

ISSUES AND OPTIONS FOR  
RESEARCH AND DATA COLLECTION IN  
CLOSED AND GEAR RESTRICTED AREAS IN  
SUPPORT OF SPATIAL FISHERIES  
MANAGEMENT



Prepared by NMFS, Highly Migratory Species (HMS) Management Division  
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## 1.0 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) is the principal law governing marine fisheries in the U.S. and includes ten National Standards to guide fishery conservation and management. The Magnuson-Stevens Act requires that conservation and management measures prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery (National Standard 1). It also requires that fishery “conservation and management measures shall be based upon the best scientific information available.” (National Standard 2). Other laws, such as the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA), require NMFS to limit interactions with certain species affected by federal actions, such as permitted fishery operations. NMFS employs a variety of conservation and management measures to maintain appropriate levels of catch consistent with applicable science-based quotas or other management goals, to limit bycatch to the extent practicable, and to limit interactions with protected species as required. These measures include “spatial management techniques,” which refers to a suite of fisheries conservation and management measures that are based on geographic area, such as closed areas. Closed areas are typically discrete geographic areas where certain types of fishing are restricted or prohibited for limited periods or the entire year. Ideally, closed areas overlap in space and time with the species habitat and/or life stages in need of protection. Closed areas can be particularly effective for reducing fishing mortality by certain types of fishing to near zero within the designated areas, because species in need of protection are not in danger of catch or interaction with those fishing gears, even incidentally.

Although an effective management tool for achieving certain objectives, closed areas also reduce access to valuable target species, and eliminate the ability to gather some fishery-dependent data within the areas. Fishery-dependent data are information collected during normal fishing operations (e.g., catch composition, bycatch rates, fishing effort), and are a vital and cost-effective source of information for fisheries management. Such data have been critical in determining stock status, assessing bycatch levels, and in meeting other fishery management needs. In some instances, fishery-dependent data may be the only data from a fishery that are cost-effective and feasible when considering research and budgetary constraints. If normal fishing operations are curtailed or prohibited, as with closed areas, fishery-dependent data collection can be negatively affected and create data gaps that can have implications across multiple fisheries, such as a reduced understanding of species distribution and stock status. Ideally, when a fishery closure is implemented, fishery-independent monitoring can continue to take place in the closed area in order to assess the closure’s success and continued appropriateness over time. Unfortunately, fishery-independent monitoring programs can be expensive, and resources to fund such research may not be readily available. In such cases, it may be appropriate to find ways to gather fishery-dependent data from active fisheries to make determinations about the effectiveness and appropriateness of a closed area, even though

otherwise-applicable closed area restrictions may not allow such fishing. Nevertheless, prudent management requires that the benefits of closed areas be periodically reviewed to evaluate if a closed area's objectives are still being met, considering changes in fishery conditions, such as changes in fishing effort, fleet composition, stock status, and environmental changes. The ocean is a highly dynamic environment and long-term shifts in fish and habitat distributions can potentially undermine conservation and management effectiveness if closed areas remain static.

NOAA Fisheries has implemented a number of closed areas that curtail or prohibit fishing for certain Atlantic highly migratory species (HMS) (i.e., tunas, sharks, swordfish, and billfish) or that restrict the use of certain HMS gear types. The management goals of these closed areas vary, as detailed in Section 2.0. Some of the goals of the closed areas are still relevant, such as conserving protected resources under the ESA or MMPA or to help rebuild overfished stocks as required by the Magnuson-Stevens Act. However, some goals may no longer be as relevant, such as reducing fishing pressure on now-rebuilt stocks. In some cases, new management measures may be adequately achieving the intended conservation goals, making the closed area no longer necessary. Furthermore, reductions in fishing effort in one area can displace fishing effort to other areas, with possible adverse impacts, depending on the magnitude of the effort and the geographic areas involved. For example, Chan et al. (2016) examined the impact of displaced effort in the Hawaiian swordfish fishery. This analysis found that regulatory reductions in swordfish fishing effort to protect sea turtles displaced effort to other areas that were not as closely regulated. In these cases, sea turtle bycatch increased in the less regulated areas and fleets, negating the intended benefits to sea turtles. The transfer of negative ecological impacts like this is termed "spillover effects." Thus, HMS closed areas should be periodically evaluated for their continued utility in meeting management goals and legal obligations, including those under the ESA, the MMPA, and the Magnuson-Stevens Act. Such reviews should include ensuring that closed areas remain appropriately placed to achieve ongoing conservation and management objectives, and conversely, that they do not unnecessarily prevent fisheries from attaining optimum yield from healthy fish stocks.

A systematic approach to analyzing the effectiveness of the existing HMS closed areas relative to original goals or new management objectives requires the collection of high-quality data on species distributions, catch rates, and habitat suitability in the closed areas. This document outlines options for enabling the collection of the data necessary to conduct such evaluations of HMS closed areas.

## **1.1 PURPOSE, NEED, AND OBJECTIVES**

This Issues and Options Paper explores different approaches to conduct research and collect data in closed areas in support of HMS management. First, the Background section details the management history of areas that restrict or prohibit fishing for HMS species or the use of certain HMS gear types. The Background section also details research programs and data collection

efforts and projects that have been used or are currently used to collect data in such closed areas. Finally, the Range of Potential Options section details potential approaches to collect data in closed areas.

Closed area data collection is needed for several reasons. First, in most cases, no fisheries data has been collected in the closed areas using affected HMS gears during times when the closure is in effect. This lack of data complicates, and may compromise, effective management of HMS. To maintain a sustainable fishery that maximizes access to fishery resources while achieving conservation goals, fishery managers need current and relevant catch data, along with protected resource interaction information. While closed areas can be effective at achieving management goals and objectives, such as curtailing or eliminating fishing mortality and bycatch interactions within the area, fishery managers need information to assess the continued effectiveness of the closed area in meeting the objectives. For example, geographically stationary closures that once protected a certain species may no longer achieve the original management goals if changing ocean conditions or changing stock status have altered that species' distribution or migration patterns. These closures may need to be moved, reduced, or expanded to meet the original goals. However, without recent catch and interaction data, it is difficult to measure management success or shortcomings.

Second, the original goals of the closure may no longer be relevant. For example, if a closure was implemented to reduce fishing mortality of an overfished stock, the closure may no longer be needed if that stock is rebuilt. Without data from the closed areas, fishery managers cannot assess whether the closed areas are still needed to provide ancillary benefits to other species or whether the areas need to be modified.

Third, closed areas may be redundant or obsolete in the context of new management measures. If the original management goals of the closure are being met through more recent management measures, it is possible that the closure warrants reconsideration or modification. Data collection can help to determine whether closed area modifications are needed in light of more recent management measures.

Fourth, assessing the impact of closed areas through data collection can help achieve other Agency goals. For example, it is NOAA Fisheries' goal to more fully utilize swordfish quota allocated to the United States by the International Commission for the Conservation of Atlantic Tunas (ICCAT). If some existing closed areas affect the U.S. fleet's ability to harvest swordfish without offering needed conservation benefits for other species, due to one of the above reasons, those closed areas may warrant reconsideration and modification. The seafood trade imbalance is another Agency priority that could be impacted by inefficient closed areas. If closed areas reduce domestic catch without providing conservation benefits, and that reduced catch increases demand for foreign imports, the areas may need to be modified. While addressing goals such as full utilization of the swordfish quota or reducing the seafood trade imbalance, consideration

must be given to possible adverse impacts, such as increased gear conflicts. Answering these questions depends on high-quality data collection in the relevant areas with the relevant gears during the relevant times.

The objectives of this Issues and Options Paper are to 1) summarize the management history and goals for existing HMS closed areas, and 2) begin exploring different approaches to collecting data in the closed areas in support of HMS management. The seven options outlined in Section 3.0 are not an exhaustive list. Other options may be more effective or warrant consideration, and NOAA Fisheries welcomes additional ideas. Additionally, some of the options may be appropriate for some closed areas, but not others. To the extent any closed areas or other spatial management measures are affected or altered by other currently-ongoing NMFS rulemaking/management actions, NMFS will take that into account and appropriately update the areas under consideration in this action.

## 2.0 BACKGROUND

The background section provides a brief summary and management history of closed areas that affect HMS fisheries.

## 2.1 MANAGEMENT HISTORY OF CLOSED AREAS

### 2.1.1 CLOSED AREAS AFFECTING MULTIPLE GEAR TYPES

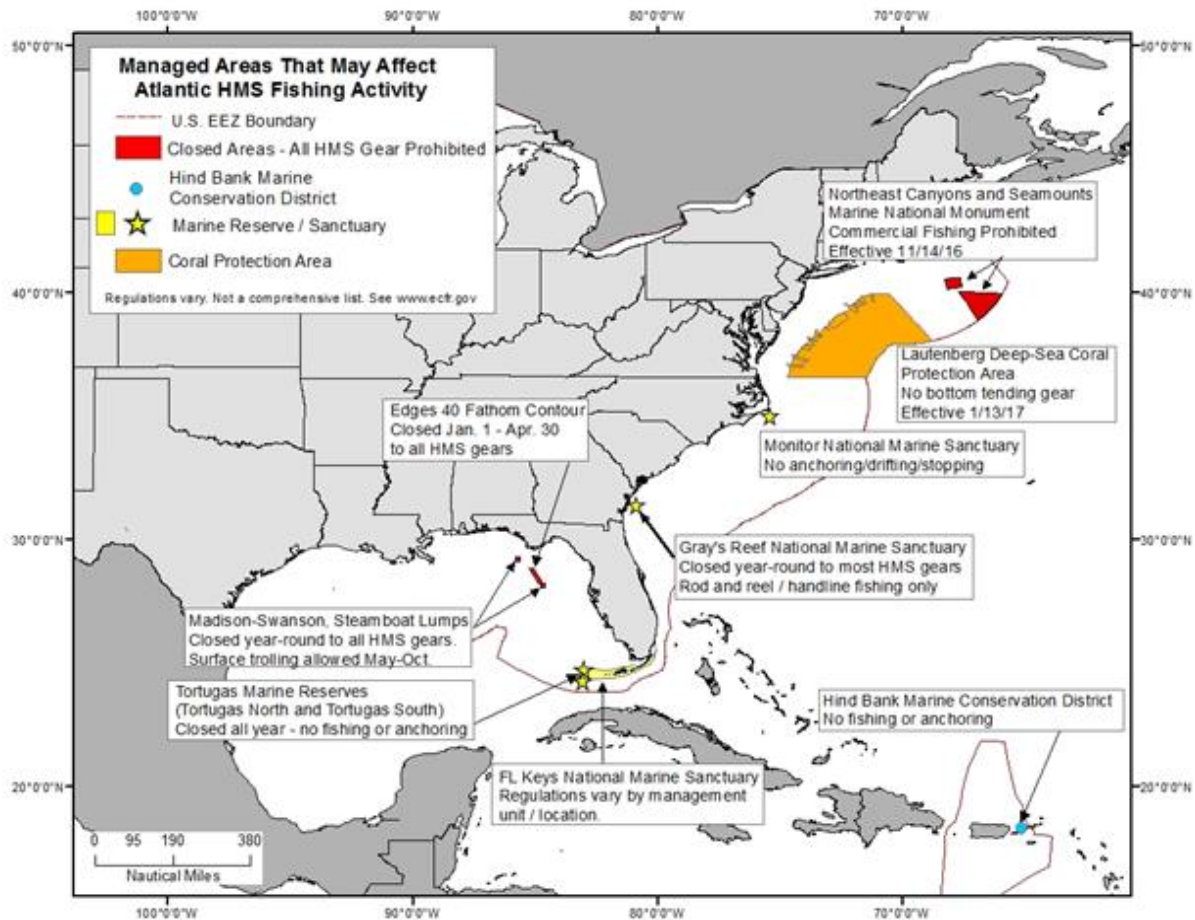


Figure 1: Marine sanctuaries, special management zones, and time/area closures that restrict use of all HMS gear in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea.

## **2.1.1.1 MADISON-SWANSON, STEAMBOAT LUMPS, AND EDGES 40 FATHOM CONTOUR CLOSURES**

### **Madison-Swanson and Steamboat Lumps Closures**

Effective Date - November 1, 2006 (for HMS fisheries)

Federal Register Citation - 71 FR 58057 (for HMS fisheries)

Closure Timing – Year-round, with the exception of surface trolling May to October.

Intent – Complementary Closure in Response to GOM Fishery Management Council measures to protect gag grouper spawning aggregations

Gear Type - All fishing prohibited November 1 through April 30; all fishing gears, excluding surface trolling, prohibited May 1 through October 31.

### **Edges 40 Fathom Contour Closure**

Effective Date - January 1, 2009 (for HMS fisheries)

Federal Register Citation - 74 FR 66585 (for HMS fisheries)

Closure Timing - January 1 through April 30

Intent - Protect gag grouper spawning aggregations

Gear Type - All fishing gears are prohibited during the closure period.

In a series of rulemakings stretching from 2000 to 2009, the Gulf of Mexico Fishery Management Council (GMFMC) established a number of closures designed to protect gag grouper spawning aggregations in the Gulf of Mexico. The first of these closures, the Madison-Swanson and Steamboat Lumps closures, were established in 2000 following a 1997 Gulf of Mexico gag grouper stock assessment which did not consider the stock to be overfished based upon the management goals at the time but that overfishing may have been occurring. Additionally, several studies had determined fishing on spawning aggregations could disrupt spawning (Shapiro 1987), reduce size at spawning (Koenig et al. 1996), and even result in the loss of entire aggregations (Gilmore and Jones 1992). These closures initially prohibited all fishing year-round with the exception of surface trolling for HMS which was allowed from May 1 to October 31. The Madison-Swanson and Steamboat Lumps closures were initially established for four years to allow for studies to determine their effectiveness as conservation measures to protect gag grouper spawning aggregations. The closures were extended for an additional six years in 2004 before being extended indefinitely by Amendment 30B to the Gulf of Mexico Reef Fish FMP in 2009.

In addition to extending the Madison-Swanson and Steamboat Lumps closures indefinitely, Amendment 30B also established the Edges 40 Fathom Contour closure. The Edges 40 Fathom Contour closure was established over concerns that the Madison-Swanson and Steamboat Lumps closures were too small to effectively protect gag grouper spawning aggregations. To address this concern, the Edges 40 Fathom Contour closure was established along the 40 fathom contour

stretching most of the way between the Madison-Swanson and Steamboat Lumps closures. Shaped like a parallelogram, the Edges 40 Fathom Contour closure is about 390 square nautical miles (nm) by 937 nm long and 10-12 nm wide) that straddles the 40 fathom contour west of the Florida Middle Grounds. Its southern border is shared with the northern border of the Steamboat Lumps closure, thus making it a seasonal extension of that closure. Unlike the previous closures, the Edges 40 Fathom Contour closure only runs from January 1 to April 30 of each year, during which time fishing with all gear types is prohibited from the closed area, while all fishing gears are allowed the rest of the year. The timing of the Edges 40 Fathom Contour closure was designed to correspond with the time of year when most gag grouper spawning aggregations take place in the region.

Although these areas were initially established by the GMFMC, the HMS Management Division adopted complementary regulatory measures in the HMS regulations (50 CFR 635) in order to streamline enforcement and further protect gag grouper spawning aggregations. Including these closures in the HMS regulations made it clear that the prohibitions included fishermen targeting HMS with bottom longline gear.



## 2.1.2 PELAGIC LONGLINE CLOSED AREAS

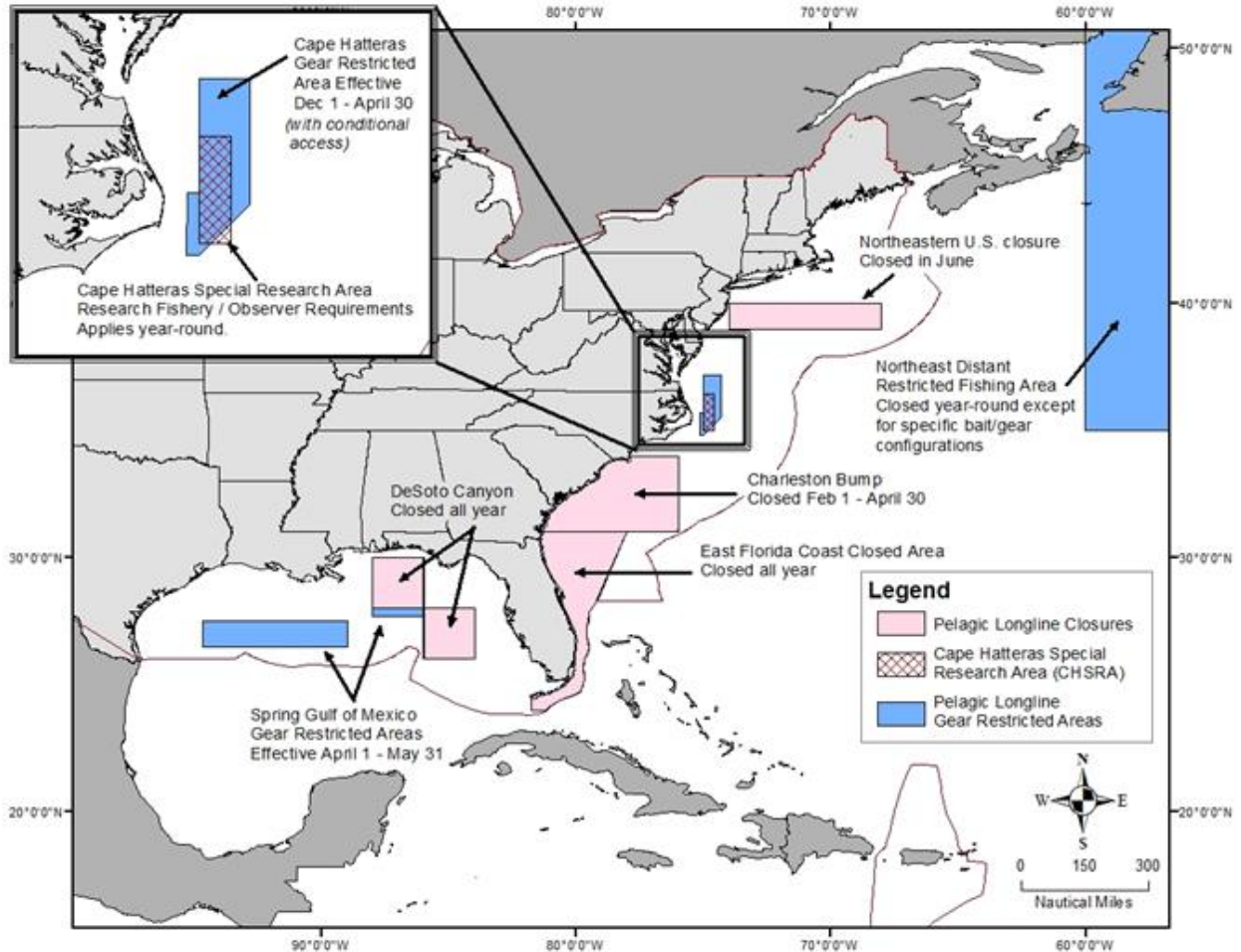


Figure 2: Time/area closures and gear restricted areas in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea that limit use of pelagic longline gear.

### 2.1.2.1 EAST FLORIDA COAST, CHARLESTON BUMP, AND DESOTO CANYONS CLOSURES

#### East Florida Coast

Effective Date - March 1, 2001

Federal Register Citation - 65 FR 47213, 66 FR 8903

Closure Timing - Year-round

Intent - Reduce bycatch, bycatch mortality, and incidental catch of undersized swordfish, billfish, and other overfished and protected species within the U.S. pelagic longline fishery

Gear Type - Pelagic Longline

#### Charleston Bump

Effective Date - March 1, 2001

Federal Register Citation - 65 FR 47213, 66 FR 8903

Closure Timing - February 1 through April 30 each year

Intent - Reduce bycatch, bycatch fishing mortality, and incidental catch of undersized swordfish, billfish, and other overfished and protected species within the U.S. pelagic longline fishery

Gear Type - Pelagic Longline

### **DeSoto Canyon**

Effective Date - November 1, 2000

Federal Register Citation - 65 FR 47213

Closure Timing - Year-round

Intent - Reduce bycatch, bycatch fishing mortality, and incidental catch of undersized swordfish, billfish, and other overfished and protected species within the U.S. pelagic longline fishery

Gear Type - Pelagic Longline

On August 1, 2000, NOAA Fisheries published a final rule (65 FR 47213) implementing three pelagic longline closed areas. One area is the Charleston Bump, which is closed to pelagic longline gear from February 1 to April 30 each year. This area was first effective on March 1, 2001 (66 FR 8903, February 5, 2001). Another area is the East Florida Coast, which is closed to pelagic longline gear year-round. This area was also first effective on March 1, 2001 (66 FR 8903, February 5, 2001). The last area, the DeSoto Canyons, is closed to pelagic longline gear year-round, and was first effective on November 1, 2000.

## **2.1.2.2 NORTHEASTERN UNITED STATES JUNE CLOSURE**

### **Northeastern U.S. June closure**

Effective Date - July 1, 1999

Federal Register Citation - 64 FR 29090

Closure Timing - June 1 through 30 each year

Intent - Reduce bluefin tuna discards within the pelagic longline fishery

Gear Type - Pelagic Longline

The Northeastern United States Pelagic Longline closed area was implemented in 1999 to reduce bluefin tuna discards in the pelagic longline fishery (64 FR 29090, May 28, 1999). NOAA Fisheries determined that the western Atlantic bluefin tuna stock was overfished in 1997. In addition, the 1998 ICCAT Recommendation on western Atlantic bluefin tuna required that all Contracting Parties, including the United States, minimize dead discards of bluefin tuna to the extent practicable, and set a country-specific dead discard allowance. Given the status of bluefin tuna and recommendations from ICCAT at that time, NOAA Fisheries investigated a range of different options for time/area closures in locations with high bluefin tuna bycatch in the 1999

HMS FMP for Atlantic tunas, sharks, and swordfish. NOAA Fisheries finalized the Northeastern United States closed area based on a redistribution analysis (disbursement analysis in the Final EIS) that showed that a closure during the month of June could reduce bluefin tuna discards by 55 percent in this area, without any substantial changes to target catch or other bycatch levels. This area, located off the coast of New Jersey, is now closed to fishing with pelagic longline gear from June 1 through June 30 each year.

Recently, NOAA Fisheries published a [scoping paper and notice of intent](#) (83 FR 8969, March 2, 2018) to determine if management changes should occur in the Northeastern United States Pelagic Longline closed area. One of the objectives of this scoping document was to begin considering and analyzing whether pelagic longline fleet-wide measures intended to reduce bluefin tuna bycatch remain necessary given the reductions in landings and dead discards since implementation of the Individual Bluefin Quota (IBQ) program. Management options presented in the scoping document for the Northeastern United States Pelagic Longline closed area included a no action option, performance access, modification of the time and/or spatial coverage, provisional application, and elimination of the area. During the comment period, six public meetings and a conference call were conducted from Louisiana to Massachusetts. Currently, NOAA Fisheries is considering the public comments received and in turn using them to help develop alternatives for a proposed rule involving the management of the pelagic longline fishery.

### **2.1.2.3 NORTHEAST DISTANT (NED) CLOSED AREA**

#### **NED Closed Area**

Effective Date – July 13, 2001, modified July 6, 2004

Federal Register Citation - 66 FR 36711 (initial emergency rule); 69 FR 40734 (modified closure)

Closure Timing – year-round except certain bait/gear configurations

Intent – Reduce sea turtle interactions and mortality within the pelagic longline fishery and comply with measures needed to avoid jeopardizing loggerhead and leatherback sea turtles, consistent with ESA consultation BiOp.

Gear Type – Pelagic Longline

On June 30, 2000, a BiOp was issued that evaluated the current status of the loggerhead and leatherback sea turtles and concluded that the actions of the pelagic longline fishery jeopardized the continued existence of these species. Because of this, NOAA Fisheries reinitiated consultation on the HMS fisheries on September 7, 2000.

On June 14, 2001, an updated BiOp was issued that included information from loggerhead and leatherback sea turtle stock assessments and a NOAA Fisheries technical memorandum titled

“Assessment of the Impact of the Pelagic Longline Fishery on the Loggerhead and Leatherback Sea Turtles of the Western North Atlantic in February 2001” (NOAA Fisheries, 2001). The June 2001 BiOp specified a Reasonable and Prudent Alternative (RPA) that would avoid the likelihood of jeopardizing the continued existence of these turtles. In addition to some gear modification requirements, the RPA included a requirement to close the entire NED area effective July 15, 2001. On July 9, 2002, NOAA Fisheries published a final rule (67 FR 45393) implementing most of the measures required under the June 14, 2001 BiOp, including the closure of the NED statistical reporting area.

Based on the conclusion of a three-year experiment in the NED discussed in Section 2.2.1, and based on preliminary data that indicated that the Atlantic pelagic longline fishery may have exceeded the ITS in the June 14, 2001 BiOp, NOAA Fisheries modified the requirements of the NED closure on July 6, 2004 (69 FR 40734). That action, among other things, authorized pelagic longline fishing in the NED provided that 18/0 or larger circle hooks with an offset less than 10 degrees are deployed and only whole Atlantic mackerel and squid baits were possessed and/or utilized.

#### **2.1.2.4 CAPE HATTERAS SPECIAL RESEARCH AREA**

##### **Cape Hatteras Special Research Area**

Effective Date - June 18, 2009

Federal Register Citation - 74 FR 23349

Closure Timing - trip notification and observer requirements year-round

Intent - Reduce serious injuries and mortalities of pilot whales and Risso’s dolphins to insignificant levels approaching a zero rate within the pelagic longline fishery

Gear Type - Pelagic Longline

In accordance with the MMPA, NOAA Fisheries convened the Pelagic Longline Take Reduction Team (PLTRT) in June 2005. Members of the PLTRT included fishermen and representatives of the Atlantic pelagic longline fishing industry, environmental groups, marine mammal biologists, fisheries biologists, and representatives of the Mid-Atlantic Regional Fishery Management Council, the Marine Mammal Commission, and NOAA Fisheries. The Agency carefully considered the consensus recommendations of the PLTRT in drafting the proposed rule to implement the Pelagic Longline Take Reduction Plan (PLTRP), which published on June 24, 2008 (73 FR 35623). The final rule implementing the PLTRP (May 19, 2009; 74 FR 23349) included the consensus recommendations of the PLTRT.

The final rule implemented a number of measures to achieve the long-term goal of reducing serious injuries and mortalities of pilot whales and Risso’s dolphins in the Atlantic pelagic longline fishery to insignificant levels approaching a zero mortality and serious injury rate within

five years of implementation. Among these measures was the creation of the Cape Hatteras Special Research Area (CHSRA) with specific observer and research participation requirements for fishermen operating in that area at any time during the year.

The CHSRA encompasses a 5,927 sq km (2,288 sq mile) region that had exhibited both high fishing effort and high pilot whale bycatch rates. NOAA Fisheries delineated the area to encompass the vast majority of the observed marine mammal interactions and to exclude the area where inshore longline vessels target yellowfin tuna and coastal sharks, since the inshore area had low observed marine mammal interaction rates. Pelagic longline vessels in the CHSRA are required to carry observers when requested. Vessels deploying or fishing with pelagic longline gear in the CHSRA must call the Southeast Fisheries Science Center (SEFSC) at least 48 hours, but no more than 96 hours, prior to embarking on the trip. If, upon calling in, the vessel operator is informed by the SEFSC that no observer will be assigned and that no special research requirements will apply for that trip, then the vessel need not wait until its stated date and time of departure and may depart on its fishing trip immediately. In addition to the requirement for carrying observers, pelagic longline vessels fishing in the CHSRA must also participate in research. The observers will inform vessel operators of the specific additional investigations that may be conducted during the trip. An observer may direct vessel operators to modify their fishing behavior, gear, or both. Instead of or in addition to carrying an observer, vessels may be required to carry and deploy gear provided by NOAA Fisheries or an observer or modify their fishing practices. If vessels are assigned any special research requirements, they must participate in the research for the duration of the assignment.

A vessel may transit through the CHSRA with pelagic longline gear onboard without meeting the observer and research requirements if that gear is stowed. Allowing fishing vessels to transit through the CHSRA with stowed gear contributes to safety at sea in the event of foul weather by taking the most direct route to port and may reduce fuel costs for fishing vessels as they will not have to transit around the CHSRA to and from port.

### **2.1.2.5 PELAGIC LONGLINE GEAR RESTRICTED AREAS (GRAs)**

#### **Spring Gulf of Mexico GRAs**

Effective Date - January 1, 2015

Federal Register Citation - 79 FR 71509

Closure Timing - April 1 through May 31 each year

Intent - Reduce bluefin tuna discards within the pelagic longline fishery

Gear Type - Pelagic Longline

#### **Cape Hatteras GRA**

Effective Date - January 1, 2015

Federal Register Citation - 79 FR 71509

Closure Timing - December 1 through April 30 each year

Intent - Reduce bluefin tuna discards

Gear Type - Pelagic Longline

Amendment 7 to the 2006 Consolidated Atlantic HMS FMP implemented several GRAs to reduce pelagic longline gear interactions with bluefin tuna. One area is off the coast of Cape Hatteras and is closed from December 1 through April 30 annually. The Spring Gulf of Mexico GRAs consist of two areas in the central and eastern Gulf of Mexico. Both Gulf of Mexico GRAs are closed to pelagic longline gear from April 1 through May 31 annually. Each of these areas were identified in Amendment 7 as locations of high bluefin tuna concentrations and interactions with pelagic longline gear.

The majority of interactions with bluefin tuna occurring in the Cape Hatteras GRA were limited to a few pelagic longline fishery participants. Due to this dynamic, NOAA Fisheries implemented performance measures to grant “qualified” fishery participants access to the area. Access is granted if pelagic longline vessels have a low ratio of bluefin tuna interactions to designated species (e.g., swordfish, yellowfin tuna, bigeye tuna, pelagic sharks, dolphin, wahoo) landings, compliance with the pelagic observer program, and timely submission of logbooks. Most recently, 101 out of 108 vessels were granted access to the Cape Hatteras GRA.

The Spring Gulf of Mexico GRAs are closed to all vessels fishing with pelagic longline gear, instead of being implemented with performance access, because the distribution of interactions was more widespread across both the area of interest and fleet participants. In comparison, performance metrics were deemed more appropriate for the Cape Hatteras GRA given that high numbers of bluefin interactions in that area resulted from the fishing behavior of a small number of vessels.

Recently, NOAA Fisheries published a [scoping paper and notice of intent](#) (83 FR 8969, March 2, 2018) to determine if management changes should occur in both of the GRAs. One of the objectives of this scoping document was to begin considering and analyzing whether pelagic longline fleet-wide measures intended to reduce bluefin tuna bycatch remain necessary given the reductions in landings and dead discards since implementation of the IBQ program. Management options presented in the scoping document for the Cape Hatteras and Spring Gulf of Mexico GRAs were very similar, and included a no action option, performance access (only for Gulf of Mexico GRAs), modification of the time and/or spatial coverage, provisional application, and elimination of the areas. During the comment period, six public meetings and a conference call were conducted from Louisiana to Massachusetts. Currently, NOAA Fisheries is considering the public comments received and in turn using them to help develop alternatives for a proposed rule involving the management of the pelagic longline fishery.

### 2.1.3 BOTTOM LONGLINE CLOSED AREAS

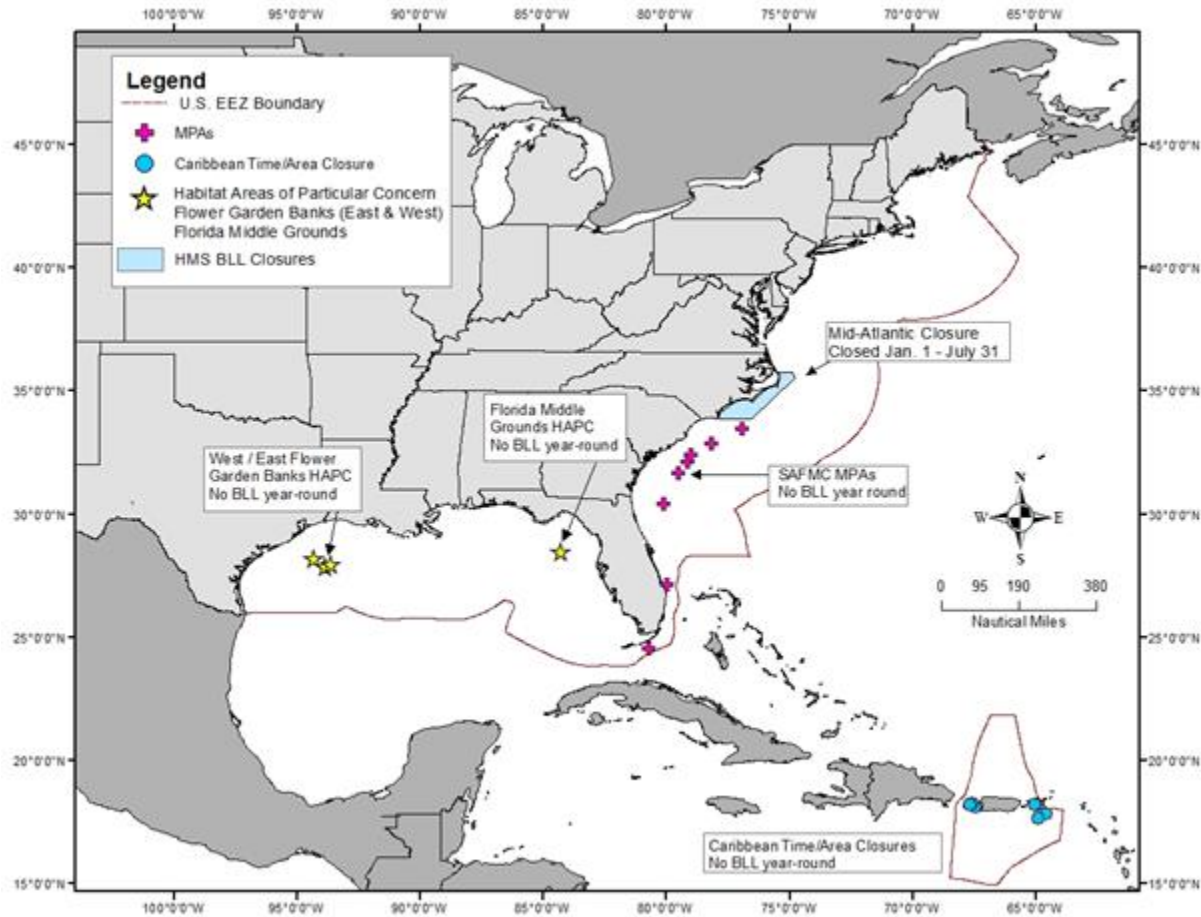


Figure 3 Marine Protected Areas (MPAs), Habitat Areas of Particular Concern (HAPCs), and time/area closures that restrict use of bottom longline (BLL) gear in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea.

#### 2.1.3.1 MID-ATLANTIC SHARK CLOSED AREA

##### Mid-Atlantic Shark Closed Area

Effective Date – January 1, 2005

Federal Register Citation – 68 FR 74746

Closure Timing – January 1 through July 31 each year

Intent – Reduce mortality on dusky and juvenile sandbar sharks

Gear Type – Bottom Longline

Primarily in response to the 2002 stock assessments for large and small coastal sharks, which determined that certain stocks were overfished and/or had overfishing occurring, NOAA Fisheries developed Amendment 1 to the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks. Among the measures implemented in the final rule to address overfishing and needed mortality reductions was a new time/area closure for sandbar and dusky shark nursery and pupping areas

encompassing essential fish habitat (EFH) and HAPC areas off the coast of North Carolina. This time/area closure, known as the Mid-Atlantic Shark Closed Area, encompasses an area of approximately 4,490 nm<sup>2</sup>, and is closed to commercial shark-permitted vessels using bottom longline from January through July. The closure was designed to reduce the bycatch of neonate and juvenile sandbar and dusky sharks which are concentrated in this area during those months.

In August 2008, the Atlantic States Marine Fisheries Commission implemented its Interstate Fishery Management Plan for Coastal Sharks, which extended this time/area closure into adjacent state waters for January 1 through July 15 of each year.

Periodic bottom longline sampling has occurred within the Mid-Atlantic Shark Closed Area through the NOAA Fisheries Northeast Fisheries Science Center's Apex Predators Program shark longline survey (<https://www.nefsc.noaa.gov/nefsc/Narragansett/sharks/survey.html>) and the Shark Research Fishery, implemented in 2008 as part of Amendment 2 to the 2006 Consolidated Atlantic HMS FMP (<https://www.fisheries.noaa.gov/action/amendment-2-2006-consolidated-hms-fishery-management-plan-atlantic-shark-management-measures>).

### **2.1.3.2 COUNCIL-IMPLEMENTED AREAS**

#### **Council Marine Protected Areas, Time/Area Closures, and Habitat Areas of Particular Concern**

Several small discrete areas with sensitive bottom habitat are closed to gears that interact with ocean floor, including bottom longline targeting HMS. These include the South Atlantic Fishery Management Council (SAFMC) marine protected areas (MPA), Caribbean Fishery Management Council (CFMC) time/area closures, and GMFMC HAPC. All of these areas are identified in Figure 3. Although these areas were initially established by the Councils, the HMS Management Division also implemented complementary regulations for each of these closures through inclusion in the HMS regulations in order to streamline enforcement and further protect bottom habitat. Including these closures in the HMS regulations made it clear that the prohibitions included fishermen targeting HMS with bottom longline gear.

These closures are small areas designed to protect corals and other sensitive bottom types. Because bottom-tending gears can cause irreparable damage to these areas and because they are small, NMFS currently does not anticipate these areas being a high priority for HMS fishery-dependent research.



## 2.1.4 GILLNET CLOSED AREAS

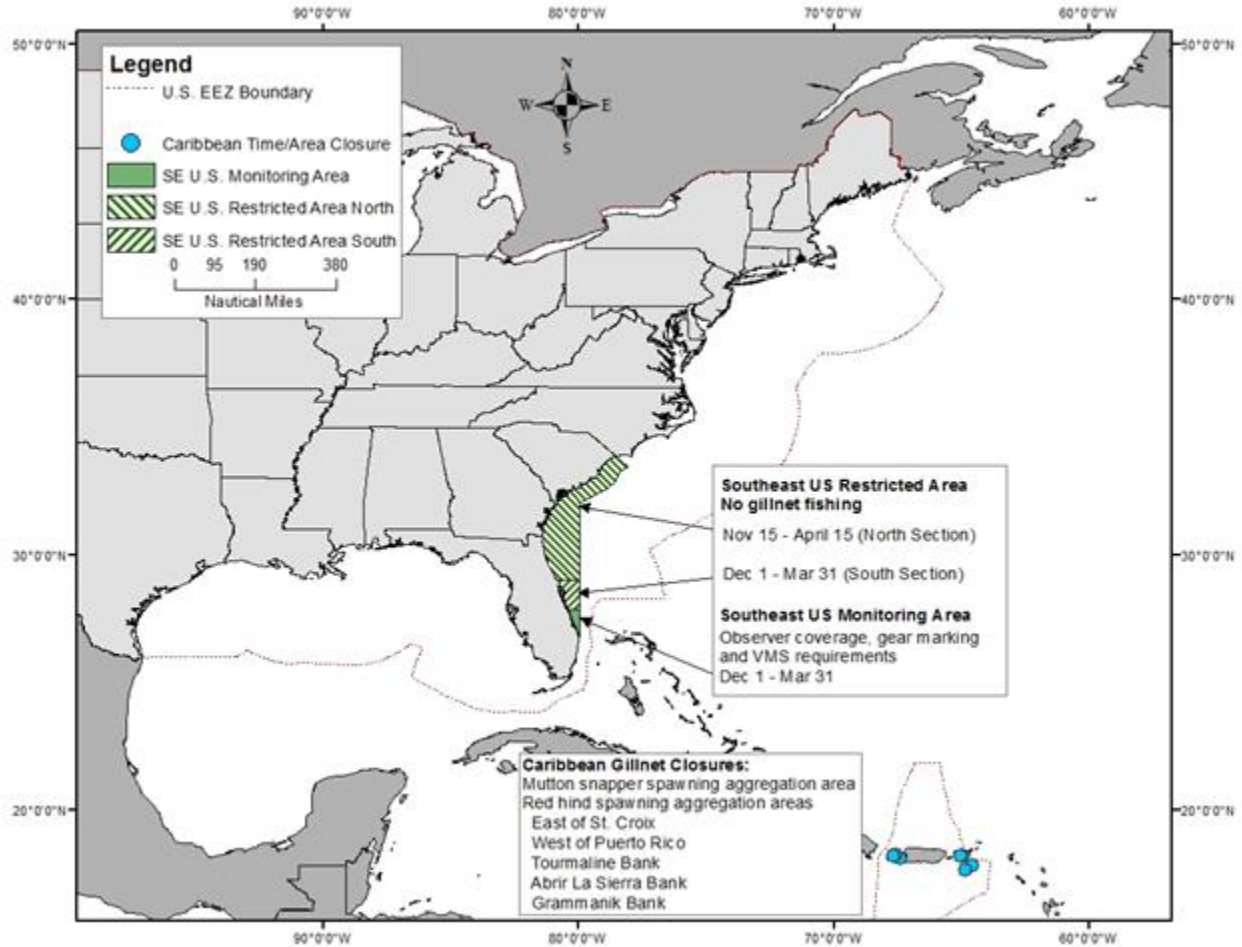


Figure 4 Time/area closures that restrict use of gillnet gear in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea.

### 2.1.4.1 SOUTHEAST U.S. RESTRICTED AREA AND SOUTHEAST U.S. MONITORING AREA

#### Southeast U.S. Restricted Area and Southeast U.S. Monitoring Area

Effective Date – November 15, 1997; November 1, 2014

Federal Register Citation – 62 FR 39157, July 22, 1997; 64 FR 7529, February 16, 1999; 79 FR 36586, June 27, 2014.

Closure Timing - Southeast U.S. Restricted Area North: November 15 through April 15.

Southeast U.S. Restricted Area South: December 1 through March 31. Southeast U.S.

Monitoring Area: December 1 through March 31.

Intent – Implemented as part of the Atlantic Large Whale Take Reduction Plan (ALWTRP) to reduce serious injuries and deaths of large whales due to entanglement in commercial fishing gear.

Gear Type - Gillnet

The first ALWTRP went into effect in 1997 to reduce serious injury and mortality to four large whale stocks (North Atlantic right whale, humpback whale, fin whale, and minke whale) that occur incidental to several fisheries (62 FR 39157, July 22, 1997; 64 FR 7529, February 16, 1999). The ALWTRP final rule included regulations implementing a Southeast U.S. restricted area and a Southeast U.S. observer area for shark drift gillnet fisheries. The regulations contained in the ALWTRP final rule have been updated several times, most recently in 2014, to revise management measures for reducing the incidental mortality and serious injury to North Atlantic right whales, humpback whales, and fin whales due to vertical lines in commercial trap/pot and gillnet fisheries (79 FR 36586, June 27, 2014). The 2014 final rule implemented the current Southeast U.S. Restricted Area and Southeast U.S. Monitoring Area for gillnet gear, including shark gillnet, as described at 50 CFR § 229.32(f) and (h) and shown in Figure 5. ALWTRP gillnet gear provisions were added to the HMS regulations in Amendment 3 to the 2006 Consolidated Atlantic HMS FMP (75 FR 30483, June 1, 2010), currently at 50 CFR § 635.21(g)(1). Gillnet gear restrictions and requirements for these two areas are summarized in the ALWTRP Southeast Gillnet Gear Guide

([https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/docs/Outreach%20Guides%20Updated%20May%202015/southeast\\_gillnet\\_2015.pdf](https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/docs/Outreach%20Guides%20Updated%20May%202015/southeast_gillnet_2015.pdf)).

## **2.2 EXAMPLES OF PAST CLOSED AREA RESEARCH AND DATA COLLECTION**

### **2.2.1 PELAGIC LONGLINE - SEA TURTLE BYCATCH REDUCTION RESEARCH IN THE NORTHEAST DISTANT (NED) RESTRICTED FISHING AREA**

A major concern in the management of the Atlantic HMS fisheries has been the incidental take and mortality of threatened and endangered species, including loggerhead and leatherback sea turtles. The June 2001 BiOp concluded that the long-term operation of the U.S. Atlantic pelagic longline fishery at its historical level of interaction with sea turtles, taken together with the status of the species, the environmental baseline, and cumulative effects on the species, was likely to jeopardize the continued existence of leatherback and loggerhead sea turtles (NMFS, 2001). To address this jeopardy finding, on July 9, 2002, NOAA Fisheries published a final rule (67 FR

45393) to implement the measures required by the June 2001 BiOp, including closure of the NED statistical reporting area to pelagic longline fishing because the area had the highest incidental take rate of sea turtles by the U.S. Atlantic pelagic longline fleet. The closure comprised an area of 2,631,000 square nautical miles (nm<sup>2</sup>), including the Grand Banks and other fishing locations.

The June 2001 BiOp also instructed NOAA Fisheries to conduct research into sea turtle bycatch and avoidance techniques and to execute rulemaking to require the adoption of bycatch reduction measures before pelagic longline vessels could be allowed to fish within the NED again. NOAA Fisheries researchers, in consultation and cooperation with the U.S Atlantic pelagic longline fleet, developed a research program to evaluate the efficacy of new technologies and changes in fishing practices to reduce sea turtle interactions. Funding for the NED research program was provided by NOAA Fisheries. The goal of the experiment was to develop effective pelagic longline gear and/or fishing modifications to reduce sea turtle bycatch and bycatch mortality sufficiently (a 55 percent reduction) so that the NED pelagic longline closed area could be reopened. Field research personnel included NOAA Fisheries fishery biologists, NOAA Fisheries biological technicians, fishery observers, and commercial pelagic longline vessel operators and crew that had historically fished in the NED area. The experimental fishery used a limited number of qualifying commercial pelagic longline fishing vessels (12 – 14 vessels) as research platforms. The research experiment focused upon measures that involved modifications to the actual fishing gear, rather than efforts to change the timing or location of fishing.

In 2001, the experiment evaluated the effect of gangions placed two gangion lengths from floatlines, the effect of blue-dyed bait on target catch and sea turtle interactions, and the effectiveness of dipnets, line clippers, and dehooking devices. These results of the 2001 study led to the conclusion that the measures tested were not successful in reducing interactions between sea turtles and pelagic longline gear.

The 2002 NED experiment commenced in July 2002. Thirteen participating vessels deployed 501 pelagic longline sets with 100 percent observer coverage. The results indicated that a significant reduction in loggerhead catch could be achieved by reducing daylight soak time. Also, 18/0 circle hooks and mackerel bait were found to significantly reduce both loggerhead and leatherback sea turtle interactions when compared with industry standard J hooks and squid bait. Additionally, circle hooks significantly reduced the rate of hook ingestion by loggerhead turtles, thereby reducing the post-hooking mortality associated with the interactions. The combination of 18/0 circle hooks and mackerel bait was found to be the most effective mitigation measure for both loggerhead and leatherback turtles.

The two primary research goals for the 2003 research were: (1) to confirm the effects of 18/0 circle hook and mackerel bait on sea turtle bycatch reduction and target species catch to ensure

their applicability across a range of oceanographic conditions, fishing operational characteristics, and target species; and, (2) evaluate two new hook types to understand the relative contributing roles of hook size and hook shape on loggerhead and leatherback turtle capture and swordfish catch. Eleven participating vessels deployed 539 sets with 100 percent observer coverage in 2003.

An annual report with research results and management recommendations was provided by NOAA Fisheries in 2004. Sea turtle reduction rates calculated for various experimental treatments (hook and bait combinations) were standardized to control for several variables including sea surface temperature, daylight soak time, total soak time, vessel effect, and pairing effect in case of matched paired hook types per set. The research identified various sea turtle bycatch mitigation techniques, primarily involving hook and bait combinations that reduced turtle interactions by a range of 50 to 90 percent, depending upon the hook treatment and the species. The standardized results are summarized below.

Table 1 Results of the 2003 NED study

	Loggerhead	Leatherback	Swordfish	Tuna
18/0 non-offset circle hook with squid (compared with 9/0 “J”-hook and squid)	-74%	- 75%	- 30%	+ 25% (not statistically significant)
18/0 offset circle hook with squid (compared with 9/0 “J”-hook and squid) (2002 tested-only)	- 85%	- 50%	- 29 %	non-statistically significant increase
9/0 “J”-Hook with mackerel bait (compared to 9/0 J-hook with squid) (2002 tested only)	-75%	- 67%	+ 63%	- 90 %
18/0 offset circle hook with whole mackerel (compared to 9/0 “J” hook with squid)	- 92 %	- 67%	+ 16 %	- 84 %

The results of the NED experimental fishery demonstrated that loggerhead and leatherback sea turtle interactions could be significantly reduced by employing 18/0 circle hooks with 10° offset and the use of mackerel bait in place of squid bait. Importantly, when the two treatments were used in combination, the resulting reduction in turtle interactions could be obtained without

negatively impacting swordfish catch. These realized reductions in sea turtle bycatch were greater than what was required in the 2001 BiOp to re-open the NED to U.S. fishermen.

In 2004, NOAA Fisheries implemented the fishery management measures that had been proven effective in the NED experiment at reducing sea turtle interactions and that were specified as Reasonable and Prudent Measures (RPMs) in the newly issued pelagic longline BiOp (June 2004). These measures included: (1) circle hook and bait restrictions for all Atlantic pelagic longline vessels fishing for HMS; (2) re-opening the NED to Atlantic pelagic longline fishing for HMS with specified circle hook and bait restrictions; 3) required possession and use of certain equipment to safely remove fishing hooks and line from incidentally caught sea turtles; and 4) required possession of new sea turtle handling and release guidelines. These management measures remain in place today and have been effective at complying with the June 2004 pelagic longline BiOp.

### **2.2.2 SHARK RESEARCH FISHERY**

In 2006, sandbar and dusky sharks were determined to be overfished with overfishing occurring. To address this determination, among other things, NOAA Fisheries developed Amendment 2 to the 2006 Consolidated Atlantic HMS FMP (July 15, 2008; 73 FR 40657) which prohibited targeting and retention of sandbar sharks in the recreational fishery and most of the commercial fisheries. Since a prohibition of sandbar sharks would eliminate fishery-dependent data collection on the species, Amendment 2 also implemented a shark research fishery to allow limited retention of sandbar sharks by commercial fishermen operating under a scientific research plan developed by the SEFSC. Creation of the shark research fishery allows for the continued collection of fishery-dependent sandbar shark data.

Each year, NOAA Fisheries solicits applications for commercial fishermen to participate in the shark research fishery. Selected applicants are chosen based on research priorities and priority is given to qualified directed shark permit holders who can participate year-round and who affirmatively state that they intend to do so, in order to ensure timely and accurate data collection needed to meet a given year's research objectives. Qualified incidental permit holders will be selected only if there are not enough qualified directed permit holders. Geographic distribution of participants is also considered during the selection process to address spatial needs of the research objectives.

All trips operating under the shark research fishery are required to maintain 100 percent observer coverage. The research fishery is also subject to terms and conditions that have slightly changed since the program's inception. In 2018, NOAA Fisheries split 90 percent of the sandbar and large coastal shark research fishery quotas equally among selected participants, with each vessel allocated individual sandbar and large coastal shark research fishery quotas. The Agency also established a dusky bycatch limit, specific to this small research fishery, for each of four regions

across the Gulf of Mexico and Atlantic. The dusky bycatch limit specified that when three or more dusky sharks were brought to the vessel dead in any of the four regions, the shark research fishery permit holders in that region would be limited to a three-hour soak time. If, after the change in soak time, three or more additional dusky shark interactions (alive or dead) were observed in the region, shark research fishery permit holders would not be able to make a trip in that region for the remainder of the year, unless otherwise permitted by NOAA Fisheries. Participants were also required to keep any dead sharks, unless the sharks were prohibited species, in which case they were required to release or discard them. In addition, participants are restricted by the number of longline sets as well as the number of hooks they can deploy and have on board the vessel. Vessels participating in the shark research fishery typically fish an average of one trip per month. The selected vessels may also land other large coastal sharks, small coastal sharks, and some pelagic sharks.

The shark research fishery helps maintain time series data for stock assessments, collect biological data, and meet shark research objectives. The research fishery also allows selected fishermen the opportunity to earn more revenue from selling additional sharks, including sandbar sharks, outside of the commercial shark fishery. The commercial vessels selected to participate in the shark research fishery are the only vessels that are authorized to land/harvest sandbar sharks subject to the sandbar shark quota available for each year.

### **2.2.3 CURRENT EFP PROGRAM**

The HMS Management Division issues exempt fishing permits (EFP), scientific research permits (SRP), display permit, and letters of acknowledgement (LOA) on an annual basis. At the end of a given year the Division announces its intent to issue permits in the next year. This announcement is done via a notice in the Federal Register, which describes the permits and catch from the previous year and any potential new applications the Division may receive in the upcoming year. This notice typically has a 30-day comment period, which provides constituents an opportunity to comment on the issuance of EFPs for a given year. Once the comment period is over and the Division reviews comments, staff begin the permit issuance process. If the Atlantic HMS Management Division receives any applications that were outside the scope of the annual notice of intent, a separate notice would be published in the Federal Register to provide additional opportunity to comment on the application.

Researchers and aquaria collectors interested in EFPs and related permits must complete an application which is [available online](#). Once a complete application is submitted to the Atlantic HMS Management Division, it is reviewed and assigned to a staff member. All EFPs and related permits go through multiple levels of review within the Atlantic HMS Management Division, the Office of General Council, and Office of Law Enforcement. Typically, it can take at least 60 days to issue an EFP or any other related permits. Permits are issued for research on all types of

Atlantic HMS, that research could involve tagging for migration or post-release mortality studies or biological sampling for genetic research. In any given year, the Division can issue between 30 and 40 EFPs and related permits.

#### **2.2.4 2017 EFP FOR PELAGIC LONGLINE RESEARCH IN EAST FLORIDA COAST CLOSED AREA**

In 2001 and 2002, several areas along the Atlantic Coast were closed to the commercial pelagic longline fishery to reduce the bycatch of juvenile swordfish and other species. One of the areas was the East Florida Coast (EFC) Pelagic Longline Closed Area, established in 2001. Since then, new regulatory measures have been established for the pelagic longline fishery and the number of active vessels in the fishery has been reduced by approximately 50 percent. The swordfish population has been declared fully rebuilt, and measures to reduce the bycatch of non-target species such as bluefin tuna, sea turtles, and certain shark species have been implemented. Under these changed circumstances, the effects and effectiveness of the EFC Pelagic Longline Closed Area has been largely unknown because little pelagic longline fishing activity has occurred in the area since 2001.

On Nov. 3, 2016, a researcher from NOVA Southeastern University applied for an EFP to evaluate the impacts of fishing with pelagic longline gear in the northern portion of the EFC pelagic longline Closed Area. An EFP authorizes the harvest of species and allows fishing activities that would otherwise be prohibited. The EFP would allow for the deployment of pelagic longline gear on six vessels to catch swordfish and tunas while evaluating the bycatch of non-target juvenile swordfish and other species. Swordfish caught as part of the study would be sold to offset the cost of fishery observers and other expenses. After a public comment period, NOAA Fisheries issued the permit with several modifications on August 11, 2017. During the comment period the EFP received significant criticism from the recreational fishery, the State of Florida, and congressional representatives. However, NOAA Fisheries did receive support from some in the commercial industry, conservation community, and academia. In response to these concerns, NOAA Fisheries reduced the number of authorized sets from 1,080 sets/year to 720 sets/year. Observers were required on 40 percent of sets, and 100 percent of sets were subject to electronic monitoring. A bycatch threshold was established for dusky sharks and several conditions were implemented to improve and verify shark identification. The EFP also included a provision whereby NOAA Fisheries could stop the research, if warranted.

No research activity occurred under the EFP. On December 14, 2017, NOAA Fisheries received a revised EFP application changing the affiliation of the principal investigator from NOVA Southeastern University to Florida Fisheries Solutions, LLC. No other aspect of the research project was changed. NOAA Fisheries notified the applicant and the public in February 2018 that, with submission of the new EFP application, the original EFP was no longer valid. The

revised application was subsequently reviewed and denied on August 29, 2018. The revised application was denied because the Agency needed a more detailed articulation of project goals for closed area research and a comprehensive, transparent approach to research of that scale. Additionally, NOAA Fisheries determined that denial of the individual EFP application was appropriate while other approaches to research and data collection are evaluated to ensure that the Agency is meeting the goals of the 2006 Consolidated HMS (FMP).



### 3.0 RANGE OF POTENTIAL OPTIONS

In this chapter, NOAA Fisheries sets out a broad range of options to collect data and perform research in closed areas. Some options may require consideration in a later draft NEPA document and proposed rule.

#### **Option 1 – No action. Continue to authorize any closed area research through the current HMS EFP program**

NOAA Fisheries would continue to consider authorizing closed area research as EFP applications/requests are submitted as described in Section 2.2.3. Closed area research generally has been considered to be outside the scope of the anticipated range of EFP requests included in annual notices to the public. Each EFP application for closed area research during normal fishing operations likely would need to undergo separate NEPA analysis and public comment, depending on the scope of the proposal, its potential effects, and controversiality.

#### Pros

This option would maintain the current practices the Agency uses for granting access to the closed areas. Depending on the scope of the proposal, its potential effects, and controversiality, each application/research project likely would require a separate NEPA analysis for environmental impacts. Having analyses tailored to the complexities of each research project would give NOAA Fisheries the opportunity to develop more accurate ecological and socio-economic impacts. This option would also provide the public opportunity for input on each project for which NOAA Fisheries receives applications. This option would most likely have a limited number of applicants and vessels fishing within the closed areas.

#### Cons

As described in Section 1.4.3, this option would issue separate permits for each activity and may take substantially more than 60 days to issue each permit given associated NEPA analyses and public comment periods. Each project would require coordination between researchers and fishery participants to develop a research plan. Research projects may not be granted for all of the closed areas, which would leave some areas devoid of data. Permits would be issued on an annual basis and would need to be renewed each year to continue the research. This option may not be accessible by all fishery participants if not selected by a researcher. With this option, NOAA Fisheries has some control over the type of research, timing, and management applicability, but the projects would not be designed and carried out by the Agency but rather by the permit applicant.

## **Option 2 – Authorize closed area research through a streamlined HMS EFP process; Streamline process of issuing HMS EFPs for closed area research**

For this option, NOAA Fisheries would analyze effects of a variety of potential closed area research activities across multiple closed areas in a single NEPA document. The NEPA document would be available for public comment, and would likely establish a general research plan for researchers to follow. Analyzing the effects of potential research activities before the EFP closed area research application process begins could simplify EFP issuance. Templates for permits for these projects could be drafted and reviewed by the Atlantic HMS Management Division, Office of General Counsel, and Office of Law Enforcement.

### Pros

Bundling the NEPA analyses for all potential closed area research could streamline the public comment process and permit issuance. Establishing the research protocols in a single action would be transparent for the public. Such a process could decrease the lag time of review and issuance of permits. This process may increase incentives for researchers to investigate the validity of Atlantic HMS closed areas.

### Cons

While ecological and socioeconomic impacts would be analyzed in a single NEPA document, this option would not provide the public an opportunity to comment on each individual EFP application submitted by researchers and could be controversial given the opposition to an EFP process NOAA Fisheries began in 2017, described in Section 1.4.4 of this document. However, the NEPA analysis would not take into account subsequent changes in each research plan and application submitted to the Agency. If needed, addendums to NEPA analysis may be necessary as research is carried out over time. Additionally, this option may not provide a vehicle for data collection for all of the Atlantic HMS closed areas. Lastly, this option may not be accessible by all fishery participants if not selected by a researcher. With this option, NOAA Fisheries has some control over the type of research, timing, and management applicability, although projects would not be designed and carried out by the Agency but rather by the permit applicant. This option would not require a large commitment of Agency resources as permittees would fund their own project.

## **Option 3 – Collect data on closed area catch through an observed access program**

Under Option 3, fishing vessels with an observer on board could enter and fish in closed areas. The existing observer program selection process would not be altered or expanded, so only those vessels chosen to carry an observer, and that have an observer on board, would be allowed access to fish in the closed area. Current reporting requirements would apply, such as logbooks, electronic monitoring, vessel monitoring reports, and dealer reports, supplemented by observer

reports. This information and data could be used by fishery managers and scientists when assessing the effectiveness of closed areas. This option would also require rulemaking, NEPA analyses, and public comment but would not require annual EFPs.

#### Pros

This option would not require a large commitment of Agency resources since fishermen would voluntarily fish in closed areas to catch marketable fish. Data collected under this option would be directly relevant to normal fishing activities. This option would also provide access to the closed areas to all vessels in the fleet when an observer is onboard.

#### Cons

This option would allow minimal agency control since fishermen decide if, when, and where to fish rather than operating under a formal research plan. This option would also likely take more time to gather a sufficient amount of consistent data to analyze. Observer coverage varies by gear type, so not all fleets would have the same amount of access to closed areas. The Agency would receive varying amounts of observer data for different closed areas depending on the gear type and the observer coverage.

### **Option 4 – Institute an HMS closed area research program, similar to the current shark research fishery**

In the shark research fishery, implemented in 2008 as part of Amendment 2, fishermen apply to be part of the program and operate under an EFP. If accepted, they are authorized to fish for and retain sandbar and other sharks. When a shark research fishery participant plans to fish for sandbar sharks, they must carry an observer and fish in a manner and location consistent with the terms and conditions of their permit, as derived from research needs. Shark research fishery participants must also abide by shark retention limits and dusky shark bycatch caps. In the case of dusky shark bycatch caps, fishermen must limit soak times once a certain number of dusky sharks are caught. If additional dusky sharks are caught, regional closures are triggered in the shark research fishery.

Under this option, fishermen could apply to a closed area research project to fish in certain closed areas. NOAA Fisheries would create an overarching HMS closed area research plan, setting requirements for closed area fishing, observer coverage, fishing location, and season. These would be commercial fishing trips, but there would be significant data collection and a number of constraints governed by NOAA's specific research plan.

## Pros

This option could provide for more formal data collection and more rigorous analysis. Participation would be voluntary, and most costs for the data collection would be borne by the participating vessels. The research plan could be altered each year in response to changing needs of the fishery and management.

## Cons

This option would require a substantial commitment of Agency resources as both time and personnel. The program would require adequate availability of observer coverage, which would have to be coordinated with other observer program priorities.

### **Option 5 – Conduct closed area research through public/private partnerships, partially funded by NOAA Fisheries, similar to the 2001 - 2003 NED research program**

NOAA Fisheries could consider authorizing closed area research as described in Section 1.4.1. Under this option, vessels would be authorized through an EFP with specified terms and conditions to fish in certain closed areas under an Agency-developed research plan. Vessel operators would be selected to participate in the project by NOAA Fisheries based upon their willingness to participate, their agreement to abide by the requirements of the research experimental design, and their understanding of the scientific principles. If a vessel did not strictly adhere to the research protocols, their participation in the experiment could be terminated. All research would be conducted by vessel operators with direct oversight by a NOAA employee, contracted biological technician, or a fishery observer. To incentivize fishing in closed areas with unknown catch rates, the Agency could consider compensation fishing arrangements or whether it could pay some portion of the vessel operating costs. Vessel operators could also cooperatively work with NOAA researchers to determine fishing locations and times or other variables.

## Pros

This option could allow for a formalized research plan developed and controlled by NOAA Fisheries that could provide for robust and reproducible research results. All experimental fishing activity would be observed by NOAA employees, contracted biological technicians, or fishery observers. Vessel operators would be given access to fish in closed areas in exchange for their participation in the project. However, participation in the project could be terminated if a vessel did not strictly adhere to research protocols. Vessel operators could be allowed to sell any marketable catch and/or could be compensated by the Agency for serving as research platforms.

## Cons

This option would likely be very expensive for NOAA Fisheries. These expenses could include personnel costs to deploy NOAA employees and/or observers, costs to compensate participating vessels, and costs to conduct the research. Vessel operators would have less control over fishing activities which could reduce their catch. This approach would also have to carefully consider

legal implications and project structuring and scope if non-governmental/private partners were selected.

### **Option 6 – Conduct closed area research through a research program led by NOAA Fisheries, using NOAA or contract vessels**

Under this option, NOAA Fisheries would design, fund, and execute a series of formal research projects to study closed areas and their effectiveness. Separate research cruises would need to be initiated, or existing ones modified, to assess closures for pelagic and bottom longline gear and gillnet gear. NOAA Fisheries scientists would be tasked with designing survey cruises using each gear type to randomly sample HMS within and without the respective gear closures to assess the effectiveness of the closures for minimizing bycatch and maximizing targeted catch of HMS. These cruises would require either the use of NOAA research vessels or contracting with commercial vessels to do the required data collection. The later option is likely to be preferred due to costs and a desire to use vessels similar to those used in the respective fisheries. In the later scenario, NOAA Fisheries scientists would accompany the vessel to coordinate fishing, process fish, and collect data while the contracted fishermen would set and haulback the fishing gear while assisting in processing fish. The collected information and data would be used by fishery manager and scientists to assess the effectiveness of closed areas. This option would not require rulemaking, but would require NEPA analysis and the issuance of annual EFPs. With this option, NOAA Fisheries would have the greatest amount of control over the type of research conducted, its timing, and management applicability within the limits of available funding and resources. This option would require significant commitment of Agency resources in funding, vessel resources, and scientific personnel.

#### Pros

This option would likely provide the most temporally and geographically broad research plan resulting in scientifically-rigorous data and results. NOAA Fisheries would have the greatest level of control of research operations to ensure they answer the needed research questions while minimizing bycatch of protected species.

#### Cons

The results of NOAA Fisheries led research cruises may or may not be applicable to normal fishing activities, depending on study design. This option is also the most expensive with vessel, equipment, and personnel costs likely to be very high over the course of the various gear-based studies. This approach would also have to carefully consider legal implications and project structuring and scope if non-governmental/private partners were selected.

## **Option 7 – Performance-based closed area access**

Performance-based access under this option would allow access to closed areas for fishermen that meet Agency-established criteria, for purposes of collecting data in those areas. This option would be similar to access to the Cape Hatteras GRA. In Amendment 7, NOAA Fisheries implemented performance metrics for pelagic longline vessels to gain access to the Cape Hatteras GRA, as described at 50 CFR § 635.14. The Cape Hatteras GRA performance metrics are for bluefin tuna interactions, observer compliance, and logbook compliance, and are evaluated each year based on data from the previous three years. Research performance metrics would likely not be the same as those for the Cape Hatteras GRA, but could include observer and reporting requirement compliance (e.g., submission of logbooks or electronic monitoring hard drives), as well as metrics for interactions with species for which a given area was implemented (e.g., bluefin tuna interactions in the Northeastern U.S. June closure; interactions with undersized swordfish and billfish in the Charleston Bump). Additional conditions of performance-based access could include specific reporting requirements to further data collection.

### Pros

Vessels that have access to closed areas would be able to provide NOAA Fisheries with data on interactions with species of interest, and the larger number of vessels allowed access, the more data would be available to analyze. Compared to other options like observed closed area access or EFPs, this option could provide a greater quantity of data, while still allowing NOAA Fisheries to establish criteria and requirements for access. This option would also have lower administrative costs than options like observed access or access by NOAA research vessels. Performance metrics for research purposes would not necessarily be the same as for the Cape Hatteras GRA, but for comparison, in recent years, 101 out of 108 pelagic longline vessels with fishing activity in the period analyzed were granted access to the Cape Hatteras GRA and thus are continuing to contribute fisheries data in that area. Levels of interactions with species of interest could be kept low in these areas by allowing access to vessels that have demonstrated the ability to avoid those species. In addition, since implementing performance metrics for the Cape Hatteras GRA, compliance with the Pelagic Observer Program and with timely logbook submission has increased, and implementing performance metrics for additional areas or gear types could further increase relevant reporting compliance. The performance-based access could provide an incentive for fishermen to further avoid bycatch or interactions in those areas, promote innovation in gear and fishing techniques, and allow fishermen to maintain their knowledge of fishing and marine conditions in those areas. Allowing performance-based access would also allow participation by a greater number of vessels than would the other options. Allowing performance-based access to closed areas would also relieve economic impacts to shoreside industries that are somewhat reliant on servicing fishing vessels operating in those regions.

### Cons

Granting access to these areas may not maintain the same level of reductions of interactions with given species as estimated when the areas were put in place, and this option would allow access

by a greater number of vessels than other options. Performance-based access would not be organized under a formal research plan, which could hinder data analyses if fishing patterns are not equivalent to data collection design under a research plan. Usage of these areas by vessels that have been granted access may be inconsistent from year to year and maybe be affected by market forces and target catch availability in those areas, which could make data analysis difficult.

## 4.0 REFERENCES

Chan, H. L. and M. Pan, 2016. Spillover Effects of Environmental Regulation for Sea Turtle Protection in the Hawaii Longline Swordfish Fishery. *Marine Resource Economics* 31, no. 3: 259-279.

Gilmore, R. G. and R. J. Jones. 1992. Color variation and associated behavior in the epinepheline groupers, *Mycteroperca microlepis* (Goode and Bean) and *M. phenax* (Jordan and Swain). *Bull. Mar. Sci.* 51 (1): 83-103.

Koenig, C. C., F. C. Coleman, L. A. Collins, Y. Sadovy, and P. L. Colin. 1996. Reproduction in gag, *Mycteroperca microlepis*, in the eastern Gulf of Mexico and the consequences of fishing spawning aggregations. In F. Arreguin-Sanchez, J. L. Monro, M. C. Balgos and D. Pauly (eds.) *Biology, Fisheries and culture of tropical groupers and snappers*. ICLARM Conf. Proc. 48, 449 p.

NOAA Fisheries. 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce, National Marine Fisheries Service, Miami, FL, SEFSC Contribution PRD-00/01-0

Shapiro, M. J. 1987. Reproduction in groupers. Pp. 295 – 327 in: J. J. Polovina and S. Ralstin (ed.). *Tropical Snappers and Groupers: Biology and Fisheries Management*. Westview Press, Boulder, Co.