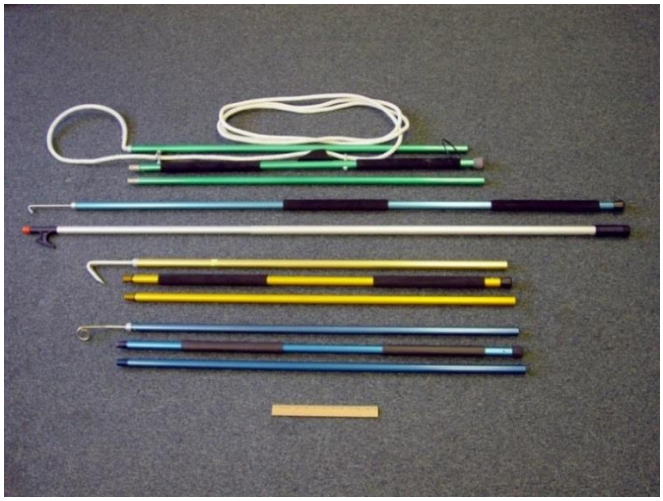
Rev. 6/1/2018

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



Final Draft Amendment 49 to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico

Including Draft Environmental Assessment, Fishery Impact Statement Regulatory Impact Review, and Regulatory Flexibility Act Analysis

June 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, Fishery Impact Statement, Regulatory Impact Review, and Regulatory Flexibility Act Analysis

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Proposed Actions: The document has two actions. The first action considers including three new types of approved sea turtle release gear and setting a minimum length for a currently required gear for commercial and charter vessel/headboats 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.

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Type of Action

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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
FIS	Fishery Impact Statement
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
PVC	polyvinyl chloride
pw	product weight
RA	Regional Administrator
Release Protocols	Careful Release Protocols for Sea Turtle Release with Minimal Injury
RFFA	reasonably foreseeable future action
RIR	regulatory impact review
SCL	straight carapace length

Secretary	Secretary of Commerce
SEDAR	Southeast Data, Assessment, and Review
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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FISHERY IMPACT STATEMENT

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires that a fishery impact statement (FIS) be prepared for all amendments to fishery management plans. The FIS contains: 1) an assessment of the likely biological/conservation, economic, and social effects of the conservation and management measures on fishery participants and their communities; 2) an assessment of any effects on participants in the fisheries conducted in adjacent areas under the authority of another Fishery Management Council; and 3) the safety of human life at sea. Detailed discussion of the expected effects for all alternatives considered is provided in Chapter 4. The FIS provides a summary of these effects.

The Gulf of Mexico (Gulf) reef fish fishery is known to encounter endangered and threatened sea turtles and, less frequently, endangered smalltooth sawfish. 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 different types of gear. 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 National Marine Fisheries Service (NMFS) Southeast Regional Office (SERO) has issued several Biological Opinions (Bi Op) over the years, in accordance with section 7 of the ESA that evaluated the impact of the reef fish fishery on endangered sea turtles and smalltooth sawfish. The February 2005 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. The Bi Op also specified that the 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 protocols and guidelines for federally permitted commercial vessels and charter vessel/headboats in the Gulf.

The Careful Release Protocols for Sea Turtle Release with Minimal Injury (Release Protocols) were originally published in 2004 with revised editions released in 2008 and 2010. A new update is ready for publication and includes three additional types of sea turtle release gear approved by the Southeast Fisheries Science Center (SEFSC) for use in handling and releasing incidentally caught sea turtles when fishing for reef fish. The new update to the Release Protocols also includes clarification on a new minimum length for a currently required release gear.

Reef Fish Amendment 49 to the Fishery Management Plan (FMP) for the Reef Fish Resources of the Gulf of Mexico consists of two management actions: 1) allow other sea turtle release gear options for federal commercial and charter vessel/headboat reef fish fishermen to choose as part of the requirement under their permit and 2) modify the framework procedure in the Reef Fish FMP. The addition of other sea turtle release gear options would allow more flexibility for fishermen; therefore, better compliance is expected and ultimately improvement of the survival rate of incidentally caught sea turtles. The addition of sea turtle and other protected resources

release gear types and handling procedures to the list of items that can be changed through the open, abbreviated, framework procedure would allow for faster adoption of gear types designed and tested to safeguard sea turtles and other protected resources. Actions proposed in this amendment are not expected to result in significant impacts on fishery participants.

Biological Effects

In Action 1, **Preferred Alternative 2** is anticipated to result in some positive indirect biological benefits, because these new gear types are anticipated to allow additional flexibility in the regulatory requirements for fishermen. The additional flexibility is anticipated to assist with compliance and aid in the safe release of sea turtles and other protected species at a greater frequency than the current release gear requirements alone.

Revising the framework procedure, which outlines the actions that can be implemented through framework actions, would enable modifications to sea turtle and other protected resources release gear and handling procedures to be expedited to allow for public use after being approved by the SEFSC. **Preferred Alternatives 2a** and **2b** in Action 2 increase the types of actions that could be implemented quickly through the framework procedure, and therefore, would provide beneficial biological/ecological effects to sea turtles and other protected resources more quickly.

Economic Effects

Preferred Alternative 2 in Action 1 would allow the use of the three new release gears and set a new minimum length for long-nose or needle-nose pliers. As a direct economic effect of the three new release gears, vessels owners have additional options to supplement current release gear. Owners may then examine the net economic benefits of the new gears in relation to the current available gear to determine whether or not to adopt one of the new gears; these net benefits include both the cost of a particular device as well as any added benefits, such as saved space onboard. A self-constructed collapsible hoop net and self-constructed PVC small turtle hoist are less expensive than the current dipnet; a retail purchased collapsible hoop net is, however, currently more expensive than the current dipnet. The new short-handled dehooker is less expensive than some of the current dehookers and more expensive than others. As an indirect economic effect of the three new release gears, demand for specific brands of release gears may change, as vessel owners consider the net economic benefits of the new gears compared to the current gears. No impacts would be expected to the overall demand for this broad category of products, as the number of vessels using sea turtle release gear is not expected to be impacted. Lastly, a specific minimum length limit for pliers removes ambiguity for fishermen for compliance purposes and would reduce the risk of a non-compliance fine. **Preferred Alternative 2** is expected to result in net economic benefits.

Preferred Alternatives 2a and **2b** in Action 2 would modify the reef fish framework procedure to include release gear requirements and handling protocols for sea turtles and other protected resources through the open abbreviated documentation process. Direct economic effects to fishermen are not expected, as this is a procedural change and no specific gear requirements or handling protocols are specified; as an indirect effect, any economic benefits or costs resulting from changes to gear requirements or handling protocols would accrue faster to fishermen.

Additionally, due to shortening the timeline for modifications to release gear and handling requirements, cost reductions to the government are anticipated as a positive indirect economic effect, but these government cost reductions cannot be quantified.

Social Effects

Some minimal positive effects could result from the actions of this amendment. The addition of new release gears that may be used in place of currently required gears provides some flexibility to fishermen (Action 1, **Preferred Alternative 2**). Changing the length limit for the long-nose or needle-nose pliers to be a minimum of 11 inches (Action 1, **Preferred Alternative 2**) would make the regulation more clear for law enforcement. Modifying the framework procedure to allow for release gear and handling requirements to be adopted through the open abbreviated documentation process (Action 2, **Preferred Alternative 2**) would enable fishermen to begin using newly approved gears sooner than if their adoption requires a plan amendment.

Because the actions in this amendment would only affect federally permitted for-hire and commercial vessels fishing for reef fish in the Gulf, participants in fisheries conducted in adjacent areas, including the South Atlantic region, would not be affected. Nevertheless, the South Atlantic Fishery Management Council is establishing comparable regulations in its jurisdiction. Further, the actions in this amendment are not expected to affect safety-at-sea. No safety-at-sea issues would arise from the administrative actions of adding alternative sea turtle release gears and setting minimum length for currently required release gear. Modifying the recreational and commercial management measures would not require fishermen to alter their fishing behavior by fishing in unsafe conditions.

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 different types of gear.

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).

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.

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

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 by NMFS titled, "Careful Release Protocols for Sea Turtle Release with Minimal Injury" (Release Protocols). Permit holders are also required to post inside the wheelhouse, or in an easily viewable area if no wheelhouse, the sea turtle handling and release guidelines placard by NMFS[1]. The guidelines are also available in Spanish and Vietnamese.

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 sea turtle release gear types were approved and a new minimum length limit was specified for a currently required gear by the Southeast Fisheries Science Center (SEFSC) for use in handling and releasing incidentally caught sea turtles when fishing for reef fish. These new 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, 2.1.4, and 2.1.5) and a new type of dehooking device (Figures 2.1.6 and 2.1.7). This gear is recommended for use, if a fishing hook is externally embedded. The new length limit is for the long nose or needle nose pliers were the size limit requirement would change from approximately 12 inches to a minimum of 11 inches and would make compliance with this gear requirement easier for participants in the fishery. The collapsible hoop net and small sea turtle hoist, both for bringing sea turtles onboard, require less space on vessels than a dipnet with a rigid handle, but still provide the necessary functionality. However, these new release gears and new length limit 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 types of release gear and setting a new minimum length for a currently required gear, this document also considers modifying the Reef Fish FMP 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 sea turtle release gear requirements to be implemented via the framework procedure. 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

[1] https://www.fisheries.noaa.gov/webdam/download/63740915

streamline management and provide additional flexibility to participants in the commercial sector and charter vessel/headboat component of the reef fish fishery. It can also be interpreted that making more restrictive changes (more gear, more requirements) will be easier to implement. However, this change to the framework procedure would only allow changes to release gear and handling protocols for sea turtles and other protected resources that are considered routine and/or insignificant for the reef fish fishery. Gear restrictions would continue to be modified under a plan amendment or the open standard framework procedure.

1.2 Purpose and Need

The purpose is to allow the use of three new sea turtle release gear types and establish a new length limit for a currently required gear to release incidentally hooked sea turtles and other protected species. Further, the purpose is to streamline the process for allowing federal commercial and charter vessel/headboat reef fish permit holders to use additional gear types and handling procedures for incidentally hooked sea turtles and other protected species after they are approved by the SEFSC.

The need is to provide flexibility to participants in the federal commercial and charter vessel/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 comprised of non-target species that were generally taken incidentally to the directed fishery. 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 charter vessel/headboat reef fish vessel permits to comply with highly migratory species 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 required all reef fish permit holders, commercial and recreational for-hire, to report their bycatch. This amendment also requested that NMFS 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 hard shell 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 add 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 changed the minimum stock size threshold for seven species in the Reef Fish FMP. Upon approval of Amendment 44 in December 2017, red snapper and gray triggerfish were reclassified as not overfished but rebuilding, because the biomass for the stocks are currently estimated to be greater than 50% of B_{MSY}. The stock status for greater amberjack currently remains 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.

Preferred 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 turtle hoist, as well as set a new minimum length limit for long-nose or needle-nose pliers 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 gear types (collapsible hoop net, dehooking device, and small sea turtle hoist) that have been tested in the field and approved by the Southeast Fisheries Science Center (SEFSC), as well as setting a new minimum length for long-nose or needle-nose pliers are included in the pending revision of the Careful Release Protocols for Sea Turtle Release with Minimal Injury (Release Protocols) (National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum NMFS-SEFSC). Incidental capture in vertical and bottom longline fisheries has the potential to injure or kill protected species. These new and modified types of release gear were designed to reduce the severity of injury and mortality rate of protected species if incidentally captured. The careful handling, gear, 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, and make very minor additional changes to the existing gear descriptions, which are intended to simplify and clarify the precise requirements. For example, vessels are required to carry a dipnet on board, and there are numerous options for the exact dipnet device that satisfy the minimum regulatory specifications. 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 and set a minimum length limit for a currently required release gear that may be used in place of existing options (**Preferred 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.

Preferred 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). 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 NMFS regulations (capable of lifting a minimum of 100 lbs with a minimum diameter of 31 inches, a minimum bag depth of 38 inches, and a rope handle length of 6 feet or 150% of freeboard height, whichever is greater). 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. Consistent with existing regulations, SEFSC is defining mesh opening as a maximum of 3 by 3 inches bar measure (knot to knot on a single line of the webbing) for all new release net devices. When the collapsible net is folded over on itself its size 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 can be used to bring sea turtles on board when it is not feasible to use a 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 inside diameter of 31 inches, no minimum bag depth requirement and a rope handle length of 6 feet or 150% of freeboard height, whichever is greater). The mesh must be securely fastened to the hoop frame (Figure 2.1.4). The hoop frame can be constructed of aluminum, stainless steel, a minimum of schedule 40 polyvinyl chloride (PVC) pipe, or another material capable of maintaining its shape when lifting a sea turtle. Generally, the small turtle 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 Release Protocols (draft NOAA Technical Memorandum NMFS-SEFSC).

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

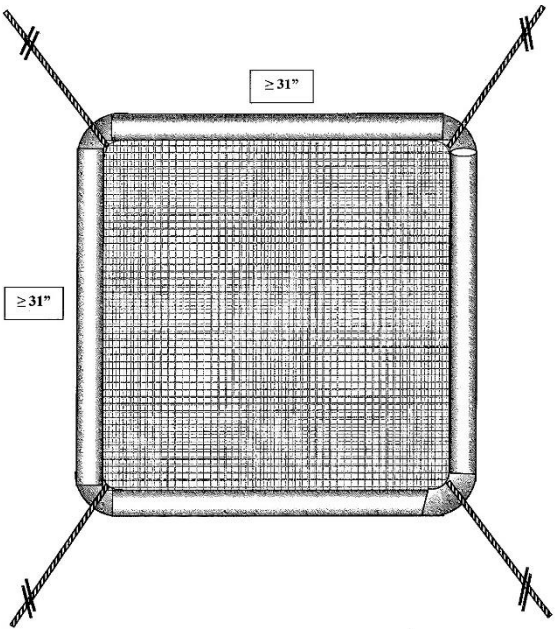

Figure 2.1.4. Example of a small sea turtle hoist that can be constructed. Photo credit: NMFS-SEFSC.

The small sea turtle basket hoist must meet the standards to be specified in the NMFS regulations (capable of lifting 100 lbs with a minimum inside diameter of 31 inches, no minimum bag depth requirement, and a rope handle length of 6 feet or 150% of freeboard height, whichever is greater). The mesh must be securely fastened to the frame (Figure 2.1.5). The hoop frame can be constructed of aluminum, stainless steel, a minimum of schedule 40 PVC pipe, or another material capable of maintaining its shape when lifting a sea turtle.

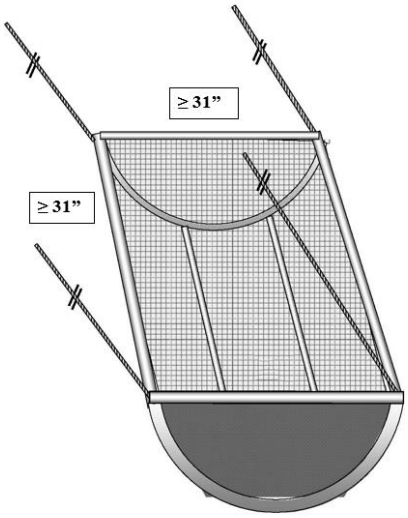

Figure 2.1.5. Example of a small sea turtle basket style hoist. Photo credit: NMFS-SEFSC.

The collapsible hoop net (Figures 2.1.1 and 2.1.2) and the small turtle hoist (Figures 2.1.3, 2.1.4, and 2.1.5) 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, whichever is greater) after this amendment is approved and implemented (Appendix A).

The third new gear type is a dehooking device (Figures 2.1.6 and 2.1.7). This gear can be used if a fishing hook is externally embedded and cannot be removed via needle-nose pliers or bolt cutters. 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) and larger hooks up to 10/0 in size. Use of this release gear will be further described in the pending revision to the Release Protocols (draft NOAA Technical Memorandum NMFS-SEFSC). The new dehooking device must meet the standards to be specified in the NMFS regulations (minimum of 11 inches overall length, the end of the device that secures the fishhook must be blunt and all edges rounded, and must be constructed of 304L or 316L SS).

Figure 2.1.6. Example of new sea turtle release dehooker. The minimum length required is 11 inches. 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 will provide another option to comply with the short-handled dehooker for the external hooks regulation.

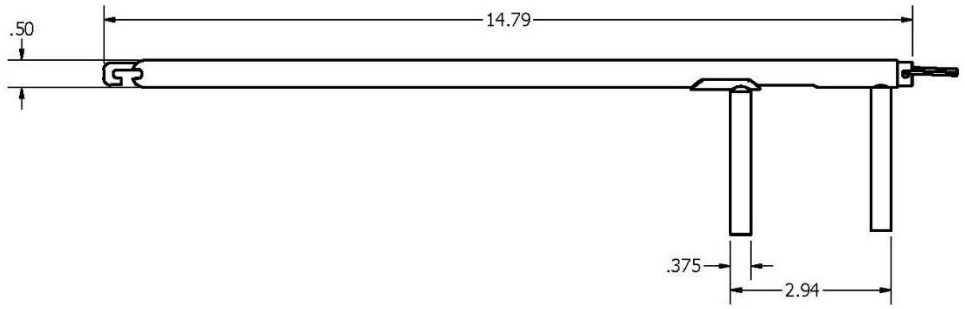

Figure 2.1.7. Example of new sea turtle release dehooker with dimensions in inches. The minimum length is 11 inches. Photo credit: NMFS-SEFSC.

Fishermen indicated that it is difficult to find needle-nose and long-nose pliers that are approximately 12 inches as currently indicated in the regulations (Appendix A). It is not clear whether pliers measuring less than 12 inches meet the current requirement for pliers to be "approximately 12 inches." Thus, **Preferred Alternative 2** would also clarify that the new minimum length limit for long-nose or needle-nose pliers would be 11 inches (Figure 2.1.8). After this amendment is approved and implemented, any long-nose or needle-nose pliers 11 inches or greater could be carried onboard to release incidentally hooked sea turtles and meet the gear requirements.

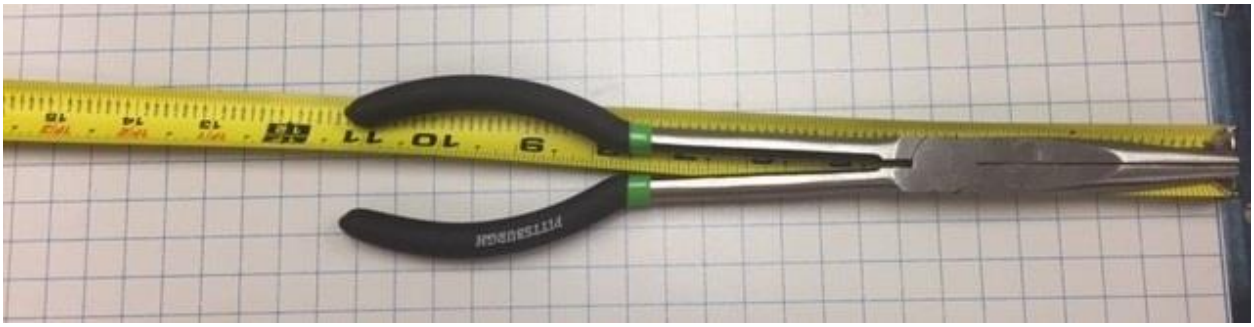

Figure 2.1.8. Example of needle-nose pliers that comply with the new minimum length of 11 inches. Photo credit: NMFS-SEFSC.

Some additional clarifications will be made to the regulations to simplify and clarify the precise requirements for other release gear requirements. These include: additional acceptable grades of stainless steel for other short-handled and long-handled dehookers for internal and external device construction; minimum blade length standard for monofilament line cutters; and removal of end covering requirements for canine mouth gags.

The SEFSC has tested an additional stainless steel material, 304L stainless steel, and has deemed it sufficient for construction of all short-handled and long-handled dehookers. The regulations would be updated to notate 304L and 316L stainless steel is acceptable. Current regulations state that the required monofilament line cutter gear must have a blade of 1 inch. However, it was clarified by SEFSC that the blade has to be a minimum length of 1 inch or greater. Lastly, current regulations state the canine mouth gag is required to have the ends covered with clear vinyl tubing, friction tape, or similar, to pad the surface. However, SEFSC determined that it was not necessary and could result in other issues with sea turtle. This requirement will be removed from the regulations after implementation of this amendment.

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.

Preferred 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:

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

Preferred 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 require less time to complete 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 new types of gear 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 (**Preferred 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.

Preferred 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 **Preferred 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. **Preferred 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. **Preferred Alternative 2** would provide the ability to adopt new options for release devices (**Preferred Option a**) and handling procedures (**Preferred 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 (**Preferred Option a**), and handling procedures (**Preferred Option b**), are both currently required to be abided by as part of the commercial and/or charter vessel/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
Release Gear	
Dehookers, nets, line cutters	Implement SEFSC modified, tested and approved devices
Mouth Openers and Gags	Implement SEFSC approved devices
Handling	
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 (RA) 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 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 RA

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 internal 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 internal 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 85º30'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%
Subtotal	**825**	**98.1%**
Other	16	1.9%
Total	**841**	**100.0%**

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 types of gear 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.

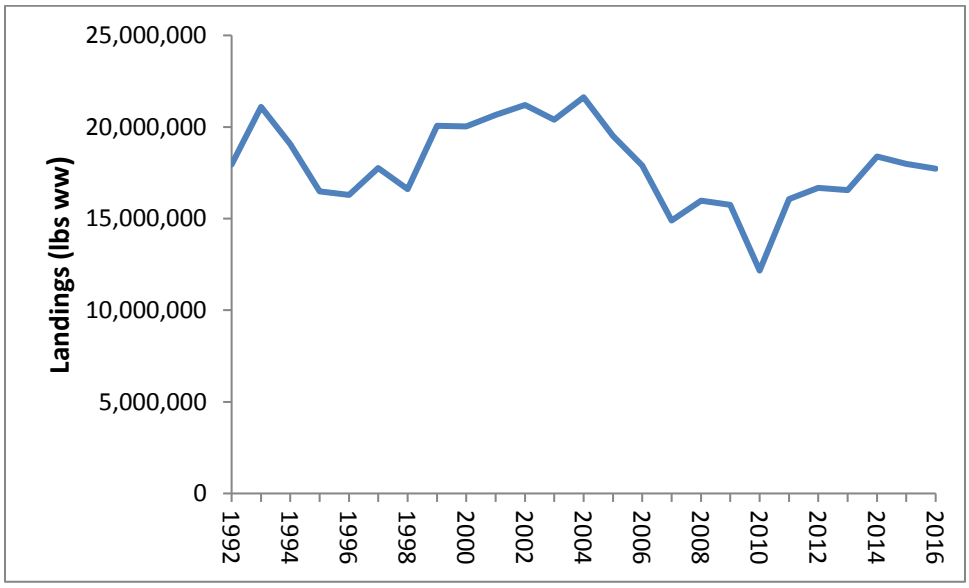

Figure 3.1.1.1. Commercial landings (lbs ww) of species currently managed under the Reef Fish Fishery Management Plant (FMP) from 1992 to 2016.
Source: SEFSC commercial (October 2017) ACL datasets.

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 vessel/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 vessel/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%
Subtotal	**1229**	**96.5%**
Other	45	3.5%
Total	**1274**	**100.0%**

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.

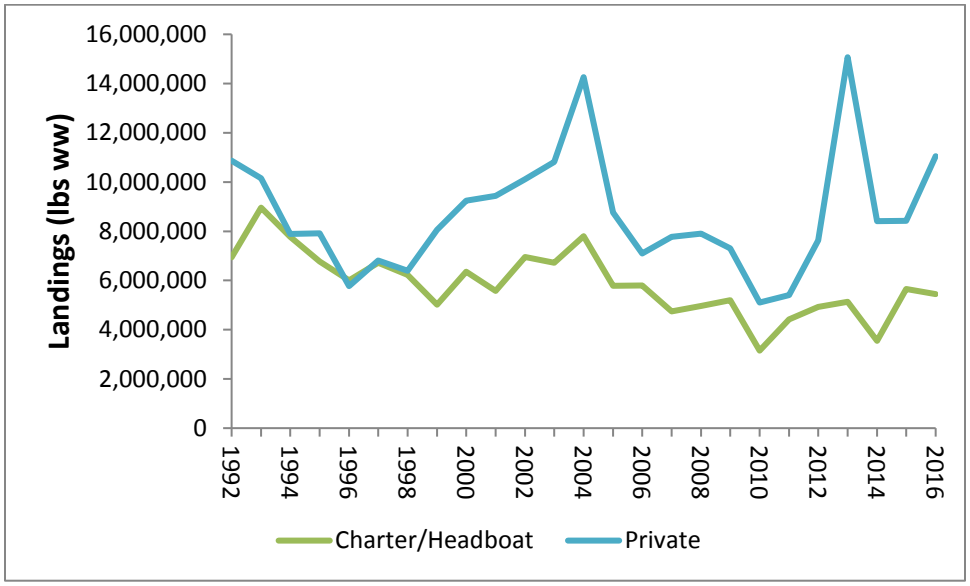

Figure 3.1.2.1. Recreational charter vessel/headboat landings and private angling landings (lbs ww) of species currently managed under the Reef Fish FMP from 1992 to 2016.
Source: SEFSC recreational (October 2017) ACL datasets. Recreational landings were estimates from the Marine Recreational Information 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^2), including state waters (Gore 1992). It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel (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 83º F (23-28º C) including bays and bayous (Figure 3.2.1) between 1982 and 2009, according to satellite-derived measurements[2]. In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

[2] http://accession.nodc.noaa.gov/0072888

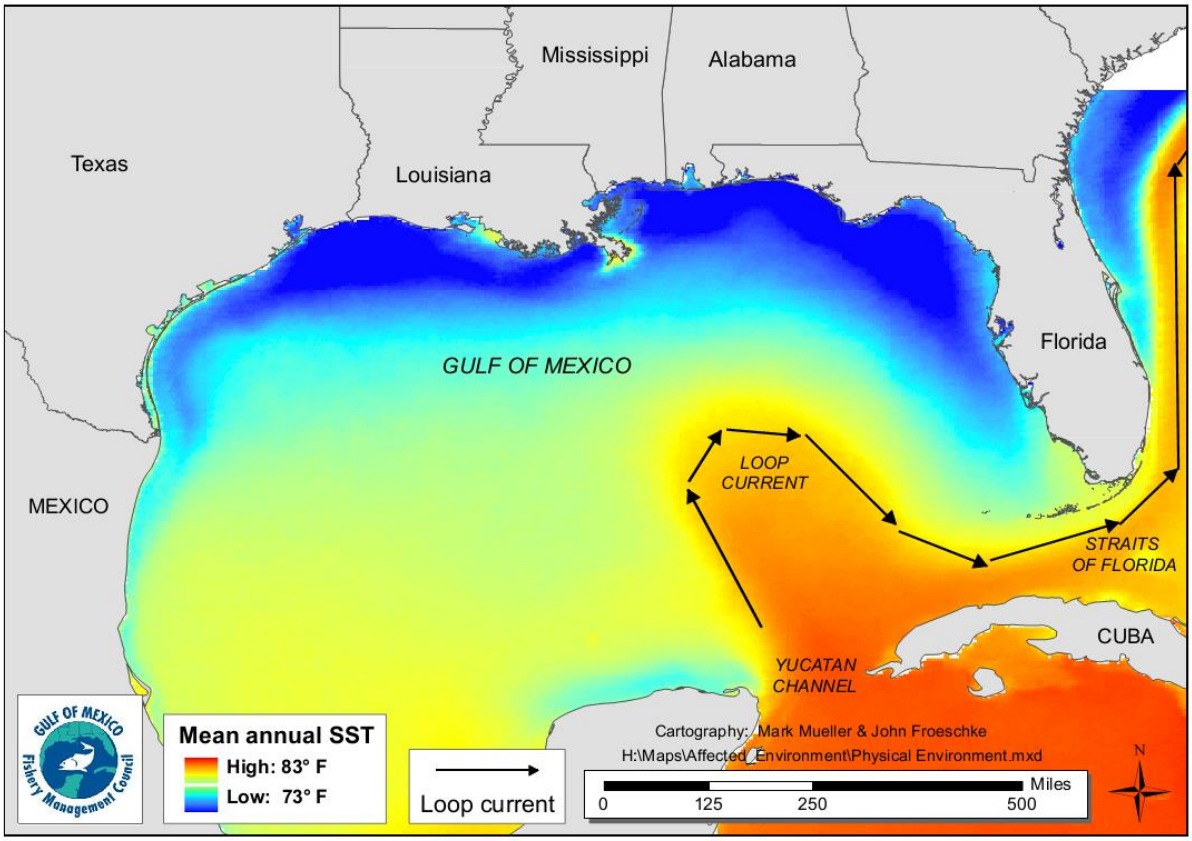

Figure 3.2.1. Mean annual sea surface temperature derived from the Advanced Very High Resolution Radiometer Pathfinder Version 5 sea surface temperature data set (http://pathfinder.nodc.noaa.gov).

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 this gear 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^2) or 133,344 km^2 (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^2 or 405 km^2) 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^2 or 1,338 km^2) 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^2) 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^2 or 487.4 km^2). 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^2 or 644.5 km^2) 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^2 or 4,259 km^2) 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.

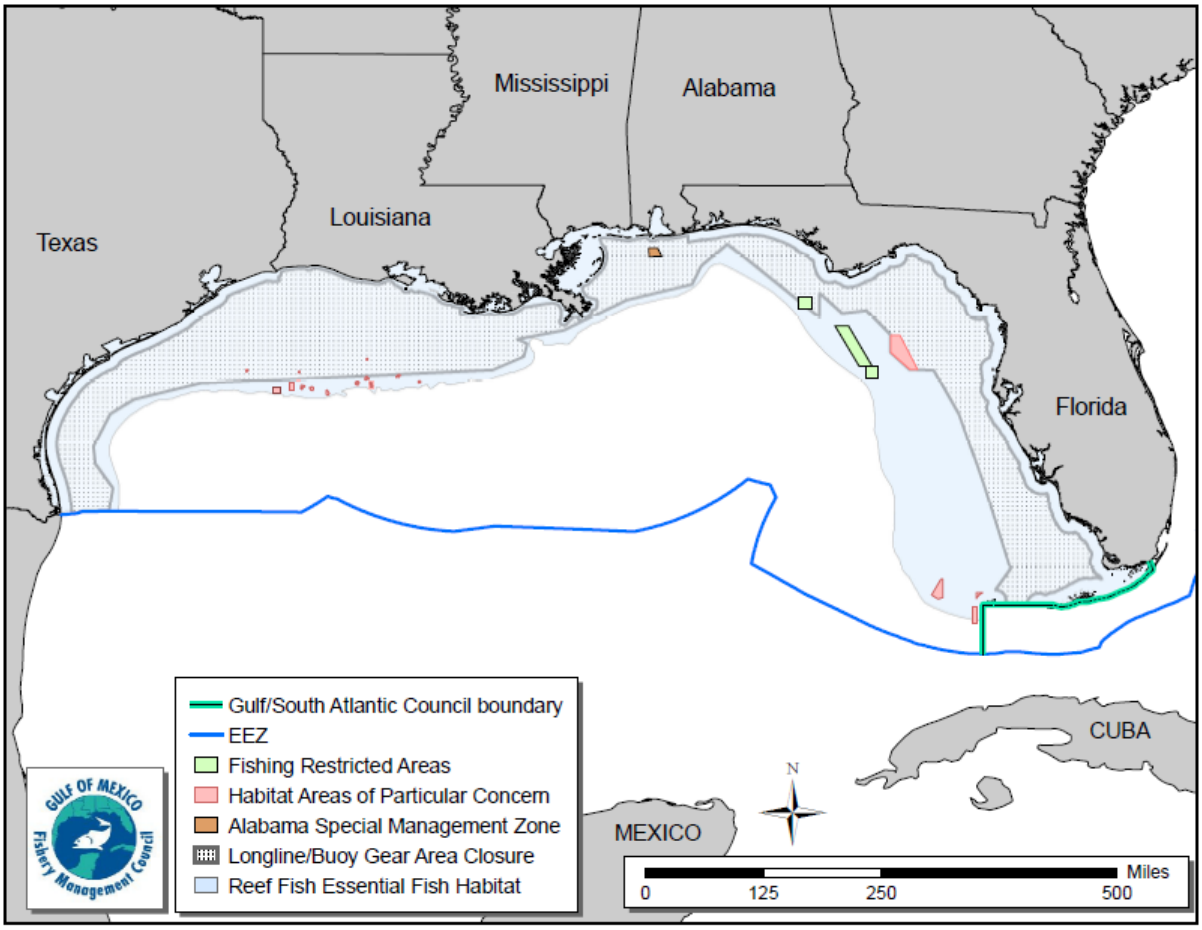

Figure 3.2.2. Map of most fishery management closed areas in the Gulf.
Note: An interactive map of these areas is available at http://portal.gulfcouncil.org/FisheryManagementAreas.html.

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[3] 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 Gulf of Mexico Fishery Management Council (Council)[4] and Southeast Data, Assessment, and Review (SEDAR)[5] websites. Of the 12 stocks for which stock assessments have been conducted, the fourth quarter report of the 2017 Status of U.S. Fisheries classifies only one as overfished (greater amberjack), and two stocks as undergoing overfishing (greater amberjack and gray triggerfish).

The status of both assessed and unassessed stocks, as of the most recent version of the Status of U.S. Fisheries 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

[3] http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/status_updates.html
[4] www.gulfcouncil.org
[5] www.sedarweb.org

44 (GMFMC 2017a), implemented December 2017, modified the minimum stock size threshold for seven species in the Reef Fish FMP. Red snapper and gray triggerfish are now 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 remains classified as overfished.

A stock assessment has been conducted for Atlantic goliath grouper (SEDAR 47 2016). The Scientific and Statistical Committee (SSC) accepted the assessment's general findings that the stock was not overfished nor experiencing overfishing. Although the SSC determined Atlantic goliath grouper to not be experiencing overfishing based on annual harvest remaining below the OFL, the SSC deemed the assessment not suitable for stock status determination and management advice.

Stock assessments were conducted for seven reef fish stocks using the Data Limited Methods Toolkit (DLMToolkit; SEDAR 49 2016). This method allows the setting of overfishing limit (OFL) and acceptable biological catch (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 DLMToolkit. These stocks are not experiencing overfishing based on annual harvest remaining below the OFL, but no overfished status determination has been made (Table 3.3.1). Lane snapper was the only stock with adequate data to be assessed using the DLMToolkit methods resulting in OFL and ABC recommendations by the SSC.

The remaining species within the Reef Fish FMP have not been assessed at this time. Therefore, their stock status is unknown (Table 3.3.1). For those species that are listed as not undergoing overfishing, that determination has been made based on the annual harvest remaining below the OFL. The gray snapper stock assessment is final (SEDAR 51 2018) and is currently awaiting SSC review in May 2018. No other unassessed species are scheduled for a stock assessment at this time.

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

Common Name	Scientific Name	Stock Status		Most recent assessment or SSC workshop
		Overfishing	Overfished	
Family Balistidae – Triggerfishes				
gray triggerfish	*Balistes capriscus*	Y	N	SEDAR 43 2015
Family Carangidae – Jacks				
greater amberjack	*Seriola dumerili*	Y	Y	SEDAR 33 Update 2016a
lesser amberjack	*Seriola fasciata*	N	Unknown	SEDAR 49 2016
almaco jack	*Seriola rivoliana*	N	Unknown	SEDAR 49 2016
banded rudderfish	*Seriola zonata*	Unknown	Unknown	
Family Labridae – Wrasses				
hogfish	*Lachnolaimus maximus*	N	N	SEDAR 37 2013
Family Malacanthidae – Tilefishes				
tilefish (golden)	*Lopholatilus chamaeleonticeps*	N	N	SEDAR 22 2011a
blueline tilefish	*Caulolatilus microps*	Unknown	Unknown	
goldface tilefish	*Caulolatilus chrysops*	Unknown	Unknown	
Family Serranidae – Groupers				
gag	*Mycteroperca microlepis*	N	N	SEDAR 33 Update 2016b
red grouper	*Epinephelus morio*	N	N	SEDAR 42 2015
scamp	*Mycteroperca phenax*	Unknown	Unknown	
black grouper	*Mycteroperca bonaci*	N	N	SEDAR 19 2010
yellowedge grouper	*Hyporthodus flavolimbatus*	N	N	SEDAR 22 2011b
snowy grouper	*Hyporthodus niveatus*	N	Unknown	SEDAR 49 2016
speckled hind	*Epinephelus drummondhayi*	N	Unknown	SEDAR 49 2016
yellowmouth grouper	*Mycteroperca interstitialis*	N	Unknown	SEDAR 49 2016
yellowfin grouper	*Mycteroperca venenosa*	Unknown	Unknown	
warsaw grouper	*Hyporthodus nigritus*	N	Unknown	
*Atlantic goliath grouper	*Epinephelus itajara*	N	Unknown	SEDAR 47 2016
Family Lutjanidae – Snappers				
queen snapper	*Etelis oculatus*	N	Unknown	
mutton snapper	*Lutjanus analis*	N	N	SEDAR 15A Update 2015
blackfin snapper	*Lutjanus buccanella*	N	Unknown	
red snapper	*Lutjanus campechanus*	N	N	SEDAR 31 Update 2015
cubera snapper	*Lutjanus cyanopterus*	N	Unknown	
gray snapper	*Lutjanus griseus*	N	Unknown	
lane snapper	*Lutjanus synagris*	N	Unknown	SEDAR 49 2016
silk snapper	*Lutjanus vivanus*	Unknown	Unknown	
yellowtail snapper	*Ocyurus chrysurus*	N	N	SEDAR 27A 2012
vermilion snapper	*Rhomboplites aurorubens*	N	N	SEDAR 45 2016
wenchman	*Pristipomoides aquilonaris*	N	N	SEDAR 49 2016

Note: *Atlantic goliath grouper is a protected grouper (i.e., ACL is set at zero) and benchmarks do not reflect appropriate stock dynamics.

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 2015a), 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 2016a). 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.[6] 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

[6] https://www.fisheries.noaa.gov/about/office-protected-resources

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 re-initiation period is not likely to jeopardize the continued existence of these DPSs or Nassau grouper[7]. Furthermore, on January 22, 2018, NMFS published a final rule (83 FR 2916) listing the giant manta ray as threatened under the ESA. On January 30, 2018, NMFS published a final rule (83 FR 4153) listing the oceanic whitetip shark as threatened under the ESA. NMFS has revised the reinitiated consultation on the Reef Fish FMP to address the listings of the giant manta and oceanic whitetip and determined that allowing fishing under the Reef Fish FMP to continue during the re-initiation period is not likely to jeopardize the continued existence of listed sea turtle species, smalltooth sawfish, the green turtle DPSs, Nassau grouper, or the giant manta, and may effect, but not likely to adversely affect the oceanic whitetip.

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.

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

[7] http://www.nmfs.noaa.gov/pr/laws/

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[8].

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[9].

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).

[8] http://www.nmfs.noaa.gov/pr/sspecies/

[9] http://www.nmfs.noaa.gov/pr/interactions/fisheries/lof.html

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, 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 hawksbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcareous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely, dives last about 56 minutes (Hughes 1974).

Kemp's ridley 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 vessel/headboat component of the reef fish fisheries to minimize post-release mortality.

Protected Fish

Giant manta rays are circumglobal in range, but within this broad distribution, individual populations are scattered and highly fragmented (CITES 2013). The giant manta ray can be found in all ocean basins. In terms of range, within the Northern Hemisphere, the species has been documented as far north as southern California and New Jersey on the United States west and east coasts, respectively (Gudger 1922; Kashiwagi et al. 2010; Moore 2012; CITES 2013). Clark (2010) suggests that giant manta rays may forage in less productive pelagic waters and conduct seasonal migrations following prey abundance. Satellite tracking studies using pop-up satellite archival tags registering movements of the giant manta ray from the Yucatan, Mexico, into the Gulf (448 km) (Marshall et al. 2011). Despite this large range, sightings are often sporadic. The timing of these sightings also varies by region (for example, the majority of sightings in Brazil occur during June and September, while in New Zealand sightings mostly occur between January and March) and seems to correspond with the movement of zooplankton, current circulation and tidal patterns, seawater temperature, and possibly mating behavior (Couturier et al. 2012; De Boer et al. 2015; Armstrong et al. 2016). However, a recent study by Stewart et al. (2016a) suggests that the species may not be as highly migratory as previously thought. Using pop-up satellite archival tags in combination with analyses of stable isotope and genetic data, the authors found evidence that giant manta rays may actually exist as well-structured subpopulations off Mexico's coast that exhibit a high degree of residency (Stewart et al. 2016a). Additional research is required to better understand the distribution and movement of the species throughout its range. Within its range, the giant manta ray inhabits tropical, subtropical, and temperate bodies of water and is commonly found offshore, in oceanic waters, and near productive coastlines (Marshall et al. 2009; Kashiwagi et al. 2011). As such, giant manta rays can be found in cooler water, as low as 19 °C, although temperature preference appears to vary by region (Duffy and Abbott 2003; Marshall et al. 2009; Freedman and Roy 2012; Graham et al. 2012). Additionally, giant manta rays exhibit a high degree of plasticity in terms of their use of depths within their habitat, with tagging studies that show the species conducting night descents of 200-450 meters (m) depths (Rubin et al. 2008; Stewart et al. 2016b) and capable of diving to depths exceeding 1,000 m (A. Marshall et al. unpubl. data 2011 cited in Marshall et al. [2011a]).

The most serious threat to giant manta rays is overfishing. Manta rays are caught throughout their global warm water range in the Atlantic, Pacific, and Indian Oceans in commercial and artisanal fisheries. Fishermen targeting manta rays primarily use harpoons and nets, while significant manta bycatch occurs in purse seine, gillnet, and trawl fisheries targeting other species. The prebranchial appendages (or gill plates), which *Manta spp*. use to filter planktonic food from the water, are highly valued in international trade for use in traditional medicine. Cartilage and skins are also traded internationally while meat is consumed or used for bait locally. Due to their association with nearshore habitats, manta rays are at elevated risk for

exposure to a variety of contaminants and pollutants, including brevetoxins, heavy metals, polychlorinated biphenyls, and plastics. Many pollutants in the environment have the ability to bioaccumulate in fish species, however, only a few studies have specifically examined the accumulation of heavy metals in the tissues of manta rays (Essumang 2010; Ooi et al. 2015). Plastics within the marine environment may also be a threat to the giant manta ray, as the animals ingest microplastics (through filter feeding) or become entangled in plastic debris, potentially contributing to increased mortality rates. Because giant manta rays are migratory and considered ecologically flexible (e.g. low habitat specificity), they may be less vulnerable to the impacts of climate change compared to other sharks and rays (Chin et al. 2010). However, as giant manta rays frequently rely on coral reef habitat for important life history functions (e.g. feeding, cleaning) and depend on planktonic food resources for nourishment, both of which are highly sensitive to environmental changes (Brainard et al. 2011; Guinder and Molinero 2013), climate change is likely to have an impact on the distribution and behavior of the giant manta ray. There is insufficient information to indicate how and to what extent changes in the reef community structure will affect the status of the giant manta ray.

The **oceanic whitetip** is considered the only truly oceanic (i.e. pelagic) shark of its genus (Bonfil et al. 2008). They are distributed worldwide in epipelagic tropical and subtropical waters between 30° North latitude and 35° South latitude (Baum et al. 2006). In the western Atlantic, oceanic whitetips occur from Maine to Argentina, including the Caribbean and Gulf. The oceanic whitetip shark is a highly migratory species of shark that is usually found offshore in the open ocean, on the outer continental shelf, or around oceanic islands in deep water, occurring from the surface to at least 152 m depth. It has a clear preference for open ocean waters between 10° South latitude and 10° North latitude (Backus et al. 1956; Strasburg 1958; Compagno 1984; Bonfil et al. 2008). The species can be found in waters temperatures between 15 °C and 28 °C, but it exhibits a strong preference for the surface mixed layer in water with temperatures above 20 °C, and is considered a surface-dwelling shark. Little is known about the movement or possible migration paths of the oceanic whitetip shark. Although the species is considered highly migratory and capable of making long distance movements, tagging data provides evidence that this species also exhibits a high degree of philopatry (*i.e.*, site fidelity) in some locations.

Currently, the most significant threat to oceanic whitetip sharks is mortality in commercial fisheries, largely driven by demand of the international shark fin trade, bycatch related mortality, as well as illegal, unreported, and unregulated fishing. Although generally not targeted, oceanic whitetip sharks are frequently caught as bycatch in many fisheries, including pelagic longline fisheries targeting tuna and swordfish, purse seine, gillnet, and artisanal fisheries. Oceanic whitetip sharks are also a preferred species for their large, morphologically distinct fins, as they obtain a high price in the Asian fin market. The oceanic whitetip shark's vertical and horizontal distribution significantly increases its exposure to industrial fisheries, including pelagic longline and purse seine fisheries operating within the species' core tropical habitat throughout its global range. The oceanic whitetip population size has likely declined significantly in the Gulf region due to historical exploitation of the species since the onset of industrial fishing; however, results of the extinction risk analysis team's analysis show that the oceanic whitetip shark population in the Gulf region has potentially stabilized since the 1990s/early 2000s (Young et al. 2016). The potential stabilization of oceanic whitetip sharks occurred concomitantly with the first Federal

Fishery Management Plan for Sharks in the Northwest Atlantic Ocean and Gulf, which directly manages oceanic whitetip shark under the pelagic shark group, and includes regulations on trip limits and quotas.

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. 1954). 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 [10]. 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.[7]

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]).[8] 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

[10] http://www.gulfhypoxia.net/

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[11] indicates the average sea surface temperature in the Gulf will increase by 1-3ºC 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 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).

[11] http://www.esrl.noaa.gov/psd/ipcc/ocn/

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.

Emission source	CO_2	Greenhouse CH_4	Gas N_2O	Total CO_{2e}**
Oil platform	5,940,330	225,667	98	11,611,272
Non-platform	14,017,962	1,999	2,646	14,856,307
Total	**19,958,292**	**227,665**	**2,743**	**26,467,578**
Commercial fishing	531,190	3	25	538,842
Recreational fishing	435,327	3	21	441,559
Percent commercial fishing	2.66%	>0.01%	0.91%	2.04%
Percent recreational fishing	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_2 equivalent (CO_{2e}) emission estimates represent the number of tons of CO_2 emissions with the same global warming potential as one ton of another greenhouse gas (e.g., CH_4 and N_2O). Conversion factors to CO_{2e} are 21 for CH_4 and 310 for N_2O.

Deepwater Horizon MC252 Oil Spill

General Impacts on Fishery Resources

The presence of polyaromatic hydrocarbons (PAH) 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 (Mendelssohn 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[12].

[12] http://sero.nmfs.noaa.gov/deepwater_horizon/documents/pdfs/fact_sheets/oil_characteristics.pdf

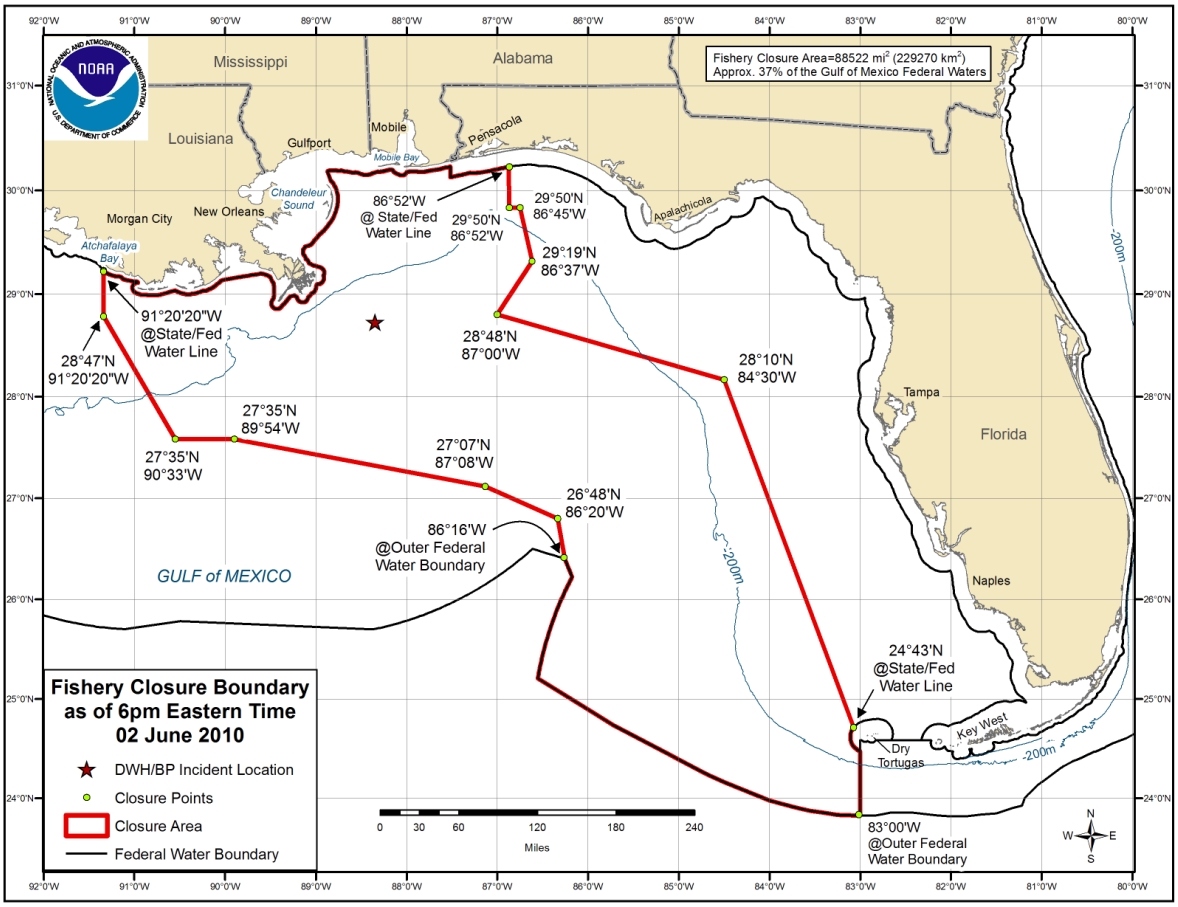

Figure 3.3.1. Fishery closure at the height of the *Deepwater Horizon MC252* oil spill.

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[13].

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 2017c), Red Grouper Allowable Harvest Framework Action (GMFMC 2016b), Modifications to Gag Minimum Size Limits, Recreational Season and Black Grouper Minimum Size Limits Framework Action (GMFMC 2016c), 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 2013).

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 the years after the red snapper IFQ program was implemented, and this decline has continued

[13] http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm

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, of which 756 of 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 in Tables 3.4.1.3 and 3.4.1.4 have been converted to 2016 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 (2016$).

	Mean	Median
Reef Fish Trips		
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
Trip Revenue	$10,184	$5,930
Trip Costs[14]		
Fuel	$781	$529
Bait	$322	$148
Ice	$166	$82
Groceries	$268	$123
Miscellaneous	$246	$61
Hired Crew	$2,935	$1,188
Annual Allocation	$1,328	$102
Owner-Captain Time[15]	$773	$172
Trip Net Cash Flow	$4,137	$1,674
Trip Net Revenue	$4,692	$1,832

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

[14] In 2016 dollars, the average price of fuel per gallon was $3.50 and the average cost of labor was $274 per crew/day.

[15] Owner-Captain Time is the estimated opportunity cost of an owner's labor as captain over the year.

economic performance of the commercial fishing trip. Trip cash flow and trip net revenue were 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%.

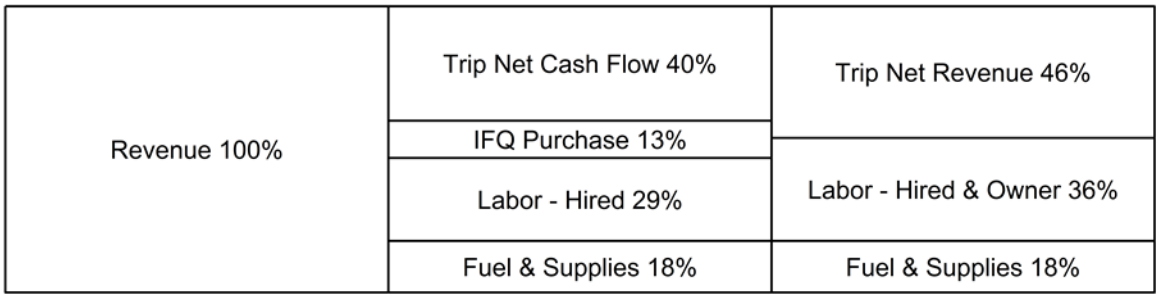

Figure 3.4.1.1. Diagram of trip net cash flow and trip net revenue as percentage of trip revenue.

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,[16] 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

[16] Net revenue from operations accrues to the vessel owner and, when applicable, the IFQ shareholder, who may not be the same entity.

generated by reef fish vessels were used to pay for crew costs, fuel/supplies costs, fixed costs, 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 (2016$).

	Mean	Median
Reef Fish Vessels		
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	$120,789	$71,680
Has Insurance	27%	NA
Total Revenue	$162,143	$77,421
Commercial Fishing[17]	$148,560	$50,299
For-Hire Fishing	$13,583	$0
Costs		
Fuel	$13,688	$7,877
Other Supplies	$15,551	$5,550
Hired Crew	$43,641	$8,332
Vessel Repair & Maintenance	$12,420	$6,502
Insurance	$1,713	$0
Overhead	$9,038	$3,098
Loan Payment	$1,638	$0
IFQ Purchase	$18,006	$3,072
Owner-Captain Time	$9,118	$2,657
Depreciation	$6,040	$3,584
Net Cash Flow	$46,448	$5,327
Net Revenue from Operations	$50,934	$5,812

[17] 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.

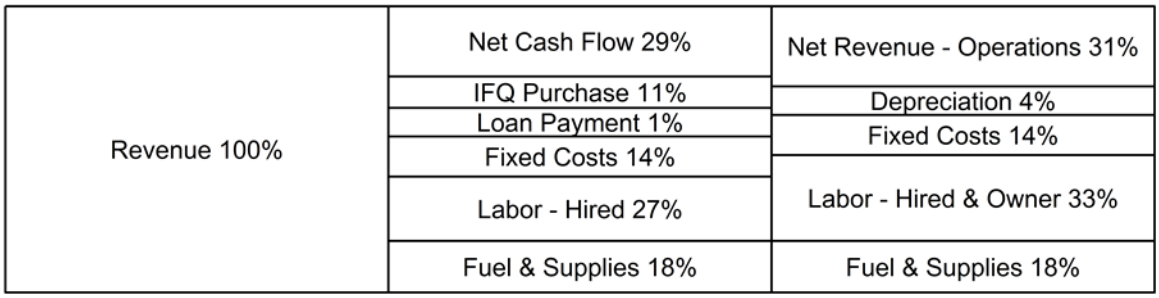

Figure 3.4.1.2. Diagram of net cash flow and net revenue from operations as percentage of revenue.

Overstreet, Perruso, and Liese (2017) only provide estimates of economic returns in 2014, and thus it cannot be used to assess how economic returns and related measures have changed since the implementation of the G-T IFQ program. However, Liese (pers. communication, Nov. 22, 2017) has conducted an analysis that compares economic returns and related measures in 2006 and 2014, and thus examines how they have changed since the implementation of the G-T and RS-IFQ programs. Because of the years chosen, the changes in economic performance indicated by these results can only, at best, be attributed to the combination of the two IFQ programs as opposed to one or the other. Also, his results apply to all trips that landed Gulf reef fish species as opposed to landings of species managed under one or both of the IFQ programs. Further, as these results are preliminary, only a generally qualitative overview can be provided for this review.

First, effort in the commercial sector of the fishery has decreased significantly according to multiple measures. Specifically, the number of vessels, trips, and days at sea decreased by 31%, 38%, and 28%, respectively, between 2006 and 2014. At the same time, landings of Gulf reef fish were relatively unchanged, decreasing by about 4% during that time. Thus, output per unit of input (one measure of productivity) has increased significantly since the IFQ programs were implemented. Further, even though landings have remained about the same, the average ex-vessel price of Gulf reef fish landings increased by 20% during this time, resulting in a 16% increase in total annual revenues from these landings.

Because productivity increased, costs decreased. Specifically, crew costs decreased by 6%, other variable costs (supplies, fuel, etc.) decreased by 33%, and fixed costs decreased by 19%. The decrease in crew costs was driven by a decrease in crew days of 26%, as crew compensation per day actually increased by 24% (i.e., the amount of labor used decreased somewhat significantly, but "wages" increased somewhat significantly as well). Similarly, even though fuel prices increased by 25%, a 49% decrease in fuel usage was the primary driver of the decline in other variable costs. In addition, the opportunity costs associated with the owner's labor time and capital invested in the vessel decreased by 16% and 31%, respectively.

Because costs decreased, significantly lower percentages of the total revenues had to be used to cover these costs, in turn resulting in much higher economic returns and margins. Net cash flow to the owner(s) increased by more than 300% while net revenue from operations increased by

more than 400%. Trip net revenue as a percentage of total trip revenue increased by 94% while, at the vessel level, net revenue from operations as a percentage of total revenues increased by 180%. While such increases may appear to be exorbitant, it must be kept in mind that, in 2006, net cash flows were only slightly above the break-even point and net revenues from operations were negative.

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.

In addition to these types of impacts, economic impact models can be used to determine the sources of the impacts. Each impact can be broken down into direct, indirect, and induced economic impacts. "Direct" economic impacts are the results of the money initially spent in the study area (e.g., country, region, state, or community) by the fishery or industry being studied. This includes money spent to pay for labor, supplies, raw materials, and operating expenses. The direct economic impacts from the initial spending create additional activity in the local economy, i.e., "indirect" economic impacts. Indirect economic impacts are the results of business-to-business transactions indirectly caused by the direct impacts. For example, businesses initially benefiting from the direct impacts will subsequently increase spending at other local businesses. The indirect economic impact is a measure of this increase in business-to-business activity, excluding the initial round of spending which is included in the estimate of direct impacts. "Induced" economic impacts are the results of increased personal income caused by the direct and indirect economic impacts. For example, businesses experiencing increased revenue from the direct and indirect impacts will subsequently increase spending on labor by hiring more employees, increasing work hours, raising salaries/wage rates, etc. In turn, households will increase spending at local businesses. The induced impact is a measure of this increase in household-to-business activity.

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 and employment is measured in full-time equivalent jobs.

Industry sector	Direct	Indirect	Induced	Total
Harvesters				
Employment impacts	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
Primary dealers/processors				
Employment impacts	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
Secondary wholesalers/distributors				
Employment impacts	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
Grocers				
Employment impacts	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
Restaurants				
Employment impacts	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
Harvesters and seafood industry				
Employment impacts	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[18] developed for and applied in NMFS (2017) 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 business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting.

[18] A detailed description of the input/output model is provided in NMFS (2011b).

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.[19] 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, 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 http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/queries/index.

[19] 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.

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	NA	0	109,137
2015	27,299	158,214	NA	366	185,879
2016	38,975	158,450	NA	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.
**Data in Florida were not post-stratified, and therefore, estimates include all trips taken in Monroe County that targeted Gulf reef fish.
***MRIP estimates for Louisiana are not available after 2013. The LA creel survey did not start collecting data on targeted trips until May 2016. Thus, the average for Louisiana only includes MRIP estimates for 2012 and 2013.
****Total effort does not include Texas and no Louisiana data for calendar years 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	NA	742	3,526	454,063
2015	56,762	452,184	NA	366	3,783	513,095
2016	66,292	475,671	NA	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.
* Data were not post-stratified, and therefore, Florida estimates include all trips taken in Monroe County that caught Gulf reef fish.
**MRIP estimates for Louisiana are not available after 2013. Effort data from 2014-2016 was collected by the LA Creel survey, but those estimates have not been calibrated to the MRIP effort estimates. Thus, the average for Louisiana only includes the MRIP estimates for 2012 and 2013.
***Total effort for 2014-2016 does not include Louisiana.

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.

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.

	Angler Days				Percent Distribution			
Year	**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%
Average	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 1,980 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, 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).[20] In 2016 dollars, the average annual gross revenue for a Gulf headboat is $256,122 while the average annual gross revenue for a Gulf charter vessel is $84,500. However, gross revenues overstate the annual economic value and profits generated by for-hire vessels. Economic value for for-hire vessels can be measured by producer surplus (PS). In general, producer surplus is the amount of money a vessel owner earns in excess of variable (trip) costs. Economic profit is the amount of money a vessel owner earns in excess of variable and fixed costs, inclusive of all implicit costs, such as the value of a vessel owner's time as captain and as entrepreneur, and the cost of using physical capital (i.e., depreciation of the vessel and gear). In 2016 dollars, Savolainen, et al. (2012) estimated the annual producer surplus for Gulf headboats and charter vessels was approximately $179,202 and $55,589, respectively. Their best estimates of economic profit were $74,765 and $24,985 (2016 dollars), respectively.[21]

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

[20] Research by Abbott and Willard (2017) suggest that Savolainen, et al.'s estimate of average annual gross revenues for headboats may be an underestimate as data in the former suggest that average gross revenue in 2009 for the vessels in their sample was about $453,000 (2016 $). However, Abbott and Willard's estimates are based on a sample of 17 headboats that chose to participate in the Headboat Collaborative Program in 2014 while Savolainen, et al.'s are based on a random sample of 20 headboats. It is very possible that the headboats that participated in the Collaborative are economic highliners, in which case Abbott and Willard's estimates would not be representative of the fleet.

[21] Although Savolainen, et al. (2012) account for all explicit variable and fixed costs, they do not account for implicit costs, and thus they over-estimate actual economic profits for these vessels.

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 by charter vessels (2012-2016 average) and associated business activity using state level multipliers. Monetary estimates are in thousands of 2016 dollars and employment is measured in full-time equivalent jobs.

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

*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 MRIP so, in addition to the absence of target effort estimates, 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 2017c), Red Grouper Allowable Harvest Framework Action (GMFMC 2016b), Modifications to Gag Minimum Size Limits, Recreational Season and Black Grouper Minimum Size Limits Framework Action (GMFMC 2016c), 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 2013).

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.

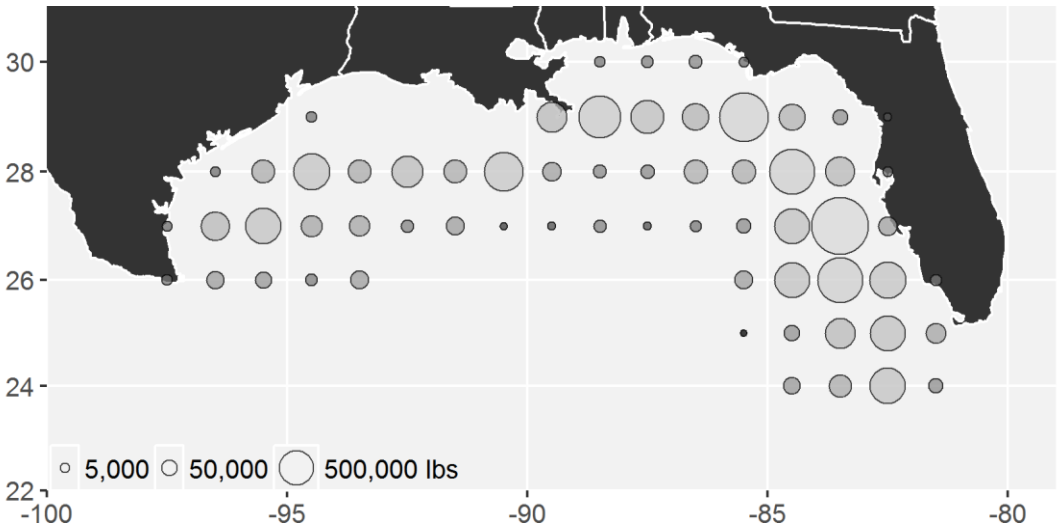

Figure 3.5.1.1. Distribution of reef fish landings by area fished for Gulf reef fish
Source: Overstreet et al., 2017.

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.

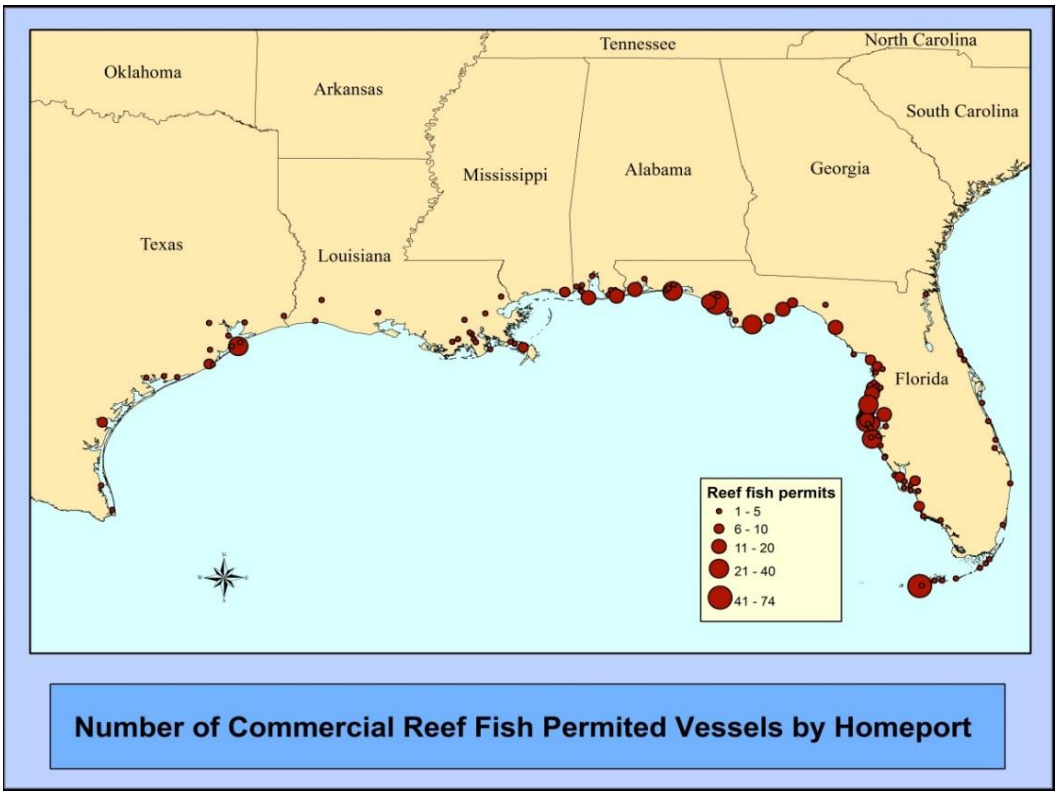

Figure 3.5.1.2. Distribution of commercially permitted reef fish vessels for Gulf States by community. Source: NMFS Southeast Regional Office permits office, September 20, 2016.

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.

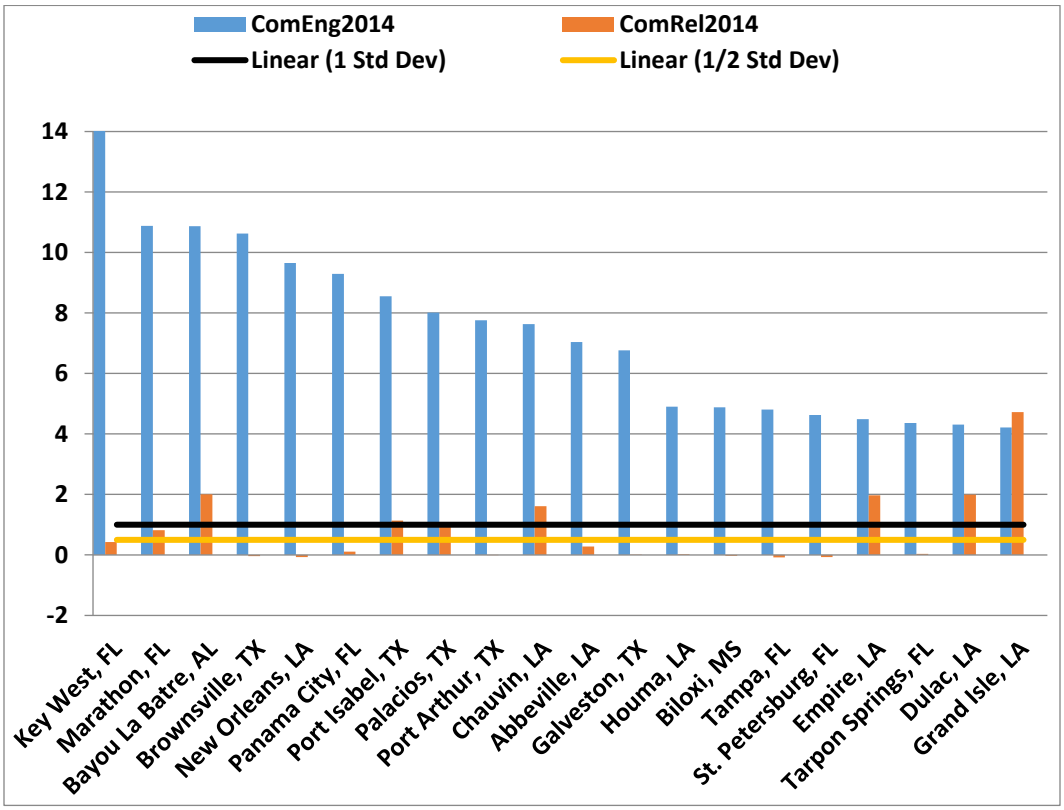

Figure 3.5.1.3. Top 20 commercial fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2014.

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.

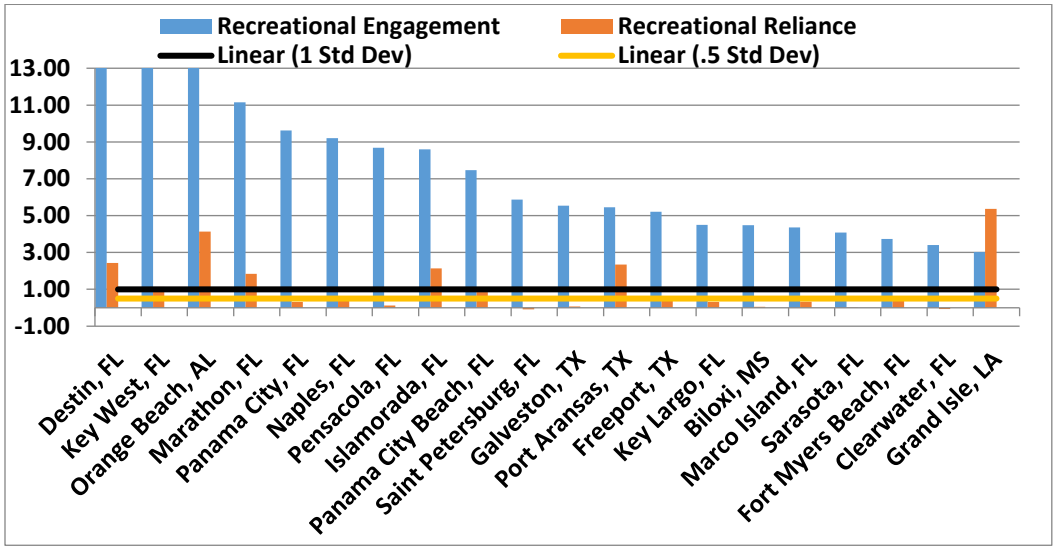

Figure 3.5.2.1. Top 20 recreational fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2014.

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.

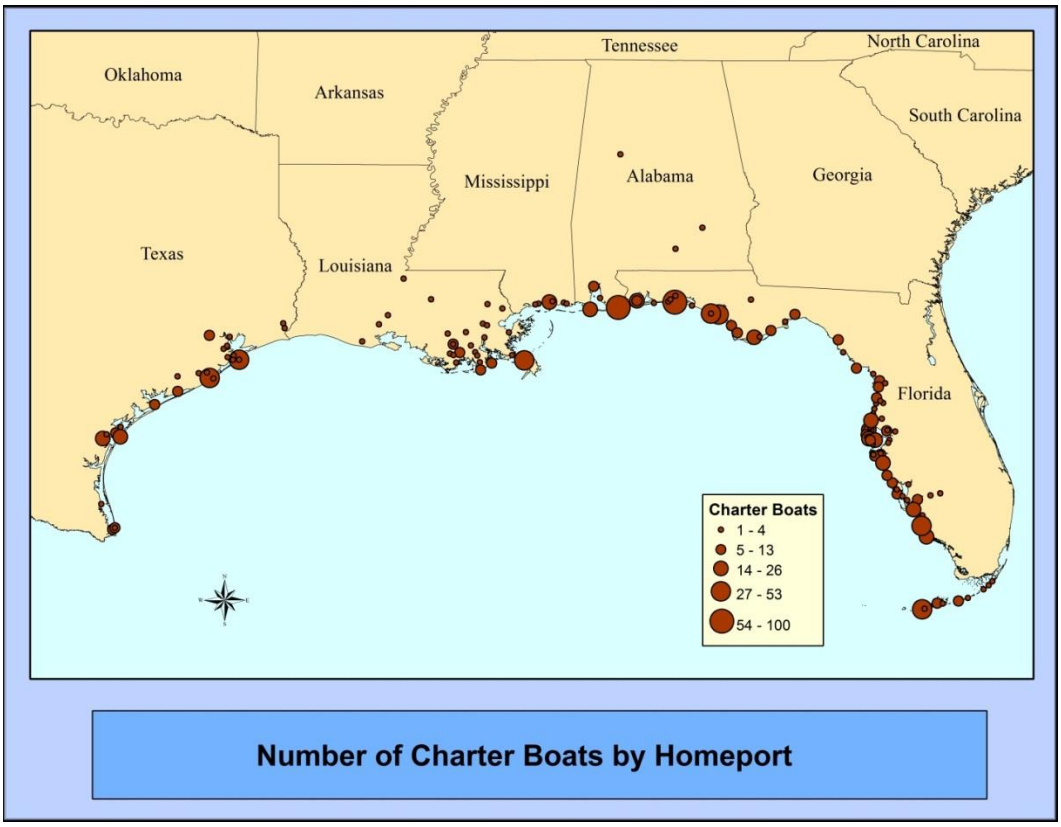

Figure 3.5.2.2. Distribution of charter vessels with federal for-hire permits for Gulf reef fish in Gulf states by community.
Source: NMFS Southeast Regional Office permits office, September 20, 2016.

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.

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

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, or making the minor additional modifications to gear descriptions. 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 **Preferred 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, limited observer data is available Gulf-wide that documents interactions between sea turtles and the charter vessel/headboats with reef fish permits because the commercial observer program does not include these vessels. The State of Florida has a voluntary fishery observer program for charter vessel/headboats on the Gulf coast; however, survey coverage is low (less than1% of trips) and gear interactions with sea turtles are rarely observed (B. Sauls, Florida Fish and Wildlife Commission, pers. comm. 2018)

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 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 2018). 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 types of release gear.

Preferred Alternative 2 is anticipated to result in positive indirect biological benefits, but these new gear types are anticipated to allow additional flexibility in the regulatory requirements for fishermen compared to **Alternative 1** (No Action). **Preferred Alternative 2** 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 and set a new minimum length limit for long-nose or needle-nose pliers and making the minor additional modifications to gear descriptions. **Alternative 1** (No Action) would not modify regulations to allow the use of the three new release gears or set a new minimum length limit for pliers, while **Preferred Alternative 2** would modify regulations for the use of those release gears and for the new minimum length limit for pliers. Allowing additional gear for sea turtle release and setting the new minimum length limit for pliers would result in direct economic effects for commercial vessels or charter vessel/headboats with federal Gulf reef fish permits. **Preferred Alternative 2** is expected to yield greater economic benefits than **Alternative 1**.

In the case of a vessel owner purchasing release gear for the first time (such as with a new vessel) or replacement release gear for broken or otherwise unusable gear, the owner would examine the net economic benefits of the three new release gears in relation to the current, available gear. The net economic benefits would include not only the cost of that particular device, but also any added benefits, such as saved space onboard due to the collapsible nature of the collapsible hoop net. Saved space would be of particular benefit to charter boats and bandit boats, which often have little extra room for this type of gear storage. If the net 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 gear, the owner would consider the price of a particular new release device against any cost reductions, as well as any additional benefits, such as saved space onboard; if the owner determines the net economic benefits of switching to be positive he would replace his current device. Finally, because the current release gear would be supplemented by the three proposed gears, vessel owners are not required to adopt one of the three proposed gears. Regarding the proposed minimum length limit in **Preferred Alternative 2**, regulations currently state that, for design standards, needle-nose or long-nose pliers "should be ~ 12 inches in length"

(NMFS-SEFSC 2008, Revised 2010). Setting a specific minimum length limit removes ambiguity for fishermen in terms of compliance and thereby reduces risk of a non-compliance fine. In addition, fishermen report being unable to locate 12-inch pliers for purchase, but have been able to secure primarily 11″ and 15″ pliers. As a result of the proposed additional release gear and new minimum length limit, **Preferred Alternative 2** would be expected to generate net economic benefits.

The costs of the three proposed gears as well as the currently approved gears are displayed in Table 4.1.3.1. Several companies produce the proposed dehooker, with price estimates that vary from $20 to $35. The $20 estimate is used for this analysis. Since the proposed dehooker is available for purchase online, vessel owners would have access to a range of producers from which to purchase, and vessel owners would attempt to purchase the lowest cost option. The proposed dehooker device is about $28 cheaper than the 17-in bite block deep-hooked pigtail ARC dehooker and about $10 cheaper than the National Oceanic and Atmospheric Administration (NOAA)/chainlink dehooker, thereby suggesting that at least some vessel owners who currently use the 17-in bite block deep-hooked pigtail ARC dehooker or the NOAA/chainlink dehooker would be expected to substitute with the proposed dehooker if approved. The proposed dehooker is about $1 more expensive than the ARC 24″ handheld "game" model dehooker and about $4 more expensive than the ARC short-handled J-style dehooker, suggesting that vessel owners who use the ARC 24″ handheld "game" model or the ARC short-handled J-style dehooker may not adopt the proposed dehooker if approved. The gear life of the current and proposed dehookers does not vary, for purposes of how frequently the gear would need to be replaced and thereby how often the cost savings would accrue. Dehookers typically do not wear out due to time and usage. Replacement of dehookers generally occurs as a result of gear falling overboard, and thus any cost savings would only be expected to occur in that event.

A retail purchased collapsible hoop net is $50 more expensive than a dipnet, suggesting that vessel owners would not be expected to 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 retail purchased collapsible hoop net may still be adopted by some vessels. However, production and thus availability of the collapsible hoop net is very limited at present because it is not a currently approved gear. If the regulations are modified and the collapsible hoop net becomes an allowable gear and demand for it increases, gear producers would be expected to start producing more of this gear, and it would likely become more widely commercially available. In turn, the price may decrease as well, contributing to the adoptability of the gear by vessel owners. Taking into account the cost of parts and the time to produce a collapsible hoop net, self-construction would be about $15 cheaper than a dipnet.[22] So, vessels owners may adopt the proposed device if they choose to construct the gear themselves. However, a compression machine is needed for construction, which may reduce the number of individuals that self-construct the gear.

[22] Cost estimate for self-construction of gear is based on material cost of $40 and 3 hours of labor at $23.47/hour, which is the average hourly wage of first-line supervisors in farming, fishing, and forestry. See https://www.bls.gov/oes/current/oes451011.htm.

Retail cost estimates for the proposed small hoist are not available, as they are not currently being produced and sold on the market. After accounting for the cost of parts and the time to produce it, a self-constructed polyvinyl chloride (PVC) small hoist would be about $65 cheaper than a dipnet and about $50 cheaper than a self-constructed collapsible hoop net,[23] suggesting that vessel owners may adopt this device if they are able to construct the device themselves. A self-constructed metal small hoist would be more expensive than one made of PVC. Materials would cost about $8 more, and welding skills and equipment would also be necessary in construction.

The gear life of the dipnet, the collapsible hoop net, and the small hoist depend primarily on sun exposure and weathering of the netting. The dipnet might be less easy to store out of the elements compared to the two proposed gear, due to the length of the dipnet handle being 6 feet (or 150% of the freeboard height if the freeboard height is 4 feet). In cases where the dipnet is not stored out of the elements, replacement costs with the dipnet may occur more frequently.

If the regulations are modified to allow for the use of the three proposed gears for sea turtle release, then as an indirect effect, producers of the proposed gear as well as producers of currently allowed gear may see some changes over time in the demand for their specific brand of product, as vessel owners take into consideration the net economic benefits already mentioned when deciding whether to switch gear. Thus, producers of gear that would provide a net economic benefit to vessels owners could be expected to see an increase in demand for their specific gear, whereas producers of gear that would not provide a net economic benefit to vessels owners could be expected to see a decrease in demand for their specific gear. Since allowing additional gear for sea turtle release would not be expected to impact the number of vessels using sea turtle release gear, no impacts would be expected to the overall demand for this category of products.

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

Status	Device	Retail Cost
Current	17-in Bite Block Deep-Hooked (Sea Turtle) Pigtail ARC Dehooker	$58
Current	NOAA/Chainlink Dehooker	$30
Current	ARC Short-handled J-Style Dehooker	$16
Current	ARC 24″ Handheld “Game” Model Dehooker	$19
Proposed	New Short-handled Dehooker	$20-$35
Current	Dipnet	$125
Proposed	Collapsible Hoop Net	$175, ($110)
Proposed	PVC Small Hoist	($60)

Source: C. Bergmann, SEFSC, pers comm. Estimates in parentheses are self-construction costs.

[23] Cost estimate for self-construction of gear is based on material cost of $35 and 1 hour of labor at $23.47/hour.

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, as well as some minor additional modifications to gear descriptions. However, unless new release gears are specifically adopted for use through regulatory action, their use is prohibited. Further, the current size limit for the required long-nose or needle-nose pliers ("approximately 12 inches") has been difficult for law enforcement to interpret and difficult for fishermen to find pliers 12 inches or greater. Thus, **Alternative 1** prevents the adoption of these new release gears that have been developed and are now approved by the SEFSC and does not rectify issues with the existing long-nose or needle-nose pliers size limit.

The effects from allowing fishermen to carry and use the three new release gears and from modifying the minimum length for long-nose or needle-nose pliers 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 **Preferred 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 new sea turtle release dehooker 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 may obtain those already required. The added flexibility may provide some benefits to fishermen. Modifying the language of the long-nose or needle-nose plier minimum length limit from "approximately 12 inches" to "a minimum of 11 inches" clarifies the requirement, although fishermen may continue to have problems locating pliers large enough to satisfy the requirement.

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. **Preferred Alternative 2** would add three new types of allowable sea turtle release gear to 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. **Preferred Alternative 2** results in the greatest burden on law enforcement. The three new gears (new collapsible hoop net, dehooking device, small turtle hoist, and new length requirements for long-nose or needle-nose pliers) 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 new dehooker can be used in place of the short-handled dehooker for external 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 different types of sea turtle release gear. 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 gear types 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. **Preferred Alternative 2**, **Preferred Options 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. **Preferred Alternative 2**, **Preferred 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. **Preferred Alternative 2**, **Preferred 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. **Preferred Alternative 2** would modify the reef fish framework procedure to include changes to, under **Preferred Option a**, release gear requirements and, under **Preferred Option b**, handling protocols. Either or both

options in **Preferred 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 **Preferred Alternative 2** cannot be quantified. Still, any economic benefits or costs to fishermen stemming from changes to the requirements would accrue faster with **Preferred Option a** and **Preferred Option b** under **Preferred Alternative 2**. 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 (**Preferred Option a**) and handling requirements (**Preferred Option b**) to be adopted through the open abbreviated documentation process (**Preferred 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 and assume that the new gears would be beneficial for fishermen. 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 (**Preferred 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 some 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. **Preferred Alternative 2**, **Preferred 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. **Preferred Alternative 2**, **Preferred 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 2017d) 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 Gulf of Mexico Fishery Management Council's (Council) web page[24]. 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[25], the NMFS HMS web page[26], and the South Atlantic Fishery Management Council web page[27].

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

[24] www.gulfcouncil.org
[25] http://sero.nmfs.noaa.gov/protected_resources/sea_turtle_protection_and_shrimp_fisheries/index.html
[26] http://www.nmfs.noaa.gov/sfa/hms/compliance/workshops/protected_species_workshop/requirements.html
[27] http://safmc.net/fishery-management-plans-amendments/snapper-grouper-fishery-management-plan/

Gulf reef fish permit or a Gulf charter vessel/headboat reef fish permit. In addition, Action 2 would modify the reef fish framework allowing for sea turtle and other protected resources release gear 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[28] 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,

[28] http://www.ipcc.ch/publications_and_data/publications_and_data.shtml.

economic and social analyses, and other scientific observations. Landings data for the 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. REGULATORY IMPACT REVIEW

5.1 Introduction

The National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest. The RIR does three things: 1) it provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action; 2) it provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and, 3) it ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR also serves as the basis for determining whether the regulations are a "significant regulatory action" under the criteria provided in Executive Order (E.O.) 12866. This RIR analyzes the impacts this action would be expected to have on the commercial sector and for-hire component of the Gulf of Mexico (Gulf) reef fish fishery.

5.2 Problems and Objectives

The problems and objectives addressed by this action are discussed in Section 1.2.

5.3 Description of Fisheries

A description of the commercial sector and for-hire component of the Gulf reef fish fishery is provided in Section 3.4.

5.4 Impacts of Management Measures

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

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.1.3. The following discussion analyzes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternative 2 modifies the regulations to permit three additional release gears (collapsible hoop net, dehooking device, and small sea turtle hoist) for use by vessels with commercial or charter vessel/headboat Gulf reef fish permits and also establishes a new minimum length limit of 11″ for long-nose or needle-nose pliers for releasing incidentally hooked sea turtles. As of November 14, 2017, the number of valid or renewable for-hire reef fish permit that would potentially be affected was 1,278, of which 1,175 were valid; in addition, there were 844 valid or renewable commercial reef fish permits that would potentially be affected by the change in release gears, 756 of which were valid. The number of vessels with both commercial and for-hire reef fish permits was 142, so the total number of vessels with a commercial and/or a for-hire reef fish permit was 1,980 as of November 14, 2017 (i.e., 702

vessels with only a commercial permit, 1,136 vessels with only a for-hire permit, and 142 vessels with both permits). This regulatory modification would be expected to result in net economic benefits commercial or for-hire vessel owners in comparison to Alternative 1. The decision to adopt one of the three additional gears as a substitute good rather than one of the current approved gears depends on the net economic benefits to commercial or for-hire vessel owners. One component of this calculation is the gear cost, either through a retail purchase or by self-construction; these costs are displayed in Table 5.4.1.1. Another component is from added benefits, such as through saved space onboard due to the collapsible nature of the proposed collapsible hoop net. The total industry benefits are not quantifiable, as they are dependent on how many vessel owners adopt a new release gear, the particular release gear chosen, and the frequency with which the gear is replaced. Still, for replacement of the dipnet, vessel owners may expect cost reductions from $15 to $65, or about $40 on average per vessel, based on self-construction costs of the collapsible hoop net and PVC small hoist. Since the cost of the proposed dehooker is in the price range of current dehookers, the proposed gear is not considered to contribute to industry cost reductions. Regarding replacement, dehookers typically have a long gear life, in terms of wear due to time and usage. Replacement of dehookers occurs more frequently as a result of gear falling overboard, and thus any cost savings would only be expected to occur in that event. In addition, any new vessels owners would benefit from cost savings, as compared to some of the current dehookers in the higher price range, when first purchasing gear. The gear life of the dipnet, the collapsible hoop net, and the small hoist depend primarily on sun exposure and weathering of the netting, but will still need to be replaced over time from use. The dipnet might be less easy to store out of the elements compared to the two proposed gear, due to the length of the dipnet handle being 6 feet (or 150% of the freeboard height if the freeboard height is 4 feet). In cases where the dipnet is not stored out of the elements, replacement costs with the dipnet may occur more frequently. Potential cost reductions will accrue indefinitely, as both proposed and current approved gear will need replacements over time. In addition to the benefits from permitting the three additional release gears, setting a specific minimum length limit removes ambiguity for fishermen in terms of compliance and thereby reduces risk of a non-compliance fine. Fishermen report being unable to locate 12-inch pliers for purchase, but have been able to secure primarily 11″ and 15″ pliers. As a result of the new minimum length limit, fishermen will be able to meet the new requirement without purchasing new pliers and thereby absorb the associated cost of compliance.

Table 5.4.1.1. Summary of costs for proposed gear and current approved gear substitutions

Status	Device	Retail Cost
Current	17-in Bite Block Deep-Hooked (Sea Turtle) Pigtail ARC Dehooker	$58
Current	NOAA/Chainlink Dehooker	$30
Current	ARC Short-handled J-Style Dehooker	$16
Current	ARC 24″ Handheld "Game" Model Dehooker	$19
Proposed	New Short-handled Dehooker	$20-$35
Current	Dipnet	$125
Proposed	Collapsible Hoop Net	$175, ($110)
Proposed	PVC Small Hoist	($60)

Source: C. Bergmann, SEFSC, pers comm. Estimates in parentheses are self-construction costs.

5.4.2 Action 2: Modify the Reef Fish Framework Procedure

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.2.3. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternative 2 would modify the abbreviated framework process of the reef fish framework procedure to include changes to release gear requirements, under **Preferred Option a**, and handling protocols, under **Preferred Option b**. Direct economic benefits or costs are not expected, as this action would implement a procedural change that would not be expected to alter the behavior of commercial or for-hire fishing vessels and thus not affect the outcomes of that behavior (e.g., landings, effort, revenues, costs, etc.). Still, indirect cost reductions are expected, in that government costs would be reduced as a result of a shortened timeline for modifications to release gear and/or handling requirements to occur. In addition, while economic benefits or costs would still accrue to commercial or for-hire fishing vessel owners from changes to release gear requirements, the economic effects to industry would accrue faster under **Preferred Alternative 2** than under Alternative 1.

5.5 Public and Private Costs of Regulations

The preparation, implementation, enforcement, and monitoring of this or any federal action involves the expenditure of public and private resources which can be expressed as costs associated with the regulations. Costs to the private sector are discussed in Section 5.4. Estimated public costs associated with this action include:

Council costs of document preparation, meetings, public hearings, and information dissemination……$35,000

NMFS administrative costs of document preparation, meetings and review ….....$20,000

NMFS outreach costs…….....$24,000

TOTAL ….....$79,000

The estimate provided above does not include any law enforcement costs. Any enforcement duties associated with this action would be expected to be covered under routine enforcement costs rather than an expenditure of new funds. Council and NMFS administrative costs directly attributable to this amendment and the rulemaking process will be incurred prior to the effective date of the final rule implementing this amendment. NMFS outreach costs are expenditures for workshops along the Gulf coast to educate vessel owners about the proposed gear, and are expected to be incurred in the first year following the effective date of the final rule.

5.6 Net Benefits of the Regulatory Action

It is important to specify the time period being considered when evaluating benefits and costs. According to OMB's FAQs regarding Circular A-4,[29] "When choosing the appropriate time horizon for estimating costs and benefits, agencies should consider how long the regulation being analyzed is likely to have resulting effects. The time horizon begins when the regulatory action is implemented and ends when those effects are expected to cease. Ideally, analysis should include all future costs and benefits. Here as elsewhere, however, a 'rule of reason' is appropriate, and the agency should consider for how long it can reasonably predict the future and limit its analysis to this time period. Thus, if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future. For most agencies, a standard time period of analysis is 10 to 20 years."

For current purposes, the reasonably "foreseeable future" is considered to be the next 10 years. There are two primary reasons for considering the next 10 years the appropriate time period for evaluating the benefits and costs of this regulatory action rather than a longer (or shorter) time period. First, this regulatory action does not include a predetermined sunset provision. Second, based on the history of management in the reef fish fishery, as well as the related snapper-grouper fishery in the South Atlantic, regulations regarding sea turtle release gear are revisited about once every 10 years or so.

The analysis in Section 5.4 shows that the preferred alternative in Action 1 would be expected to produce cost reductions and thus net economic benefits to industry in the future, primarily as a result of the lower costs associated with the proposed additional alternatives for dipnet gear. All vessels are expected to replace their dipnet gear about once every 7 years on average, and thus the expected cost reductions would accrue to the industry over that period of time. The estimated cost reduction per vessel is estimated to be approximately $40 on average. As there are 1,980 vessels in the for-hire and commercial sectors of the Gulf reef fish fishery, the total cost savings to these vessels over that 7 year time period would be approximately $79,200 in non-discounted terms. In discounted terms and over a 10 year time period, the total net present

[29] See p. 4 at https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/OMB/circulars/a004/a-4_FAQ.pdf

value of these cost reductions is about $79,465 using a 7% discount rate and $96,511 using a 3% discount rate. These estimates do not account for the expected economic benefits resulting from saved space onboard the vessels, which cannot be quantified. These estimates also do not account for cost savings to fishermen who currently use pliers whose length may not be consistent with current regulations, and would have therefore potentially been forced to purchase new pliers that comply with the current regulations.

The preferred alternative in Action 2 would be expected to reduce costs to the government in the future, which would increase net economic benefits to the Nation. The magnitude of these reductions in public sector costs cannot be quantified. Also, the preferred alternative for Action 2 may lead to higher costs or higher benefits to industry in the future, depending on whether future framework processes have release gear requirements and handling protocols that are more restrictive or more flexible.

The non-discounted public costs resulting from the regulation are $79,000. The $55,000 in costs resulting from the amendment and the associated rulemaking process should not be discounted as they will be incurred prior to the effective date of the final rule. However, outreach costs are expected to be incurred in the following year and therefore should be discounted. The discounted values of these costs are approximately $22,430 and $23,300 using a 7% and 3% discount rate, respectively. Thus, public costs are estimated to be $77,430 and $78,300 using a 7% and 3% discount rate, respectively.

Based on this information, this regulatory action is expected to increase net benefits to the Nation, though only marginally so under a 7% discount rate.

5.7 Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a "significant regulatory action" if it is likely to result in: 1) an annual effect of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; 2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; 3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this executive order (E.O). Based on the information in Sections 5.4-5.6, the costs and benefits resulting from this regulatory action are not expected to meet or exceed the $100 million threshold, and thus this action has been determined to not be economically significant for the purposes of E.O. 12866.

CHAPTER 6. REGULATORY FLEXIBILITY ACT ANALYSIS

6.1 Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency, as well as the public, of the expected economic effects of various alternatives contained in the regulatory action and to ensure the agency considers alternatives that minimize the expected economic effects on small entities while meeting the goals and objectives of the applicable statutes (e.g., the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)).

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

In addition to the information provided in this section, additional information on the expected economic effects of the proposed action is included in the Regulatory Impact Review (RIR).

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

A discussion of the reasons why action by the agency is being considered is provided in Section 1.1. The purposes of this action are to: 1) allow the use of three new sea turtle release gear types in the commercial and for-hire sectors of the Gulf reef fish fishery, 2) establish a new and clearer

minimum length for long nose and needle nose pliers used to release incidentally hooked sea turtles and other protected species in the commercial and for-hire sectors of the Gulf reef fish fishery, and 3) modify the abbreviated framework process of the reef fish framework procedure to include changes to release gear requirements. The objectives of this proposed rule are to: 1) provide greater flexibility to participants in the commercial and for-hire sectors of the reef fish fishery in complying with release gear regulations, and 2) streamline the process for allowing federal commercial and for-hire reef fish permit holders to use additional gear types and handling procedures for incidentally hooked sea turtles and other protected species after they are approved by the SEFSC. The Magnuson-Stevens Act serves as the legal basis for the proposed rule.

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

This proposed regulatory action would allow vessels with commercial or charter/headboat Gulf permits for the Gulf reef fish fishery to use: 1) a collapsible hoop net or small turtle hoist rather than a dipnet to release incidentally hooked sea turtles and other protected species, 2) a new dehooking device when a fishing hook is externally embedded in a sea turtle or other protected species and cannot be removed via needle-nose pliers or bolt cutters, and 3) long-nose or needle-nose pliers with an overall length of 11 inches or greater to release incidentally hooked sea turtles and other protected species. Thus, this action is expected to directly regulate businesses that possess commercial or charter/headboat permits for the Gulf reef fish fishery.

As of November 14, 2017, the number of vessels with a valid or renewable charter/headboat Gulf reef fish permit was 1,278. In addition, there were 844 vessels with valid or renewable commercial Gulf reef fish permits. The number of vessels with both commercial and charter-headboat Gulf reef fish permits was 142, so the total number of vessels with a commercial and/or charter/headboat Gulf reef fish permit was 1,980 as of November 14, 2017. Thus, 1,980 vessels are expected to be directly regulated by this proposed regulatory action.

Although NMFS possesses complete ownership data regarding businesses and vessels that participate in the Gulf red snapper and grouper-tilefish individual fishing quota (IFQ) programs, ownership data regarding businesses that possess commercial or charter-headboat Gulf reef fish permits but do not commercially harvest IFQ species is incomplete. Therefore, it is not currently feasible to accurately determine affiliations between these particular businesses. As a result of the incomplete ownership data, for purposes of this analysis, it is assumed each of these vessels is independently owned by a single business, which is expected to result in an overestimate of the actual number of businesses directly regulated by this proposed regulatory action. Thus, this proposed regulatory action is estimated to directly regulate 1,980 businesses in the commercial or for-hire sectors of the Gulf reef fish fishery.

For vessels with commercial Gulf reef fish permits that were active in the reef fish fishery, in 2014, which is the only year for which economic return estimates are available for the commercial sector in this fishery, average annual gross revenue in 2016 dollars was approximately $162,000 per vessel while net revenue from operations was approximately $51,000 per vessel (Overstreet, Perruso, and Liese, 2017). According to Savolainen, et al.

(2012), which contains the most recent estimates of economic returns in the for-hire sector, the average annual gross revenue for a Gulf headboat was $256,122 while the average annual gross revenue for a Gulf charter vessel was $84,500 in 2009 (2016 dollars). Savolainen, et al. (2012) also estimated that economic profits were $74,765 and $24,985 (2016 dollars) for Gulf headboats and charter vessels in 2009, respectively.

The Small Business Administration (SBA) has established size standards for all major industry sectors in the U.S. including for-hire businesses (NAICS code 487210). A business primarily involved in for-hire fishing is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has annual receipts (revenue) not in excess of $7.5 million for all its affiliated operations worldwide. According to Savolainen, et al. (2012), on average, annual gross revenue for headboats in the Gulf is about three times greater than annual gross revenue for charter vessels. The maximum annual gross revenue for a single headboat in the Gulf was about $1.3 million (2016 dollars) in 2017 (D. Carter, pers. comm.).

On December 29, 2015, NMFS issued a final rule establishing a small business size standard of $11 million in annual gross receipts (revenue) for all businesses primarily engaged in the commercial fishing industry (NAICS code 11411) for RFA compliance purposes only (80 FR 81194, December 29, 2015). In addition to this gross revenue standard, a business primarily involved in commercial fishing is classified as a small business if it is independently owned and operated, and is not dominant in it field of operations (including its affiliates). For the vessels with commercial Gulf reef fish permits, the maximum annual gross revenue earned by a single vessel in any year from 2012 through 2016 was approximately $4.65 million (2016 dollars) while the maximum average annual gross revenue per vessel was approximately $3.1 million (2016 dollars) during this time.

Based on the information above, all businesses directly regulated by this proposed regulatory action are determined to be small businesses for the purpose of this analysis.

6.4 Description of the projected reporting, record-keeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or records

This proposed regulatory action would not establish any new reporting or record-keeping requirements. However, for vessels with commercial or charter/headboat permits in the Gulf reef fish fishery, it will expand the available options for complying with release gear regulatory requirements for sea turtles and other protected species. See discussion in Section 6.6 for additional details.

6.5 Identification of all relevant federal rules, which may duplicate, overlap or conflict with the proposed rule

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

6.6 Significance of economic effects on small entities

Substantial number criterion

This proposed regulatory action, if implemented, would be expected to directly regulate all 1,980 vessels with commercial or charter/headboat permits in the Gulf reef fish fishery. All directly regulated businesses have been determined, for the purpose of this analysis, to be small entities. Based on this information, the proposed regulatory action is expected to affect a substantial number of small businesses.

Significant economic effects

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

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

All entities directly regulated by this regulatory action have been determined to be small entities. Thus, the issue of disproportionality does not arise in the present case.

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

Allowing businesses (vessels) with commercial or charter/headboat Gulf reef fish permits to use a collapsible hoop net or small turtle hoist rather than a dipnet to release incidentally hooked sea turtles and other protected species is expected to reduce the cost of complying with the associated regulatory requirement by about $40 (2016 dollars) per business (vessel) on average. However, as this gear is typically replaced about once every 7 years, the average cost savings to each business (vessel) is only about $6 per year and thus only minimally increase these businesses' profitability.

Allowing businesses (vessels) with commercial or charter/headboat Gulf reef fish permits to use a new dehooking device when a fishing hook is externally embedded in a sea turtle or other protected species is not expected to change the expected cost of complying with the associated regulatory requirement as its cost is within the range of the currently allowed dehooking devices. Thus, the profitability of commercial and for-hire businesses is not expected to change as a result of allowing this new dehooking device.

Allowing businesses (vessels) with commercial or charter/headboat Gulf reef fish permits to use long-nose or needle-nose pliers with an overall length of 11 inches or greater, rather than "approximately 12 inches" or greater, to release incidentally hooked sea turtles and other protected species is expected to reduce the cost of complying with the associated regulatory requirement for at least some of these businesses. As a result of the ambiguity with the current minimum length, as well as the limited market availability of pliers with an overall length of 12 inches, it has been difficult for some business (vessel) owners to find pliers that clearly comply with the current regulation. As a result, some of these owners currently use pliers that have an overall length of 11 inches. Thus, the proposed change to the regulation may preclude some business (vessel) owners from having to purchase new pliers, which typically cost around $10, that clearly comply with the current regulation.

The action to modify the abbreviated framework process of the reef fish framework procedure to include changes to release gear requirements is an administrative action that does not alter any regulatory requirements that apply to vessels with commercial or charter-headboat permits in the Gulf reef fish fishery. Therefore, this action is not expected to affect the profitability of any businesses that possess these permits.

As a result of the information above, a significant reduction in profits for a substantial number of small entities is not expected as a result of the proposed regulatory action.

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

This proposed regulatory action, if implemented, is not expected to reduce the profits of any small businesses directly regulated by this action. As a result, the issue of significant alternatives is not relevant.

CHAPTER 7. LIST OF AGENCIES, ORGANIZATIONS AND PERSONS CONSULTED

Name	Expertise	Responsibility	Agency
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
Lesley Stokes	Research 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, whichever is greater)	Dipnets meeting requirements available at Bluewater Tackle; Howell Tackle; Fishermans Ideal Supply House; Halfhitch Tackle; Hiliner Tackle; SNL Corp; etc.
Cushioned Support Device	A standard automobile tire; boat cushion; or any other comparable cushioned elevated surface
Short-Handled Dehooker for Internal Hooks*	17-in Bite Block Deep-Hooked (Sea Turtle) pigtail ARC Dehooker; NOAA/Chainlink Dehooker
Short-Handled Dehooker for External Hooks	17-in Bite Block Deep-Hooked (Sea Turtle) pigtail ARC Dehooker; NOAA/Chainlink Dehooker; ARC Short-handled J-Style Dehooker; Scotty's Dehooker; Short-handled NOAA/Cylinder 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 and Model MC-A; Fisherman's Ideal Supply House and SNL Corp. monofilament line cutter models 1278 and CM100; Momoi Anvils mono cutters, serrated mono cutters, and scissor style mono cutters; Fiskars Multi-purpose cutter
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 hard wood wire brush with the bristles removed (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 Protective Tubing	Any set of (2) rope loops covered with protected tubing meeting design standards
Hank of Rope	Any size soft braided or wrapped 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	Avian oral speculum set from Veterinary Specialty Products; Jorvet Model J-51z; and Krusse Model 273117; Large macaw model J0051Z from Patterson Veterinary.

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 internal 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, whichever is greater)	NOAA/LaForce Line Cutter or NOAA/Arceneaux Line Clipper
Long-Handled (6 ft or 150% of freeboard height, whichever is greater) Dehooker for Internal Hooks[1*]	ARC 6' Pole Big Game (Pigtail) Dehooker; ARC 8' and 12' Pole Breakdown Big Game (Pigtail) Dehooker; Long-handled NOAA/Chainlink Dehooker
Long-Handled (6 ft or 150% of freeboard height, whichever is greater) Dehooker for External Hooks[1*]	ARC 6'Pole Big Game (Pigtail) Dehooker; ARC 8' and 12' Pole Breakdown Big Game (Pigtail) Dehooker; Long-handled J-Style Dehooker or "Flip Stick"; Long-handled NOAA/Cylinder Dehooker; Long-handled NOAA/Chainlink Dehooker
Long-handled Device to pull an ''Inverted V'' (6 ft (1.83 m) or 150% of freeboard height, whichever is greater)	Long-handled J-Style Dehooker or "Flip Stick"; 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, whichever is greater)	Dipnets meeting requirements available at Bluewater Tackle; Howell Tackle; Fishermans Ideal Supply House; Halfhitch Tackle; Hiliner Tackle; SNL Corp; etc.
Cushioned Support Device	A standard automobile tire; boat cushion; or any other comparable cushioned elevated surface
Short-Handled Dehooker for Internal Hooks*	17-in Bite Block Deep-Hooked (Sea Turtle) pigtail ARC Dehooker; NOAA/Chainlink Dehooker
Short-Handled Dehooker for External Hooks	17-in Bite Block Deep-Hooked (Sea Turtle) pigtail ARC Dehooker; NOAA/Chainlink Dehooker; ARC Short-handled J-Style Dehooker; Scotty's Dehooker; or Short-handled NOAA/Cylinder 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; Fisherman's Ideal Supply House and SNL Corp. monofilament line cutter models 1278 and CM100; Momoi Anvils mono cutters, serrated mono cutters, and scissor style mono cutters; Fiskars Multi-purpose cutter
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 hard wood wire brush with the bristles removed (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 Protected Tubing	Any set of (2) rope loops covered with protected tubing meeting design standards
Hank of Rope	Any size soft braided or wrapped 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	Avian oral speculum set from Veterinary Specialty Products; Jorvet Model J-51z; and Krusse Model 273117; Large macaw model J0051Z from Patterson Veterinary.

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 and one long-handled dehooker is required onboard if the approved short-handled and long-handled dehookers are designed to remove both internal and external hooks.

[1] A short–handled dehooker with an appropriate length handle extender will also fulfill this requirement.
[2] 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.

APPENDIX C. EXAMPLES OF APPROVED SEA TURTLE RELEASE GEAR

Appendix C1. Sea turtle release gear options for vessels with a federal commercial and/or charter vessel/headboat Gulf reef fish permit(s) that will be allowed once this Amendment is implemented. Some links may need to be copied and pasted in your browser.

New gear	Where to get it
Collapsible Hoop Net	• Hillmans Seafood Netshop 281-339-2897 • Can be self-made
Small Turtle Hoist	Self-made at this time
New Short-handled Dehooker for External Hooks	• https://www.amazon.com/Baker-HXSS-Stainless-X-Heavy-HooKouT/dp/B01BOOC6W0/ref=pd_lpo_vtph_200_tr_img_2?_encoding=UTF8&psc=1&refRID=20C2JM8TF82JGHD9EAKN • http://www.fishingtackleunlimited.com/fish-hook-extractor-long • https://www.fishingheadquarters.net/hookremovers.html • https://dogfishtacklecompany.com/products/angler-tech-fish-hook-extractor?variant=33773794636
11” or larger Long-nose or Needle-nose Pliers	• https://www.basspro.com/shop/en/boone-pliers • https://www.harborfreight.com/11-inch-long-reach-needlenose-pliers-with-straight-jaws-39538.html • https://www.harborfreight.com/11-inch-90-angle-long-reach-pliers-39539.html • https://www.harborfreight.com/11-inch-long-reach-needlenose-pliers-with-45-offset-jaws-39537.html

Appendix C2. Sea turtle release gear required for all vessels with a federal commercial and/or charter vessel/headboat federal Gulf reef fish permit(s).

Required Item	Where to get it
Dipnet (handle length must be 6 ft or 150% of freeboard height)	• Bluewater Tackle • Howell Tackle • Fishermans Ideal Supply House • Hiliner Tackle
Cushioned Support Device	• https://www.basspro.com/shop/en/type-iv-flotation-cushion • https://www.dickssportinggoods.com/p/dbx-floating-throw-cushion-18dbxudbxfltngthrwsr/18dbxudbxfltngthrwsr
Short-Handled Dehooker for Internal Hooks	• https://dehooker4arc.com/store/product.cfm/mode/details/id/408/17-bite-block-deep-hooked-sea-turtle-dehooker
Short-Handled Dehooker for External Hooks	• https://dehooker4arc.com/store/product.cfm/mode/details/id/426/commercial-16-j-style-dehooker • https://dehooker4arc.com/store/product.cfm/mode/details/id/406/arc-24-handheld-game-model-dehooker-perfect-for-larger-stripers

12” or larger Long-nose or Needle-nose Pliers	• https://www.harborfreight.com/16-inch-long-reach-pliers-set-38598.html
Bolt Cutter	• https://www.amazon.com/HK-Porter-1490MC-Industrial-Center/dp/B00002NB85
Monofilament Line Cutter	• https://www.tackledirect.com/jinkaimct.html • https://www.tackledirect.com/jinkaimca.html • http://fishsaltwatertackle.com/shop/1278-mono-cutter/ • http://snlcorp.com/SNL/Tools/Cuttingtools.aspx • http://fishsaltwatertackle.com/shop/cm100-stainless-mono-cutter/ • http://snlcorp.com/SNL/Tools/Cuttingtools.aspx • https://www.halfhitch.com/store?level1=1-30000000&level2=2-30000000&level3=3-40000000&level4=4-10000000&level5= • http://hiliner.com/product-catalog/cutters/momoi-anvil-style/ • http://snlcorp.com/SNL/Tools/Cuttingtools.aspx • http://hiliner.com/product-catalog/cutters/momoi-serrated/ • http://hiliner.com/product-catalog/cutters/momoi-scissor-style/
At least Two (2) Types of the following Mouth Openers and Mouth Gags	
Block of Hard Wood	Any hardware supply store
Set of (3) Canine Mouth Gags	• https://www.jorvet.com/product/canine-mouth-gag-large/ • https://www.jorvet.com/product/canine-mouth-gag-medium/ • https://www.jorvet.com/product/canine-mouth-gag-small/
Set of (2) Sturdy Dog Chew Bones	• https://www.petsmart.com/dog/toys/interactive-toys/nylabone-durachew-bone-chew-dog-toy-11077.html • https://www.petco.com/shop/en/petcostore/product/nylabone-souper-dura-chew-chicken-bone • https://www.petsupermarket.com/dog/dog-toys/nylabone-giant/
Set of (2) Rope Loops Covered with Protective Tubing	Any hardware supply store
Hank of Rope	Any hardware supply store
Set of (4) PVC Splice Couplings	Any hardware supply store
Large Avian Oral Speculum	• https://www.kruuse.com/en/ecom/Konsult_Diagnostik/Spekulum_fugle/prod_273117.aspx • https://www.pattersonvet.com/ProductItem/078023455

Appendix C3. Additional sea turtle release gear required for vessels with a federal commercial and/or charter vessel/headboat Gulf reef fish permit(s) and a freeboard height of greater than 4 ft.

Required Item	Where to get it
Long-Handled Line Cutter (6 ft or 150% of freeboard height)	• https://dehooker4arc.com/store/product.cfm/mode/details/id/417/4-noaa-laforce-middle-section-extended-reach • Hiliner Tackle • Fishermans Ideal Supply House
Long-Handled (6 ft or 150% of freeboard height) Dehooker for Internal Hooks	• https://dehooker4arc.com/store/product.cfm/mode/details/id/409/arc-6-pole-big-game-dehooker-perfect-for-billfish • https://dehooker4arc.com/store/product.cfm/mode/details/id/410/arc-8-pole-breakdown-2-4-sections-big-game-dehooker • https://dehooker4arc.com/store/product.cfm/mode/details/id/411/arc-12-pole-breakdown-2-6-sections-big-game-dehooker
Long-Handled (6 ft or 150% of freeboard height) Dehooker for External Hooks	• https://dehooker4arc.com/store/product.cfm/mode/details/id/429/commercial-6-pole-j-style-dehooker
Long-handled Device to pull an ‘‘Inverted V’’ (6 ft (1.83 m) or 150% of freeboard height)	• https://www.westmarine.com/buy/davis-instruments--telescoping-3-section-boat-hook--4545216?recordNum=2 • https://www.westmarine.com/buy/aftco--6-taper-tip-aluminum-gaff--14535546?cm_sp=Onsite-Recs-_-DY-_-Search-Results-Test • https://www.basspro.com/shop/en/deluxe-telescopic-boat-hooks • https://www.basspro.com/shop/en/offshore-angler-ocean-master-carbon-fiber-gaff