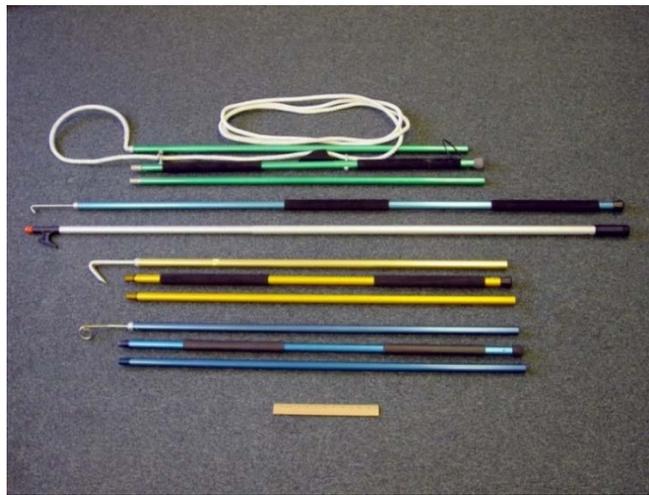


# **Modifications to the Sea Turtle Release Gear and Framework Procedure for the Reef Fish Fishery**



## **Public Hearing Draft Amendment 49 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico**

**Including Draft Environmental Assessment**

**January 2018**



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# AMENDMENT 49 – MODIFICATIONS TO THE SEA TURTLE RELEASE GEAR AND FRAMEWORK PROCEDURE FOR THE REEF FISH FISHERY

Including Environmental Assessment

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**Proposed Actions:** The document has two actions. The first action considers including the three new approved sea turtle release gears for commercial and charter vessels/headboat with federal Gulf reef fish permits. The second action would modify the framework procedure to allow new gears to be approved for use without a full amendment to the fishery management plan.

## Responsible Agencies and Contact Persons

Gulf of Mexico Fishery Management Council (Council) 2203 North Lois Avenue, Suite 1100 Tampa, Florida 33607 Carrie Simmons ( <a href="mailto:carrie.simmons@gulfcouncil.org">carrie.simmons@gulfcouncil.org</a> )	813-348-1630 813-348-1711 (fax)  <a href="http://www.gulfcouncil.org">http://www.gulfcouncil.org</a>
--	---

National Marine Fisheries Service (Lead Agency) Southeast Regional Office 263 13 <sup>th</sup> Avenue South St. Petersburg, Florida 33701 Kelli O'Donnell ( <a href="mailto:kelli.odonnell@noaa.gov">kelli.odonnell@noaa.gov</a> )	727-824-5305 727-824-5308 (fax) <a href="http://sero.nmfs.noaa.gov">http://sero.nmfs.noaa.gov</a>
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## Type of Action

<input type="checkbox"/> Administrative	<input type="checkbox"/> Legislative
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## ABBREVIATIONS USED IN THIS DOCUMENT

AM	accountability measure
ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
ALS	Accumulated Landings System
Bi Op	Biological Opinion
BLL	bottom longline
Council	Gulf of Mexico Fishery Management Council
DPS	distinct population segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
EFH	Essential Fish Habitat
EJ	environmental justice
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FMP	Fishery Management Plan
Gulf	Gulf of Mexico
HAPC	habitat area of particular concern
HMS	Highly Migratory Species
IFQ	individual fishing quota
IPCC	Intergovernmental Panel on Climate Change
IRFA	initial regulatory flexibility analysis
LAPP	limited access privilege program
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Survey and Statistics
MRIP	Marine Recreational Information Program
MSY	maximum sustainable yield
NOAA	National Oceanic and Atmospheric Administration
NOR	net operating revenue
NMFS	National Marine Fisheries Service
OFL	overfishing limit
OY	optimum yield
PAH	polyaromatic hydrocarbon
PS	producer surplus
pw	product weight
RA	Regional Administrator
RFFA	reasonably foreseeable future action
RIR	regulatory impact review
SCL	straight carapace length
Secretary	Secretary of Commerce
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Region Office

SOI	Segments of Interest
SRD	Science Research Director
SRHS	Southeast Regional Headboat Survey
SSC	Science and Statistical Committee
TL	total length
TPWD	Texas Parks and Wildlife Department
VOC	volatile organic compounds

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# CHAPTER 1. INTRODUCTION

## 1.1 Background

The Gulf of Mexico (Gulf) reef fish fishery is known to encounter endangered and threatened sea turtles and, less frequently, endangered smalltooth sawfish. Sea turtles are highly migratory and occur throughout the Gulf (Lutz and Musick 1997; Lutz et al. 2003; Spotila 2004). Adverse effects to these species may result from being hooked on or entangled in bottom longline and vertical line gear targeting reef fish. Sea turtles and sawfish can be injured or killed as a result of interacting with these gears.

The Endangered Species Act (ESA) directs all federal agencies to insure that any action they authorize, fund, or carry-out does not jeopardize the continued existence of an endangered or threatened species or designated or proposed critical habitat. The ESA requires that any federal agency proposing an action that may adversely affect an ESA-listed species or critical habitat, formally consult with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service (NMFS) (i.e., consulting agencies). The agency proposing the action (known as the action agency) will commonly complete a biological assessment on potential effects to the species or its habitat and submit it to the consulting agency. The consulting agency then renders a Biological Opinion (Bi Op) to the action agency making the proposal.

In February 2005, the NMFS Southeast Regional Office (SERO) issued a Bi Op, in accordance with section 7 of the ESA that evaluated the impact of the reef fish fishery on endangered sea turtles and smalltooth sawfish (NMFS 2005). The Bi Op concluded that the anticipated incidental take of sea turtles and smalltooth sawfish by the reef fish fishery was not likely to jeopardize their continued existence; however, it required that reasonable and prudent measures be taken to minimize stress and increase survival rates of any sea turtles and smalltooth sawfish taken in the reef fish fishery. At the time of the 2005 Bi Op, the only reef fish regulation that specifically addressed bycatch of protected species was a prohibition of the use of entangling nets that was implemented in 1990 (GMFMC 1990).

The Bi Op specified that NMFS, in cooperation with the Gulf of Mexico Fishery Management Council (Council), must implement sea turtle bycatch release equipment requirements and sea turtle and smalltooth sawfish handling

### *Biological Opinion (Bi Op):*

Bi Ops document the NMFS opinion on how a proposed federal agency action affects ESA-listed species and critical habitat. Federal agencies are required to ensure that their proposed actions do not negatively impact the likelihood of survival and recovery of an ESA-listed species.

Bi Ops that provide an exemption for the "take" of listed species specify the extent of take allowed. Reasonable and Prudent Measures are necessary to minimize impacts from any federal action, and the terms and conditions with which the action agency must comply. A Bi Op also includes conservation recommendations that may further recovery of the specific ESA-listed species if implemented.

protocols and/or guidelines in the commercial sector and charter vessel/headboat components for those with a federal Gulf reef fish permit.

In response to the 2005 Bi Op, the Council developed Amendment 18A to the Reef Fish Fishery Management Plan (FMP) for Reef Fish Resources of the Gulf of Mexico (GMFMC 2005a) to increase the likelihood of survival of released sea turtles and smalltooth sawfish caught incidentally by the reef fish fishery (GMFMC 2005a). Amendment 18A implemented regulations that required vessels with federal commercial or charter vessel/headboat permit for reef fish to possess a specific set of release gear (Appendix A), and comply with sea turtle and smalltooth sawfish release protocols and guidelines for proper care and release of incidentally caught sea turtles and sawfish (GMFMC 2005a). In the Gulf, commercial and charter vessel/headboat reef fish permit holders are also required to possess inside the wheelhouse, or within a waterproof case if no wheelhouse, a copy of the most updated document provided by NMFS titled, “Careful Release Protocols for Sea Turtle Release with Minimal Injury” (hereafter referred to as Release Protocols). Permit holders are also required to post inside the wheelhouse, or in an easily viewable area if no wheelhouse, sea turtle handling and release guidelines provided by NMFS<sup>1</sup>.

The Release Protocols were originally published in 2004 (Epperly et. al 2004). Revised editions were released in 2008 and 2010 (NMFS-SEFSC 2008, Revised 2010), and a new update is ready for publication. In the pending update, three additional turtle release gear types were approved by the Southeast Fisheries Science Center (SEFSC) for use in handling and releasing incidentally caught sea turtles when fishing for reef fish. These sea turtle release gears include a collapsible hoop net (Figures 2.1.1 and 2.1.2), a small sea turtle hoist (Figures 2.1.3 and 2.1.4) and a new type of dehooking device (Figure 2.1.5). These new gears require less space on vessels but still provide the necessary functionality. However, these release gears cannot be used by fishermen participating in the reef fish fishery until they are added to the regulations.

In addition to the Council considering the three new SEFSC approved release gears; this document also considers modifying the reef fish framework procedure, so that in the future the Council may more quickly modify sea turtle and other protected resources release gear and handling requirements. The framework procedure to the FMP was most recently updated in 2012 (GMFMC 2012c), but it does not currently allow for changes in release gear requirements to be implemented via the framework process. Thus, an amendment to the FMP is required to make these changes. Incorporating a process to allow changes in sea turtle and other protected resources release gear and handling requirements to be implemented via the framework procedure could streamline management and provide additional flexibility to participants in the commercial sector and charter/headboat component of the reef fish fishery.

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<sup>1</sup>[http://www.nmfs.noaa.gov/sfa/hms/compliance/workshops/protected\\_species\\_workshop/turtles/sea\\_turtle\\_handling\\_release\\_hookline.pdf](http://www.nmfs.noaa.gov/sfa/hms/compliance/workshops/protected_species_workshop/turtles/sea_turtle_handling_release_hookline.pdf)

## 1.2 Purpose and Need

The purpose is to allow the use of three new sea turtle release gear types and streamline the process for allowing commercial and charter/headboat reef fish permit holders to use additional sea turtle and other protected species release gear types and handling procedures after they are approved by the SEFSC.

The need is to provide flexibility to participants in the federal commercial and charter/headboat reef fish fishery in complying with regulations and to develop a process that allows changes in release gear requirements and handling procedures for sea turtles and other protected species to be implemented more quickly.

## 1.3 History of Management

The **Reef Fish FMP** (with its associated environmental impact statement [EIS]) was implemented in November 1984. The original list of species included in the management unit consisted of snappers, groupers, and sea basses. A second list of species included in the fishery, but not in the management unit, was not considered to be comprised of target species because they were generally taken incidentally to the directed fishery for species in the management unit. Their inclusion in the Reef Fish FMP was for purposes of data collection, and their take was not regulated.

**Amendment 1** (with its associated environmental assessment [EA], regulatory impact review [RIR], and initial regulatory flexibility analysis [IRFA], implemented in 1990, put a prohibition on the use of entangling nets due to the potential for entangling nets to ghost fish and kill non-targeted and protected species. This provided the only regulation in the FMP that specifically addressed safeguarding of protected species until the implementation of Amendment 18A.

**Amendment 18A** (with its associated EA, RIR, and IRFA), implemented in August 2006, required vessels with commercial or for-hire reef fish vessel permits to comply with highly migratory species (HMS) pelagic longline sea turtle and smalltooth sawfish release protocols and to possess a specific set of release gear, along with adopting guidelines for the proper care for incidentally caught smalltooth sawfish. The intended effect of the final rule was to reduce bycatch mortality of incidentally caught endangered sea turtles and smalltooth sawfish by the reef fish fishery.

**Amendment 22** (with its associated EIS, RIR, and IRFA) implemented in May 2004, established bycatch reporting methodologies for the reef fish fishery. These included all reef fish permit holders, whether they are commercial or recreational for-hire, to report their bycatch; it also requested NMFS to develop an observer program for the reef fish fishery and enhance the Marine Recreational Fisheries Survey and Statistics (MRFSS) by including headboats within the same sampling methods utilized for charter vessels.

**Amendment 31** (with associated EIS, RIR, and IRFA), implemented May 2010, specified that a longline endorsement would be required to fish east of Cape San Blas, Florida; restricted the use of bottom longline gear for reef fish in the eastern Gulf (east of 85° 30' W Longitude, near Cape San Blas, Florida); and restricted the number of hooks for vessels using bottom longline gear to

harvest reef fish east of Cape San Blas, Florida. The intended effect of this final rule was to reduce hardshell sea turtle takes by the bottom longline component of the Gulf reef fish fishery. This amendment was developed following a 2008 observer report by the SEFSC that estimated sea turtle takes by the commercial bottom longline component of the Gulf reef fish fishery had exceeded the 3-year anticipated take levels in the 2005 Bi Op on the fishery (NMFS 2009).

**Amendment 38** (with associated EA, RIR, and RFA), implemented March 2013, modified the reef fish framework procedure to include the addition of accountability measures to the list of items that can be changed through the standard framework procedure. This was the last time the reef fish framework procedure was updated, which had the intended effect of reducing the time needed to implement a regulation by being able to use the framework procedure rather than a plan amendment.

**Amendment 44** (with associated EA, RIR, and RFA), implemented December 2017 changes the minimum stock size threshold for seven species in the Reef Fish FMP. NMFS expects that with the approval of Amendment 44, for red snapper and gray triggerfish as not overfished but rebuilding, because the biomass for the stock is currently estimated to be greater than 50% of  $B_{MSY}$ . The greater amberjack stock will remain classified as overfished.

## CHAPTER 2. MANAGEMENT ALTERNATIVES

### 2.1 Action 1 – Modify sea turtle release gear requirements for vessels with reef fish permits in the Gulf of Mexico (Gulf)

**Alternative 1:** No Action. Do not modify the regulations to allow the use of newly approved sea turtle release gears for vessels with commercial or charter vessel/headboat Gulf reef fish permits.

**Alternative 2:** Modify the regulations for vessels with commercial or charter vessel/headboat Gulf reef fish permits to allow the use of the new collapsible hoop net, dehooking device, and small hoist to release incidentally hooked sea turtles.

#### **Discussion:**

This action allows the Gulf of Mexico Fishery Management Council (Council) to modify sea turtle release gear requirements for commercial and charter vessel/headboats with federal Gulf reef fish permits. The three proposed gears (collapsible hoop net, dehooking device, and small sea turtle hoist) have been tested in the field, approved by the Southeast Fisheries Science Center (SEFSC), and are included in the pending publication of the 2015 Release Protocols (National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum NMFS-SEFSC-580). Incidental capture in vertical and bottom longline fisheries have the potential to injure or kill protected species. These new release gears were designed to reduce the severity of injury and mortality rate of protected species if incidentally captured. The careful handling, gears, and release protocols are anticipated to result in the greatest post-release survival of the protected species (Ryder et al. 2006). Numerous workshops and educational opportunities for fishermen have been delivered across the Gulf as well as in the South Atlantic Fishery Management Council's jurisdiction.

The two alternatives analyzed for this action are considered a reasonable range because of the limited scope and nature of the action. Currently, the applicable regulations require permitted reef fish vessels to carry certain types of release gear, but there are typically multiple options for specific devices that will satisfy the underlying gear requirement. This action proposes to add such additional options. For example, vessels are required to carry a dipnet, but there are numerous options for the exact dipnet device that may be carried to satisfy the dipnet requirement. The primary goal of this action is for the Council to potentially add three new devices to the regulations, alongside the other sea turtle release devices that are already authorized. These three new devices are not the only devices that industry may use, and would be mere options that may be used in place of existing authorized devices (Appendix A). The decision is merely whether to allow the addition of the optional release devices that may be used in place of existing options (**Alternative 2**) or not (**Alternative 1**). Adding these devices to the regulations is only expected to result in positive impacts for fishermen and subsequently, protected resources, since more flexibility would be afforded to fishermen who would now have the opportunity to use these more compact sea turtle release gears. This is ultimately anticipated to result in better compliance due to increased flexibility for fishermen that hold federal Gulf commercial and/or charter vessel/headboat reef fish permits.

**Alternative 1** (No Action) would not modify the regulations to allow three new sea turtle release gears to be included in the regulations for use in releasing incidentally caught sea turtles. This alternative would retain the existing list of required release gear (Appendix A) and not provide additional flexibility to fishermen with commercial and charter vessel/headboat reef fish permits in the Gulf to use these devices to satisfy existing gear requirements.

**Alternative 2** would modify the federal regulations for commercial vessels and charter vessels/headboats with federal Gulf reef fish permits to allow the use of a collapsible hoop net, small sea turtle hoist, and dehooking device to release incidentally hooked sea turtles. If a sea turtle must be brought aboard the boat to remove a hook it is very important that the sea turtle is never pulled out of the water even partially using the fishing gear in which it is entangled (draft NOAA Technical Memo NMFS-SEFSC-580). Thus the importance of having gears that can lift sea turtles onboard, when necessary is of high importance. These new gears have been tested in the field and are designed based on user feedback from captains, crew members, and observers after numerous tests.

Two of the new sea turtle release devices are a collapsible hoop net (Figures 2.1.1 and 2.1.2) and a small sea turtle net hoist (Figures 2.1.3 and 2.1.4). Both of these gears are more compact versions of the currently required long-handled dipnet, and are used for bringing an incidentally captured sea turtle on board the fishing vessel to remove fishing gear. The collapsible hoop net must meet the standards to be specified in the National Marine Fisheries Service (NMFS) regulations (capable of lifting a minimum of 100 lbs with a minimum diameter of 31 inches and a minimum bag depth of 38 inches). The net is attached to hoops made of flexible stainless steel cable, so that the net and hoop are both collapsible to make storage easier. When the collapsible net is folded over on itself it reduces to about half of its original diameter (Figure 2.1.2).



**Figure 2.1.1.** Example of a collapsible hoop net when fully deployed for use. Photo credit: NMFS-SEFSC.

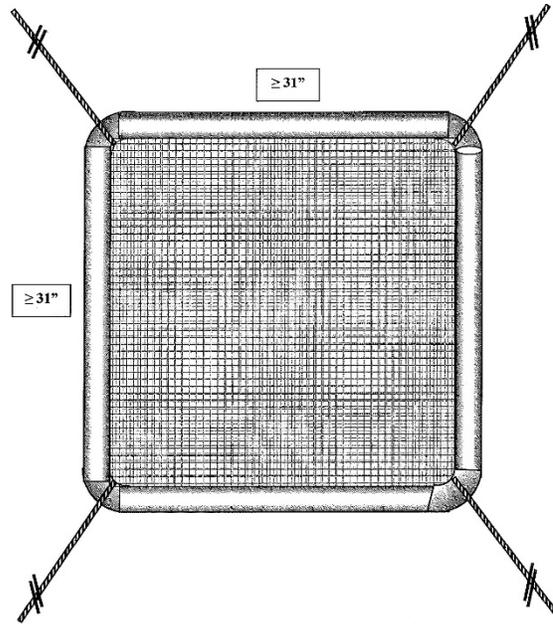


**Figure 2.1.2.** Example of a collapsible hoop net that is ready to be stored when folded. Photo credit: NMFS-SEFSC.

The second new release device is a small sea turtle hoist (Figures 2.1.3 and 2.1.4). This gear is recommended to bring sea turtles on board that cannot be brought onboard the boat using a traditional dipnet. The small sea turtle hoist must meet the standards to be specified in the NMFS regulations (capable of lifting 100 lbs with a minimum diameter of 31 inches). The mesh must be securely fastened to a  $\frac{3}{4}$  inch or greater heavy duty hollow aluminum or marine grade stainless steel (Figure 2.1.4). The frame can also be constructed of 40/80 polyvinyl chloride (PVC) pipe. Generally, the small hoist would be used on vessels with a high freeboard and when space on the fishing vessel is limited. The proper use of this gear is outlined in the 2015 Release Protocols (draft NOAA Technical Memorandum NMFS-SEFSC-580).



**Figure 2.1.3.** Example of a small sea turtle hoist. Photo credit: World Wildlife Fund.



**Figure 2.1.4.** Example of a small sea turtle hoist that can be constructed. Photo credit: NMFS-SEFSC.

The collapsible hoop net (Figures 2.1.1 and 2.1.2) and the small turtle hoist (Figures 2.1.3 and 2.1.4) would be able to be carried onboard in place of the currently required dipnet (handle length must be 6 feet or 150% of freeboard height) after this amendment is approved and implemented (Appendix A).

The third new gear type is a dehooking device (Figure 2.1.5). This gear is recommended for use, if a fishing hook, embedded internally or externally, cannot be removed via needle-nose pliers or bolt cutters. Although other dehookers are currently allowed this new release gear type is appropriate for removing the range of hook sizes currently used in the reef fish fishery (e.g., 6/0-7/0). This gear is also recommended for use when removing lightly embedded larger hooks up to 10/0 in size because it can more easily remove a hook by twisting it out. The release protocol for this gear is outlined in the 2015 Release Protocols (draft NOAA Technical Memorandum NMFS-SEFSC-580).



**Figure 2.1.5.** Example of new sea turtle release gear ‘hookout’ to release incidentally hooked sea turtles. Photo credit: NMFS-SEFSC.

Currently, a short-handled dehooker for external hooks and the short-handled dehooker for internal hooks is required (Appendix A). This third new gear type could be carried onboard and be used in place of both short-handled dehookers after this amendment is approved and implemented. In practice, however, only one short-handled dehooker may be required, as there are two currently allowed models that function to remove both hooks that are embedded internally and externally.

## 2.2 Action 2 – Modify the Reef Fish Framework Procedure

**Alternative 1:** No Action. Do not modify the reef fish framework procedure adopted through Reef Fish Amendment 38.

**Alternative 2:** Modify the reef fish framework procedure to include changes to release gear requirements and handling protocols for sea turtles and other protected resources through the abbreviated documentation process for open framework actions. Release gear requirements and handling protocols that could be implemented or changed would include:

**Option a:** Release gear requirements for sea turtles and other protected resources

**Option b:** Handling requirements for sea turtles and other protected resources

*Note: In Alternative 2, both Option a and Option b could be selected as preferred.*

### **Discussion:**

The Council currently has three different regulatory mechanisms for addressing fishery management issues. First, they may develop a fishery management plan (FMP) or plan amendment to establish management measures. The amendment process can take 1 to 3 years depending on the analysis needed to support the proposed actions in the amendment. Second, the Council may vote to request an interim or emergency rule that could remain effective for 180 days with the option to extend it for an additional 186 days. Interim and emergency rules are only meant as short-term management tools while permanent regulations are developed through an amendment. Third, the Council may prepare a framework action based on a predetermined procedure that allows changes to specific management measures and parameters. Typically, framework actions take less than a year to implement, and, like plan amendments, are effective until amended. Frameworks are broken into three categories: open standard, open abbreviated, and closed. The open abbreviated process is for regulatory changes that are categorized as routine or insignificant, while the open standard process is used for regulatory changes that do not qualify as routine or insignificant. Open standard frameworks take the longest to complete due to requiring the most analysis, while a closed framework has the shortest time to completion. An open abbreviated framework, while not as quick as a closed, still is expected to be shorter than an open standard framework.

Two alternatives for changing the framework procedure are presented in this action. The goal is to facilitate the potential adoption of new options for gears that industry may use to satisfy regulatory requirements in a timelier manner, and to reduce the burden associated with making future changes regarding sea turtle and other protected resources release gear and handling requirements. Modifying the open framework utilizing the abbreviated documentation process (**Alternative 2**) is presented as the only alternative to the no action (**Alternative 1**), because the open framework procedure utilizing the standard documentation process can at times take as long as a plan amendment. Utilizing the abbreviated framework procedure would allow more timely changes to the release gear and handling requirements for industry, which is the primary purpose of the proposed change. Additionally, such future potential changes to release gear and

handling requirements do not fit under the actions that may be taken through the closed framework procedure, which is why that alternative is not presented.

**Alternative 1** would retain the current reef fish framework procedure without any changes. This framework procedure was last modified in Reef Fish Amendment 38 (GMFMC 2012c) and provides the Council and NMFS the flexibility to respond more quickly to changes in the reef fish fishery than using a plan amendment. The framework procedure has both open and closed processes. The open processes (abbreviated and standard) provide more policy discretion, i.e., there is a decision that could be made among alternatives. In contrast, the closed process addresses more specific, well-defined circumstances. Measures that can be changed under the framework procedure are identified below, as well as the appropriate process needed for each type of change. Under **Alternative 1**, changes to release gear and handling requirements for sea turtles and other protected resources would continue to require full plan amendments, limiting the Council's and NMFS ability to implement SEFSC-approved release devices and handling requirements in a timely manner.

**Alternative 2** would allow changes to release gear and handling requirements for sea turtles and other protected resources under the abbreviated documentation process of the open framework procedure (see highlighted portion of Section 2a of the Framework Procedure). Table 2.2.1 lists the types of release devices and handling requirements for sea turtles and other protected resources that would be included under **Alternative 2**, and an example of a change to these requirements that would be possible through the framework procedure. It is important to note that gear restrictions are already included in the standard process section of the open framework procedure. **Alternative 2** would only allow changes to release gear and handling protocols for sea turtles and other protected resources that are considered more flexible for the reef fish fishery, not those that are considered more restrictive. **Alternative 2** would provide the ability to adopt new options for release devices (**Option a**) and handling procedures (**Option b**) that industry may use to satisfy regulatory requirements. Gear restrictions would continue to be modified under a plan amendment or the open standard framework procedure. Release gear (**Option a**), and handling procedures (**Option b**), are both currently required to be abided by as part of the commercial and/or charter/headboat reef fish permits. Allowing more timely modifications to both of these by an abbreviated framework procedure should benefit fishermen as more alternatives for these options become available.

**Table 2.2.1.** Examples of release gear and handling requirements for sea turtles and other protected resources that could be changed through a framework action, rather than a plan amendment.

Type	Example
<b>Release Gear</b>	
Dehookers, dipnets, line cutters	Implement SEFSC modified, tested and approved devices
Mouth Openers and Gags	Implement SEFSC approved devices
<b>Handling</b>	
Sea turtles	Changes to SEFSC requirements on the boarding of various size turtles, if caught
Sea turtles	Changes to SEFSC requirements on the types of approved cushioned devices
Other protected resources	Changes to disentangling requirements when a large cetacean interaction occurs
Other protected resources	Changes to handling requirements when removing entangling gear from small cetaceans

**Framework Procedure with proposed changes highlighted**

This framework procedure provides standardized procedures for implementing management changes pursuant to the provisions of the FMP. There are two basic processes, the open framework process and the closed framework process. Open frameworks address issues where there is more policy discretion in selecting among various management options developed to address an identified management issue, such as changing a size limit to reduce harvest. Closed frameworks address much more specific factual circumstances, where the FMP and implementing regulations identify specific actions to be taken in the event of specific facts occurring, such as closing a sector of a fishery after their quota has been harvested.

Open Framework:

1. Situations under which this framework procedure may be used to implement management changes include the following:
  - a. A new stock assessment resulting in changes to the overfishing limit, acceptable biological catch, or other associated management parameters.  
*In such instances the Council may, as part of a proposed framework action, propose an annual catch limit (ACL) or series of ACLs and optionally an annual catch target (ACT) or series of ACTs, as well as any corresponding adjustments to maximum sustainable yield (MSY), optimum yield (OY), and related management parameters.*
  - b. New information or circumstances.  
*The Council will, as part of a proposed framework action, identify the new information and provide rationale as to why this new information indicates that management measures should be changed.*
  - c. Changes are required to comply with applicable law such as Magnuson-Stevens Fishery Management and Conservation Act (Magnuson-Stevens Act), Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), or are required as a

result of a court order.

*In such instances the Regional Administrator will notify the Council in writing of the issue and that action is required. If there is a legal deadline for taking action, the deadline will be included in the notification.*

2. Open framework actions may be implemented in either of two ways, abbreviated documentation or standard documentation process.
  - a. Abbreviated documentation process. Regulatory changes that may be categorized as routine or insignificant may be proposed in the form of a letter or memo from the Council to the Regional Administrator (RA) containing the proposed action and the relevant biological, social and economic information to support the action. If multiple actions are proposed, a finding that the actions are also routine or insignificant must also be included. If the RA concurs with the determination and approves the proposed action, the action will be implemented through publication of appropriate notification in the Federal Register. Actions that may be viewed as routine or insignificant include, among others:
    - i. Reporting and monitoring requirements,
    - ii. Permitting requirements,
    - iii. Gear marking requirements,
    - iv. Vessel marking requirements,
    - v. Restrictions relating to maintaining fish in a specific condition (whole condition, filleting, use as bait, etc.),
    - vi. Bag and possession limit changes of not more than 1 fish,
    - vii. Size limit changes of not more than 10% of the prior size limit,
    - viii. Vessel trip limit changes of not more than 10% of the prior trip limit,
    - ix. Closed seasons of not more than 10% of the overall open fishing season,
    - x. Species complex composition, including species subject to limited access privilege program (LAPP) management, requiring new share specification,
    - xi. Restricted areas (seasonal or year-round) affecting no more than a total of 100 square nautical miles,
    - xii. Respecification of ACL, ACT or quotas that had been previously approved as part of a series of ACLs, ACTs or quotas,
    - xiii. Specification of MSY, OY, and associated management parameters (such as overfished and overfishing definitions) where new values are calculated based on previously approved specifications,
    - xiv. Gear restrictions, except those that result significant changes in the fishery, such as complete prohibitions on gear types,
    - xv. Quota changes of not more than 10%, or retention of a portion of an annual quota in anticipation of future regulatory changes during the same fishing year,
    - xvi. Release gear requirements for sea turtles and other protected resources,
    - xvii. Handling requirements for sea turtles and other protected resources
  - b. Standard documentation process. Regulatory changes that do not qualify as routine or insignificant may be proposed in the form of a framework document with supporting analyses. Non-routine or significant actions that may be implemented

under a framework action include:

- i. Specification of ACTs or sector ACTs, and modifications to ACL/ACT control rule,
- ii. Specification of annual biological catch (ABC) and ABC control rules,
- iii. Rebuilding plans and revisions to approved rebuilding plans,
- iv. The addition of new species to existing LAPP,
- v. Changes specified in section 4(a) that exceed the established thresholds,
- vi. Changes to accountability measures including:
  - In-season accountability measures
    1. Closures and closure procedures
    2. Trip limit changes
    3. Designation of an existing limited access privilege program as the accountability measure for species in the program
    4. Implementation of gear restrictions
  - Post-season accountability measures
    1. Adjustment of season length
    2. Implementation of closed seasons/time periods
    3. Adjustment or implementation of bag, trip, or possession limit
    4. Reduction of the ACL/ACT to account for the previous year overage
    5. Revoking a scheduled increase in the ACL/ACT if the ACL was exceeded in the previous year
    6. Implementation of gear restrictions
    7. Reporting and monitoring requirements

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

Closed Framework:

1. Consistent with existing requirements in the FMP and implementing regulations, the

Regional Administrator is authorized to conduct the following framework actions through appropriate notification in the Federal Register:

- a. Close or adjust harvest of any sector of the fishery for a species, sub-species, or species group that has a quota or sub-quota at such time as projected to be necessary to prevent the sector from exceeding its sector-quota for the remainder of the fishing year or sub-quota season,
- b. Reopen any sector of the fishery that had been prematurely closed,
- c. Implement accountability measures, either in-season or post-season.

## CHAPTER 3. AFFECTED ENVIRONMENT

### 3.1 Description of the Fishery

All vessels with reef fish permits must have the appropriate sea turtle release gear and documents aboard when harvesting reef fish. A permitted vessel with a freeboard height of 4 ft. or less must have on board: a dipnet with a handle 6 ft. or 150% of the freeboard height, whichever is greater; a short-handled dehooker for ingested hooks; a short-handled dehooker for external hooks; long-nose or needle-nose pliers; bolt cutters; monofilament line cutters; and at least two types of mouth openers/mouth gags. A permitted vessel with a freeboard height of greater than four feet must have on board : a dipnet with a handle 6 ft. or 150% of the freeboard height, whichever is greater; a long-handled line clipper; a short-handled and a long-handled dehooker for ingested hooks; a short-handled and a long-handled dehooker for external hooks; a long-handled device to pull an “inverted V”; long-nose or needle-nose pliers; bolt cutters; monofilament line cutters; and at least two types of mouth openers/mouth gags. All vessels, regardless of freeboard, also need an auto tire or some other cushioned surface to rest a sea turtle on if it is brought aboard. Other cushioned surfaces include dedicated life rings, seat cushions, life jackets, or life vests (NMFS-SEFSC 2008, revised 2010).

#### 3.1.1 Commercial Sector

Commercial fishing within the reef fish fishery occurs year round; however, during some times of the year, fishing may be closed for some species. Since 1990, commercial fishing vessels that harvest reef fish from the Gulf of Mexico (Gulf) exclusive economic zone (EEZ) must possess a federal Gulf reef fish commercial permit, which is a limited access permit (GMFMC 1989). Since 2010, those that use bottom longline gear in the Gulf EEZ east of 85°30' W. must also have a valid Eastern Gulf longline endorsement (GMFMC 2010). As of October 24, 2017, a total of 844 vessels possess a reef fish commercial permit (766 valid and 75 renewable), and 62 vessels possess a bottom longline endorsement (61 valid and one renewable). A permit in renewable status is an expired limited access permit that may not be actively fished, but is renewable for up to one year after expiration. Approximately 98% of the Gulf reef fish permits list a mailing recipient in a Gulf state (Table 3.1.1.1). Commercial landings from the Gulf reef fish fishery ranged from 531 to 576 vessels annually since 2012.

**Table 3.1.1.1.** Number and percentage of vessels with a commercial Gulf reef fish permit by state.

State	Commercial Gulf Reef Fish Permits	
	Number	Percent
Alabama	37	4.4%
Florida	668	79.4%
Louisiana	39	4.6%
Mississippi	7	0.8%
Texas	74	8.8%
<b>Subtotal</b>	<b>825</b>	<b>98.1%</b>
Other	16	1.9%
<b>Total</b>	<b>841</b>	<b>100.0%</b>

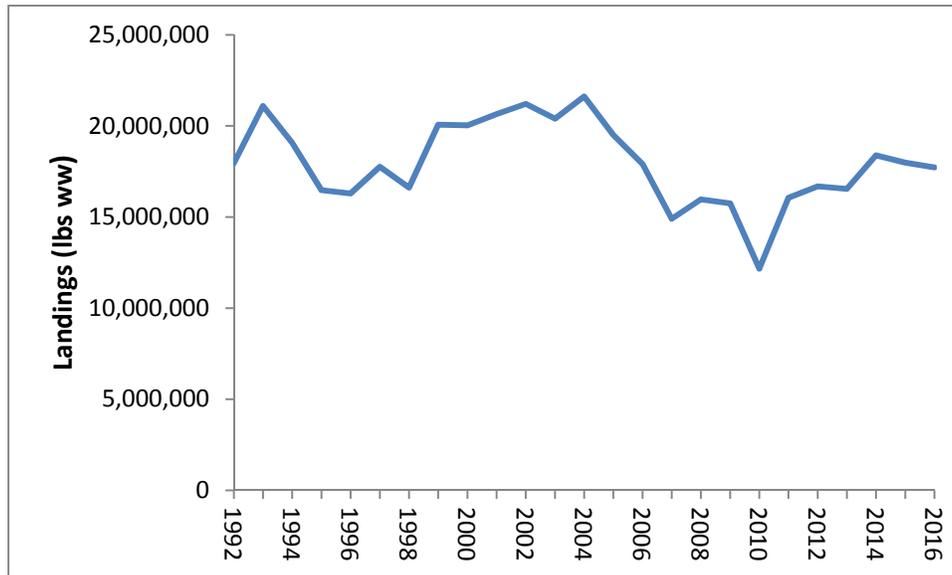
Source: NMFS SERO Permits website (October 24, 2017).

Gulf reef fish management measures for fish harvested commercially are in place to constrain fishing effort or protect spawning stock. These management measures can include annual catch limits (ACL), annual catch targets (ACT), time and area/gear restrictions, minimum size limits, trip limits, fixed season closures, and accountability measures (AM). These AMs can state that if commercial landings reach, or are projected to reach the ACT, the commercial sector will close for the remainder of the fishing year. In addition, for species that are considered overfished, if commercial landings exceed the commercial ACL, the commercial quota and the commercial ACL will be reduced for the following fishing year by the amount of the overage in the prior fishing year. Also, certain Gulf reef fish species (black grouper, scamp, yellowmouth grouper, yellowfin grouper, warsaw grouper, snowy grouper, speckled hind, yellowedge grouper, red snapper, tilefish, goldface tilefish, and blueline tilefish) are managed under the Gulf Individual Fishing Quota (IFQ) program. Since the implementation of their respective IFQ programs, commercial quota closures for these species have not occurred.

Commercial fishermen use several different gears in Gulf federal waters to harvest reef fish including: bottom longline gear, vertical line gear (e.g., hook-and-line, handline, and bandit reels), and spearfishing gear. Vertical line gear has been the predominant gear in the commercial harvest of reef fish, accounting for approximately 47% of total landings from 1992 through 2016 (Southeast Fishery Science Center [SEFSC] Commercial ACL Data Set October 2017). Bottom longlines account for approximately 31% of total landings from 1992 through 2016 (SEFSC Commercial ACL Data Set October 2017). The remaining 22% of the commercial reef fish landings were made by diving and with nets from 1992 through 2016 (SEFSC Commercial ACL Data Set October 2017). Vessels in the eastern Gulf use bottom longlines and vertical lines to catch primarily groupers. In the northern Gulf, commercial catches differ by gear with vessels using vertical lines catching primarily snapper (red and vermilion) and vessels using bottom longlines catching primarily deep-water groupers (GMFMC 2004a).

While commercial landings records have been required since 1984 (GMFMC 1981), regular and more complete logbook reporting did not begin until the early 1990s. Commercial landings have generally fluctuated since 1992 with less variation seen in recent years (Figure 3.1.1.1). A peak

year of commercial reef fish landings, approximately 21.6 million pounds (mp), occurred in 2004 with the lowest commercial landings occurring in 2010 (approximately 12 mp). The sharp decline of commercial landings seen in 2010 was most likely attributed to the 2010 *Deepwater Horizon MC252* oil spill. Since 2010, overall commercial reef fish landings have increased.



**Figure 3.1.1.1.** Commercial landings (lbs ww) of species currently managed under the Reef Fish Fishery Management Plant (FMP) from 1992 to 2016.

Source: SEFSC commercial (October 2017) ACL datasets.

### 3.1.2 Recreational Sector

Recreational fishing within the reef fish fishery also occurs year round and is closed at certain times of the year for some species. Recreational anglers fish through a variety of fishing modes which are classified generally as shore, private/rental, charter vessel, and headboat (party boats). The latter two comprise the for-hire component of the federal recreational sector. Although charter vessels tend to be smaller, on average, than headboats, the main distinction between the two types of operations is that charter vessels charge by the trip, regardless of how many passengers are carried, whereas headboats charge per individual angler.

The National Marine Fisheries (NMFS) does not require a recreational permit for private angling of reef fish in federal waters of the Gulf, although states each require their own recreational fishing licenses while in their respective state waters. However, a federal charter vessel/headboat permit for reef fish has been required to take paying passengers fishing in federal waters since 1996. The for-hire component currently operates under a limited access system, meaning that no additional permits are available, although existing permits may be transferred (GMFMC 2005b). The charter vessel/headboat permit does not distinguish between charter vessels and headboats, though information on the primary method of operation is collected on the permit application form. Some vessels may operate as both a charter vessel and a headboat, depending on the season or purpose of a trip. On October 24, 2017, there were 1,274

vessels with a valid (non-expired) or renewable Gulf charter vessel/headboat permit for reef fish (including historical captain permits). From 2012-2015, 68 of these permits were for headboats. In 2016, there were 69. Additionally, 162 of charter/headboat permitted vessels also had a Gulf commercial reef fish permit and are referred to as dual-permitted vessels. Approximately 96% of the charter vessel/headboat permits list a mailing recipient in a Gulf state (Table 3.1.2.1.). All federally permitted charter vessel/headboat reef fish permit holders must also comply with the same sea turtle release gear and document requirements as the commercial sector.

**Table 3.1.2.1.** Number and percentage of vessels with a Gulf charter vessel/headboat permit for reef fish by states.

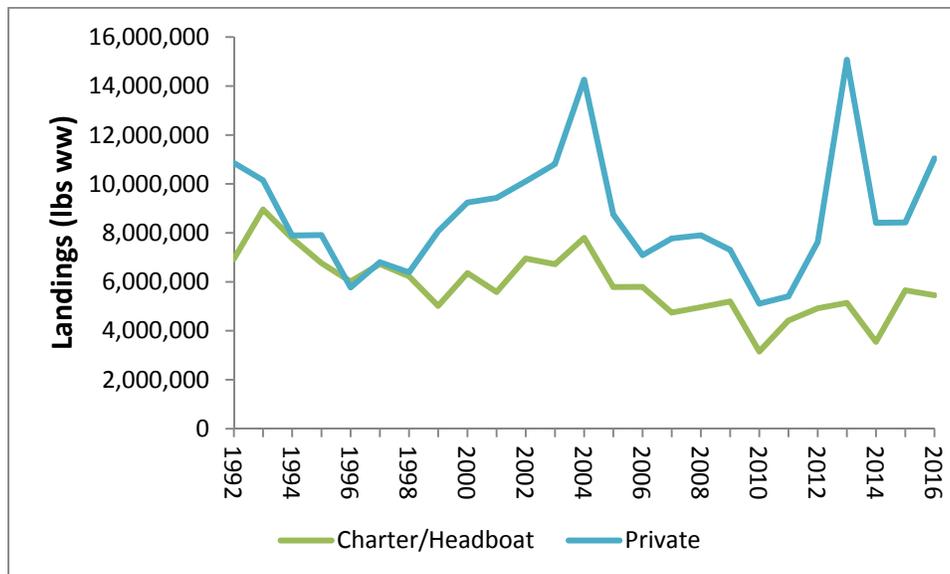
State	Charter/Headboat Gulf Reef Fish Permits	
	Number	Percent
Alabama	128	10.0%
Florida	743	58.3%
Louisiana	104	8.2%
Mississippi	34	2.7%
Texas	220	17.3%
<b>Subtotal</b>	<b>1229</b>	<b>96.5%</b>
Other	45	3.5%
<b>Total</b>	<b>1274</b>	<b>100.0%</b>

Source: NMFS SERO Permits website (October 24, 2017).

Management measures for Gulf reef fish harvested recreationally are used for the same reasons as the commercial sector. Management measures may vary between the commercial and recreational sector for the same species. For example, the recreational sector uses bag limits set as per person per day, while the commercial sector uses vessel trip limits for some species. Additionally, charter vessel/headboat permit holders are restricted to a zero bag limit for captain and crew.

The primary gear used in the recreational sector is manual handlines with the occasional electric reel. Some harvest is conducted by spear, although it is only a small percentage. Private recreational landings of reef fish began being reported in 1979 with the Marine Recreational Fisheries Statistics Survey (MRFSS), although landings in 1979 and 1980 have been considered unreliable. In recent years, recreational landings have been provided by the Marine Recreational Information Program (MRIP), the Southeast Region Headboat Survey (SRHS), the Texas Parks and Wildlife Department (TPWD), and the Louisiana (LA) Creel Survey. Landings of recreationally caught reef fish peaked in 2004 at approximately 22 mp, but have been well below this level in subsequent years except for 2013 when landings reached approximately 20 mp. Private recreational landings from 1992 through 2016 averaged approximately 8.7 mp with charter vessel/headboat recreational landings averaging 5.8 mp (Figure 3.1.2.1). Private angling landings have generally had fluctuations with sharp spikes seen around every 10 years. Charter vessel/headboat landings have followed a similar pattern, but with smaller fluctuations and a decreasing trend overall. The decline in landings seen in 2010 was most likely attributed to the

2010 *Deepwater Horizon* MC252 oil spill. From 2012-2016, the majority of recreational reef fish trips, 82%, were conducted in waters adjacent to Florida.



**Figure 3.1.2.1.** Recreational charter vessel/headboat landings and private angling landings (lbs ww) of species currently managed under the Reef Fish FMP from 1992 to 2016.

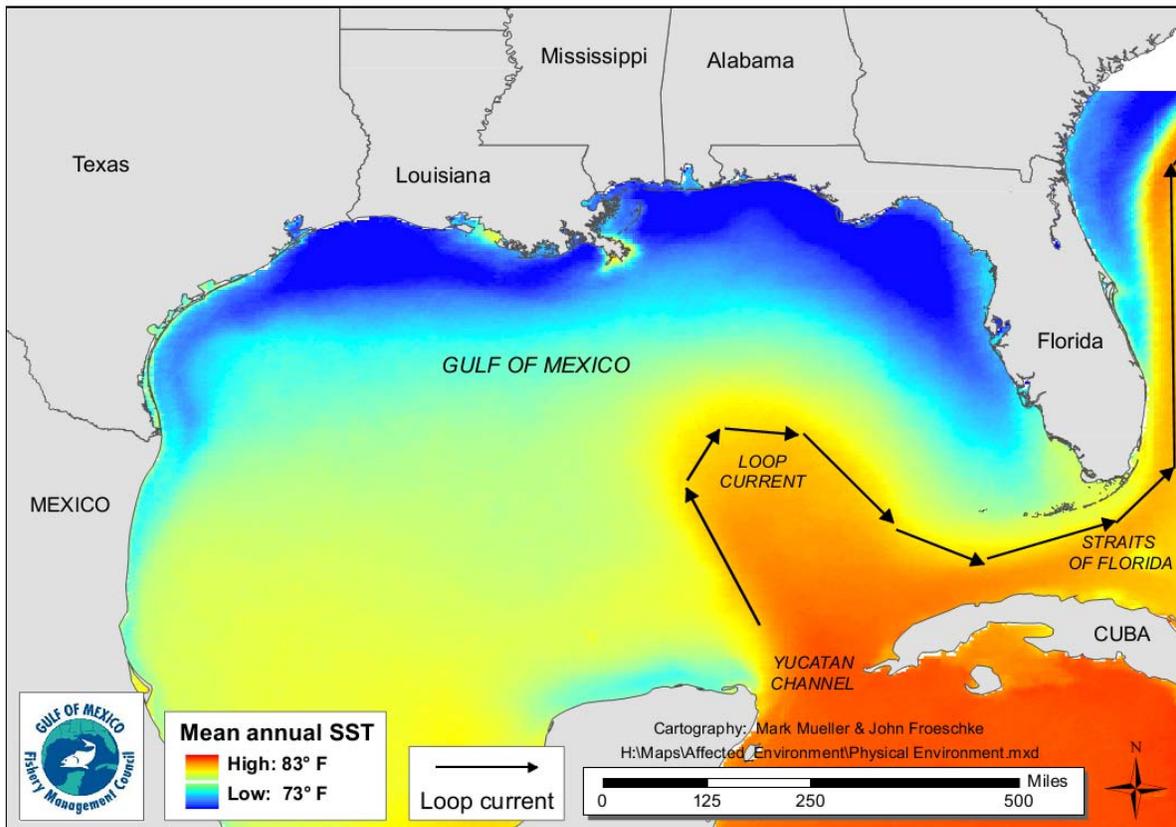
Source: SEFSC recreational (October 2017) ACL datasets. Recreational landings were estimates from the Marine Recreational Information Program, Texas Parks and Wildlife Department, Louisiana Creel, and Southeast Region Headboat Surveys.

### 3.2 Description of the Physical Environment

The physical environment for Gulf reef fish is detailed in the Generic Essential Fish Habitat (EFH) Amendment (GMFMC 2004a), Generic Amendment 3 (GMFMC 2005c), and the Generic ACL/ AM Amendment (GMFMC 2011a), which are hereby incorporated by reference.

The Gulf has a total area of approximately 600,000 square miles (1.5 million km<sup>2</sup>), including state waters (Gore 1992). It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel (Figure 3.2.1). Oceanographic conditions are affected by the Loop Current, discharge of freshwater into the northern Gulf, and a semi-permanent, anti-cyclonic gyre in the western Gulf. The Gulf includes both temperate and tropical waters (McEachran and Fechhelm 2005). Mean annual sea surface temperatures ranged from 73 through 83° F (23-28° C) including bays and bayous (Figure 3.2.1) between 1982 and 2009, according to satellite-derived measurements<sup>2</sup>. In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

<sup>2</sup> <http://accession.nodc.noaa.gov/0072888>



**Figure 3.2.1.** Mean annual sea surface temperature derived from the Advanced Very High Resolution Radiometer Pathfinder Version 5 sea surface temperature data set (<http://pathfinder.nodc.noaa.gov>).

### Habitat Areas of Particular Concern

Generic Amendment 3 (GMFMC 2005c) for addressing EFH, Habitat Areas of Particular Concern (HAPC), and adverse effects of fishing in the following FMPs, including the Gulf Reef Fish Resources, Red Drum, and Coastal Migratory Pelagics is hereby incorporated by reference.

### Environmental Sites of Special Interest Relevant to Reef Fish, Red Drum, Coastal Migratory Pelagics, and Red Drum. (Figure 3.2.2)

Longline/Buoy Gear Area Closure – Permanent closure to use of these gears for reef fish harvest inshore of 118 feet (36.6 meters) off the Florida shelf and inshore of 293 feet (91.4 meters) for the remainder of the Gulf, and encompasses 72,300 square nautical miles (nm<sup>2</sup>) or 133,344 km<sup>2</sup> (GMFMC 1989). Bottom longline gear is prohibited inshore of 35 fathoms (54.3 meters) during the months of June through August in the eastern Gulf (GMFMC 2010), but is not depicted in Figure 3.2.2.

Madison-Swanson and Steamboat Lumps Marine Reserves – No-take marine reserves (total area is 219 nm<sup>2</sup> or 405 km<sup>2</sup>) sited based on gag spawning aggregation areas where all fishing is prohibited except surface trolling from May through October (GMFMC 1999; GMFMC 2003).

The Edges Marine Reserve – All fishing is prohibited in this area (390 nm<sup>2</sup> or 1,338 km<sup>2</sup>) from January through April and possession of any fish species is prohibited, except for such possession aboard a vessel in transit with fishing gear stowed as specified. These provisions do not apply to highly migratory species (GMFMC 2008c).

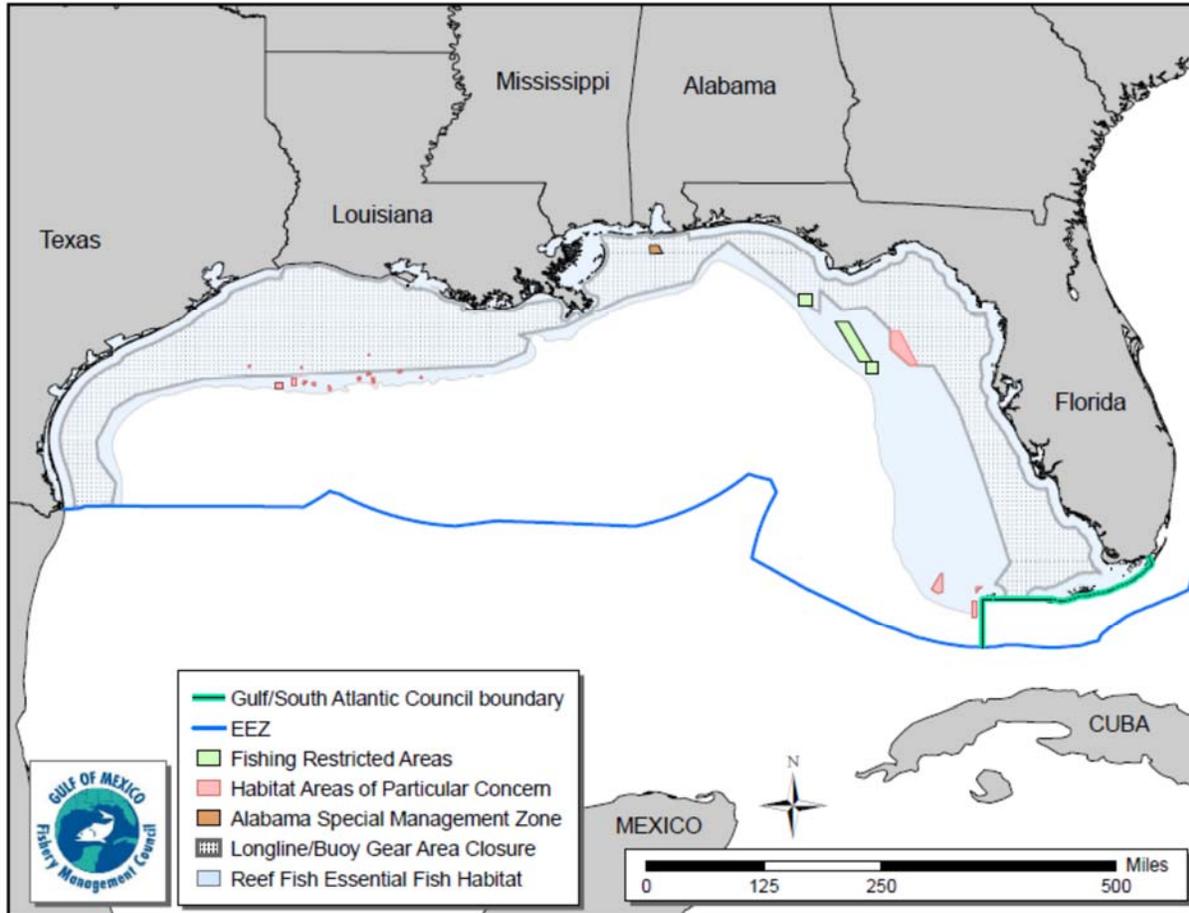
Tortugas North and South Marine Reserves – No-take marine reserves (185 nm<sup>2</sup>) cooperatively implemented by the state of Florida, National Ocean Service, the Gulf of Mexico Fishery Management Council (Council), and the National Park Service in Generic Amendment 2 Establishing the Tortugas Marine Reserves (GMFMC 2001).

Reef and bank areas designated as HAPCs in the northwestern Gulf include – 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 – pristine coral areas protected by preventing the use of some fishing gear that interacts with the bottom and prohibited use of anchors (totaling 263.2 nm<sup>2</sup> or 487.4 km<sup>2</sup>). Subsequently, three of these areas were established as marine sanctuaries (i.e., East and West Flower Garden Banks and Stetson Bank). Bottom anchoring and the use of trawling gear, bottom longlines, buoy gear, and all traps/pots on coral reefs are prohibited in the East and West Flower Garden Banks, McGrail Bank, and on significant coral resources on Stetson Bank (GMFMC 2005c).

Florida Middle Grounds HAPC – Pristine soft coral area (348 nm<sup>2</sup> or 644.5 km<sup>2</sup>) that is protected by prohibiting the following gear types: bottom longlines, trawls, dredges, pots and traps (GMFMC and SAFMC 1982).

Pulley Ridge HAPC – A portion of the HAPC (2,300 nm<sup>2</sup> or 4,259 km<sup>2</sup>) where deepwater hermatypic coral reefs are found is closed to anchoring and the use of trawling gear, bottom longlines, buoy gear, and all traps/pots (GMFMC 2005c).

Alabama Special Management Zone – For vessels operating as a charter vessel or headboat, a vessel that does not have a commercial permit for Gulf reef fish, or a vessel with such a permit fishing for Gulf reef fish, fishing is limited to hook-and-line gear with no more than three hooks. Nonconforming gear is restricted to recreational bag limits, or for reef fish without a bag limit, to 5% by weight of all fish aboard.



**Figure 3.2.2.** Map of most fishery management closed areas in the Gulf.  
 Note: An interactive map of these areas is available at <http://portal.gulfcouncil.org/FisheryManagementAreas.html>.

### Deepwater Horizon MC252

The *Deepwater Horizon MC252* oil spill in 2010 affected at least one-third of the Gulf area from western Louisiana east to the Florida Panhandle and south to the Campeche Bank in Mexico. The impacts of the *Deepwater Horizon MC252* oil spill on the physical environment are expected to be significant and may be long-term. Oil was dispersed on the surface, and because of the heavy use of dispersants (both at the surface and at the wellhead), oil was also documented as being suspended within the water column, some even deeper than the location of the broken well head. Floating and suspended oil washed onto shore in several areas of the Gulf, as did non-floating tar balls. Whereas suspended and floating oil degrades over time, tar balls are persistent in the environment and can be transported hundreds of miles.

Surface or submerged oil during the *Deepwater Horizon MC252* event could have restricted the normal processes of atmospheric oxygen mixing into and replenishing oxygen concentrations in the water column, thus affecting the long-standing hypoxic zone located west of the Mississippi

River on the Louisiana continental shelf. In addition, microbes in the water that break down oil and dispersant also consume oxygen, which could lead to further oxygen depletion. Zooplankton that feed on algae could also be negatively impacted, thus allowing more of the hypoxia-fueling algae to grow.

### 3.3 Description of the Biological/Ecological Environment

#### General Information on Reef Fish Species

Reef fish are widely distributed in the Gulf, occupying both pelagic and benthic habitats during their life cycle. Habitat types and life history stages can be found in more detail in Amendment 23 (GMFMC 2004c). In general, both eggs and larval stages are planktonic. Larval fish feed on zooplankton and phytoplankton. Gray triggerfish and gray snapper are exceptions, to this generalization as gray triggerfish lay their eggs in nests on the sandy bottom (Simmons and Szedlmayer 2012) and gray snapper larvae are found around submerged aquatic vegetation. Juvenile and adult reef fish are typically demersal, and are usually associated with bottom topographies on the continental shelf (less than 328 feet; less than 100 m) which have high relief, i.e., coral reefs, artificial reefs, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings. However, several species are found over sand and soft-bottom substrates. Juvenile red snapper are common on mud bottoms in the northern Gulf, particularly from Texas to Alabama. Also, some juvenile snappers (e.g., mutton, gray, red, dog, lane, and yellowtail snappers) and groupers (e.g., goliath grouper, red, gag, and yellowfin groupers) have been documented in inshore seagrass beds, mangrove estuaries, lagoons, and larger bay systems (GMFMC 1981). More detail on hard bottom substrate and coral can be found in the Fishery Management Plan (FMP) for Corals and Coral Reefs (GMFMC and SAFMC 1982).

## Status of Reef Fish Stocks

The Reef Fish FMP currently encompasses 31 species (Table 3.3.1). Eleven other species were removed from the FMP in 2012 through the Generic ACL/AM Amendment (GMFMC 2011a). The NMFS Office of Sustainable Fisheries updates its Status of U.S. Fisheries Report to Congress<sup>3</sup> on a quarterly basis utilizing the most current stock assessment information. Stock assessments and status determinations have been conducted and designated for 12 stocks and can be found on the Council<sup>4</sup> and SEDAR<sup>5</sup> websites (Table 3.3.2). Of the 12 stocks for which stock assessments have been conducted, the third quarter report of the 2017 Status of U.S. Fisheries classifies three as overfished (greater amberjack, gray triggerfish, and red snapper), and the only one as undergoing overfishing (greater amberjack).

A stock assessment for Atlantic goliath grouper has been conducted, but upon review by the Scientific and Statistical Committee (SSC), the assessment was deemed not suitable for stock status and management advice (Table 3.3.3). Stock assessments were conducted for seven stocks using the Data Limited Methods Toolkit (DLMTToolkit) although only lane snapper was able to have overfishing limit (OFL) and annual biological catch (ABC) limits set based on the limited data (Table 3.3.4).

The status of both assessed and unassessed stocks, as of the writing of this report is provided in Table 3.3.1. However, it should be noted that greater amberjack, gray triggerfish, and red snapper are under rebuilding plans. Reef fish Amendment 44 (GMFMC 2017a), implemented December 21, 2017 modified the minimum stock size threshold for seven species in the Reef Fish FMP. After the next Status of U.S. Fisheries Report to Congress is completed, red snapper and gray triggerfish will be listed as not overfished but rebuilding, because the biomass for the stock is currently estimated to be greater than 50% of  $B_{MSY}$ . The greater amberjack stock will remain classified as overfished.

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<sup>3</sup> [http://www.nmfs.noaa.gov/sfa/fisheries\\_eco/status\\_of\\_fisheries/status\\_updates.html](http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/status_updates.html)

<sup>4</sup> [www.gulfcouncil.org](http://www.gulfcouncil.org)

<sup>5</sup> [www.sedarweb.org](http://www.sedarweb.org)

**Table 3.3.1.** Status of species in the Reef Fish FMP grouped by family.

Common Name	Scientific Name	Stock Status
<b>Family Balistidae – Triggerfishes</b>		
gray triggerfish	<i>Balistes capriscus</i>	Overfished, no overfishing
<b>Family Carangidae – Jacks</b>		
greater amberjack	<i>Seriola dumerili</i>	Overfished, overfishing
lesser amberjack	<i>Seriola fasciata</i>	Unknown if overfished, no overfishing
almaco jack	<i>Seriola rivoliana</i>	Unknown if overfished, no overfishing
banded rudderfish	<i>Seriola zonata</i>	Unknown
<b>Family Labridae – Wrasses</b>		
*hogfish	<i>Lachnolaimus maximus</i>	Not overfished, no overfishing
<b>Family Malacanthidae – Tilefishes</b>		
tilefish (golden)	<i>Lopholatilus chamaeleonticeps</i>	Not overfished, no overfishing
blueline tilefish	<i>Caulolatilus microps</i>	Unknown
goldface tilefish	<i>Caulolatilus chrysops</i>	Unknown
<b>Family Serranidae – Groupers</b>		
gag	<i>Mycteroperca microlepis</i>	Not overfished, no overfishing
red grouper	<i>Epinephelus morio</i>	Not overfished, no overfishing
scamp	<i>Mycteroperca phenax</i>	Unknown
black grouper	<i>Mycteroperca bonaci</i>	Not overfished, no overfishing
yellowedge grouper	** <i>Hyporthodus flavolimbatus</i>	Unknown if overfished, no overfishing
snowy grouper	** <i>Hyporthodus niveatus</i>	Unknown if overfished, no overfishing
speckled hind	<i>Epinephelus drummondhayi</i>	Unknown if overfished, no overfishing
yellowmouth grouper	<i>Mycteroperca interstitialis</i>	Unknown if overfished, no overfishing
yellowfin grouper	<i>Mycteroperca venenosa</i>	Unknown
warsaw grouper	** <i>Hyporthodus nigritus</i>	Unknown if overfished, no overfishing
***Atlantic goliath grouper	<i>Epinephelus itajara</i>	Unknown if overfished, no overfishing
<b>Family Lutjanidae – Snappers</b>		
queen snapper	<i>Etelis oculatus</i>	Unknown if overfished, no overfishing
mutton snapper	<i>Lutjanus analis</i>	Not overfished, no overfishing
blackfin snapper	<i>Lutjanus buccanella</i>	Unknown if overfished, no overfishing
red snapper	<i>Lutjanus campechanus</i>	Overfished, no overfishing
cupera snapper	<i>Lutjanus cyanopterus</i>	Unknown if overfished, no overfishing
gray snapper	<i>Lutjanus griseus</i>	Unknown if overfished, no overfishing
lane snapper	<i>Lutjanus synagris</i>	Unknown if overfished, no overfishing
silk snapper	<i>Lutjanus vivanus</i>	Unknown
yellowtail snapper	<i>Ocyurus chrysurus</i>	Not overfished, no overfishing
vermilion snapper	<i>Rhomboplites aurorubens</i>	Not overfished, no overfishing
wenchman	<i>Pristipomoides aquilonaris</i>	Unknown if overfished, no overfishing

Notes: \*The East Florida/Florida Keys hogfish stock is considered overfished and undergoing overfishing.

\*\*In 2013 the genus for yellowedge grouper, snowy grouper, and warsaw grouper was changed by the American Fisheries Society from *Epinephelus* to *Hyporthodus* (American Fisheries Society 2013).

\*\*\*Atlantic goliath grouper is a protected grouper and benchmarks do not reflect appropriate stock dynamics. In 2013 the common name was changed from goliath grouper to Atlantic goliath grouper by the American Fisheries Society to differentiate from the Pacific goliath grouper, a newly named species (American Fisheries Society 2013).

**Table 3.3.2.** Reef fish stock that have assessments and accepted status determinations.

Stock	Stock Status		Most Recent SSC Determination	Most Recent Stock Assessment
	Overfishing	Overfished		
black grouper	N	N	Mar 2010	SEDAR 19 2010
yellowedge grouper	N	N	May 2011	SEDAR 22 2011b
tilefish (golden)	N	N	May 2011	SEDAR 22 2011a
yellowtail snapper	N	N	Oct 2012	SEDAR 27A 2012
red snapper	N	Y	Jan 2015	SEDAR 31 Update 2015
hogfish	N	N	Oct 2014	SEDAR 37 2013
mutton snapper	N	N	May 2015	SEDAR 15A Update 2015
gray triggerfish	N	Y	Jan 2016	SEDAR 43 2015
red grouper	N	N	Jan 2016	SEDAR 42 2015
vermilion snapper	N	N	Jun 2016	SEDAR 45 2016
gag	N	N	Jan 2017	SEDAR 33 Update 2016b
greater amberjack	Y	Y	Mar 2017	SEDAR 33 Update 2016a

A stock assessment has been conducted for Atlantic Goliath grouper (Table 3.3.3). The SSC accepted the assessment's general findings that the stock was not overfished nor experiencing overfishing. The Atlantic Goliath grouper assessment was deemed not suitable for stock status and management advice but was determined to not be experiencing overfishing based on annual harvest remaining below the OFL. There has been no assessment-based status determination.

**Table 3.3.3.** Reef fish stocks deemed unsuitable by the SSC for stock status and management advice.

Stock	Stock Status		Most Recent SSC Determination	Most Recent Stock Assessment
	Overfishing	Overfished		
Atlantic goliath grouper	N	unknown	Sep 2016	SEDAR 47 2016

For SEDAR 49, data limited methods were attempted for seven reef fish stocks listed in Table 3.3.4. This method allows the setting of OFL and ABC based on limited data and life history information, but does not provide assessment-based status determinations. Data were requested for the following stocks but it was determined not enough information was available to complete an assessment even using the DLMTToolkit. These stocks are not experiencing overfishing based on annual harvest remaining below the OFL, but no overfished status determination has been made (Table 3.3.4). Lane snapper was the only stock with adequate data to be assessed using the DLMTToolkit methods resulting in OFL and ABC recommendations by the SSC.

**Table 3.3.4.** Reef fish stocks were data limited assessments were attempted but without stock status determinations.

Stock	Stock Status		Most Recent SSC Determination	Most Recent SSC Workshop
	Overfishing	Overfished		
lane snapper	N	unknown	Mar 2017	SEDAR 49 2016
wenchman	N	unknown	Mar 2017	SEDAR 49 2016
almaco jack	N	unknown	Mar 2017	SEDAR 49 2016
lesser amberjack	N	unknown	Mar 2017	SEDAR 49 2016
speckled hind	N	unknown	Mar 2017	SEDAR 49 2016
snowy grouper	N	unknown	Mar 2017	SEDAR 49 2016
yellowmouth grouper	N	unknown	Mar 2017	SEDAR 49 2016

### Bycatch

Many reef fish species co-occur and can be incidentally caught, resulting in harvest, when fishermen target certain reef fish species. In some cases, these fish may be discarded for regulatory reasons and thus are considered bycatch. Bycatch practicability analyses have been completed for red snapper (GMFMC 2004b, GMFMC 2007, GMFMC 2014, GMFMC 2015), grouper (GMFMC 2008a, GMFMC 2010, GMFMC 2011b, GMFMC 2012c), vermilion snapper (GMFMC 2004c), greater amberjack (GMFMC 2008b, GMFMC 2012a, GMFMC 2017b), gray triggerfish (GMFMC 2012b), and hogfish (GMFMC 2016). These analyses examined the effects of fishing on these species. In general, these analyses have found that reducing bycatch provides biological benefits to managed species as well as benefits to the fishery through less waste, higher yields, and less forgone yield. However, in some cases, actions are approved that can increase bycatch through regulatory discards such as increased minimum sizes and closed seasons. Under these circumstances, there is some biological benefit to the managed species that outweigh any increases in discards from the action.

## Protected Species

The Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) provide special protections to some species that occur in the Gulf. A very brief summary of these two laws and more information is available on NMFS Office of Protected Resources website.<sup>4</sup> All 22 marine mammals in the Gulf are protected under the MMPA. Two marine mammals (sperm whales and manatees) are also protected under the ESA. Other species protected under the ESA that occur in the Gulf include sea turtles (Kemp's ridley, loggerhead (Northwest Atlantic Ocean distinct population segment [DPS]), green (South Atlantic and North Atlantic DPSs), leatherback, and hawksbill), three fish (Gulf sturgeon, smalltooth sawfish, and Nassau grouper), and seven corals (elkhorn, staghorn, pillar, rough cactus, lobed star, mountainous star, and boulder star). Critical habitat designated under the ESA for smalltooth sawfish, Gulf sturgeon, and the Northwest Atlantic Ocean DPS of loggerhead sea turtles also occur in the Gulf, though only loggerhead critical habitat occurs in federal waters.

The most recent biological opinion (Bi Op) on the Reef Fish FMP was completed on September 30, 2011. The Bi Op determined the continued authorization of the Gulf reef fish fishery managed under the Reef Fish FMP is not likely to affect ESA-listed marine mammals or corals, and is not likely to jeopardize the continued existence of sea turtles (loggerhead, Kemp's ridley, green, hawksbill, and leatherback), or smalltooth sawfish. An incidental take statement was provided. Since issuing the Bi Op, in memoranda dated September 16, 2014, and October 7, 2014, NMFS concluded that the activities associated with the Reef Fish FMP are not likely to adversely affect four species of newly listed corals (rough cactus, lobed star, mountainous star, and boulder star) or critical habitat for the Northwest Atlantic Ocean loggerhead sea turtle DPS.

On April 6, 2016, NMFS and the U.S. Fish and Wildlife Service published a final rule (81 FR 2007) removing the range-wide and breeding population ESA listings of the green sea turtle and listing eight DPSs as threatened and three DPSs as endangered, effective May 6, 2016. Two of the green sea turtle DPSs, the North Atlantic DPS and the South Atlantic DPS, occur in the Gulf and are listed as threatened. In addition, on June 29, 2016, NMFS published a final rule (81 FR 42268) listing Nassau grouper as threatened under the ESA. NMFS has reinitiated consultation on the Reef Fish FMP to address the listing of green sea turtle DPSs and Nassau grouper and determined that allowing fishing under the Reef Fish FMP to continue during the reinitiation period is not likely to jeopardize the continued existence of these DPSs or Nassau grouper<sup>6</sup>.

The following sections provide a brief overview of the marine mammals, sea turtles, and fish that may be present in or near areas where Gulf reef fish fishing occurs and their general life history characteristics. Since none of the listed corals or designated critical habitats in the Gulf are likely to be adversely affected by the Gulf reef fish fishery, they are not discussed further.

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<sup>6</sup> <http://www.nmfs.noaa.gov/pr/laws/>

## *Marine Mammals*

The 22 species of marine mammals in the Gulf include one sirenian species (a manatee), which is under U.S. Fish and Wildlife Service jurisdiction, and 21 cetacean species (dolphins and whales), all under NMFS' jurisdiction. Manatees primarily inhabit rivers, bays, canals, estuaries, and coastal waters rich in seagrass and other vegetation off Florida, but can occasionally be found in seagrass habitats as far west as Texas. Although most of the cetacean species reside in the oceanic habitat (depth greater than or equal to 200 m), the Atlantic spotted dolphin is found in waters over the continental shelf (20-200 m), and the common bottlenose dolphin (hereafter referred to as bottlenose dolphins) is found throughout the Gulf, including within bays, sounds, and estuaries; coastal waters over the continental shelf; and in deeper oceanic waters.

**Sperm whales** are one of the cetacean species found in offshore waters of the Gulf (greater than 200 m) and are listed endangered under the ESA. Sperm whales are the largest toothed whales and are found year-round in the northern Gulf along the continental slope and in oceanic waters (Waring et al. 2013). There are several areas between Mississippi Canyon and De Soto Canyon where sperm whales congregate at high densities, likely because of localized, highly productive habitats (Biggs et al. 2005; Jochens et al. 2008). There is a resident population of female sperm whales, and whales with calves frequently sighted there.

**Bryde's whales** are the only resident baleen whales in the Gulf and are currently being evaluated to determine if listing under the ESA is warranted. Bryde's whales (pronounced "BREW-days") in the Gulf are currently restricted to a small area in the northeastern Gulf near De Soto Canyon in waters between 100 – 400 m depth along the continental shelf break, though information in the southern Gulf is sparse (Waring et al. 2013). On September 18, 2014, NMFS received a revised petition from the Natural Resource Defense Council to list the Gulf Bryde's whale as an endangered DPS. On April 6, 2015, NMFS found the petitioned action may be warranted and convened a Status Review Team to prepare a status review report. On December 8, 2016, NMFS published a proposed rule to list the Gulf Bryde's whale as endangered under the ESA (81 FR 88639). NMFS solicited public comments on the proposed rule and is developing a final rule.

Although they are all the same species, **bottlenose dolphins** in the Gulf can be separated into demographically independent populations called stocks. Bottlenose dolphins are currently identified by NMFS as 36 distinct stocks within the Gulf. These include 31 bay, sound and estuary stocks, three coastal stocks, one continental shelf stock, and one oceanic stock (Waring et al. 2013). Additional climatic and oceanographic boundaries delineate the three coastal stocks such that the Gulf Eastern Coastal Stock ranges from 84°W to Key West, FL, the Northern Coastal Stock ranges from 84°W to the Mississippi River Delta, and the Gulf Western Coastal stock ranges from the Mississippi River Delta to the Texas/Mexico border. Marine Mammal Stock Assessment Reports and additional information on these species in the Gulf are available on the NMFS Office of Protected Species website<sup>7</sup>.

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<sup>7</sup> <http://www.nmfs.noaa.gov/pr/sspecies/>

The MMPA requires that each commercial fishery be classified by the number of marine mammals they seriously injure or kill. NMFS's List of Fisheries classifies U.S. commercial fisheries into three categories based on the number of incidental mortality or serious injury they cause to marine mammals. More information can be found on the website for the List of Fisheries and the classification process<sup>8</sup>.

NMFS classifies reef fish bottom longline/hook-and-line gear in the MMPA proposed 2018 List of Fisheries as a Category III fishery (82 FR 47424). This classification indicates the annual mortality and serious injury of a marine mammal stock resulting from any fishery is less than or equal to 1% of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. Dolphins are the only species documented as interacting with these fisheries. Bottlenose dolphins are a common predator around reef fish vessels. They prey upon bait, catch, and/or released discards of fish from the reef fish fishery.

### *Sea Turtles*

Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the Gulf and other open ocean waters. Several volumes exist that cover the biology and ecology of these species (Lutz and Musick 1997; Lutz et al. 2003; Wynekan et al. 2013).

**Green** sea turtles are the largest of the hardshell marine turtles, growing to a weight of 350 lbs (159 kg) with a straight carapace length of greater than 3.3 ft (1 m). Hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with Sargassum rafts (Carr 1987; Walker 1994). At approximately 20 to 25 cm carapace length, juveniles migrate from pelagic habitats to benthic foraging areas in nearshore tropical and subtropical waters (Bjorndal 1997). As juveniles move into benthic foraging areas a diet shift towards herbivory occurs. They consume primarily seagrasses and algae, but are also known to consume jellyfish, salps, and sponges (Bjorndal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtles species vary by their life stages. The maximum diving depth of green sea turtles is estimated at 110 m (360 ft) (Frick 1976), but they are most frequently making dives of less than 20 m (65 ft) (Walker 1994). The time of these dives also varies by life stage. The maximum dive length is estimated at 66 minutes with most dives lasting from 9 to 23 minutes (Walker 1994).

**Hawksbill** sea turtles are small- to medium-sized (99-150 lbs on average [45-68 kg]) although females nesting in the Caribbean are known to weigh up to 176 lbs (80 kg) (Pritchard et al. 1983). Hatchlings have a pelagic stage that lasts from the time they leave the nesting beach until they are approximately 22-25 cm in straight carapace length (Meylan 1988; Meylan and Donnelly 1999). The pelagic stage is followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Hawksbill sea turtles have a circumtropical distribution and usually occur between latitudes 30°N and 30°S in the Atlantic,

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<sup>8</sup> <http://www.nmfs.noaa.gov/pr/interactions/fisheries/lof.html>

Pacific, and Indian Oceans. In the western Atlantic, hawksbills are widely distributed and can be found off the coasts of Florida and Texas in the continental U.S. Little is known about the diet of pelagic stage hawksbills. Adult foraging typically occurs over coral reefs, although other hardbottom communities and mangrove-fringed areas are occupied occasionally. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998). The hawkbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcareous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely, dives last about 56 minutes (Hughes 1974).

**Kemp's ridley** are the smallest of all sea turtles. Adults generally weigh less than 100 lbs (45 kg) and have a carapace length of around 2.1 ft (65 cm). The primary range of Kemp's ridley sea turtles is within the Gulf basin, though they also occur in coastal and offshore waters of the U.S. Atlantic Ocean. Hatchlings are pelagic during the early stages of life and feed in surface waters (Carr 1987; Ogren 1989). After the juveniles reach approximately 20 cm carapace length they move to relatively shallow (less than 50 m) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridley sea turtles feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, jellyfish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridley sea turtles ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or discarded bait (Shaver 1991). Given their preference for shallower water, Kemp's ridley sea turtles most routinely make dives of 50 m or less (Soma 1985; Byles 1988). Their maximum diving range is unknown. Depending on the life stage a Kemp's ridley sea turtles may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985; Mendonca and Pritchard 1986; Byles 1988). Kemp's ridley sea turtles may also spend as much as 96% of their time underwater (Soma 1985; Byles 1988).

**Leatherbacks** are the largest, most pelagic, and most vulnerable to entanglement in fishing gear of all ESA-listed sea turtles. They spend most of their time in the open ocean although they will enter coastal waters and are seen over the continental shelf on a seasonal basis to feed in areas where jellyfish are concentrated (Heppell et al. 2003). Curved carapace length often exceeds 5 ft (150 cm) and front flippers that can span almost 9 ft (270 cm) (NMFS and USFWS 1998). Mature males and females can reach lengths of over 6 ft (2 m) and weigh close to 2,000 lbs (900 kg). Leatherbacks feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks' diets do not shift during their life cycles. Because leatherbacks' ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of a half-mile (Eckert et al. 1989) but more frequently dive to depths of 50 m to 84 m (Eckert et al. 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora et al. 1984; Eckert et al. 1986; Eckert et al. 1989; Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora et al. 1984).

**Loggerhead** sea turtles inhabit continental shelf and estuarine environments throughout the U.S. Atlantic, Gulf, and Caribbean Sea. (Dodd Jr. 1988). Hatchlings forage in the open ocean and are often associated with Sargassum rafts (Hughes 1974; Carr 1987; Walker 1994; Bolten and Balazs 1995). The pelagic stage of these sea turtles are known to eat a wide range of things including salps, jellyfish, amphipods, crabs, syngnathid fish, squid, and pelagic snails (Brongersma 1972). Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight carapace length (SCL), they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic (Witzell 2002). Here they forage over hard and soft-bottom habitats for crabs, mollusks, jellyfish, and vegetation (Carr 1986; Dodd Jr. 1988). Adults in the southeast U.S. average about 3 ft (92 cm) long SCL and weigh approximately 255 lbs (116 kg) (Ehrhart and Yoder 1978). Adult loggerheads eat a variety of invertebrates with crabs and mollusks being an important prey source (Burke et al. 1993). Estimates of the maximum diving depths of loggerheads range from 211 m to 233 m (692-764 ft.) (Thayer et al. 1984; Limpus and Nichols 1988). The lengths of loggerhead dives are frequently between 17 and 30 minutes (Thayer et al. 1984, Limpus and Nichols 1988; Limpus and Nichols 1994; Lanyon et al. 1989) and they may spend anywhere from 80 to 94% of their time submerged (Limpus and Nichols 1994; Lanyon et al. 1989).

All of the above sea turtles are adversely affected by the Gulf reef fish fishery. Incidental captures are infrequent, but occur in all commercial and recreational hook-and-line and longline components of the reef fish fishery. Observer data indicate that the bottom longline component of the fishery interacts solely with loggerhead sea turtles. Captured loggerhead sea turtles can be released alive or can be found dead upon retrieval of bottom longline gear as a result of forced submergence. Sea turtles caught during other reef fish fishing with other gear types are believed to all be released alive due to shorter gear soak times. All sea turtles released alive may later succumb to injuries sustained at the time of capture or from exacerbated trauma from fishing hooks or lines that were ingested, entangled, or otherwise still attached when they were released. Sea turtle release gear and handling protocols are required in the commercial sector and charter/headboat component of the reef fish fisheries to minimize post-release mortality.

### *Protected Fish*

The **Nassau grouper's** confirmed distribution currently includes Bermuda and Florida (USA), throughout the Bahamas and Caribbean Sea (Heemstra and Randall 1993). The Nassau grouper has been documented in the Gulf at Arrecife Alacranes (north of Progreso) to the northwest off the Yucatan Peninsula, Mexico (Hildebrand et al. 1964). Nassau grouper is generally replaced ecologically in the eastern Gulf by red grouper (*E. morio*) in areas north of Key West or the Tortugas (Smith 1971). They are considered a rare or transient species off Texas in the northwestern Gulf (Gunter and Knapp 1951 in Hoese and Moore 1998).

The Nassau grouper is primarily a shallow-water, insular fish species that has long been valued as a major fish resource throughout the wider Caribbean, South Florida, Bermuda, and the Bahamas (Carter et al. 1994). As larvae, Nassau grouper are planktonic. After an average of 35-40 days and at an average size of 32 millimeters total length (TL), larvae recruit from an oceanic environment into demersal habitats (Colin 1992; Eggleston 1995). Juvenile Nassau grouper (12-

15 centimeters TL) are relatively solitary and remain in specific areas associated with macroalgae, and both natural and artificial reef structure) for months (Bardach 1958). As juveniles grow, they move progressively to deeper areas and offshore reefs (Tucker et al. 1993; Colin et al. 1997). Smaller juveniles occur in shallower inshore waters (3.7-16.5m) and larger juveniles are more common near deeper (18.3-54.9 m) offshore banks (Bardach et al. 1958; Cervigón 1966; Silva Lee 1974; Radakov et al. 1975; Thompson and Munro 1978). Adult Nassau grouper also tend to be relatively sedentary and are commonly associated with high-relief coral reefs or rocky substrate in clear waters to depths of 130 m. Generally, adults are most common at depths less than 100 m (Hill and Sadovy de Mitcheson 2013) except when at spawning aggregations where they are known to descend to depths of 255 m (Starr et al. 2007). Nassau grouper form spawning aggregations at predictable locations around the winter full moons, or between full and new moons (Smith 1971; Colin 1992; Tucker et al. 1993; Aguilar-Perera 1994; Carter et al. 1994; Tucker and Woodward 1994).

The most serious threats to the status of Nassau grouper today are fishing of spawning aggregations and inadequate law enforcement protecting spawning aggregations in many foreign nations. These threats are currently affecting the status of Nassau grouper, putting it at a heightened risk of extinction.

Historically the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. Smalltooth sawfish primarily occur in the Gulf off peninsular Florida and are most common off Southwest Florida and the Florida Keys. Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 m (Bigelow and Schroeder 1953; Adams and Wilson 1995), while mature animals occur in waters in excess of 100 m. Smalltooth sawfish feed primarily on fish. Mullet, jacks, and ladyfish are believed to be their primary food resources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1938; Bigelow and Schroeder 1953).

Smalltooth sawfish are also adversely affected by the Gulf reef fish fishery, but are interacted with at a much lesser extent than sea turtles. Although the long, toothed rostrum of the smalltooth sawfish causes this species to be particularly vulnerable to entanglement in fishing gear, incidental captures in the commercial and recreational hook-and-line components of the reef fish fishery are rare events. Only eight smalltooth sawfish are anticipated to be incidentally caught every 3 years in the entire reef fish fishery, and none of these captures are expected to result in mortality (NMFS 2011). Fishermen in this fishery are required to follow smalltooth sawfish safe handling and release guidelines.

### **Northern Gulf of Mexico Hypoxic Zone**

Every summer in the northern Gulf, a large hypoxic zone forms. It is the result of allochthonous (i.e. sediment carried from somewhere else) materials and runoff from agricultural lands by rivers to the Gulf, increasing nutrient inputs from the Mississippi River, and a seasonal layering

of waters in the Gulf<sup>9</sup>. The layering of the water is temperature and salinity dependent and prevents the mixing of higher oxygen content surface water with oxygen-poor bottom water. For 2014, the extent of the hypoxic area was estimated to be 5,052 square miles and is similar to the running average for over the past five years of 5,543 square miles Gulf.<sup>7</sup>

The hypoxic conditions in the northern Gulf directly impact less mobile benthic macroinvertebrates (e.g., polychaetes) by influencing density, species richness, and community composition (Baustian and Rabalais 2009). However, mobile macroinvertebrates and demersal fishes (e.g., red snapper) are able to detect lower dissolved oxygen levels and move away from hypoxic conditions. Therefore, although not directly affected, these organisms are indirectly affected by limited prey availability and constrained available habitat (Baustian and Rabalais 2009; Craig 2012). For red snapper, Courtney et al. (2013) have suggested that the hypoxic zone could have an indirect positive effect on red snapper populations in the western Gulf. They hypothesize that increased nutrient loading may be working in ‘synergy’ with abundant red snapper artificial habitats (oil platforms) to increase the productivity of the red snapper stock in areas that are not oxygen depleted. Nutrient loading likely increases forage species biomass and productivity providing ample prey for red snapper residing on the petroleum platforms. Grouper and tilefish are less common in the northern Gulf, so the northern Gulf hypoxic zone influences these stocks less than red snapper.

## **Climate Change**

Climate change projections predict increases in sea-surface temperature and sea level; decreases in sea-ice cover; and changes in salinity, wave climate, and ocean circulation (Intergovernmental Panel on Climate Change [IPCC]).<sup>8</sup> These changes are likely to affect plankton biomass and fish larvae abundance that could adversely impact fish, marine mammals, seabirds, and ocean biodiversity. Kennedy et al. (2002) and Osgood (2008) have suggested global climate change could affect temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions. These changes in precipitation patterns cause a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influence the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs. The National Oceanic and Atmospheric Administration (NOAA) Climate Change Web Portal<sup>10</sup> indicates the average sea surface temperature in the Gulf will increase by 1-3°C for 2010-2070 compared to the average over the years 1950-2010. For reef fishes, Burton (2008) speculated climate change could cause shifts in spawning seasons, changes in migration patterns, and changes to basic life history parameters, such as growth rates. It is unclear if reef fish distribution in the Gulf has been affected. Although not managed by the Council, the smooth puffer is an example of a reef fish species for which there has been a distributional trend to the north in the Gulf. For other species such as red snapper and the dwarf sand perch, there has been a distributional trend towards deeper waters. For other reef fish species, such as the dwarf goatfish, there has been a distributional trend both to the north and to deeper waters. These

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<sup>9</sup> <http://www.gulfhypoxia.net/>

<sup>10</sup> <http://www.esrl.noaa.gov/psd/ipcc/ocn/>

changes in distributions have been hypothesized as a response to environmental factors such as increases in temperature.

The distribution of native and exotic species, the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms may also change with increased water temperature. Hollowed et al. (2013) provided a review of projected effects of climate change on the marine fisheries and dependent communities. Integrating the potential effects of climate change into the fisheries assessment is currently difficult due to the time scale differences (Hollowed et al. 2013). The fisheries stock assessments rarely project through a time span that would include detectable climate change effects.

### *Greenhouse gases*

The IPCC has indicated greenhouse gas emissions are among the most important drivers of recent changes in climate. Wilson et al. (2017) inventoried the sources of greenhouse gases in the Gulf from sources associated with oil platforms and those associated with other activities such as fishing. A summary of the results of the inventory are shown in Table 3.3.5 with respect to total emissions and from fishing. Commercial fishing and recreational vessels make up a small percentage of the total estimated greenhouse gas emissions from the Gulf (2.04% and 1.67%, respectively).

**Table 3.3.5.** Total Gulf greenhouse gas 2014 emissions estimates (tons per year [tpy]) from oil platform and non-oil platform sources, commercial fishing, and percent greenhouse gas emissions from commercial fishing vessels of the total emissions.

<b>Emission source</b>	<b>CO<sub>2</sub></b>	<b>Greenhouse CH<sub>4</sub></b>	<b>Gas N<sub>2</sub>O</b>	<b>Total CO<sub>2e</sub>**</b>
<b>Oil platform</b>	5,940,330	225,667	98	11,611,272
<b>Non-platform</b>	14,017,962	1,999	2,646	14,856,307
<b>Total</b>	<b>19,958,292</b>	<b>227,665</b>	<b>2,743</b>	<b>26,467,578</b>
<b>Commercial fishing</b>	531,190	3	25	538,842
<b>Recreational fishing</b>	435,327	3	21	441,559
<b>Percent commercial fishing</b>	2.66%	>0.01%	0.91%	2.04%
<b>Percent recreational fishing</b>	2.18%	>0.01%	0.77%	1.67%

\*Compiled from Tables 6-11, 6-12, and 6-13 in Wilson et al. (2017). \*\*The CO<sub>2</sub> equivalent (CO<sub>2e</sub>) emission estimates represent the number of tons of CO<sub>2</sub> emissions with the same global warming potential as one ton of another greenhouse gas (e.g., CH<sub>4</sub> and N<sub>2</sub>O). Conversion factors to CO<sub>2e</sub> are 21 for CH<sub>4</sub> and 310 for N<sub>2</sub>O.

## ***Deepwater Horizon MC252 Oil Spill***

### *General Impacts on Fishery Resources*

The presence of polyaromatic hydrocarbons (PAHs) in marine environments can have detrimental impacts on marine finfish, especially during the more vulnerable larval stage of development (Whitehead et al. 2012). When exposed to toxic levels of PAHs (1–15 µg/L), greater amberjack larvae develop cardiac abnormalities and physiological defects (Incardona et al. 2014). The future reproductive success of long-lived species, including red drum and many reef fish species, may be negatively affected by episodic events resulting in high-mortality years or low recruitment. These episodic events could leave gaps in the age structure of the population, thereby affecting future reproductive output (Mendelsohn et al. 2012). Other studies have described the vulnerabilities of various marine finfish species, with morphological and/or life history characteristics similar to species found in the Gulf, to oil spills and dispersants (Hose et al. 1996; Carls et al. 1999; Heintz et al. 1999; Short 2003).

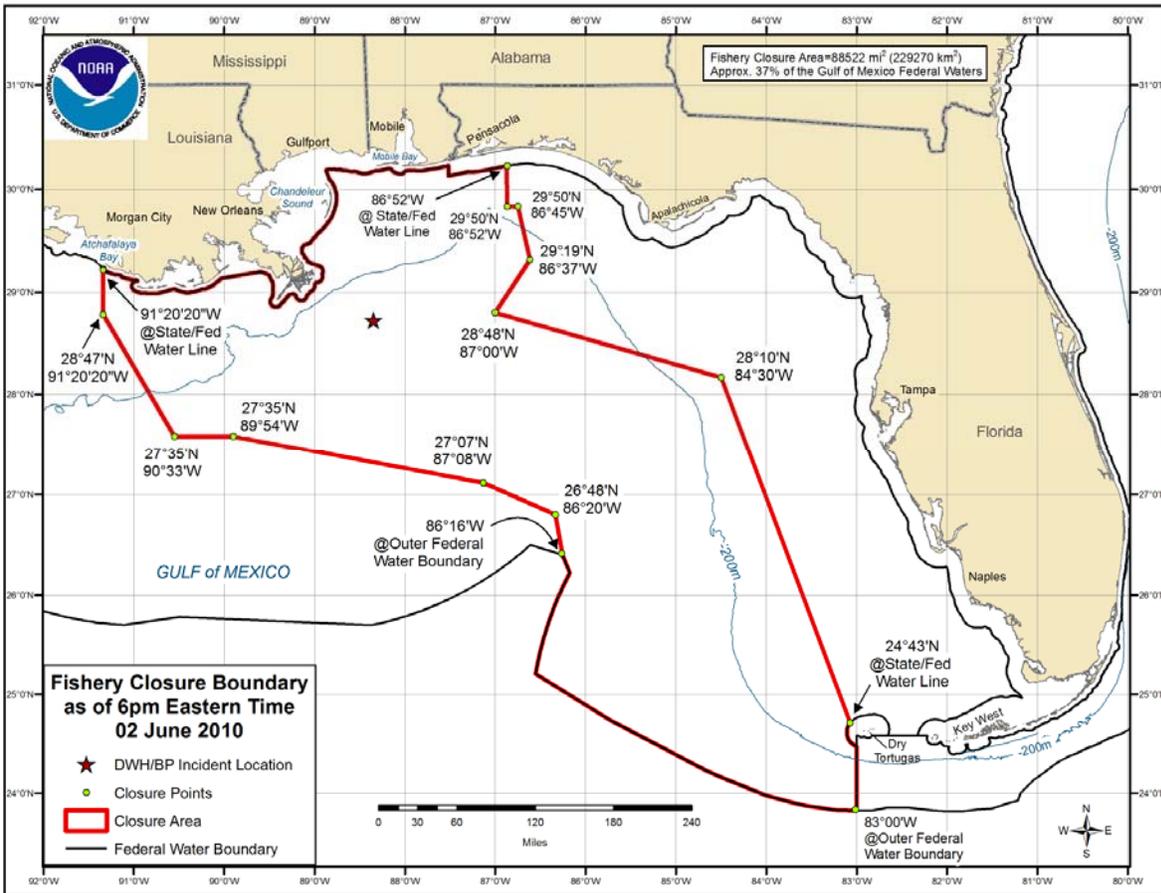
An increase in histopathological lesions were found in red snapper in the area affected by the oil, but Murawski et al. (2014) found that the incidence of lesions had declined between 2011 and 2012. The occurrence of such lesions in marine fish is not uncommon (Sindermann 1979; Haensly et al. 1982; Solangi and Overstreet 1982; Khan and Kiceniuk 1984, 1988; Kiceniuk and Khan 1987; Khan 1990). Red snapper diet was also affected after the spill. A decrease in zooplankton consumed, especially by adults (greater than 400 mm TL) over natural and artificial substrates may have contributed to an increase in the consumption of fish and invertebrate prey—more so at artificial reefs than natural reefs (Tarnecki and Patterson 2015).

The effect of oil, dispersants, and the combination of oil and dispersants on fishes of the Gulf remains an area of concern. Marine fish species typically concentrate PAHs in the digestive tract, making stomach bile an appropriate testing medium. A study by Synder et al. (2015) assessed bile samples from golden tilefish, king snake eel, and red snapper for PAH accumulation over time and reported concentrations were highest in golden tilefish during the same time period when compared to king snake eel and red snapper. These results suggest that the more highly associated an organism is with the sediment in an oil spill area, the higher the likelihood of toxic PAH accumulation. Twenty-first century dispersant applications are thought to be less harmful than their predecessors. However, the combination of oil and dispersants has proven to be more toxic to marine fishes than either dispersants or crude oil alone. Marine fish which are more active (e.g., a pelagic species versus a demersal species) appear to be more susceptible to negative effects from interactions with weathered oil/dispersant emulsions. These effects can include mobility impairment and inhibited respiration (Swedmark et al. 1973). Another study found that while Corexit 9500A® and oil are similar in their toxicity, when Corexit 9500A® and oil were mixed in lab tests, toxicity to microscopic rotifers increased up to 52-fold (Rico-Martínez et al. 2013). These studies suggest that the toxicity of the oil and dispersant combined may be greater than anticipated.

As reported by NOAA's Office of Response and Restoration (NOAA 2010), the oil from the *Deepwater Horizon MC252* spill (Figure 3.3.1), is relatively high in alkanes, which can readily be used by microorganisms as a food source. As a result, the oil from this spill is likely to biodegrade more readily than crude oil in general. The *Deepwater Horizon MC252* oil is also relatively much lower in PAHs, which are highly toxic chemicals that tend to persist in the environment for long periods of time, especially if the spilled oil penetrates into the substrate on beaches or shorelines. Like all crude oils, MC252 oil contains volatile organic compounds (VOC) such as benzene, toluene, and xylene. Some VOCs are acutely toxic but because they evaporate readily, they are generally a concern only when oil is fresh<sup>11</sup>.

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<sup>11</sup> [http://sero.nmfs.noaa.gov/deepwater\\_horizon/documents/pdfs/fact\\_sheets/oil\\_characteristics.pdf](http://sero.nmfs.noaa.gov/deepwater_horizon/documents/pdfs/fact_sheets/oil_characteristics.pdf)



### *Deepwater Coral Communities*

Deepwater corals are particularly vulnerable to episodic mortality events such as oil spills, since corals are immobile. Severe health declines have been observed in three deepwater corals in response to dispersant alone (2.3–3.4 fold) and the oil–dispersant mixtures (1.1–4.4 fold) compared to oil-only treatments (DeLeo et al. 2015). Increased dispersant concentrations appeared to exacerbate these results. As hundreds of thousands of gallons of dispersant were applied near the wellhead during the *Deepwater Horizon* MC252 oil spill, the possibility exists that deepwater corals may have been negatively impacted by the oil spill and subsequent spill remediation activities.

Several studies have documented declines in coral health or coral death in the presence of oil from the *Deepwater Horizon* MC252 oil spill (White et al. 2012; Hsing et al. 2013; Fisher et al. 2014). Sites as far as 11 km southwest of the spill were documented to have greater than 45% of the coral colonies affected by oil (White et al. 2012; Hsing et al. 2013), and, though less affected, a site 22 km in 1900 m of water had coral damage caused by oil (Fisher et al. 2014). Coral colonies from several areas around the wellhead had damage to colonies that seemed to be

representative of microdroplets as all colonies were not affected, and colonies that were affected had patchy distributions of damaged areas (Fisher et al. 2014). Because locations of deep-sea corals are still being discovered, it is likely that the extent of damage to deep-sea communities will remain undefined.

### *Outstanding Effects*

As a result of the *Deepwater Horizon MC252* oil spill, a consultation pursuant to ESA Section 7(a)(2) was reinitiated. As discussed above, on September 30, 2011, the Protected Resources Division released a Bi Op, which after analyzing best available data, the current status of the species, environmental baseline (including the impacts of the recent *Deepwater Horizon MC252* oil spill in the northern Gulf), effects of the proposed action, and cumulative effects, concluded that the continued operation of the Gulf reef fish fishery is not likely to jeopardize the continued existence of green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles, nor the continued existence of smalltooth sawfish (NMFS 2011). Additional information on the *Deepwater Horizon MC252* oil spill and associated closures is available online<sup>12</sup>.

## **3.4 Description of the Economic Environment**

A description of the reef fish stocks affected by the actions considered in this amendment is provided in Section 3.3. Additional details on the economic environment of the recreational and commercial sectors of the Gulf reef fish fishery, or components thereof, are provided in Reef Fish Amendment 36A (GMFMC 2017), Red Grouper Allowable Harvest Framework Action (GMFMC 2016a), Modifications to Gag Minimum Size Limits, Recreational Season and Black Grouper Minimum Size Limits Framework Action (GMFMC 2016b), Reef Fish Amendment 28 (GMFMC 2015a), Modifications to Greater Amberjack Allowable Harvest and Management Measures Framework Action (GMFMC 2015b), and the Framework Action to Set the Annual Catch Limit and Bag Limit for Vermilion Snapper, Set Annual Catch Limit for Yellowtail Snapper, and Modify the Venting Tool Requirement (GMFMC 2013a).

This amendment does not contain management measures that would directly or indirectly affect Gulf reef fish dealers and thus additional details on the economic environment of that component of the commercial sector are not provided here. Sections 3.4.1 and 3.4.2 contain additional information on the economic environment of the Gulf reef fish fishery's commercial sector and the for-hire component of the recreational sector.

### **3.4.1 Commercial Sector**

#### **Permits**

Any fishing vessel that harvests and sells any of the reef fish species managed under the reef fish FMP from the Gulf EEZ must have a valid Gulf commercial reef fish permit. From a historical perspective, the number of permits that were valid in a given year has continually decreased in

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<sup>12</sup> [http://sero.nmfs.noaa.gov/deepwater\\_horizon\\_oil\\_spill.htm](http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm)

the years after the red snapper IFQ program was implemented, and this decline has continued since the grouper-tilefish IFQ program was implemented, but at a slower rate. Specifically, from 2008 to 2016, the number of valid permits in each year was: 1,099, 998, 969, 952, 917, 898, 882, 868, and 852, respectively. As of November 14, 2017, there were 844 valid or renewable commercial reef fish permits, 756 of which were valid.

### **Economic Performance**

The information in Tables 3.4.1.1 and 3.4.1.2 describes the activity of vessels that were active in the commercial sector in each year from 2012 to 2016. The tables contain summarized data based solely on the NMFS SEFSC coastal logbook data (e.g., vessel count, trips, and landings). Dockside revenues were generated using landings information from the coastal logbook data and price information from the NMFS SEFSC Accumulated Landings System (ALS) data. The estimates of total landings, total revenue, and average revenue per vessel in each year include the harvest of all species included in the coastal logbook data for the vessels that harvested reef fish in that year.

Vessel participation in the commercial sector of the Gulf reef fish fishery is very fluid. While many vessels were active in every year between 2012 and 2016, some vessels were only active in certain years. The information in Tables 3.4.1.1 and 3.4.1.2 only represents the activity of vessels that harvested reef fish in each specific year. Thus, for example, if a vessel harvested reef fish in 2012 but not in 2013, that vessel's fishing activities in 2013 are not represented in these tables. Further, this data does not account for landings and revenues generated from fishing activity that is not covered by the coastal logbooks. If vessels are shifting between fisheries based on their relative profitability, as economic theory would suggest, then this information likely understates the economic performance of vessels that only participate in the reef fish fishery in certain years.

Vessel participation in the commercial sector of the reef fish fishery does not demonstrate a distinct trend during the 2012-2016 time period. However, landings of reef fish and associated revenues generally increased from 2012 to 2015 and basically remained stable in 2016. These increases were largely caused by higher commercial quotas for several species, particularly species in the Gulf IFQ programs (e.g., red snapper, red grouper, tilefish, and other shallow-water grouper), as well as higher ex-vessel prices. As a result, average gross revenue per vessel from fisheries covered by the coastal logbooks increased by about 27% between 2012 and 2015 before leveling off in 2016.

**Table 3.4.1.1.** Summary of vessel counts, trips, and logbook landings (pounds gutted weight (lbs gw)) for vessels landing at least one pound of reef fish, 2012-2016.

Year	Number of vessels that landed reef fish (> 0 lbs gw)	Number of trips that landed reef fish	Reef fish landings (lbs gw)	Other species' landings jointly harvested with reef fish (lbs gw)	Number of Gulf trips that only landed other species	Other species' landings on Gulf trips without reef fish (lbs gw)	All species landings on South Atlantic trips (lbs gw)
2012	554	6,593	13,983,396	968,920	904	741,806	334,233
2013	531	6,288	13,625,944	768,890	799	789,777	428,690
2014	576	6,981	15,285,917	895,749	1,010	848,153	401,112
2015	548	6,997	15,385,266	738,966	784	800,444	665,643
2016	535	7,058	15,001,885	695,781	817	943,737	549,976
Average	549	6,783	14,656,481	813,661	863	824,783	475,931

Source: NMFS SEFSC Coastal Fisheries Logbook

**Table 3.4.1.2.** Summary of vessel counts and revenue (2016 dollars) for vessels landing at least one pound of reef fish, 2012-2016.

Year	Number of vessels that landed reef fish (> 0 lbs gw)	Dockside revenue from reef fish	Dockside revenue from 'other species' jointly landed with reef fish	Dockside revenue from 'other species' landed on Gulf trips without reef fish	Dockside revenue from 'all species' landed on South Atlantic trips.	Total dockside revenue	Average total dockside revenue per vessel
2012	554	\$49,760,147	\$1,469,879	\$1,454,395	\$928,321	\$53,612,742	\$96,774
2013	531	\$52,954,318	\$1,344,204	\$1,640,058	\$1,267,724	\$57,206,303	\$107,733
2014	576	\$60,548,000	\$1,488,283	\$1,906,147	\$1,324,403	\$65,266,833	\$113,310
2015	548	\$62,524,673	\$1,289,604	\$1,461,367	\$2,172,340	\$67,447,985	\$123,080
2016	535	\$61,003,038	\$1,183,145	\$1,891,349	\$1,624,958	\$65,702,490	\$122,808
Average	549	\$57,358,035	\$1,355,023	\$1,670,663	\$1,463,549	\$61,847,271	\$112,741

Source: SEFSC Coastal Fisheries Logbook, augmented by the NMFS Accumulated Landings System for prices.

\*Revenues converted to 2016 dollars using the annual, seasonally-adjusted Gross Domestic Product (GDP) implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Estimates of economic return measures have not been available historically for the commercial sector of the Gulf reef fish fishery. A recently released report (Overstreet, Perruso, and Liese, 2017) provides the first such estimates. These estimates are specific to economic performance in 2014. Estimates in the report are based on a combination of Southeast Coastal logbook data, a supplemental economic add-on survey to the logbooks, and an annual economic survey at the vessel level. The economic surveys collect data on gross revenue, variable costs, fixed costs, as well as some auxiliary economic variables (e.g., market value of the vessel). The report provides

estimates of critical economic variables for the commercial sector of the Gulf reef fish fishery as a whole, but also provides estimates by “subsets” within this sector. These subsets are referred to as Segments of Interest (SOI). Subsets are generally defined at the individual species (e.g., red snapper), species group (e.g., Jacks), and/or gear-level (e.g., longline). In addition, estimates are provided at the trip level and the annual vessel level for each SOI. For current purposes, the most important results are those for the commercial sector as a whole. All monetary estimates in the report and thus in Tables 3.4.1.3 and 3.4.1.4 are in 2014 dollars.

Table 3.4.1.3 provides estimates of the important economic variables for reef fish trips (i.e., trips that harvested at least one pound of reef fish species). The mean and median estimates differ, sometimes significantly, reflecting the fact that the distribution of data for these economic variables is highly skewed. This finding suggests that the median estimates are likely more representative of the true “average” values.

**Table 3.4.1.3. Economic Characteristics of Reef Fish Trips in 2014.**

	Mean	Median
<b>Reef Fish Trips</b>		
Owner-Operated	73%	NA
Days at Sea	4.67	3
Crew Size	2.75	3
Fuel Used (gallons)	223	150
Landings (gutted lbs)	2, 620	1, 714
<b>Trip Revenue</b>	\$9, 945	5, 791
<b>Trip Costs<sup>13</sup></b>		
Fuel	\$763	\$517
Bait	\$314	\$145
Ice	\$162	\$80
Groceries	\$262	\$120
Miscellaneous	\$240	\$60
Hired Crew	\$2, 866	\$1,160
Annual Allocation	\$1, 297	\$100
Owner-Captain Time <sup>14</sup>	\$755	\$168
<b>Trip Net Cash Flow</b>	\$4, 040	\$1,635
<b>Trip Net Revenue</b>	\$4, 582	\$1,789

From an economic returns perspective, the two most critical results are the estimates of trip net cash flow and trip net revenue. Trip net cash flow is trip revenue minus the costs for fuel, bait, ice, groceries, miscellaneous, hired crew, and purchases of annual allocation from other allocation holders. Thus, this estimate represents the amount of cash generated by a typical reef fish trip over and above the cash cost of taking the trip (i.e., variable costs of the trip). Trip net revenue is trip revenue minus the costs for fuel, bait, ice, groceries, miscellaneous, hired crew, and the opportunity cost of owner’s time as captain. By including opportunity cost of the owner’s time and excluding purchases of annual allocation, trip net revenue is a measure of the economic performance of the commercial fishing trip. Trip cash flow and trip net revenue were

<sup>13</sup> The average price of fuel per gallon was \$3.42 and the average cost of labor was \$268 per crew/day.

<sup>14</sup> Owner-Captain Time is the estimated opportunity cost of an owner’s labor as captain over the year.

both positive in 2014, generally indicating that “profits” were being earned on reef fish trips, though some trips earned much greater profits than others.

Figure 3.4.1.1 illustrates the economic “margins” generated on reef fish trips, i.e., trip net cash flow and trip net revenue as a percentage of trip revenue. According to this figure, 29%, 18% and 13% of the revenues generated on reef fish trips were used to pay for crew costs, fuel/supplies costs, and purchases of annual allocation, while the remaining 40% was net cash flow back to the owner(s). The margin associated with trip net revenue was slightly higher at 46%.

Revenue 100%	Trip Net Cash Flow 40%	Trip Net Revenue 46%
	IFQ Purchase 13%	Labor - Hired & Owner 36%
	Labor - Hired 29%	
	Fuel & Supplies 18%	Fuel & Supplies 18%

**Figure 3.4.1.1.** Diagram of trip net cash flow and trip net revenue as percentage of trip revenue.

Table 3.4.1.4 provides estimates of the important economic variables at the annual level for all vessels that had reef fish landings in 2014. As with the trip level estimates, the mean and median estimates differ, and the median values are likely more representative of the true “averages” for vessels that participate in the commercial sector. Similar to the trip level, the three most important estimates of “economic returns” are net cash flow, net revenue from operations,<sup>15</sup> and economic return on asset value. Of these measures, net revenue from operations most closely represents “economic profits” to the owner(s). Net cash flow is total annual revenue minus the costs for fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, loan payments, and purchases of annual allocation. Net revenue from operations is total annual revenue minus the costs for fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, and the opportunity cost of an owner’s time as captain as well as the vessel’s depreciation. Economic return on asset value is calculated by dividing the net revenue from operations by the vessel value. Net cash flow and net revenue from operations were both positive in 2014, generally indicating that “profits” were being earned by vessels in the commercial sector, though some vessels earned much greater profits than others. In addition, the economic return on asset value was approximately 42% in 2014.

Figure 3.4.1.2 illustrates the economic “margins” that were generated by vessels in the commercial sector, i.e., net cash flow and net revenue from operations as a percentage of total annual revenue. According to this figure, 27%, 18%, 14%, 11%, and 1% of the revenues generated by reef fish vessels were used to pay for crew costs, fuel/supplies costs, fixed costs,

<sup>15</sup> Net revenue from operations accrues to the vessel owner and, when applicable, the IFQ shareholder, who may not be the same entity.

purchases of annual allocation, and loans while the remaining 29% was net cash flow back to the owner(s). The margin associated with net revenue from operations was slightly higher at 31%.

**Table 3.4.1.4.** Economic Characteristics of Reef Fish Vessels in 2014.

	Mean	Median
<b>Reef Fish Vessels</b>		
Owner-Operated	78%	NA
For-Hire Active	8%	NA
Days - Commercial Fishing	67	44
Days - For-Hire Fishing	9	0
Days - Non-fishing	5	0
Vessel Value	\$117, 958	\$70, 000
Has Insurance	27%	NA
<b>Total Revenue</b>	\$158, 343	\$75, 606
Commercial Fishing <sup>16</sup>	\$145, 078	\$49, 120
For-Hire Fishing	\$13, 265	\$0
<b>Costs</b>		
Fuel	\$13, 367	\$7, 692
Other Supplies	\$15, 187	\$5, 420
Hired Crew	\$42, 618	\$8, 137
Vessel Repair & Maintenance	\$12, 129	\$6, 350
Insurance	\$1, 673	\$0
Overhead	\$8, 826	\$3, 025
Loan Payment	\$1, 600	\$0
IFQ Purchase	\$17, 584	\$3, 000
Owner-Captain Time	\$8, 904	\$2, 595
Depreciation	\$5, 898	\$3, 500
<b>Net Cash Flow</b>	\$45, 359	\$5, 202
<b>Net Revenue from Operations</b>	\$49, 740	\$5, 676

<sup>16</sup> These estimates are higher than the estimates in Table 3.4.1.2 because they include all sources of commercial fishing revenue rather than revenue only from commercial fishing activities reported on the Southeast coastal logbooks. Further, revenue based on ALS and coastal logbook data underestimates actual revenue from landings of IFQ species.

Revenue 100%	Net Cash Flow 29%	Net Revenue - Operations 31%
	IFQ Purchase 11%	Depreciation 4%
	Loan Payment 1%	Fixed Costs 14%
	Fixed Costs 14%	Labor - Hired & Owner 33%
	Labor - Hired 27%	Fuel & Supplies 18%
	Fuel & Supplies 18%	

**Figure 3.4.1.2.** Diagram of net cash flow and net revenue from operations as percentage of revenue.

## Imports

Imports of seafood products compete in the domestic seafood market and have in fact dominated many segments of the seafood market. Imports aid in determining the price for domestic seafood products and tend to set the price in the market segments in which they dominate. Seafood imports have downstream effects on the local fish market. At the harvest level for reef fish, imports affect the returns to fishermen through the ex-vessel prices they receive for their landings. As substitutes to domestic production of reef fish, imports tend to cushion the adverse economic effects on consumers resulting from a reduction in domestic landings. The following describes the imports of fish products which directly compete with domestic harvest of reef fish.

Imports of fresh snapper increased steadily from 22.7 mp product weight (pw) in 2012 to 30.6 mp pw in 2016. Total revenue from fresh snapper imports increased from \$69.4 million (2016 dollars) in 2012 to an all-time high of \$90.2 million in 2016. Imports of fresh snappers primarily originated in Mexico, Central America, or South America, and entered the U.S. through the port of Miami. Imports of fresh snapper were highest on average during the months of March through August. Imports of frozen snapper were substantially less than imports of fresh snapper from 2011 through 2015. Frozen snapper imports ranged from 11.4 mp pw worth \$30.8 million (2016 dollars) in 2011 to 14.4 mp pw worth \$38 million in 2016. Imports of frozen snapper primarily originated in South America (especially Brazil), Indonesia, and Mexico. The majority of frozen snapper imports entered the U.S. through the ports of Miami and New York. Imports of frozen snappers tended to be lowest during March through June when fresh snapper imports were strong.

Imports of fresh grouper ranged from 9.2 mp pw in 2012 to 11.5 mp pw in 2016. Total revenue from fresh grouper imports ranged from \$33.1 million (2016 dollars) to \$47.2 million during this time period. The bulk of fresh grouper imports originated in Mexico and entered the U.S. through Miami and Tampa. From 2012 through 2016, fresh grouper imports were lowest on average during the month of March and higher the rest of the year, with a peak in July. Imports of frozen grouper were minimal, increasing from 1.3 mp pw in 2012 to 1.8 mp pw in 2014, but then decreasing significantly to only .81 mp pw in 2016. Similarly, total revenue from frozen grouper increased from \$2.6 million to \$3.7 million (2016 dollars) from 2012 to 2014, but then

declined to \$1.5 million in 2016. Frozen grouper imports generally originated in Mexico and, to a lesser extent, Asia and entered the U.S. through Miami and Tampa. There was an inverse relationship in monthly imports between frozen and fresh groupers, with average imports being the highest in March for frozen grouper and lower during other months.

### **Economic Impacts**

The commercial harvest and subsequent sales and consumption of fish generates business activity as fishermen expend funds to harvest the fish and consumers spend money on goods and services, such as red grouper purchased at a local fish market and served during restaurant visits. These expenditures spur additional business activity in the region(s) where the harvest and purchases are made, such as jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would spend their money on substitute goods and services. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic impacts may be distributed through regional markets and should not be interpreted to represent the impacts if these species are not available for harvest or purchase.

**Table 3.4.1.5.** Economic impacts of the commercial sector in the Gulf reef fish fishery. All monetary estimates are in thousands of 2016 dollars.

<b>Industry sector</b>	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>Harvesters</b>				
Employment impacts (FTE jobs)	1,335	208	275	1,817
Income impacts	\$30,968	\$5,750	\$13,904	\$50,621
Total value-added impacts	\$33,010	\$20,700	\$23,789	\$77,499
Output Impacts	\$57,358	\$46,666	\$46,181	\$150,205
<b>Primary dealers/processors</b>				
Employment impacts (FTE jobs)	278	111	193	582
Income impacts	\$10,104	\$9,312	\$8,807	\$28,224
Total value-added impacts	\$10,771	\$11,882	\$16,582	\$39,234
Output impacts	\$32,522	\$24,496	\$32,413	\$89,431
<b>Secondary wholesalers/distributors</b>				
Employment impacts (FTE jobs)	129	28	125	283
Income impacts	\$6,020	\$1,790	\$6,331	\$14,141
Total value-added impacts	\$6,417	\$3,003	\$10,814	\$20,234
Output impacts	\$16,123	\$5,879	\$21,031	\$43,033
<b>Grocers</b>				
Employment impacts (FTE jobs)	553	63	123	738
Income impacts	\$12,383	\$4,114	\$6,215	\$22,712
Total value-added impacts	\$13,199	\$6,630	\$10,522	\$30,351
Output impacts	\$21,163	\$10,768	\$20,657	\$52,588
<b>Restaurants</b>				
Employment impacts (FTE jobs)	3,445	230	563	4,237
Income impacts	\$49,672	\$15,065	\$28,452	\$93,189
Total value-added impacts	\$52,948	\$26,928	\$47,939	\$127,815
Output impacts	\$96,816	\$42,139	\$94,597	\$233,552
<b>Harvesters and seafood industry</b>				
Employment impacts (FTE jobs)	5,740	639	1,278	7,657
Income impacts	\$109,146	\$36,031	\$63,709	\$208,887
Total value-added impacts	\$116,345	\$69,143	\$109,645	\$295,132
Output impacts	\$223,982	\$129,947	\$214,879	\$568,809

Estimates of the U.S. average annual business activity associated with the commercial harvest of reef fish species in the Gulf were derived using the model<sup>17</sup> developed for and applied in NMFS (2015b) and are provided in Table 3.4.1.5. Specifically, these impact estimates reflect the expected impacts from average annual gross revenues generated by landings of Gulf reef fish from 2012-2016. This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), value-added impacts (the difference between the value of goods and the cost of materials or supplies), and output impacts (gross

<sup>17</sup> A detailed description of the input/output model is provided in NMFS (2011b).

business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting.

The results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models for individual species are not available. Between 2012 and 2016, landings of Gulf reef fish species resulted in approximately \$57.36 million in gross revenue on average.<sup>18</sup> In turn, this revenue generated employment, income, value-added, and output impacts of 7,657 jobs, \$209 million, \$295 million, and \$569 billion per year, respectively, on average.

### 3.4.2 Recreational Sector

This proposed action would only apply to for-hire vessels (i.e., charter vessels and headboats). As a result, a description of the economic environment for the private angler component of the recreational sector is not provided.

#### Angler Effort

Recreational effort derived from the MRIP database can be characterized in terms of the number of trips as follows:

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

Other measures of effort are available as well, such as directed trips (the number of individual angler trips that either targeted or caught a particular species).

Amendment 49 applies to all for-hire vessels that harvest reef fish in the Gulf. Tables 3.4.2.1 and Table 3.4.2.2 present estimates of target and catch trips on charter vessels associated with reef fish species from 2012 through 2016. The vast majority of these target and catch trips were recorded in Florida. In 2014, there was a precipitous drop in Gulf charter trips that targeted reef fish species. This was likely due in part to the short 9-day federal recreational red snapper season. Estimated charter trips that targeted reef fish species rebounded in subsequent years,

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<sup>18</sup> To the extent this average underestimates revenues from landings of IFQ species, because it is based on ALS and coastal logbook ex-vessel prices and landings rather than IFQ prices and landings, the economic impact estimates will be similarly underestimated.

following Reef Fish Amendment 40 and the implementation of sector separation for red snapper. Estimates for additional years, and other measures of directed effort, are available at<sup>19</sup>.

**Table 3.4.2.1.** Gulf recreational charter trips that targeted reef fish by year and state.\*

	Alabama	Florida	Louisiana**	Mississippi	Total
2012	17,258	132,245	9,648	74	159,225
2013	26,953	133,038	9,793	38	169,822
2014	14,444	94,693	N/A	0	109,137
2015	27,299	158,214	N/A	366	185,879
2016	38,975	158,450	N/A	1,287	198,712
Average	24,986	135,328	9,721	353	164,555

Source: MRIP database, SERO, NMFS.

\*Target species information is not collected for Texas angler trips.

\*\*MRIP estimates for Louisiana are not available after 2013. The average for Louisiana excludes 2014-2016.

**Table 3.4.2.2.** Gulf recreational charter trips that caught reef fish by year and state.

	Alabama	Florida	Louisiana*	Mississippi	Texas	Total
2012	30,207	368,911	14,155	283	2,858	416,414
2013	59,524	421,208	14,838	384	2,455	498,409
2014	51,884	397,911	N/A	742	3,526	454,063
2015	56,762	452,184	N/A	366	3,783	513,095
2016	66,292	475,671	N/A	1,633	4,659	548,255
Average	52,934	423,177	14,497	682	3,456	494,746

Source: MRIP database, SERO, NMFS for all states except Texas. Texas estimates are from Texas Parks and Wildlife Department.

\*MRIP estimates for Louisiana are not available after 2013. The averages for Louisiana exclude 2014 through 2016.

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

<sup>19</sup> <http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/queries/index>

The distribution of headboat effort (angler days) by geographic area is presented in Table 3.4.2.3. For purposes of data collection, the headboat data collection program divides the Gulf into several areas. On average, from 2012 through 2016, the area from the Dry Tortugas through the Florida Middle Grounds (i.e., FLW) accounted for 41.2% of total headboat angler days in the Gulf, followed by northwest (NW) Florida through Alabama (35.1%), Texas (22.3%), and Mississippi through Louisiana (1.4%). Western Florida experienced a steady increase in angler days over that time period to a five-year high in 2016.

**Table 3.4.2.3.** Headboat angler days and percent distribution, by state, 2012-2016.

Year	Angler Days				Percent Distribution			
	FLW	NWFL-AL*	MS-LA**	TX	FLW	NWFL-AL	MS-LA	TX
2012	84,205	77,770	3,680	51,776	38.73%	35.77%	1.69%	23.81%
2013	94,752	80,048	3,406	55,749	40.50%	34.22%	1.46%	23.83%
2014	102,841	88,524	3,257	51,231	41.83%	36.01%	1.32%	20.84%
2015	107,910	86,473	3,587	55,135	42.63%	34.16%	1.42%	21.78%
2016	109,101	90,877	2,955	54,083	42.45%	35.36%	1.15%	21.04%
<b>Average</b>	99,762	84,738	3,377	53,595	41.23%	35.10%	1.41%	22.26%

Source: NMFS Southeast Region Headboat Survey (SRHS).

\*Beginning in 2013, SRHS data was reported separately for NW Florida and Alabama, but has been combined here for consistency with previous years.

\*\*Headboat data from Mississippi and Louisiana are combined for confidentiality purposes.

## Permits

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

A federal charter/headboat (for-hire) vessel permit is required for fishing in federal waters for Gulf reef fish. Gulf reef fish for-hire permits are limited access permits. From a historical perspective, the number of permits that were valid in a given year has continually decreased over the past several years. Specifically, from 2008 to 2016, the number of valid permits in each year was as follows: 1458, 1417, 1385, 1353, 1336, 1323, 1310, 1294, and 1282, respectively. As of November 14, 2017, there were 1,278 valid or renewable for-hire reef fish permits, 1,175 of which were valid. A renewable permit is an expired limited access permit that cannot be actively fished, but is renewable for up to one year after expiration. Some vessels have both commercial and for-hire limited access Gulf reef fish permits. Specifically, as of November 14, 2017, there were 142 vessels with both permits (i.e., 702 vessels only had a commercial permit and 1,136 only had a for-hire permit). Thus, the total number of vessels with a commercial or a for-hire Gulf reef fish permit was 1,960 as of November 14, 2017.

Although the for-hire permit application collects information on the primary method of operation, the permit itself does not identify the permitted vessel as either a headboat or a charter vessel and vessels may operate in both capacities. However, if a vessel meets the selection criteria used by the SRHS and is selected to report by the Science Research Director (SRD) of the SEFSC, it is determined to operate primarily as a headboat and is required to submit harvest and effort information to the SRHS. The number of active federally permitted Gulf headboats in the SRHS was 68 from 2012 through 2015 and 69 in 2016 (K. Fitzpatrick, NMFS SEFSC, pers. comm.).

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

### **Economic Value**

The most current estimates of average annual gross revenue per vessel are also provided in Savolainen, et al. (2012). In 2016 dollars, the average annual gross revenue for a Gulf headboat is \$256,134 while the average annual gross revenue for a Gulf charter vessel is \$84,503. However, gross revenues overstate the economic value generated by trips taken by for-hire vessels. Economic value for for-hire vessels can be measured by producer surplus (PS) per passenger trip. In general, producer surplus is the amount of money that a vessel owner earns in excess of the cost of providing the trip. Estimates of the PS per for-hire passenger trip are not available. Instead, net operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. For vessels in the Gulf, the estimated NOR value is approximately \$155 (2016 dollars) per angler trip in charter-boats (Liese and Carter 2011). The estimated NOR value per angler trip for headboats is approximately \$55 (2016 dollars) (C. Liese, NMFS SEFSC, pers. comm.).

### **Economic Impacts**

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

Estimates of the economic impacts (business activity) associated with recreational angling for Gulf reef fish on charter vessels were calculated using average trip-level impact coefficients derived from the 2015 Fisheries Economics of the U.S. report (NMFS 2017) and underlying data provided by the NOAA Office of Science and Technology. Economic impact estimates in 2015

dollars were adjusted to 2016 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Recreational fishing generates economic impacts (business activity). Business activity for the recreational sector is characterized in the form of jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), value-added impacts (the difference between the value of goods and the cost of materials or supplies), and output impacts (gross business sales). Estimates of the average reef fish target effort (2012-2016) for charter vessels and associated business activity are provided in Table 3.4.2.4. Economic impacts for Texas cannot be provided due to the lack of target effort data.

**Table 3.4.2.4.** Summary of reef fish target trips (2012-2016 average) and associated business activity using state level multipliers. Monetary estimates are in thousands of 2016 dollars.

	FL	AL	MS	LA	TX*
	Charter Mode				
Target Trips	135,328	24,986	353	9,721	*
Value Added Impacts	\$48,644	\$7,913	\$79	\$3,022	*
Output Impacts	\$88,168	\$15,156	\$160	\$5,238	*
Income Impacts	\$31,754	\$5,403	\$55	\$2,034	*
Jobs	705	128	1	36	*

\*Note: Economic impacts for Texas cannot be provided due to the lack of target effort data.

The estimates provided in Table 3.4.2.4 use state level multipliers and thus only apply at the state-level. For example, estimates of business activity in Florida represent business activity in Florida only and not to other states (for e.g., a good purchased in Florida may have been manufactured in a neighboring state) or the nation as a whole. The same holds true for each of the other states.

Addition of the state-level estimates to produce a regional (or national) total may underestimate the actual amount of total business activity because state-level impact multipliers do not account for interstate and interregional trading. National level multipliers must be used to account for interstate and interregional trading. Between 2012 and 2016, and using national level multipliers, reef fish target effort by charter vessels generated employment, income, value-added, and output (sales) impacts of 1,025 jobs, \$51.7 million, \$80 million, and \$149.5 billion per year, respectively, on average. Income impacts should not be added to output (sales) impacts because this would result in double counting. The results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species.

Estimates of the economic impacts resulting from headboat target effort for reef fish are not available. Headboat vessels are not covered in the MRFSS/MRIP so, in addition to the absence of estimates of target effort, estimates of the appropriate business activity coefficients for headboat effort have not been generated.

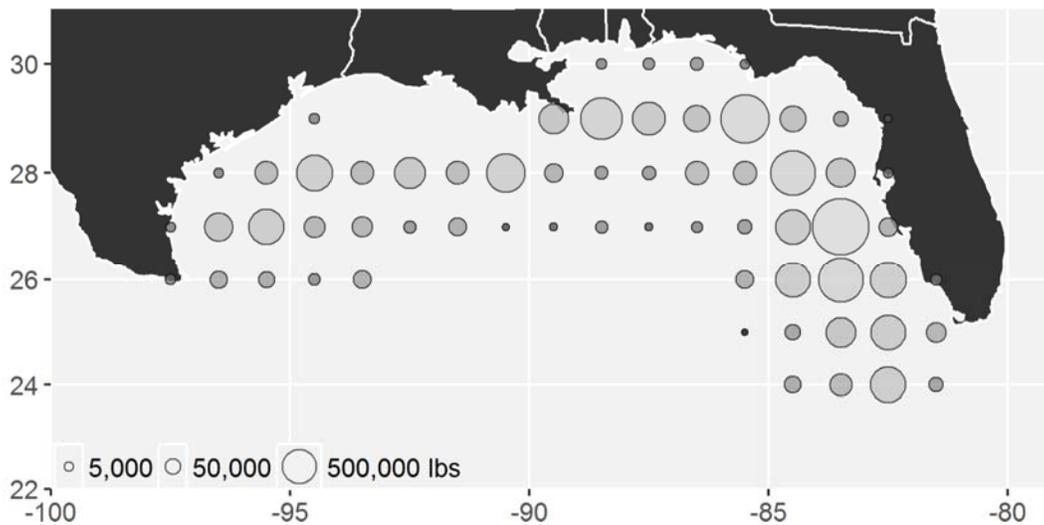


### 3.5 Description of the Social Environment

This amendment affects both commercial and recreational management of reef fish in the Gulf. Descriptions of the top recreational and commercial fishing communities based on engagement and reliance are included. Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Additional details on the social environment of the recreational and commercial sectors of the Gulf reef fish fishery, or components thereof, are provided in Reef Fish Amendment 36A (GMFMC 2017), Red Grouper Allowable Harvest Framework Action (GMFMC 2016a), Modifications to Gag Minimum Size Limits, Recreational Season and Black Grouper Minimum Size Limits Framework Action (GMFMC 2016b), Reef Fish Amendment 28 (GMFMC 2015a), Modifications to Greater Amberjack Allowable Harvest and Management Measures Framework Action (GMFMC 2015b), and the Framework Action to Set the ACL and Bag Limit for Vermilion Snapper, Set Annual Catch Limit for Yellowtail Snapper, and Modify the Venting Tool Requirement (GMFMC 2013a).

#### 3.5.1 Commercial Fishing Communities

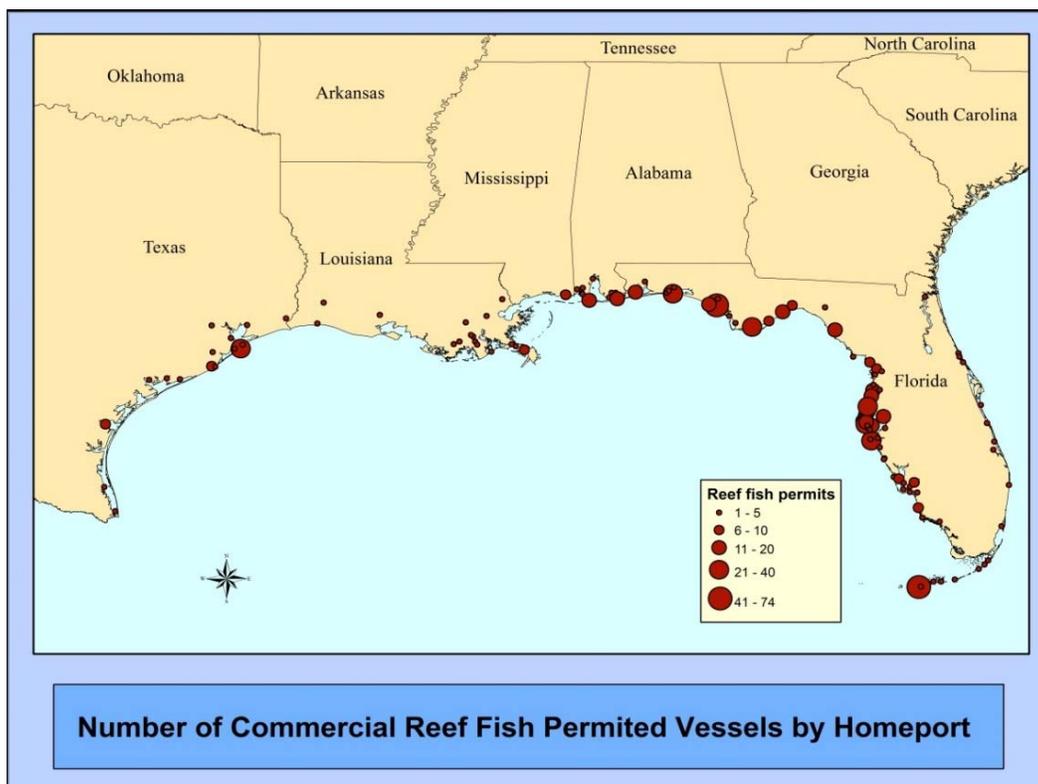
Reef fish landings by all gear types are depicted in Figure 3.5.1.1 (Overstreet et al., 2017) and show a concentration of the largest landings in the Eastern Gulf. This is consistent with the location of many reef fish vessel homeports as seen in figures below.



**Figure 3.5.1.1.** Distribution of reef fish landings by area fished for Gulf reef fish  
Source: Overstreet et al., 2017.

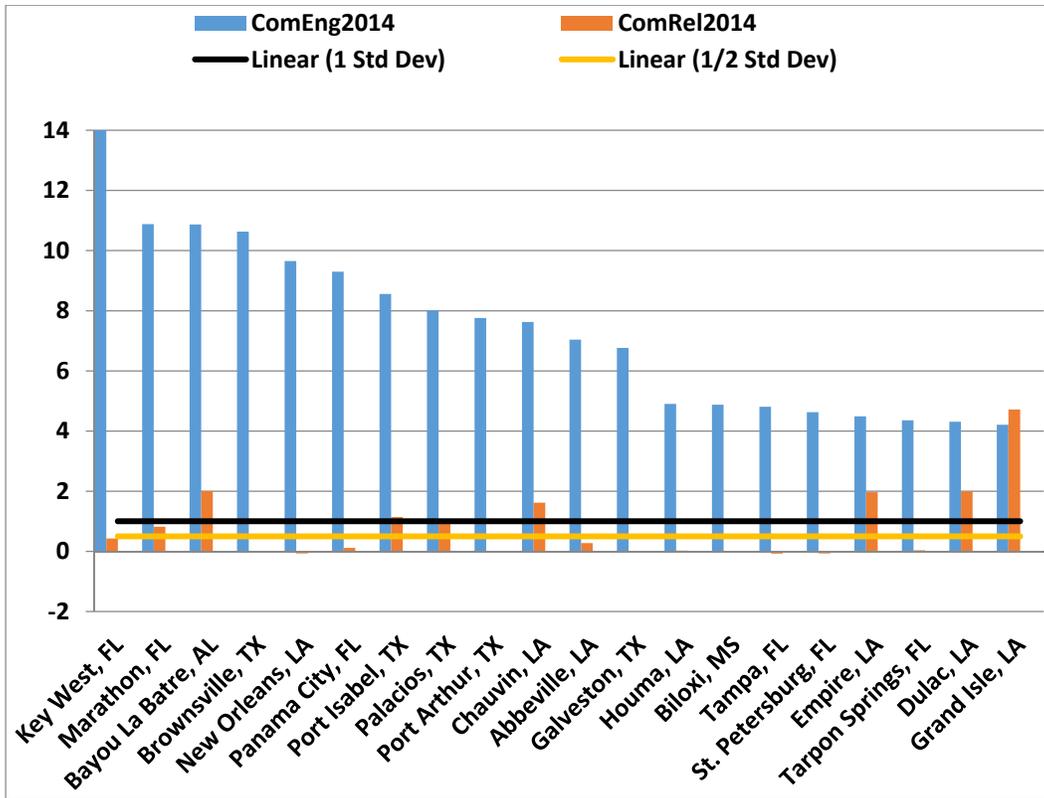
The distribution of reef fish commercial permits is provided in Fig. 3.5.1.2. Again the largest concentration is along Florida's Central west coast and Panhandle area. Alabama has large clusters in the Orange Beach and Dauphin Island areas. Mississippi also has a concentration of vessels in the Pascagoula area while the largest group of vessels in Louisiana is located near the

Venice/Empire and Buras/Triumph region. Texas has its largest concentration of vessels in the Galveston area with a few smaller concentrations near Freeport and Corpus Christi.



**Figure 3.5.1.2.** Distribution of commercially permitted reef fish vessels for Gulf States by community. Source: NMFS Southeast Regional Office permits office, September 20, 2016.

To further understand the importance of commercial fishing to Gulf coast communities, a list of top 20 commercial fishing communities is included by using their rank on commercial fishing engagement. Commercial fishing engagement is represented by the number of commercial permits designated as “commercial” by homeport and owners address plus landings and value of all commercially harvested species for a community. These variables were factor analyzed as described previously for the recreational engagement and reliance indices. Fishing reliance includes the same variables as fishing engagement, divided by population. Communities are presented in rank order by fishing engagement and all 20 included communities demonstrate high levels of commercial engagement, although this is not specific to fishing for reef fish. Factor scores of both engagement and reliance were plotted together in Figure 3.5.1.3 to provide some indication of the importance of commercial fishing to a particular community.



**Figure 3.5.1.3.** Top 20 commercial fishing communities’ engagement and reliance. Source: SERO, Community Social Vulnerability Indicators Database 2014.

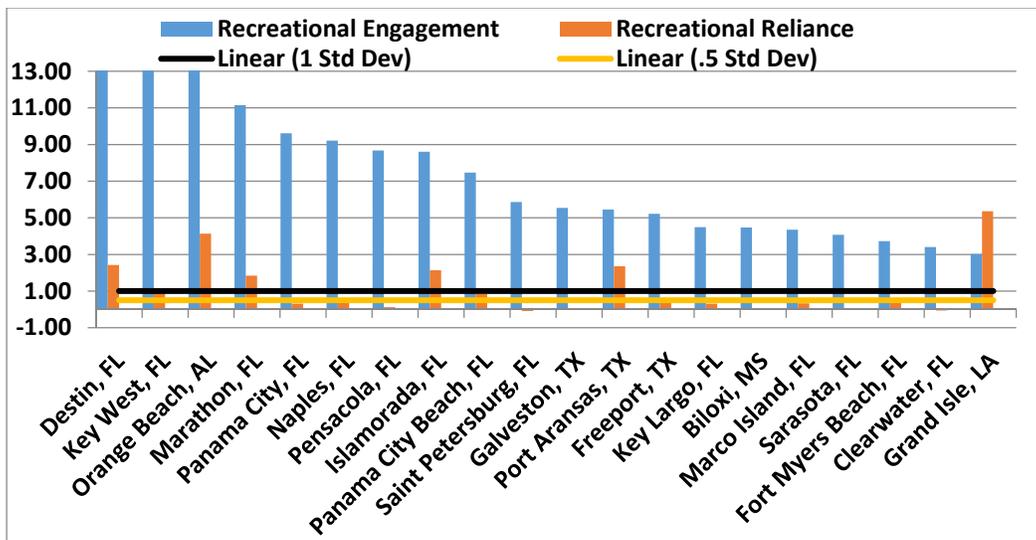
Figure 3.5.1.3 identifies the top 20 Gulf communities that are engaged and reliant upon commercial fishing in general. Two thresholds of one and one-half standard deviation above the mean were plotted to help determine a threshold for significance. All states are represented within the top 20 commercially engaged fishing communities in the Gulf. Alabama and Mississippi each have one community in the top 20, while Florida, Louisiana and Texas have several. The most reliant communities within the top 20 are in located Louisiana. Many of the top 20 commercial fishing communities are likely ranked where they are because of the shrimp fishery. However, several communities, especially those that are highly reliant are also communities with large concentrations of commercial reef fish permit holders.

### 3.5.2 Recreational Fishing Communities

Reef fish landings for the recreational sector are not available at the community level, making it difficult to identify communities as dependent on recreational fishing for reef fish. Because limited data are available concerning how recreational fishing communities are engaged and reliant on specific species or species groups, indices were created using secondary data from permit and infrastructure information for the southeast recreational fishing sector at the community level (Jepson and Colburn 2013). Recreational fishing engagement is represented by the number of recreational permits and vessels designated as “recreational” by homeport and owners address. Fishing reliance includes the same variables as fishing engagement, divided by

population. Factor scores of both engagement and reliance were plotted into Figure 3.5.2.1.

Figure 3.5.2.1 identifies the top Gulf communities that are engaged and reliant upon recreational fishing in general. Two thresholds of one and one-half standard deviation above the mean were plotted to help determine a threshold for significance. Communities are presented in ranked order by fishing engagement and all 20 included communities demonstrate high levels of recreational engagement, although this is not specific to fishing for reef fish. Because the analysis used discrete geo-political boundaries, Panama City and Panama City Beach, Florida had separate values for the associated variables. Calculated independently, each still ranked high enough to appear in the top 20 list suggesting a greater importance for recreational fishing in that area. Grand Isle, Louisiana demonstrates a high reliance upon recreational fishing as the community’s population is smaller than most of the highly engaged communities. With both a high engagement and reliance, Grand Isle may depend upon recreational fishing as a strong component of its local economy.



**Figure 3.5.2.1.** Top 20 recreational fishing communities’ engagement and reliance. Source: SERO, Community Social Vulnerability Indicators Database 2014.

### Charter Vessels and Headboats by Community

In order to present information about the charter vessels and headboats that are engaged in the recreational reef fish fishery, all vessels with a federal for-hire permit for reef fish, including historical captain permits, are included in the following analysis.

The majority of federal for-hire permits for reef fish are held by operators in Florida (59% in 2016), followed by Texas (17.6%), Alabama (10.2%), Louisiana (9%), Mississippi (2.7%), and other states (1.4%; Table 3.5.2.1). The distribution of permits by state has followed a similar pattern throughout the last five years. These data may deviate from the numbers included elsewhere in the document because of the date on which data were gathered. Data included in Table 3.5.2.1 are based on the number of permits throughout the year, rather than from a specific date, and include permits that were valid or renewable sometime during the year. However, if

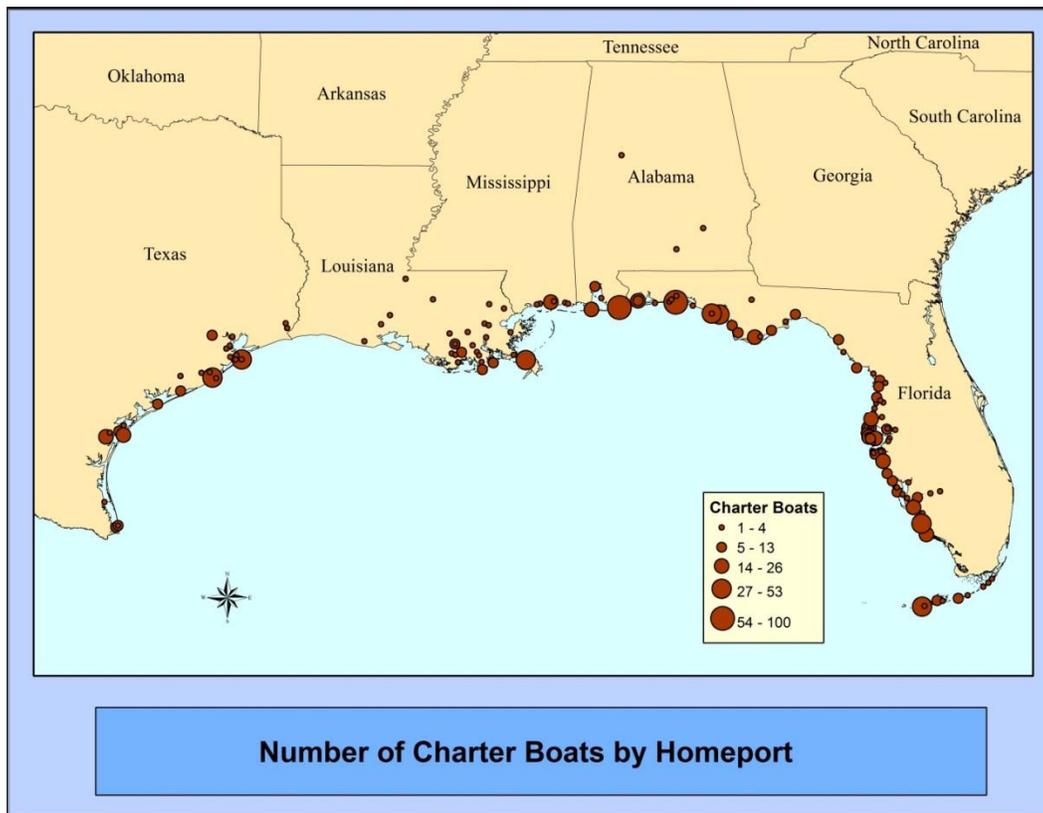
the permit was sold, then only the most current permit has been counted. Federal for-hire permits are held by those with mailing addresses in a total of 348 communities, located in 21 states (Southeast Regional Office permit office, October 25, 2017).

**Table 3.5.2.1.** Number of federal for-hire permits for Gulf reef fish including historical captain permits, by state and by year.

State	2012	2013	2014	2015	2016
AL	157	159	153	143	134
FL	812	803	787	778	776
LA	123	120	117	121	119
MS	48	47	42	38	35
TX	221	219	230	232	232
Other	17	15	16	16	19
Total	1378	1363	1345	1328	1315

Source: NMFS Southeast Regional Office permit office, SERO Access database. Includes valid and renewable permits.

When Gulf reef fish for-hire vessels are separated into charter vessels or headboats, the majority of vessels are charter vessels (95% of for-hire vessels as of September 20, 2016) and a smaller proportion are headboats (approximately 5%, NMFS Southeast Regional Office permit office). Figure 3.5.1.2 shows the spatial distribution of charter vessels with federal for-hire permits around the Gulf as of September 20, 2016.

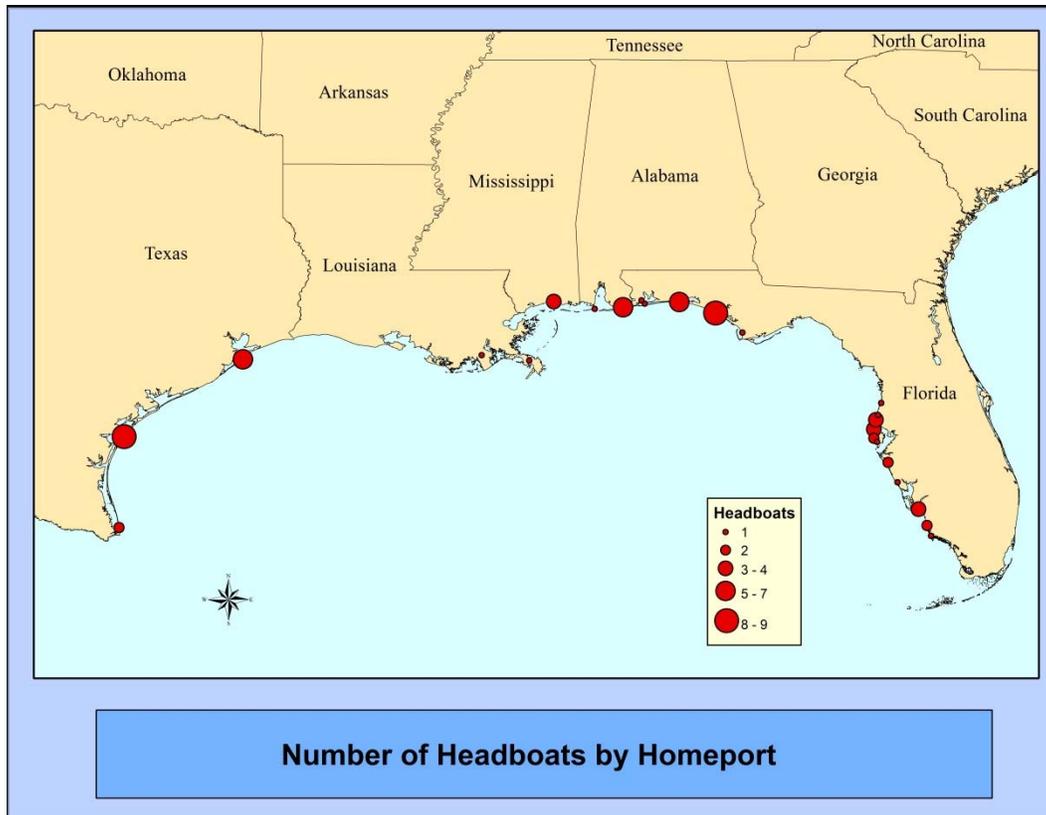


**Figure 3.5.2.2.** Distribution of charter vessels with federal for-hire permits for Gulf reef fish in Gulf states by community.

Source: NMFS Southeast Regional Office permits office, September 20, 2016.

Charter vessels are distributed throughout the Gulf coast with large clusters in Florida communities along the Panhandle, along the mid-Florida and southwest Florida coast, and in the Keys; in Alabama (Orange Beach and Dauphin Island); in Texas (Galveston, Freeport, Corpus Christi, Port Aransas, Port O’Connor, and Matagorda); Mississippi (Biloxi); and in Louisiana (Venice, Chauvin, and Grand Isle) as depicted in Figure 3.5.2.2.

Figure 3.5.2.3 shows the spatial distribution of headboats with federal for-hire reef fish permits throughout the Gulf. While far fewer than charter vessels, headboats are homeported in some of the same communities where there are a considerable number of charter vessels. Only in the Florida Keys do you not see a strong presence of headboats. This may be a factor linked to how vessels are characterized within the permit system when asked how the vessel is best described. In some cases, vessels are best described by the permit holder as one category, but may also be appropriate in another.



**Figure 3.5.1.3.** Distribution of headboats with federal for-hire permits for Gulf reef fish by community.  
 Source: NMFS Southeast Regional Office permits office, September 20, 2016.

### 3.5.3 Environmental Justice Considerations

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

Information on race, ethnicity, and income status for commercial and for-hire reef fish fishermen is not available, because these types of data are not collected by NMFS or other agencies. Commercial and for-hire fishermen and communities along the coast may be affected by the actions in this amendment. However, as addressed in the social effects analysis for each action (Chapter 4), the effects are expected to be minimal and positive. Further, the actions in this amendment would not affect fishermen differently based on race, ethnicity, or income status.

Thus, disproportionate impacts to EJ populations are not expected to result from either of the actions in this amendment. Nevertheless, the lack of impacts on EJ populations cannot be assumed. Finally, there are no known claims for customary usage or subsistence consumption of any reef fish species by any population including tribes or indigenous groups.

## **3.6 Description of the Administrative Environment**

### **3.6.1 Federal Fishery Management**

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

Responsibility for federal fishery management decision-making is divided between the Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for promulgating regulations to implement proposed plans and amendments after ensuring management measures are consistent with the Magnuson-Stevens Act and with other applicable laws summarized in Section 10. In most cases, the Secretary has delegated this authority to NMFS.

The Council is responsible for fishery resources in federal waters of the Gulf. These waters extend 9 to 200 nautical miles offshore from the seaward boundaries of Alabama, Florida, Louisiana, Mississippi, and Texas, as those boundaries have been defined by law. The length of the Gulf coastline is approximately 1,631 miles. Florida has the longest coastline extending 770 miles along its Gulf coast, followed by Louisiana (397 miles), Texas (361 miles), Alabama (53 miles), and Mississippi (44 miles).

The Council consists of seventeen voting members: 11 public members appointed by the Secretary; one each from the fishery agencies of Texas, Louisiana, Mississippi, Alabama, and Florida; and one from NMFS. The public is also involved in the fishery management process.

### **3.6.2 State Fishery Management**

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state governments of Texas, Louisiana, Mississippi, Alabama, and Florida have the authority to manage their respective state fisheries. Each of the five Gulf states exercises legislative and regulatory authority over their states' natural resources through discrete administrative units. Although each agency is the primary administrative body with

respect to the states' natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources. A more detailed description of each state's primary regulatory agency for marine resources is provided on their respective web pages (Table 3.6.2.1).

**Table 3.6.2.1.** Gulf state marine resource agencies and web pages.

<b>State Marine Resource Agency</b>	<b>Web Page</b>
<b>Alabama Marine Resources Division</b>	<a href="http://www.outdooralabama.com/">http://www.outdooralabama.com/</a>
<b>Florida Fish and Wildlife Conservation Commission</b>	<a href="http://myfwc.com/">http://myfwc.com/</a>
<b>Louisiana Department of Wildlife and Fisheries</b>	<a href="http://www.wlf.louisiana.gov/">http://www.wlf.louisiana.gov/</a>
<b>Mississippi Department of Marine Resources</b>	<a href="http://www.dmr.ms.gov/">http://www.dmr.ms.gov/</a>
<b>Texas Parks and Wildlife Department</b>	<a href="http://tpwd.texas.gov/">http://tpwd.texas.gov/</a>

## CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

### 4.1 Action 1 – Modify Sea Turtle Release Gear Requirements for Vessels with Reef Fish Permits in the Gulf of Mexico (Gulf)

#### 4.1.1 Direct and Indirect Effects on the Physical Environment

The physical environment is not directly or indirectly impacted by adding new options for allowable sea turtle release gear that must be carried on vessels with a Gulf commercial and/or charter vessel/headboat permit for reef fish. The list of gear types used and landings by gear type for the commercial and charter vessel/headboat with reef fish permits is provided in Section 3.1.

Additional effects are not expected from **Alternative 1** (No Action), which would not modify the regulations to allow the use of new approved sea turtle release devices for vessels with commercial or charter vessel/headboat Gulf reef fish permits. Although **Alternative 2** would modify the regulations for vessels with commercial or charter vessel/headboat Gulf reef fish permits to allow the use of new collapsible hoop net, dehooking device, and small hoist net to release incidentally hooked sea turtles, adding these allowable gear devices would not be expected to have any foreseeable impacts on the physical environment.

#### 4.1.2 Direct and Indirect Effects on the Biological Environment

In the Gulf, the observer program records the annual interactions with sea turtles in the commercial reef fish fishery by gear type (Table 4.1.2.1). Observers cover approximately 4% of the commercial reef fish fishery on an annual basis. The Southeast Fisheries Science Center (SEFSC) provides an annual expanded sea turtle take estimate based on observer and logbook data per the Terms and Conditions of the 2011 Biological Opinion (Bi Op) on the Continued Authorization of Reef Fish Fishing under the Gulf of Mexico Reef Fish Fishery Management Plan (FMP) (NMFS 2011). Although charter vessel/headboat reef fish permit holders are required to carry and use sea turtle release gear, no observer data is available for interactions between sea turtles and the charter vessel/headboats with reef fish permits because the observer program does not include these vessels.

**Table 4.1.2.1.** Summary of observed sea turtle interactions by gear type in the commercial reef fish fishery in 2015.

Gear Type	Observed Number of Sea Turtles	Number of Trips	Number of Sets
bottom longline	2	26	724
vertical line	4	200	8,161

Source: NMFS 2015

If a protected species is incidentally hooked, the release and successful survival of the animal depends not only on having the required release gear onboard the fishing vessel, but the ability and knowledge of the captain and crew to properly release sea turtles and other protected species.

The 2015 Annual Report on the Terms and Conditions of the 2011 Bi Op describes the outreach and education plan for the Gulf that was designed to meet the requirements of the Bi Op by training state and government personnel to conduct in-person training and education workshops of commercial and recreational fishermen (NMFS 2015). During these workshops staff also led a discussion on the careful release and protocols for sea turtles with minimal injury and the proper use and gear requirements by permit type. Approximately 12 workshops are held throughout the Gulf annually to aid in the proper use of the required release gears.

If the Gulf of Mexico Fishery Management Council (Council) selects **Alternative 2** as preferred, positive indirect biological benefits are anticipated as this would allow additional flexibility in the regulatory requirements for fishermen compared to **Alternative 1** (No Action). Selecting **Alternative 2** as the preferred compared to **Alternative 1** is anticipated to assist with compliance and aid in the safe release of sea turtles and other protected species at a greater frequency than if **Alternative 1** alternative was selected as the preferred.

### 4.1.3 Direct and Indirect Effects on the Economic Environment

This action considers modifying regulations for vessels with commercial or charter vessel/headboat Gulf reef fish permits to allow for the use of three additional devices with sea turtle release. **Alternative 1** (No Action) would not modify regulations to allow the use of the three new release gears, while **Alternative 2** would modify regulations for the use of those release gears. Allowing additional gears for sea turtle release would result in direct economic effects for commercial vessels or charter vessel/headboats with federal Gulf reef fish permits. **Alternative 2** is expected to yield greater economic benefits than **Alternative 1**. In the case of a vessel owner purchasing release gears for the first time (such as with a new vessel) or replacement release gears for broken or otherwise unusable gears, the owner would examine the relative cost of the three new release gears in relation to the current, available gears. The relative cost would include not only the price of that particular device, but also any added cost reductions, such as saved space onboard due to the collapsible nature of the collapsible hoop net. If the relative cost is lower, one or more of the three new gears would be adopted. In the case of a vessel owner replacing still functional and usable release gears, the owner would consider the price of a particular new release device against any cost reductions, such as saved space onboard; if the owner determines that to be a positive value, he would replace his current device. Finally, because the current release gears would be supplemented by the three proposed gears, vessel owners are not required to adopt one of the three proposed gears. As such, **Alternative 2** would be expected to generate economic benefits.

The costs of the three proposed gears as well as the currently approved gear substitutions are displayed in Table 4.1.3.1. A hook out dehooker device has a lower cost than the ARC short-handled dehooker, thereby suggesting that at least some vessel owners would be expected to substitute to the proposed device if approved. A hook out dehooker device is about \$5 more expensive than the current chainlink short-handled dehooker, suggesting that vessel owners would not be expected to adopt the proposed device if approved. However, a chainlink short-handled dehooker is constructed by local machine shops or welding shops, so that cost may vary. The for-hire vessels tend to purchase the ARC short-handled dehooker as part of a kit that includes a dipnet (Charles Bergmann, SEFSC, pers. comm). So, if the hook out dehooker an

approved device and becomes part of a kit, that may increase the likelihood of that device being adopted by vessel owners.

A collapsible hoop net is \$50 more expensive than a dipnet, suggesting that vessel owners would not be expected adopt the proposed device if approved. However, the collapsible hoop net does save space onboard due to its collapsible nature, so depending on the value of that space to a vessel owner, a collapsible hoop net may be adopted by some vessels. Estimates for the proposed small hoist are not available, as it would be self-constructed. Anecdotally, construction involves minimal cost (C. Bergmann, SEFSC, pers. comm.).

**Table 4.1.3.1.** Summary of costs for three proposed gears and current approved gear substitutions

Status	Device	Cost
Current	ARC short-handled dehooker, 17" bite block	\$58
Current	Short-handled dehooker, chainlink 17" bite block	~\$30
Proposed	Hook out dehooker	\$35
Current	Dipnet	\$125
Proposed	Collapsible hoop net	\$175
Proposed	Small hoist	---

Source: C. Bergmann, SEFSC, pers comm.

#### 4.1.4 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from retaining **Alternative 1** and the list of required release gear that must be carried aboard a vessel with a commercial and/or charter vessel/headboat permit for Gulf reef fish would remain unchanged. However, unless new release gears are specifically adopted for use through regulatory action, their use is prohibited. Thus, **Alternative 1** prevents the adoption of these new release gears that have been developed and are now approved by the SEFSC.

The effects from allowing fishermen to carry and use the three new release gears are expected to be minimal but positive. Fishermen are already required to have release gear aboard that serve the same functions as the proposed new release gears and would not be required to purchase or construct the new release gears under **Alternative 2**. Therefore, there would be no additional action or expense required on the part of fishermen for compliance. Rather, the three new release gears could be used in place of currently required release gear that serve the same function. The new collapsible hoop net and small turtle hoist would be allowed to replace the dipnet, and the hook out could be carried aboard in place of the short-handled dehookers required for removing ingested and external hooks. Thus, in the event these release gears need to be replaced, fishermen would have the option of purchasing or building the new release gears or obtaining those already required. This flexibility would provide some benefits to fishermen.

#### 4.1.5 Direct and Indirect Effects on the Administrative Environment

This action would have direct effects on the administrative environment. **Alternative 1** (No Action) would not modify the regulations to allow the use of the new approved sea turtle release gears for vessels with commercial or charter vessel/headboat Gulf reef fish permits. If the Council selects **Alternative 2** as the preferred then three new allowable gears would be added to the regulations. Initially, this would require some administrative paper work as well as education and outreach to the fishermen until they become aware of the modifications to the regulations. If the Council selects **Alternative 2** as preferred, the greatest burden would fall on law enforcement. The three new gears (new collapsible hoop net, dehooking device, and small hoist) are not the only gear requirements for vessels with a Gulf commercial or charter vessel/headboat permits but would supplement the current requirements. The new collapsible hoop net and small turtle hoist can be used in place of the currently required dipnet and the dehooker or hook out can be used in place of both the short-handled dehooker for external hooks and the short-handled dehooker for internal hooks. These changes in the regulations will take a while to be realized but numerous educational workshops have been held across the Gulf by SEFSC staff. Thus, over time this action is anticipated to help fishermen by providing more flexibility to the requirement of carrying sea turtle release gears. Further, given that enforcement activities address the reef fish fishery in general, most enforcement activities would be covered in day-to-day operations. Therefore, any adverse effects on enforcement are expected to be minor after the initial change in allowable gear are put in place.

## 4.2 Action 2 – Modify the Reef Fish Framework Procedure

### 4.2.1 Direct and Indirect Effects on the Physical Environment

As this is primarily an administrative action, none of the alternatives would directly change any effect on the physical environment from recreational or commercial fishing. However, adding the capability to modify sea turtle and other protected species release gears and handling procedures through a framework action would increase the flexibility of management to adjust these measures to better optimize regulatory specifications by implementing a framework action rather than the lengthier full plan amendment process.

**Alternative 1** would not modify the Reef Fish framework protocol and therefore would not increase flexibility. **Alternative 2**, with the selection of both **Option a** and **b**, would add the largest number of sea turtle and other protected species release gears and handling procedures that can be implemented or modified using the framework procedure. It therefore would provide the greatest flexibility to use the framework procedure to reduce any possible adverse impacts on the physical environment. **Alternative 2, Options a and b** would provide greater flexibility than **Alternative 1** to modify requirements within the reef fish fishery and indirectly effect the physical environment. Effects on the physical environment could result in either increased or decreased impacts from recreational fishing since any given change could result in either increased or decreased fishing effort. Because the impacts could go in either direction, overall the indirect effects to the physical environment would be neutral for all alternatives.

### 4.2.2 Direct and Indirect Effects on the Biological Environment

This action would only have indirect impacts on the biological/ecological environment, all of which would be expected to be beneficial in that they would facilitate effective release of incidentally captured protected species. With respect to the indirect effects on the biological/ecological environment, **Alternative 1** would provide the least benefits since it would result in no change to the ability of management to implement changes to the sea turtle and other protected species release gears and handling procedures. **Alternative 2, Options a and b**, would provide the greatest indirect benefits because it would allow the largest number of sea turtle and other protected species release gears and handling procedures to be modified, thereby providing the greatest flexibility for management resulting in biological benefits in the future. For example, quickly implementing more efficient sea turtle release gears may allow sea turtle survivability to increase after incidentally hooking.

### 4.2.3 Direct and Indirect Effects on the Economic Environment

This action considers modifying the reef fish framework procedure to include changes to release gear requirements and/or handling protocols for sea turtles and other protected resources through the abbreviated framework process. **Alternative 1** (No Action) would not modify the reef fish framework procedure adopted through Reef Fish Amendment 38. **Alternative 2** would modify the reef fish framework procedure to include changes to, under **Option a**, release gear requirements and, under **Option b**, handling protocols. Either or both options in **Alternative 2**

may be selected.

Modifying the regulatory mechanism for addressing gear requirements and handling protocols for sea turtles and other protected species is not expected to result in direct economic effects to fishermen, as this is a procedural change and specific gear requirements and handling protocols are not specified. Indirect effects would be anticipated in that the timeline for modifications to release gear and/or handling requirements would be shortened, which would reduce costs to the government. However, the anticipated cost reductions to the government from a shorter timeline under **Alternative 2** cannot be quantified. Still, any economic benefits or costs to fishermen stemming from changes to the requirements would accrue faster, and therefore, **Option a** and **Option b** under **Alternative 2**, with either one option or both options in place, would lead to greater economic effects than **Alternative 1**. Under **Alternative 1**, the benefits or costs to fishermen from changes in release gear and/or handling requirements would still occur, simply at a later date.

#### 4.2.4 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from retaining the current reef fish framework procedure (**Alternative 1**), which would require the addition of new release gear requirements and handling protocols for protected resources to continue to be implemented through a plan amendment. However, adopting new allowable release gears through a plan amendment takes the longest amount of time to implement, resulting in a delay in incorporating new release gears into the regulations.

Modifying the framework procedure to allow for release gear and handling requirements to be adopted through the open abbreviated documentation process (**Alternative 2**) would be expected to result in minimal positive effects compared with **Alternative 1**. These effects would relate to the expedited adoption of these new requirements for sea turtles and other protected resources. In the example of adopting the new release gears which may be used in place of existing release gears (Action 1), greater positive effects would have been expected had it been possible to adopt these release gears through the open abbreviated documentation process (**Alternative 2**), rather than through this plan amendment (**Alternative 1**). However, it is possible that release gear or handling requirements may be proposed in the future that may not benefit fishermen through added flexibility or which may be objectionable to fishermen, such as a requirement to purchase new equipment. In this case, allowing the adoption of new requirements through the open abbreviated documentation process may result in negative effects, as the requirements would not be subject to the same amount of public comment and implementation would occur sooner. Nevertheless, because the open abbreviated framework procedure allows regulatory changes to be made that are categorized as routine or insignificant, it is assumed that any new requirements that may be controversial would not be implemented using the abbreviated procedure.

#### 4.2.5 Direct and Indirect Effects on the Administrative Environment

This action would have direct impacts on the administrative environment. **Alternative 1** would be the most administratively burdensome of the alternatives being considered, because any

modifications to sea turtle and other protected species release gears and handling procedures would need to be implemented through a plan amendment, which is a more laborious and time-consuming process than a framework action. **Alternative 2, Options a and b**, would give the National Marine Fisheries Service (NMFS) and the Council flexibility by allowing for an adjustment of sea turtle and other protected species release gears and handling procedures through a framework action. Framework actions generally require less time and staff effort than plan amendments and would lessen the administrative burden on the agency. **Alternative 2, Options a and b**, would provide the most flexibility, resulting in the least administrative burden on the agency.

### 4.3 Cumulative Effects Analysis

Cumulative effects to the reef fish fishery relative to sea turtles have been analyzed in detail in Amendment 18A (GMFMC 2005a), and Amendment 31 (GMFMC 2010). In addition, combined effects of Amendment 31 and a more recent bottom longline (BLL) abbreviated framework (GMFMC 2017c) were considered. These effects are incorporated by reference and summarized below. Additional pertinent past actions are summarized in the history of management (Section 1.3). This is the first document to consider allowing additional, optional, sea turtle release devices since Amendment 18A (GMFMC 2005a). Currently, the Council is considering reasonably foreseeable future actions (RFFAs) for the reef fish fishery management plan. These include: Amendment 36B, which would further revise the red snapper and grouper-tilefish commercial individual fishing quota (IFQ) programs; Amendment 41, which would set red snapper charter management programs; Amendment 42, which would set a reef fish headboat management program; an amendment for state management of red snapper; and several framework actions, which address reef fish overall and specifically red snapper, and greater amberjack. Descriptions of these actions can be found on the Council's web page<sup>20</sup>. RFFAs are not expected to have significant adverse effects on public health or safety. The proposed action (see Sections 2.1 and 2.2), along with past and RFFAs, are not expected to alter the manner in which the fishery is prosecuted. Furthermore, other requirements and additional RFFAs are being addressed regarding sea turtles through other fisheries. These include: turtle excluder device requirements in the shrimp fishery, turtle release gear and safe handling requirements in the highly migratory species (HMS) fishery, and sea turtle release gear requirements in the South Atlantic snapper grouper fishery. Descriptions of these actions can be found on the NMFS protected resources web page<sup>21</sup>, the NMFS HMS web page<sup>22</sup>, and the South Atlantic Fishery Management Council web page<sup>23</sup>.

The affected area of this proposed action encompasses the state and federal waters of the Gulf. Action 1 would allow additional sea turtle release gear to be selected as options fulfilling the requirements of what sea turtle release gear is mandatory on board vessels holding a commercial Gulf reef fish permit or a Gulf charter/headboat reef fish permit. In addition, Action 2 would modify the reef fish framework allowing for sea turtle and other protected resources release gear

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<sup>20</sup> [www.gulfcouncil.org](http://www.gulfcouncil.org)

<sup>21</sup> [http://sero.nmfs.noaa.gov/protected\\_resources/sea\\_turtle\\_protection\\_and\\_shrimp\\_fisheries/index.html](http://sero.nmfs.noaa.gov/protected_resources/sea_turtle_protection_and_shrimp_fisheries/index.html)

<sup>22</sup> [http://www.nmfs.noaa.gov/sfa/hms/compliance/workshops/protected\\_species\\_workshop/requirements.html](http://www.nmfs.noaa.gov/sfa/hms/compliance/workshops/protected_species_workshop/requirements.html)

<sup>23</sup> <http://safmc.net/fishery-management-plans-amendments/snapper-grouper-fishery-management-plan/>

and handling requirements to be implanted via the framework process rather than a full amendment. These actions are not expected to have significant beneficial or adverse effects on the physical and biological/ecological environments because this action will only minimally affect current fishing practices (see Sections 4.1.1 and 4.1.2). Social and economic effects are considered to have a minimal positive effect although the effect is considered a non-negative value, that is, the value of a live sea turtle (see Sections 4.1.3, and 4.1.4). This action, combined with past and RFFAs is not expected to have significant adverse effects on public health or safety. The proposed action (see Sections 4.1.1 and 4.1.2), along with past and RFFAs, are not expected to alter the manner in which the fishery is prosecuted.

The proposed actions are directed towards the management of naturally occurring species in the Gulf, so the introduction or spread of non-indigenous species should not occur. Additionally, the action does not propose any activity, such as increased ballast water discharge from foreign vessels, which is associated with the introduction or spread on non-indigenous species.

There is a large and growing body of literature on past, present, and future impacts of global climate change induced by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. The Environmental Protection Agency's (EPA) climate change web page<sup>24</sup> provides basic background information on these and other measured or anticipated effects. In addition, the Intergovernmental Panel on Climate Change (IPCC) has numerous reports addressing their assessments of climate change. Global climate changes could have significant effects on Gulf fisheries; however, the extent of these effects is not known at this time. Possible impacts include temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions; changes in precipitation patterns and a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influencing the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs (Kennedy et al. 2002). Modeling of climate change in relation to the northern Gulf hypoxic zone may exacerbate attempts to reduce the area affected by these events (Justic et al. 2003). It is unclear how climate change would affect reef fishes, and likely would affect species differently. Climate change can affect factors such as migration, range, larval and juvenile survival, prey availability, and susceptibility to predators. In addition, the distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Climate change may significantly impact Gulf reef fish species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts would occur. Actions in this amendment are not expected to significantly contribute to climate change through the increase or decrease the carbon footprint from fishing.

The effects of the proposed action are, and will continue to be, monitored through collection of landings data by NMFS, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. Landings data for the

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<sup>24</sup> [http://www.ipcc.ch/publications\\_and\\_data/publications\\_and\\_data.shtml](http://www.ipcc.ch/publications_and_data/publications_and_data.shtml).

recreational sector in the Gulf are collected through the Marine Recreational Information Program (MRIP), the Southeast Region Headboat Survey (SRHS), and the Texas Marine Recreational Fishing Survey. In addition, the Louisiana Department of Wildlife and Fisheries and the Alabama Department of Conservation and Natural Resources have instituted programs to collect reef fish recreational landings information in their respective states. Commercial data are collected through trip ticket programs, port samplers, and logbook programs, as well as dealer reporting through the IFQ program.

Impacts from the *Deepwater Horizon MC252* oil spill are still being examined and peer-reviewed studies are only now just being published. However, the effects of this oil on reef fish populations are incomplete and unavailable (see 40 CFR § 1502.22) at this time because studies of the effects of the oil spill are still ongoing. If the oil impacts important habitat for these species or interrupts critical life history stages, the effects could reduce these species' population sizes. The oil itself could have adversely affected adult greater amberjack and other reef fish species. In a recent study, Weisberg et al. (2014) suggested the hydrocarbons associated with *Deepwater Horizon MC252* oil spill did transit onto the Florida shelf and may be associated with the occurrences of reef fish with lesions and other deformities. However, Murawski et al. (2014) reported that the incidence of lesions on bottom dwelling fish had declined between 2011 and 2012 in the northern Gulf.

## **CHAPTER 5. LIST OF AGENCIES, ORGANIZATIONS AND PERSONS CONSULTED**

<b>Name</b>	<b>Expertise</b>	<b>Responsibility</b>	<b>Agency</b>
Carrie Simmons	Fishery Biologist	Co-Team Lead – Amendment development and introduction	GMFMC
Kelli O’Donnell	Fishery Biologist	Co-Team Lead – Amendment development, description of the fishery, and effects analysis,	SERO
Mike Travis	Economist	Regulatory Impact Review and Regulatory Flexibility Act analysis	SERO
Ava Lasseter	Anthropologist	Social effects analysis and Reviewer	GMFMC
Matt Freeman	Economist	Economic effects analysis and Reviewer	GMFMC
Michael Jepson	Anthropologist	Social analyses and Reviewer	SERO
Shepherd Grimes	Attorney	Legal compliance and Reviewer	NOAA GC
Adam Bailey	Technical Writer & Editor	Regulatory writer and Reviewer	SERO
Susan Gerhart	Fishery Biologist	Reviewer	SERO
Frank Helies	Fishery Biologist	Reviewer	SERO
Mary Wunderlich	Protected Species Biologist	Effects analysis and Reviewer	SERO
Charlie Bergmann	Fishery Biologist	Reviewer	SEFSC

### **LIST OF AGENCIES CONSULTED**

National Marine Fisheries Service  
 - Southeast Fisheries Science Center  
 - Southeast Regional Office  
     - Protected Resources  
     - Habitat Conservation  
     - Sustainable Fisheries  
 NOAA General Counsel  
 U.S. Coast Guard

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## APPENDIX A. SEA TURTLE RELEASE GEAR REQUIREMENTS

Appendix A1. Sea turtle release gear required for vessels with a federal commercial and/or charter vessel/headboat permit for Gulf reef fish permit(s) and with a freeboard height of 4 ft or less. Freeboard is defined as the working distance between the top rail of the gunwale to the water's surface, and will vary based on the vessel design.

Required Item	Example Model(s) Meeting Current Design Standards
Dipnet (handle length must be 6 ft or 150% of freeboard height)	ARC 12' Breakdown Lightweight DipNet Model DN6P (6'), DN08 (8') or DN14 (12') or ARC Net Assembly (hoop, net, coupling-DNIN) and handle; Lindgren-Pitman, Inc. Model NMFS-Turtle Net; Bluewater Tackle; or Howell Tackle
Cushioned Support Device	A standard automobile tire; boat cushion; or large turtle hoist
Short-Handled Dehooker for Ingested Hooks*	17-in Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker Model ST08 or NOAA/Bergmann Dehooker
Short-Handled Dehooker for External Hooks*	17-in Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker Model ST08; NOAA/Bergmann Dehooker; Short-handled J-Style Dehooker; Scotty's Dehooker; or Short-handled Roby Dehooker
Long-nose or Needle-nose Pliers	12-in S.S. NuMark Model #030 281 109 871, Offshore Angler® Stainless Longreach Pliers Model #38-481-759-00, or Pittsburgh® 15-in Long Nose Locking Pliers
Bolt Cutter	H.K. Porter Model 1490 AC
Monofilament Line Cutter	Jinkai Model MC-T
At least Two (2) Types of the following Mouth Openers and Mouth Gags	
Block of Hard Wood	Any block of hard wood or long-handled wire brush (e.g., Olympia Tools Model 974174)
Set of (3) Canine Mouth Gags	Jorvet Model 4160, 4162, and 4164
Set of (2) Sturdy Dog Chew Bones	Nylabone®, Gumabone®, or Galileo® (trademarks owned by T. F. H. Publications, Inc.)
Set of (2) Rope Loops Covered with Hose	Any set of (2) rope loops covered with hose meeting design standards
Hank of Rope	Any size soft braided nylon rope is acceptable, provided it creates a hank of rope approximately 2–4 in thickness
Set of (4) PVC Splice Couplings	A set of (4) Standard Schedule 40 PVC splice couplings (1 in, 1.25 in, 1.5 in, and 2 in)
Large Avian Oral Speculum	Model # 85408 from Webster Vet Supply; VSP # 216-08 from Veterinary Specialty Products; Jorvet Model J-51z; and Krusse Model 273117.

**Disclaimer:** This table is meant to help fishermen comply with sea turtle release measures contained in regulations published in the *Federal Register* [76 FR 82183] on December 30, 2011, for the South Atlantic, and 71 FR 45428 published on August 9, 2006, for the Gulf of Mexico. All sea turtle release gear must meet the specific requirements in Appendix F to Part 622.

\*Only one short-handled dehooker is required onboard if the approved short-handled dehooker is designed to remove both ingested and external hooks.

Appendix A2. Sea turtle release gear required for vessels with commercial and/or charter vessel/headboats with a federal reef fish permit(s) and a freeboard height of greater than 4 ft. Freeboard is defined as the working distance between the top rail of the gunwale to the water's surface, and will vary based on the vessel design.

Required Item	Example Model(s) Meeting Current Design Standards
Long-handled line cutter (6 ft or 150% of freeboard height)	NOAA/LaForce Line Cutter or NOAA/Arceneaux Line Clipper
Long-handled <sup>25</sup> (6 ft or 150% of freeboard height) dehooker for ingested hooks <sup>26</sup>	ARC Pole Big Game Dehooker Models BP04, BP08, BP11, P610 and BPIN
Long-handled (6 ft or 150% of freeboard height) dehooker for external hooks <sup>1</sup>	ARC Pole Big Game Dehooker Models BP04, BP08, BP11, P610 and BPIN; Long-handled J-Style Dehooker or "Flip Stick" (ARC Model LJ6P); or Long-handled Roby Dehooker
Long-handled device to pull an "inverted V" (6 ft (1.83 m) or 150% of freeboard height)	Long-handled J-Style Dehooker or "Flip Stick" (ARC Model LJ6P); Any standard boat hook (e.g., Davis Telescoping Boat Hook to 96" Model 85002A); or Any standard fishing gaff (e.g., West Marine # F6H5 Hook and # F6-006 Handle)
Dipnet (handle length must be 6 ft or 150% of freeboard height)	ARC 12' Breakdown Lightweight DipNet Model DN6P (6'), DN08 (8') or DN14 (12') or ARC Net Assembly (hoop, net, coupling-DNIN) and handle; Lindgren-Pitman, Inc. Model NMFS-Turtle Net; Bluewater Tackle; or Howell Tackle
Cushioned Support Device	A standard automobile tire; boat cushion; or large turtle hoist
Short-Handled Dehooker for Ingested Hooks	17-in Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker Model ST08 or NOAA/Bergmann Dehooker
Short-Handled Dehooker for External Hooks	17-in Bite Block Deep-Hooked (Sea Turtle) ARC Dehooker Model ST08; NOAA/Bergmann Dehooker; Short-handled J-Style Dehooker; Scotty's Dehooker; or Short-handled Roby Dehooker
Long-nose or Needle-nose Pliers	12-in S.S. NuMark Model #030 281 109 871, Offshore Angler® Stainless Longreach Pliers Model #38-481-759-00, or Pittsburgh® 15-in Long Nose Locking Pliers
Bolt Cutter	H.K. Porter Model 1490 AC
Monofilament Line Cutter	Jinkai Model MC-T

At least Two (2) Types of the following Mouth Openers and Mouth Gags	
Block of Hard Wood	Any block of hard wood or long-handled wire brush (e.g., Olympia Tools Model 974174)
Set of (3) Canine Mouth Gags	Jorvet Model 4160, 4162, and 4164
Set of (2) Sturdy Dog Chew Bones	Nylabone®, Gumabone®, or Galileo® (trademarks owned by T. F. H. Publications, Inc)
Set of (2) Rope Loops Covered with Hose	Any set of (2) rope loops covered with hose meeting design standards
Hank of Rope	Any size soft braided nylon rope is acceptable, provided it creates a hank of rope approximately 2–4 in thickness
Set of (4) PVC Splice Couplings	A set of (4) Standard Schedule 40 PVC splice couplings (1 in, 1.25 in, 1.5 in, and 2 in)
Large Avian Oral Speculum	Model # 85408 from Webster Vet Supply; VSP # 216-08 from Veterinary Specialty Products; Jorvet Model J-51z; and Krusse Model 273117.

**Disclaimer:** This table is meant to help fishermen comply with sea turtle release measures contained in regulations published in the *Federal Register* [76 FR 82183] on December 30, 2011, for the South Atlantic, and 71 FR 45428 published on August 9, 2006, for the Gulf of Mexico. All sea turtle release gear must meet the specific requirements in Appendix F to Part 622.

<sup>1</sup> A short-handled dehooker with an appropriate length handle extender will also fulfill this requirement.

<sup>2</sup> Until you have received training on the proper use of internal dehookers and internal dehooking techniques, an external dehooker is recommended. For those with proper training, an internal and external dehooker or one that does both, is recommended.

## APPENDIX B. OTHER APPLICABLE LAWS

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.) provides the authority for management of stocks included in fishery management plans (FMP) in federal waters of the exclusive economic zone. However, management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems that support those fisheries. Major laws affecting federal fishery management decision-making include the Endangered Species Act (Section 3.3.3), E.O. 12866 (Regulatory Planning and Review, Chapter 5) and E.O. 12898 (Environmental Justice, Section 3.5). Other applicable laws are summarized below.

### **Administrative Procedure Act**

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (5 U.S.C. Subchapter II), which establishes a “notice and comment” procedure to enable public participation in the rulemaking process. Under the Act, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider, and respond to public comment on those rules before they are finalized. The Act also establishes a 30-day waiting period from the time a final rule is published until it takes effect. Proposed and final rules will be published before implementing the actions in this amendment.

### **Coastal Zone Management Act**

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

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

### **Data Quality Act**

The Data Quality Act (Public Law 106-443) effective October 1, 2002, requires the government to set standards for the quality of scientific information and statistics used and disseminated by

federal agencies. Information includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, cartographic, narrative, or audiovisual forms (includes web dissemination, but not hyperlinks to information that others disseminate; does not include clearly stated opinions).

Specifically, the Act directs the Office of Management and Budget to issue government wide guidelines that “provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies.” Such guidelines have been issued, directing all federal agencies to create and disseminate agency-specific standards to: (1 ensure information quality and develop a pre-dissemination review process; (2 establish administrative mechanisms allowing affected persons to seek and obtain correction of information; and (3 report periodically to Office of Management and Budget on the number and nature of complaints received.

Scientific information and data are key components of FMPs and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Act. To be consistent with the Magnuson-Stevens Act, FMPs and amendments must be based on the best information available. They should also properly reference all supporting materials and data, and be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data will also undergo quality control prior to being used by the agency and a pre-dissemination review.

### **National Historic Preservation Act**

The National Historic Preservation Act (NHPA) of 1966, (Public Law 89-665; 16 U.S.C. 470 *et seq.*) is intended to preserve historical and archaeological sites in the United States of America. Section 106 of the NHPA requires federal agencies to evaluate the impact of all federally funded or permitted projects for sites on listed on, or eligible for listing on, the National Register of Historic Places and aims to minimize damage to such places.

Historical research indicates that over 2,000 ships have sunk on the Federal Outer Continental Shelf between 1625 and 1951; thousands more have sunk closer to shore in state waters during the same period. Only a handful of these have been scientifically excavated by archaeologists for the benefit of generations to come. Further information can be found at: <http://www.boem.gov/Environmental-Stewardship/Archaeology/Shipwrecks.aspx>

The proposed action does not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places nor is it expected to cause loss or destruction of significant scientific, cultural, or historical resources. In the Gulf of Mexico (Gulf), the *U.S.S. Hatteras*, located in federal waters off Texas, is listed in the National Register of Historic Places. Fishing activity already occurs in the vicinity of this site, but the proposed action would have no additional adverse impacts on listed historic resources, nor would they alter any regulations intended to protect them.

## **Executive Orders (E.O.)**

### **E.O. 12630: Takings**

The E.O. on Government Actions and Interference with Constitutionally Protected Property Rights that became effective March 18, 1988, requires each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment. The NOAA Office of General Counsel will determine whether a Taking Implication Assessment is necessary for this amendment.

### **E.O. 12962: Recreational Fisheries**

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

### **E.O. 13089: Coral Reef Protection**

The E.O. on Coral Reef Protection requires federal agencies whose actions may affect U.S. coral reef ecosystems to identify those actions, utilize their programs and authorities to protect and enhance the conditions of such ecosystems, and, to the extent permitted by law, ensure actions that they authorize, fund, or carry out do not degrade the condition of that ecosystem. By definition, a U.S. coral reef ecosystem means those species, habitats, and other national resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States (e.g., federal, state, territorial, or commonwealth waters).

Regulations are already in place to limit or reduce habitat impacts within the Flower Garden Banks National Marine Sanctuary. Additionally, NMFS approved and implemented Generic Amendment 3 for Essential Fish Habitat (GMFMC 2005), which established additional habitat areas of particular concern (HAPCs) and gear restrictions to protect corals throughout the Gulf.

There are no implications to coral reefs by the actions proposed in this amendment.

**E.O. 13132: Federalism**

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

No Federalism issues were identified relative to the action to modify the management of the recreational harvest of greater amberjack. Therefore, consultation with state officials under Executive Order 12612 was not necessary. Consequently, consultation with state officials under Executive Order 12612 remains unnecessary.

**E.O. 13158: Marine Protected Areas**

This E.O. requires federal agencies to consider whether their proposed action(s) will affect any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural or cultural resource within the protected area. There are several marine protected areas, HAPCs, and gear-restricted areas in the eastern and northwestern Gulf. The existing areas are entirely within federal waters of the Gulf. They do not affect any areas reserved by federal, state, territorial, tribal or local jurisdictions.