corals)
Millepora alcicornis
Millepora complanata
Millepora squarrosa
Order Stylasterina (hydrocorals)
Stylaster duchassaingi
Stylaster punctata
Distichopora foliacea
Piibothrus symmetricus

Class Anthozoa
Subclass Octocorallia
Order Stolonifera
Family Clavulariidae
Clavularia bathyblus
Sarcodictyon rubens
Sarcodicyon rugosum
Scleranthelia sp.

Order Telestacea (white encrusting soft corals)
Family Telstidae
Telesto corrallina
Telesto flavula
Telesto fruticulosa
Telesto nelleae
Telesto riisei
Telesto sanguinea
Telestula sp.

Order Alcyonacea (soft corals)
Family Alcynoniidae
Anthomastus agassizzi
Anthomastus grandiflora
Bellonella rubistella
Bellonella sp.
Nidalia occidentalis
Nidalia rigida
Family Nephtheidae
Psuedodrifa nigra
Family Siponogorgiidae
Neospongodes agassizii
Order Gongonaciea (horny corals, sea fans, whips, precious red coral)
Family Anthothelidae
Anthopodium rubens
Anthothela grandiflora
Anthothela tropicalis
Diodogorgia nodulifera
Erythropodium caribaeorum
Iciligorgia schrammi
Titanideum frauenfeldtii
Titanideum subserosum
Family Briareidae
Briarum asbestinum
Family Paragorgiidae
Paragorgia boschmai
Paragorgia sp.
Family Coralliidae
Corallium media
Corallium niobe
Family Acanthogorgiidae
Acanthogorgia aspera
Acanthogorgia schrammi
Family Paramuriceidae
Paramuricea placomus
Paramuricea sp.
Bebryce cinera
Bebryce grandis
Bebryce parastellata
Chinomuricas atlantica
Hynogorgia pendula
Muriceides sp.
Placogorgia mirabilis
Placogorgia tenuis
Placogorgia sp.
Caliacis nutans
Scleracis guadalupensis
Swiftia casta
Swiftia exerserta
Swiftia koreni
Swiftia pourtalesi
Thesea citrina

Thesea grandiflora
Thesea nivea
Thesea parviflora
Thesea plana
Thesea rubra
Thesea rugosa
Thesea solitaria
Trachymuricea kukenthali
Trachymuricea hirta
Villogorgia nigrescens

Family Plexauridae
Eunicea asperula
Eunicea calyculata
Eunicea clavogera
Eunicea fusca
Eunicea laciniata
Eunicea laxispica
Eunicea mammiosa
Eunicea knighti
Eunicea palmeri
Eunicea pinta
Eunicea knighti
Eunicea succinea
Eunicea tourneforti
Eunicella albatrossi
Eunicella modesta
Muricea atlantica
Muricea elongata
Muricea laxa
Muricea muricata
Muricea pendula
Muriceopsis flavida
Muriceopsis petila
Plexaura flexuosa
Plexaurella dichtotoma
Plexaurella nutans
Plexaurella grisea
Plexaurella pumila
Plexaurella fusifera
Pseudopterogorgia bipinnata
Pseudopterogorgia kallos
Pseudopterogorgia rigida
Pseudopterogorgia blanquillensis
Pseudopterogorgia acerosa
Pseudopterogorgia americana
Pseudopterogorgia hummelincki
Pseudopterogorgia ellsabethae
Pseudopterogorgia navia
Pseudoplexaura porosa
Pseudoplexaura crucis
Pseudoplexaura flagellosa
Pseudoplexaura wagenaari
Pterogorgia citrina
Pterogorgia anceps
Pterogorgia guadalupensis

Family Gorgoniidae
Gorgonia ventalina
Leptogorgia euryale
Leptogorgia medusa
Leptogorgia setecea
Leptogorgia stheno
Leptogorgia virgulata
Lophogorgia cardinalis
Lophogorgia hebes
Lophogorgia punicea

Family Ellisellidae
Ellisella atlantica
Ellisella barbadenensis
Ellisella elongata
Ellisella funiculina
Nicella americana
Nicella flagellum
Nicella schmitti
Nicella guadalupensis
Nicella obesa
Riisea paniculata

Family Chrysogorgiidae
Chrysogorgia desbonni
Chrysogorgia elegans
Chrysogorgia fewkesi
Radicipes gracilis
Trichogorgia viola

Family Primadae
Calllogorgia verticillata
Callogorida grimaldii
Plumarella aurea
Plumarella goesi
Plumarella pourtalesi
Thouarella aurea
Thouarella sp.
Calyptrophora trilepis
Narella pauciflora
Narella regularis
Narella versiuysi
Candidella imbricata

Family Isididae
Acanella arbuscula
Acanella eburnea
Keratoisis flexibilis
Keratoisis ornata
Lepidisis caryophyllia

- Lepidisis longiflora
- Chelidonisis aurantiaca
- Primnoisis humilis
- Family Keroeidadae
  - Lignella richardii
- Other Pennatulacea (sea pens)
- Family Anthoptilidae
  - Anthoptilum murrayi
  - Anthoptilum sp.
- Family Funiculinidae
  - Funiculina quadranularis
- Family Pennatulidae
  - Pennatula grandis
- Family Protoptilidae
  - Protoptilum thompsoni
- Family Kophobelemnidae
  - Kophobelemnon sp.
  - Sclerobelemmon theseus
  - Sclerobelemmon sp.
- Family Renillidae
  - Renilla reniformes
  - Renilla mulleri
- Family Scleroptilidae
  - Scleroptilum sp.
- Family Umbillulidae
  - Umbelllula guntheri
  - Umbelllula lindahlii
  - Umbelllula eloisa
  - Umbelllula sp. 1 (sensu Giammona)
  - Umbelllula sp. 2 (sensu Giammona)
  - Umbelllula sp. 3 (sensu Giammona)
- Family Virgulariidae
  - Acanthoptilum agassizii
  - Acanthoptilum oligacis
  - Acanthoptilum sp.
  - Scytatilum sp.
  - Stylatula antillarum
  - Stylatula elegans
  - Stylatula sp.
  - Virgularia presbytes
  - Virgularia sp.
- Subclass Zoantharia
- Order Scleractinia (stony corals)
- Family Astrocoeniidae
  - Stephanoenia michelinii
- Family Acroporidae
  - Acropora cervicornni
  - Acropora cervicornis
  - Acropora palmata
  - Acropora prolifera
- Family Agariciidae
  - Agaricia agaricites
  - Agaricia tenifolia
  - Agaricia lamarcki
  - Agaricia fragilis
  - Helioseris cucullata
- Family Faviidae
  - Favia fragum
  - Favia gravida
  - Diploria labyrinthiformis
  - Diploria clivosa
  - Diploria strigosa
  - Manicina aerolata
  - Colpophyllia amaranthus
  - Colpophyllia natans
  - Colpophyllia breviserialis
  - Cladocora arbuscula
  - Cladocora debilis
  - Montastrea cavernosa
  - Montastrea annularis
  - Solenastrea hyades
  - Solenastrea bournoni
- Family Procillopridae
  - Madracis myriaster
  - Madracis decactis
  - Madracis formosa
  - Madracis mirabilis
  - Madracis asperula
  - Madracis brueggemanni
- Family Portidae
  - Porites astreoides
  - Porites branneri
  - Porites porites
- Family Rhizangiidae
  - Astrangia astreiformis
  - Astrangia danae
  - Astrangia solitaria
  - Phyllangia americana
- Family Siderastreidae
  - Siderastrea radians
  - Siderastrea siderea
- Family Fungiidae
  - Fungiacyathus pusillus
  - Fungiacyathus symmetricus
  - Fungiacyathus crispus
- Family Oculinidae
  - Madrepora oculata
  - Madrepora carolina
  - Oculina arbuscula

Oculina varicosa
Oculina tenella
Oculina diffusa
Oculina robusta
Family Meandrinidae
Meandrina meandrites
Dichocoenia stellaris
Dichocoenia stokesi
Dendrogyra cylindrus
Family Mussidae
Mussa angulosa
Scolymia lacera
Scolymia cubensis
Isophyllia multiflora
Isophyllia sinuosa
Isophyllastrea rigida
Myceotphyllia lamarkiana
Myceotphyllia danaana
Myceotphyllia ferox
Myceotphyllia aliciae
Family Anthemiphylliidae
Anthemiphllia patera
Family Caryophyllidae
Caryophyllia berteriana
Caryophyllia horologium
Caryophyllia polygona
Caryophyllia cornuformis
Caryophyllia ambrosia caribbeana
Caryophyllia parvula
Concentrotheca laevigate
Layrinthocyathus facetus
Layrinthocyathus langi
Cyathoceras squiresi
Layrinthocyathus facetus
Layrinthocyathus langi
Oxysmilia rotundifolia
Trochocyathus rawsonii
Tethocyathus cylindraceus
Tethocyathus variabilis
Paracyathus pulchullas
Deltocyathus moseley
Deltocyathus calcar
Deltocyathus italicus
Deltocyathus eccentricus
Deltocyathus pourtalesi
Eusmilia fastigiata
Pourtalosmilia conferta
Rhozosmilia maculata
Stephanocyathus diadema
Stephanocyathus paliferus
Stephanocyathus laevifundus
Stephanocyathus coronatus
Tubastrea coscinea
Peponcyathus folliculus
Peponcyathus stimpsonii
Desmophyllum cristagalli
Thalamophyllia gombergi
Lophelia prolifera
Anomocora fecunda
Coenosmilia arbuscula
Dasmosmilia variegata
Solenosmilia variabilis
Asterosmila prolifera
Asterosmila marchadi
Phacelocythus flos
Family Flabellidae
Flabellum moseleyi
Flabellum fragile
Javania cailleti
Polymyces fragilis
Gardineria paradoxa
Family Guyniidae
Guynia annulata
Schizocyathus fissilis
Stenocyathus vermiformis
Pourtalocyathus hispidus
Family Dendrophylliidae
Balanophyllia floridana
Balanophyllia palifera
Dendrophyllia cornucopia
Dendrophyllia gaditana
Dendrophyllia alternata
Enallopsammia profunda
Enallopsammia rostrata
Thecopsammia socialis
Bathypsammia tintinnabulim
Bathypsammia fallosocialis
Rhizopsammia manuelensis
Trochopsammia infundibulum
Order Antipatharia (black corals)
Cirripathes desbonni
Cirripathes lutkeni
Cirripathes sp.
Antipathes pennacea
Antipathes lenta
Antipathes sp.
Parantipathes coumnaris

Table 3 – Description of the four levels of information potentially used to describe and identify EFH as defined in the EFH Final Rule

Layer	Possible units/information sources
Level 4: Production rates	Overall production rates can be calculated from growth, reproduction and survival rates. However, using this information to describe and identify EFH requires not only that production rates have been calculated, but also that they have been calculated for different patches of habitat that can then be distinguished from each other. According to the EFH Final Rule, at this level, data are available that directly relate the production rates of a species or life stage to habitat type, quantity, quality, and location. Essential habitats are those necessary to maintain fish production consistent with a sustainable fishery and the managed species' contribution to a healthy ecosystem.
Level 3: Growth, reproduction or survival rates	Similar to information on overall production rates; growth, reproduction, and survival rates can be used to describe and identify EFH. Growth, reproduction and survival rates would need to have been calculated for different patches of habitat that can then be distinguished from each other. According to the EFH Final Rule, at this level, data are available on habitat-related growth, reproduction, and/or survival by life stage. The habitats contributing the most to productivity should be those that support the highest growth, reproduction, and survival of the species (or life stage).
Level 2: Density	Relative density information may be available from surveys, or it could perhaps be inferred from catch per unit effort data, although only for those areas that have been fished. According to the EFH Final Rule, at this level, quantitative data (i.e., density or relative abundance) are available for the habitats occupied by a species or life stage. Because the efficiency of sampling methods is often affected by habitat characteristics, strict quality assurance criteria should be used to ensure that density estimates are comparable among methods and habitats. Density data should reflect habitat utilization, and the degree that a habitat is utilized is assumed to be indicative of habitat value. When assessing habitat value on the basis of fish densities in this manner, temporal changes in habitat availability and utilization should be considered.
Level 1: Distribution	Distribution information is available from surveys, catch/effort data, and evidence in the biological literature, including ecological inferences (e.g. - a habitat suitability index, HSI). According to the EFH Final Rule, distribution data may be derived from systematic presence/absence sampling and/or may include information on species and life stages collected opportunistically. In the event that distribution data are available only for portions of the geographic area occupied by a particular life stage of a species, habitat use can be inferred on the basis of distributions among habitats where the species has been found and on information about its habitat requirements and behavior. Habitat use may also be inferred, if appropriate, based on information on a similar species or another life stage.

Table 4 - Areas designated by the Proposed Actions as HAPC.

Site	Point	North latitude	West longitude	Area (nm^2)
Florida Middle Grounds	A	28 º 42.5’	84 º 24.8’	348.0
	B	28 º 42.5’	84 º 16.3’	
	C	28 º 11.0’	84 º 00.0’	
	D	28 º 11.0’	84 º 07.0’	
	E	28 º 26.6’	84 º 24.8’	
	A	28 º 42.5’	84 º 24.8’	
Tortugas North	A	24 º 40.0’	83 º 06.0’	90.0
	B	24 º 46.0’	83 º 06.0’	
	C	24 º 46.0’	83 º 00.0’	
	along the line denoting the seaward limit of Florida’s waters as shown on the current edition of NOAA chart 11438			
	A	24 º 40.0’	83 º 06.0’	
Tortugas South	A	24 º 33.0’	83 º 09.0’	60.0
	B	24 º 33.0’	83 º 05.0’	
	C	24 º 18.0’	83 º 05.0’	
	D	24 º 18.0’	83 º 09.0’	
	A	24 º 33.0’	83 º 09.0’	
Madison-Swanson Marine Reserve	A	29 º 17.0’	85 º 50.0’	115.0
	B	29 º 17.0’	85 º 38.0’	
	C	29 º 06.0’	85 º 38.0’	
	D	29 º 06.0’	85 º 50.0’	
	A	29 º 17.0’	85 º 50.0’	
		Northern Boundary	**Southern Boundary**	**Western Boundary**	**Eastern Boundary**	
Pulley Ridge		26 º 05’	24 º 40’	84 º 0’	83 º 30’	2300
Reef and Banks of NW GOM						
West Flower Garden Bank		27º55’22.8”	27º49’03.0”	93º53’09.6”	93º46’46.0”	35.8
East Flower Garden Bank		27º59’14.4”	27º52’36.5”	93º38’58.2”	93º34’03.5”	28.80
Stetson Bank		28º10’38.3”	28º09’18.6”	94º18’36.5”	94º17’06.3”	1.8
29 Fathom		28º09’22.7”	28º07’03.0”	93º30’23.4”	93º28’17.4”	4.3
MacNeil		28º02’34.9”	27º59’34.8”	93º31’46.2”	93º28’42.6”	8.1
Rezak Sidner Bank		28º00’05.4”	27º53’38.4”	92º24’48.6”	92º21’18.0”	20.0
Rankin Bright Bank		27º56’36.6”	27º49’33.6”	93º28’26.4”	93º15’25.2”	81.0
Geyer Bank		27º51’59.0”	27º47’16.8”	93º04’58.8”	93º01’49.3”	13.1
McGrail Bank		27º59’06.0”	27º55’55.5”	92º37’19.2”	92º32’17.4”	14.1
Bouma Bank		28º04’53.4”	28º01’29.2”	92º29’15.6”	92º25’35.4”	11.1
Sonnier Bank		28º21’30.6”	28º19’26.4”	92º28’38.0”	92º26’18.0”	4.3
Alderice Bank		28º05’54.8	28º04’01.4	92º01’47.3”	91º58’10.2”	6.0
Jakkula Bank		28º01’06.6”	27º57’09.0”	91º44’07.8”	91º34’06.6”	34.8

Table 5 - Areas designated by the Proposed Actions as having fishing restrictions.

Site	Point	North latitude	West longitude	Area (nm^2)
Tortugas North	A	24º 40.0’	83º 06.0’	90.0
	B	24º 46.0’	83º 06.0’	
	C	24º 46.0’	83º 00.0’	
	along the line denoting the seaward limit of Florida’s waters as shown on the current edition of NOAA chart 11438			
	A	24º 40.0’	83º 06.0’	
Tortugas South	A	24º 33.0’	83º 09.0’	60.0
	B	24º 33.0’	83º 05.0’	
	C	24º 18.0’	83º 05.0’	
	D	24º 18.0’	83º 09.0’	
	A	24º 33.0’	83º 09.0’	
Pulley Ridge (area closed to fishing)	A	24º 58’ 18’’	83º 38’ 33’’	103.8
	B	24º 58’ 18’’	83º 37’ 00’’	
	C	24º 41’ 11’’	83º 37’ 00’’	
	D	24º 40’ 00’’	83º 41’ 22’’	
	E	24º 43’ 55’’	83º 47’ 15’’	
	A	24º 58’ 18’’	83º 38’ 33’’	

	Northern Boundary	Southern Boundary	Western Boundary	Eastern Boundary	
West Flower Garden Bank	27º 55’ 22.8”	27º 49’ 03.0”	93º 53’ 09.6”	93º 46’ 46.0”	35.5
East Flower Garden Bank	27º 59’ 14.4”	27º 52’ 36.5”	93º 38’ 58.2”	93º 34’ 03.5”	11.0
Stetson Bank	28º 10’ 38.3”	28º 09’ 18.6”	94º 18’ 36.5”	94º 17’ 06.3”	1.4
McGrail Bank	27º 59’ 06.0”	27º 55’ 55.5”	92º 37’ 19.2”	92º 32’ 17.4”	6.0

Table 6 - Landings for the Gulf of Mexico and States for the Year 2000 (NMFS 2000)

Region or State	Thousand Pounds	Thousand Dollars
Gulf of Mexico	1,759,993	910,645
Florida, West Coast	79,415	155,200
Alabama	29,931	63,275
Mississippi	217,744	58715
Louisiana	1,344,913	401,095
Texas	87,990	232,400

Table 7 – Reef Fish Dealer Permits in the Gulf of Mexico in 2002 (NOAA Fisheries)

State	Number
Total permits	142
Florida (Gulf dealers)	68
Alabama	14
Mississippi	5
Louisiana	31
Texas	24

Table 8- Gulf of Mexico Fishing Community Vulnerability Index; The index score may also be consolidated into three general vulnerability categories of:

Not vulnerable (Index scores from 3 to 5)
Somewhat vulnerable (Index scores from -1 to 2)
Very vulnerable (Index scores from -5 to -2)

State	Community	Vulnerability Index Score
Alabama	Bayou La Batre	-3
	Dauphin Island	3
	Gulf Shores	3
	Orange Beach	-1
Florida	Apalachicola	-1
	Big Pine Key	4
	Bokeelia	-
	Carrabelle	-1
	Cedar Key	3
	Clearwater	1
	Cortez	1
	Crystal River	5
	Destin	5
	East Point	3
	Everglades City	4
	Ft. Myers Beach	5
	Ft. Walton Beach	1
	Gulf Breeze	5
	Homosassa	5
	Horseshoe Beach	0
	Inglis	-1
	Islamorada	4
	Key Largo	4
	Key West	4
	Madeira Beach	2
	Marathon	1
	Marco Island	5
	Matlacha	-
	Naples	5
	New Port Richey	1
	Panama City	1
	Panama City Beach	3
	Pensacola	1
	Port St. Joseph	0
	St. Marks	-1
	St. Petersburg	-
	Tampa	-
	Tarpon Springs	4
	Yankeetown	3
Louisiana	Cameron	-5
	Chauvin	-2
	Cutoff	1
	Delcambre	-1
	Dulac	-3
	Empire	-4
	Golden Meadow	-3
	Grand Isle	-3
	Houma	-3
	Morgan City	-1
	Venice	-3
Mississippi	Biloxi	0
	Gautier	-3
	Gulfport	1
	Pascagoula	-5
Texas	Aransas Pass	-1
	Brownsville	-1
	Freeport	-3
	Galveston	1
	Palacios	1
	Port Aransas	3
	Port Arthur	1
	Port Isabel	1
	Port Lavaca	-1
	Rockport	4
	Seadrift	-5
	South Padre Island	3

Figures

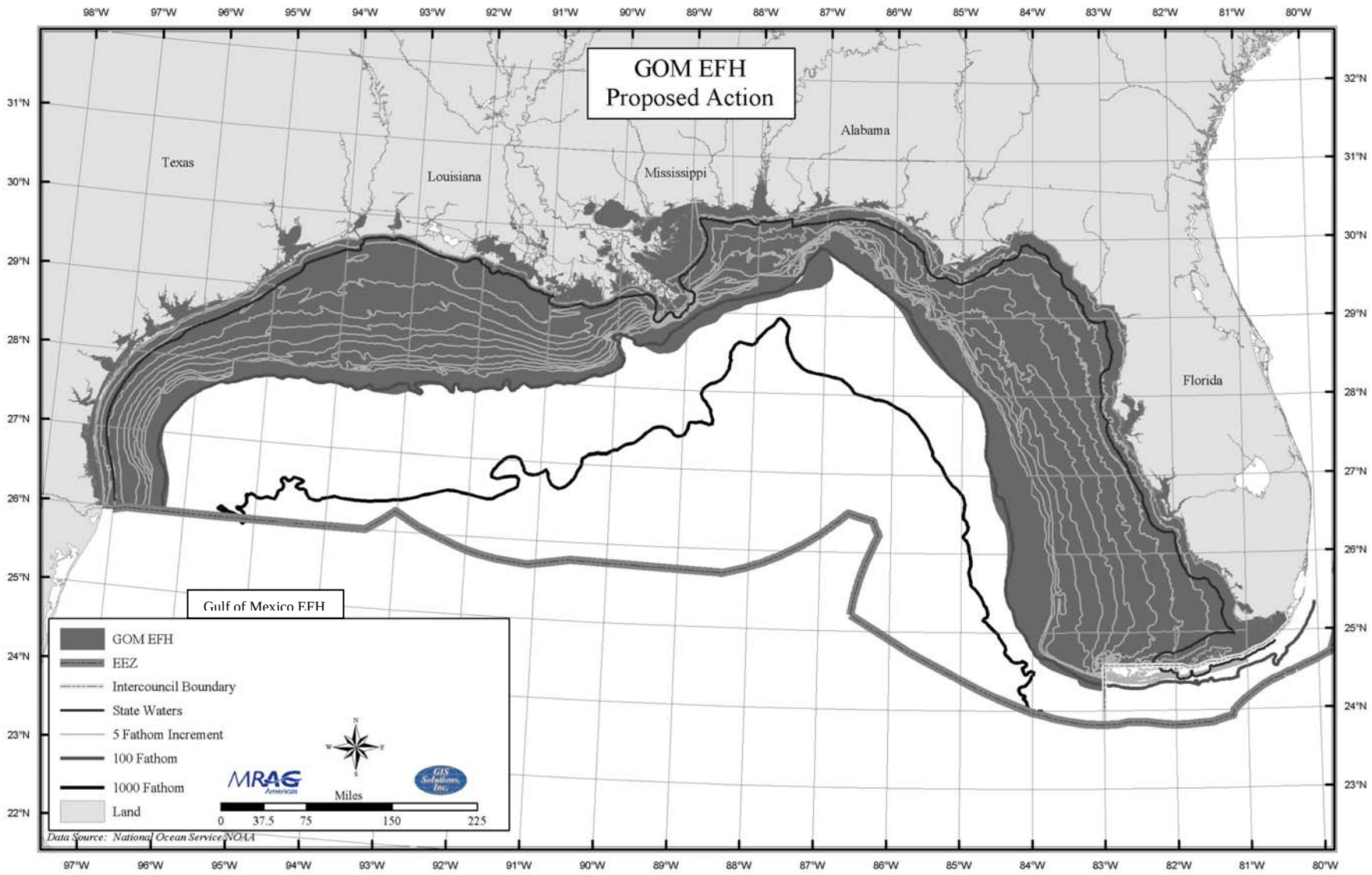

Figure 1. Composite EFH resulting from combining EFH for each of the seven fishery management plans for the Gulf of Mexico.

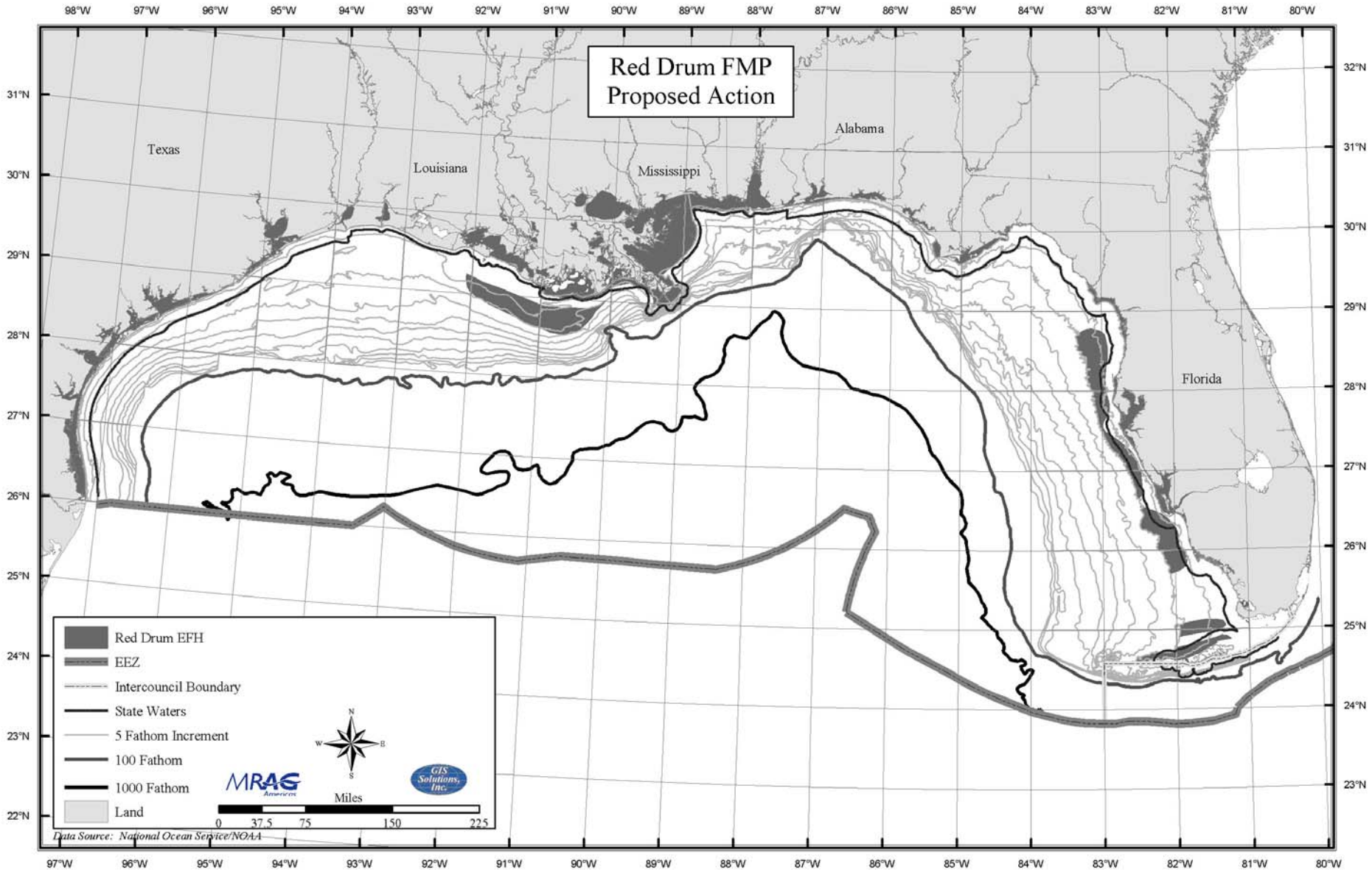

Figure 2. EFH for the Red Drum Fishery Management Plan.

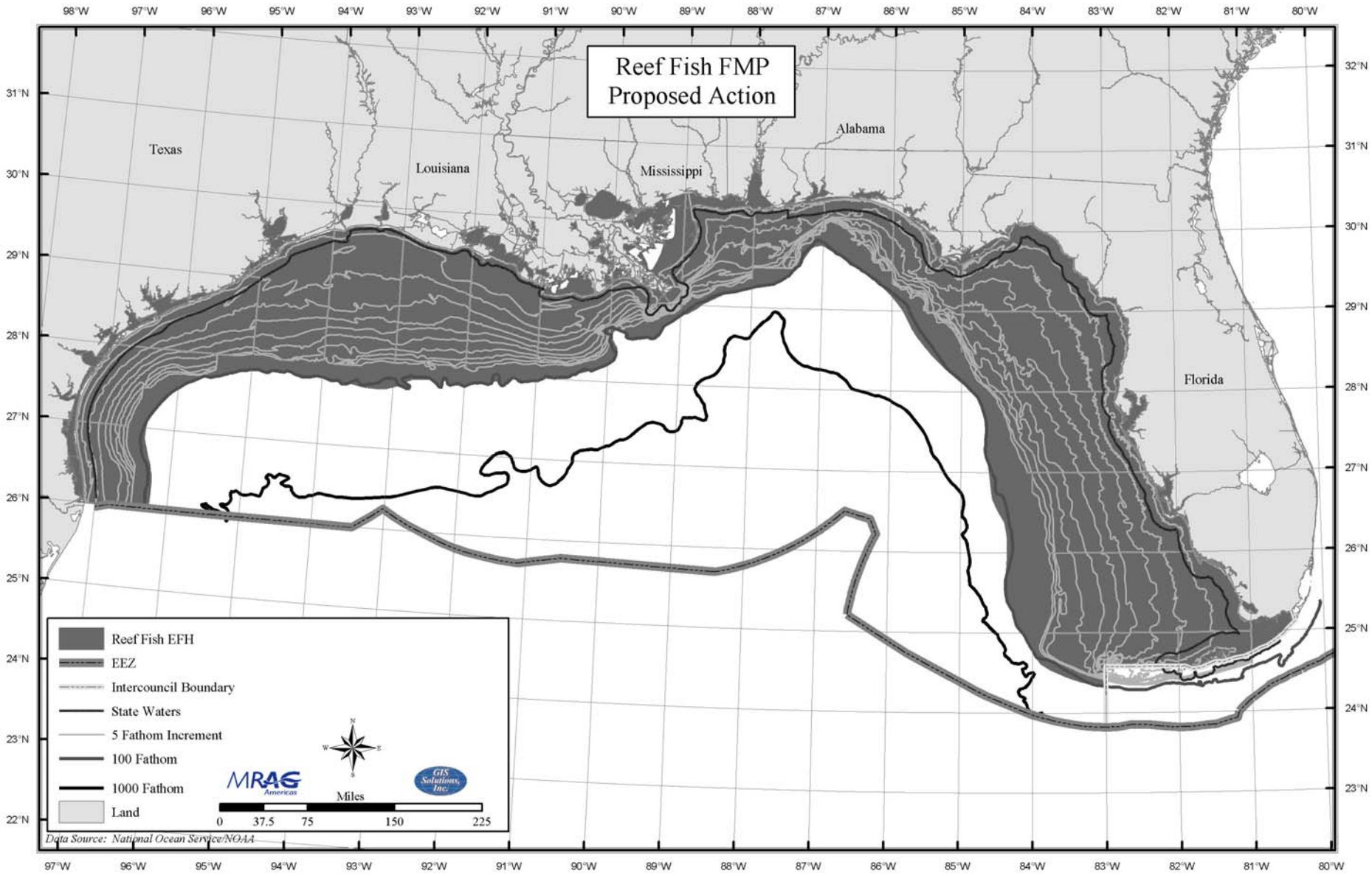

Figure 3. EFH for the Reef Fish Fishery Management Plan.

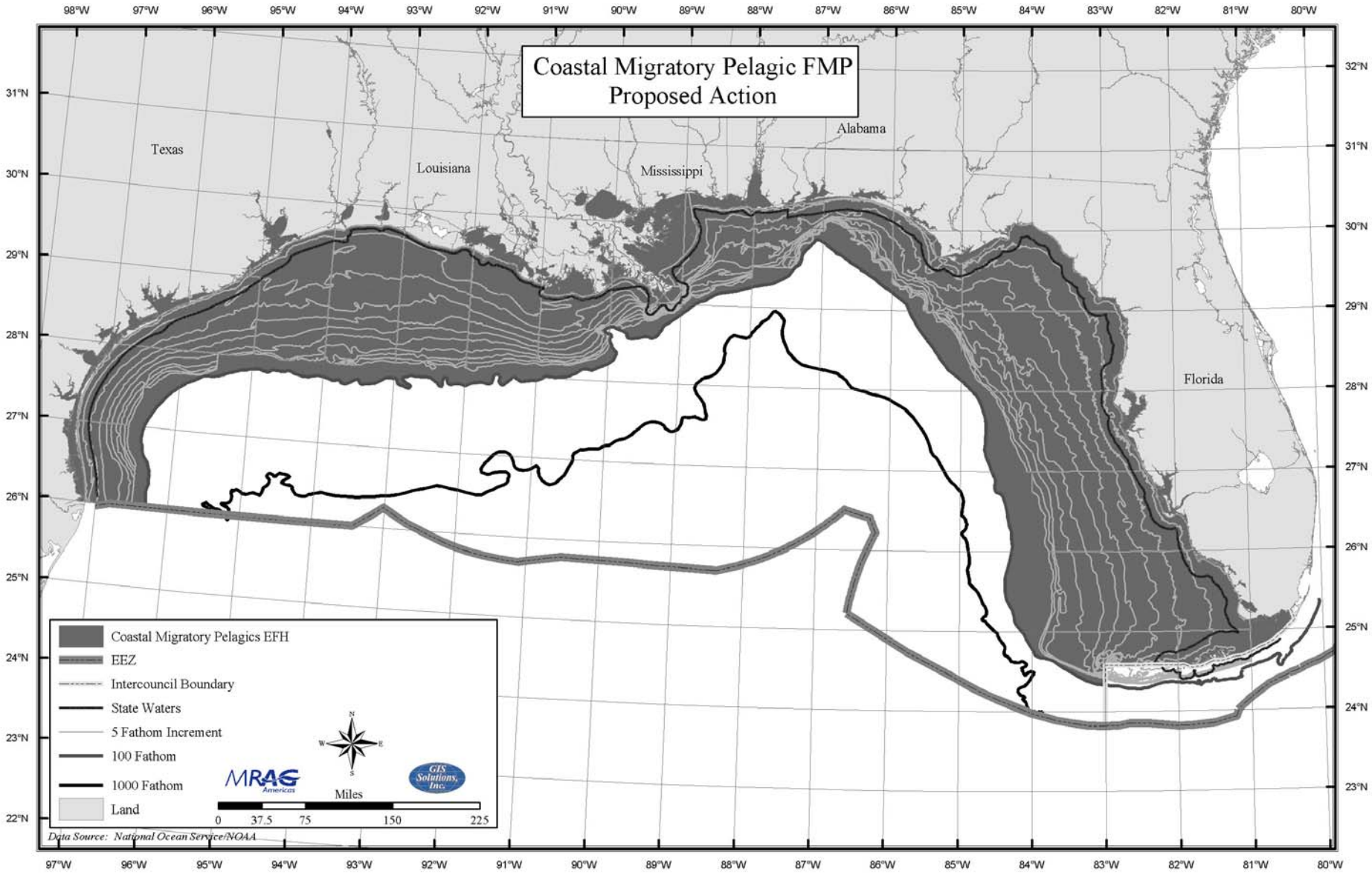

Figure 4. EFH for the Coastal Pelagics Fishery Management Plan.

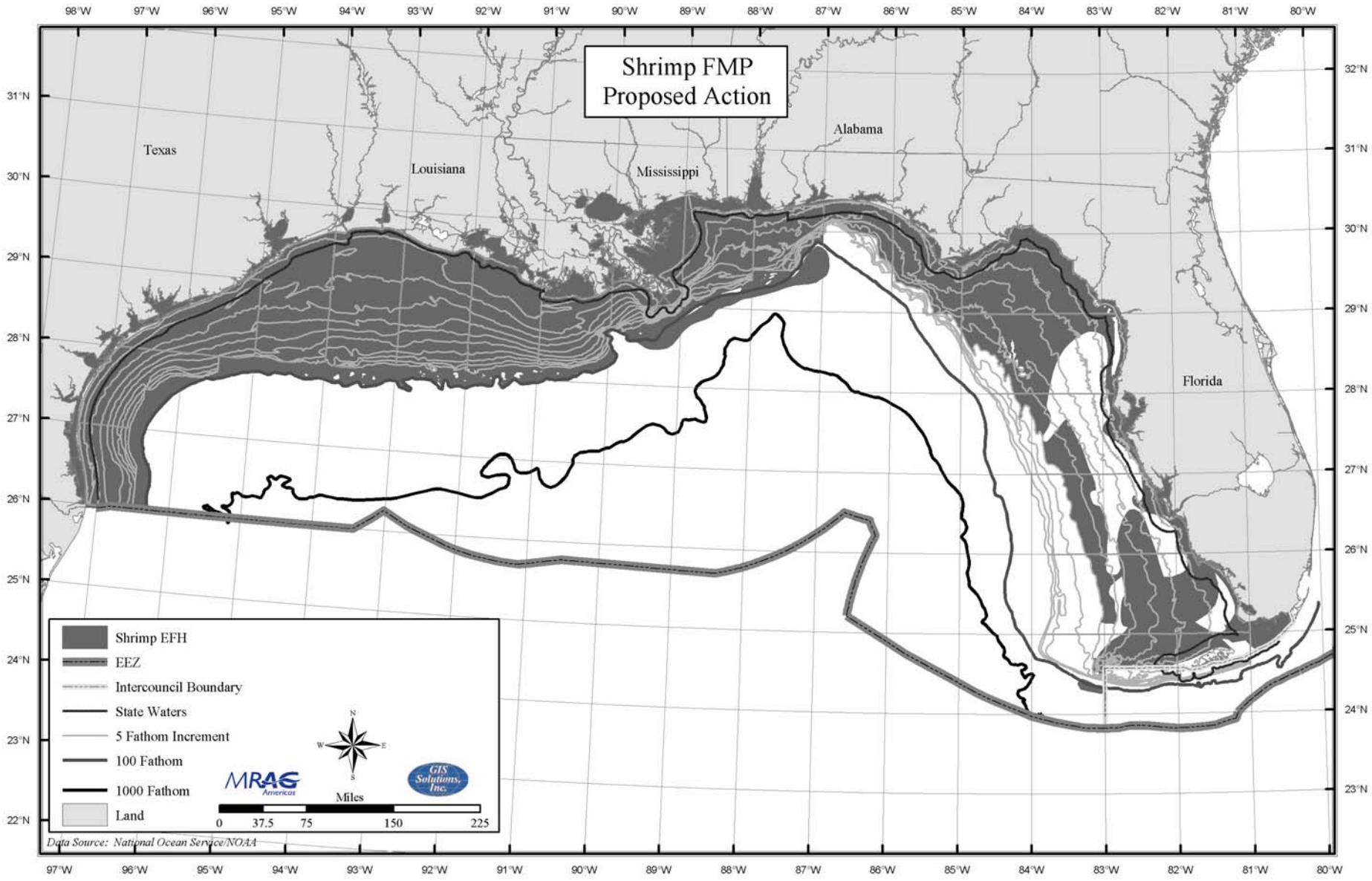

Figure 5. EFH for the Shrimp Fishery Management Plan.

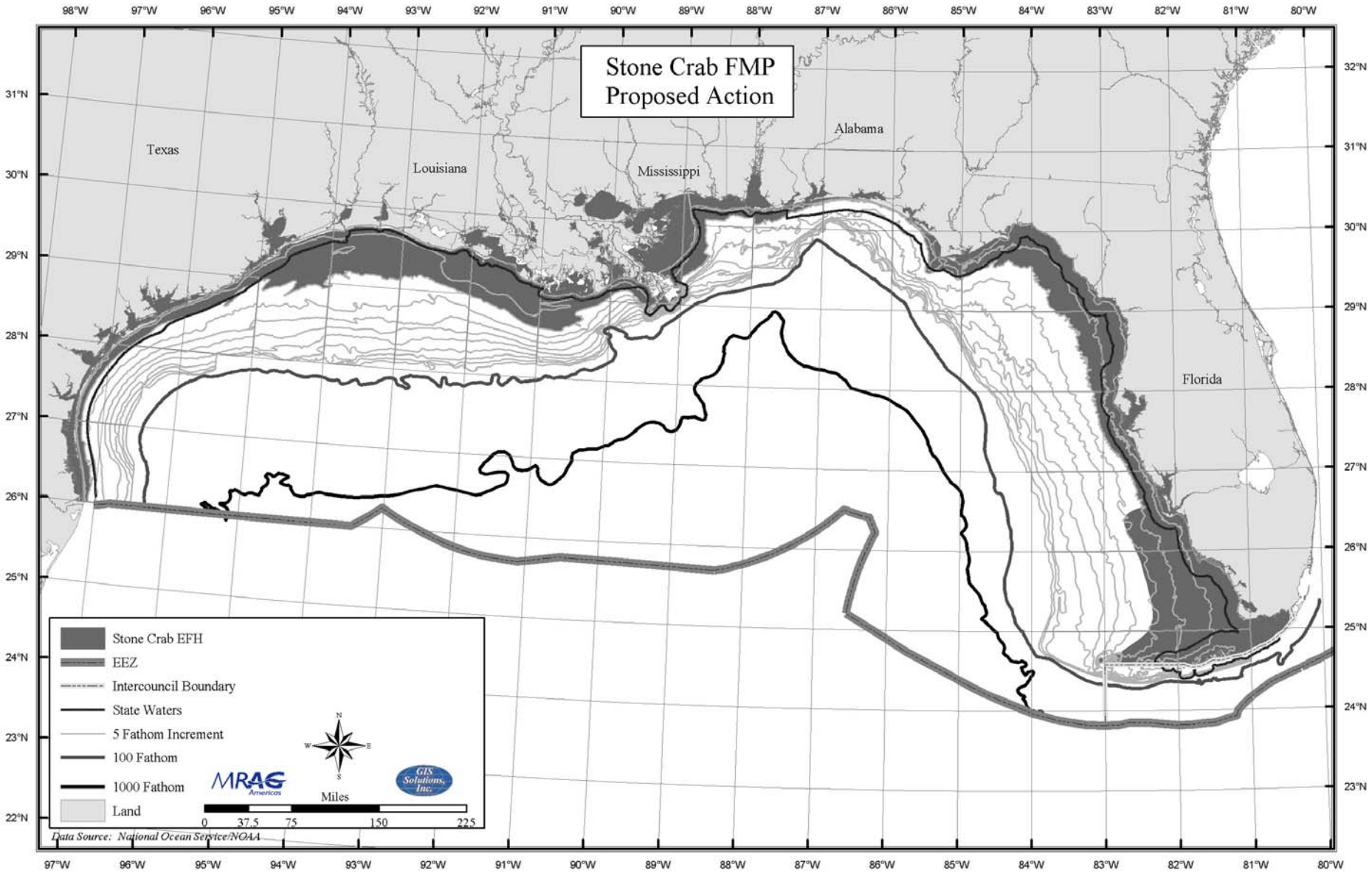

Figure 6. EFH for the Stone Crab Fishery Management Plan.

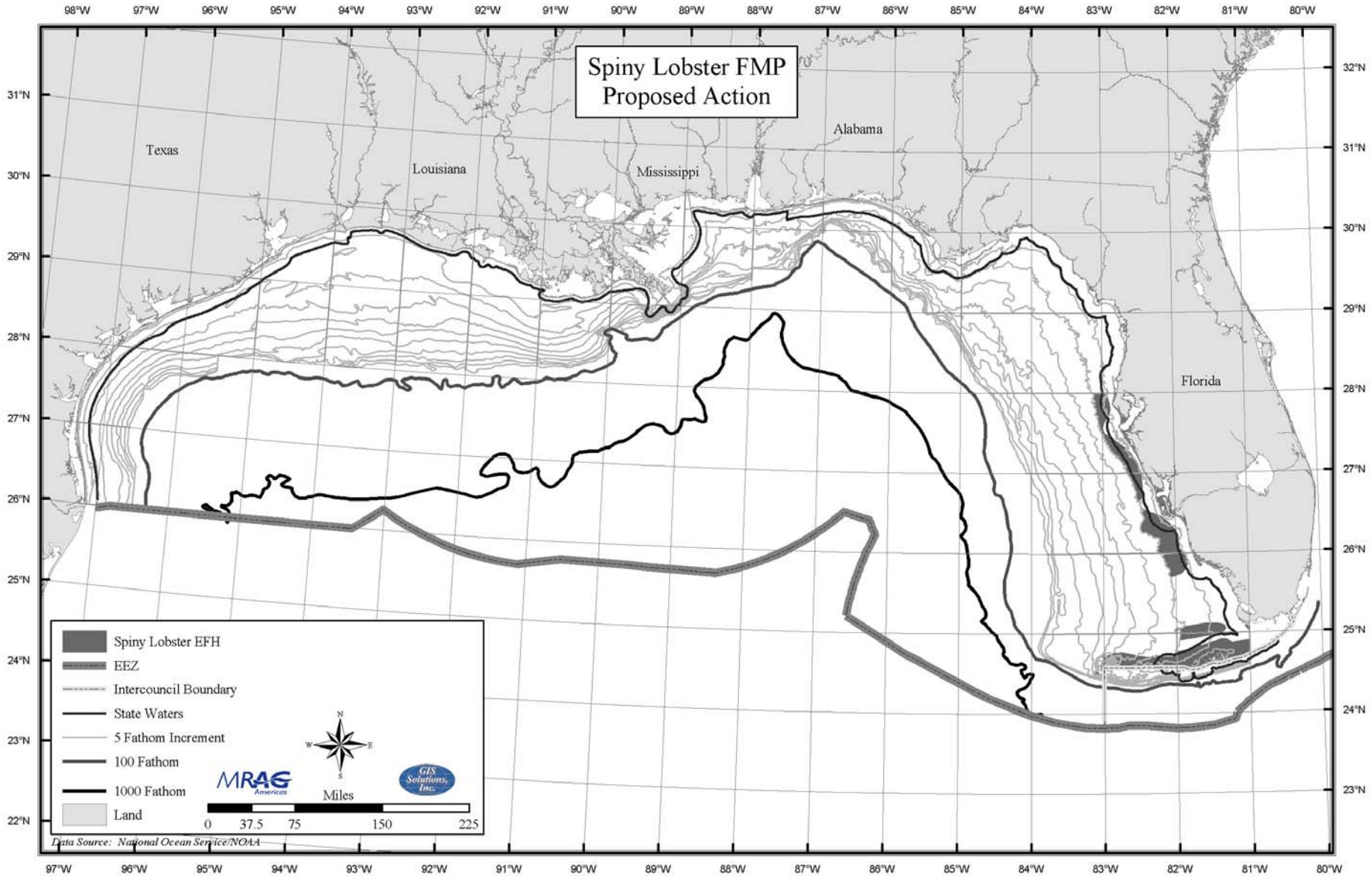

Figure 7. EFH for the Spiny Lobster Fishery Management Plan.

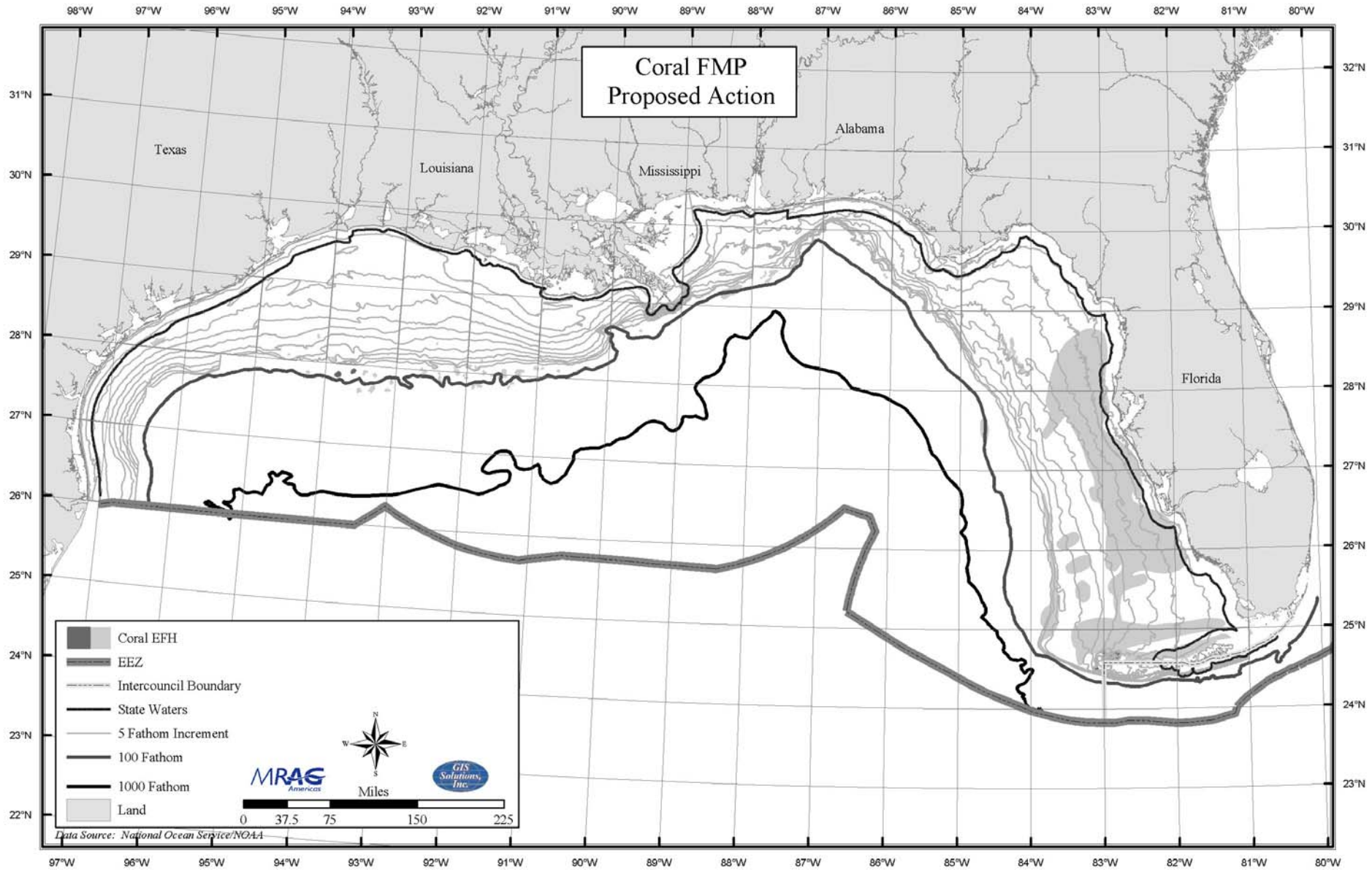

Figure 8. EFH for the Coral Fishery Management Plan.

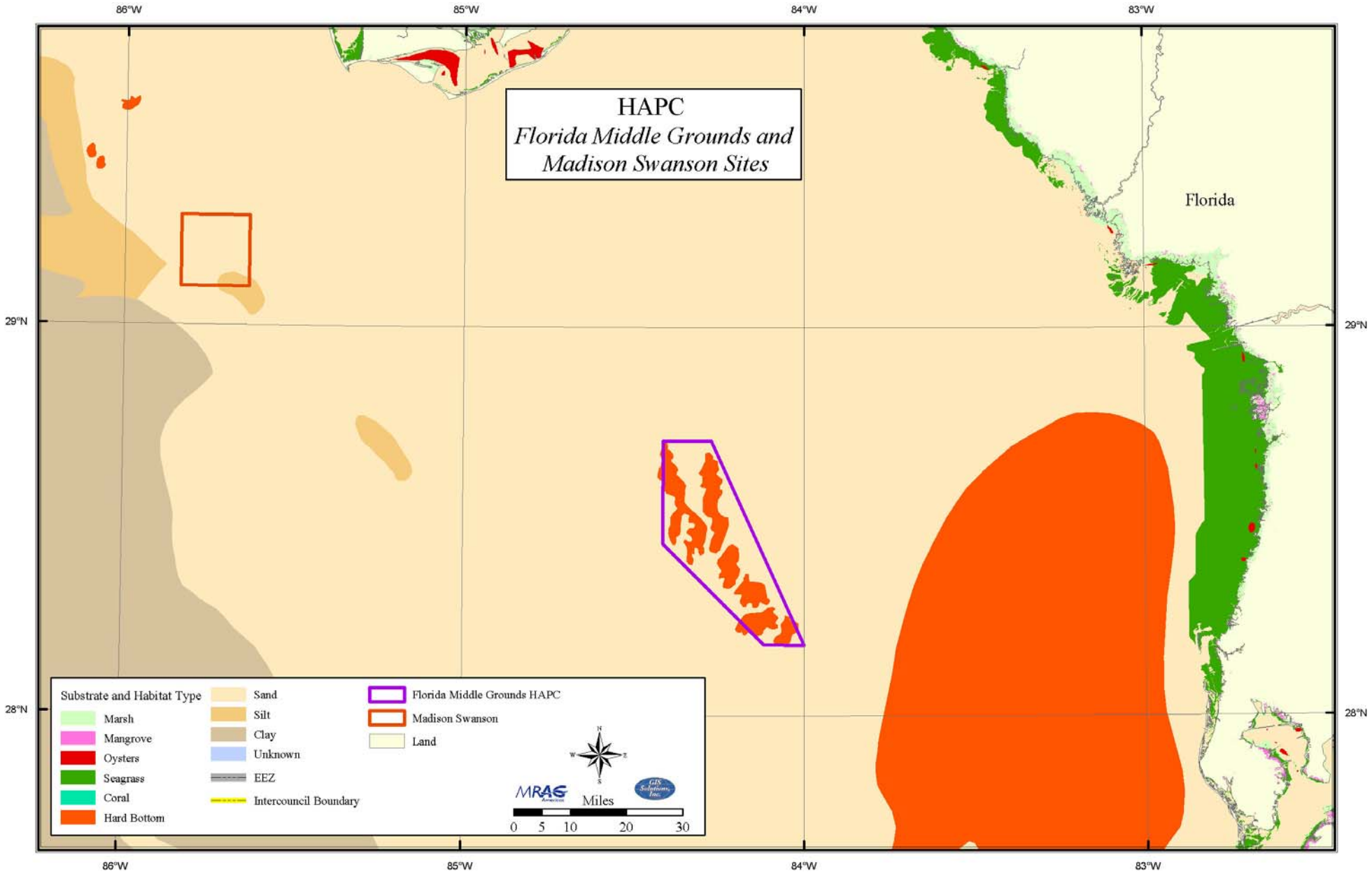

Figure 9. Proposed Florida Middle Grounds and Madison-Swanson Marine Reserve HAPC (see Table 4 for the boundaries (latitude & longitude) and area (in nm^2) of each site).

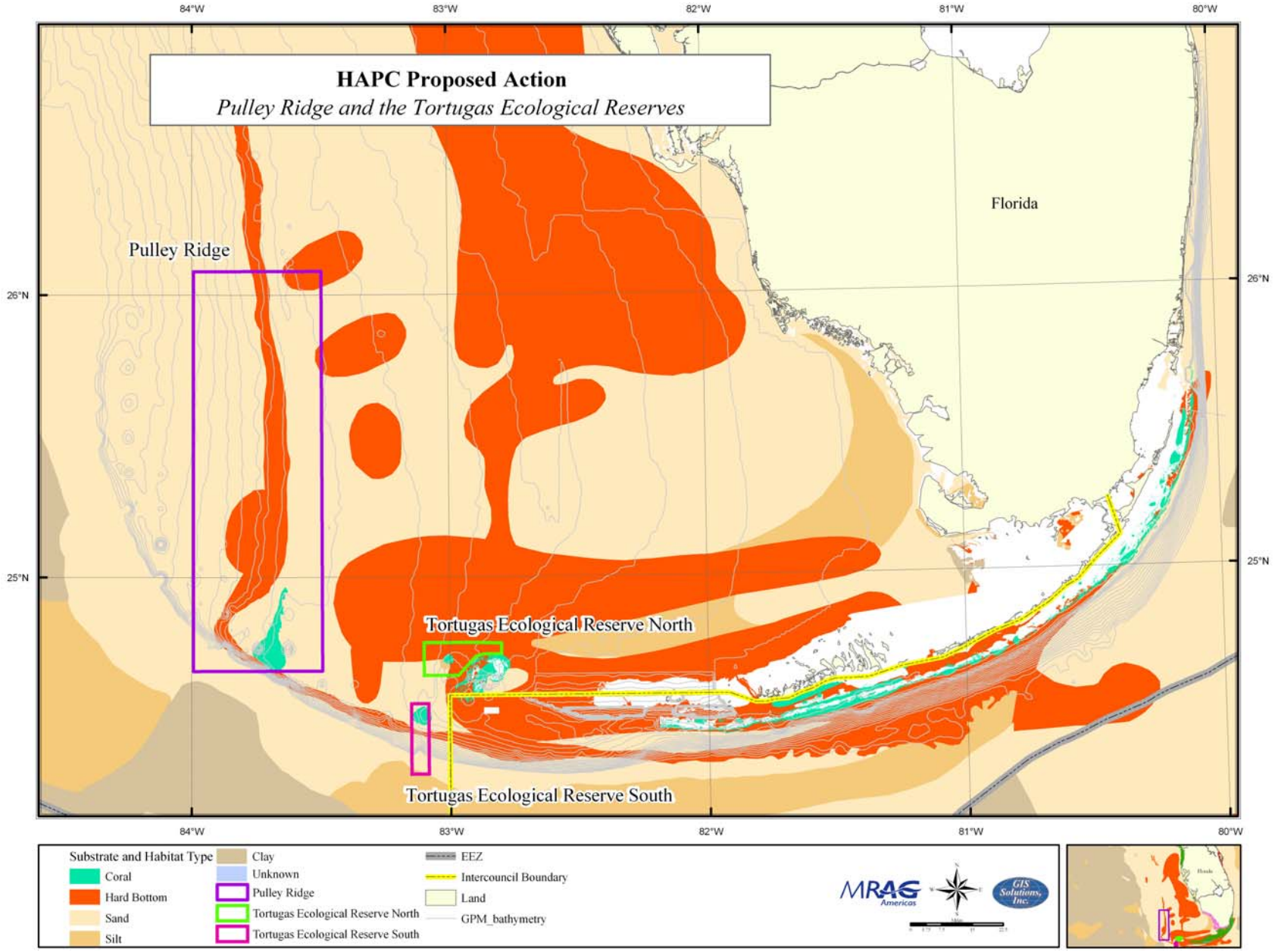

Figure 10. Proposed HAPC for Pulley Ridge and Tortugas North and South Ecological Reserves (see Table 4 for the boundaries (latitude & longitude) and area (in nm^2) of each site.)

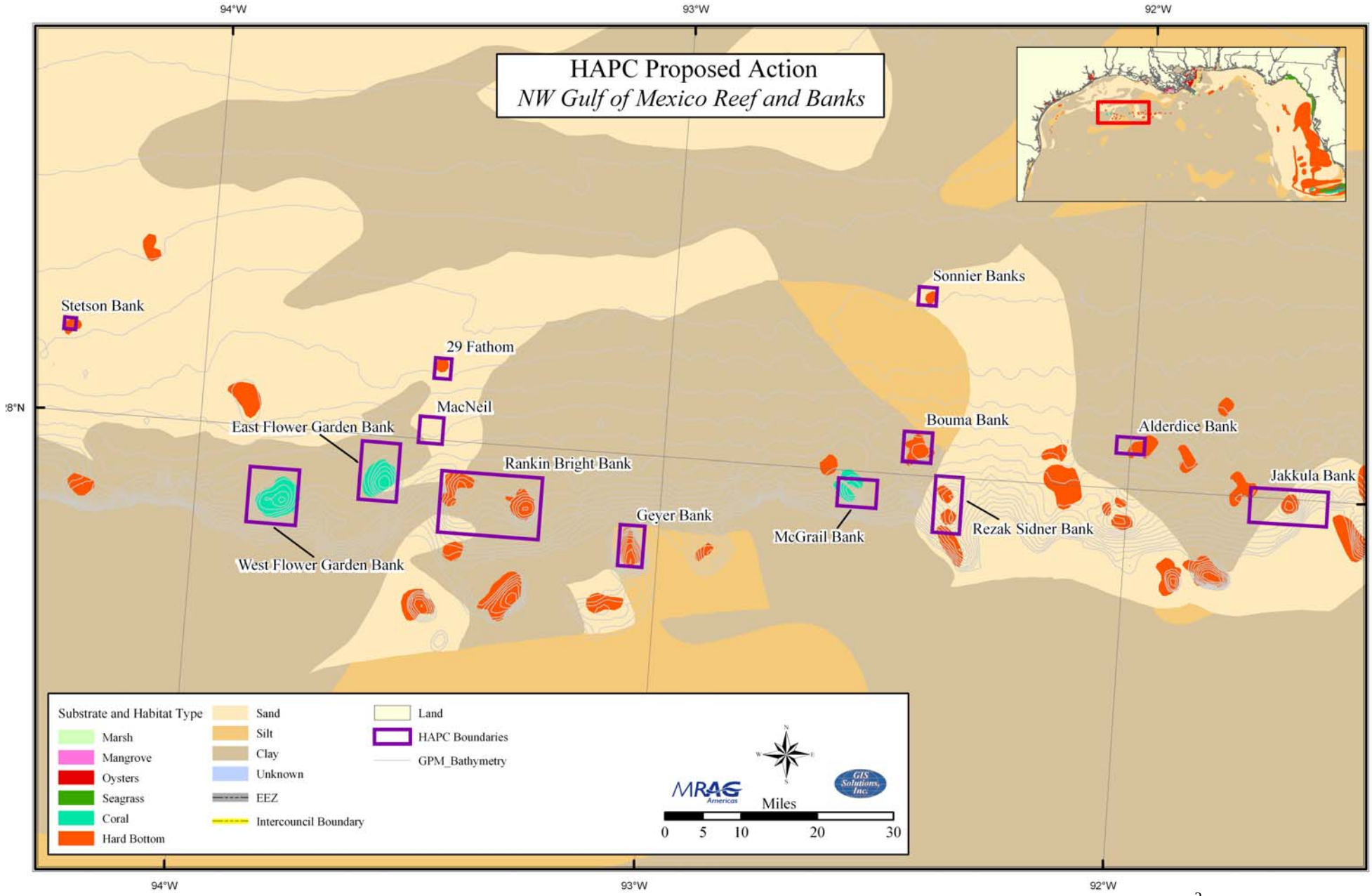

Figure 11. Proposed HAPC for the Northwest reefs and banks (see Table 4 for the boundaries (latitude & longitude) and area (in nm^2) of each site).

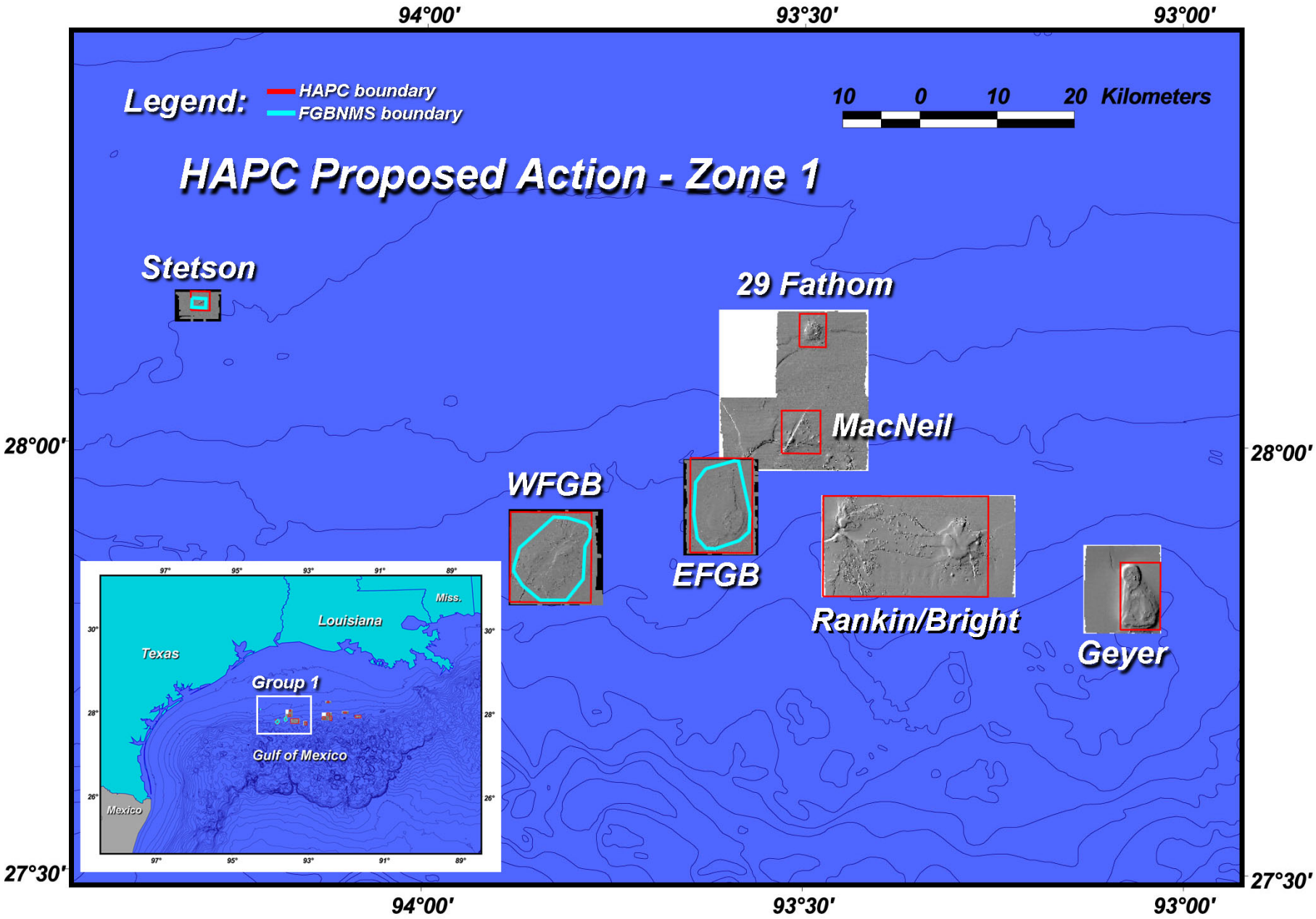

Figure 12a. Detailed bathymetric data of the proposed HAPC for the western group (zone 1) of the Northwest reefs and banks, provided by the Flower Garden Banks National Marine Sanctuary.

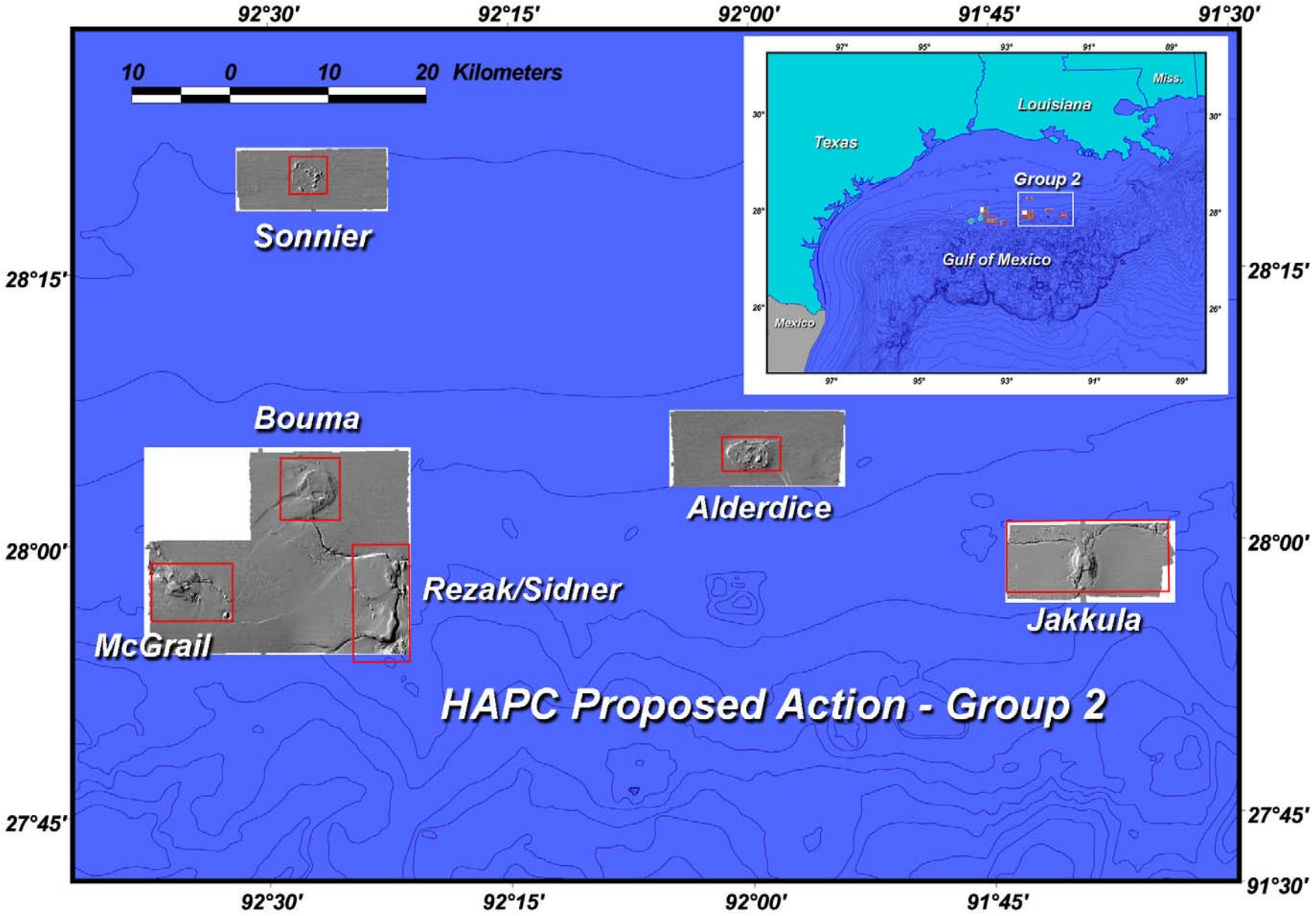

Figure 12b. Detailed bathymetric data of the proposed HAPC for the eastern group (zone 2) of the Northwest reefs and banks, provided by the Flower Garden Banks National Marine Sanctuary.

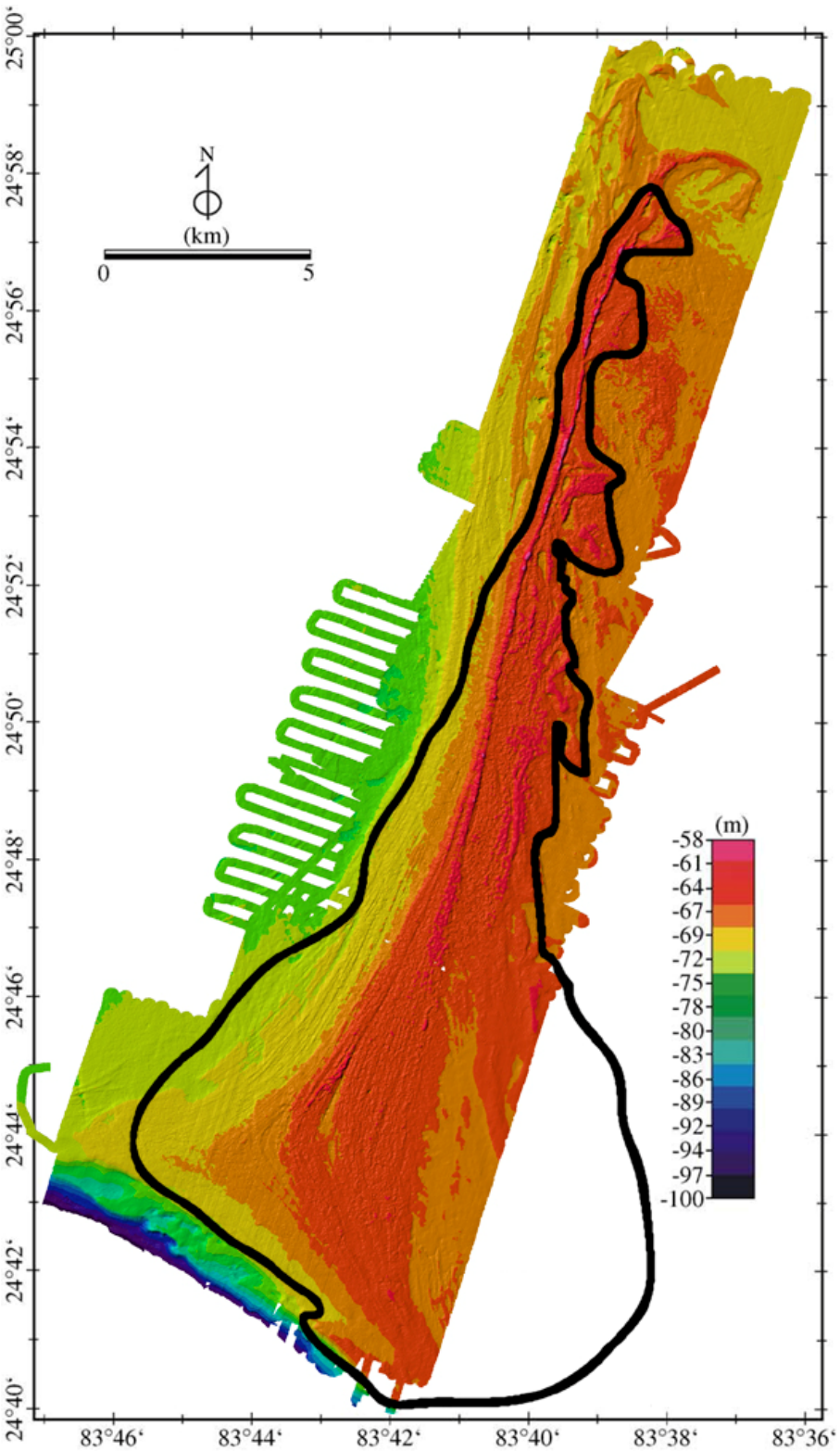

Figure 13. Outline of location of recently discovered coral reef formations on Pulley Ridge (inside black line). Video transects and still photography were used to identify location of coral. Multibeam bathymetry data are portrayed beneath the coral boundary and was used to map and interpret the geological origin of the site (Jarrett *et al*. in press).

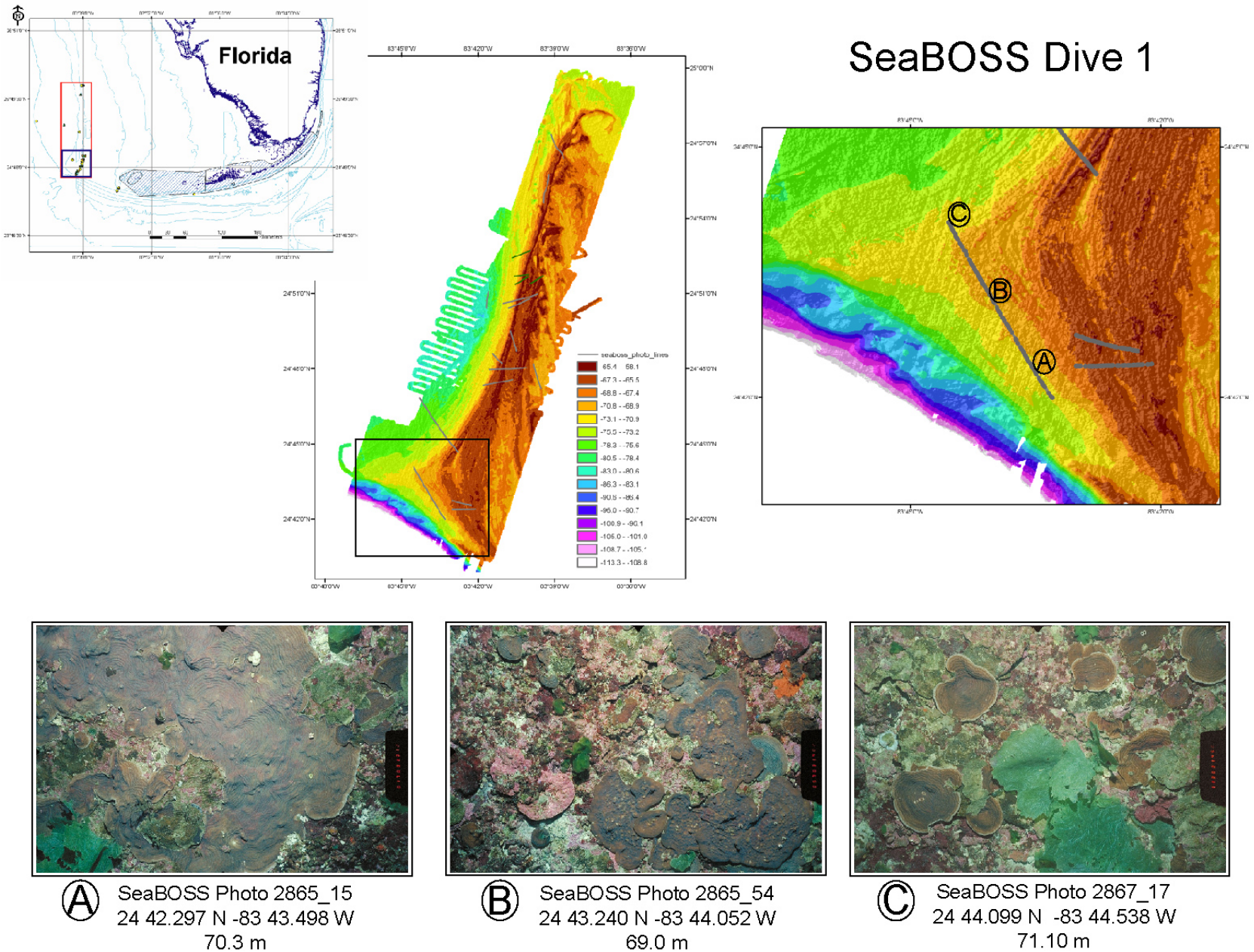

Figure 14. Still imagery of coral coverage and depths of image from the SeaBOSS Dive 1 transect, Pulley Ridge, collected by the US Geological Survey.

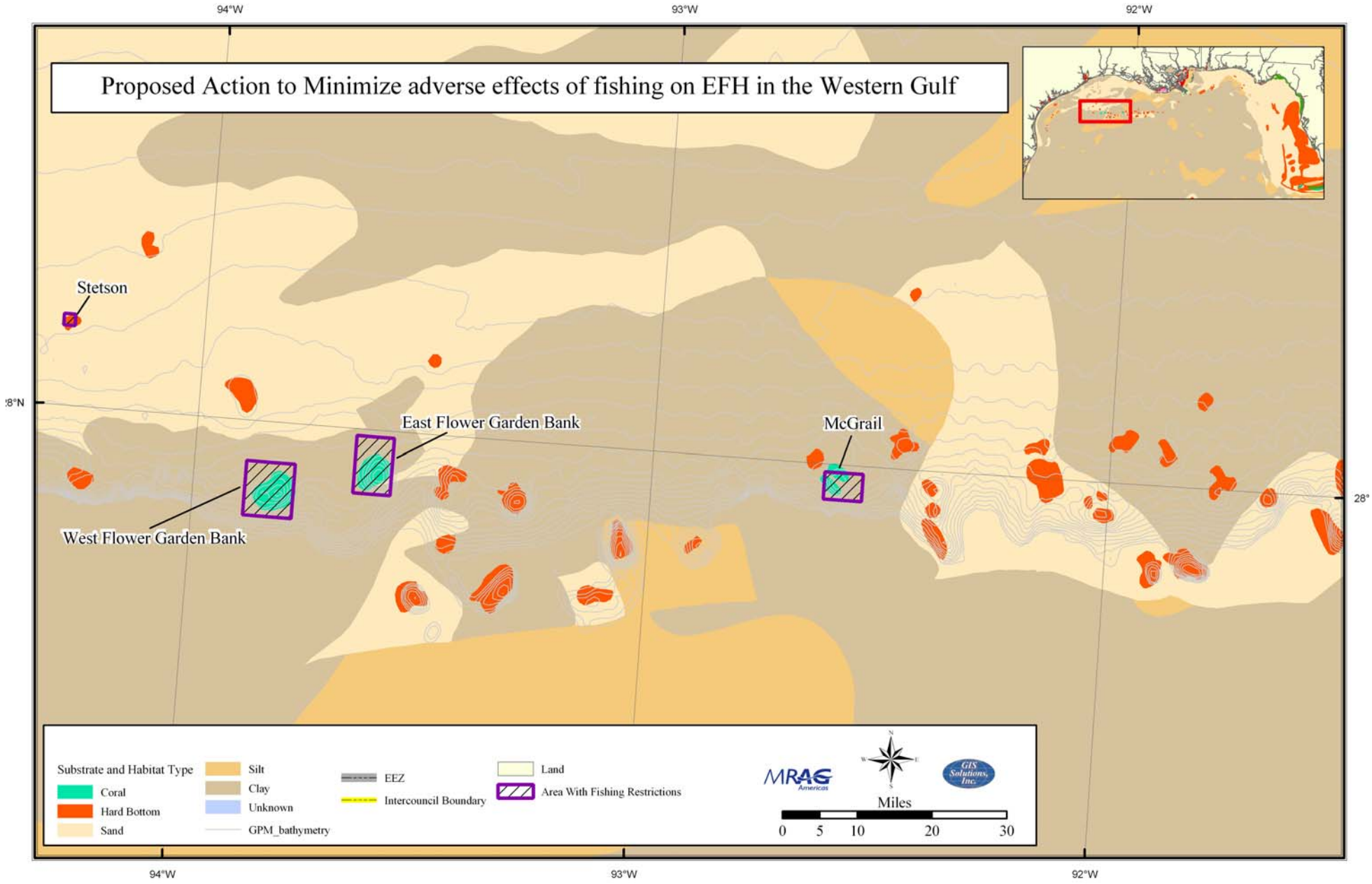

Figure 15. Proposed action to minimize adverse effects of fishing on the East and West Flower Garden Banks, Stetson Bank and McGrail Bank (boundaries are defined in Table 5).

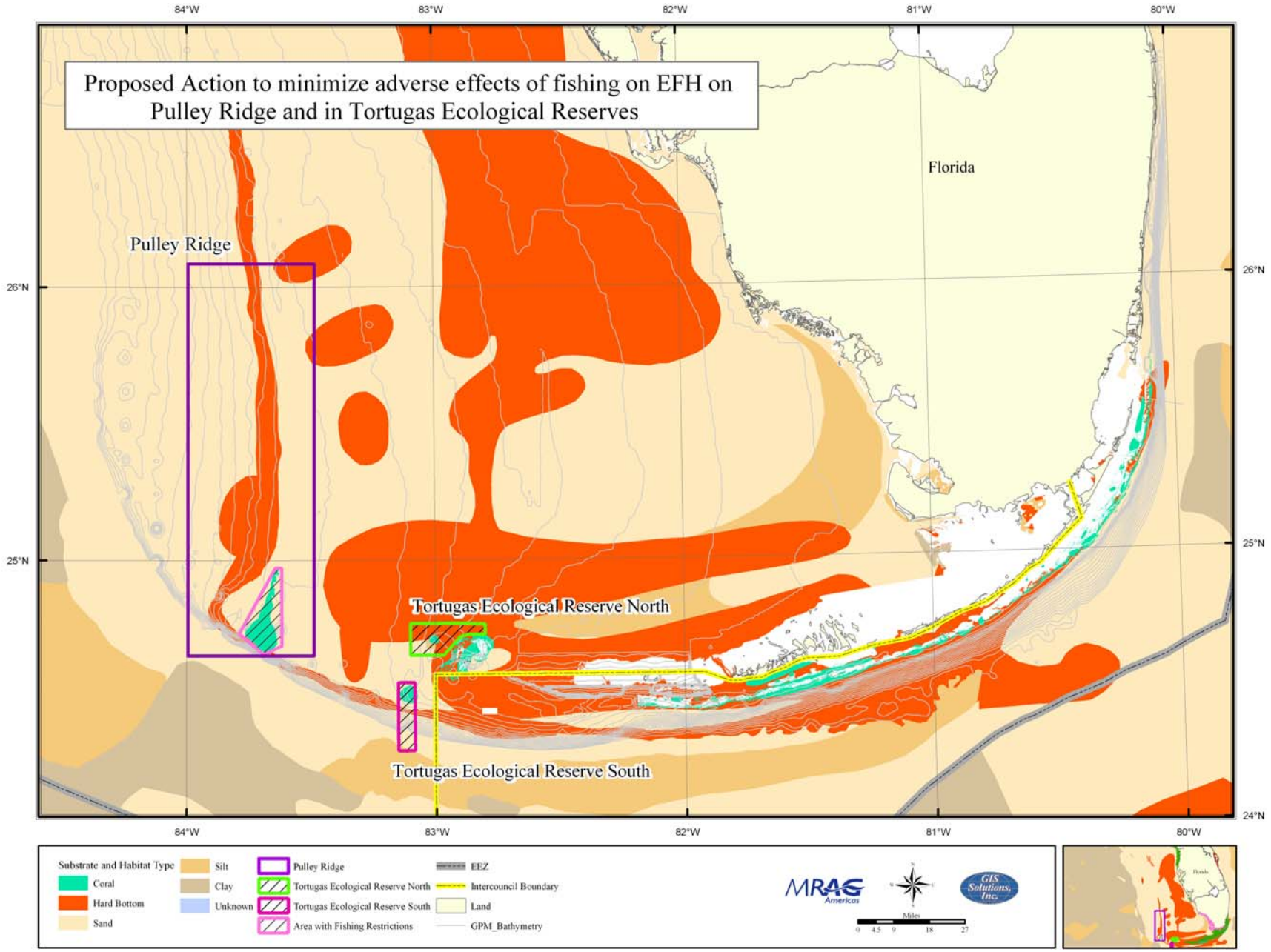

Figure 16. Proposed action to minimize adverse effects of fishing on Pulley Ridge and in the North and South Tortugas Ecological Reserves (boundaries are defined in Table 5).

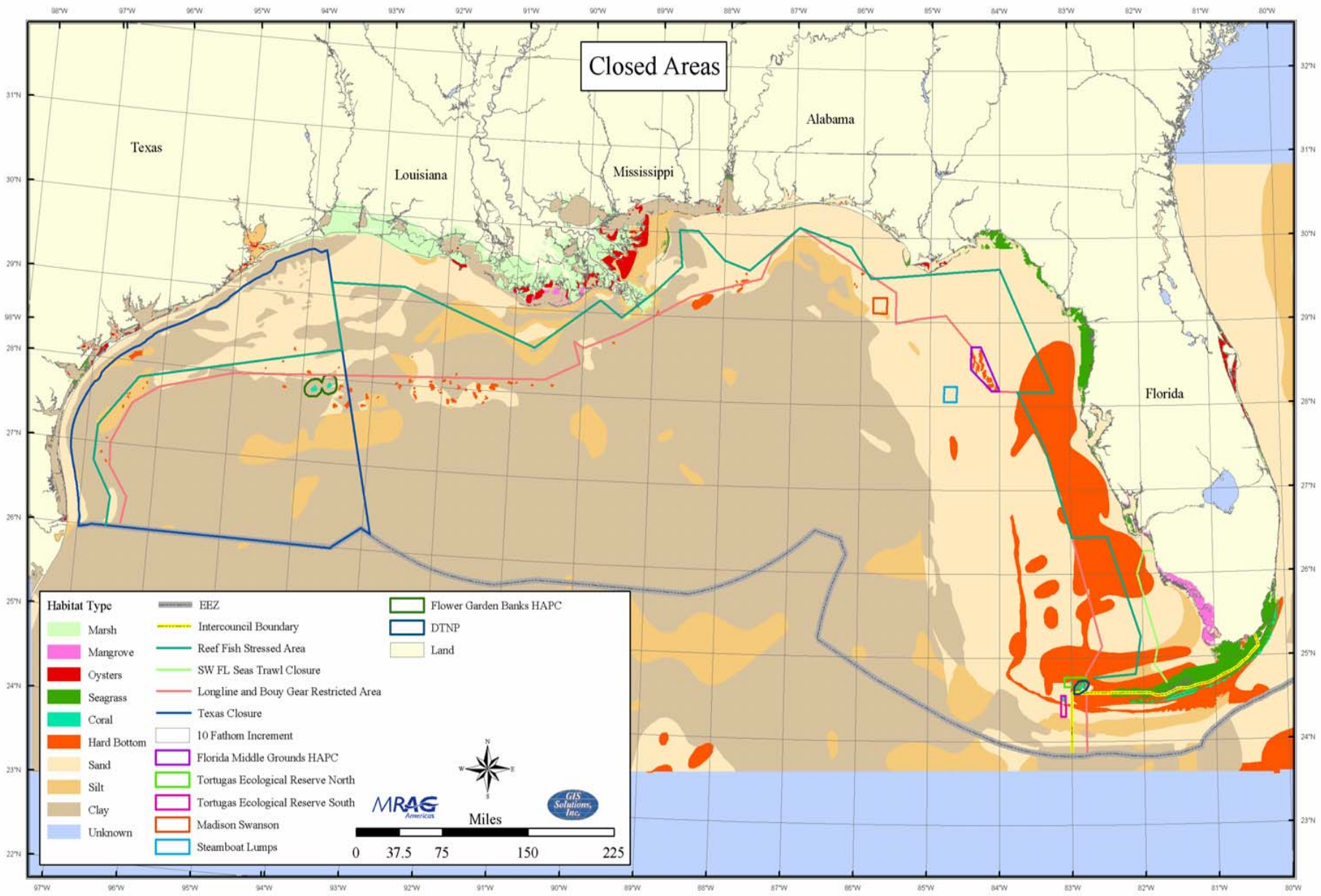

Figure 17. Map of all existing fishery management closed areas in the Gulf of Mexico prior to this EFH Amendment.