FINAL
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

REGULATORY ADJUSTMENT 2 TO THE ATLANTIC TUNAS, SWORDFISH, AND SHARKS FISHERY MANAGEMENT PLAN

FINAL RULE TO REDUCE SEA TURTLE BYCATCH AND BYCATCH MORTALITY IN HIGHLY MIGRATORY SPECIES FISHERIES

(Includes Final Supplemental Environmental Impact Statement, Regulatory Impact Review, and Final Regulatory Flexibility Analysis and incorporates Abbreviated Final Supplemental Environmental Impact Statement)

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Office of Sustainable Fisheries
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Reduction of Sea Turtle Bycatch and Mortality in Highly Migratory Species Fisheries

Final Actions: Pelagic Longline Fishery: close the Northeast Distant Statistical Reporting Area, require any gangion length to be 110 percent of any floatline length if the total length of any gangion plus the total length of any floatline is less than 100 meters, require the possession and use of corrodible non-stainless steel hooks, require that lethal sea turtle take be reported within 48 hours of returning to port, post sea turtle handling and release guidelines in the wheelhouse.

Bottom Longline Fishery: post sea turtle handling and release guidelines in the wheelhouse.

Shark Gillnet Fishery: require that both the observer and vessel operator are responsible for sighting whales and contacting the National Marine Fisheries Service, require net checks every 0.5 to 2 hours and removal of any captured sea turtles or marine mammals.

Type of Statement: Final Documents: Supplemental Environmental Impact Statement, Social Impact Assessment, Regulatory Impact Review, and Final Regulatory Flexibility Analysis

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Abstract: The purpose of this action is to avoid jeopardy by implementing most of the reasonable and prudent alternative (RPA) and the other measures required by the June 14, 2001, Biological Opinion (BiOp) on the Atlantic Highly Migratory Species (HMS) Management Plan and its Associated Fisheries to reduce the incidental take and mortality of sea turtles and other protected species in the fisheries for Atlantic tunas, swordfish, sharks, and billfish. These measures affect U.S. fishermen who hold Federal permits for Atlantic tunas, swordfish, and sharks and use pelagic and bottom longline and shark gillnet gear in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea.

The final action closes the Northeast Distant Statistical Reporting (NED) Area to pelagic longline fishing to reduce the bycatch of sea turtles. In addition to the closure, this action requires that the

Atlantic pelagic longline fleet modify the manner in which they fish as follows: any gangion must be 10 percent longer than any floatline if the total length of any gangion plus the total length of any floatline is less than 100 meters and only corrodible non-stainless steel hooks may be possessed when pelagic longline gear is on board. These measures are necessary to reduce the bycatch and post-release mortality of marine mammals and sea turtles. In addition to these gear modifications, the vessel operators in the pelagic longline fleet must report lethal sea turtle takes within 48 hours of returning to port and must post sea turtle handling and release guidelines in the wheelhouse.

Fishermen in the bottom longline fishery must post sea turtle handling and release guidelines in the wheelhouse. This measure should decrease the level of post-release mortality of sea turtles attributable to this fishery.

Fishermen in the shark gillnet fishery must conduct net checks every 0.5 to 2 hours and look for and remove any entangled sea turtles and marine mammals. Also, this final action specifies that both the observer and vessel operator are responsible for sighting whales and contacting the National Marine Fisheries Service (NOAA Fisheries). These measures should decrease the levels of post-release mortality attributable to this fishery.

NOAA Fisheries received numerous comments on the proposed rule issued on April 10, 2002, which are addressed in this document. Since the issuance of the proposed rule, NOAA Fisheries has received information that one of the measures required by the RPA, gangion placement, is not effective in reducing the incidental capture of sea turtles. Based on this information, that preferred alternative is not promulgated in this final action.

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1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

A major concern in the management of the Atlantic HMS fisheries is the incidental take and mortality of threatened and endangered species, specifically loggerhead and leatherback sea turtles. These animals are migratory and exist in many of the oceanic locales targeted by U.S. vessels permitted to catch HMS. The sea turtles are accidentally hooked or entangled in pelagic longline, drift gillnet, and other gear that is meant to target primarily tunas, swordfish, and sharks.

The BiOp issued on June 8, 2001, (revised on June 14, 2001) by NOAA Fisheries concluded that the continued operation of the Atlantic pelagic longline fishery is likely to jeopardize the continued existence of loggerhead and leatherback sea turtles. The clause "jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR §402.02). Accordingly, the BiOp provided a RPA to avoid jeopardy. The BiOp found no jeopardy for other HMS fisheries but does require other management measures to reduce sea turtle takes in these fisheries.

Under the Endangered Species Act (ESA), NOAA Fisheries is required to implement the elements of the RPA, reasonable and prudent measures (RPMs), and terms and conditions (TCs) identified in the BiOp to prevent further jeopardizing sea turtle populations due to takes and associated mortality in HMS fisheries. If the measures recommended in the BiOp to relieve jeopardy are not adopted, the implicated fishery can be closed due to the lack of compliance with the ESA.

1.2 Consultation History and Actions Relevant to the Final Rule

The ESA is the primary federal legislation governing interactions between fisheries and species whose continued existence is threatened or endangered. Through a consultative process, this law allows federal agencies to evaluate final actions in light of the impacts they could have on these ESA-listed species. In the case of marine fisheries, the NOAA Fisheries Office of Sustainable Fisheries consults with the NOAA Fisheries Office of Protected Resources to determine what impacts fishery management actions will have on endangered populations of marine species and what actions can be taken to reduce or eliminate negative impacts. Under the consultative process, NOAA Fisheries issues a BiOp which outlines expected impacts of the final action and specifies terms and conditions which must be met to mitigate impacts on ESA-listed species.

Several circumstances can create the need to reinitiate consultation: the regulated action exceeds the level of take previously authorized in an existing incidental take statement, the action changes in a way that was not previously considered, or the population status of a listed species changes. On November 19, 1999, the Office of Sustainable Fisheries requested reinitiation of consultation on HMS fisheries based on preliminary information that the number of sea turtles incidentally

taken in the pelagic longline fishery had exceeded levels anticipated in the April 23, 1999, BiOp. The bycatch reduction rule (proposed December 15, 1999, 64 FR 69982; final August 1, 2000, 65 FR 47214), which constituted a major action that may have affected the operation of the pelagic longline fishery in a manner not considered in the April 23, 1999, BiOp, also triggered the need to reinitiate consultation.

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. This conclusion was based on the status of the loggerhead and leatherback sea turtle populations in the Atlantic Ocean, Caribbean, and Gulf of Mexico, the status of the northern subpopulation of loggerhead sea turtle, and the anticipated continuation of current levels of injury and mortality of both species described in the environmental baseline and cumulative effects section of the BiOp at that time. NOAA Fisheries conducted a series of scoping hearings in July and August 2000 to present the findings of the June 30, 2000, BiOp and to gather information and insights from affected constituents. During this process, NOAA Fisheries concluded that further analyses of observer data and additional population modeling of loggerhead sea turtles were needed to determine more precisely the impact of the pelagic longline fishery on sea turtles. Because of this, NOAA Fisheries reinitiated consultation on the HMS fisheries on September 7, 2000.

To comply with national standard 9 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and comply with ESA section 7(a)(2) as provided in the June 30, 2000, BiOp, NOAA Fisheries issued emergency regulations on October 13, 2000, that closed a 55,970 square nautical mile L-shape portion of the NED area from October 10, 2000, through April 9, 2001 (65 FR 60889). This closure was expected to reduce the incidental capture of loggerhead and leatherback sea turtles. The emergency regulations also required the use of dipnets and line clippers meeting NOAA Fisheries design and specification criteria to remove entangling fishing gear and reduce post-release mortality of captured sea turtles in the pelagic longline fishery.

To prevent a lapse in sea turtle bycatch reduction measures, NOAA Fisheries published an interim final rule on March 30, 2001 (66 FR 17370), which continued the requirement to possess and use dipnets and line clippers on all vessels in the pelagic longline fishery. The interim final rule also modified the definition of pelagic longline gear so it would not include high-flyers and reduced the amount of observer coverage required in the shark gillnet fishery outside right whale calving season. These regulations remain in effect until a superceding final action is published.

In January 2001, NOAA Fisheries held a technical gear workshop in Silver Spring, Maryland that was attended by scientists, fishermen, environmentalists, and other interested parties. Additionally, the NOAA Fisheries Southeast Fisheries Science Center (SEFSC) published the 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 in February 2001.

The June 14, 2001, BiOp incorporated the new information from the assessment report and the gear workshop in its examination of the effect of the pelagic longline fishery on sea turtles in the western Atlantic Ocean. The BiOp specified an RPA that would avoid the likelihood of jeopardizing the continued existence of these turtles. The RPA included the following elements: closing the NED area effective July 15, 2001; requiring gangions to be placed no closer than twice the average gangion length from the suspending floatlines effective August 1, 2001; requiring gangion lengths to be 110 percent of the length of the floatline in sets of 100 meters or less in depth effective August 1, 2001; and, requiring the use of corrodible hooks effective August 1, 2001. Also, the BiOp included a TC for the incidental take statement that requires NOAA Fisheries to issue a regulation requiring that all vessels permitted for HMS fisheries, commercial and recreational, post the sea turtle guidelines for safe handling and release following longline interactions inside the wheelhouse by September 15, 2001. The requirement that all vessels permitted for HMS fisheries post sea turtle handling and release guidelines was modified to specify only bottom and pelagic longline vessels by an August 31, 2001, memorandum from the Office of Protected Resources.

On July 13, 2001, NOAA Fisheries published an emergency rule (66 FR 36711) to implement several of the BiOp requirements. NOAA Fisheries published an amendment to the emergency rule to incorporate the change in requirement for the handling and release guidelines which was published in the Federal Register on September 24, 2001 (66 FR 48812). These requirements were effective for 180 days, through January 9, 2002. On December 13, 2001 (66 FR 64378), NOAA Fisheries published a Federal Register notice extending this emergency rule for another 180 days, to July 8, 2002. On January 14, 2002 (67 FR 1688), NOAA Fisheries published an amendment to the emergency rule extension clarifying the effective dates.

On April 10, 2002, NOAA Fisheries published a proposed rule in the Federal Register (67 FR 17349) that would implement the RPA and several other measures required by the BiOp. An accompanying Draft Supplemental Environmental Impact Statement (DSEIS) finalized on March 29, 2002, analyzed the biological, economic, and social impacts of the preferred and not selected alternatives, including no action, for the proposed rule. A Federal Register notice published on April 29, 2002 (67 FR 20944), announced four public hearings in Panama City, FL; Barnegat Light, NJ; Riverhead, NY; and Silver Spring, MD. NOAA Fisheries presented information concerning this proposed rule and solicited comments on the proposed measures. The comment period on the proposed rule and DSEIS ended on May 20, 2002.

On June 7, 2002, The Environmental Protection Agency published a notice of availability of an abbreviated Final Supplemental Environmental Impact Statement (FSEIS). The abbreviated FSEIS explains that the gangion placement measure of the RPA is not being implemented because it evidently increases rather than decreases interactions with leatherback turtles. The abbreviated FSEIS also provides a summary table comparing the proposed measures to the final measures, contains a table summarizing the direct, indirect, and cumulative impacts of all the alternatives examined by NOAA Fisheries in this rulemaking process, and responds to the comments received by mail, fax, and at the public hearings. Because there are only minor changes from the DSEIS

(rewording for clarification or to improve enforcement and removal of one requirement), NOAA Fisheries prepared this FSEIS in an abbreviated format, designed to be used with the March 29, 2002, DSEIS, in accordance with the National Environmental Policy Act regulations at 40 CFR 1503.4(c). This FSEIS incorporates the changes to the DSEIS described in the abbreviated FSEIS.

The final rule implements the RPA, with the exception of the gangion placement measure, and other required measures in the BiOp and also finalizes measures that would decrease impacts of other HMS fisheries on sea turtle and whale populations. As noted above, NOAA Fisheries is not making final the gangion placement requirement because it appeared to result in an unchanged number of interactions with loggerheads and an apparent increase in interactions with leatherbacks. Preliminary logbook data, which are inconclusive in the absence of analysis in conjunction with observer data, indicate that the incidental take level of loggerheads is below that anticipated in the incidental take statement of the BiOp. Preliminary logbook data, collected during the time that the gangion placement measure was in effect, indicate that the level of take of leatherbacks may or may not be exceeded. Accordingly, although NOAA Fisheries will reevaluate this conclusion upon completion of the analysis of incidental take based on both logbook and observer data, at this time NOAA Fisheries determines that the fishery with the final rule is not likely to jeopardize sea turtles.

1.3 June 14, 2001, Biological Opinion Incidental Take Statement

Under ESA, a "take" is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct. An incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

The incidental take levels defined in the BiOp are based on an annual estimated number derived from observed takes while considering the expected reductions from the RPA requirements. Additionally, section 7(b)(4) of the ESA requires that when the final action may incidentally take listed species, NOAA Fisheries will issue a statement specifying the impact of any incidental taking. It also states that RPMs necessary to minimize impacts and TCs to implement those measures be provided and must be followed to minimize those impacts. Only incidental taking by the federal agency or applicant that complies with the specified TCs is authorized.

The anticipated sea turtle take levels for the U.S. Atlantic pelagic longline fishery are listed in Table 1.1.

Table 1.1 **The anticipated sea turtle take levels for the Atlantic pelagic longline fishery.** Source: NOAA Fisheries, 2001a.

Sea turtle species	Incidental Take Level
Leatherback	438 turtles *estimated* captured per calendar year
Loggerhead	402 turtles *estimated* captured per calendar year
Green, Hawksbill, Kemp's Ridley (combined)	35 turtles *estimated* captured per calendar year

The southeast U.S. shark gillnet fishery anticipated take levels are listed in Table 1.2 (these numbers represent the number of total estimated sea turtle takes anticipated for this fishery).

Table 1.2 **The anticipated sea turtle take levels for the shark gillnet fishery.** Source: NOAA Fisheries, 2001a.

Sea turtle species	Incidental Take Level
Leatherback	4 turtles per year, of which no more than 2 are lethal
Loggerhead	20 turtles per year
Green	2 turtles per year
Hawksbill	2 turtles per year
Kemp's Ridley	2 turtles per year

NOAA Fisheries anticipates that continued operation of the bottom longline fishery for sharks will result in the capture of the following number of sea turtles (total effort levels in this fishery are unavailable so these limits represent the number of total observed takes anticipated) (Table 1.3).

Table 1.3 **The anticipated level of observed sea turtle takes in the bottom longline fishery.** Source: NOAA Fisheries, 2001a.

Sea turtle species	Incidental Take Level
Leatherback	2 turtles per year
Loggerhead	12 turtles per year
Green	2 turtles per year
Hawksbill	2 turtles per year
Kemp's Ridley	2 turtles per year

1.4 Purpose and Scope

The purpose of this action is to avoid jeopardy by implementing the effective measures of the

RPA and the TCs identified in the June 2001 BiOp that will reduce the incidental take and mortality of sea turtles and other protected species in the HMS fisheries of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. This action is needed because once the July 13, 2001, emergency rule and its December 13, 2001, extension expires on July 8, 2002, the pelagic longline fishery would be jeopardizing the continued existence of sea turtles. Additionally, without this action, all HMS fisheries would be out of compliance with the June 2001 BiOp. This action would be accomplished by finalizing the March 30, 2001, interim final rule (66 FR 17370)); adopting the measures implemented in the July 13, 2001, emergency rule (66 FR 36711) and December 13, 2001, emergency rule extension (66 FR 64378); and implementing several TCs required by the June 14, 2001, BiOp. The scope of this action is to address protected species interactions, particularly sea turtles, in the Atlantic HMS fisheries. As discussed above, NOAA Fisheries is required to take these actions under the ESA.

2.0 ALTERNATIVES

The following alternatives represent the range of options NOAA Fisheries considered to reduce the incidental catch and bycatch mortality of protected species in all HMS fisheries. The alternatives range from no action to a total prohibition of a gear type. Each alternative identifies potential regulatory mechanisms for implementation. Alternatives are evaluated in Section 7.0 with respect to existing data on target and incidentally caught species, as well as ecological, social, and economic impacts.

2.1 Alternatives for Analysis: Pelagic Longline Fishery Requirements

Alternative 1 (Final Action) — *Close the NED area to fishing with pelagic longline gear on board* (BiOp Requirement)

This action closes the NED area (20 to 60° W, 35 to 55° N) to all Federally permitted vessels, or those required to be permitted for HMS, with pelagic longline gear on board. The need for a closure will be reevaluated in spring 2004 following the completion of a three year experimental fishery that began in 2001.

Alternative 2 (Not Selected) — *Prohibit vessel operators using pelagic longline gear from setting gangions next to floatlines (must be two gangion lengths away)* (BiOp Requirement)

Implementing this alternative would prohibit fishermen on all Federally permitted vessels, or those required to be permitted for HMS, engaged in pelagic longline fishing for HMS from attaching gangions to the mainline within two gangion lengths of the floatline attachment to the mainline. The 2001 NED experimental fishery found that this alternative is not effective in reducing pelagic longline interactions with loggerhead and leatherback sea turtles.

Alternative 3 (Final Action) — *Require vessels with pelagic longline gear on board to have the length of any gangion be 10 percent longer than the length of any floatline if the total length of any gangion plus the total length of any floatline is less than 100 meters* (BiOp Requirement)

Under this alternative, all Federally permitted vessels, or those required to be permitted for HMS, with pelagic longline gear on board are required to deploy gangions that are 10 percent longer than the floatlines, if the total length of any gangion plus the length of any floatline is 100 meters or less. This alternative allows incidentally captured sea turtles to reach the surface to breathe, reducing mortality.

Alternative 4 (Final Action) — *Require vessels with pelagic longline gear on board to possess and use only corrodible, non-stainless steel hooks* (BiOp Requirement)

Under this alternative, all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board are required to possess and use only corrodible hooks. It is expected that this measure will reduce the post-release mortality of incidentally captured sea turtles.

Alternative 5 (Final Action) — *The vessel operator of all vessels with pelagic longline gear on board must report lethal sea turtle takes within 48 hours of returning to port* (BiOp Requirement)

The vessel operator of all Federally permitted vessels, or vessels required to be permitted, for HMS with pelagic longline gear on board are required to report any turtles that are dead when captured or that die during capture to the SEFSC Observer Program (at 800-858-0624) within 48 hours of returning to port, in addition to filling out logbook forms.

Alternative 6 (Final Action) — *Require all vessels with bottom or pelagic longline gear on board to have sea turtle handling and release guidelines posted in the wheelhouse* (BiOp Requirement)

This alternative requires all Federally permitted vessels, or vessels required to be permitted, for HMS that have bottom or pelagic longline gear on board to have posted in the wheelhouse sea turtle handling and release guidelines. This alternative should reduce the post-release mortality of incidentally captured sea turtles.

Alternative 7 (Not Selected) — *No action*

This alternative would maintain the existing regulations regarding pelagic and bottom longline gear and sea turtle interactions. The provisions implemented by the July 13, 2001, emergency rule would remain in effect until July 8, 2002 (as extended on December 13, 2001), at which time they would expire.

Alternative 8 (Not Selected) — *Require vessels with pelagic longline gear on board to have a dehooking device on board; require vessel operators on such vessels to use the dehooking device*

Under this alternative, all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board would be required to have a dehooking device on board. Vessel operators aboard such vessels would be required to use it to remove longline hooks from incidentally captured sea turtles.

Alternative 9 (Not Selected) — *Require vessel operators on vessels with pelagic longline gear on board to rig the mainline so hooks are fished deeper in the water column (tuna style fishing)*

This alternative would require vessel operators aboard all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board to configure the gear to maintain the hooks deeper in the water column. This configuration might minimize attracting sea turtles to baited hooks.

Alternative 10 (Not Selected) — *Require vessel operators on vessels with pelagic longline gear on board to use only blue-dyed bait*

Under this alternative, all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline on board would be required to deploy only blue-dyed bait. The 2001 NED experimental fishery found that this alternative is not effective in reducing pelagic longline interactions with loggerhead and leatherback sea turtles.

Alternative 11 (Not Selected) — *Require vessel operators on vessels with pelagic longline gear on board to use only mackerel as bait*

This alternative would require vessel operators aboard all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board to use mackerel exclusively as bait. NOAA Fisheries will analyze the ability of this measure to reduce the incidental catch of sea turtles in the 2002 NED area experimental fishery.

Alternative 12 (Not Selected) — *Require vessels with pelagic longline gear on board to utilize stealth gear (counter-shaded floats, dark colored lines, capped LED lights, etc.)*

This alternative would require all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board to utilize some form of stealth fishing gear such as counter-shaded floats, dulled or dark gear, and capped lights. NOAA Fisheries is currently working to develop and test several gear modifications that are expected to reduce the number of sea turtle interactions.

2.2 Alternatives for Analysis: Shark Gillnet Fishery Requirements

Alternative 13 (Final Action) — *Both the observer and vessel operator are responsible for sighting whales and the vessel operator must contact NOAA Fisheries Southeast Regional Office (SERO) if a listed whale is taken* (BiOp Requirement)

The vessel operator of all vessels issued Federal Atlantic shark limited access permits and that fish

for Atlantic sharks with a gillnet and, in cases where an observer is on board, the observer, are responsible for sighting whales. The vessel operator is responsible for contacting NOAA Fisheries SERO (at 305-862-2850) and ceasing fishing in the event of a listed whale being taken in the gillnet gear while fishing in either a drift gillnet or strikenet method.

Alternative 14 (Final Action) *Shark gillnet fishermen are required to conduct net checks every 0.5 to 2 hours to look for and remove any sea turtles or marine mammals* (BiOp Requirement)

In this fishery, it is customary for fishermen to inspect the entire length of the net every 0.5 to 2 hours. If a protected species is caught in the net, the fishermen are required to remove it in a manner that would not induce further harm.

Alternative 15 (Not Selected) *No action*

This alternative would maintain the existing regulations regarding shark gillnet gear.

Alternative 16 (Not Selected) *Prohibit use of shark gillnet gear for HMS fisheries*

This alternative would prohibit the use of shark gillnet used in either a drift gillnet or strikenet method in Atlantic HMS fisheries year-round.

Alternative 17 (Not Selected) *Require fishermen who hold a Federal shark permit and use shark gillnets to use spotter planes for strikenetting*

All Federally permitted vessels for using HMS shark gillnet gear to target sharks would be required to utilize the assistance of a spotter plane when setting their net and to fish in a strikenet fashion. This alternative would reduce the risk of interactions with protected species.

2.3 Alternatives for Analysis: General Requirements (bycatch mortality measures for all gear types)

Alternative 18 (Final Action) *No action*

This alternative maintains the existing regulations for all HMS gear types except pelagic longline, bottom longline, and shark gillnet as described above.

Alternative 19 (Not Selected) *Require all vessel operators on HMS permitted vessels in each HMS fishery to post sea turtle handling guidelines specific to interactions in that particular fishery*

This alternative would require every vessel permitted to catch HMS to post in the wheelhouse, or in an appropriate area not yet determined, sea turtle handling and release guidelines specific to

their gear type. This requirement would be effective for each gear type individually as appropriate guidelines are developed.

Alternative 20 (Not Selected) — *Require all vessels with hook and line gear on board, in addition to pelagic longline vessels, to carry on board line clippers and dipnets*

All Federally permitted vessels fishing for HMS species with any hook and line gear type on board would be required to have a line clipper and a dipnet on board that meets NOAA Fisheries design and performance standards. Vessel operators would be required to use them to facilitate removal of gear from incidentally captured sea turtles. This measure would help improve the post-release survival of incidentally captured sea turtles.

Alternative 21 (Not Selected) — *Require all vessels with hook and line gear on board to carry on board a dehooking device*

All Federally permitted vessels with hook and line gear on board engaged in fishing for HMS would be required to have a dehooking device on board. Vessel operators would be required to use it to remove gear from incidentally captured sea turtles.

Alternative 22 (Not Selected) — *Require all vessels, in addition to pelagic longline vessels, to move 1 nautical mile if a marine mammal or sea turtle is hooked or entangled*

This alternative would require all Federally permitted vessels engaged in fishing for HMS to move 1 nautical mile following the entanglement or hooking of a marine mammal or sea turtle.

2.4 Alternatives Considered Previously but not Further Analyzed

These alternatives are relevant to this Supplemental Environmental Impact Statement, but NOAA Fisheries does not have enough new data to justify a full examination in this document. However, these alternatives may be analyzed further in future rulemaking documents, as appropriate.

Alternative 23 — *Prohibit use of pelagic longline gear by U.S.-flagged fishing vessels in the Atlantic Ocean, including the Gulf of Mexico and Caribbean Sea*

This alternative would prohibit the use of pelagic longline gear in Atlantic HMS fisheries year-round. As this measure was examined in detail in Section 7 of the Final Supplemental Environmental Impact Statement (FSEIS) to reduce bycatch, bycatch mortality, and incidental catch in the Atlantic pelagic longline fishery (NOAA Fisheries, 2000a) and the HMS FMP (NOAA Fisheries, 1999b), it is not analyzed in depth in this document. Prohibiting the use of pelagic longline gear by U.S. commercial fishing vessels would have immediate and significant

economic and social impacts on the longline vessel owners, vessel operator, and crew that would need to re-rig their vessels to continue fishing for HMS, find alternative fisheries, or discontinue fishing; dealers that purchase fish from pelagic longliners; families that work, or own the fishing vessels that would either have to re-rig or discontinue fishing; and indirect impacts in the local communities that support the pelagic longline fishery. Also, landings of target species such as swordfish, as well as interactions with bycatch and bycatch species such as sea turtles, would be eliminated from the U.S. portion of the total Atlantic-wide longline fishery. However, foreign longline fishing effort may increase in areas beyond the U.S. EEZ, such as the NED area. While prohibiting the use of pelagic longline gear by U.S. commercial fishing vessels would reduce sea turtle interactions and mortality from U.S. vessels, this course of action is not justified at this time given the availability of a RPA, the large social and economic impacts on fishermen and fishing communities, and the possibility that removal of U.S. effort could increase sea turtle interactions and mortality Atlantic-wide.

Alternative 24 — *Require use of circle hooks on all pelagic longline gear (No possession of any hook but circle hook)*

This alternative would require all Federally permitted vessels engaged in pelagic longline fishing for HMS to use circle hooks. As this measure was examined in detail in Section 7 of the FSEIS to reduce bycatch, bycatch mortality, and incidental catch in the Atlantic pelagic longline fishery (NOAA Fisheries, 2000a) and the HMS FMP (NOAA Fisheries, 1999b), it is not further analyzed in this document. In the FSEIS, NOAA Fisheries concluded that additionally scientific information is needed before circle hooks could be mandated. At the time of the FSEIS there was little data available to NOAA Fisheries regarding the effects of circle hooks on sea turtles but there was information suggesting that both incidental and swordfish catch rates were reduced when circle hooks were used. Since that time, NOAA Fisheries now has some preliminary information regarding circle hooks and sea turtles. Based on these preliminary experiments, circle hooks have been found to reduce the instances of deep hooking of incidentally captured sea turtles. While the initial experiments with circle hooks (16/0) found that they significantly decreased the incidence of throat hooking sea turtles, the circle hooks resulted in a significant reduction in target catch. It appears that the cost of switching to circle hooks would increase the cost of fishing in the short term, and could reduce revenues in the long term if target catch rates are reduced. NOAA Fisheries is currently testing a hypothesis that larger gauge circle hooks (18/0) may improve the retention of target species.

Alternative 25 — *Prohibit the setting of pelagic longline gear between 3 p.m. and 9 p.m.*

Under this alternative, all vessels fishing for HMS with pelagic longline gear would be restricted from setting their gear between 3 p.m. and 9 p.m or other, similar, times of the day. This measure would be expected to reduce the incidental take of sea turtles by reducing their exposure to baited hooks during their prime feeding time. As this measure was examined in detail in Section 7 of the FSEIS to reduce bycatch, bycatch mortality, and incidental catch in the Atlantic pelagic longline

fishery (NOAA Fisheries, 2000a), it is not analyzed in depth in this document. As described in the FSEIS, preliminary observer data analyses indicate that the rate of sea turtle takes is higher in sets made in the evening before 9 p.m. Generally, this measure would not be expected to cause any significant economic or social impacts unless the level of target catch is decreased. At this time, NOAA Fisheries does not have any additional information regarding this measure.

2.5 Changes From March 29, 2002, Draft Supplemental Environmental Impact Statement

The FSEIS finalizes most of the measures identified as preferred alternatives in the March 29, 2002, DSEIS and the April 10, 2002, proposed rule. Table 2.1, below, compares the preferred alternatives analyzed in the DSEIS with the final actions. The primary difference is that Alternative 2, prohibiting vessel operators using pelagic longline gear from setting gangions next to floatlines (must be two gangions lengths away), has been not selected. Results from the 2001 experimental fishery in the NED area determined that this alternative is not effective in reducing interactions with loggerhead and leatherback sea turtles. Because of this information, the requirement to set gangions two gangion lengths from floatlines has been not selected.

Table 2.1 Comparison of Alternatives Preferred in the DSEIS to the Final Actions in the FSEIS. Note: RPA - reasonable and prudent alternative; TC - term and condition; pages in parentheses indicate page numbers in the BiOp.

Preferred Alternative in DSEIS	Final Action in FSEIS
Pelagic Longline Fishery	
Close the Northeast Distant area to fishing with pelagic longline gear on board (RPA, page 116)	Same
Prohibit vessel operators using pelagic longline gear from setting gangions next to floatlines (must be two gangion lengths away) (RPA, page 117)	Not selected. Preliminary results from an experimental fishery in the Northeast Distant area indicate that this measure is ineffective at reducing loggerhead turtle bycatch and may increase leatherback turtle bycatch.
Require vessels with pelagic longline gear on board to have gangion length be 110 percent of floatline length in shallow sets (100 meters or less) (RPA, page 117)	Same, rephrased for clarification as follows: "The length of any gangion on vessels that have pelagic longline gear on board must be at least 10 percent longer than any floatline length if the total length of any gangion plus the total length of any floatline is less than 100 meters."
Require vessels with pelagic longline gear on board to use only corrodible hooks and/or crimps, proposed as non-stainless steel. (RPA, page 117)	Same, modified to a possession prohibition to improve enforcement as follows "Require vessels with pelagic longline gear on board to possess only corrodible non-stainless steel hooks."

Preferred Alternative in DSEIS	Final Action in FSEIS
The vessel operator of all vessels with pelagic longline gear on board must report lethal turtle takes within 48 hours of returning to port (TC, page 122)	Same
Require all vessels with bottom or pelagic longline gear on board to have sea turtle handling and release guidelines posted in the wheelhouse (TC, page 125, modified on 8/31/2001)	Same
Shark Gillnet Fishery	
Both the observer and vessel operator are responsible for sighting whales and the vessel operator must contact NOAA Fisheries Southeast Regional Office if a listed whale is taken (TC, page 122)	Same
Shark gillnet fishermen are required to conduct net checks every 0.5 to 2 hours to look for and remove any sea turtles or marine mammals (TC, page 123)	Same
General Requirements	
No Action	Same

3.0 ECONOMIC CONSIDERATIONS

Before implementing management measures, NOAA Fisheries must consider the economic impacts particularly in accordance with two laws: the Regulatory Flexibility Act (Reg Flex Act) and Executive Order 12866 (E.O. 12866). Other laws, such as National Environmental Policy Act (NEPA) and the Magnuson-Stevens Act, also require NOAA Fisheries to consider economic impacts before implementing management measures. The requirements under E.O. 12866 and Reg Flex Act are similar. Both require a description of the need for the action, the management objectives, and a description of the expected economic impacts. Those requirements related to this final action are met in Sections 1 and 2. They also require an analysis of each alternative, the expected effects, and a description of the reasons why an action is being taken (Sections 7 and 8). The main difference between the Reg Flex Act and E.O. 12866 is the focus of the analysis. While the Reg Flex Act focuses on individual small entities (e.g. businesses and individuals), E.O. 12866 focuses on the entire fishery.

NOAA Fisheries has worked with its constituencies, including representatives of small businesses, fishermen, and vessel owners, to identify alternatives, consider the economic impacts of these alternatives, and to select preferred alternatives based on various factors, including relative effects on small businesses. For this final action NOAA Fisheries has worked with its constituents through the take reduction team process, public scoping process, gear workshop, and comment periods on draft versions of BiOp itself and the proposed rule.

In addition, NOAA Fisheries continues to strive for improved collection and analyses of data pertaining to socio-economic aspects of the fisheries. The recent re-authorization of the Reg Flex Act has increased the focus on these analyses and NOAA Fisheries has recently revised its own guidelines on how to comply with the Reg Flex Act. NOAA Fisheries believes the goals of fishery management are consistent with those of the Reg Flex Act: implement fishery management regulations to ensure a healthy resource that will sustain viable fisheries for both commercial and recreational constituents and the businesses associated with those fisheries.

The analyses required for E.O. 12866 and under the Reg Flex Act are included in Section 8, and additional economic impacts are discussed throughout this document. Additional information about the Reg Flex Act, E.O. 12866, and economic impacts can be found in Chapter 7 of the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (NOAA Fisheries, 1999b).

3.1 Small Business Regulatory Enforcement and Fairness Act

The Small Business Regulatory Enforcement and Fairness Act of 1996 amended the Reg Flex Act and made compliance with sections of the Reg Flex Act subject to judicial review. The Reg Flex Act requires agencies to assess impacts of their final regulations on small entities and to encourage Federal agencies to utilize innovative administrative procedures when dealing with small entities. If an action is believed to be significant, Reg Flex Act requires agencies to perform an Initial Regulatory Flexibility Analysis (IRFA) during the proposed rule stage and, after

considering public comment, a Final Regulatory Flexibility Analysis (FRFA) during the final rule stage.

The focus of a regulatory flexibility analysis is small businesses and the effect of regulatory measures on their revenues and/or costs. The analyses should contain sufficient information to make a determination of whether the rule has a "significant economic impact on a substantial number of small entities" under the meaning of the Reg Flex Act. The definition of a "small entity" includes small businesses, small organizations, and small governmental jurisdictions. The Small Business Administration (SBA) considers a small finfish fishing or other marine fishing business as a firm with annual receipts averaging over three years up to $3.5 million annually (67 FR 3041, January 23, 2002). For fresh and seafood markets, a small business is one that has receipts averaging $6.0 million annually (67 FR 3041, January 23, 2002). A small organization is defined as any non-profit enterprise that is independently owned and operated and is not dominant in its field. NOAA Fisheries believes that all participants in HMS fisheries, including processors, can be defined as small entities under SBA guidelines.

3.2 Executive Order 12866

In compliance with Executive Order 12866, the Department of Commerce and NOAA require the preparation of a Regulatory Impact Review (RIR) for all regulatory actions that either implement a new Fishery Management Plan or significantly amend an existing plan, or may be significant in that they reflect agency policy concerns and are of public interest. The RIR is part of the process of preparing and reviewing FMPs and regulatory actions and is intended to provide a comprehensive review of the changes in net economic benefits to society associated with regulatory actions. Thus, the focus of the RIR is on the net economic benefit from the entire fishery, not the net economic benefit accruing to individual fishermen. The analysis also 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 problems. The purpose of the analysis is to ensure 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.

3.3 Common Economic Terms

3.3.1 Net Economic Benefit

One type of measurement used in evaluating the economic importance of a fishery is net economic benefit, also referred to as economic value. Net economic benefit is the sum of producer and consumer surplus associated with the fishery. For the commercial fishery, net economic benefit includes profits (difference between total revenues and total costs) to producers (vessel operators, suppliers, fish dealers, retailers, etc.) and the net benefits to seafood consumers. In examining alternatives, these are often considered at the margin, i.e., the change in net benefits in moving from no action to another alternative.

Due to limited data on fishing costs, and limited studies measuring consumer surplus for seafood products, net economic benefits are difficult to measure in HMS commercial fisheries. Trip-level data on fishing costs are collected on a voluntary basis in an add-on questionnaire at the end of the pelagic longline trip summary form. Some cost data are also available from previous surveys of the various highly migratory species fleets. These may be used to generate partial estimates of net economic benefit, notably producer surplus (revenues-costs).

3.3.2 Economic Impact

Another type of economic measurement is economic impact. Economic impact is often what fishermen, commercial and recreational, refer to in emphasizing the importance of their activities to local communities and the national economy. Economic impact is a measure of the income, tax revenues, and employment generated by an activity. In the commercial fishery, information on expenditures (bait, tackle, labor, etc.) as well as the ex-vessel value of landings are usually used to describe economic impacts. Non-consumptive uses of a resource (e.g., whale watching) also generate economic activity. The relative levels of economic impact allow cross-comparison of the effect of the measures on the level of expenditures -- primarily fishing costs -- from both the recreational and commercial fisheries. Expenditures may be examined in the format of an input-output model, which traces the "ripple" effect of every dollar of expenditures in one sector on other sectors, often referred to as secondary, and induced effects. Expenditures can also be used to estimate the number of jobs generated or lost due to various management measures. Economic impacts can be important to communities, as employment levels, income, and a wider tax base are desirable economic effects of fishing activities.

3.3.3 Consumer Surplus

Changes in consumer surplus can occur due to changes in the price of seafood as well as changes in the availability of recreational fishing opportunities, the latter known as angler consumer surplus. Because a large percentage of swordfish consumed in the United States is imported, it is assumed that regulations affecting the operation of the domestic fishery (other than a complete closure) will not result in price changes at the consumer level and therefore will not result in changes in consumer surplus. In contrast, to the extent that restrictions on U.S. longlines may enhance recreational fisheries for HMS, increased angler consumer surplus may be an additional benefit for the alternatives considered herein.

3.3.4 Producer Surplus

Producer surplus is measured by the economic rent (above normal profits) earned by the vessel owners, vessel operator and crew. For the purposes of this analysis, profits will be used as a proxy for economic rents earned by the vessel owners. Note that crew wages are generally considered to be part of the variable costs of fishing to the vessel owner. Profits are affected through changes in both revenue and costs which occur because of the management action. For example, time/area closures likely affect fishing costs due to greater distances to fishing grounds

for affected vessels.

Profit to the vessel operator and crew depends on the wages they receive. If the crew members are earning more money longline fishing than they would earn in the next best alternative fishing area and/or occupation available to them, their income is likely to decrease as a result of a final action that reduces employment opportunities. It is assumed that crew members would be able to find alternative employment because it is possible they are capable of participating in another fishery (i.e., some may possess a broad range of commercial fishing skills).

Initial losses in producer surplus are typically estimated for year one only. Vessels might incur further losses in future seasons, but will also have time to adjust their fishing practices so as to minimize these losses. Labor will also adjust as some crew members leave the industry or shift to vessels in other fisheries that are unaffected by the new regulations.

3.3.5 Non-Market Valuation

Although marine mammals and other protected species are not normally traded in economic markets, society still places a value on protecting these species from human-induced mortality. Thus, those who place a value on the survival of a species also benefit from the protection of these species afforded by fisheries regulation. Contingent valuation techniques have been used by economists to assess the value to society of such non-market goods and services, and the techniques have been endorsed by a NOAA Blue Ribbon Panel of independent experts. However, the use of contingent valuation techniques to answer public policy questions is still considered controversial.

NOAA Fisheries does not have value estimates for animals protected by the ESA or MMPA taken by gear used in HMS fisheries, but studies indicate that society does value the existence of marine mammal species encountered by other fishing gears (Strand, McConnell, and Bockstael, 1994). For that reason, it is important to consider the value to society of protecting endangered and threatened species. Due to lack of specific valuation data, no attempt has been made to include such values in the analysis presented below. Rather, they are mentioned to illustrate the high value the public places on eliminating human-induced mortality of marine mammal and sea turtle stocks. Note that if a market situation could be developed, (e.g., transferable quotas), societal values for marine mammal and sea turtle protection could be expressed through trade such as a buyout of swordfish permits, which would be subsequently taken out of the fishery.

3.3.6 Net National Benefits

Net national benefits are the benefits minus the costs under the alternatives. Due to lack of cost data, only marginal changes in gross revenues are evaluated. Because costs are likely changing as well, these analyses are only a partial picture of the effect of the various alternatives. The net economic benefits are measured as the change in consumer and producer surplus brought about by the preferred management measures. As indicated above, these net benefits are minimum

estimates because they do not include non-market benefits such as existence values or non-consumptive use values. These benefits are difficult to calculate and are not generated in this document.

In practice, one of the most straightforward methods of evaluating producer and consumer surplus is to allocate and allow the sale of individual transferrable quotas (ITQs): for example, the price that might be bid by an individual fisherman for the opportunity to harvest one swordfish reflects either producer surplus (for a commercial fisherman) or angler consumer surplus (for a recreational angler) or existence value (for a conservationist). Although ITQs are not in place for the swordfish fishery, the limited access system implemented in July, 1999, imparts a value to permits and may provide a proxy for estimating this value in a few years. Preliminary information on transfers of HMS limited access permits indicate sale/offer prices of $0 to $5,000 for all swordfish or shark permits. NOAA Fisheries expects that permits for larger vessels would be worth more than those for smaller vessels given the existing vessel upgrading restrictions. These values reflect primarily the present value of expected net revenues from swordfishing (subject to vessel restrictions) for the range of years considered by parties to the transaction.

4.0 SOCIAL IMPACT CONSIDERATIONS

Mandates to conduct social impact assessments come from both NEPA and the Magnuson-Stevens Act. NEPA requires federal agencies to consider the interactions of natural and human environments by using a "systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences...in planning and decision-making" [NEPA section 102(2)(a)]. Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects which may be direct, indirect, or cumulative. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. With an increasing need for management action, the consequence of such changes need to be examined in order to mitigate the negative impacts experienced by the populations concerned.

Social impacts are generally the consequences to human populations that follow from some type of public or private action. Those consequences may include alterations to the ways in which people live, work or play, relate to one another, and organize to meet their needs. In addition, cultural impacts which may involve changes in values and beliefs which affect people's way of identifying themselves within their occupation, communities, and society in general are included under this interpretation. Social impact analyses help determine the consequences of policy action in advance by comparing no action with the projected impacts.

Pending the collection of quantitative information concerning the views of HMS fishermen, qualitative data can be used to provide a rough estimate of some impacts. Section 9 provides a description of the social impacts of the final actions. Additional information regarding the social impacts of each alternative can be found in section 7.

5.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

United States HMS fishermen encounter many species of fish; some of those are marketable, others are discarded for economic or regulatory reasons. Species frequently encountered are swordfish, tunas, and sharks, as well as billfish, dolphin, wahoo, king mackerel, and other finfish species. Sometimes HMS fishermen also catch sea turtles, marine mammals, and seabirds, known collectively as "protected" species. All of these species are federally managed, and NOAA Fisheries seeks to control the mortality that results from fishing effort. Detailed descriptions of those species are given in the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (NOAA Fisheries, 1999b) and are summarized and updated here. Management of declining fish populations requires decreasing fishing mortality from both directed and incidental fishing. The status of the stocks of concern is summarized below, as a further reason for reducing bycatch and incidental catch in the HMS fisheries.

5.1 Swordfish

Atlantic swordfish (*Xiphias gladius*) are large migratory predators that range from Canada to Argentina in the West Atlantic Ocean. Swordfish live to be more than 25 years old, and reach a maximum size of about 902 lb dressed weight (dw). Females mature between ages 2 and 8 with 50 percent mature at age 5 at a weight of about 113 lb dw. Males mature between ages 2 and 6 with 50 percent mature at age 3 at a weight of about 53 lb dw (Arocha, 1997). Large swordfish are all females; males seldom exceed 150 lb dw. Swordfish are distributed globally in tropical and subtropical marine waters. Their broad distribution, large spawning area, and prolific nature have contributed to the resilience of the species in spite of the heavy fishing pressure being exerted on it by many nations. During their annual migration, north Atlantic swordfish follow the major currents which circle the north Atlantic Ocean (including the Gulf Stream, Canary and North Equatorial Currents) and the currents of the Caribbean Sea and Gulf of Mexico. The primary habitat in the western north Atlantic is the Gulf Stream, which flows northeasterly along the U.S. coast, then turns eastward across the Grand Banks. North-south movement along the eastern seaboard of the United States and Canada is significant (SAFMC, 1990).

In 2000, the estimated amount of U.S. vessel landings and dead discards of swordfish was 3,460 metric tons (MT). This level corresponds to approximately a 2 percent decrease from the 3,548 MT landed and discarded dead in 1999 NOAA Fisheries (NOAA Fisheries, 2002). U.S. swordfish landings are monitored in-season from reports submitted by dealers, vessel owners and vessel operators, NOAA Fisheries port agents, and mandatory daily logbook reports submitted by U.S. vessels permitted to fish for swordfish. Starting in 1992, this fishery has been monitored via a scientific observer sampling program that strives to observe approximately 5 percent of the longline fleet-wide fishing effort. This serves as a mechanism to observe amounts of bycatch and to verify logbook data.

5.2 Atlantic Billfish

Blue marlin (*Makaira nigricans*), white marlin (*Tetrapturus albidus*) and sailfish (*Istiophorus platypterus*) are highly migratory billfish that are widely distributed over the Atlantic Ocean (including the Caribbean Sea and Gulf of Mexico). They are opportunistic feeders, feeding primarily on fish and squid. Marlins, in addition to sailfish and longbill spearfish, are bycatch in the Atlantic pelagic longline and shark gillnet fisheries and they can not be taken commercially. The Billfish FMP Amendment provides more detailed background information regarding the life history strategies of Atlantic billfish, including age and growth, reproduction, movement pattern, influence of physical oceanographic features, essential fish habitat, and other information.

In 2000, the preliminary estimates of the recreational catches for these billfish species in the combined areas of the Gulf of Mexico, the northwestern Atlantic Ocean west of 60^{o} W longitude, and the Caribbean Sea are: 24.1 MT for blue marlin, 0.2 MT for white marlin, and 2.0 MT for sailfish (NOAA Fisheries, 2001b). These estimates of the recreational catch do not include any estimates of mortality of released fish. In addition to this, some components of the charter boat and non-tournament recreational fishery are not surveyed, such that the recreational catches are considered minimum estimates. The 2000 estimates of the level of the billfish bycatch discarded dead by the U.S. commercial longline and other commercial fisheries are: 59.6 MT of blue marlin, 40.8 MT of white marlin, and 45.4 MT of sailfish (NOAA Fisheries, 2002).

5.3 Atlantic Tunas

Tunas are highly migratory fish found in many of the world's tropical, subtropical, and temperate ocean regions. Bluefin (*Thunnus thynnus*), bigeye (*Thunnus obesus*), albacore (*Thunnus alalunga*) and skipjack (*Katsuwonus pelamis*) tunas are widely distributed throughout the Atlantic, while yellowfin tuna (*Thunnus albacores*) are considered to be a more tropical species. Bluefin tuna mature at approximately age 8 or later (60 inches curved fork length (CFL)), while yellowfin, bigeye, and albacore tunas mature at a smaller size. Smaller yellowfin tuna form mixed schools with skipjack tuna and juvenile bigeye tuna and are mainly limited to surface waters, while larger yellowfin tuna are found in surface and sub-surface waters. Bigeye tuna inhabit waters deeper than those of any other tuna species and undertake extensive vertical movements. Albacore tuna tend to inhabit deeper waters, except when young. Many of these tunas are opportunistic feeders, eating mainly fish and squid (SCRS, 1999). Commercial and recreational fishermen from numerous countries participate in fisheries for several species of Atlantic tuna.

The estimated U.S. vessel landings and dead discards of tuna species in commercial and recreational HMS fisheries for 2000 are in Table 5.1.

Table 5.1 **Estimated U.S. vessel landings in metric tons of tuna species in commercial and recreational HMS fisheries in 2000.** Source: NOAA Fisheries, 2002.

Gear	Albacore	Bigeye	Bluefin	Skipjack	Yellowfin
Commercial Handgear (Handline, Harpoon, Rod and Reel, Troll) (varies depending on species)	7.9	5.7	766.7	9.7	283.7
Pelagic Longline	147.4	531.9	66.1	1.8	2,901.1
Purse Seine	0	0	275.2	0	0
Recreational Handgear (Rod and Reel)	250.8	34.4	50.4	29.8	3,861.8
Total	**406.1**	**572**	**1,158.4**	**41.3**	**7,046.6**

5.4 Atlantic Sharks

Atlantic sharks are managed in several species groups. Many shark species make extensive migrations along the U.S. Atlantic coast.

Species in the large coastal sharks (LCS) group are the main commercial species and are targeted with bottom longline gear. Sandbar and blacktip sharks make up approximately 60 to 75 percent of the bottom longline catch and approximately 75 to 95 percent of the bottom longline landings (GSAFDF, 1996). The remainder of the bottom longline catch is comprised mostly of bull, bignose, tiger, sand tiger, lemon, spinner, scalloped hammerhead and great hammerhead sharks, with catch composition varying by region. These species are less marketable and are often released, so they are reflected in the overall catch but not the landings. Several LCS can also be caught by pelagic longline gear: silky, dusky, sandbar, and hammerhead sharks. The shark gillnet fishery catches several large coastal species including blacktip (targeted and retained), and scalloped hammerhead (discarded). To a lesser extent, sandbar, bull, spinner, tiger, lemon, and silky sharks are caught and retained in the shark gillnet fishery.

Pelagic sharks including shortfin mako, porbeagle, common thresher, and blue sharks are commonly taken in the pelagic longline fishery. Longfin mako, sixgill, bigeye sixgill, and sevengill sharks are occasionally or rarely taken. Pelagic sharks are also sometimes encountered incidentally in the shark gillnet fishery (e.g., thresher sharks, mostly discarded) and bottom longline fishery. Trans-Atlantic migrations of these sharks are common; they are taken in several international fisheries outside the U.S. EEZ.

Small coastal sharks are targeted in localized fisheries in the southern United States, caught incidentally in other commercial fisheries, and are commonly used for bait. The species caught predominantly in the shark gillnet fishing season include Atlantic sharpnose, bonnethead, finetooth, and blacknose sharks (all retained). Discarded species include sharpnose sharks during

LCS closures. Small coastal sharks are also commonly encountered in recreational fisheries in the southern United States. NOAA Fisheries recently conducted a stock assessment for SCS and found that SCS populations can sustain the present removal levels (Cortes 2002).

Compared to other finfish, sharks have low reproductive rates which make them particularly vulnerable to overfishing. Because LCS are overfished, SCS are fully fished, and the status of pelagic sharks is unknown at this time, NOAA Fisheries seeks to minimize bycatch in any fishery which encounters them. Additional information can be found in the HMS FMP (NOAA Fisheries, 1999b) and 2002 Stock Assessment and Fishery Evaluation Report (NOAA Fisheries, 2002).

5.5 Other Finfish

Dolphin (*Coryphaena hippurus*) are fast-swimming, pelagic, migratory, and predatory fish found in tropical and subtropical waters throughout the world. They are short-lived and fast growing. These traits allow the stock to support high fishing mortality rates. Also referred to as mahi-mahi, these fish are sold by commercial fishermen (driftnet and pelagic longline) and are targeted by recreational fishermen along the Atlantic and Gulf Coasts.

Wahoo (*Acanthocybium solanderia*) are large pelagic fish found throughout the tropical and subtropical waters of the Atlantic Ocean. The life history of wahoo is largely unknown, although they are a fast-growing species similar to dolphin. These fish are also landed both recreationally and commercially, although encounter rates seem to be lower than those for dolphin.

Drum (*Sciaenid* spp.) may not be retained by shark gillnet fishermen and are discarded dead in small numbers. Tarpon are also discarded dead in small numbers as they have no market value. There are valuable redfish and tarpon recreational fisheries in both Georgia and Florida. NOAA Fisheries seeks to minimize bycatch, to the extent practicable, in all fisheries. Cobia, king mackerel, barracuda and spanish mackerel are also caught in these nets and are retained for sale.

5.6 Marine Mammals

NOAA Fisheries published the final 2001 Marine Mammal Protection Act (MMPA) List of Fisheries on August 15, 2001 (66 FR 42780). On January 17, 2002 (67 FR 2410), NOAA Fisheries published a notice that the 2001 List of Fisheries remains in effect for 2002. The Atlantic Ocean, Caribbean, and Gulf of Mexico pelagic longline fishery is classified as Category I (frequent serious injuries and mortalities incidental to commercial fishing) and the southeastern Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities). The following fisheries are classified as Category III (remote likelihood or no known serious injuries or mortalities): Atlantic tuna purse seine; Gulf of Maine and mid Atlantic tuna, swordfish, and shark hook-and-line/harpoon, southeastern mid Atlantic and Gulf of Mexico shark bottom longline, and mid Atlantic, southeastern Atlantic, and Gulf of Mexico pelagic hook-and-line/harpoon fisheries.

In accordance with the MMPA, NOAA Fisheries published draft stock assessment reports for Atlantic and Gulf of Mexico marine mammals. These species are sometimes hooked on pelagic longline gear and fishermen report takes of mammals to NOAA Fisheries in a marine mammal logbook. In 2000, there were 14 observed takes of marine mammals by pelagic longlines. This number has been extrapolated out to an estimated 403 mammals fleet-wide (32 common dolphin, 93 Risso's dolphin, 231 pilot whale, 19 whale, 29 pygmy sperm whale) (Yeung, 2001). In addition to mammals released *dead* from fishing gear, which is uncommon in the pelagic longline fishery, NOAA Fisheries must consider post-release mortality of mammals released *alive*. The bottom longline fishery has been observed to interact with one delphinid between 1994 and 2001 and the shark gillnet fishery interacted with 4 bottlenose dolphins and 3 spinner dolphins in 2001.

5.7 Sea Turtles

The following represents a summary of the information found in the June 14, 2001, BiOp. For more detailed information, please see that document. The status of Atlantic sea turtles can be found in Table 5.2.

Table 5.2. Status of Atlantic sea turtle populations: Species taken in HMS fisheries 1992-1997. Source: NOAA Fisheries, 2001a.

Species/Stock	**Status: trend in U.S. nesting population**
Loggerhead: Northern sub-population	Threatened: stable or declining
Leatherback	Endangered: loss of some nesting populations, otherwise stable
Green	Endangered: increasing
Kemp's Ridley	Endangered: thought to be increasing
Hawksbill	Endangered: unknown if there is a recent trend

Loggerhead sea turtles

The loggerhead sea turtles in the action area (west Atlantic Ocean, Caribbean Sea, and Gulf of Mexico) represent differing proportions of five western north Atlantic subpopulations, as well as unidentified subpopulations from the eastern Atlantic. The June 14, 2001, BiOp considers these subpopulations for the analysis, with particular emphasis on the northern subpopulation of loggerhead sea turtles. Loggerheads reported captured in the pelagic longline fishery in the open ocean are mostly pelagic juveniles, with approximately 19 percent of the captured turtles expected to be from the northern subpopulation.

In examining the nesting trend for the northern subpopulation, the turtle expert working group (TEWG) concluded that it is stable or declining (1998, 2000). The analysis described in the NOAA Fisheries SEFSC 2001 stock assessment report summarized the trend analyses for the

number of nests sampled from beaches for the northern subpopulation and the south Florida subpopulation and concluded that from 1978-1990, the northern subpopulation has been stable at best and possibly declining (less than 5 percent per year). From 1990 to the present, the number of nests in the northern subpopulation has been increasing at 2.8-2.9 percent annually; however, there are confidence intervals about these estimates that include no growth (0 percent). Over the same time frame, the south Florida population has been increasing at 5.3-5.4 percent per year from 1978-1990, and increasing at 3.9-4.2 percent since 1990. However, NOAA Fisheries SEFSC (2001) cautions that "it is an unweighted analysis and does not consider the beaches' relative contribution to the total nesting activity of the subpopulation and must be interpreted with some caution." Furthermore, although the analysis was limited to data from beaches where the effort was believed to have been relatively constant over time, this assumption of consistent effort may not always be true.

The southeast population of loggerhead turtles appears to be increasing in size, although they are still considered at risk. These animals are protected by ESA and NOAA Fisheries has recently enacted additional measures to restrict commercial fishing to reduce interactions, including gear requirements and a closed area applicable to the pelagic longline fishery.

Table 5.3 **Annual estimates of total marine turtle bycatch and the subset that were dead when released in the U.S. pelagic longline fishery.** Source: NOAA Fisheries, 2001a.

Species	Loggerhead		Leatherback		Green		Hawksbill		Kemp's Ridley		Unidentified		Sum Total
Year	Total	Dead*	Total	Dead*	Total	Dead*	Total	Dead*	Total	Dead*	Total	Dead*	
1992	293	0	914	88	87	30	20	0	1	0	26	0	1,341
1993	417	9	1,054	0	31	0					31	0	1,533
1994	1,344	31	837	0	33	0			26	0	34	0	2,274
1995	2,439	0	934	0	40	0					171	0	3,584
1996	917	2	904	0	16	2					2	0	1,839
1997	384	0	308	0			16	0	22	0	47	0	777
1998	1,106	1	400	0	14	1	17	0			1	0	1,538
1999	991	23	1,012	0							66	0	2,069
Total	7,891	66	6,363	88	221	33	53	0	49	0	378	0	14,955

* Does not account for fishing related mortality that may occur after release.

Loggerhead sea turtles are primarily exposed to pelagic longline gear in the pelagic juvenile stage. According to observer records, an estimated 7,891 loggerhead sea turtles were caught by the U.S. Atlantic tuna and swordfish longline fisheries between 1992-1999, of which 66 were estimated to

be released dead (Table 5.3). However, the U.S. fleet accounts for a small proportion (5-8 percent) of the total hooks fished in the Atlantic Ocean compared to other nations, including Taipei, Brazil, Trinidad, Morocco, Cyprus, Venezuela, Korea, Mexico, Cuba, U.K., Bermuda, People's Republic of China, Grenada, Canada, Belize, France, and Ireland (Carocci and Majkowski, 1998). Reports of incidental takes of turtles are incomplete for many of these nations (see NOAA Fisheries SEFSC 2001 for a complete description of take records). Projections based on known takes for the 23 actively fishing countries, after accounting for the unobserved fraction, likely result in an estimate of thousands of animals annually over different life stages.

In the shark gillnet fishery, turtles are rarely caught. During the 1999 right whale calving season[1] no turtles were caught in this fishery (Carlson and Lee, 1999). In the 2000 right whale calving season, no turtles were caught in gillnets fished in a strikenet method and one loggerhead sea turtle was caught in gillnets fished in a driftnet method (Carlson, 2000). In the 2001 right whale calving season, no turtles were caught in gillnets fished in a strikenet method and 14 leatherback sea turtles, one loggerhead sea turtle, and one hawksbill sea turtle were caught in gillnets fished in a driftnet method (Carlson, 2001). Two of the leatherback sea turtles were released dead. During this season, observers also noted high densities of jellyfish, a prey source for leatherback turtles, in the area. During the 2000 and 2001 non-right whale calving seasons, no turtles were observed caught in gillnets fished in a strikenet method and one loggerhead sea turtle was observed caught and released alive in gillnets fished in a driftnet method (Carlson and Baremore, 2001).

In the bottom longline fishery a total of 37 sea turtles have been observed from 1994 through 2001 (G. Burgess, pers. comm., 2001). Of these 37 observed sea turtles, 26 were loggerhead turtles (18 released alive, 6 released dead, and 2 released in an unknown condition) and 4 were leatherback turtles (1 released alive, 1 released dead, and 2 released condition unknown. An additional seven unidentified species of sea turtle have been observed caught, with one released alive, one released dead, and five released condition unknown.

Leatherback sea turtles

Female leatherback sea turtles nest from southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Surinam (NOAA Fisheries SEFSC, 2001). When they leave the nesting beaches, leatherback sea turtles move offshore but eventually utilize both coastal and pelagic waters. The leatherback is the largest living turtle and it ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NOAA Fisheries and USFWS, 1995). Leatherback sea turtles feed primarily

on cnidarians (medusae, siphonophores) and tunicates (salps, pyrosomas) and are often found in association with jellyfish.

[1] 100 percent observer coverage is required during right whale calving season (November 15 through March 15).

The conflicting information regarding the status of Atlantic leatherback sea turtles makes it difficult to conclude whether or not the population is currently in decline. Numbers at some nesting sites are up, while numbers at others are down. Data collected in southeast Florida clearly indicate increasing numbers of nests for the past twenty years (9.1-11.5 percent increase), although it is critical to note that there was also an increase in the survey area in Florida over time (NOAA Fisheries SEFSC, 2001). The largest leatherback rookery in the western north Atlantic remains along the northern coast of South America in French Guiana and Suriname. While Spotila *et al.* (1996) indicated that turtles may have been shifting their nesting from French Guiana to Suriname due to beach erosion, analyses show that the overall area trend in number of nests has been negative since 1987, declining at a rate of 15.0 - 17.3 percent per year (NOAA Fisheries SEFSC, 2001). If turtles are not nesting elsewhere, it appears that the Western Atlantic portion of the population is being subjected to high anthropogenic mortality rates, resulting in a continued decline in numbers of nesting females.

Leatherback sea turtles are exposed to pelagic fisheries throughout their life cycle. According to observer records, an estimated 6,363 leatherback sea turtles were caught by the U.S. Atlantic tuna and swordfish longline fisheries between 1992-1999, of which 88 were released dead (Table 5.3) (NOAA Fisheries SEFSC, 2001). Leatherback sea turtles make up a significant portion of takes in the Gulf of Mexico and south Atlantic areas, but are more often released alive. The U.S. fleet accounts for five to eight percent of the hooks fished in the Atlantic Ocean. Other nations, including Taipei, Brazil, Trinidad, Morocco, Cyprus, Venezuela, Korea, Mexico, Cuba, U.K., Bermuda, People's Republic of China, Grenada, Canada, Belize, France, and Ireland also fish in these waters (Carocci and Majkowski, 1998). Reports of incidental takes of turtles are incomplete for many of these nations (see NOAA Fisheries SEFSC, 2001, for a complete description of take records). Projections based on known takes from the 23 actively fishing countries, after accounting for the unobserved fraction, likely result in estimates of thousands of leatherback sea turtles annually over different life stages.

During the 2001 right whale calving season, the shark gillnet fishery interacted with 14 leatherback turtles. Mortalities were observed for two of the leatherback turtles and two of them were released condition unknown (Carlson, 2001). Observers also noted high densities of jellyfish, a prey source for leatherback turtles, in the area.

5.8 Seabirds

Seabirds are protected under the Migratory Bird Treaty Act; endangered seabirds are further protected under the Endangered Species Act; and all migratory birds are protected under E.O. 13186. The United States has developed a National Plan of Action in response to the Food and Agriculture Organization International Plan of Action to Reduce Incidental Seabird Takes in Longline Fisheries. Many seabird populations are especially slow to recover from mortality because their reproductive potential is low (one egg per year and late sexual maturation). They forage on the surface but can also pursue prey fish swimming at shallow depths which makes seabirds somewhat susceptible to driftnets, shallow set longlines, and longline gear being

deployed. They are possibly at the highest risk during the process of setting and hauling the gear. Observer data for the Atlantic pelagic longline fishery from 1992 through 2001 indicate that bycatch is relatively low (Table 5.4). Since 1992, a total of 92 seabird interactions have been observed, with 67 seabirds observed killed in the Atlantic pelagic longline fishery. No expanded estimates of seabird bycatch or catch rates are available for the pelagic longline fishery. Observed bycatch has ranged from 1 to 18 seabirds observed dead per year and 0 to 15 seabirds observed released alive per year from 1992 through 2001.

Table 5.4 **Seabird Bycatch in the Atlantic Pelagic Longline Fishery from 1992 to 2001.** MAB - Mid Atlantic Bight, SAB - South Atlantic Bight, NEC - Northeast Coastal, GOM - Gulf of Mexico. Source: NOAA Fisheries Observer Program.

Year	Month	Area	Type of Bird	Number observed	Status
1992	October	MAB	Gull	4	Dead
	October	MAB	Shearwater, Greater	2	Dead
1993	February	SAB	Gannet, Northern	2	Alive
	February	MAB	Gannet, Northern	2	Alive
	February	MAB	Gull, Black Backed	1	Alive
	February	MAB	Gull, Black Backed	3	Dead
	November	MAB	Gull	1	Alive
1994	June	MAB	Shearwater, Greater	3	Dead
	August	MAB	Shearwater, Greater	1	Dead
	November	MAB	Gull	4	Dead
	December	MAB	Gull, Herring	7	Dead
1995	July	MAB	Seabird	5	Dead
	August	GOM	Seabird	1	Dead
	October	MAB	Storm Petrel	1	Dead
	November	NEC	Gannet, Northern	2	Alive
	November	NEC	Gull	1	Alive
1997	June	SAB	Seabird	11	Dead
	July	MAB	Seabird	1	Dead
	July	NEC	Seabird	15	Alive
	July	NEC	Seabird	6	Dead
1998	February	MAB	Seabird	7	Dead

Year	Month	Area	Type of Bird	Number observed	Status
	July	NEC	Seabird	1	Dead
1999	June	SAB	Seabird	1	Dead
2000	June	SAB	Gull, Laughing	1	Alive
	November	NEC	Gannet, Northern	1	Dead
2001	June	NEC	Shearwater, Greater	7	Dead
	July	NEC	Shearwater, Greater	1	Dead

In the Atlantic bottom longline shark fishery, one pelican has been observed killed from 1994 through 2001. The pelican was caught in January 1995 off the Florida Gulf Coast (between 25 18.68 N, 81 35.47 W and 25 19.11 N, 81 23.83 W) (G. Burgess, pers. comm., 2001). No expanded estimates of seabird bycatch or catch rates are available for the bottom longline fishery.

NOAA Fisheries has not identified a need to implement gear modifications to reduce takes of seabirds in Atlantic HMS longline fisheries. Takes of seabirds are minimal in these fisheries in the Atlantic, probably due to night setting of the longlines or fishing in areas where there are not significant numbers of birds. Interested readers can refer to Alexander et al., 1997, for additional possibilities of mitigating measures for seabird mortality in longline fisheries.

6.0 DESCRIPTION OF THE ATLANTIC HMS FISHERIES

The HMS FMP provides a thorough description of the U.S. fisheries for Atlantic HMS. Below is specific information regarding the pelagic longline, bottom longline, shark gillnet, and handgear fisheries. As the final rule impacts these fisheries most directly, it is necessary to examine each fully.

6.1 Pelagic Longline Fishery

The U.S. pelagic longline fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, or bigeye tuna in various areas and seasons. Secondary target species include dolphin; albacore tuna; pelagic sharks including mako, thresher, and porbeagle sharks; as well as several species of large coastal sharks. Although this gear can be modified (i.e., depth of set, hook type, etc.) to target swordfish, tunas, or sharks, it is generally a multi-species fishery. These vessel operators are opportunistic, switching gear style and making subtle changes to target the best available economic opportunity of each individual trip. Longline gear sometimes attracts and hooks non-target finfish with no commercial value, as well as species that cannot be retained by commercial fishermen due to regulations, such as billfish. Pelagic longlines may also interact with protected species such as marine mammals, sea turtles, and seabirds. Thus, this gear has been classified as a Category I fishery with respect to the Marine Mammal Protection Act. Any species (or undersized catch of permitted species) that cannot be landed due to fishery regulations is required to be released, whether dead or alive.

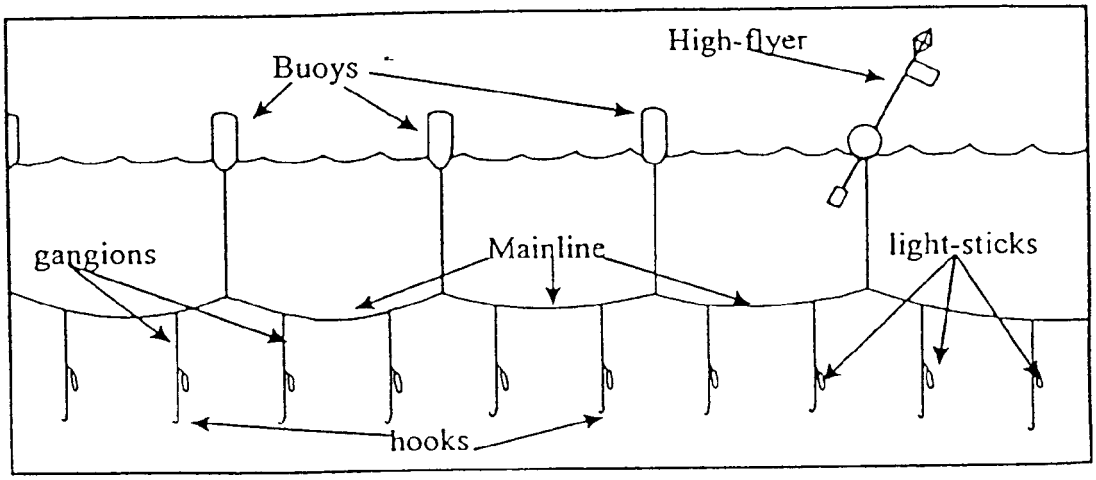

Figure 6.1 Typical U.S. pelagic longline gear. Source: Arocha, 1996.

Pelagic longline gear is composed of several parts (see Figure 6.1[2]). The primary fishing line, or mainline of the longline system, can vary from five to 40 miles in length, with approximately 20 to

[2] As of April 1, 2001, (66 FR 17370) a vessel is considered to have pelagic longline gear on board when a power-operated longline hauler, a mainline, floats capable of supporting the mainline, and leaders (gangions) with hooks are on board.

30 hooks per mile. The depth of the mainline is determined by ocean currents and the length of the floatline, which connects the mainline to several buoys and periodic markers which can have radar reflectors or radio beacons attached. Each individual hook is connected by a leader to the mainline. Lightsticks, which contain chemicals that emit a glowing light are often used, particularly when targeting swordfish. When attached to the hook and suspended at a certain depth, lightsticks attract bait fish which may, in turn, attract pelagic predators.

When targeting swordfish, the lines generally are deployed at sunset and hauled at sunrise to take advantage of swordfish nocturnal near-surface feeding habits (Berkeley *et al*., 1981). In general, longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. Except for vessels of the distant water fleet which undertake extended trips, fishing vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface. The number of hooks per set varies with line configuration and target catch (Table 6.1).

Table 6.1 **Average Number of Hooks per pelagic longline set, 1995-2000.** Source: Data reported in pelagic longline logbook.

Target Species	1995	1996	1997	1998	1999	2000
Swordfish	539	529	550	563	521	550
Bigeye Tuna	752	764	729	688	768	454
Yellowfin Tuna	721	679	647	685	741	772
Mix of tuna species	NA	NA	NA	NA	NA	638
Shark	654	531	540	706	613	621
Dolphin	NA	NA	NA	NA	NA	943
Other species	231	79	460	492	781	504
Mix of species	658	695	713	726	738	694

Figure 6.2 illustrates the difference between swordfish (shallow) sets and tuna (deep) longline sets. Swordfish sets are buoyed to the surface, have few hooks between floats, and are relatively shallow. This same type of gear arrangement is used for mixed target sets. Tuna sets use a different type of float placed much further apart. Compared with swordfish sets, tuna sets have more hooks between the floats and the hooks are set much deeper in the water column. It is believed that because of the difference in fishing depth, tuna sets hook less turtles than the swordfish sets. The hook types are also different for each target species. Swordfish sets generally use “J” hooks and tuna sets use “tuna” hooks, which are more curved than “J” hooks. In addition, tuna sets use bait only, while swordfish fishing uses a combination of bait and lightsticks. Compared with vessels targeting swordfish or mixed species, vessels targeting tuna typically are smaller and fish different grounds.

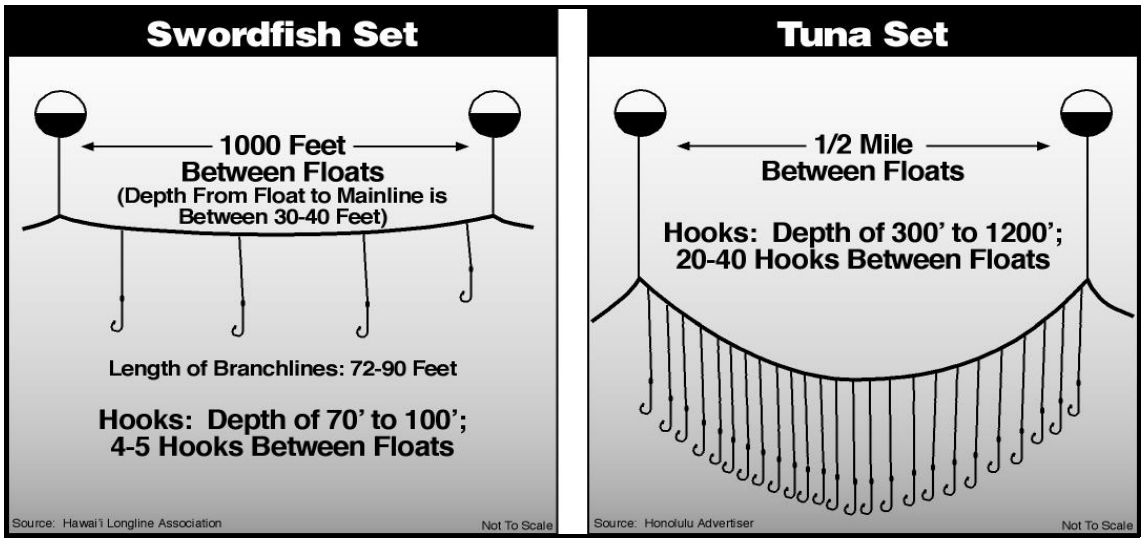

Figure 6.2 **Different longline gear deployment techniques.** Source: Hawaii Longline Association and Honolulu Advertiser.

6.1.1 Pelagic Longline Catch and Discard Patterns

The pelagic longline fishery sector is comprised of five relatively distinct segments with different fishing practices and strategies, including the Gulf of Mexico yellowfin tuna fishery, the south Atlantic-Florida east coast to Cape Hatteras swordfish fishery, the mid-Atlantic and New England swordfish and bigeye tuna fishery, the U.S. distant water swordfish fishery, and the Caribbean Islands tuna and swordfish fishery. Each vessel type has different range capabilities due to fuel capacity, hold capacity, size, and construction. In addition to geographical area, segments differ by percentage of various target and non-target species, gear characteristics, bait, and deployment techniques. Some vessels fish in more than one fishery segment during the course of the year. Pelagic longline catch (including bycatch, incidental catch, and target catch) is largely related to these vessel and gear characteristics but is summarized for the whole fishery in Table 6.2.

Table 6.2 **Reported catch of species caught by U.S. Atlantic pelagic longlines, in number of fish 1995-2000.** Reported in pelagic longline logbook.

Species	1995	1996	1997	1998	1999	2000
Swordfish Kept	72,788	73,111	68,274	68,345	64,370	60,101
Swordfish Discarded	29,789	23,831	20,613	22,579	20,066	16,711
Blue Marlin Discarded	3,091	3,310	2,614	1,291	1,248	1,392
White Marlin Discarded	3,432	2,924	2,812	1,490	1,971	1,237
Sailfish Discarded	1,195	1,443	1,766	827	1,404	1,086
Spearfish Discarded	445	553	390	105	156	79

Species	1995	1996	1997	1998	1999	2000
Bluefin Tuna Kept	239	209	180	206	239	232
Bluefin Tuna Discarded	2,852	1,709	688	1,304	601	737
Bigeye, Albacore, Yellowfin, Skipjack Tunas Kept	16,611	6,876	9,077	8,797	9,695	9,199
Pelagic Sharks Kept	5,885	5,270	5,134	3,624	2,705	2,932
Pelagic Sharks Discarded	90,173	84,330	82,220	44,000	28,910	26,281
Large Coastal Sharks Kept	57,676	36,022	21,382	8,742	1,025	7,752
Large Coastal Sharks Discarded	11,013	10,403	8,243	5,908	5,774	6,800
Dolphin Kept	72,463	35,888	62,811	21,864	29,902	28,095
Wahoo Kept	4,976	3,635	4,570	4,303	4,112	3,887
Turtles Discarded	1,142	498	267	885	627	270
Number of Hooks (X 1,000)	*11,064*	*10,657*	*9,861*	*7,676*	*7,488*	*7,570*

Marine Mammals

Of the marine mammals that are hooked by pelagic longline fishermen, many are released alive, although some animals suffer serious injuries and may die after being released. Mammals are caught primarily from June through December in the Mid-Atlantic Bight and Northeast Coastal areas (see Figure 6.3). In the past, the incidental catch rate was highest, on average, in the third quarter (July - September) in the Mid-Atlantic Bight. In 2000, there were 14 observed takes of marine mammals by pelagic longlines. This number has been extrapolated based on reported fishing effort to an estimated 403 mammals fleet-wide (32 common dolphin, 93 Risso's dolphin, 231 pilot whale, 19 whale, 29 pygmy sperm whale) (Yeung, 2001). Incidental catch of pilot whales in pelagic longlines is thought to result from pilot whales preying on tuna that have been caught on the gear.

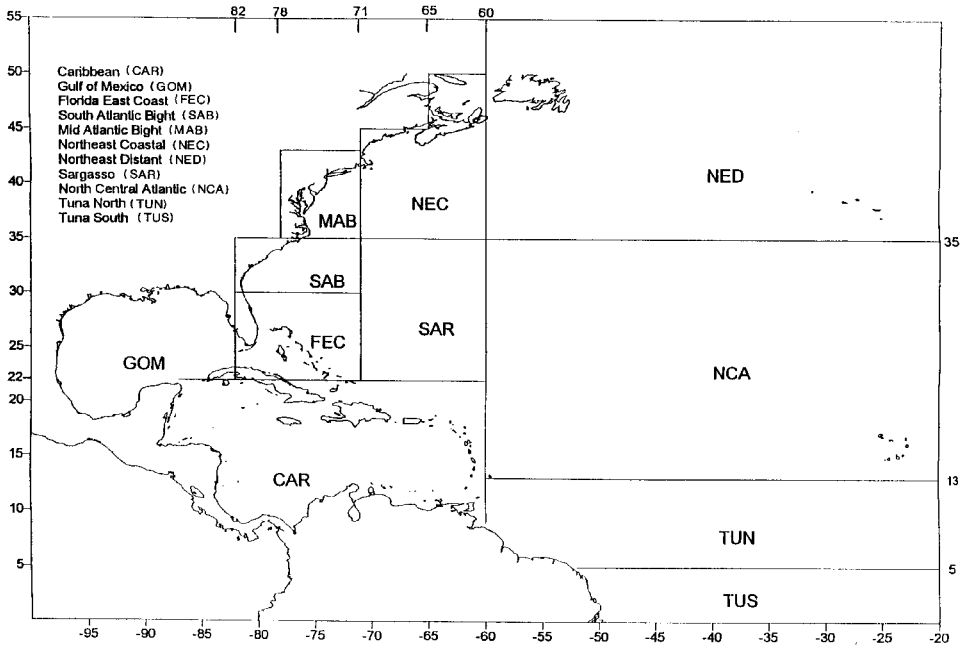

Figure 6.3 **Geographic areas used in summaries of pelagic logbook data.** Source: Cramer and Adams, 2000.

Sea Turtles

Many sea turtles are taken in the Northeast Coastal and Northeast Distant areas (Figure 6.3) and most are released alive. In the past, the bycatch rate was highest in the third and fourth quarters. Loggerhead and leatherback turtles dominate the catch of turtles. In general, sea turtle captures are rare, but takes appear to be clustered (Hoey and Moore, 1999).

6.1.2 U.S. Catch in Relation to International Catch of Atlantic Highly Migratory Species

The U.S. pelagic longline fleet targeting HMS in the Atlantic captures sea turtles at a rate estimated to average 986 loggerheads and 795 leatherbacks per year, based on observed takes and total reported effort from 1992 to 1999 (Table 5.3). Estimates for 2000 based on observed take and reported effort are 1256 loggerhead and 769 leatherback sea turtles (Yeung, 2001). Most of these takes occur on the high seas, rather than within the U.S. EEZ. The U.S. fleet is a small part of the international fleet that competes on the high seas for catches of tunas and swordfish. Although the U.S. fleet landed as much as 35 percent of the swordfish from the north Atlantic, north of 5°N. latitude in 1990, this proportion decreased to 25 percent by 1997. For tunas, the U.S. proportion of landings was 23 percent in 1990, decreasing to 16 percent by 1997. The U.S. fleet accounts for none or virtually none of the landings of swordfish and tuna from the Atlantic Ocean, south of 5°N. latitude, and does not operate at all in the Mediterranean Sea. Tuna and

swordfish landings by foreign fleets operating in the tropical Atlantic and Mediterranean are greater than the catches from the north Atlantic area where the U.S. fleet operates. Even within the area where U.S. fleet operates, the U.S. portion of fishing effort (in numbers of hooks fished) is less than 10 percent of the entire international fleet's effort, and likely less than that due to differences in reporting effort between ICCAT countries (NOAA Fisheries SEFSC, 2001). Since other ICCAT nations do not monitor incidental catches of sea turtles, an exact assessment of their impact is not possible. High absolute numbers of sea turtle catches in the foreign fleets have been reported from other sources, however (NOAA Fisheries SEFSC, 2001). If the sea turtle catch rates of foreign fleets, per hook, or even per pound of swordfish landed, are similar to the catch rates of the American fleet, then the American fleet may represent less than one-tenth and certainly no more than one-third of the total catch and mortality of sea turtles in north Atlantic pelagic longline fisheries.

Table 6.3 **Estimated international longline landings of HMS, other than sharks, for all countries in the Atlantic: 1996-2000 (mt ww)*.** Source: SCRS, 2001.

Species	1996	1997	1998	1999	2000
Swordfish (N.Atl + S. Atl)	31,331	30,302	24,376	25,308	23,796
Yellowfin Tuna (W. Atl)**	8,631	8,724	8,716	11,981	9,842
Bigeye Tuna	74,876	68,227	71,811	78,886	70,049
Bluefin Tuna (W. Atl.)**	528	382	764	914	589
Albacore Tuna (N. Atl + S. Atl)	25,092	23,490	23,573	27,203	28,221
Skipjack Tuna	26	65	99	49	28
Blue Marlin (N. Atl. + S. Atl.)***	3,444	3,612	2,483	2,442	1,934
White Marlin (N. Atl. + S. Atl.)***	1,237	974	884	954	798
Sailfish (W. Atl.)***	252	188	251	191	219
Total	**145,417**	**135,964**	**132,957**	**147,928**	**135,476**
U.S. Longline Landings (from U.S. Natl. Report, 2001b)#	**8,721.1**	**8,931.6**	**7,150.3**	**8,362.0**	**7,320.7**
U.S. Longline as Percentage of Longline Total	**6.0**	**6.6**	**5.4**	**5.6**	**5.4**

* landings include those classified by the SCRS as longline landings for all areas
**Note that the U.S. has not reported participation in the E. Atlantic yellowfin tuna fishery since 1983 and has not participated in the E. Atl bluefin tuna fishery since 1982.
***includes U.S. *dead discards*
includes swordfish longline discards and bluefin tuna discards

Mortality in the domestic and foreign pelagic longline fisheries is just one of the numerous factors affecting sea turtle populations in the Atlantic (National Research Council, 1990). Many sources of anthropogenic mortality are outside of U.S. jurisdiction and control. If the U.S. swordfish quota was to be relinquished to other fishing nations, the effort now expended by the U.S. fleet would be replaced by foreign effort. This could significantly alter the U.S. position at ICCAT and make the implementation of international conservation efforts more difficult. This would also eliminate the option of gear or other experimentation with the U.S. longline fleet, thus making it difficult to find reduction solutions which could be transferred to other longlining nations to effect a greater global reduction in sea turtle takes in pelagic longline fisheries. NOAA Fisheries is not aware of any foreign fleets that are currently using any conservation measures, and in the absence of a domestic fishing fleet subject to turtle conservation measures, foreign vessels would likely increase their fishing effort and turtle mortality would likely increase.

6.1.3 Regional U.S. Pelagic Longline Fisheries Description

The Gulf of Mexico Yellowfin Tuna Fishery

These vessels primarily target yellowfin tuna year-round; however, each port has one to three vessels that directly target swordfish either seasonally or year-round. Longline fishing vessels that target yellowfin tuna in the Gulf of Mexico also catch and sell dolphin, swordfish, other tunas, and sharks. During yellowfin tuna fishing, few swordfish are captured incidentally. Many of these vessels participate in other Gulf of Mexico fisheries (targeting shrimp, shark, and snapper/grouper) during allowed seasons. Major home ports for this fishery include Panama City, FL; Destin, FL; Dulac, LA; and Venice, LA.

For catching tuna, the longline gear is configured similar to swordfish longline gear, however, it is deployed differently. The gear is typically set out at dawn (between 2 a.m. and noon) and retrieved at sunset (4 p.m. to midnight). The water temperature varies based on the location of fishing. However, yellowfin tuna are targeted in the western Gulf of Mexico during the summer when water temperatures are high. In the past, fishermen have used live bait, however, NOAA Fisheries has recently banned the use of live bait in an effort to decrease bycatch and bycatch mortality of billfish (August 1, 2000, 65 FR 47214). Bait used includes frozen squid, Japanese mackerel, and local finfish. Circle hooks are most commonly used.

Yellowfin tuna inhabit tropical and subtropical waters of the Atlantic, prefer the upper 100 meters of the water column, and eat fishes, cephalopods, and crustaceans, with a preference for squid. This species is extensively fished in the Intertropical Atlantic (45° N - 40° S) by many nations using purse seine, longline, handline, and baitboat.

The South Atlantic ~ Florida East Coast to Cape Hatteras Swordfish Fishery

These pelagic longline vessels used to target swordfish year-round although yellowfin tuna and dolphin fish were other important marketable components of the catch. In 2001 (August 1, 2000,

65 FR 47214), the Florida East Coast closed area (year-round closure) and the Charleston Bump closed area (February through April closure) became effective. NOAA Fisheries plans to analyze logbook data from 2001 to determine the effectiveness of these closed areas and to determine what adjustments have been made by the vessels that used to fish in these areas.

Smaller vessels used to fish shorter trips from the Florida Straits north to the bend in the Gulf Stream off Charleston, South Carolina (Charleston Bump). Mid-sized and larger vessels migrate seasonally on longer trips from the Yucatan Peninsula throughout the West Indies and Caribbean Sea and some trips range as far north as the mid-Atlantic coast of the United States to target bigeye tuna and swordfish during the late summer and fall. Fishing trips in this fishery average nine sets over 12 days. Major home ports (including seasonal ports) for this fishery include Georgetown, SC; Cherry Point, SC; Charleston, SC; Fort Pierce, FL; Pompano Beach, FL; Dania, FL; and Key West, FL. This sector of the fishery consists of small to mid-size vessels which typically sell fresh swordfish to local high-quality markets. "J" hooks are most commonly used in this fishery sector.

The Mid-Atlantic and New England Swordfish and Bigeye Tuna Fishery

This fishery has evolved during recent years to become an almost year-round fishery based on directed tuna trips, with substantial numbers of swordfish trips as well. Some vessels participate in the directed bigeye/yellowfin tuna fishery during the summer and fall months and then switch to bottom longline fisheries and/or shark fishing during the winter when the large coastal shark season is open. Fishing trips in this fishery sector average 12 sets over 18 days. During the season, vessels primarily offload in the major ports of Fairhaven, MA; Montauk, NY; Barnegat Light, NJ; Ocean City, MD; and Wanchese, NC.

Bigeye tuna inhabit tropical and subtropical waters (50°N lat. and 45°S lat.) and range in surface waters to depths of 250 meters, this species tends to swim the deepest of the tunas. Bigeye tuna feed day and night on a variety of fish species including cephalopods and crustaceans. This species is mostly caught on deep-water longlines for the fresh fish market, but is also caught by baitboat and purse seine as a secondary species by other nations. Bait used is typically frozen squid.

The U.S. Atlantic Distant Water Swordfish Fishery

This fleet's fishing grounds range virtually the entire span of the western north Atlantic to as far east as the Azores and the mid-Atlantic Ridge. About ten large fishing vessels operate out of mid-Atlantic and New England ports during the summer and fall months, and move to Caribbean ports during the winter and spring months. Many of the current distant water operations were among the early participants in the U.S. directed Atlantic commercial swordfish fishery. These larger vessels, with greater ranges and capacities than the coastal fishing vessels, enabled the United States to become a significant player in the north Atlantic fishery. They also fish for swordfish in the south Atlantic. The distant water vessels traditionally have been larger than their

southeast counterparts because of the distances required to travel to the fishing grounds. Fishing trips in this fishery tend to be longer than in other fisheries, averaging 30 days and 16 sets. Principal ports for this fishery range from San Juan, PR through Portland, ME, and include Fairhaven, MA, and Barnegat Light, NJ. Bait used includes frozen squid and Boston mackerel. "J" hooks are most commonly used in this fishery sector. This segment of the fleet was directly affected by the L-shaped closure in 2000 and the NED closure in 2001.

The Caribbean Tuna and Swordfish Fishery

This fleet is similar to the southeast coastal fishing fleet in that both are comprised primarily of smaller vessels that make short trips relatively near-shore, producing high quality fresh product. Both fleets also encounter relatively high numbers of undersized swordfish at certain times of the year. Longline vessels targeting HMS in the Caribbean set fewer hooks per set, on average, fishing deeper in the water column than the distant water fleet off New England, the northeast coastal fleet, and the Gulf of Mexico yellowfin tuna fleet. This fishery is typical of most pelagic fisheries, being truly a multi-species fishery, with swordfish as a substantial portion of the total catch. Yellowfin tuna, dolphin and, to a lesser extent, bigeye tuna, are other important components of the landed catch. Principal ports are St. Croix, U.S. Virgin Island; and San Juan, Puerto Rico. Many of these high quality fresh fish are sold to local markets to support the tourist trade in the Caribbean. Bait used includes frozen squid.

Other Tunas

Other tunas, such as albacore, skipjack, and bonito are not targeted by longline fishermen in the Atlantic due to low market value but are often caught incidentally, landed and sold.

6.1.4 Experimental Fishery

Consistent with the BiOp, NOAA Fisheries initiated an experimental fishery in the NED area in consultation and cooperation with the domestic pelagic longline fleet. The goal is to develop and evaluate the efficacy of new technologies and changes in fishing practices to reduce sea turtle interactions. In 2001, the experiment attempted to evaluate 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. Eight vessels participated, making 186 sets, between August and November. During the course of the experimental fishery, 142 loggerhead and 77 leatherback sea turtles were incidentally captured and no turtles were released dead.

The data gathered during the 2001 experiment were analyzed to determine if the tested measures reduced the incidental capture of sea turtles by a statistically significant amount. The blue-dyed bait parameter decreased the catch of loggerheads by 9.5 percent and increased the catch of leatherbacks by 45 percent. Neither value is statistically significant. In examining the gangion

placement provision, the treatment sections of the gear (with gangions placed 20 fathoms from floatlines) did not display a statistically significant reduction in the number of loggerhead and leatherback sea turtle interactions than the control sections of the gear (with a gangion located under a floatline). The treatment section of the gear recorded an insignificant increase in the number of leatherback interactions.

The dipnets and line clippers were examined for general effectiveness. The dipnets were found to be adequate in boating loggerhead sea turtles. Several line clippers were tested, with the La Force line clipper having the best performance. Several types of dehooking devices were tested, with the work on these devices to continue in the 2002 NED experimental fishery.

6.1.5 Management of the Fishery

The U.S. Atlantic pelagic longline fishery is restricted by a limited swordfish quota, divided between the north and south Atlantic (separated at 5° N. lat.). Other regulations include minimum sizes for swordfish, yellowfin, bigeye, and bluefin tuna, limited access permitting, bluefin tuna catch requirements, shark quotas, protected species incidental take limits, reporting requirements (including logbooks), and gear requirements. Current billfish regulations prohibit the retention of billfish by commercial vessels, or the sale of billfish from the Atlantic Ocean. As a result, all billfish hooked on longlines must be discarded, and are considered bycatch. This is a heavily managed gear type, and as such, is strictly monitored to avoid overharvest of the swordfish quota.

Pelagic longline fishermen and the dealers who purchase HMS from them are also subject to reporting requirements. NOAA Fisheries has extended dealer permitting and reporting requirements to all swordfish importers as well as dealers who buy domestic swordfish from the Atlantic. These data are used to evaluate the impacts of harvesting on the stock and the impacts of regulations on affected entities.

6.2 Shark Bottom Longline Fishery

Large coastal sharks (LCS) are the predominant target species group in the bottom longline fishery, as meat and fins of these species are valuable. They are also caught by fishermen re-rigging pelagic longlines into bottom longline gear.

Bottom longline gear consists of a weighted longline about 10 miles long, containing about 750 hooks, that is fished overnight (average soak time 10.1 to 14.9 hours) with longer sets typical of the North Carolina and Florida Gulf fisheries and shorter sets typical of the South Carolina/ Georgia fishery (GSAFDF, 1997). Bottom longline gear is heavier-gauge than pelagic longline gear, and typically consists of a heavy monofilament mainline with lighter weight monofilament gangions. Some fishermen may use a flexible 1/16" wire rope as a short leader above the hook. Lightsticks are not used in the fishery. In 1997 and 1998, observer program data indicate that sets were made in 12-30° C water temperatures. Skates, sharks and finfish are used as bait.

Commercial shark fishing effort with bottom longline gear is concentrated in the southeastern United States and Gulf of Mexico. McHugh and Murray (1997) found in a survey of shark fishery participants that the largest concentration of bottom longline fishing vessels is found along the central Gulf coast of Florida, with the John's Pass - Madeira Beach area considered the center of directed shark fishing activities. As with all HMS fisheries, some shark fishery participants move from their home ports to active fishing areas as the seasons change.

6.2.1 Bottom Longline Catch and Bycatch

The 2001 observed catches of sharks in the directed bottom longline fishery are dominated by large coastal sharks (74.6 percent), with small coastal sharks comprising 25.2 percent and pelagic sharks comprising 0.2 percent. Sandbar sharks dominate the large coastal catch and landings (74.1 and 90.0 percent, respectively), followed by tiger sharks (10.8 and 2.3 percent, respectively), scalloped hammerheads (3 and 1.7 percent, respectively), and dusky sharks (2.2 and 1.6 percent, respectively; note that dusky sharks are a prohibited species so possession and landing is prohibited). Tiger sharks represent 56 percent of large coastal sharks tagged and released. Atlantic sharpnose sharks dominate the catches of small coastal sharks at 97.7 percent. Approximately 99 percent of small coastal sharks are used for bait in this fishery (only 10 out of 1,466 individuals were landed). Only 12 pelagic sharks were caught and landed - eleven shortfin mako and one thresher shark (NOAA Fisheries, 2002).

As of October 2001, approximately 390 fishermen had active incidental commercial shark limited access permits and 250 had active directed commercial shark limited access permits. The addresses of these permit holders range from Texas through Maine with nearly half (46 percent) of the permit holders located in Florida. Additionally, as of October 2000, there were 251 dealers permitted to buy sharks. Dealer addresses also range from Texas through Maine with 40 percent located in Florida.

A total of 37 sea turtles have been observed from 1994 through 2001 (G. Burgess, pers. comm. 2001). A total of 26 loggerhead turtles have been observed caught, with 18 released alive, 6 released dead, and 2 released condition unknown. A total of 4 leatherback turtles have been observed caught, with one released alive, one released dead, and 2 released condition unknown. An additional 7 unidentified species of sea turtle have been observed caught, with one released alive, one released dead, and five released condition unknown (G. Burgess, pers. comm. 2001).

6.2.2 Management of Fishery

Fishermen who wish to sell sharks caught in Federal waters must possess a Federal shark permit (directed or incidental). The shark fishery is limited access so permits can only be obtained through transfer or sale, subject to upgrading restrictions. Current commercial regulations for LCS include quotas, a trip limit of 4,000 pounds dressed weight for directed permits, and a trip limit of 5 LCS and 16 SCS and pelagic species combined for incidental permit holders. An LCS stock assessment is expected in 2002. The commercial regulations for pelagic sharks include

separate quotas for porbeagle and blue sharks and a trip limit of 16 pelagic and SCS for incidental permits. The commercial regulations for SCS include a trip limit of 16 pelagic and SCS for incidental permits. All three categories involve limited access permitting and reporting requirements, a ban on fishing, prohibited species, and authorized gears. Since 1997, the LCS fishing season has generally been open for three months (January-March) in the first fishing season and a few weeks (July-August) in the second season. The small coastal shark (SCS) and pelagic shark fisheries are also managed with semiannual seasons, but the available quota is rarely taken.

6.3 Shark Gillnet Fishery Description

The southeast shark gillnet fishery occurs in two major areas: between Fort Pierce and Port Salerno, FL, and northwest of Key West, FL. A small number of trips have been conducted in the past on the west coast of Florida by a vessel that also makes trips on the east coast of Florida. The fishery is currently comprised of about 6 vessels approximately 8-17 m long that use nets typically 547-2,736 meters long and 9.1- 13.7 meters deep, with stretched mesh from 12.7 to 25.4 cm. The nets are longer and deeper than those used previously (1993-1995), but the mesh size used has remained constant over time. Fishing trips are typically less than 18 hours long and are conducted in nearshore areas (within 30 nautical miles from port). South Carolina, Georgia, and Florida prohibit the use of commercial gillnets in state waters; prohibitions which forced these vessels into deeper Federal waters, where gillnets are less effective.

Some of the vessels set gillnets "drifting" to catch sharks; the net remains attached to the boat at one end as it "soaks." Other fishermen target sharks by "strikenetting," a method in which two boats corral the sharks with the net, similar to a purse seine (when behind a shrimp trawler, one boat is used). A spotter plane can be used to locate schools of sharks and to minimize bycatch. Alternatively, some vessels strike behind trawl vessels where shark schools tend to congregate. Strikenetting, required by the large whale regulations, implies a net that is set in a circle around a school of sharks and actively fished. The "southeast shark gillnet fishery" includes both strikenet and drift gillnet operations because the gear type is essentially the same. However, gillnetting operations imply a different range of bycatch levels and species, and the two fishing methods are therefore considered separately.

6.3.1 Drift Gillnet and Strikenet Catch and Bycatch

During the 2001 right whale calving season, a total of 70 drift gillnet sets and 12 strikenet sets were observed. Approximately 20 additional strikenet trips were made when the observer was on board but no strike was made due to inability to locate the school, sharks were located in state waters, and poor weather conditions. Observed catches on drift gillnet sets were comprised of 12 species of sharks (92.6 percent of numbers caught), 34 species of teleosts and rays (5.65 percent were teleosts, 1.58 percent were rays), three species of sea turtle (0.10 percent), and two species of marine mammals (0.04 percent; Carlson, 2001). By number, four species of sharks made up 94.3 percent of the number of sharks caught: blacktip (32.3 percent), bonnethead (31.2 percent),

Atlantic sharpnose (22 percent), and finetooth sharks (8.8 percent; Carlson, 2001). By weight, the shark catch was made up primarily of blacktip (40.1 percent), bonnethead (17.5 percent), Atlantic sharpnose (14.4 percent), scalloped hammerhead (9.4 percent), and great hammerhead sharks (8.9 percent).

Observed catches on strikenet sets during the 2001 right whale calving season were comprised of four species of sharks (99.9 percent of numbers caught) and three species of teleosts and rays (0.1 percent; Carlson, 2001). No marine mammals or sea turtles were caught while strikenetting. Blacktip sharks made up 99.9 percent of the shark catch when strikenetting. Bycatch included great barracuda, Atlantic guitar fish, and gray triggerfish (Carlson, 2001).

6.3.2 Management of the Fishery

Fishermen who wish to sell sharks caught in Federal waters must possess a Federal shark permit (directed or incidental). The shark fishery is limited access so permits can only be obtained through transfer or sale, subject to upgrading restrictions. However, Federal shark permits are not gear-specific so, although there are a limited number of shark gillnetters that operated in 2000, any of the shark permit holders may purchase gillnet gear and operate in the southeast shark gillnet fishery.

To reduce bycatch of right whales, NOAA Fisheries implemented a restricted area from November 15 through March 31, where only gillnets used in a strikenet fashion can operate during times when right whales are usually present. Operation in this area at that time requires 100 percent observer coverage. NOAA Fisheries also designated an area open to shark gillnet vessels fishing in a driftnet fashion but only under the condition that they carry an observer at all times during right whale calving season. Outside of the right whale calving season, observer coverage to produce reliable estimates of bycatch is required.

Vessel operators intending to use gillnets in the "observer area" during right whale season must notify NOAA Fisheries at least 48 hours in advance of departure to arrange for observer coverage. Observations of right whales in the observer area or restricted area outside this period, are rare, and a broader closure period, was not considered necessary to meet the objectives of the MMPA. After these requirements were implemented, NOAA Fisheries extended observer requirements to include all shark gillnet vessels at all times. The objective of that regulation was to collect bycatch information for all species (including turtles and finfish), consistent with requirements of the Magnuson-Stevens Act. In March, 2001 (66 FR 17370), the observer coverage for this fishery during non-right whale calving season was reduced to a level that would ensure a statistically significant level of coverage.

Gear provisions were also implemented to further the goals of the MMPA. NOAA Fisheries restricted the way gillnets used in a strikenet fashion are set in the southeast gillnet fishery to minimize the risk of entanglement. In addition, shark gillnets must be marked to identify the fishery and region in which the gear is fished. Strikenetting in the restricted area is permitted

during right whale season only if: (1) no nets are set at night or when visibility is less than 500 yards (460 m), (2) each set is made under the observation of a spotter plane, (3) no net is set within 3 miles of a right, humpback or fin whale, and (4) if a whale comes within 3 miles of set gear, the gear is removed from the water immediately. These measures were designed to minimize the risk of entangling any large whale.

6.4 Commercial Handgear Fishery

Handgear (rod and reel, handline, harpoon, and bandit gear) are used for Atlantic HMS by fishermen on private vessels, charter vessels, and headboat vessels. Operations, frequency and duration of trips, and distance ventured offshore vary widely. The proportion of domestic HMS landings harvested with handgear varies by species, with Atlantic tunas comprising the majority of commercial landings. Commercial handgear landings of all Atlantic HMS (other than sharks) in the United States are shown in Table 6.4. The fishery is most active during the summer and fall, although in the south Atlantic and Gulf of Mexico fishing occurs during the winter months. For bluefin tuna, commercial handgear landings accounted for approximately 60% of total U.S. bluefin tuna landings, and over 71% of commercial bluefin tuna landings. The commercial handgear fishery for bluefin tuna occurs mainly in New England, with vessels targeting large medium and giant bluefin. Beyond these general patterns, the availability of bluefin tuna at a specific location and time is highly dependent on environmental variables that fluctuate from year to year. Fishing usually takes place between eight and 200 km from shore using bait including mackerel, whiting, mullet, ballyhoo, herring, and squid.

The majority of U.S. commercial handgear fishing activities for bigeye, albacore, yellowfin, and skipjack tunas take place in the northwest Atlantic. In 1998, 4.3 percent of the total yellowfin catch, or 9.0 percent of the commercial yellowfin catch, was attributable to commercial handgear. The majority of these landings occurred in the northwest Atlantic Ocean. Commercial handgear landings of skipjack tuna accounted for less than one percent of total skipjack landings, or about 2.1 percent of commercial skipjack landings. The percentages of albacore are similar to those for skipjack, and handgear landings of bigeye tuna accounted for less than one percent of total and commercial bigeye landings. Swordfish are landed using harpoons and/or handlines. While commercial handgear is periodically used by New England fishermen, fishermen in the southeast may increase their handgear landings as the swordfish stock increases. Handgear landings of swordfish are shown in Table 6.4 and account for a very small percentage of total U.S. swordfish catch (less than 0.1%). There are a significant number of sharks landed by fishermen using commercial handgear. However, the nature of the data collected and assessed for Atlantic sharks does not readily allow a breakdown into various commercial gear types. Anecdotal evidence suggests that many charter and headboat vessel operators target sharks as an alternative when other species are unavailable.

6.4.1 Most Recent Catch and Landings Data

Updated tables of landings for the commercial handgear fisheries by gear and by area for 1997-

2000 are presented in Table 6.4. As commercial shark landings are not recorded/disaggregated by gear type, no commercial handgear data are provided in this section. A complete discussion of the commercial fisheries for Atlantic sharks is found in Sections 6.2 and 6.3.

Table 6.4 **Domestic landings for the commercial handgear fishery, by species and gear, for 1997-2000 (mt ww)**. Source: NOAA Fisheries, 2001b.

Species	Gear	1997	1998	1999	2000
Bluefin Tuna	Rod and Reel	617.8	603.4	643.6	579.3
	Handline	17.4	29.2	16.4	3.2
	Harpoon	97.5	133.4	114.4	184.2
	TOTAL	**732.7**	**766.0**	**774.4**	**766.7**
Bigeye Tuna	Troll	3.9	4.0	0	0
	Handline	2.7	0.1	12.3	5.7
	TOTAL	**6.6**	**4.1**	**12.3**	**5.7**
Albacore Tuna	Troll	5.2	5.8	0	0
	Handline	4.8	0	4.4	7.9
	TOTAL	**10.0**	**5.8**	**4.4**	**7.9**
Yellowfin Tuna	Troll	237.6	177.5	0	0
	Handline	90.6	64.7	219.2	283.7
	TOTAL	**328.2**	**242.2**	**219.2**	**283.7**
Skipjack Tuna	Troll	7.9	0.4	0	0
	Handline	0.1	0	6.6	9.7
	TOTAL	**8.0**	**0.4**	**6.6**	**9.7**
Swordfish	Troll	0.4	0.7	0	0
	Handline	1.3	0	5.0	8.9
	Harpoon	0.7	1.5	0	0.6
	TOTAL	**2.4**	**2.2**	**5.0**	**9.5**

Tables 6.5 and 6.6 display the estimated number of rod and reel and handline trips targeting large pelagic species in 2000 and 2001. The trips include commercial and recreational trips, and are not specific to any particular species. One can assume that most trips in Massachusetts, New Hampshire, and Maine were targeting bluefin tuna, and that most of these trips were commercial, as over 90 percent of Atlantic tunas vessel permit holders in these states have commercial General

category tuna permits. For the other states, the majority of the trips are recreational (in that fish are not sold), with the predominant targeted species consisting of yellowfin and bluefin tunas, and sharks. It should be noted that these estimates are preliminary and subject to change.

Table 6.5 **Estimated total trips targeting large pelagic species from June 5 through November 5, 2000.** Source: LPS telephone and dockside interviews.

State/Area	Private Vessel Trips	Charter Trips	Total
VA	930	198	1,128
MD/DE	1,008	915	1,923
NJ	2,934	1,279	4,213
NY	1,093	468	1,561
CT/RI	1,096	372	1,468
MA	6,390	1,108	7,498
NH/ME	1,221	233	1,454
Total	**14,672**	**4,573**	**19,245**

Table 6.6 **Estimated total trips targeting large pelagic species from June 4 through November 4, 2001.** Source: LPS telephone and dockside interviews.

State/Area	Private Vessel Trips	Charter Trips	Total
VA	910	307	1,217
MD/DE and Cape May County, NJ	2,675	655	3,330
NJ (not including Cape May County)	3,040	660	3,700
NY	2,039	280	2,319
CT/RI	497	203	700
MA	3,641	567	4,208
NH/ME	1,944	133	2,077
Total	**14,746**	**2,805**	**17,551**

6.4.2 Bycatch Issues and Data Associated with the Fishery

As compared with other commercial gear types, commercial handgear is thought to produce relatively lower levels of bycatch. However, bycatch in the yellowfin tuna commercial handgear fishery is unmonitored in those areas where commercial activities occur after the Large Pelagic Survey (LPS) sampling season. Rod and reel discards of HMS as assessed from LPS data are

discussed in the Recreational Section (6.5) as are new efforts in documenting catch and release survival rates. At this time, however, there is little information regarding important interactions and new data relating to commercial handgear bycatch. Anecdotal reports suggest that there may be an issue of small bluefin, yellowfin, and bigeye tuna discards, but there is no systematic information collection at this point. Some regulatory discards occur because fishermen must comply with minimum size restrictions.

6.4.3 Management of the Fishery

A thorough description of the commercial handgear fisheries for Atlantic tunas can be found in Section 2.2.3 of the HMS FMP. Social and economic aspects of the domestic handgear fisheries are described in section 2.2.4 of the HMS FMP and in chapters 5 and 6 of the SAFE report. For bluefin tuna, information regarding prices and markets, costs and expenses in the commercial fishery, exports and imports, processing and trade, charter/headboat fishing, and recreational fishing can be found in Section 2.2.4.1. Section 2.2.4.2 details commercial fishing, charter/headboat fishing, and recreational fishing for BAYS tunas.

The domestic swordfish fisheries are discussed in Section 2.3.3 of the FMP. Social and economic aspects of the domestic handgear fisheries are described in Section 2.3.4 and in chapters 5 and 6 of the SAFE report.

The domestic shark fisheries are discussed in Section 2.4.3 of the FMP. Directed fisheries for Atlantic sharks are conducted by vessels using bottom longline, gillnet, and rod and reel gear and discussed in Section 4.5 of this report. Social and economic aspects of the domestic handgear fisheries are described in Section 2.4.4 of the FMP, as well as in chapters 5 and 6 of the SAFE report.

6.5 Recreational Handgear Fishery

Atlantic tunas, sharks, and billfish are all targeted by recreational fishermen using rod and reel gear. Atlantic swordfish are also targeted and, although this fishery had declined dramatically over the past twenty years, recent anecdotal reports suggest that a recreational swordfish fishery may be growing in the mid Atlantic Bight and off the east coast of Florida.

6.5.1 Most Recent Catch and Landings Data

The recreational landings databases for HMS consists of data obtained through surveys including the Marine Recreational Fishery Statistics Survey (MRFSS), LPS, Southeast Headboat Survey (HBS), Texas Headboat Survey, and the Recreational Billfish Survey tournament data (RBS). Descriptions of these surveys, the geographic areas they include, and their limitations, are discussed in both the HMS FMP and the Billfish Amendment in Sections 2.6.2 and 2.3.2, respectively.

Reported domestic landings of Atlantic bluefin tuna (1983 through 1998) and bigeye, albacore, yellowfin, and skipjack tuna (1995 through 1997) are presented in Section 2.2.3 of the HMS FMP. As landings figures for 1997 and 1998 were preliminary in the HMS FMP, updated tables of landings for these recreational rod and reel fisheries in 1996-1999 are presented below with updates of other HMS species. Recreational landings of swordfish are monitored by the LPS and the MRFSS. However, because swordfish landings are considered rare events, it is difficult to extrapolate the total recreational landings from dockside intercepts.

Table 6.7 Updated domestic landings for the Atlantic tunas, swordfish and billfish recreational rod and reel fishery: calendar years 1996-2000 (mt ww)*. Source: NOAA Fisheries, 2002.

Species	Region	1996	1997	1998	1999	2000
Bluefin tuna**	NW Atlantic	362	299	184	99.9	49.5
	GOM	0	0	0	0.4	0.9
	Total	362	299	184	100.3	50.4
Bigeye tuna	NW Atlantic	108.2	333.5	228.0	316.1	34.4
	GOM	0	0	0	1.8	0
	Total	108.2	333.5	228.0	317.9	34.4
Albacore	NW Atlantic	277.8	269.5	601.1	90.1	250.75
	GOM	61.7	65.2	0	0	0
	Total	339.5	334.7	601.1	90.1	250.75
Yellowfin tuna	NW Atlantic	4,484.8	3,560.9	2,845.7	3,818.2	3,809.5
	GOM	13.2	7.7	80.9	149.4	52.3
	Total	4,498	3,569	2,927	3,967.6	3,861.8
Skipjack tuna	NW Atlantic	48.1	42.0	49.5	63.6	13.1
	GOM	36.4	21.7	37.0	34.8	16.7
	Total	84.5	63.7	86.5	98.4	29.8
Blue marlin***	NW Atlantic	17.0	25.0	34.1	24.8	NA
	GOM	8.3	11.5	4.5	7.5	NA
	Caribbean	9.6	8.6	10.6	4.6	NA
	Total	34.9	45.1	49.2	36.9	NA
White marlin***	NW Atlantic	2.7	0.9	2.4	1.5	NA
	GOM	0.6	0.9	0.2	0.1	NA

Species	Region	1996	1997	1998	1999	2000
	Caribbean	0.0	0.0	0.02	0	NA
	Total	3.3	1.8	2.6	1.6	NA
Sailfish***	NW Atlantic	0.2	0	0.1	0.07	NA
	GOM	0.8	0.4	1.0	0.6	NA
	Caribbean	0.2	0.2	0.05	0	NA
	Total	1.2	0.6	1.15	0.67	NA
Swordfish	Total	5.9	10.9	4.7	21.3	15.6

* Rod and reel catches and landings for Atlantic tunas represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
**Rod and Reel catch estimates for bluefin tuna in the U.S. National Report to ICCAT include both recreational and commercial landings. Rod and reel catch of bluefin less than 73" curved fork length (CFL) are recreational, and rod and reel catch of bluefin 73 inches CFL or greater are commercial. Rod and reel catch of bluefin > 73" CFL also includes a few metric tons of "trophy" bluefin (recreational bluefin 73").
***Blue marlin, white marlin, and sailfish landings are estimated based on the SEFSC Recreational Billfish Survey and the Large Pelagic Survey.
NA = not available at time of publication.

Tuna Recreational Fishery

Recreational tuna fishing regulations are the most complex and include a combination of minimum sizes, bag limits, limited seasons based quota allotment for bluefin tuna, and reporting requirements depending on the particular species and vessel type. Currently, Atlantic tunas are the only HMS species group that require a permit for recreational fishing. Bluefin tuna are the only HMS species managed under a recreational quota for which the fishing season closes after the quota has been met.

Swordfish Recreational Fishery

The recreational swordfish fishery in the north Atlantic Ocean has been expanding in recent years probably due to increased availability of small swordfish and increased interest in this sport. Fishermen typically fish off the east coast of Florida and off the coasts of New Jersey and New York. In the past, the New York fishery for swordfish has occurred incidental to overnight yellowfin tuna trips. During the day, fishermen targeted tunas, while at night they fished deeper for swordfish. This appears to have evolved into a directed fishery off Florida year-round and New Jersey in the summer months. The Florida fishery occurs at night when fishermen target swordfish using live bait, circle hooks, and lightsticks.

Existing survey strategies do not pick up landings of these fish which anecdotally appear to be frequent. Some handgear swordfish fishermen have commercial permits[3], others land swordfish for personal consumption. NOAA Fisheries is developing a strategy for sampling this fishery in order to accurately report recreational handgear-caught swordfish to ICCAT. These landings are currently counted against the Incidental quota.

Shark Recreational Fishery

Recreational landings of sharks are an important component of HMS fisheries. The following tables provides a summary of landing for each of the three species groups.

Table 6.8 **Final estimates of total recreational harvest of Atlantic sharks: 1995-2000 (numbers of fish in thousands)**. 2000 data are preliminary. Source: Cortes, 2000; Cortes, 2001a; and Cortes, 2001b.

Species Group	1995	1996	1997	1998	1999	2000
LCS	176.3	188.5	165.1	169.8	90.1	130.4
Pelagic	32.5	21.6	8.7	11.8	11.1	12.8
SCS	170.7	113.5	98.5	169.8	111.5	158.5

Billfish Recreational Fishery

Due to the rare nature of billfish encounters and the difficulty of monitoring landings outside of tournament events, reporting of recreational billfish landings are sparse. However, in 2000, the Recreational Billfish Survey Program documented 119 blue marlin, 8 white marlin, and 16 sailfish landings.

In support of the sailfish assessment conducted at the 2001 SCRS billfish species group meeting, document SCRS/01/106 developed indices of abundance of sailfish from the United States recreational billfish tournament fishery for the period 1973-2000. The index of weight per 100 hours fishing was estimated from numbers of sailfish caught and reported in the logbooks submitted by tournament coordinators and NOAA Fisheries observers under the Recreational Billfish Survey Program, as well as available size information. Document SCRS/01/138 estimated U.S. sailfish catch estimates from various recreational fishery surveys.

6.5.2 Bycatch Issues and Data Associated with the Fishery

Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen

[3]Access to the commercial swordfish fishery is limited; handgear fishermen however may purchase permits from other permitted fishermen because the permits are transferable.

value the experience of fishing and may not be targeting a particular pelagic species. Recreational "marlin" or "tuna" trips may yield dolphin, tunas, wahoo, and other species, both undersized and legally sized. Bluefin trips may yield undersized bluefin or a seasonal closure may prevent landing of a bluefin tuna above the minimum size. In some cases, therefore, rod and reel catch may be discarded.

The Billfish Amendment established a catch-and-release fishery management program for the recreational Atlantic billfish fishery. As a result of this program, all Atlantic billfish that are released alive in this fishery, regardless of size, are not considered bycatch. NOAA Fisheries believes that establishing a catch and release program in this situation will further solidify the existing catch-and-release ethic of recreational billfish fishermen, thereby increasing release rates of billfish caught in this fishery. The recreational white shark fishery is by regulation a catch-and-release fishery only and white sharks are not considered bycatch.

Bycatch can result in death or injury to discarded fish and bycatch mortality should be incorporated into fish stock assessments and evaluation of management measures. Rod and reel estimates from Virginia to Maine during June through October can be monitored through expanding survey data derived from the Large Pelagic Survey (dockside and telephone surveys). Actual numbers of fish discarded for many species are so low that presenting these data by area may be misleading, particularly if estimates are expanded for unreported effort in the future.

Table 6.9 Reported discards* of HMS in the rod and reel fishery. Source: LPS Preliminary Data.

Species	Number of Fish Kept					Number of Fish Discarded Alive				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
White Marlin**	7	11	6	4	21	203	465	156	705	285
Blue Marlin**	2	3	3	0	0	30	27	28	1,886	68
Sailfish**	0	1	0	-	-	2	2	3	-	-
Swordfish	5	1	3	0	15	6	5	1	0	57
Bluefin Tuna	749	653	396			1,181	1,105	327	1,789	
Bigeye Tuna	17	17	27	2,116	39	6	9	0	0	8
Yellowfin Tuna	1,632	2,646	2,501	26,727	11,833	224	645	682	1,436	546
Skipjack Tuna	285	261	146	-	0	468	267	88	0	0
Albacore Tuna	189	558	133	0	3,406	43	92	52	0	122
Thresher Shark	3	7	3	11	35	2	2	2	36	0
Mako Shark	51	78	49	0	120	86	92	49	0	486
Sandbar Shark	5	2	2	89	39	30	56	6	2	51
Dusky Shark	16	6	1	0	0	50	54	7	42	17

Species	Number of Fish Kept					Number of Fish Discarded Alive				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Tiger Shark	0	2	0	-	0	5	5	0	0	0
Blue Shark	68	26	11	473	6	1,897	780	572	13,769	2,019
Hammerhead Shark	1	1	1	3	4	4	4	5	0	2
Wahoo	6	71	45	803	125	1	2	0	0	14
Dolphinfish	920	7,263	2,139	7,753	8,364	61	194	73	4,878	345
King Mackerel	174	198	141	1,352	100	1	10	8	83	62
Atlantic Bonito	336	328	254	5,258	180	203	300	166	1,067	127
Little Tunny	587	1,231	97	403	216	1,015	1,507	133	783	204
Amberjack	3	6	9	3,154	55	18	40	24	463	0
Spanish Mackerel	-	-	-	190	23	-	-	-	0	0

*NOAA Fisheries typically expands these “raw” data to report discards of bluefin tuna by the rod and reel fishery to ICCAT. If sample sizes are large enough to make reasonable discard estimates for other species, NOAA Fisheries may estimate discard estimates of other bycatch species in future SAFE reports.
**The Billfish Amendment established billfish released in the recreational fishery as a “catch and release” program, thereby exempting these fish from bycatch considerations

Outreach programs were included as final actions in the HMS FMP and the Billfish Amendment as part of the management measures to address bycatch. These programs have not yet been implemented, but preparation of program designs are currently in progress. One of the key elements of the outreach program will be to provide information that leads to an improvement in post-release survival from both commercial and recreational gear. Section 3.5.2.2 in the Billfish Amendment includes a review of available information on post-release mortality. Table 3.5.3 of the Billfish Amendment and Table 3.40 of the HMS FMP list the existing studies, their methods, and conclusions. Approximately 90 percent, or greater, of blue and white marlin taken by U.S. recreational fishermen are released after capture, therefore, studies on post-release mortality are critical.

6.5.3 Management of the Fishery

Atlantic tunas, swordfish, and sharks are managed under the HMS FMP, while Atlantic billfish are managed separately under the Billfish Amendment. The history of Atlantic billfish management is reviewed in Section 1.1.1 of the Billfish Amendment. Summaries of the domestic aspects of the Atlantic tuna fishery, the Atlantic swordfish fishery, and the Atlantic shark fishery are found in Sections 2.2.3, 2.3.3, and 2.4.3, respectively, of the HMS FMP.

Recreational fishing for Atlantic HMS is managed primarily through the use of minimum sizes and

bag limits. Recreational tuna fishing regulations are the most complex and include a combination of minimum sizes, bag limits, limited seasons based quota allotment for bluefin tuna, and reporting requirements depending on the particular species and vessel type. Atlantic tunas are the only HMS species group that require a permit for recreational fishing at this time. Bluefin tuna are the only HMS species managed under a recreational quota for which the fishing season closes after the quota has been met. While Atlantic marlin have associated landing caps (a maximum amount of fish that can be landed), the overall strategy for management of recreational billfish fisheries is based on use of minimum size limits. The recreational fishery for swordfish is also managed through a minimum size requirement and there is a proposed bag limit (December 26, 2001, 66 FR 66386). The recreational shark fishery is managed through bag limits, minimum size requirements, and landing requirements (sharks must be landed with heads and fins attached). Additionally, the possession of 19 species of sharks is prohibited.

In 1997, ICCAT made several recommendations to recover billfish resources throughout the Atlantic Ocean, including reduction of Atlantic blue marlin (BUM) and white marlin (WHM) landings by at least 25 percent from 1996 levels, starting in 1998, to be accomplished by 1999; promote the voluntary release of live Atlantic BUM and WHM; and work to improve current monitoring, data collection and reporting in all Atlantic billfish fisheries. A 1998 ICCAT recommendation continued the requirement for a reduced level of marlin landings through 2000. Because commercial landings of Atlantic billfish by U.S.-flagged vessels were prohibited by the 1988 Atlantic Billfish FMP, the 25 percent reduction in blue and white marlin landings affects only recreational anglers in the United States. In November, 2000, ICCAT made a third recommendation for BUM and WHM by developing a two-phase rebuilding program. NOAA Fisheries has undertaken rulemaking activities to begin to implement this rebuilding program.

7. 0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES CONSIDERED

National standard (NS) 9 states that:

> *Conservation and management measures shall, to the extent practicable:*
> *(1) Minimize bycatch; and*
> *(2) To the extent bycatch cannot be avoided, minimize the mortality of such bycatch.*

Reducing bycatch, bycatch mortality, and incidental catch in HMS fisheries, particularly the Atlantic pelagic longline fishery, was identified in the HMS FMP as a critical management goal that needed to be addressed pursuant to this NS. Specifically, an objective of the HMS FMP is to "minimize, to the extent practicable, bycatch of living marine resources and the mortality of such bycatch that cannot be avoided in the fisheries for Atlantic tuna, swordfish, and sharks." The HMS FMP and a final rule published on August 1, 2000 (65 FR 47214), provide detailed discussions of bycatch and incidental catch issues associated with the various HMS commercial and recreational fisheries. Further, these documents also note that additional actions beyond those included in the HMS FMP or final rule would be necessary to address these bycatch, bycatch mortality and incidental catch concerns. Under ESA, the June 14, 2001, BiOp requires NOAA Fisheries to further reduce bycatch and bycatch mortality of sea turtles in HMS fisheries. The following sections evaluate a number of alternatives to meet this goal.

7.1 Alternatives for Analysis: Pelagic Longline Requirements

Alternative 1 (Final Action) — *Close the NED area to fishing with pelagic longline gear on board* (BiOp Requirement)

This action closes the NED area (20 to 60^{o} W, 35 to 55^{o} N) to all Federally permitted vessels, or those required to be permitted for HMS, with pelagic longline gear on board. The need for a closure will be reevaluated in spring 2004 following the completion of a three year experimental fishery that began in 2001.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

Observer and logbook data from pelagic longline vessels in the NED area in the third and fourth quarters (July to December) indicate high levels of sea turtle bycatch over the past several years. For example, based on logbook data from 1997 to 1999, closing the NED area for the entire year will reduce the number of loggerhead and leatherback turtles captured in this fishery by 76 percent and 65 percent, respectively, assuming no redistribution of the fishing effort displaced out of the NED. Even assuming that all of the fishing effort that occurred in the NED area shifts into the adjacent area, the northeast coast statistical reporting (NEC) area, which also has a relatively high bycatch rate, the number of takes per year will still be reduced by 67 percent for loggerheads and 58 percent for leatherbacks, based on the logbook data (Table 7.1). Additionally, Hoey and

Moore (1999) stated that in many cases, two or more sea turtles have been caught per longline set in the NED area, which indicates that pelagic longline fishing in this area poses a potentially greater risk to listed species of sea turtles than pelagic longline fishing in other areas (where multiple sea turtle takes per set are less frequent). Hoey and Moore (1999) found that the NED area was the only observed area where four or more sea turtles were caught on a single set, and that 19 sets caught three sea turtles per set and 22 sets caught two sea turtles per set contrasted to the mid-Atlantic bight statistical reporting (MAB) and NEC areas where three sets caught three sea turtles per set, and 11 sets caught two sea turtles per set.

Table 7.1 **The estimated percent reductions of loggerhead and leatherback sea turtles interactions for the NED area closure under the no effort redistribution and effort redistribution models.** Source: Logbook reports from 1997 through 1999.

Month	Number of leatherback sea turtles reported caught in NED area	Number of loggerhead sea turtles reported caught in NED area	Percent reduction of leatherback sea turtles		Percent reduction of loggerhead sea turtles		Percent reduction if all the effort in the NED area goes to the NEC area	
			No effort redistr.	Effort redistr.	No effort redistr.	Effort redistr.	Leatherback	Loggerhead
Jan.	0	0	0.00	0.00	0.00	0.00	0.00	0.00
Feb.	0	0	0.00	0.00	0.00	0.00	0.00	0.00
Mar.	0	0	0.00	0.00	0.00	0.00	0.00	0.00
Apr.	0	0	0.00	0.00	0.00	0.00	0.00	0.00
May	1	6	0.27	0.27	0.47	0.47	0.27	0.46
Jun.	18	56	4.84	4.48	4.42	4.09	3.94	1.90
Jul.	81	473	21.77	21.30	37.30	36.19	21.02	33.25
Aug.	60	137	16.13	15.20	10.80	10.22	13.47	8.93
Sep.	43	140	11.56	10.90	11.04	10.70	9.56	10.41
Oct.	37	154	9.95	9.79	12.15	11.97	9.37	11.53
Nov.	1	2	0.27	0.22	0.16	0.14	0.27	0.14
Dec.	0	0	0.00	0.00	0.00	0.00	0.00	0.00
Total	**241**	**968**	**64.78**	**62.51**	**76.34**	**74.81**	**57.90**	**66.62**

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

Initially, the closure may result in fewer target and bycatch species, such as swordfish, blue sharks, and sea turtles, being captured by pelagic longlines. The NED area is one of the highest

areas of blue shark discards for U.S. fishermen and has the greatest incidence of sea turtles interactions. However, if the U.S. vessels are not fishing in the NED area, vessels of the international fleet may begin fishing in that area, which could result in the same or increased levels of bycatch of other species. As international vessels are not known to practice the same conservation measures that the United States has implemented, greater ecological harm may befall the impacted species and associated ecosystem if foreign vessels move to the NED area.

Effects on Marine Mammals and Seabirds

The Atlantic pelagic longline fishery is considered a Category I fishery under the MMPA. In 2000, there were 14 observed takes of marine mammals by pelagic longlines. This number has been extrapolated out to an estimated 403 mammals fleet-wide (32 common dolphin, 93 Risso's dolphin, 231 pilot whale, 19 whale, 29 pygmy sperm whale) (Yeung, 2001). The NED area accounted for only 23 of these takes. By closing the NED area, NOAA Fisheries may redistribute fishing effort into areas of higher marine mammal concentrations.

Gannetts, gulls, greater shearwaters, and storm petrels are occasionally hooked by Atlantic pelagic longlines (Table 5.4). These species and all other seabirds are protected under the Migratory Bird Treaty Act. Seabird populations are often slow to recover from excess mortality as a consequence of their low reproductive potential (one egg per year and late sexual maturation). The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line; the line sinks and the birds are subsequently drowned. Since 1992, a total of 92 seabird interactions have been observed, with 67 seabirds observed killed, in the Atlantic pelagic longline fishery. Most of these interactions occurred in the NEC and MAB areas (Table 5.4). There were no interactions in the NED areas. Based on this limited information and the level and location of effort redistribution, closing the NED area could slightly increase the incidental capture of seabirds in the pelagic longline fisheries if the NED vessels relocated their fishing effort to the NEC or MAB areas.

Effects on Essential Fish Habitat

The HMS FMP and the Billfish Amendment state that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the U.S. Atlantic pelagic longline fishery. The HMS FMP describes habitat damage by pelagic longlines as negligible to the pelagic environment. Area closures to pelagic longline gear are not anticipated to have a negative effect on the EFH for Atlantic HMS.

Changes in Fishing, Processing, Disposal, and Marketing Costs

A closure of the NED area could result in changes in fishing, processing, marketing practices, and costs because effort could be redistributed to other areas and fishermen might sell their catch to previously unknown dealers. As shown in Larkin *et al*. (2000) and Porter *et al*. (2001) fishing costs vary depending on the area fished. Thus, depending on the area NED area fishermen move

to, fishing costs could stay relatively the same (e.g., if they move to the Caribbean) or they could decrease (e.g., they move to the NEC). However, the net revenues of the trips in all areas, except the Caribbean, are lower than the net revenues in the NED area. Thus, NOAA Fisheries expects that NED area fishermen would move to the Caribbean where net revenues are similar to NED area net revenues.

Because some fishermen currently have strong financial and loyalty links to their dealers, closing the NED area could affect both dealers and fishermen economically and socially. The long-standing relationships between certain vessel operators and dealers at specific locations can provide financial benefits to both parties. Closing the NED area, therefore, could convey reduced certainty to dealers (supply of raw product) and a lack of a credit source (or other services) for vessel operators. This is especially true for dealers of NED area fishermen because NED area fishermen land such a high percent of the total U.S. swordfish catch. Some NED area fishermen might continue to sell to their original buyer; however, transport costs for the catch might increase and the amount of fish landed might decrease.

The secondary processing firms are not likely to be affected as much by any of the closure alternatives if they currently depend on imported swordfish or tunas throughout the year. If they do not currently work with these imported species, it is possible they would be able to replace their domestic fish supply with imports or with fish caught in open areas. Most of these firms handle species caught in other fisheries as well, which also provides them some flexibility.

Changes in Fishing Practices and Behavior of Fishermen

As a result of a NED area closure, pelagic longline fishermen might: 1) stop fishing for HMS and sell their limited access permits for shark, swordfish, and tunas and possibly their vessel or 2) fish for HMS in an open area. Because of their size, the NED area vessels could move to any location reasonably safely. Additionally, because of their size, these vessels could take longer trips than the vessels that have traditionally fished in those areas. Furthermore, because there are so few NED area vessels, their movement to other areas would be unlikely to cause any further crowding on traditional fishing grounds in other areas.

In the short-term, NOAA Fisheries hopes that eligible vessels that have traditionally fished the NED area will participate in the three year experiment. The purpose of the experiment is to test different fishing practices to reduce interactions and mortality of sea turtles in the pelagic longline fleet. The results of the experiment could alter fishing practices and behavior of all pelagic longline fishermen in the long-term.

Changes in Research, Administration, and Management Effectiveness

The closure of the NED area and subsequent experiment in the NED area will increase research, administration, and enforcement costs, due largely to evaluating and monitoring the closure and running the experiment. At the moment, the primary mechanism for monitoring pelagic longline

activity is fly overs, at sea boardings, and visits to the dock. However, depending on the result of an ongoing lawsuit, NOAA Fisheries hopes to increase monitoring of the pelagic longline fleet with the implementation of a Vessel Monitoring System (VMS) program as described in the HMS FMP and a remand document submitted to the court. Implementing a fleet-wide VMS program has substantial initial administration and enforcement costs; however, once the program is established, its capabilities will allow for more effective use of limited assets to enforce closed areas. Additionally, depending on the results of the three year experiment, the NED area may be re-opened. This would reduce enforcement and research costs to their current levels.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

Fewer than 20 vessels fish in the NED area in any given year (Table 7.2). In 1999, out of 224 vessels that reported using pelagic longline gear, 10 fished in the NED. In 2000, out of the 171 vessels that reported using pelagic longline gear, 13 vessels fished in the NED. However, these few vessels land a significant portion of the swordfish by the U.S. pelagic longline fleet. In 1998, the 15 vessels fishing in the NED area landed 19.8 percent of all the swordfish landed by U.S. pelagic longline fishermen. In 1999, the 10 vessels in the NED area landed 18.3 percent of all the swordfish landed by U.S. pelagic longline fishermen. In 2000, the 13 vessels in the NED area landed 24.7 percent of all the swordfish landed by U.S. pelagic longline fishermen (Cramer 2001). Thus, although few fishermen actively participate in the NED area each year, the fishermen that are active in the NED area report landing a substantial amount of the swordfish relative to the entire fleet and closing the area could reduce the amount of domestic swordfish available for consumption if the supply shortfall could not be made up from other fishing areas or through increased imports.

Table 7.2 **The number of swordfish and tunas caught (kept and discarded) in 1998 and 1999.** Source: Cramer and Adams, 2001

Area	Year	Swordfish	Yellowfin tuna	Bigeye tuna	Bluefin tuna	Albacore tuna	Number of vessels
CAR	1998	5,269	319	386	1	205	30
	1999	3,171	91	235	2	120	18
GOM	1998	12,131	37,623	415	173	82	98
	1999	12,684	59,050	507	319	104	89
FEC	1998	14,206	996	2,916	54	742	69
	1999	16,789	1,589	2,767	63	496	53
SAB	1998	19,974	1,656	92	16	93	53
	1999	19,638	5,658	118	14	47	45

Area	Year	Swordfish	Yellowfin tuna	Bigeye tuna	Bluefin tuna	Albacore tuna	Number of vessels
MAB	1998	8,275	8,451	6,592	934	3,905	64
	1999	7,745	13,278	11,255	202	5.566	68
NEC	1998	5,921	4,691	5,415	312	1,512	40
	1999	4,199	3,736	4,666	202	1,425	39
NED	1998	15,677	96	1,552	27	103	15
	1999	13,877	13	1,063	54	116	10
SAR	1998	159	29	219	24	278	9
	1999	208	162	45	4	49	4
NCA	1998	4,495	150	278	3	332	12
	1999	2,253	76	172	0	151	9
TUN	1998	1,117	722	784	0	97	12
	1999	534	291	279	0	13	9
TUS	1998	4,431	956	656	0	31	11
	1999	4,856	532	1,614	0	42	8
Total	**1998**	**91,655**	**55,689**	**19,305**	**1,544**	**9,380**	**210**
	1999	**85,954**	**84,476**	**22,721**	**860**	**8,129**	**193**

This reduction in swordfish landings could also affect dealers, especially those who are supplied by the vessels fishing in the NED area, who as a result of the closure would receive approximately 20 percent fewer swordfish to process. Bait houses and equipment suppliers would not be affected as much as dealers or fishermen because, in the worst case scenario, only 10 to 20 vessels would go out of business as a result of the closure of the NED area. Presumably, bait houses and equipment suppliers rely on more than 10 to 20 vessels to remain in business, although NOAA Fisheries realizes that these 10 to 20 vessels, on average, probably require more bait and equipment than many other vessel types. Although domestic swordfish landings could decrease, U.S. consumers would not likely be affected because the United States already imports large amounts of swordfish each year from other countries (13,842,970 kg in 1999, 14,314,075 kg in 2000, NOAA Fisheries, 2002) and importers would likely expand their business depending on demand.

In general, gross and net revenues for vessels that fish in the NED area are much higher than the gross and net revenues for vessels that fish in other areas, with the possible exception of the Caribbean. Using the data presented in Table 7.2, the ex-vessel price information available in the

2001 SAFE report (NOAA Fisheries, 2001d), and the total weight of swordfish reported to ICCAT in the U.S. National Report (NOAA Fisheries, 2000b), the total annual ex-vessel gross revenues from swordfish alone for the 10 vessels fishing in the NED area in 1999 were approximately $3.2 M with an average annual ex-vessel gross revenue of $323,532 per vessel. Similarly, the 15 vessels active in 1998 landed approximately $3.6 million in total ex-vessel gross revenues from swordfish alone with an average of $237,753 ex-vessel gross revenues per vessel (Table 7.3). If information more specific to NED area vessels and their NED area landings is used (i.e., weights reported to dealers in ports commonly used by vessels fishing in the NED area and the addition of bigeye tuna revenues) (Table 7.4), the average annual ex-vessel gross revenues per vessel for 1999 is $325,545 and for 1998 is $188,561. The average annual ex-vessel gross revenues per vessel for vessels in areas other than the NED area was $41,053 in 1998 and $46,473 in 1999. The estimated total annual ex-vessel gross revenues from swordfish for all areas except the NED area is $13.9 million for 1999 and $14.2 million in 1998. Using 2000 weigh-out data and 2000 average prices from the north Atlantic region, the 13 active vessels landed a total of $5 million in gross revenues from all species with an average gross revenues per trip of $106,903 (see Table 8.4). Similarly, the vessels outside the NED area landed a total of $29 million in gross revenues from all species (see Table 8.4). Thus, closing the NED area could reduce the total annual ex-vessel gross revenues by pelagic longline gear by almost 20 percent.

Table 7.3 **The estimated annual gross revenues for vessels from swordfish landed from all areas for 1998 and 1999.** The average price per lb. changes between areas. Source: Cramer and Adams, 2001; NOAA Fisheries, 2001d; NOAA Fisheries, 2000b.

Area	Year	Swordfish landed	Total annual gross revenues for all vessels ($M)	Number of vessels	Average annual gross revenues per vessel ($K)
CAR	1998	4,260	$1.11	30	$36.9
	1999	2,600	$0.68	18	$38.0
GOM	1998	8,523	$2.22	98	$22.6
	1999	7,960	$2.10	89	$23.5
FEC	1998	9,003	$2.29	69	$33.1
	1999	12,259	$3.15	53	$59.4
SAB	1998	14,185	$3.60	53	$68.0
	1999	14,708	$3.78	45	$84.0
MAB	1998	4,918	$1.32	64	$20.7
	1999	4,709	$1.28	68	$18.9

Area	Year	Swordfish landed	Total annual gross revenues for all vessels ($M)	Number of vessels	Average annual gross revenues per vessel ($K)
NEC	1998	4,067	$1.09	40	$27.2
	1999	3,003	$0.81	39	$20.9
NED	1998	13,308	$3.57	15	$237.8
	1999	11,932	$3.23	10	$323.5
SAR	1998	137	$0.03	9	$3.8
	1999	171	$0.04	4	$11.0
NCA	1998	4,074	$1.03	12	$86.2
	1999	1,974	$0.51	9	$56.4
TUN	1998	882	$0.22	12	$18.7
	1999	427	$0.11	9	$12.2
TUS	1998	4,032	$1.02	11	$93.1
	1999	4,370	$1.12	8	$140.4
Total	**1998**	**67,633**	**$17.76**	**210**	**$84.6**
	1999	**64,365**	**$17.10**	**193**	**$88.6**

Table 7.4 **The estimated annual gross revenues for vessels from swordfish and bigeye tuna landed from the NED area for 1997-2000 using data specific to those vessels that fished in the NED area.** Source: Data maintained by the NEFSC and SEFSC.

Year	Number of vessels	Average annual gross revenues per vessel ($K)
1997	22	$152.2
1998	15	$188.6
1999	10	$325.5
2000	13	$386.5
Average	15	$263.2

NOAA Fisheries hopes that at least a few vessels who normally fish in the NED area will decide to participate in the experimental fishery NOAA Fisheries is conducting in the NED area. If this happens, NOAA Fisheries expects that those fishermen who participate would be compensated as appropriate and that dealers who rely on those fishermen would receive some of the swordfish normally expected. Additionally, bait houses and equipment suppliers would still be required by any of the participating vessels. Thus, the experimental fishery could mitigate some of the economic impacts to those vessels that participate.

Any benefits to U.S. fishermen as a result of closing the NED area would arise if fishermen decided to fish in areas closer to shore or in the Caribbean. If the fishermen do decide to fish in open areas closer to shore, they would experience fewer costs in terms of fuel and may be able to spend the time usually spent traveling to the NED area fishing in those areas. If the fishermen who fish in the NED area land as many swordfish fishing in these other areas, they may experience higher net revenues. However, given the estimated gross revenues for vessels in these other areas, this may be unlikely.

Instead, closing the NED area will likely have benefits for the nation as a whole in terms of the existence value of turtles. The existence value is the value that society at large places on the recovery of turtle populations. It is also possible that U.S. consumers would be willing to pay more for domestic swordfish if they perceive that the U.S. pelagic longline fleet is fostering sea turtle recovery and working towards a solution to reduce interactions with sea turtles for all international fleets. Although there is limited evidence of effective market segmentation in seafood trade, this could benefit dealers, processors, and fishermen.

Changes in the Distribution of Benefits and Costs

Depending on the course of action taken by individual vessels, this action could have large economic impacts on the fewer than 20 vessels that normally fish in the NED area. Those vessels could volunteer to participate in the experimental fishery in the NED area. The vessels that do participate would be able to continue fishing in the NED area pursuant to the terms of the experimental fishery, and could receive some monetary compensation to offset lost revenues attributable to gear modifications and other variables of the experiment. Thus, participating vessels may not be significantly affected by this action, at least during the experiment (see Chapter 8 for further discussion of the economic impacts of the NED closed area). Affected vessels could also decide to fish in the open areas either near shore (compared to the NED area) or farther away from their current homeports (e.g., the Caribbean). Those vessels that stay near shore would probably have fewer variable costs and could spend time usually spent traveling on fishing. However, none of the ex-vessel gross revenues from these other areas are, on average, as large as those expected from fishing in the NED area (Table 8.4) so any vessel that chooses this course of action may experience some decreased revenue. These impacts of increased costs and decreased revenues may be enough to put some of the vessels out of business. Vessels could also reflag to another country. NOAA Fisheries is unsure what net economic costs or benefits might arise for the individual vessel under this circumstance.

Social Effects

Because the fishermen in the NED area report landing approximately 20 percent of all the swordfish landed by commercial U.S. fishermen, closing the NED area could also have an adverse impact on dealers. However, the experimental fishery could mitigate impacts on these dealers at least in the short-term.

Consumers may notice a decrease in the supply of fresh fish if importers are unable to increase their supplies. Also, as a result of the BiOp and resulting rules, consumers may perceive U.S.-caught fish as more environmentally sound and demand domestic fish. If this occurs, it is possible that fishermen fleet-wide may experience an increase in ex-vessel revenues depending on the demand of consumers.

This closure could have noticeable impacts on the communities that depend on the vessels that fish in the NED area. Any impact would depend on the course of action taken by each individual vessel.

Summary

Closing the NED area will reduce the number of sea turtle takes in the HMS Atlantic pelagic longline fishery by approximately 70 percent (Table 7.1). While closing this area could increase marine mammal and seabird takes slightly and could have large economic and social impacts, until gear modifications are designed and tested to reduce sea turtle takes, this alternative is the only alternative that meets the BiOp requirements to reduce sea turtle takes in the HMS Atlantic pelagic longline fishery. In the short-term, it is likely that the economic and social impacts could be minimized if NED area fishermen participate in the experimental fishery.

Alternative 2 (Not Selected) — *Prohibit vessel operators using pelagic longline gear from setting gangions next to floatlines (must be two gangion lengths away)* (BiOp Requirement)

Implementing this alternative would prohibit fishermen on all Federally permitted vessels, or those required to be permitted for HMS, engaged in pelagic longline fishing for HMS from attaching gangions to the mainline within two gangion lengths of the floatline attachment to the mainline.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

Data from the Hawaii pelagic longline fishery indicate that hooks that are beneath or adjacent to floatlines have a much higher sea turtle catch rate than hooks one or more positions away from the floatline (Kleiber, 2000). In observer data from the Hawaii fleet, hooks nearest the floatline caught 45 percent of all loggerheads, but only represented 19 percent of the hooks fished on sets that caught loggerheads. Hooks nearest the floatline caught 49 percent of all leatherbacks, but only represented 17 percent of the hooks fished on sets that caught leatherbacks. Based on this

information, the June 14, 2001, BiOp estimated that eliminating hooks in this position could, theoretically, reduce takes of leatherbacks and loggerheads by as much as 49 percent and 45 percent, respectively. The June 14, 2001, BiOp noted that such a large reduction is unlikely as turtles might still be caught on the hooks set farther from the floatline. Because of this, the BiOp estimated that the reductions in sea turtle captures due to this measure would be 22-percent for loggerheads and 24-percent for leatherbacks.

In the Atlantic pelagic longline fishery, as demonstrated during the 2001 NED experimental fishery, shifting gangions away from floatlines does not significantly reduce interactions with sea turtles. In the case of leatherback sea turtles, shifting gangions from floatlines may increase incidental captures. Loggerhead captures in the treatment sets did not change significantly from the number of captures in the control sets. Because of its lack of effectiveness and the possibility of increasing sea turtle takes, NOAA Fisheries is not selecting this alternative.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

Preliminary data from the 2001 experimental fishery concerning target catch indicate that moving gangions away from floatlines does not decrease the catch of target species. Some swordfish fishermen add the gangion adjacent to the floatline because they believe that the action imparted to the hook by wave motion makes the bait presentation more attractive to swordfish (Thompson, 2001). However, a preliminary analysis of data on swordfish caught in the Hawaii-based fishery indicates that the distribution of all hooks that caught swordfish was not much different from the distribution of all hooks available to the swordfish (Thompson, 2001). Thus, NOAA Fisheries would not expect this alternative to reduce the catch rate of swordfish although a reduction in the number of hooks could reduce the amount of swordfish caught. However, this alternative may not affect the number of hooks fished per set if the length of the mainline is increased or the hook spacing is decreased to maintain a similar number of hooks.

Effects on Marine Mammals and Seabirds

This alternative is not expected to have any positive or negative impact on the catch of marine mammal and seabird species. While marine mammals can be hooked on pelagic longline gear, there are no reports indicating that more marine mammals are caught on hooks near floatlines as opposed to other hooks along the length of the mainline. Thus, because the number of hooks is likely to remain the same, NOAA Fisheries would not expect this alternative to change the number of marine mammals hooked on pelagic longline gear. Similarly, because seabirds are caught on pelagic longline during the hauling and setting of the gear, changing the placement of the hooks along the longline is unlikely to have an impact on the number of seabirds caught.

Effects on Essential Fish Habitat

The HMS FMP and Amendment One to the Atlantic Billfish FMP state that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the U.S. Atlantic pelagic longline fishery. The HMS FMP describes habitat damage by pelagic longlines as negligible to the pelagic environment. Gear modifications are not anticipated to have a negative effect on the EFH for Atlantic HMS.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would have minimal economic impacts on fishermen or communities. Fishermen may decide to buy additional monofilament to extend the length of the mainline if they decide to keep the same spacing of hooks between floatlines. However, if fishermen wish to maintain the length of the mainline, they may reduce the spacing of the gangions between the floatlines or reduce the number of gangions. NOAA Fisheries would not expect this alternative to affect the catch rates of target catch. Thus, ex-vessel gross revenues and variable costs would not be expected to change.

Changes in Fishing Practices and Behavior of Fishermen

This alternative would cause fishermen to re-rig their longlines which might take some initial training for the crew. Fishermen may decide to buy additional monofilament to extend the length of the mainline if they decide to keep the same spacing of hooks between floatlines. However, NOAA Fisheries expects that many fishermen would decide to set hooks closer together or reduce the number of gangions, thus minimizing the need for any additional gear.

Changes in Research, Administration, and Management Effectiveness

This alternative would be difficult to enforce (i.e., must be enforced at sea while the gear is deployed) and therefore might have decreased management effectiveness if fishing vessel operators do not perceive benefits from compliance. From an administrative standpoint, gear modifications are less costly to implement than other bycatch reduction measures such as time/area closures.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative would be unlikely to, but could decrease catch rates of target species if fewer hooks are set on a mainline. It is difficult to predict how fishermen might respond to this measure. Fishermen could choose to set a longer mainline or reduce spacing between gangions in order to maintain the same number of hooks set.

From a social or cultural standpoint, longline fishermen might benefit by indicating support for fishing practices that may reduce sea turtle interactions.

Changes in the Distribution of Benefits and Costs

This alternative would not be expected to change the distribution of benefits and costs for the pelagic longline fishery unless there is a change in the composition of the target catch (tunas, swordfish) or other marketable non-target fish (e.g., dolphin, pelagic sharks).

Social Effects

This alternative would not be expected to have social effects on fishing communities.

Summary

The results of the 2001 NED experimental fishery demonstrated that requiring gangions to be set two gangion lengths from floatlines would not reduce the incidental capture of sea turtles in pelagic longline gear and may increase the interactions with leatherback sea turtles. Based on this information, NOAA Fisheries is not selecting this measure at this time.

Alternative 3 (Final Action) — *Require vessels with pelagic longline gear on board to have the length of any gangion be 10 percent longer than the length of any floatline if the total length of any gangion plus the total length of any floatline is less than 100 meters* (BiOp Requirement)

Under this alternative, all Federally permitted vessels, or those required to be permitted for HMS, with pelagic longline gear on board are required to deploy gangions that are 10 percent longer than the floatlines, if the total length of any gangion plus the length of any floatline is 100 meters or less. This alternative allows incidentally captured sea turtles to reach the surface to breathe, reducing mortality.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

The intent of this requirement is to ensure that hooked or entangled turtles have a sufficient amount of line to be able to reach the surface and avoid drowning. No quantitative estimate of the effectiveness of this measure can be made at this time. While allowing turtles access to the surface would certainly be beneficial, it is recognized that due to the dynamic nature of the ocean environment, fishing gear does not remain stationary following deployment. The mainline would float and sink based on prevailing local ocean currents. This behavior of the gear makes it difficult to assess the impacts of this measure.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

NOAA Fisheries does not expect this action to significantly change target or incidental catch rates. However, this measure could have a slight impact on the catch composition of the set if the

hooks are set deeper. NOAA Fisheries intends to analyze changes in target catch related to hook depth and floatline length.

Effects on Marine Mammals and Seabirds

This measure is not expected to have any effects on marine mammals or birds. Although, similar to turtles, it is possible that marine mammals who can reach the surface to breathe could have a higher rate of survival. At this time, however, NOAA Fisheries does not know of any studies of hook depth or floatline length that evaluated mammal or bird capture or survival rates.

Effects on Essential Fish Habitat

The HMS FMP and Amendment One to the Atlantic Billfish FMP state that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the U.S. Atlantic pelagic longline fishery. The HMS FMP describes habitat damage by pelagic longlines as negligible to the pelagic environment. Gear modifications are not anticipated to have a negative effect on the EFH for Atlantic HMS.

Changes in Fishing, Processing, Disposal, and Marketing Costs

There may be slightly higher costs associated with modifying the length of the gangions or floatlines in the short-term. There are no other expected changes in costs.

Changes in Fishing Practices and Behavior of Fishermen

This alternative will cause fishermen to modify their gear. This might take some initial time for the crew. However, once the gangions are longer or floatlines shorter, there will be no expected changes in fishing behavior or practices. This measure is not be expected to have long-term impacts on processing, disposal, or marketing costs.

Changes in Research, Administration, and Management Effectiveness

This alternative will be difficult to enforce (e.g., enforcement is unlikely to measure all gangions and floatlines on a vessel to make sure they have the correct proportions) and therefore might have decreased management effectiveness if fishing vessel operators do not perceive benefits from compliance. From an administrative standpoint, gear modifications are less costly to implement than other bycatch reduction methods such as time/area closures.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative will have minimal economic or social impacts. From a social or cultural standpoint, longline fishermen might benefit by indicating support for fishing practices that may

reduce sea turtle interactions.

Changes in the Distribution of Benefits and Costs

This alternative is not expected to change the distribution of benefits and costs for the pelagic longline fishery.

Social Effects

This alternative is not expected to have social effects on fishing communities.

Summary

This alternative could reasonably be expected to decrease the mortality of sea turtles caught on pelagic longline gear with few, if any, impacts on fishermen, target catch, or other species. Additionally, this alternative may similarly increase marine mammal survivability.

Alternative 4 (Final Action) — *Require vessels with pelagic longline gear on board to possess and use only corrodible, non-stainless steel hooks* (BiOp Requirement)

Under this alternative, all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board are required to possess and use only corrodible hooks. It is expected that this measure will reduce the post-release mortality of incidentally captured sea turtles.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This alternative may increase the survival of released sea turtles by requiring pelagic longline gear to be rigged with hooks that corrode relatively quickly and thereby reduce the amount of time any ingested or deeply hooked hooks will remain embedded in the turtle after its release. Depending on how quickly corrodible hooks dissolve, this alternative may reduce the serious injury and/or mortality of gear not readily removed from hooked sea turtles. Currently, NOAA Fisheries is investigating several hook type alternatives to determine the most efficient corroding mechanism. There is some concern about the physiological effects of an imbedded hook or a corroding hook on the overall health of a captured species. NOAA Fisheries plans on holding a meeting to examine and discuss the potential effects of this occurrence.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

NOAA Fisheries believes that many fishermen already use non-stainless steel hooks so NOAA Fisheries does not expect any changes in the interaction rate of any of the species that interact with pelagic longlines because of the use of corrodible hooks. However, depending on the

strength of the corrodible hooks if other types of corrodible hooks are developed, this alternative could have an impact on retention rates of all species.

Effects on Marine Mammals and Seabirds

This alternative is not expected to have any impact on the catch rate of marine mammals or seabirds. However, the corrodibility of the hooks could improve the post-release survivability of these species.

Effects on Essential Fish Habitat

The HMS FMP and Amendment One to the Atlantic Billfish FMP state that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the U.S. Atlantic pelagic longline fishery. The HMS FMP describes habitat damage by pelagic longlines as negligible to the pelagic environment. Corrodible hooks are not anticipated to have a negative effect on the EFH for Atlantic HMS.

Changes in Fishing, Processing, Disposal, and Marketing Costs

NOAA Fisheries believes that many fishermen already use non-stainless steel hooks and expects that this alternative would result in little change in costs or benefits in the short-term. However, depending on how "corrodible" is defined in the future, this alternative could result in increased costs and decreased revenues for pelagic longline vessel owners, captains, and crew. Those vessels that are currently rigged with stainless steel hooks would have increased direct costs of replacement hooks and crew time to re-rig the gear. As corrodible hooks will dissolve more quickly than stainless hooks, those vessels will also have continued replacement hook and re-rigging costs.

However, in the future, if corrodible is defined as a specific hook type, hook coating, or alloy content, then economic and social impacts could be substantial. Economic cost increases could range from high initial hook replacement and re-rigging costs for all pelagic longline vessels upon implementation of the requirement to long-term increased hook replacement costs if the corrodible hooks are more expensive to manufacture and would need to be replaced more frequently due to their higher corrodibility. Revenues could decrease if the corrodible hooks are not commercially available so that fishermen could not fish until new hooks were manufactured or if target catches decrease because corrodible hooks cannot retain swordfish or tuna as well as currently used hook types. Revenues of hook suppliers could also be impacted if they are unable to sell any non-corrodible hooks in their inventory.

Changes in Fishing Practices and Behavior of Fishermen

The impact of this alternative on the practices and behavior of fishermen will depend upon the type and durability of the corrodible hook. Under this final rule, fishermen already using non-

stainless steel hooks will not notice any difference. However, fishermen using stainless steel hooks will have to replace all their hooks at once and in the future, may have to replace them more often. If, in the future, corrodible hooks are defined differently, the hooks will probably have to be replaced more frequently than the current varieties during the course of a fishing trip and may need to be sharpened often throughout a trip.

Changes in Research, Administration, and Management Effectiveness

Management effectiveness could decrease because this measure is difficult to enforce. However, management effectiveness would be increased if a low-cost gear modification could reduce bycatch and other more economically significant measures are not necessary. In addition, by requiring one type of hook on all vessels utilizing this gear type, this measure could be enforced at the dock and at sea.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

In the short-term, this measure will force some, but not all, fishermen to buy all new hooks to comply with the requirement. NOAA Fisheries does not expect the use of non-stainless steel hooks to have large economic or social impacts in the short- or long-term.

If the definition of corrodible hooks changes and these new hooks can be manufactured to be as resilient as current hooks, and retention rates of hooked finfish do not change significantly, this measure would have minimal economic impacts on fishermen over time. However, there is a possibility that other definitions of corrodible hooks could increase costs in the long-term if fishermen need to replace hooks after each set.

This measure might enhance the social image of pelagic longline fishing activities as longline fishermen would be perceived as “doing their part” to increase survival of discarded species.

Changes in the Distribution of Benefits and Costs

This alternative will not be expected to significantly change the distribution of benefits and costs for the pelagic longline fishery.

Social Effects

This alternative is not expected to have social effects on fishing communities. This measure, if effective at increasing the survival of released fish and some species of turtles, could have positive social benefits as other more costly measures could be avoided to protect overfished species.

Summary

Non-stainless steel corrodible hooks are expected to have few, if any economic or social impact, but may increase survivability of hooked sea turtles or other species. If the definition changes in the future, this alternative could have larger economic impacts depending on the definition or type of hook required.

Alternative 5 (Final Action) — *The vessel operator of all vessels with pelagic longline gear on board must report lethal sea turtle takes within 48 hours of returning to port* (BiOp Requirement)

The vessel operator of all Federally permitted vessels, or vessels required to be permitted, for HMS with pelagic longline gear on board will be required to report any turtles that are dead when captured or that die during capture to the SEFSC Observer Program (at 800-858-0624) within 48 hours of returning to port, in addition to filling out logbook forms.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This alternative will not have a direct effect on the Atlantic sea turtle populations. However, by requiring that vessel captains report any dead sea turtles within 48 hours of returning to port, NOAA Fisheries will have more timely estimates of the number of sea turtles harmed during pelagic longline operations. This could result in improved management decisions involving fishery interactions with protected species.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This alternative is not be expected to have an impact on the catch or bycatch of other species.

Effects on Marine Mammals and Seabirds

This alternative is not expected to adversely affect marine mammals or seabirds.

Effects on Essential Fish Habitat

This alternative will not have any impact upon essential fish habitat.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative should not have impacts on fishing, processing, disposal, or marketing costs.

Changes in Fishing Practices and Behavior of Fishermen

This alternative should not impact the general behavior and fishing practices of fishermen with one

exception: the vessel captain will have to call NOAA Fisheries to report any lethal sea turtles takes. As this event is fairly rare, NOAA Fisheries does not expect this alternative to cause a significant alteration in the usual behavior of the vessel operator.

Changes in Research, Administration, and Management Effectiveness

This alternative will improve the effectiveness of management by allowing a more real-time assessment of sea turtle mortalities due to pelagic longline interactions. As a sea turtle mortality is relatively rare, administrative costs should be small. This alternative has been approved under the Paperwork Reduction Act.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative is not expected to cause a change in the economic, social, or cultural value of fishing activities.

Changes in the Distribution of Benefits and Costs

This alternative is not expected to change the distribution of benefits and costs for the pelagic longline fishery.

Social Effects

This alternative is not expected to have social effects on fishing communities.

Summary

This alternative could allow NOAA Fisheries to have more precise sea turtle interaction estimates, which could lead to better management decisions, at little cost to fishermen.

Alternative 6 (Final Action) — *Require all vessels with bottom or pelagic longline gear on board to have sea turtle handling and release guidelines posted in the wheelhouse* (BiOp Requirement)

This alternative requires all Federally permitted vessels, or vessels required to be permitted, for HMS that have bottom or pelagic longline gear on board to have posted in the wheelhouse sea turtle handling and release guidelines. This alternative should reduce the post-release mortality of incidentally captured sea turtles.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This alternative provides handling and release guidelines applicable to longline fisheries for incidentally captured sea turtles. The bycatch of sea turtles will not be decreased, however the post-release mortality of these individuals will be decreased because fishermen would have the information available to properly disentangle or dehook any captured sea turtles.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This alternative will not affect the catch of another species.

Effects on Marine Mammals and Seabirds

This alternative will not affect interactions with marine mammals or seabirds.

Effects on Essential Fish Habitat

This alternative has no impact on essential fish habitat.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative should not significantly alter the costs of fishing, processing, disposal, and marketing. The only impact could result in longer gear retrieval times when fishermen stop to release captured sea turtles in the appropriate method.

Changes in Fishing Practices and Behavior of Fishermen

Fishermen will have to alter their usual fishing behavior only if they incidentally capture a sea turtle. The time needed to release sea turtles will vary based on the associated circumstances, but it is not expected to take long.

Changes in Research, Administration, and Management Effectiveness

From an administrative standpoint, because NOAA Fisheries has already distributed this material several times during the past two years, currently provides photocopies during permit transfers, and has copies available on the web, this alternative is not expected to increase the cost of management. However, it is difficult to assess the management effectiveness of this measure due to the difficulties in enforcing the proper handling and release of sea turtles.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative will not impact the value of fishing activities. However, from a cultural or social

perspective, the increased protection of sea turtles could enhance the general perception of fishing activities.

Changes in the Distribution of Benefits and Costs

This alternative will not affect the distribution of benefits and costs.

Social Effects

This alternative is not expected to have any social effects.

Summary

This alternative could help increase post-release survivability of sea turtles at no cost to fishermen. No other impacts are expected.

Alternative 7 (Not Selected) *No action*

This alternative would maintain the existing regulations regarding pelagic and bottom longline gear and sea turtle interactions. The provisions implemented by the July 13, 2001, emergency rule would remain in effect until July 8, 2002 (as extended on December 13, 2001), at which time they would expire.

Population and Ecological Effects Due to Changes in the Bycatch of Sea turtles

The no action alternative would have detrimental effects on sea turtles because of the serious injuries inflicted by pelagic longline gear in the mid Atlantic Bight and Grand Banks areas. The number of turtles that pelagic longline fishermen are allowed to interact with is limited by the Incidental Take Statement under the authority of ESA in an attempt to protect vulnerable stocks from this source of mortality. In 1999, when Atlantic pelagic longline fishermen exceeded their incidental sea turtle take for loggerhead turtles, NOAA Fisheries re-initiated consultation under Section 7 of ESA. In 2000, based on the need for additional data and analyses, NOAA Fisheries once again re-initiated consultation. Taking no action is not legally acceptable once the incidental take limit for any listed species has been exceeded or a fishery is declared to jeopardize the continued existence of a protected species. In this case, ESA requires NOAA Fisheries to modify or restrict the fishery in order to reduce turtle bycatch.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This measure would not alter the current level of bycatch of other species, and therefore is not expected to affect the populations of other species.

Effects on Marine Mammals and Seabirds

This management alternative would not change the impact of the commercial HMS pelagic longline fishery on marine mammals or seabirds.

Effects on Essential Fish Habitat

The HMS FMP and Amendment One to the Atlantic Billfish FMP state that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the U.S. Atlantic pelagic longline fishery. The HMS FMP describes habitat damage by pelagic longlines as negligible to the pelagic environment.

Changes in Fishing, Processing, Disposal, and Marketing Costs

The no action alternative would not change the current costs of commercial fishing, nor of any of the associated support industries. Marketing costs might increase in the future under no action if the current public perception of the pelagic longline fishery supports a boycott of swordfish. The pelagic longline fishermen and dealers might need to increase marketing efforts in order to keep sales of swordfish constant.

Changes in Fishing Practices and Behavior of Fishermen

No changes in fishing practices or behavior of pelagic longline fishermen would be expected under the no action alternative.

Changes in Research, Administration, and Management Effectiveness

No additional management actions would be required, therefore there would not be any concomitant changes in research, administrative or management effectiveness.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative would not be expected to change the economic, social or cultural value of fishing activities because no changes in current regulations would be enacted under this alternative. To the extent that public perception of the longline fleet could reduce the demand for longline-caught highly migratory species, and to the extent that an increase in positive media coverage could offset that decrease in demand, this alternative might have negative economic effects on the value of the longline fishery.

Changes in the Distribution of Benefits and Costs

This alternative would not be likely to change the distribution of costs or benefits.

Social Effects

This alternative would have the least amount of social and economic impact on the pelagic longline fishermen and their respective communities of any alternatives considered in this document in the short-term, because this alternative would not change current management of the U.S. pelagic longline fishery in the Atlantic Ocean. However, if the no action alternative had long-term negative impacts on sea turtles, it might have long-term impacts on fishing communities if public approval for pelagic longline fishermen decreases.

Summary

This alternative is not selected because the June 14, 2001, BiOp, requires NOAA Fisheries to implement management measures that would reduce sea turtle bycatch and bycatch mortality.

Alternative 8 (Not Selected) — *Require vessels with pelagic longline gear on board to have a dehooking device on board; require vessel operators on such vessels to use the dehooking device*

Under this alternative, all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board would be required to have a dehooking device on board. Vessel operators aboard such vessels would be required to use it to remove longline hooks from incidentally captured sea turtles.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This alternative should result in increased post-release survival of sea turtles and other species released from pelagic longline gear. Reducing the post-release mortality of sea turtles would help the population levels increase in the Atlantic Ocean Basin. However, it is necessary to delay the implementation of this alternative until a tested and approved dehooking device is available. Removing hooks in an inappropriate manner could cause more harm to a sea turtle than leaving the hook in place.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

If used on all bycatch, a dehooking device should reduce the post-release mortality of other non-target finfish that are caught by pelagic longline fishermen. For example, undersized swordfish or unwanted sharks could be released alive following hook removal. This release would allow for a greater survival rate of these fish. This in turn could contribute to the recovery effort for the overfished stocks.

Effects on Marine Mammals and Seabirds

This alternative would allow hooks to be removed from marine mammals that are captured in

pelagic longline gear which should reduce the post-release mortality. However, mammals are more frequently entangled, rather than hooked, in longline gear, so it is difficult to evaluate the benefit this alternative would provide to marine mammals. It is not likely that this alternative would improve the survival of seabirds as they are captured and drowned at the time the line is set or hauled.

Effects on Essential Fish Habitat

Carrying a dehooking device is unlikely to have any impact on essential fish habitat.

Changes in Fishing, Processing, Disposal, and Marketing Costs

Hook removal devices are commercially available from several vendors and are used to minimize injury to the fish during removal of the hook. The HMS AP discussed the use of hook removal devices at its March 1998 meeting. Members of the AP representing all sectors of HMS fisheries were supportive of the voluntary use of these devices. Fishery participants have largely supported the use of hook removal devices in some applications in HMS fisheries and NOAA Fisheries encourages HMS fishermen to use this tool voluntarily. Enforcement of this alternative would be difficult. Although dockside inspections would identify the presence or absence of the tool, they would not address whether or not the devices were actually used. Dehooking devices cost about $45 to 90 per tool and NOAA Fisheries understands that use of the devices is already widespread in HMS fisheries.

Changes in Fishing Practices and Behavior of Fishermen

This alternative would change the behavior of fishermen because it would require an increase in the handling time in order to release bycatch and incidental catch without hooks. When releasing sea turtles, this alternative should not increase the handling time significantly as fishermen are already required to remove as much line as possible from hooked or entangled individuals. This alternative should allow the fishermen to remove the hook in addition to the entangled gear which would further improve the post-release survival of the captured sea turtles.

Changes in Research, Administration, and Management Effectiveness

This alternative would be difficult to enforce in its entirety. While all HMS pelagic longline vessels may possess a dehooking device on board, it would be difficult to determine if the vessel operators are using the equipment properly to release non-target or undersize species with the minimum amount of gear attached as possible.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative would not be expected to cause a change in the economic, social, or cultural value

of fishing activities.

Changes in the Distribution of Benefits and Costs

Requiring that all pelagic longline vessels permitted to fish for HMS carry on board and use a dehooking device should not cause a change in the distribution of benefits and/or costs.

Social Effects

This alternative would not be expected to have social effects on fishing communities. This measure, if effective at increasing the survival of released fish and sea turtles, could have positive social benefits as other more costly measures could be avoided to protect overfished, threatened, or endangered species.

Summary

The adoption of this measure would be contingent upon an evaluation of the effectiveness of current devices being utilized in the NED area experimental fishery. Pending the completion of the evaluation, NOAA Fisheries may propose further action. If implemented, this alternative could increase post-release survivability of sea turtles and other species if fishermen use the device properly. NOAA Fisheries encourages all fishermen to use a dehooking device voluntarily to remove hooks from bycatch species.

Alternative 9 (Not Selected) — *Require vessel operators on vessels with pelagic longline gear on board to rig the mainline so hooks are fished deeper in the water column (tuna style fishing)*

This alternative would require vessel operators aboard all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board to configure the gear to maintain the hooks deeper in the water column. This configuration might minimize attracting sea turtles to baited hooks.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

The intent of this requirement would be to avoid capturing sea turtles. As is demonstrated in the figure below, most of the sea turtle-longline interactions occur on sets deployed in shallower water. It is expected that if the captain sets the gear at a greater depth, most of the sea turtle interactions could be avoided while maintaining an acceptable catch rate. It is difficult to assess what level of reduction in sea turtle takes and mortality this alternative would effect. NOAA Fisheries is currently evaluating and testing several sea turtle bycatch reduction hypotheses in the course of an experimental fishery. It is hoped that this experiment would provide further insight into sea turtle behavior and allow the development of more efficient mitigation measures.

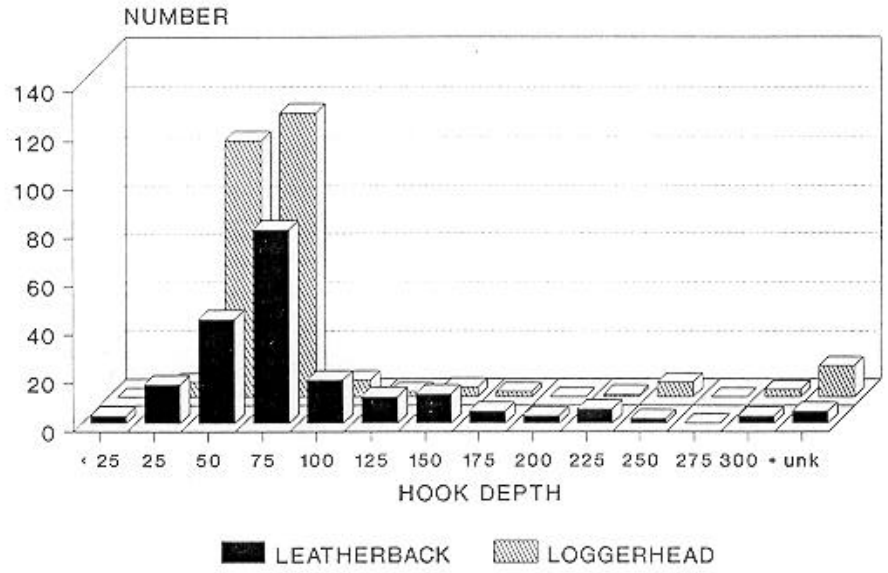

Figure 7.2 **The number of turtle interactions with respect to hook depth.**
Source: Based on observer data; taken from Hoey and Moore, 1999.

There might be ecological effects from this alternative due to decreased rates of interactions with sea turtles and resulting increased population sizes. Increased turtle stock size might have effects on prey species, however, any growth in stock size in the next few years is unlikely to have far-reaching ecological effects.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

Setting hooks deeper could change the catch composition of the longline set. It is likely that requiring all gear to be set deeper could result in larger catches of tuna and smaller catches of swordfish. NOAA Fisheries does not know what impact this requirement would have on other species.

Effects on Marine Mammals and Seabirds

NOAA Fisheries does not know of any studies of hook depth that evaluated mammal or bird capture rates and therefore does not know what impact this alternative may have on marine mammals or seabirds.

Changes in Fishing, Processing, Disposal, and Marketing Costs

Because many fishermen fish pelagic longline using both methods, this alternative would have few impacts on fishing costs. However, for vessels that only fish in shallow waters, there might be a

decrease in gross revenues if catch rates of swordfish drop because swordfish are generally worth more than tuna.

Changes in Fishing Practices and Behavior of Fishermen

Once the crew members are used to rigging the gear deeper for every set, there would be no expected changes in fishing behavior or practices.

This measure would not be expected to have long-term impacts on processing, disposal, or marketing costs. To the extent that an increase in positive media coverage could offset that decrease in demand, this alternative might improve public perception of the fishing practices of the longline fleet. If so, this gear modification might be able to contribute to the increased demand and thus improved prices for U.S.-caught HMS.

Changes in Research, Administration, and Management Effectiveness

This alternative would be difficult to enforce because not only would it have to be enforced at sea while the gear is deployed, it would also be difficult for enforcement to detect whether or not the gear is actually being fished "deep enough." Therefore, there might be decreased management effectiveness if fishing vessel operators do not perceive benefits from compliance. From an administrative standpoint, gear modifications are less costly to implement than time/area closures.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative could decrease catch rates of target species (fish per set) or change the catch composition since the hooks would be set deeper in the water column. It is difficult to predict how fishermen might respond to this measure. From a social or cultural standpoint, longline fishermen might benefit by indicating support for fishing practices that may reduce sea turtle interactions.

Changes in the Distribution of Benefits and Costs

This alternative would not be expected to change the distribution of benefits and costs for most of the pelagic longline fishery unless there is a significant change in the composition of the target catch (tunas, swordfish) or other marketable non-target fish (e.g., dolphin, pelagic sharks). For fishermen who only fish in shallow waters, this alternative could decrease revenues because swordfish are generally worth more than tuna.

Social Effects

The social impacts from this alternative would vary based on the impacts on target catch created by fishing deeper in the water column.

Summary

NOAA Fisheries needs more information on bycatch reduction effectiveness before implementing this type of regulation. For instance, how much would catch composition of target and bycatch species change if the gear is fished deeper and how much would revenues change. NOAA Fisheries is currently evaluating and testing several sea turtle bycatch reduction hypotheses in the course of an experimental fishery. It is hoped that this experiment would provide further insight into sea turtle behavior and allow the development of more efficient mitigation measures.

Alternative 10 (Not Selected) *Require vessel operators on vessels with pelagic longline gear on board to use only blue-dyed bait*

Under this alternative, all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline on board would be required to deploy only blue-dyed bait. The 2001 NED experimental fishery found that this alternative is not effective in reducing pelagic longline interactions with loggerhead and leatherback sea turtles.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This alternative would be expected to reduce the incidental capture of sea turtles in pelagic longline fisheries. Research in Hawaii has shown that blue-dyed squids reduce the bycatch of seabirds and possibly increase the catch of swordfish. When field-testing blue bait to reduce seabirds takes, no turtles were caught. However, turtles were caught with normal bait during the study (Kleiber and Boggs, 2000). Laboratory tests conducted in Hawaii have shown that green turtles in captivity are reluctant to take blue-dyed squid compared to normal squid, but eventually habituate to dyed bait (NOAA Fisheries, 2001c.). NOAA Fisheries examined the effectiveness of this measure in an experimental fishery conducted in the NED area in 2001. The analyzed results show that blue-dyed bait does not reduce interactions between pelagic longline gear and sea turtles.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

NOAA Fisheries does not expect this alternative to alter the rate of catch of target species. The 2001 experimental fishery collected information concerning the impact of blue-dyed bait on target catch. NOAA Fisheries is currently waiting for this information to be analyzed pursuant to the impact of blue bait on target catch.

Effects on Marine Mammals and Seabirds

This measure was initially tested in the Pacific to examine the effect of blue-dyed bait on the incidental capture of seabirds. Preliminary information suggests that this requirement could reduce seabird takes in the pelagic longline fishery. NOAA Fisheries does not know what the impact of this requirement would be on marine mammals but does not expect this requirement to

change the capture rate.

Effects on Essential Fish Habitat

The HMS FMP and Amendment One to the Atlantic Billfish FMP state that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the U.S. Atlantic pelagic longline fishery. The HMS FMP describes habitat damage by pelagic longlines as negligible to the pelagic environment. The use of blue-dyed bait is not anticipated to have an effect on the EFH for Atlantic HMS.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would require fishermen to purchase blue dye and prepare the bait prior to setting the longline. The dye costs approximately $46 per pound. Based on this, the economic impact should be small unless target species avoid blue-dyed bait. NOAA Fisheries should have more information concerning the effect on target catch when the results from the first year of the NED area experimental fishery are completely analyzed.

Changes in Fishing Practices and Behavior of Fishermen

The fishermen would have to adjust their fishing practices in order to comply with this alternative. The blue dye would have to be prepared and the bait would have to be soaked prior to baiting and deploying the hooks. While this procedure is not expected to consume a significant amount of time, it would alter the normal fishing behavior and practice. Also, if the crew is not accustomed to this procedure, it would take some time at the beginning of the fishing trip to teach them the proper technique. Over time, it is likely that bait suppliers could begin to provide pre-dyed bait to fishermen to eliminate the need for the fishermen to dye the bait themselves.

Changes in Research, Administration, and Management Effectiveness

This alternative would not be difficult to enforce and may aid in enforcement of the live bait ban in the Gulf of Mexico. From an administrative standpoint, gear modifications are less costly to implement than time/area closures.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative might decrease catch rates of target species or change the catch composition since different bait would be used than usual. It is difficult to predict how fishermen might respond to this measure. From a social or cultural standpoint, longline fishermen might benefit by indicating support for fishing practices that may reduce sea turtle interactions.

Changes in the Distribution of Benefits and Costs

This alternative would not be expected to change the distribution of benefits and costs for the pelagic longline fishery unless there is a significant change in the composition of the target catch (tunas, swordfish) or other marketable non-target fish (e.g., dolphin, pelagic sharks).

Social Effects

This alternative would not be expected to have social effects on fishing communities.

Summary

As the measure was found to be ineffective at reducing the incidental capture of sea turtles in the 2001 NED experimental fishery, NOAA Fisheries is not promulgating the measure in this rule making.

Alternative 11 (Not Selected) *Require vessel operators on vessels with pelagic longline gear on board to use only mackerel as bait*

This alternative would require vessel operators aboard all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board to use mackerel exclusively as bait. NOAA Fisheries will analyze the ability of this measure to reduce the incidental catch of sea turtles in the 2002 NED area experimental fishery.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

NOAA Fisheries expects this alternative to reduce the incidental capture of sea turtles in pelagic longline fisheries. NOAA Fisheries is anticipating the examination of the effectiveness of this measure in an experimental fishery being conducted in the NED area in 2002. Until these data are collected, the effect of mackerel bait on both target and incidental catch is uncertain.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

Currently, there is not a significant amount of data concerning the impact of mackerel bait on catch rate. However, NOAA Fisheries does not anticipate this alternative to alter the rate of catch of target species. NOAA Fisheries is planning on testing this measure in the NED area experimental fishery. The results of the experiment should provide more information concerning the impact of this alternative on target catch.

Effects on Marine Mammals and Seabirds

NOAA Fisheries does not anticipate the use of mackerel bait to increase the incidental capture of seabirds or marine mammals in the pelagic longline fishery.

Effects on Essential Fish Habitat

The HMS FMP and Amendment One to the Atlantic Billfish FMP state that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the U.S. Atlantic pelagic longline fishery. The HMS FMP describes habitat damage by pelagic longlines as negligible to the pelagic environment. The use of mackerel bait is not anticipated to have an effect on the EFH for Atlantic HMS.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would require fishermen to alter their bait purchase from squid to mackerel. As NOAA Fisheries expects that most fishermen already buy the bait that balances costs and revenues, this alternative would likely alter the cost of fishing. Currently, a large portion of trip costs goes towards buying bait (Table 8.9 and 8.10). It is likely that for fishermen who do not already use mackerel the cost of bait per trip would increase. However, NOAA Fisheries does not currently know how many fishermen use squid bait versus how many fishermen use mackerel bait. NOAA Fisheries should have more information concerning the effect on target catch as the NED area experimental fishery continues.

Changes in Fishing Practices and Behavior of Fishermen

The fishermen who currently use squid bait would have to slightly adjust their fishing practices in order to comply with this alternative. Baiting the hooks with mackerel instead of squid may involve a different procedure which could influence the time it takes to deploy the gear. Also, if the crew is not accustomed to this procedure, it would take time at the beginning of the fishing trip to teach them the proper technique.

Changes in Research, Administration, and Management Effectiveness

This alternative would not be difficult to enforce and may help enforce the live bait ban in the Gulf of Mexico. From an administrative standpoint, gear modifications are less costly to implement than time/area closures.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative might decrease catch rates of target species or change the catch composition since different bait would be used than usual. It is difficult to predict how fishermen might respond to this measure. From a social or cultural standpoint, longline fishermen might benefit by indicating support for fishing practices that may reduce sea turtle interactions.

Changes in the Distribution of Benefits and Costs

This alternative would not be expected to change the distribution of benefits and costs for the pelagic longline fishery unless there is a significant change in the composition of the target catch (tunas, swordfish) or other marketable non-target fish (e.g., dolphin, pelagic sharks).

Social Effects

This alternative would not be expected to have social effects on fishing communities.

Summary

NOAA Fisheries requires additional information regarding the effectiveness and potential impacts of this requirement before it can be implemented. NOAA Fisheries intends to analyze this measure as part of the 2002 NED area experimental fishery.

Alternative 12 (Not Selected) — *Require vessels with pelagic longline gear on board to utilize stealth gear (counter-shaded floats, dark colored lines, capped LED lights, etc.)*

This alternative would require all Federally permitted vessels, or those required to be permitted, for HMS with pelagic longline gear on board to utilize some form of stealth fishing gear such as counter-shaded floats, dulled or dark gear, and capped lights. NOAA Fisheries is currently working to develop and test several gear modifications that are expected to reduce the number of sea turtle interactions.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

Currently, NOAA Fisheries is unaware what effect these measures would have on the incidental capture rate of sea turtles by the pelagic longline fleet. Ideally, the use of counter-shaded floats, dulled or dark gear, and capped lights would reduce the attraction of pelagic longline gear to sea turtles and this would reduce some of the incidental entanglements and hookings. NOAA Fisheries plans on testing these measures to determine what level of reductions in sea turtle takes are realized by each mechanism.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

The actual impact on catch rates will depend on the types and combinations of stealth gear implemented. For instance, dulling the hardware (hooks, clasps, etc.) and making the lines darker could make the bait more appealing to target species due to the transparency of the gear. Thus, this combination of gear could increase catch rates slightly. However, this increase may be counteracted if the capped LED lights are used because capped LED lights may decrease target catch by preventing the light from being visible throughout 360 degrees. NOAA Fisheries plans

to test these measures to determine the effect each mechanism has on target catch.

Effects on Marine Mammals and Seabirds

These measures would not be expected to change the amount of incidental take of marine mammals or seabirds. As most mammal interactions involve entanglement, changing the appearance of the longline gear to make it more transparent could increase the level of takes because marine mammals may not be able to see the gear. As seabirds are usually taken as they attempt to feed on the deployed bait, this alternative would not change the current level of take.

Effects on Essential Fish Habitat

The HMS FMP and Amendment One to the Atlantic Billfish FMP state that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the U.S. Atlantic pelagic longline fishery. The HMS FMP describes habitat damage by pelagic longlines as negligible to the pelagic environment. The use of stealth gear is not anticipated to have an effect on the EFH for Atlantic HMS.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would require fishermen to purchase new gear (the type would depend on the result of any testing). This could impose a one-time cost to the impacted fishermen. However, if NOAA Fisheries set the effective date sufficiently in the future, pelagic longline fishermen could gradually replace their current gear with the new modifications at the usual intervals and thus minimizing the economic impacts in the short-term. This alternative is not expected to impact the processing, disposal, and marketing costs unless the measures affect the catch rate of target species. NOAA Fisheries plans to conduct tests to determine the effectiveness of this alternative to both reduce the incidental take of sea turtles and maintain the catch of target species.

Changes in Fishing Practices and Behavior of Fishermen

This alternative should not alter the behavior and practices of the pelagic longline fishermen. The gear would be deployed in the same manner, just with varied equipment. There may be some additional time required to rig the gear initially, but these modifications would not be expected to interfere or alter current fishing behavior and practices.

Changes in Research, Administration, and Management Effectiveness

This alternative would be difficult to enforce (i.e., unless this measure is enforced at sea, enforcement could only check to ensure the gear is onboard but not necessarily used) and therefore might have decreased management effectiveness if fishing vessel operators do not perceive benefits from compliance. From an administrative standpoint, gear modifications are less costly to implement than time/area closures.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative might decrease catch rates of target species or change the catch composition since different gear would be used. It is difficult to predict how fishermen might respond to this measure. From a social or cultural standpoint, longline fishermen might benefit by indicating support for fishing practices that may reduce sea turtle interactions.

Changes in the Distribution of Benefits and Costs

This alternative would not be expected to change the distribution of benefits and costs for the pelagic longline fishery unless there is a significant change in the composition of the target catch (tunas, swordfish) or other marketable non-target fish (e.g., dolphin, pelagic sharks).

Social Effects

This alternative would not be expected to have social effects on fishing communities.

Summary

NOAA Fisheries requires additional information regarding the effectiveness and potential impacts of these measures before they can be implemented. NOAA Fisheries intends to analyze these measures as part of the NED area experimental fishery.

7.2 Alternatives for Analysis: Shark Gillnet Requirements

Alternative 13 (Final Action) — *Both the observer and vessel operator are responsible for sighting whales and the vessel operator must contact NOAA Fisheries Southeast Regional Office (SERO) if a listed whale is taken* (BiOp Requirement)

The vessel operator of all vessels issued Federal Atlantic shark limited access permits and that fish for Atlantic sharks with a gillnet and, in cases where an observer is on board, the observer, are responsible for sighting whales. The vessel operator is responsible for contacting NOAA Fisheries SERO (at 305-862-2850) and ceasing fishing in the event of a listed whale being taken in the gillnet gear while fishing in either a drift gillnet or strikenet method.

Population and Ecological Effects Due to Changes in the Bycatch of Whales

This alternative is not expected to have a direct impact on the populations of whales encountered in this fishery. By having two people responsible for sighting whales, it is hoped that the animals would be spotted prior to any fishery interaction occurring.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

NOAA Fisheries does not expect the catch of target species to be significantly impacted by this alternative. If a vessel has to move due to sighting a whale, it may disrupt the amount of catch for that set. However, because whales are rarely spotted or interacted with, this disruption should have little impact on target catch.

Effects on Sea Turtles and Seabirds

This alternative is not expected to reduce the incidental capture of sea turtles. The catch of seabirds is a very rare event in this fishery (none observed since 1993), so it is difficult to anticipate what effects on bycatch of those species this alternative will have.

Effects on Essential Fish Habitat

The HMS FMP states that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the southeast shark gillnet fishery. The HMS FMP expects that the habitat damage from gillnets will be minimal due to the deployment of the gear in the water column.

Changes in Fishing, Processing, Disposal, and Marketing Costs

NOAA Fisheries does not expect this alternative to affect the costs of fishing, processing, disposal, or marketing.

Changes in Fishing Practices and Behavior of Fishermen

This alternative will change the practices of the fishermen by requiring both the vessel operator and observer to look for whales. If any listed whale is taken in gillnet gear, then the vessel operator must immediately stop all fishing and report the incident to the NOAA Fisheries SERO. This could alter the fisherman's behavior (e.g., they would have to move one nautical mile) if they spot a whale. However, as this is a rare incident in this fishery (only one whale interaction has been suspected), the impact is anticipated to be minor.

Changes in Research, Administration, and Management Effectiveness

This alternative will not involve a significant increase in cost as an existing reporting system can be used.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

NOAA Fisheries does not expect this alternative to impact the value of fishing activities or non-

consumptive uses of fishery resources.

Changes in the Distribution of Benefits and Costs

This alternative is not expected to change the distribution of benefits and costs for the shark gillnet fishery.

Social Effects

This alternative is not expected to have social effects on the fishing communities.

Summary

This alternative should reduce the potential for incidental takes of whales in shark gillnet gear by requiring both the vessel operator and the observer, if on board, to spot whales. This alternative should have few, if any, economic or social impacts.

Alternative 14 (Final Action) *Shark gillnet fishermen are required to conduct net checks every 0.5 to 2 hours to look for and remove any sea turtles or marine mammals* (BiOp Requirement)

In this fishery, it is customary for fishermen to inspect the entire length of the net every 0.5 to 2 hours. If a protected species is caught in the net, the fishermen are required to remove it in a manner that would not induce further harm.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This measure will not reduce the bycatch of sea turtles but should reduce the mortality level of those sea turtles that are incidentally caught. The average soak time for the drift gillnets in this fishery is 5.6 to 7.5 hours. By requiring that fishermen check their nets every 0.5 to 2 hours, any entangled sea turtles could be found and released before they drowned. During the 2000 and 2001 fishing years, three loggerhead sea turtles, 14 leatherback sea turtles, and one hawksbill sea turtle were incidentally captured with three mortalities (see Table 7.5 below). It is hoped that this alternative will reduce the number of sea turtle mortalities in this fishery.

Table 7.5 **Number of Sea Turtles Observed to be Incidentally Captured in Shark Gillnet Fishery in 2000 and 2001**. Source: Carlson, 2001.

Species	Incidental Catch	Status			
		Released Alive	Released Dead	Released Comatose	Condition Unknown
Hawksbill	1	0	0	1	0

Species	Incidental Catch	Status			
		Released Alive	Released Dead	Released Comatose	Condition Unknown
Leatherback	14	10	2	0	2
Loggerhead	3	2	1	0	0

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This alternative is not expected to impact the bycatch of other species. The only harmful impact could be a reduction in catch of target species due to fishermen moving the net or their increased presence near the net. However, this is not expected to significantly affect the level of target species caught in this fishery.

Effects on Marine Mammals and Seabirds

NOAA Fisheries expects that this alternative will reduce the mortality of marine mammals that are incidentally captured in the gillnet fishery. By checking the nets more frequently, many of the individuals that may be captured can be released before they drown (see Table 7.6).

Table 7.6 Number of Marine Mammals Observed to be Incidentally Captured in Shark Gillnet Fishery in 2000 and 2001. Source: Carlson, 2001.

Species	Incidental Catch	Status	
		Released Alive	Released Dead
Atlantic Spotted Dolphin	4	3	1
Bottlenose Dolphin	5	0	5

The catch of seabirds has not been observed in this fishery since 1993, so it is difficult to anticipate what effects on bycatch of those species this alternative would have.

Effects on Essential Fish Habitat

The HMS FMP states that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the southeast shark gillnet fishery. The HMS FMP expects that the habitat damage from gillnets will be minimal due to the deployment of the gear in the water column.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative is not expected to have high associated costs as NOAA Fisheries does not expect

it to significantly decrease the amount of target catch although target catch could be decreased if the net has to be moved frequently. Additionally, checking the nets every 0.5 to 2 hours could increase the fuel cost for each the vessel as the vessel would have to travel along the length of the net between two and three times per set. If the vessel fishes in a strikenet method, net checks will not have any impact on fishing costs because most strikenet sets take under one hour.

Changes in Fishing Practices and Behavior of Fishermen

This alternative will require the fishermen to vary their behavior to some extent. Based on the average soak time per set, shark gillnet fishermen fishing in a drift gillnet will have to check their nets two to three times during each set. Depending on the depth of the set (can be between 3.04 and 13.7 meters), they could use a flashlight or possibly have to partially haul the section of net to inspect it for incidentally captured protected species. Fishermen fishing with gillnet in a strikenet method do not have to vary their behavior.

Changes in Research, Administration, and Management Effectiveness

This alternative will be difficult to enforce (i.e., must be enforced at sea while the gear is deployed) and therefore might have decreased management effectiveness if fishing vessel operators do not perceive benefits from compliance. However, it is an inexpensive management alternative that could have immediate impacts on protected species.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

NOAA Fisheries does not expect this alternative to impact the value of fishing activities or non-consumptive uses of fishery resources.

Changes in the Distribution of Benefits and Costs

This alternative is not expected to change the distribution of benefits and costs for the shark gillnet fishery.

Social Effects

This alternative is not expected to have social effects on the fishing communities.

Summary

This alternative could reduce the mortality of protected species entangled in gillnet gear. There may be some increase in fishing costs, particularly fuel, depending on the length of the gillnet and the amount of time the gear is set.

Alternative 15 (Not Selected) *No action*

This alternative would maintain the existing regulations regarding shark gillnet gear.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

Because the shark gillnet fishery is small, approximately six vessels, and does not have a relatively high interaction rate with protected species, this alternative would not have a significantly negative an impact on sea turtle or whale populations. However, since the populations are listed as threatened or endangered, it is important to reduce post-interaction mortality whenever and wherever possible.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This measure would not alter the current level of bycatch of other species (those not previously encountered), and therefore is not expected to affect the population of other species or ecosystem.

Effects on Marine Mammals and Seabirds

This management alternative would not change the impact of the shark gillnet fishery on marine mammals or seabirds.

Effects on Essential Fish Habitat

The HMS FMP states that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the southeast shark gillnet fishery. The HMS FMP expects that the habitat damage from gillnets would be minimal due to the deployment of the gear in the water column.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would not alter the fishing, processing, disposal, or marketing costs.

Changes in Fishing Practices and Behavior of Fishermen

No changes in fishing practices or behavior of gillnet fishermen would be expected under the no action alternative.

Changes in Research, Administration, and Management Effectiveness

No additional management actions accompany this alternative, therefore there would not be any concomitant changes in research, administrative or management effectiveness.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative would not be expected to change the economic, social or cultural value of fishing activities because no changes in current regulations would be enacted under this alternative.

Changes in the Distribution of Benefits and Costs

This alternative would not be likely to change the distribution of costs or benefits.

Social Effects

This alternative would not be expected to have social effects on the fishing communities.

Summary

This alternative would not further reduce bycatch or bycatch mortality of protected species in the shark gillnet fishery. Thus, this alternative does not meet the requirements of the BiOp.

Alternative 16 (Not Selected) Prohibit use of shark gillnet gear for HMS fisheries

This alternative would prohibit the use of shark gillnet used in either a drift gillnet or strikenet method in Atlantic HMS fisheries year-round.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

By prohibiting the use of shark gillnet gear, NOAA Fisheries would reduce the capture and potential capture of sea turtles by vessels in this fishery. During the 2000 and 2001 fishing years, three loggerhead sea turtles, 14 leatherback sea turtles, and one hawksbill sea turtle were observed incidentally captured with three mortalities (Table 7.5). As these species are threatened and endangered, it is necessary to implement measures to limit their incidental capture. Because of the size of this fishery and its impacts on sea turtles, prohibiting the use of gillnets would not be expected to improve significantly the recovery of sea turtle populations.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

Shark gillnet fishermen target both LCS and SCS. Because of the size of this fleet compared to the bottom longline fleet or pelagic longline fleet, eliminating this gear type would be unlikely to increase the rebuilding of LCS substantially. However, these fishermen are among the only fishermen who actually target SCS. Thus, eliminating this gear type could reduce the number of

SCS caught. Given the size of this fleet, eliminating this gear type would be unlikely to affect the status of the bycatch species.

Effects on Marine Mammals and Seabirds

Over the past two years, 2000 and 2001, five bottlenose dolphins and four Atlantic spotted dolphins were observed to be incidentally captured in this fishery. Also, the location of fishing activities off the east coast of Florida has the potential to interact with right whales, one of the most endangered species on the planet. By prohibiting this fishery, these interactions and the chance of future interactions would be eliminated.

Effects on Essential Fish Habitat

The HMS FMP states that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the southeast shark gillnet fishery. The HMS FMP expects that the habitat damage from gillnets would be minimal due to the deployment of the gear in the water column.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would force approximately six vessels to stop fishing or to fish for other species. Generally, the vessels in this fishery fish in the mackerel fishery during a large coastal shark fishery closure. It is likely that at least some of the vessels would continue to fish in that fishery.

This alternative is not expected to change processing, disposal or marketing costs because no related businesses are dependent on the six vessels in this fishery. However, as SCS are often used as bait in other fisheries, it is possible that some side effects may occur until another gear begins to fish for SCS or until those fishermen decide to use another type of bait.

Changes in Fishing Practices and Behavior of Fishermen

Shark gillnet vessel captains, crew and owners would need to re-rig fishing vessels to find alternative means to target HMS or other fisheries to stay in the fishing business, or leave the fishery and find alternative sources of employment. If fishermen switched to other fisheries, this alternative might have negative impacts on other species or fisheries, particularly if those species are fully fished or overfished or if the fisheries are overcapitalized.

Changes in Research, Administration, and Management Effectiveness

Administrative and management costs would likely decrease in association with the need to observe fewer vessels.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive

Uses of Fishery Resources

The elimination of this fishery would likely have a small impact on other commercial and recreational fisheries. Some gillnet fishermen would shift effort to target other fisheries (or the same species with different gear), although many alternatives might be unavailable due to limited access programs based on prior participation. Localized reductions in discards and/or catch of sharks and other species could also increase recreational opportunities, which would have associated benefits for businesses and communities that support recreational activities.

Changes in the Distribution of Benefits and Costs

This alternative may put some vessels out of business, thus removing any benefits or costs. For vessels that continue to use gillnet gear in other fisheries, this alternative would move all benefits and costs to the other fishery.

Social Effects

For the fishermen involved in the fishery, there would be significant social effects since they would be forced to relocate or switch target species. The dealers who purchase the catch from the fishermen would be impacted by the switch in target species as well. As there are approximately six vessels involved in the fishery, this alternative could have impacts on the individuals and families. It is unlikely that any communities would be impacted because these six vessels are located in Florida, which has more HMS permit holders than any other state.

Summary

While this alternative would eliminate protected species bycatch with this gear type, this alternative would also have large economic or social impacts on the fishermen in the fishery. Because protected species interactions with this gear type are relatively few according to observer data (except for 2001 when an abnormally large number of sea turtles were captured), NOAA Fisheries does not feel the economic hardship encountered by these few vessels by this alternative would balance the benefits to protected species particularly when other options, such as VMS, could reduce bycatch while not having as a large an economic impact.

Alternative 17 (Not Selected) *Require fishermen who hold a Federal shark permit and use shark gillnets to use spotter planes for strikenetting*

All Federally permitted vessels for using HMS shark gillnet gear to target sharks would be required to utilize the assistance of a spotter plane when setting their net and to fish in a strikenet fashion. This alternative would reduce the risk of interactions with protected species.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

Strikenetting is a efficient manner of fishing because it allows the vessel operator to encircle target species with a minimum of bycatch species. During the past two years, there have been no observed interactions with sea turtles while strikenetting for sharks. This alternative would further minimize the potential for sea turtles interactions by allowing for better detection of target species and better identification of locations of protected species.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This alternative should not impact the level of target catch for strikenetting vessels. It is possible that the use of spotter planes would make the set more efficient by allowing the vessel to target larger schools of sharks. This alternative could reduce the bycatch of non-target fish species by increasing the targeting efficiency of the strikenet. For vessels that currently driftnet, this alternative would increase the catch rates of target species.

Effects on Marine Mammals and Seabirds

This alternative should virtually eliminate the incidental capture of marine mammals. The spotter plane should be able to identify protected species from the air and guide the fishing vessel to target species that are not near protected species. In the past two years, no marine mammals have been incidentally taken via strikenet. This alternative would help lessen the chance of a marine mammal incidental take. Because the catch of seabirds is a very rare event in this fishery (none observed since 1993), it is difficult to anticipate what effects on bycatch of those species this alternative would have.

Effects on Essential Fish Habitat

The HMS FMP states that Atlantic HMS occupy pelagic oceanic environments, which is the general operational range of the southeast shark gillnet fishery. The HMS FMP expects that the habitat damage from gillnets would be minimal due to the deployment of the gear in the water column.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would significantly increase the cost of fishing due to the required use of a spotter plane and a second smaller vessel used to maneuver the net. Generally, spotter planes receive a percentage of the gross revenues per trip as payment. To minimize the expense, several boats could share the services of one plane, but that arrangement would have to be agreed upon by the pilot and vessel operators. Additionally, some vessels that strikenet do not use spotter planes but fish behind other vessels where sharks congregate. This alternative could increase their fishing costs by requiring the use of a spotter plane.

Vessels who only use gillnet gear would have an added expense of finding and maintaining a second smaller vessel to maneuver the net around the school of sharks. This would require additional fuel and maintenance.

The disposal and marketing costs should not be affected. Processing costs may be reduced slightly because fishermen would not catch as many non-target species in a set.

Changes in Fishing Practices and Behavior of Fishermen

Using a spotter plane would alter the practices and behavior of the shark gillnet fishermen, both those who strikenet and those who do not. Instead of looking for target species independently or by following other vessels such as trawl vessels, they would have to rely on a spotter pilot to guide them to fish. Some captains may not be familiar with working with a pilot.

Additionally, vessels who only use drift gillnet gear could be unfamiliar with using a smaller vessel to quickly encircle the schools of shark. Thus, these fishermen would need to learn how to use these vessels and how to strikenet efficiently.

Changes in Research, Administration, and Management Effectiveness

This alternative would be difficult to enforce (i.e., vessels and planes must be monitored while at sea fishing) and therefore might have decreased management effectiveness.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative may eliminate a number of the vessels in this fishery. This decrease in fishing vessels would likely have only a small impact on other commercial and recreational fisheries. Some gillnet fishermen would shift effort to target other fisheries (or the same species with different gear), although many alternatives might be unavailable due to limited access programs based on prior participation. Localized reductions in discards and/or catch of sharks and other species could also increase recreational opportunities, which would have associated benefits for businesses and communities that support recreational activities.

Changes in the Distribution of Benefits and Costs

By requiring the use of spotter planes, NOAA Fisheries could alter the cost and benefit distribution in this fishery. Due to the increased cost required to hire and effectively utilize a spotter plane and find and maintain a smaller vessel, this alternative may preclude vessel owners or operators who can not afford the spotter plane and second vessel from participating in this fishery.

Social Effects

This alternative would have some associated social effects. If vessel owners or operators can not afford to use spotter planes, they would have to leave the fishery. That could mean switching to target different species or finding a non-fishing occupation. This could affect the impacted individual and their family. As described above, it is unlikely this alternative would affect any communities.

Summary

This alternative would reduce the bycatch of protected species but would have inordinately large economic costs for the fishermen in the fishery. Some vessels are successfully experimenting with fishing in a strikenet fashion without the use of a spotter plane and without the use of a second smaller vessel. At this time, NOAA Fisheries would like to encourage fishermen to use the strikenet fashion while observers continue to collect data on different methods of strikenet fishing and bycatch levels of these different methods.

7.3 Alternatives for Analysis: General Requirements (bycatch mortality measures for all gear types)

Alternative 18 (Final Action) *No action*

This alternative will maintain the existing regulations for all HMS gear types except pelagic longline, bottom longline, and shark gillnet as described above.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This alternative is not expected to change the bycatch of sea turtles by other HMS fishing gears.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This measure will not alter the current level of target species or bycatch of other species (those not previously encountered), and therefore is not expected to affect the population of other species or the ecosystem.

Effects on Marine Mammals and Seabirds

This management alternative will not change the incidental take levels of marine mammals or seabirds in other HMS fisheries.

Effects on Essential Fish Habitat

This alternative will not impact EFH for HMS.

Changes in Fishing, Processing, Disposal, and Marketing Costs

The no action alternative will not change the current costs of commercial or recreational fishing, nor of any of the associated support industries.

Changes in Fishing Practices and Behavior of Fishermen

No changes in fishing practices or behavior of HMS fishermen will be expected under the no action alternative.

Changes in Research, Administration, and Management Effectiveness

No additional management actions accompany this alternative, therefore there will not be any concomitant changes in research, administrative or management effectiveness.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative will not be expected to change the economic, social or cultural value of fishing activities because no changes in current regulations would be enacted under this alternative.

Changes in the Distribution of Benefits and Costs

This alternative will not be likely to change the distribution of costs or benefits.

Social Effects

This alternative will not have any social impacts on HMS fishermen.

Summary

This alternative is selected until additional data are collected and analyzed regarding the impact and effectiveness of the alternatives listed below and some of the alternatives discussed above (e.g. blue-dyed bait). Until such data are collected, NOAA Fisheries encourages all HMS fishermen to release sea turtles in a method that reduces post-release mortality; to use a dehooking device, line cutter, or dipnet when appropriate; to watch for whales; and to move 1 nm away from any observed whale or sea turtle.

Alternative 19 (Not Selected) — *Require all vessel operators on HMS permitted vessels in each HMS fishery to post sea turtle handling guidelines specific to interactions in that particular fishery*

This alternative would require every vessel permitted to catch HMS to post in the wheelhouse, or

in an appropriate area not yet determined, sea turtle handling and release guidelines specific to their gear type. This requirement would be effective for each gear type individually as appropriate guidelines are developed.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This alternative would provide vessel operators handling and release guidelines applicable to each HMS fishery for incidentally captured sea turtles. While this alternative would not reduce the bycatch of sea turtles, the appropriate use of these guidelines could decrease the post-release mortality of sea turtles.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This alternative would not affect the catch of another species.

Effects on Marine Mammals and Seabirds

This alternative would not affect interactions with marine mammals or seabirds.

Effects on Essential Fish Habitat

This alternative would have no impact on essential fish habitat.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative should not significantly alter the costs of fishing, processing, disposal, and marketing. The only impact could result in longer gear retrieval times if fishermen have to stop longer to release captured sea turtles. Charter/headboat captains could benefit from the interaction if clients perceive the release to be a positive experience.

Changes in Fishing Practices and Behavior of Fishermen

Fishermen would have to alter their usual behavior only if they incidentally capture a sea turtle. The release time would vary based on the associated circumstances, but it is not expected to take long.

Changes in Research, Administration, and Management Effectiveness

From an administrative standpoint, this alternative would increase the cost of management by requiring NOAA Fisheries to develop and prepare copies of the guidelines for the appropriate gears. At the moment, NOAA Fisheries only has guidelines for longline gear so development for all other gear types would have to be done. It would be difficult to assess the management effectiveness of this measure due to the difficulties in enforcing the proper handling and release of

sea turtles.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative would not impact the value of fishing activities. However, from a cultural or social perspective, the increased protection of sea turtles could enhance the general perception of fishing activities.

Changes in the Distribution of Benefits and Costs

This alternative would not affect the distribution of benefits and costs.

Social Effects

This alternative is not expected to have any social effects.

Summary

While this alternative could potentially reduce bycatch mortality of sea turtles at little cost to the fishermen, NOAA Fisheries cannot implement this alternative until handling and release guidelines are developed for gear types other than longline.

Alternative 20 (Not Selected) — *Require all vessels with hook and line gear on board, in addition to pelagic longline vessels, to carry on board line clippers and dipnets*

All Federally permitted vessels fishing for HMS species with any hook and line gear type on board would be required to have a line clipper and a dipnet on board that meets NOAA Fisheries design and performance standards. Vessel operators would be required to use them to facilitate removal of gear from incidentally captured sea turtles. This measure would help improve the post-release survival of incidentally captured sea turtles.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

Using a dipnet and line clipper would allow monofilament lines and ropes to be cut from incidentally captured sea turtles as close to the hook or point of attachment as possible and also facilitate removal of hooks located in sea turtle mouths, beaks, or bodies by helping to board the turtle on the vessel or holding the turtle steady in the water while the hook is removed. This would reduce the serious injury and/or mortality of sea turtles from remaining hooks or trailing gear that results in impediments to movement, increased risk of entanglement in other gear, and hook wounds that cannot heal due to attached gear. The reduction in serious injury and/or mortality of sea turtles should contribute to increased turtle recovery of the threatened loggerhead

and endangered leatherback sea turtles.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This alternative would not have an effect on the catch rate of target or bycatch species.

Effects on Marine Mammals and Seabirds

This alternative would not have a direct effect on these species, however the dipnet and line clipper could potentially be used to facilitate release and reduce mortality if a marine mammal or seabird was incidentally captured.

Effects on Essential Fish Habitat

This alternative would have no impact on essential fish habitat.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would have a one-time increase on the cost of fishing and may discourage the occasional angler from fishing for HMS. All vessels permitted to fish for HMS species that have hook and line gear on board would have to purchase a dipnet and line clipper for use on their vessel to help release incidentally captured sea turtles. The design specifications for this equipment were taken from the Hawaii pelagic longline fishery and the costs approximately $250 for both devices. NOAA Fisheries has required that the dipnet and line clipper meet specific standards which allows the fishermen to fabricate the devices from materials they already have or can easily obtain (as opposed to requiring the use of a specific device they would have to purchase). The processing, disposal, and marketing costs would not be expected to be impacted by this alternative.

Changes in Fishing Practices and Behavior of Fishermen

The fishing practices and behaviors of fishermen would be altered by this alternative. Whenever a sea turtle is incidentally captured, they would be required to use a dipnet and line clipper to bring the animal onboard, if possible, and remove as much gear as possible before releasing it. Some fishermen already spend time during gear retrieval to handle and release turtles so this alternative would not significantly alter this behavior.

Changes in Research, Administration, and Management Effectiveness

This alternative should not impact the effectiveness of research, administration, and management. However, it would be difficult to assess the management effectiveness of this measure due to the difficulties in enforcing the use of dipnets and line clippers by vessel at sea. Enforcement can verify the presence of the equipment onboard, but fishermen ultimately have the discretion of

using it properly.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative would not impact the value of fishing activities. However, from a cultural or social perspective, the increased protection of sea turtles could enhance the general perception of fishing activities.

Changes in the Distribution of Benefits and Costs

This alternative is not expected to change the distribution of benefits or costs to the impacted fishermen due to the low one-time cost of the gear and ease of implementation.

Social Effects

There would be no anticipated social impacts from the implementation of this alternative.

Summary

This alternative could potentially reduce post-release mortality of sea turtles in HMS fisheries. NOAA Fisheries may implement this alternative in the future if it is shown to be effective in the pelagic longline fishery.

Alternative 21 (Not Selected) *Require all vessels with hook and line gear on board to carry on board a dehooking device*

All Federally permitted vessels with hook and line gear on board engaged in fishing for HMS would be required to have a dehooking device on board. Vessel operators would be required to use it to remove gear from incidentally captured sea turtles.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

This measure could reduce the post-release mortality of any sea turtles incidentally hooked in HMS fisheries. Currently, it is difficult for NOAA Fisheries to typify what level of reduced mortality would be achieved due to lack of data. However, sea turtles have the potential to be hooked in longline and rod and reel fisheries. A dehooking device allows the hook to be removed with greater ease which would improve the probability of survival of the released sea turtle.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

This alternative would not directly impact the level of bycatch or the catch rate of target species in the HMS fisheries. However, it could improve the post-release mortality of non-target species captured in the longline and rod and reel fisheries by facilitating the removal of imbedded hooks. For example, vessels with a dehooking device on board could also use the device to remove the hook from incidentally caught billfish. This should increase the survival rate of released animals.

Effects on Marine Mammals and Seabirds

This alternative could have a limited effect on marine mammals and seabirds to the extent that they are captured in HMS fisheries utilizing hooks. The post-release mortality of any hooked marine mammals or seabirds would be improved by removal of the hook prior to release. NOAA Fisheries is currently unaware of the exact number of interactions with these species that occur in each fishery.

Effects on Essential Fish Habitat

There would be no impact on essential fish habitat due to this alternative.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative would be expected to have a minimal impact on fishing cost. Dehooking devices that are currently available cost less than $100. NOAA Fisheries expects that many of the vessels fishing for HMS species already possess one and carry it on board. This may increase processing costs if the crew has to take more time than usual to remove hooks from sea turtles or non target species. However, hook removal is usually not a time consuming process.

Changes in Fishing Practices and Behavior of Fishermen

By requiring removal of hooks from protected species or other non-target bycatch, fishermen may have to alter their behavior. However, NOAA Fisheries expects that some fishermen may already be using a dehooking device prior to releasing animals and would not have to alter their fishing practices. As the dehooking procedure can be fairly simple, NOAA Fisheries does not expect it to impose a burden on the impacted fishermen.

Changes in Research, Administration, and Management Effectiveness

This alternative should not impact the effectiveness of research, administration, and management. However, it would be difficult to assess the management effectiveness of this measure due to the difficulties in enforcing the use of a dehooking device by vessel at sea. Enforcement can verify the presence of the equipment onboard, but the impacted fishermen ultimately have the discretion of using it properly.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive

Uses of Fishery Resources

This alternative would not impact the value of fishing activities. However, from a cultural or social perspective, the increased protection of sea turtles could enhance the general perception of fishing activities.

Changes in the Distribution of Benefits and Costs

This alternative is not expected to change the distribution of benefits or costs to the impacted fishermen due to the low cost of the gear and ease of implementation.

Social Effects

There would be no anticipated social impacts from the implementation of this alternative.

Summary

This alternative could potentially reduce post-release mortality of sea turtles and other bycatch species. NOAA Fisheries believes that many vessels fishing for HMS already carry a dehooking device on board. NOAA Fisheries may implement this alternative in the future if it is shown to be effective in the NED experimental fishery.

Alternative 22 (Not Selected) — *Require all vessels, in addition to pelagic longline vessels, to move 1 nautical mile if a marine mammal or sea turtle is hooked or entangled*

This alternative would require all Federally permitted vessels engaged in fishing for HMS to move 1 nautical mile following the entanglement or hooking of a marine mammal or sea turtle.

Population and Ecological Effects Due to Changes in the Bycatch of Sea Turtles

NOAA Fisheries cannot quantify the population and ecological effects due to the implementation of this alternative. Sea turtles are known to aggregate along oceanic frontal zones. By moving one mile following an interaction, the vessel may be positioned off the frontal zone and thus avoid the denser concentrations of sea turtles. This should decrease sequential catches of protected species.

Changes in the Catch of Other Species and the Resulting Population and Ecosystem Effects

NOAA Fisheries is unsure what effect this alternative would have on the bycatch of other species or on the catch rate of target species. Moving one mile could cause a significant decrease in the amount of target catch or a significant increase in target catch, depending on the species and the oceanic conditions. Conversely, it could increase catch rates if the vessel moves to an area with

higher densities of target species.

Effects on Marine Mammals and Seabirds

Currently, NOAA Fisheries believes that moving one nautical mile would lessen the probability of hooking or entangling a marine mammal or sea turtle. Because marine mammals travel in pods moving one mile following an interaction may position the vessel out of the animals' direction of travel. This alternative is not expected to have any impact on seabirds.

Effects on Essential Fish Habitat

There would be no impact on essential fish habitat due to this alternative.

Changes in Fishing, Processing, Disposal, and Marketing Costs

This alternative could have an impact on fishing costs. By requiring vessels to move following an interaction with a marine mammal or a sea turtle, concentrations of target species could be missed causing a less than optimal catch rate. Also, if a vessel has to move repeatedly (e.g., a marine mammal or sea turtle is caught each time the gear is set), more than the usual amount of time and fuel would be consumed which would increase the cost of the fishing trip.

Changes in Fishing Practices and Behavior of Fishermen

The practices and behavior of the fishermen would be impacted because they would have to move after every interaction with a marine mammal or sea turtle. As most HMS vessels have not been required to do this, many fishermen would be forced to alter their usual fishing practices to comply with the regulation.

Changes in Research, Administration, and Management Effectiveness

This alternative should not impact the effectiveness of research, administration, and management. However, it would be difficult to assess the management effectiveness of this measure due to the difficulties in enforcing how far a vessel moves, if at all, following an interaction with a marine mammal or sea turtle.

Changes in the Economic, Social, or Cultural Value of Fishing Activities and Non-Consumptive Uses of Fishery Resources

This alternative would not impact the value of fishing activities. However, from a cultural or social perspective, the increased protection of marine mammals and sea turtles could enhance the general perception of fishing activities.

Changes in the Distribution of Benefits and Costs

This alternative is not expected to change the distribution of benefits or costs to the impacted fishermen over time. However, occasionally, due to an encounter with a marine mammal or sea turtle, movement of the vessel may alter the expected benefits or costs of that particular trip.

Social Effects

There would be no anticipated social impacts from the implementation of this alternative.

Summary

This alternative could potentially reduce the interaction rates of sea turtles and marine mammals in HMS fisheries. NOAA Fisheries may implement this alternative in the future if it is shown to be effective in the pelagic longline fishery. Until that time, NOAA Fisheries encourages all HMS fishermen to move 1 nm after an interaction with a protected species.

7.4 Summary of Direct, Indirect, and Cumulative Impacts

The actions analyzed in the FSEIS have direct, indirect, and cumulative impacts associated with them. In Table 7.7 below, NOAA Fisheries summarized the expected impacts of each of the alternatives examined. Direct and indirect impacts refer to the effect of each alternative alone (as if no other regulatory measures are in place). Cumulative impacts refer to impacts from the specific alternative in addition to those from other existing regulatory measures, such as quotas, minimum size limits, time and area closures, sea turtle release requirements (dipnets and line clippers), live bait prohibition in the Gulf of Mexico, permitting, reporting, observer, and vessel safety requirements. As noted below, some of the alternatives would cause a positive or negative cumulative impact, but most of them would cause no significant difference or no detectable difference in the overall regulatory impacts. In the case of the no action alternatives, the cumulative impacts do not change because no action would maintain the status quo.

Table 7.7 Direct, Indirect, and Cumulative Impacts of Alternatives Considered.

Ecological Impacts		Population and ecological effects due to changes in the bycatch of sea turtles	Changes in the catch of other species and the resulting population and ecosystem effects	Effects on marine mammals and seabirds	Effects on essential fish habitat
Pelagic Longline Fishery Requirements					
Alt 1: Close NED area to pelagic longline fishing (Final Action)	Direct/Indirect	Reduction in estimated captures of loggerheads by 67 to 76% and leatherbacks by 58 to 65 %	Initial reduction in target species and bycatch although international fishing efforts may increase in NED and negate reductions from US vessels	Could slightly increase interactions with marine mammals and seabirds depending where fishing effort relocates	No significant difference from no action
	Cumulative	Positive change in sea turtle populations	No significant change in cumulative effects	No significant change in cumulative effects	No detectable change in cumulative effects
Alt 2: Prohibit setting gangions next to floatlines (Not Selected)	Direct/Indirect	No impact on loggerheads, may increase interactions with leatherbacks	No change in catch of target species	No significant difference from no action	No significant difference from no action
	Cumulative	Possible negative change in leatherback populations	No significant change in cumulative effects	No significant change in cumulative effects	No detectable change in cumulative effects
Alt 3: Require length of any gangion to be at least 10 percent longer than any floatline if the total length of any gangion plus any floatline is less than 100 meters (Final Action)	Direct/Indirect	Should reduce sea turtle mortality by allowing them to reach the surface to breathe	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	Slight positive change in sea turtle populations	No significant change in cumulative effects	No significant change in cumulative effects	No detectable change in cumulative effects
Alt 4: Require possession of corrodible non-stainless steel hooks (Final Action)	Direct/Indirect	May increase post-release survival of sea turtles	No significant difference from no action	Could improve post-release survival of marine mammals	No significant difference from no action
	Cumulative	Slight positive change in sea turtle populations	Slight positive change in populations of bycatch species	Slight positive change in marine mammal populations	No detectable change in cumulative effects
Alt 5: Require reporting of lethal sea turtle takes within 48 hours (Final Action)	Direct/Indirect	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No detectable change in cumulative effects	No detectable change in cumulative effects	No detectable change in cumulative effects	No detectable change in cumulative effects
Alt 6: Require posting of sea turtle handling and release guidelines in wheelhouse (Final Action)	Direct/Indirect	Should reduce post-release mortality of sea turtles	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	Slight positive change in sea turtle populations	No detectable change in cumulative effects	No detectable change in cumulative effects	No detectable change in cumulative effects

Ecological Impacts		Population and ecological effects due to changes in the bycatch of sea turtles	Changes in the catch of other species and the resulting population and ecosystem effects	Effects on marine mammals and seabirds	Effects on essential fish habitat
Alt 7: No action (Not Selected)	Direct/Indirect	Jeopardizes continued existence of loggerhead and leatherback sea turtles	No change	No change	No change
	Cumulative	No change	No change	No change	No change
Alt 8: Require dehooking devices (Not Selected)	Direct/Indirect	May increase post-release survival of sea turtles	Could increase post-release survival of other bycatch species	Could increase post-release survival of marine mammals	No significant difference from no action
	Cumulative	Slight positive change in sea turtle populations	Slight positive change in bycatch populations	Slight positive change in marine mammal populations	No detectable change in cumulative effects
Alt 9: Require fishing deeper in water column (Not Selected)	Direct/Indirect	Should reduce capture of sea turtles	Could reduce catch of swordfish	Unknown	No significant difference from no action
	Cumulative	Positive change in sea turtle population	Could have positive change in swordfish population	Unknown	No detectable change in cumulative effects
Alt 10: Require blue-dyed bait (Not Selected)	Direct/Indirect	Found to be ineffective in reducing sea turtle captures	No significant difference from no action	Could reduce seabird captures	No significant difference from no action
	Cumulative	No significant change in cumulative effects	No significant change in cumulative effects	Positive change in seabird populations	No detectable change in cumulative effects
Alt 11: Require mackerel as bait (Not Selected)	Direct/Indirect	Expected to reduce capture of sea turtles	Unknown	Not expected to increase catch of seabirds or marine mammals	No significant difference from no action
	Cumulative	Unknown	Unknown	Unknown	No detectable change in cumulative effects
Alt 12: Require stealth gear (Not Selected)	Direct/Indirect	Unknown	Unknown	Unknown	No significant difference from no action
	Cumulative	Unknown	Unknown	Unknown	No detectable change in cumulative effects
Shark Gillnet Fishery Requirements					
Alt 13: Require operator and observer to look for whales; require operator to contact NOAA Fisheries if a whale is taken (Final Action)	Direct/Indirect	No significant difference from no action	No significant difference from no action	Could reduce incidental captures of whales	No significant difference from no action
	Cumulative	No detectable change in cumulative effects	No detectable change in cumulative effects	Slight positive change in whale populations	No detectable change in cumulative effects

Ecological Impacts		Population and ecological effects due to changes in the bycatch of sea turtles	Changes in the catch of other species and the resulting population and ecosystem effects	Effects on marine mammals and seabirds	Effects on essential fish habitat
Alt 14: Require net checks every 0.5 to 2 hours and removal of protected species (Final Action)	Direct/Indirect	Should reduce mortality of captured sea turtles	No significant difference from no action	Should reduce mortality of marine mammals	No significant difference from no action
	Cumulative	Positive change in sea turtle populations	No detectable change in cumulative impacts	Positive change in marine mammal populations	No detectable change in cumulative effects
Alt 15: No action (Not Selected)	Direct/Indirect	No change	No change	No change	No change
	Cumulative	No change	No change	No change	No change
Alt 16: Prohibit shark gillnet gear (Not Selected)	Direct/Indirect	Would eliminate sea turtle interactions	Reduce fishing pressure on some shark species	Would eliminate marine mammal and seabird interactions	No significant difference from no action
	Cumulative	Slight positive change in sea turtle populations	Slight positive change in some shark species	Slight positive impact on marine mammals	No detectable change in cumulative effects
Alt 17: Require use of spotter planes for strikenetting (Not Selected)	Direct/Indirect	Could reduce sea turtle interactions	No significant difference from no action	Could reduce chance of marine mammal interaction	No significant difference from no action
	Cumulative	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts	No detectable change in cumulative effects
General Requirements					
Alt 18: No action (Final Action)	Direct/Indirect	No change	No change	No change	No change
	Cumulative	No change	No change	No change	No change
Alt 19: Require all HMS vessels to post sea turtle handling and release guidelines (Not Selected)	Direct/Indirect	Would reduce post-release mortality of sea turtles	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	Positive change in sea turtle populations	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative effects
Alt 20: Require vessels with hook and line gear on board to carry line clippers and dipnets (Not Selected)	Direct/Indirect	Could reduce post-release mortality of sea turtles	May reduce post-release mortality of bycatch species	May reduce post-release mortality of marine mammals	No significant difference from no action
	Cumulative	Positive change in sea turtle populations	Slight positive change in bycatch and released species	Slight positive change in marine mammal populations	No detectable change in cumulative effects
Alt 21: Require vessels with hook and line gear on board to have dehooking device (Not Selected)	Direct/Indirect	Could reduce post-release mortality of sea turtles	Could reduce port-release mortality of bycatch and released species	Could reduce post-release mortality of marine mammals	No significant difference from no action
	Cumulative	Positive change in sea turtle populations	Positive change in bycatch and released species	Slight positive change in marine mammal populations	No detectable change in cumulative effects

Ecological Impacts		Population and ecological effects due to changes in the bycatch of sea turtles	Changes in the catch of other species and the resulting population and ecosystem effects	Effects on marine mammals and seabirds	Effects on essential fish habitat
Alt 22: Require all vessels, in addition to pelagic longline, to move 1 nautical mile if a marine mammal or sea turtle is hooked or entangled (Not Selected)	Direct/Indirect	Could reduce sea turtle interactions depending on where the vessel moves	Unknown	Could reduce sea turtle interactions depending on where the vessel moves	No significant difference from no action
	Cumulative	Unknown	Unknown	Unknown	No detectable change in cumulative effects

Economic and Social Impacts		Changes in fishing, processing, disposal, and marketing costs	Changes in fishing practices and behavior of fishermen	Changes in research, administration, and management effectiveness	Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources	Changes in the distribution of benefits and costs	Social effects
Pelagic Longline Fishery Requirements							
Alt 1: Close NED area to pelagic longline fishing (Final Action)	Direct/Indirect	Could increase costs to operators and dealers depending on relocation on vessels	Distant water vessels will either leave fishery or relocate to an open fishing area	Increase research, administration, and enforcement costs	Likely fewer swordfish landed domestically thus affecting fishermen, dealers, and consumers. Existence value of sea turtles could increase	Significantly reduce economic benefit of fishing activities of distant water vessels	Could impact communities that depend on distant water vessels
	Cumulative	Negative impact on costs	Negative impact on fishermen	Negative impact on costs	Negative impact on value of fishing activities	Negative impact on fishermen	Negative impact on fishermen
Alt 2: Prohibit setting gangions next to floatlines (Not Selected)	Direct/Indirect	Minimal impacts on fishermen	Minimal impacts on fishermen	Measure would be difficult to enforce	No significant difference from no action	No significant difference from no action	No significant difference from no action

Economic and Social Impacts		Changes in fishing, processing, disposal, and marketing costs	Changes in fishing practices and behavior of fishermen	Changes in research, administration, and management effectiveness	Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources	Changes in the distribution of benefits and costs	Social effects
	Cumulative	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects
Alt 3: Require length of any gangion to be at least 10 percent longer than any floatline if the total length of any gangion plus any floatline is less than 100 meters (Final Action)	Direct/Indirect	Minimal impacts on fishermen	Minimal impacts on fishermen	Measure would be difficult to enforce	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects
Alt 4: Require possession of corrodible non-stainless steel hooks (Final Action)	Direct/Indirect	Minor increase in costs. Those with stainless steel hooks would have a large initial cost increase	No difference from no action except hooks may be replaced more frequently	Would be difficult to enforce	Immediate cost to fishermen who need to replace hooks. Could impact suppliers	Costs could increase in short term. No change in the long term	No significant difference from no action
	Cumulative	Negative impact on costs to fishermen	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects	No significant change in cumulative effects
Alt 5: Require reporting of lethal sea turtle takes within 48 hours (Final Action)	Direct/Indirect	No significant difference from no action	Fishermen required to call NOAA Fisheries during offloading	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action

Economic and Social Impacts		Changes in fishing, processing, disposal, and marketing costs	Changes in fishing practices and behavior of fishermen	Changes in research, administration, and management effectiveness	Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources	Changes in the distribution of benefits and costs	Social effects
Alt 6: Require posting of sea turtle handling and release guidelines in wheelhouse (Final Action)	Direct/Indirect	No significant difference from no action	Could result in longer gear retrieval time	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
Alt 7: No action (Not Selected)	Direct/Indirect	No change	No change	No change	No change	No change	No change
	Cumulative	No change	No change	No change	No change	No change	No change
Alt 8: Require dehooking devices (Not Selected)	Direct/Indirect	Minor increase in fishing costs, dehooking devices cost about $100	Could increase handling time of bycatch species	Would be difficult to enforce	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
Alt 9: Require fishing deeper in water column (Not Selected)	Direct/Indirect	Would decrease revenue for vessels that normally target swordfish	Fishermen would have to rig gear to fish deeper	Would be difficult to enforce	Would decrease catch of swordfish	Change would depend on how target catch composition varies	Vary based on target catch
	Cumulative	Negative impact on cost	Unknown	No significant difference from no action	Negative impact on value of fishing activities	Unknown	Unknown
Alt 10: Require blue-dyed bait (Not Selected)	Direct/Indirect	Dye cost $46 per pound which would cause minor increase in fishing cost	Fishermen would have to dye bait blue which would increase set time	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action

Economic and Social Impacts		Changes in fishing, processing, disposal, and marketing costs	Changes in fishing practices and behavior of fishermen	Changes in research, administration, and management effectiveness	Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources	Changes in the distribution of benefits and costs	Social effects
	Cumulative	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
Alt 11: Require mackerel as bait (Not Selected)	Direct/Indirect	Could increase cost of bait which would increase cost of fishing	Would change fishing practice and behavior as fishermen used new bait	No significant difference from no action	Might decrease catch of target species or change catch composition	Unknown	No significant difference from no action
	Cumulative	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
Alt 12: Require stealth gear (Not Selected)	Direct/Indirect	May require fishermen to purchase new gear	May not alter fishing behavior, but it depends on the gear involved	May be difficult to enforce	Unknown	Unknown	Unknown
	Cumulative	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Shark Gillnet Fishery Requirements							
Alt 13: Require operator and observer to look for whales; require operator to contact NOAA Fisheries if a whale is taken (Final Action)	Direct/Indirect	No significant difference from no action	Would require fishermen to look for whales and cease fishing if a whale is taken	Would require NOAA Fisheries to establish a phone number and reporting service	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts

Economic and Social Impacts		Changes in fishing, processing, disposal, and marketing costs	Changes in fishing practices and behavior of fishermen	Changes in research, administration, and management effectiveness	Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources	Changes in the distribution of benefits and costs	Social effects
Alt 14: Require net checks every 0.5 to 2 hours and removal of protected species (Final Action)	Direct/Indirect	Could increase costs slightly for fishermen not already conducting net checks	Would alter behavior of those not already conducting net checks by requiring net checks several times during gear soak	Would be difficult to enforce	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts
Alt 15: No action (Not Selected)	Direct/Indirect	No change	No change	No change	No change	No change	No change
	Cumulative	No change	No change	No change	No change	No change	No change
Alt 16: Prohibit shark gillnet gear (Not Selected)	Direct/Indirect	Vessels would target different species or go out of business	Vessels would need to rerig to target new species or exit fishery	Costs would decrease	Minor changes based on small size of fishery	Some vessels may go out of business, others may enter a different fishery	Would be significant social effects as vessels are forced to relocate or switch target species
	Cumulative	Negative change in costs	Negative change in fishermen behavior	Positive impact on costs	Negative impact on value of fishing activities	Minor negative impact on benefits and costs	Negative impact on social effects
Alt 17: Require use of spotter planes for strikenetting (Not Selected)	Direct/Indirect	Significantly increase fishing cost due to use of spotter plane and possibly second vessel	Would significantly alter behavior and practice of participants in the fishery	Would be difficult to enforce	May eliminate some vessels due to higher cost associated with fishing	Could alter distribution by precluding vessels that cannot afford the spotter plane and second vessel	Would have negative social effects if vessels are forced to leave fishery
	Cumulative	Negative change in costs	Negative change in fishermen behavior	Negative impact on costs	Negative impact on value of fishing activities	Negative impact on benefits and costs	Negative impact on social effects

Economic and Social Impacts		Changes in fishing, processing, disposal, and marketing costs	Changes in fishing practices and behavior of fishermen	Changes in research, administration, and management effectiveness	Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources	Changes in the distribution of benefits and costs	Social effects
Alt 18: No action (Final Action)	Direct/Indirect	No change	No change	No change	No change	No change	No change
	Cumulative	No change	No change	No change	No change	No change	No change
Alt 19: Require all HMS vessels to post sea turtle handling and release guidelines (Not Selected)	Direct/Indirect	No significant difference from no action	Behavior would be altered only if fishermen had to release a turtle	Appropriate guidelines for each gear would have to be developed	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts	No detectable change in cumulative impacts
Alt 20: Require vessels with hook and line gear on board to carry line clippers and dipnets (Not Selected)	Direct/Indirect	Would impose a small one-time cost on fishermen	Behavior would be altered only if fishermen had to release a turtle	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts
Alt 21: Require vessels with hook and line gear on board to have dehooking device (Not Selected)	Direct/Indirect	Would impose a small one-time cost on fishermen	Behavior would be altered only if fishermen had to release a turtle	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts	No significant change in cumulative impacts

Economic and Social Impacts		Changes in fishing, processing, disposal, and marketing costs	Changes in fishing practices and behavior of fishermen	Changes in research, administration, and management effectiveness	Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources	Changes in the distribution of benefits and costs	Social effects
Alt 22: Require all vessels, in addition to pelagic longline, to move 1 nautical mile if a marine mammal or sea turtle is hooked or entangled (Not Selected)	Direct/Indirect	Could impact costs depending on impact on target catch	Impact behavior as fishermen have to move following an interaction	No significant difference from no action	No significant difference from no action	No significant difference from no action	No significant difference from no action
	Cumulative	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

8.0 ECONOMIC IMPACTS AND ANALYSES

As described in section 3, before implementing management measures, NOAA Fisheries must consider the economic impacts of the management measures, particularly in accordance with two laws: the Regulatory Flexibility Act (Reg Flex Act) and Executive Order 12866 (E.O. 12866). This section contains an economic analysis, the Regulatory Impact Review required under E.O. 12866, and the Final Regulatory Flexibility Analysis (FRFA) required under the Reg Flex Act. Additional economic and social considerations and information are discussed in sections 7 and 9 of this document and chapter 5 of the annual SAFE report.

8.1 Analysis of Economic Impacts

8.1.1 Expected economic impacts of the pelagic longline alternatives

Number of pelagic longline fishermen

NOAA Fisheries considers all HMS permit holders to be small entities. In October 2001, there were approximately 208 fishermen with a directed swordfish limited access permit and 112 fishermen with an incidental swordfish limited access permit. Therefore, in October 2001, there were approximately 320 fishermen who could use pelagic longline gear to fish for HMS. This is down from the 443 fishermen who were permitted to use pelagic longline gear in HMS fisheries in October 2000. The decrease in number of permit holders could be due to a number of reasons. For a description of possible reasons, please see chapter 9 of the 2002 SAFE report (NOAA Fisheries 2002).

Only a few of these fishermen actually report fishing with pelagic longline gear in logbooks (considered "active"). In 2000, 199 fishermen reported pelagic longline activity in the pelagic logbook but only 171 fishermen reported fishing for HMS with pelagic longline in both the pelagic logbook and in weigh-out slips. Table 8.1 lists the number of active pelagic longline vessels from 1990 to 2000. In general, the number of active vessels has been decreasing since 1994.

Table 8.1 The number of vessels that reported fishing with pelagic longline gear in the pelagic logbook. Source: Cramer, 2001.

Year	Number of active vessels	Year	Number of active vessels
1990	416	1996	367
1991	333	1997	350
1992	337	1998	286
1993	434	1999	224

Year	Number of active vessels	Year	Number of active vessels
1994	501	2000	199
1995	489	-	-

The number of vessels that fish in each area has also decreased although most vessels continue to fish in the Gulf of Mexico, Florida East Coast, or the mid-Atlantic Bight (Table 8.2).

Table 8.2 **The number of vessels that reported fishing with pelagic longline gear by area.** Source: Cramer and Adams, 2001; Cramer, 2001. Note: Vessels that fish in more than one area during the year are counted in both areas. CAR: Caribbean, GOM: Gulf of Mexico, FEC: Florida east coast, SAB: South Atlantic Bight, MAB: mid-Atlantic Bight, NEC: Northeast Coastal, NED: Northeast Distant, SAR: Sargasso, NCA: North Central Atlantic, TUN: tuna north, TUS: tuna south

Area	1997	1998	1999	2000
CAR	45	30	18	18
GOM	118	98	89	79
FEC	73	69	53	52
SAB	67	53	45	46
MAB	81	64	68	59
NEC	57	40	39	36
NED	22	15	10	13
SAR	11	9	4	5
NCA	24	12	9	6
TUN	21	12	9	5
TUS	21	11	8	3

Gross revenues of pelagic longline vessels

The gross revenues of pelagic longline vessels vary greatly depending on the location and species targeted. Using the weight of fish landed per trip as reported in 2000 weigh-out slips and the average 2000 ex-vessel price for the fleet (Table 8.3), NOAA Fisheries calculated the average gross revenues per trip and per vessel for pelagic longline vessels. This information indicates that overall, the average pelagic longline vessel has annual gross revenues of $168,114 (range of less than $1000 to almost $800,000) and that combined the 171 vessels reporting HMS landings in both the pelagic logbook and the weigh-out slips in 2000 had total annual gross revenues of almost $29 million (Table 8.4). Most of these gross revenues were derived from swordfish and

yellowfin tuna landings (Table 8.5).

Table 8.3 **Average ex-vessel prices per lb dw for Atlantic HMS in 2000.** Source: Dealer weigh-out slips from the Southeast Fisheries Science Center and Northeast Fisheries Science Center, and bluefin tuna dealer reports from the Northeast Regional Office. Note: Small coastal sharks are not generally caught in the North Atlantic region.

Species	Average for all regions	Average for N. Atlantic region only
Bigeye tuna	$3.18	$4.12
Bluefin tuna	$9.66	$8.93
Yellowfin tuna	$2.46	$2.64
Other tunas	$0.75	$0.93
Swordfish	$3.51	$3.87
Large coastal sharks	$0.68	$1.01
Pelagic sharks	$1.09	$1.10
Small coastal sharks	$0.46	-
Shark fins	$10.47	$6.83

Table 8.4 **Predicted gross revenues for the pelagic longline fleet based on fishing reports for 2000.** Source: Logbook and weigh-out data maintained by the Southeast Fisheries Science Center.

Description	Number	Total value	Average per vessel	Minimum value per vessel	Maximum value per vessel
Annual gross revenues for the fleet	171 vessels	$29 million	$168,114	< $1000	~ $800,000
Per trip gross revenues for vessels fishing in NED area	47 trips	$5 million	$106,903	~ $33,000	~ $183,000
Per trip gross revenues for vessels not fishing in NED area	2,379 trips	$24 million	$10,182	< $100	~ $82,000

Table 8.5 **The species composition of landings in the pelagic longline fleet in 2000.** Source: Logbook and weigh-out data maintained by the Southeast Fisheries Science Center.

Species	% by number	% by weight	% by gross revenues
Swordfish	37.34	43.71	51.93
Yellowfin tuna	42.68	41.21	34.31
Bigeye tuna	7.32	7.43	8.00
Bluefin tuna	0.14	0.95	3.09
Other tunas	5.69	2.35	0.60
Pelagic sharks	1.82	2.13	1.16
Large coastal sharks	5.00	2.22	0.91

The gross revenues data change dramatically when only trips conducted in the NED area are considered. In 2000, 13 vessels took an average of 3.6 trips per vessel in the NED area. Twenty-eight of these trips occurred in the third quarter, 12 in the fourth quarter, and seven in the second quarter. No trips occurred in the first quarter. In total, these 47 trips brought in just over $5 million in gross revenues with average gross revenues per vessel per trip at $106,903 (range from $33,000 to $183,000) (Table 8.4).[4] Unlike the fleet as a whole, these gross revenues are derived almost entirely from swordfish landings (Table 8.6). It is interesting to note that the average gross revenues *per trip* for these vessels is almost the same as the *annual* gross revenues *per vessel* for the entire fleet (Table 8.4). Thus, of all the vessels in the fleet, vessels that fish in the NED area may be considered the most economically viable vessels.

Table 8.6 **The species composition of landings for pelagic longline trips conducted in the NED area in 2000.** Source: Logbook and weigh-out data maintained by the Southeast Fisheries Science Center.

Species	% by number	% by weight	% by gross revenues
Swordfish	87.79	88.54	88.14
Yellowfin tuna	0.39	0.27	0.19
Bigeye tuna	9.57	8.23	8.72

[4] To calculate gross revenues for the NED area trips, the average ex-vessel prices from the north Atlantic region were used (Table 8.3). These ex-vessel prices may also contribute to the higher gross revenues because they are, in general, higher than the average ex-vessel prices for all regions combined. However, using these ex-vessel prices is appropriate because vessels fishing in the NED area generally land their fish in north Atlantic ports.

Species	% by number	% by weight	% by gross revenues
Bluefin tuna	0.12	0.99	2.27
Other tunas	1.00	0.36	0.09
Pelagic sharks	1.14	1.60	0.59
Large coastal sharks	0.00	0.00	0.00

NOAA Fisheries also looked at the gross revenues per trip for all trips outside of the NED area[5]. In all, there were 2,379 pelagic longline trips reported outside of the NED area. Most of these trips were in the Gulf of Mexico and Florida East Coast areas (Table 8.7). Additionally, on average, vessels fishing in those areas conducted more trips than vessels in other areas (Table 8.7). In general, the number of trips per quarter in all areas outside the NED area were fairly constant (558 in the first quarter, 636 in the second, 687 in the third, and 498 in the fourth) with a slight increase in the third quarter and a slight decrease in the fourth quarter. In total, these 2,379 trips brought in just over $24 million in gross revenues with average gross revenues per vessel per trip at $10,182 (range from less than $100 to $82,000) (Table 8.4).[6] As expected, these gross revenues were derived from both swordfish and yellowfin tuna landings (Table 8.8).

Table 8.7 **The number of trips in each area in 2000.** Source: Logbook and weigh-out data maintained by the Southeast Fisheries Science Center. CAR: Caribbean, GOM: Gulf of Mexico, FEC: Florida east coast, SAB: South Atlantic Bight, MAB: mid-Atlantic Bight, NEC: Northeast Coastal, NED: Northeast Distant, SAR: Sargasso, NCA: North Central Atlantic, TUN: tuna north, TUS: tuna south

Area	Number of trips	Average trips per vessel
CAR	51	2.8
GOM	830	10.6
FEC	687	13.5
SAB	274	6.1
MAB	397	7.0

[5] Vessels that fish for HMS are mobile and may fish in more than one area. For example, a vessel that fishes in the FEC for one trip may fish in the GOM or SAB for the next trip.

[6] To calculate gross revenues for trips outside the NED area, the average ex-vessel prices from all regions were used (Table 8.3).

Area	Number of trips	Average trips per vessel
NEC	120	3.3
NED	47	3.6
SAR	3	1.0
NCA	8	1.6
TUN	3	1.0
TUS	6	3.0

Table 8.8 **The species composition of landings for pelagic longline trips conducted outside the NED area in 2000.** Source: Logbook and weigh-out data maintained by the Southeast Fisheries Science Center.

Species	% by number	% by weight	% by gross revenues
Swordfish	31.29	36.85	45.05
Yellowfin tuna	47.76	47.48	40.68
Bigeye tuna	7.05	7.31	8.10
Bluefin tuna	0.14	0.94	3.16
Other tunas	6.25	2.65	0.69
Pelagic sharks	1.90	2.21	1.24
Large coastal sharks	5.60	2.56	1.08

Variable costs and net revenues of pelagic longline fishing

Most of the studies available to NOAA Fisheries regarding pelagic longline variable costs and net revenues analyze data from 1996 and 1997. While these data analyzed are over five years old, this information still provides interesting insights to pelagic longline fishing and provides estimates on the potential costs of pelagic longline fishing. Where noted, NOAA Fisheries has converted 1996 and 1997 dollars to 2000 dollars using the consumer price index conversion factors of 0.911 and 0.932, respectively.

Larkin *et al.* (2000) examined 1996 logbooks and the 1996 voluntary economic forms and found that net returns to a vessel owner varied substantially depending on the vessel size and the fishing behavior (i.e. sets per trip, fishing location, season, target species). They found that out of 3,255 pelagic longline trips reported in 1996, 642 pelagic longline trips provided the voluntary economic information. Larkin *et al*. (2000) suggest using median values (half of the fleet is less than this

value and half is above) instead of mean values (the average of all vessels) given the high degree of skewness to the data. For example, the mean owner's share of a trip is $4,412 while the median is $2,242. Larkin *et al*. (2000) suggest that the median values identify the characteristics of the majority of the fleet better than the mean, which can be influenced by outliers (a few vessels that may not be similar to the rest of the fleet). The mean supply costs per trip for the vessels sampled was $5,959 and median was $3,666 (Table 8.9). This changed depending on area fished with the median ranging from $1,928 in the area between North Carolina and the east coast of Florida (FEC to MAB) and $10,100 in the Caribbean. Vessels in the NED area (Maine to Virginia region in Larkin *et al*. (2000)) had a median supply cost per trip of $2,831 or $3,108 in 2000 dollars. For the entire fleet, Larkin *et al*. (2000) found that the average net revenues per vessel per trip was $7,354 ($8,072 in 2000 dollars). Vessels fishing in the Caribbean and Maine to Virginia areas had the largest average net returns to the vessel owner per trip at $12,188 and $6,672, respectively ($13,379 and $7,324, respectively, in 2000 dollars). Generally, Larkin *et al*. (2000) found that vessels that were between 46 and 64 feet in length, had between 10 and 21 sets per trip, fished in the second quarter, fished in the Caribbean, or had more than 75 percent of their gross revenues from swordfish had the highest net return to the owner (ranging from $3,187 to $13,097 per trip) while vessels that were less than 45 feet in length, had between one and three sets per trip, fished in the first quarter, fished between North Carolina and Miami, FL, or had between 25 and 50 percent of their gross revenues from swordfish had the lowest net return to the owner (ranging from $642 to $1,885 per trip).

Table 8.9 **The cost-earnings characteristics of 1996 pelagic longline trips.** Source: Larkin *et al*. 2000. Note: Numbers in the table are in 1996 dollars and denote the median not the mean, unless otherwise noted.

Variable	All trips	Region			
		ME to VA	NC to FL	TX to FL	Caribbean
Number of trips	642	86	189	319	47
Number of crew	4	3	2	4	4
Total Gross Revenues	$8,916	$7,060	$4,826	$9,387	$26,227
Fuel costs	$1,031	$753	$410	$1,266	$1,970
Bait costs	$960	$965	$590	$1,000	$2,705
Ice costs	$256	$185	$150	$330	$300
Light sticks	$360	$94	$198	$597	$1,295
Miscellaneous costs	$305	$171	$42	$821	$1,560
Total costs	$3,666	$2,831	$1,928	$5,230	$10,100

Net return to owner	$2,242	$2,671	$1,740	$2,022	$8,020
Mean net return to owner	$4,412	$6,672	$3,679	$3,099	$12,188

Porter *et al*. (2001) conducted a survey of 147 vessels along the Atlantic and Gulf of Mexico (110 surveys were completed) in 1998 regarding 1997 operations. Survey information was combined with trip tickets and logbook data. They found that on average, vessels received approximately $250,000 annual gross revenues, annual variable costs were approximately $190,000, and annual fixed costs were approximately $50,000. Thus, vessels were left with approximately $8,000 to cover depreciation on the vessel and the vessel owner lost approximately $3,500 per year. On a per trip level, gross revenues averaged $22,000 and trip expenses, including labor, were $16,000. Labor cost the owner the most (43 percent), followed by gear. Generally trip returns were divided so the vessel owner received 43 percent and the captain and crew 57%. Porter *et al*. (2001) noted that 1997 was probably a financially poor year due to a reduction in swordfish quota and a subsequent closure of the fishery (this fishery has not been closed since). Similar to Larkin *et al*. (2000), Porter *et al*. (2001) noted differences between region, vessel size, and target species. While all vessels had an average net return per trip of $5,556 ($6,019 in 2000 dollars), vessels that fished in the New England or Caribbean regions had much higher net returns per trip at $20,772 and $18,940, respectively ($22,505 and $20,520, respectively in 2000 dollars) (Table 8.10).

Table 8.10 **Cost-earnings characteristics of an average 1997 pelagic longline trip.** Source: Porter *et al*. 2001. Note: Numbers in the table are in 1997 dollars and denote the mean.

Variable	All vessels	Region				
		New England	Mid-Atlantic	South Atlantic	Gulf of Mexico	Caribbean
Length of trip	13	36	12	8	14	28
Gross revenues	$22,364	$81,569	$20,151	$11,242	$16,437	$67,440
Fuel costs	$2,071	$9,209	$2,154	$717	$1,703	$5,601
Ice costs	$297	$378	$252	$191	$469	$372
Bait costs	$1,559	$4,779	$1,488	$882	$1,406	$3,771
Light sticks	$738	$3,129	$635	$392	$490	$2,164
Food costs	$897	$2,943	$817	$438	$881	$2,270
Gear costs	$2,336	$6,800	$2,147	$1,381	$2,067	$5,808
Other costs	$442	$1,687	$414	$206	$342	$1,293

Total variable costs (not labor)	$9,634	$34,725	$8,839	$5,007	$7,867	$25,880
Total labor costs	$7,173	$26,071	$6,558	$3,670	$4,727	$22,620
Net return	$5,556	$20,772	$4,753	$2,565	$3,843	$18,940

In general, both Larkin *et al*. (2000) and Porter *et al*. (2001) found that the average net return to a vessel is fairly low after all variable costs including labor were accounted for. This was true even of vessels fishing in the northeast region or Caribbean (i.e., regions with relatively high gross revenues). This corresponds with the results of Ward and Hanson (1999) who found that fifty percent of the fleet earns $10,000 or less annually and that each year 20 percent of the fleet actually has a loss. Additionally, as suggested by Larkin *et al*. (2000) in their discussion of mean versus median values, Ward and Hanson (1999) found there were a number of vessels that earned much higher net revenues than the average vessel with 19 percent of the fleet earning $50,000 or more annually and 7 percent earning more than $100,000 annually.

Effects of the alternatives on fishermen

NOAA Fisheries considered twelve alternatives, including no action, to reduce the incidental catch and mortality of protected species, such as sea turtles, on pelagic longline gear in HMS fisheries. These alternatives include no action, a time/area closure, changes in the way pelagic longline gear is set, changes in the gear itself, changes in the bait, and changes in the reporting requirements. Of these, the alternative that proposes closing the NED area to fishing with pelagic longline gear would probably have the largest economic impact despite the fact that it actually affects only 13 (7.6%) of the 171 vessels reporting HMS landings in the pelagic logbook and weigh-out slips in 2000. The economic impact of this closure could be offset if the vessels fishing in the NED area are eligible to and decide to participate in the experimental fishery NOAA Fisheries is conducting in the NED area. Because there may be vessels that fish in the NED area that are not eligible to participate or decide not to participate in the NED area experiment, this and the following sub-section (*Effects of the alternatives on fishermen* and *Impacts on related industries*, respectively) will discuss the alternatives without considering the NED area experiment. Any economic benefits or costs of the experiment are discussed in a separate sub-section below (*The experimental fishery in the northeast distant statistical reporting area*).

As discussed above, based on gross revenues, it appears that vessels fishing in the NED area are some of the most economically viable operations in the pelagic longline fleet. This conclusion is supported when considering net revenues, although vessels fishing in the Caribbean appear to be as, or more, economically viable as vessels fishing in the NED area (Larkin *et al.*, 2000; Porter *et al*., 2001). From 1998 to 2000, NED area vessels have landed over 40,000 swordfish or 21 percent of all swordfish landed by the Atlantic pelagic longline fishery (Cramer, 2001). If the NED area is closed, the vessels that normally fish in that area could either decide to (1) leave the fishery or (2) fish in other areas. Since 1997, an average of 15 vessels have fished each year in the NED area. Because the vessels that fish in the NED area are among the largest and most

productive in the fleet, if a vessel decides to leave the fishery, it is possible that the vessel owner could sell their vessel and its permits for a "reasonable" price. However, preliminary data on the cost of HMS limited access permits do not indicate differences between permit type (directed or incidental) or vessel size. It is also likely that the experienced crew from the vessel could find positions on other pelagic longline vessels. If the vessel owner decides to have the vessel fish in other areas, unless the vessel fishes in the Caribbean, based on the gross and net revenues discussed above, it is unlikely it could generate as much revenue as it did in the NED area. Indeed, because of the vessel's large size, it is likely that with the higher maintenance costs expected, larger variable costs (e.g., fuel, ice, etc.), larger mortgage and insurance costs, and other factors such as inexperience fishing in other areas, the NED area vessels may have higher costs resulting in lower net revenues than non-NED vessels fishing in the same areas. In other words, the non-NED area vessels, even if they have similar catches as the NED area vessels, would have lower costs and therefore higher net revenues. The exception to this would be the Caribbean where vessels are also large and have similar revenues and costs as those in the NED area. However, because of their size, the NED area vessels are highly mobile and stay on longer trips than the non-NED area vessels in the fleet (except for Caribbean vessels). These factors may allow the NED area vessels to follow the migration of the fish and catch more fish per trip than is average for the other areas. This could eliminate the difference between net revenues for non-NED area vessels and net revenues for NED vessels in these open areas; although it is unlikely that the NED area vessels could have similar net revenues in other areas, except for the Caribbean, to the net revenues in the NED area.

The other alternatives considered would affect all pelagic longline fishermen but are not expected to change gross or net revenues for any portion of the fleet. Alternative 2 would prohibit fishermen from setting gangions next to floatlines. To comply with this regulation, fishermen could set fewer hooks or set hooks closer together and maintain the length of the mainline or fishermen could set the same number of hooks and maintain the same spacing while increasing the length of the mainline. If fishermen decide to set fewer hooks, the number of fish caught could decrease by an equivalent amount resulting in slightly lower gross revenues. However, the time needed to set or haul the mainline and the amount of bait needed for the hooks could also decrease resulting in slightly lower variable costs in increasing the amount of time spent fishing. If the fishermen set the same number of hooks and increase the length of the mainline to comply with the regulation, the amount of time it takes to set and haul the mainline could increase slightly but fishermen would still catch the same number of fish per set. Thus, either method of complying with this regulation should not have a large impact on overall net revenues for a trip although the ratio between costs and revenues could alter slightly.

Alternative 3 would require fishermen to have gangions longer than their floatlines. Fishermen could comply with this regulation by decreasing floatline length appropriately, increasing gangion length, or a combination of the two. Thus, this regulation could increase the amount of monofilament needed per trip in order to repair gangions and could require time in the short-term to increase the gangion length or decrease floatline length. However, this regulation should not increase costs per trip significantly and therefore should not affect net revenues.

Alternative 4 would require fishermen to possess and use non-stainless steel, corrodible hooks. Under this definition, NOAA Fisheries would not expect this alternative to have many impacts as a number of fishermen already use non-stainless steel hooks. Generally individual hooks cost less than $1.00.

Alternative 5, which would require the captain to report lethal turtle takes within 48 hours of returning to port, Alternative 6, which would require vessel operators to post handling and release guidelines, Alternative 7 which is no action, and Alternative 8, which would require fishermen to use a dehooking device, should have few, if any, economic impacts. Buying a dehooking device would be a one time cost of less than $100.

Alternative 9 would require fishermen to set hooks deeper in the water column. This could be done by placing fewer floats or placing more hooks between floats. As fishermen already do this to fish for tuna, NOAA Fisheries does not expect this alternative to have any economic impacts unless the catch composition changes dramatically. For instance, if this alternative causes more tuna to be caught than swordfish, the gross revenues per trip could decrease because swordfish are worth more than tuna (Larkin *et al.*, 2000; Porter *et al.*, 2001).

Alternatives 10 and 11 would require fishermen to change the type of bait used in the fishery. In Alternative 10, fishermen would be required to dye their bait blue. The dye used to color the bait is inexpensive ($46 per lb) and, although it may increase annual costs slightly, should have minor economic impacts. Alternative 11 would require fishermen to use mackerel instead of squid bait. Bait accounts for 16 to 26 percent of the total costs per trip (Larkin *et al*., 2000; Porter *et al*., 2001). NOAA Fisheries assumes that fishermen already use the bait that maximizes catch and minimizes costs. Thus, changing the bait type fishermen can use could either decrease gross revenues (because it does not attract as many fish) or increase total trip costs. In either case, while the exact impact is unknown because NOAA Fisheries does not collect information regarding bait type, altering the type of bait used could result in long-term changes in net revenues.

Alternative 12 would require fishermen to use a type of “stealth” gear. At this time, NOAA Fisheries has no economic information for this alternative. However, any changes to fishing gear would require at least a one-time increase in fishing costs.

Impacts on related industries

Fishermen rely on many industries including processors, dealers, wholesalers, restaurants, bait houses, equipment manufacturers and suppliers, and electronic suppliers and repairmen. Of these, only dealers are required to have Federal permits in order to buy fish from fishermen. As of October 2001, there were 522 Atlantic tuna dealers, 302 Atlantic swordfish dealers, and 249 Atlantic shark dealers. As with fishermen, the majority of these permit holders are located in Florida (20 percent), followed by Massachusetts (14 percent) and New York (10 percent).

Many of these alternatives would be unlikely to affect dealers, processors, and wholesalers unless they had an impact on the amount of fish landed. However, once again, the closure of the NED area is the alternative most likely to affect dealers, particularly dealers in the Northeast who rely on fishing vessels fishing in the NED area. Because there are so few NED area fishermen, only a few dealers rely on the NED area fishing for a substantial portion of their activities. However, because those few vessels land such a large percentage of U.S.-caught swordfish, it is likely that these dealers would be significantly affected and may be forced out of business, regardless of the course of action of the vessel. This is because if the vessel decides to continue fishing but changes areas, it is likely the vessel would change dealers in order to land the highest quality seafood and receive the highest ex-vessel price possible. Dealers that do not go out of business would likely increase dependence on other fisheries, including tunas.

Equipment manufacturers and suppliers could also experience some economic impacts if fishermen are required to change their methods of fishing. Alternatives that would affect them include Alternatives 2 and 3 because fishermen might need additional monofilament, Alternative 4 because fishermen might need different types of hooks, Alternative 8 because fishermen could be required to carry dehooking devices, and Alternative 12 because fishermen might need additional supplies than under no action. In all, these alternatives could require fishermen to buy additional supplies and thus have a positive impact on equipment manufacturers and suppliers.

The alternatives could also have implications for bait houses if fishermen are required to dye bait or switch bait. Although, it is not clear how much of an economic impact might result.

The experimental fishery in the northeast distant statistical reporting area

The information presented here is preliminary and is based on only a few of the dealer reports submitted to NOAA Fisheries regarding the vessels that participated in the experiment in 2001.

In 2001, 8 vessels participated in the experimental fishery and conducted approximately 185 sets. In 2001, the experiment examined bait type and gangion spacing. In order to participate in the experiment, each vessel had to meet a number of requirements such as holding a valid permit, carrying an observer, and complying with all other regulations. In return for participating, each vessel received $4,150 per set conducted and was allowed to sell any fish caught[7]. While the experiment did not begin until mid-September, some vessels were able to conduct two trips before the end of the season.

In total, NOAA Fisheries paid participating vessels a total of $769,825 or approximately $96,228 per vessel. Vessels received additional money from selling their fish. As expected, these vessels made most of their gross revenues per trip from swordfish (Table 8.11). However, it also appears that the amount of gross revenues from bigeye tuna was larger than expected based on

[7] Terms of participation and amount of money offered each vessel may change in each year of the experiment.

the information in Table 8.6. In total, it appears that the vessels that participated in the 2001 NED area experiment obtained approximately $2 million in gross revenues from both fishing and the experiment. Considering the experiment did not begin until late in the fishing season for the NED area, it appears that participating in the NED area experiment will help NED area fishing vessels economically in the short-term while fishing methods to reduce turtle bycatch are examined. In the long-term, participating in the NED area experiment will help all pelagic longline fishing vessels, particularly those in the NED area, if the experiment can document bycatch reduction methods and allow for the NED area to be re-opened to U.S. pelagic longline vessels. Depending on the impacts on catch rates, the NED area experimental fishery could also mitigate impacts on dealers in the short-term. Additionally, during the duration of the experimental fishery, dealers could experiment expanding into other fisheries in case the fishing experiment does not result in bycatch reduction methods.

NOAA Fisheries has received a number of bids for the 2002 experimental fishery. NOAA Fisheries anticipates having 10 vessels participating in the 2002 experimental fishery starting in mid-July and running through October. The bids received ranged from $4,000 to $4,500 per set.

Table 8.11 **Preliminary information regarding the 2001 experimental fishery.** Source: Northeast dealer weight out slips. Note: The average gross revenues per species per trip are averages from all vessels and do not add up to the total average gross revenues per trip. The information in this table does not include compensatory payments for participating in the fishery; this information denotes gross revenues from sale of fish only.

Species	Average ex-vessel price	Average gross revenues per trip	Minimum gross revenues per trip	Maximum gross revenues per trip
Swordfish	$2.96	$32,501	$776	$95,731
Yellowfin tuna	$3.15	$5,327	$1,064	$11,841
Bigeye tuna	$4.15	$17,235	$1,153	$53,460
Albacore tuna	$0.34	$557	$13	$1,949
Mako shark	$1.23	$632	$94	$1,911
Total	--	$84,738	$23,376	$199,123

8.1.2 Expected economic impacts of the shark gillnet fishery alternatives

Number of shark gillnet fishermen

In October 2001, there were 252 directed shark permit holders. However, the number of these permit holders that use drift gillnet gear to fish for sharks has been less than 11 vessels in recent years (Table 8.12). Each vessel has between three and six crew members, including the operator. These fishermen fish off the east coast of Florida and Georgia. Because of the gear restrictions,

the short large coastal shark season, and observer coverage requirements for these vessels, it is unlikely that the number of vessels in this fishery would increase substantially.

Table 8.12 **The number of operating shark gillnet vessels.** Source: Trent *et al*., 1997; Carlson and Lee, 1999; Carlson and Baremore, 2001.

Year	Number of vessels	Year	Number of vessels
1990	11	1996	unknown
1991	unknown	1997	unknown
1992	unknown	1998	unknown
1993	5	1999	4
1994	6	2000	6
1995	11	2001	6

Gross revenues of shark gillnet fishermen

NOAA Fisheries has few data regarding the gross revenues of shark gillnet fishermen although NOAA Fisheries hopes to collect additional economic information for all HMS fishermen in the near future. Based on landings reported in logbooks and ex-vessel price information, the gross revenues for shark gillnet fishermen during the first large coastal shark season of 1999 ranged from $3,000 to $38,000 and averaged $19,615. The average gross revenues per trip during the first large coastal shark season of 1999 ranged from $380 to $9,000 and averaged $3,700.

Using the 2000 and 2001 observer information during the non-right whale calving season, the prices listed in Table 8.3 above, and the average weight per shark (Scott *et al*. 1998, Carlson 2001), it appears that the total gross revenues from sharks for all observed strikenet trips (8 sets total in 2000 and 2001) was approximately $1,130 ($142 per set; the amount of time per set averaged less than one hour). Similarly, the total gross revenues from sharks for all observed driftnet trips (37 sets total in 2000 and 2001) was approximately $46,700 ($1,262 per set; the amount of time per set averaged nine hours). This information indicates that shark gillnet vessels are not as economically viable as other commercial sectors of HMS fisheries such as the pelagic longline fishermen.

Variable costs of fishing with shark gillnet gear

NOAA Fisheries has limited information available regarding variable costs of shark gillnet fishing, although NOAA Fisheries hopes to collect additional economic information for all HMS fishermen in the near future. NOAA Fisheries expects that the fishing costs per trip are less than those of a pelagic longline fishing trip because the trips are usually shorter (an average of 18 hours

per trip), vessels do not fish far offshore (within 30 nautical miles from port), and the gear does not need hooks, bait, or light sticks. Other costs may be incurred as the holes in the gear would need to be repaired regularly.

Shark gillnet vessels that fish in a strike-net method probably incur higher costs per trip than those vessels that fish in a drift gillnet method. This is because strikenetting usually requires the use of a small vessel (used to run the net around the school of sharks) and a spotter plane (used to spot schools of fish). While the cost per trip is higher than the traditional drift gillnet method, bycatch in this method is extremely low, catch rates of the target species is high, and vessels can complete a set in less time (one hour versus nine hours). NOAA Fisheries estimates that the smaller vessel could cost between $2,000 and $14,000 to buy. Because these second vessels have specific requirements to be sturdy enough to hold the gillnet and move quickly around the school of sharks, it is likely that vessel owners would need to re-fit any used vessel bought for this purpose. Additionally, a second vessel means additional fuel and maintenance costs. Spotter planes in other fisheries are paid based on the percentage of the proceeds from the trip, generally 10 to 25 percent of gross revenues. Thus, given the average gross revenues per trip, converting a drift gillnet vessel to a strikenet vessel could be prohibitive.

Recently some strikenet vessels have begun striking behind other vessels such as trawl vessels (e.g., shrimp vessels). This negates the need for a spotter plane and could reduce the variable costs substantially. Additionally, some of the smaller drift gillnet vessels have begun to use small nets to strike fish without a second vessel (Carlson, 2002). Their efforts are moderately successful and could reduce the costs of the fishing in a strikenet method substantially by reducing the amount of net that needs to be repaired and the amount of additional gear needed.

Effects of the alternatives on fishermen

Alternative 13 would require the vessel operator and the observer to sight whales and contact NOAA Fisheries if a listed whale is taken. This alternative is not expected to have any economic impacts. Similarly, Alternative 15, no action, would not have any economic impacts.

Alternative 14 would require shark gillnet fishermen to conduct net checks every 0.5 to two hours to check for protected species. For fishermen operating in a strikenet fashion, this alternative would not have any economic impacts since a set takes less than one hour. However, for fishermen operating in a drift gillnet fashion, this alternative would require fishermen to check the net approximately four times during a nine hour set. NOAA Fisheries believes that most gillnet fishermen fishing in a drift gillnet fashion already do this but for fishermen who do not already follow this practice, this may reduce gross revenues per set if moving the net reduces the number of fish caught. Additionally, checking the net could increase the amount of fuel needed. As fuel can be a major portion of the variable costs per trip (at least in the pelagic longline fishery), the profit per trip could be reduced. Because the profits for these vessels are already low, even a small reduction in profits could force less profitable vessels out of the fishery.

Alternative 16, prohibiting drift gillnet gear in the shark fishery, could have significant negative economic impacts on the six vessels that have fished in this fishery in recent years. While these vessels often fish in other fisheries during a large coastal shark closure, such as the mackerel fishery, NOAA Fisheries would not expect them to regain all their lost revenues by switching to other fisheries.

Alternative 17 would require shark gillnet vessels to fish in a strikenet fashion and to use spotter planes. As discussed above, a number of drift gillnet vessels are beginning to switch to a strikenet fashion of fishing but not all of them use spotter planes. Some vessels are fishing behind trawl vessels where shark schools congregate to eat the bycatch discards from those vessels. Requiring them to use spotter planes could have a substantial impact on net revenues since spotter planes typically take 10 to 25 percent of gross revenues from a trip. This alternative may have large economic costs, putting some of the vessels out of business or into other fisheries, with few ecological benefits.

Impacts on related industries

As with pelagic longline fishermen, shark gillnet fishermen rely on other industries for equipment and to sell fish. However, there are few shark gillnet fishermen, their revenues are small compared to other fishermen, and the fishery occurs in Florida where most commercial HMS fishermen are located. Therefore, it is unlikely that any related industries rely solely on shark gillnet fishermen. The only alternative that may affect other industries is Alternative 16, requiring the use of a spotter plane. This industry may notice a slight increase in revenues if shark gillnet fishermen are required to use spotter planes and all shark gillnet fishermen remain in business.

8.1.3 Expected economic impacts of the general alternatives

Number of HMS fishermen

There are approximately 23,000 fishermen who hold HMS permits. As seen in section 8.1.1, not all of these permit holders report fishing for HMS. This is especially true for the Atlantic tunas Angling and General categories where there are thousands of permit holders and but few participants are actually successful in landing bluefin or yellowfin tuna. For example, in 1997, only 1,027 vessels and, in 1998, only 965 vessels in the General and Charter/Headboat categories reported landing bluefin tuna over 73 inches curved fork length.

Table 8.13 **The number of HMS permit holders.** The actual number of permit holders are subject to change and can vary from year to year based on participation rates.

Permit type	As of October 2000	As of October 2001
Shark, swordfish, tuna longline limited access permits	982	752
Atlantic tunas Angling category	14,908	12,685
Atlantic tunas Harpoon category	44	53
Atlantic tunas Trap category	4	1
Atlantic tunas General category	6,705	6,072
Atlantic tunas Purse Seine category, limited access	5	5
HMS Charter/headboat	2,728[8]	3,260
Total	25,376	22,828

Gross revenues of HMS fishermen

The gross revenues of HMS fishermen changes depending on the gear type used and the species targeted. In total, HMS fishermen earned approximately $77.5 million in 2000 (on average $3,372 per permit holder) (Table 8.14). Of all HMS, yellowfin tuna brings in the highest gross revenues (~$30.6 million in 2000), followed by bluefin tuna (~$20.6 million in 2000), and swordfish (~$17.0 million in 2000). Sharks brought in the lowest gross revenues (~$5.5 million total in 2000).

[8] The charter/headboat permits used to be for Atlantic tunas only. Starting in 2001, all charter/headboats fishing for any HMS are required to obtain a permit.

Table 8.14 **Estimates of the total ex-vessel value gross revenues of Atlantic HMS fisheries as presented in the 2002 SAFE report.** Note: Average ex-vessel prices are the averages of averages and may have some weighting errors, except for bluefin tuna which is based on a fleet-wide average. 2000 prices are converted to 1996 dollars using a conversion factor of .911. Sources: NOAA Fisheries, 1997b; NOAA Fisheries, 2001b; Cortes, 2000; Cortes, 2001a; Cortes, 2001b; and bluefin tuna dealer reports from the Northeast Regional Office.

Species	1996			2000		
	Ex-vessel price ($/lb dw)	Weight (lb dw)	Fishery Value	Ex-vessel price ($/lb dw)	Weight (lb dw)	Fishery Value
Bigeye tuna	$2.40	1,212,706	$2,904,432	$2.90	1,012,352	$2,935,821
Bluefin tuna	$10.58	1,652,989	$17,488,624	$8.80	2,137,580	$18,810,704
Yellowfin tuna	$2.11	6,679,938	$14,116,936	$2.24	12,435,708	$27,855,986
Other tunas	$0.83	368,433	$305,799	$0.68	795,243	$540,765
Total tuna	--	--	$34,815,791	--	--	$50,143,276
Swordfish	$3.77	7,170,619	$27,033,234	$3.20	4,832,384	$15,463,629
Large coastal sharks	$0.67	5,262,314	$3,499,439	$0.62	3,762,000	$2,332,440
Pelagic sharks	$1.05	695,531	$727,989	$0.99	215,005	$212,855
Small coastal sharks	$0.25	460,667	$115,167	$0.42	672,245*	$282,343
Shark fins (weight = 5% of all sharks landed)	$6.01	320,926	$1,928,763	$9.54	232,462	$2,217,687
Total sharks	--	--	$6,271,358	--	--	$5,045,325
Total HMS	**--**	**--**	**$68,120,382**	**--**	**--**	**$70,652,230**

*1999 data used. 2000 data not available.

Variable costs of HMS fishing

NOAA Fisheries has little economic data for fishing gears other than pelagic longline. Regarding bottom longline, this gear is mainly used to target sharks and any fishing costs for this gear type should be similar to the fishing costs for pelagic longline. McHugh and Murray (1997) found that a seven day trip had an average profit (owner's share of catch minus all expenses) of $1,589. Vessels between 40 and 49 feet had an average profit of $1,975 for a seven day trip. Additional data are needed for this fishery.

Regarding purse seine, NOAA Fisheries is continuing its efforts to collect economic data on the

Atlantic tunas purse seine fishery. In 2000, a voluntary survey was distributed to the owners of the five Atlantic tuna purse seine vessels. The study is still in the data collection and compilation stage, and NOAA Fisheries plans to collect additional data from the purse seine vessels in order to have preliminary results available for next year's SAFE report. The purpose of the survey is to collect up-to-date information regarding the seasonal and/or yearly costs incurred by the purse seine fleet. Accurate cost information will be particularly useful when addressing the impact of regulations on Atlantic tuna fishery participants, including purse seiners, to ensure that the agency conducts adequate analyses as required under various legal mandates.

The actual costs associated with the commercial handgear fishery is unknown although a non-random sample of 15 vessel owners in the General Category Tuna Association reported in the HMS FMP estimated the average variable cost per fishing trip in 1997 to be $516. The commercial handgear fishery targets mainly tunas, particularly bluefin tuna. For this reason, most of the economic information regarding this fishery is related to bluefin tuna. In 1999, researchers at the University of Rhode Island finalized a project that: 1) evaluated the influence of factors such as quantity supplied, time of harvest, and quality characteristics on the price of U.S. Atlantic bluefin tuna sold on the Japanese wholesale market; 2) determined the relationship between prices in Japan and ex-vessel prices received by U.S. fishermen, and 3) determined how different fishery management options influence gross revenues received by U.S. fishermen. The final report concluded that regulations should be developed and implemented that would help the fishery avoid capture seasons that are condensed into sporadic intervals. The report also recommended that consumer preferences should be considered for the efficient exploitation and trade of bluefin tuna in order to help increase revenues for the industry and to eliminate economic inefficiencies generated by public management. Specifically, the report suggests a more dispersed allocation of harvest planned in conjunction with periods of the year when fish seem to possess consumer-favored characteristics, such as high fat content. The researchers at the University of Rhode Island have continued their work, concentrating on the following research objectives: 1) to formally evaluate, using a hedonic model, the degree to which price of U.S. fresh bluefin tuna is determined by those quality attributes of each fish, rather than by just the quantity supplied; 2) to attempt to show how the quality of U.S. bluefin tuna depends on harvest practices; and 3) to combine the results from the hedonic model and production model estimates to find quota allocations that could result in the highest payoffs to the industry.

Economic information for recreational fisheries generally measures angler willingness to pay (WTP). Angler WTP depends, in part, on the species sought and on the location. Ditton *et al*. (1998) found that the WTP for a bluefin tuna trip in North Carolina ranged from $344 to 388 per person. Fisher and Ditton (1992a) found that anglers were willing to pay an additional $105 per trip rather than stop fishing for sharks. The most recent recreational economic information comes from a 1994 survey of anglers in New England and the mid-Atlantic (Hicks *et al.*, 1999). The data collected were used to estimate expenditures and economic value of the various groups of recreational fisheries in this area. One category of fishing, called "Big Game" consisted primarily of HMS, including sharks, billfish, and tunas. Although this study is not an exhaustive picture of the entire HMS recreational fishery, the results provide considerable insight into the absolute and

relative values of the recreational fisheries for HMS. Overall average WTP for a one-day fishing trip ranged from a low of less than a dollar in New Hampshire to a high of $42 in Virginia. Aggregate WTP (average WTP times the number of trips) ranged from $18,000 in New Hampshire to nearly $1 million in Virginia. Besides WTP, recreational anglers also have to pay for equipment and possibly travel costs. This study also found that boat fees were responsible for the greatest percentage of expenditures. Roughly 70 percent and 53 percent of total expenditures by anglers went for private/rental boats and charter/party boats, respectively. Travel expenses were the smallest portion of expenditures, although travel costs for those fishing on party/charter vessels were about twice as high as for those fishing on private/rental boats ($28 *vs.* $16).

Effects of the alternatives on fishermen

Alternative 18, no action, would not have any incremental economic impacts. Similarly, Alternative 19, requiring all vessels to post sea turtle handling guidelines, should not have any economic impacts since NOAA Fisheries will provide the guidelines at no cost to vessel owners.

Alternative 20, would likely have the greatest economic impact of all the alternatives considered for all gear types (excluding the NED closure area which is applicable only to pelagic longline gear). This alternative would require all fishermen to carry and use line clippers and dipnets. This equipment currently has a one-time cost of approximately $250. However, the cost could change if demand is increased as a result of any rulemaking. While $250 is not a large amount compared to other costs of fishing, it could discourage the occasional angler who would only be required to have the equipment on board for one or two HMS fishing trips a year. In total, the 23,000 fishermen permitted in HMS fisheries could spend $5.75 million buying this equipment.

Alternative 21, requiring vessels to carry and use a dehooking device, could also have minor economic impacts. Dehooking devices generally cost approximately $100 depending on the length of the handle and the strength of the material (i.e., whether it was designed for small fin fish or large fish such as sharks). As described above, this should not impact most commercial fishermen who spend much more on other fishing costs but it could discourage the occasional HMS angler. However, a number of recreational and commercial fishermen already use dehooking devices voluntarily. In total, the 23,000 fishermen permitted in HMS fisheries could spend approximately $2.3 million buying this equipment.

Alternative 22, requiring vessels to move 1 nm after any interactions with protected species, would have minor economic impacts. Interactions with protected species are a relatively rare occurrence and therefore would not affect most fishing trips. However, on the occasional fishing trip where a protected species is encountered, this alternative could increase fuel costs and could decrease target catch if the vessel is forced to move off prime fishing grounds.

Impacts on related industries

The only alternatives that would significantly affect related industries are alternatives 18 and 19. Under these alternatives, HMS fishermen could spend over $8 million buying additional equipment. This could increase profits for suppliers and encourage production for line clippers, dipnets, and dehooking devices.

8.2 Regulatory Impact Review

8.2.1 Description of the management objectives

Please see section 1 for a description of the objectives of this rulemaking.

8.2.2 Description of the fishery

Please see section 6 for a description of the fisheries that could be affected by this rulemaking.

8.2.3 Statement of the problem

Please see section 1 for a description of the problem and need for this rulemaking.

8.2.4 Description of each alternative

Please see section 2 for a summary of each alternative and section 7 for a complete description of each alternative and its expected ecological, social, and economic impacts.

8.2.5 Economic analysis of expected effects of each alternative relative to the baseline

NOAA Fisheries does not believe that the national net benefits and costs would change significantly in the long run as a result of implementation of the preferred alternatives. The benefits and costs of parts of the industry might change and the volume of certain species (such as swordfish from the NED area) might change slightly but the total volume of fish available for consumption should not change significantly. Table 8.14 indicates possible changes as a result of each alternative.

Table 8.14 Summary of net benefits and costs for each alternative.

Management measure	Net Economic Benefits	Net Economic Costs
Pelagic longline fishery requirements		
Alternative 1- NED area closure **FINAL ACTION**	Could reduce interactions with sea turtles leading to higher existence value.	The fewer than 20 vessels that fish in the NED area land a significant amount of the U.S.-caught swordfish. This alternative would cause the vessels that fish in that area to change areas, leading to lower gross revenues, or leave fishery. If the vessels move or leave the fishery, that could impact related businesses that rely on those vessels and could effect consumers if importers increase the cost of swordfish.
Alternative 2 - Prohibit gangions next to floatlines	None.	Minimal.
Alternative 3 - Gangion length longer than floatline length **FINAL ACTION**	Could reduce mortality of sea turtles leading to higher existence value.	Minimal.
Alternative 4 - Corrodible hooks **FINAL ACTION**	Could reduce post-release mortality of hooked sea turtles leading to higher existence value.	Minimal.
Alternative 5 - Report lethal turtle takes within 48 hours **FINAL ACTION**	None.	None.
Alternative 6 - Require bottom and pelagic longline fishermen to post sea turtle handing guidelines **FINAL ACTION**	None.	None.
Alternative 7 - No Action	None.	None.
Alternative 8 - Carry and use a dehooking device	Could reduce post-release mortality of hooked sea turtles leading to higher existence value. Could increase profits for suppliers.	Minimal. Approximately $100 per vessel.
Alternative 9 - Fish hooks deeper in water column	Could reduce interactions with sea turtles leading to higher existence value.	Could reduce gross revenues by increasing the amount of tuna caught while decreasing the amount of swordfish caught. Swordfish trips generally have higher profits than tuna trips.

Management measure	Net Economic Benefits	Net Economic Costs
Alternative 10 - Use blue-dyed bait	Could reduce interactions with sea turtles leading to higher existence value.	Blue dye costs approximately $46 per lb. Impacts on target catch are unknown.
Alternative 11 - Use mackerel bait	Could reduce interactions with sea turtles leading to higher existence value.	Unknown.
Alternative 12 - Use stealth gear	Could reduce interactions with sea turtles leading to higher existence value.	Unknown.
Shark gillnet fishery requirements		
Alternative 13 - Watch for whales; Notify NOAA Fisheries if whale taken **FINAL ACTION**	Might reduce interactions with whales leading to higher existence value.	None.
Alternative 14 - Net checks every 0.5 to 2 hours **FINAL ACTION**	Might reduce mortality of protected species leading to higher existence value.	Minimal. For fishermen who do not already do this, might increase fuel costs. Might decrease target catch if net needs to be moved during checks.
Alternative 15 - No Action	None.	None.
Alternative 16 - Prohibit gear	Would eliminate any bycatch in the fishery leading to higher existence value of protected species.	Would eliminate the six vessels in this fishery sector but would not have a large impact on the shark fishery as a whole.
Alternative 17 - Require strikenetting and spotter plane	Would virtually eliminate any bycatch in the fishery leading to higher existence value of protected species. Could increase profits for spotter planes.	Could eliminate the six vessels in this fishery but would not have a large impact on the shark fishery as a whole. If vessels remain in fishery, profits would decrease as much of the revenues would pay for the spotter plane.
General requirements		
Alternative 18 - No Action **FINAL ACTION**	No incremental effects.	No incremental effects.
Alternative 19 - Post sea turtle handling guidelines	None.	None.

Management measure	Net Economic Benefits	Net Economic Costs
Alternative 20 - Carry and use line clippers and dipnets	Might reduce post-release mortality of sea turtles leading to higher existence value. Might increase profits for suppliers.	Approximately $250 per vessel or $5.75 million for all HMS fishermen.
Alternative 21 - Carry and use a dehooking device	Might reduce post-release mortality of sea turtles leading to higher existence value. Might increase profits for suppliers.	Approximately $100 per vessel or $2.3 million for all HMS fishermen.
Alternative 22 - Move 1 nm after interaction with protected species	Might reduce post-release mortality of sea turtles leading to higher existence value.	Minimal. Might increase fuel costs on rare occasions when interactions occur. Might decrease target catch on rare occasions when interactions occur.

8.2.6 Summary

Under E.O. 12866, a regulation is a "significant regulatory action" if it is likely to: 1) have an annual effect on the economy 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, and obligation 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 the Executive Order. The final actions described in this document and in the final rule do not meet the above criteria. Therefore, under E.O. 12866, the final rule is not a significant regulatory action.

8.3 Final Regulatory Flexibility Analysis

8.3.1 Statement of the need for and objectives of this rulemaking

Please see section 1 of this document for a description of the need for, the legal basis, and objectives of this rulemaking.

8.3.2 A summary of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a summary of the assessment of the agency of such issues, and a statement of any changes made in the rule as a result of such comments

NOAA Fisheries received many comments during the comment period. These and NOAA Fisheries' responses are summarized in Appendix A of this document and are included in the final rule. NOAA Fisheries received only a few comments related to economic issues and concerns; all

pertained to the closure of the NED area. These comments are responded to with the other comments in Appendix A and the economic concerns are discussed here.

All of the economic comments noted the substantial economic impacts a closure of the NED area will have on the vessels that normally would fish in the area. These comments noted that NED area vessels cannot simply go fish elsewhere and remain profitable; that paychecks for crew members for NED area trips are double, and in some cases twenty times, the paychecks for crew members for non-NED area trips; and that eliminating fishing in the NED removes the incentive to continue in this fishery. Further the comments note that if the NED area is closed, NED area vessels have two options: stop fishing or attempt to survive by switching to the coastal fishery. These comments further note that other coastal fishing areas are overcrowded and that NED area vessels will experience competition with coastal longline fishermen and have gear conflicts with stationary lobster and crab gear in these coastal areas.

NOAA Fisheries is aware, and stated in the economic analyses and Initial Regulatory Flexibility Analysis (IRFA) for the proposed rule, that not all other fishing areas are likely to be as profitable as the NED area for pelagic longline vessels that typically fished in the NED area. However, data available to NOAA Fisheries indicate that other areas, such as the Caribbean area, can be as profitable as the NED area. Additionally, data available to NOAA Fisheries indicate that NED vessels already fish in other areas during winter months; thus, switching locations is not prohibitive for NED vessels. Also, in the short term, NED vessels can volunteer to participate in the NED experimental fishery. Participating in the NED experimental fishery can be profitable for these vessels in the short-term, and, in the worse case scenario, will allow these vessels time to plan their course of action if the experimental fishery does not produce results that would allow NOAA Fisheries to reopen the NED area. Additionally, while the NED area vessels could be substantially impacted due to a closure of the NED area, NOAA Fisheries must close the NED area as part of the RPA to remove jeopardy as described in the BiOp and section 1 of this document. The NED area was chosen as part of the RPA because the majority of sea turtle interactions, both as reported in fishing logbooks and as observed by fishing observers, occurs in the NED area (see section 7). Furthermore, no other area(s) would eliminate as many sea turtle interactions while impacting so few active vessels (15 vessels out of almost 200 vessels). Thus, to the extent practicable, NOAA Fisheries has minimized the economic impact of the BiOp fleet-wide.

8.3.3 Description and estimate of the number of small entities to which the final rule will apply

NOAA Fisheries considers all permit holders to be small entities. A description of the fisheries affected can be found in section 6 of this document. As of October 2001, there were approximately 208 directed swordfish permit holders and 112 incidental swordfish permit holders for a total of 320 permit holders who are authorized to use pelagic longline (only about half of all permit holders are actually active in the pelagic longline fishery) and could be affected by the

pelagic longline gear requirements of the final rule. Fewer than 20 vessels would be affected by a closure of the NED area. Additionally, while there were 252 directed shark permit holders in October 2001, NOAA Fisheries knows of fewer than 11 shark fishermen who have used drift gillnet gear at some point in the past few years and who could be affected by the shark gillnet gear requirements of the final rule. The general requirements considered but not finalized in this rulemaking could have affected all HMS permit holders including HMS limited access permit holders (~ 752), tuna harpoon category permit holders (~53), tuna trap category permit holders (~1), tuna general category permit holders (~6,072), tuna purse seine category permit holders (5), tuna angling category permit holders (~12,685), and HMS charter/headboat permit holders (~3,260).

Other sectors of HMS fisheries such as dealers, processors, bait houses, and gear manufacturers might be affected by the final regulations particularly the closure of the NED area. However, the final rule does not apply directly to them, only to permit holders and fishermen. As such, economic impacts on these other sectors are discussed in other sections of this document but not here.

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

Some of the final actions in this document result in additional reporting, record-keeping, and compliance requirements. Alternatives 5 and 13 would require fishermen to report to NOAA Fisheries turtle takes (required for fishermen using pelagic longline gear) or whale sightings (required for fishermen using shark gillnet gear) within a specified amount of time. Neither of these alternatives are expected to increase costs or to increase the needed skill levels required for HMS fisheries.

The other final actions would change the way and areas where fishermen can fish and set their gear but should not increase the skill level needed to participate in HMS fisheries. Alternatives 3 (required for fishermen using pelagic longline gear) and 14 (required for fishermen using shark gillnet gear) could have a small impact on fishing profits (e.g., 3 may require additional monofilament, 14 could reduce target catch slightly and increase fuel costs) but these alternatives would not have a significant economic impact on individual fishermen. Alternative 1 (required for fishermen using pelagic longline gear) could have a significant economic impact on fewer than 20 vessels and their communities if they do not participate in the experimental fishery and are not as successful fishing in other areas. Under the definition of non-stainless steel, Alternative 4 (required for fishermen using pelagic longline gear) is unlikely to change the profits of individual fishermen. Alternative 6 (required for fishermen using pelagic longline gear) should not have any economic impact on individual fishermen.

8.3.5 Description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and the reason that each one of the other significant alternatives to the rule considered by the agency which affect small entities was rejected

During preparation of an IRFA, the Reg Flex Act (5 U.S.C. § 603 (c) (1)-(4)) lists four types of alternatives to minimize the economic impacts of a proposed rule which should be discussed. NOAA Fisheries is also including discussion of these alternatives in this FRFA. These alternatives (all of which assume the proposed action could impact small entities differently than large entities) are:

1. Establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities
2. Clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities
3. Use of performance rather than design standards
4. Exemptions from coverage of the rule for small entities

Under the first and fourth alternatives listed above, NOAA Fisheries considers all permit holders to be small entities, and thus, in order to meet the objectives of this rulemaking and address the management concerns at hand, NOAA Fisheries cannot exempt small entities or change the reporting requirements for small entities. The second and third alternatives are discussed below with the alternatives that were considered but not preferred.

NOAA Fisheries considered a number of alternatives for pelagic longline fishermen that could minimize the economic impact of the final actions, particularly the closure of the NED area. All of these alternatives were designed to reduce sea turtle interactions and reduce post release mortality. These alternatives included rigging the pelagic longline in a different method (Alternative 9), requiring vessels to use mackerel instead of squid bait (Alternative 11), and requiring vessels to use stealth gear (Alternative 12). At this time, NOAA Fisheries does not have adequate information on how these alternatives would affect sea turtle interactions or post-release mortality. For this reason, NOAA Fisheries is conducting an experimental fishery in the NED area to test some of these alternatives in the hopes of opening the NED area in the future and exporting the knowledge gained to other nations. In the meantime, closing the NED area (Alternative 1) allows for the greatest reduction in turtle interactions and no other alternative (performance or design) or simplification of the requirements is available that can minimize its economic impacts on the small portion of the fleet (<8 percent) that fishes in the NED area. The other final actions, would have minor economic impacts similar to those for Alternatives 9

through 12.

NOAA Fisheries is also finalizing regulations for shark gillnet fishermen. These fishermen have small profits compared to fishermen in other sectors of the HMS fleet and they often spend time fishing in other fisheries in order to make a living. The two final actions (requiring the vessel operator to sight whales and contact NOAA Fisheries and require net checks at specified times) should not have a large economic impact and should help reduce interactions and any post-release mortality if interactions do occur. However, requiring the net checks could make some trips unprofitable if the fisherman has to move the net causing him/her to miss large amount of target species and if the net checks require large amounts of fuel, thus increasing the trip costs. However, the two final actions already minimize the economic impacts compared to the two other alternatives considered (prohibiting the gear and requiring the use of a spotter plane). It is not likely that simplifying the regulations or formulating performance standards would help reduce protected species interactions or post-release mortality in this fishery.

NOAA Fisheries is not finalizing any alternative that would affect all HMS fishermen at this time. The final action maintains the status quo and will not result in any additional substantial impacts on individual small entities. The alternatives that were considered for all HMS fishermen but not selected would not result in substantial impacts on individual small entities but could have some small costs. For instance, Alternative 19 should not have any economic impact as the guidelines will be provided at no cost to the fisherman; Alternatives 20 and 21 may have some slight (~$350 in total) one time costs; and Alternative 22 might occasionally increase trip costs depending on the circumstances involved.

8.3.6 Summary

NOAA Fisheries concludes that while some of the final actions are likely to have a minor impact on small entities, most of the final actions would not have a significant impact on a substantial number of small entities as defined under the Reg Flex Act. However, Alternative 1, closure of the NED area, could have a significant impact on a substantial number of small entities (less than 20 vessels that fish in the NED area) as defined under the Reg Flex Act. In fact, some of the small entities that participate in the NED area fishery, both fishermen and businesses related to fishing (i.e., dealers and bait houses), might be forced out of business or be forced to significantly alter their method of business. However, NOAA Fisheries is conducting an experimental fishery in the NED area that could minimize the economic impacts for fishermen who participate in the short-term, and depending on the results of the experiment, gear modifications could replace the area closure as a means to minimize the economic impacts in the long-term for the entire fishery. If NOAA Fisheries is unable to find gear modifications that reduce sea turtle takes and mortality to the extent required by the BiOp, the experimental fishery minimizes the economic impact to these few vessels to the extent practicable by allowing some fishermen to continue to fish in the NED area in the short-term while allowing time for them to explore other options for the long-term.

9.0 SOCIAL IMPACT ASSESSMENT

Under the Magnuson-Stevens Act and NEPA, NOAA Fisheries is required to analyze the social impacts of fishing regulations on HMS fishing communities. A fishing community, as defined under NS 8, is

> "...a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, crew, and fish processors that are based in such communities."

Often, it is the economic impacts (described in Sections 7 and 8 of this document) which drive the changes in fishing communities. However, social impacts can occur without any associated economic impacts. While NOAA Fisheries collects fishing and economic data through observers and mandatory reporting requirements, these data provide information only on when, where, and how HMS vessels fish and the productivity of their fishing trips. These data do not provide information on the socio-economic aspects of the HMS fisheries. Additionally, because some HMS fishing vessels and their crew are "migratory," following the fish up and down the coast, and others and their crew generally stay in one location (e.g., some of the smaller vessels), it is difficult to estimate the impacts of some of these measures on fishing communities. At this time, the best available information regarding HMS fishing communities is summarized in the HMS FMP and updates are provided in the annual SAFE reports. For these reasons, the social impacts of the alternatives on fishing communities are discussed qualitatively, not quantitatively.

In order to increase its understanding of HMS fishing communities, NOAA Fisheries has recently provided funding for additional research regarding HMS fishing regulations on HMS communities. However, this research is not expected to be done this year. Additionally, NOAA Fisheries continues to work with fishing and environmental representatives through organizations (e.g., Blue Water Fishermen's Association), the HMS and Billfish APs, and public hearings in order to improve its understanding of all HMS fishing communities and the impacts of fishing regulations on these communities.

This section analyzes the social impacts of the final actions in this document on fishing communities. Additional social impacts are discussed in Section 7.

9.1 Community Profiles

Chapter 9 of the HMS FMP contains a full description of many fishing communities that participate in HMS fisheries. These descriptions include the population, level of education, sources of employment, per capita income, and the fishing sectors in the community. The communities described include Gloucester, MA; New Bedford, MA; Barnegat Light, NJ; Brielle, NJ; Hatteras, NC; Wanchese, NC; Islamorada, FL; Pompano Beach, FL; Madeira Beach, FL; Panama City, FL; Dulac, LA; and Venice, LA.

Of these communities, the HMS FMP points out that New Bedford, Barnegat Light, Wanchese, Islamorada, Pompano Beach, Madeira Beach, Panama City, Dulac, and Venice have sectors that rely on fishing with pelagic longline gear. Wilson *et al*. (1998) found that all pelagic longline fishermen that land HMS are vessels that fish in the NED area and that many of these vessels fish in the Caribbean in the winter months or have moved to the Pacific Ocean. Additionally, the families of fishermen on these vessels are isolated from each other and feel the strain of long fishing trips. According to Wilson *et al.* (1998), some vessels in Barnegat Light are trying to convert to other fishing gears. Wilson *et al*. (1998) also found that many pelagic longline fishermen in Wanchese had already switched out of fishing and moved into other employment such as carpentry, building, and charter/headboat fishing. It is possible that this trend could continue as a result of the preferred alternatives if fishermen feel that the regulations are becoming too restrictive. In Islamorada, Wilson *et al*. (1998) found that vessels had a limited range and that some captains were already seeking employment in the Bahamas, South Africa, and South America. As with Islamorada, Pompano Beach is experiencing an increasing number of recreational fishing vessels that compete with pelagic longline vessels. The pelagic longline fishing community at Madeira Beach is composed of vessels that have multiple permits including tunas, grouper, and shark. Wilson *et al*. (1998) found that alternative employment, such as in the oil industry and agriculture, does exist for unemployed pelagic longline fishermen in Dulac and Venice.

In the past shark gillnet fishermen listed their home ports as Fort Pierce, Port Salerno, Melbourne Beach, and Stuart, FL. Shark gillnet fishermen are located in Florida (home addresses are in Palm City, Port Alerno, Stuart, and Fort Pierce) and many fish for other species besides sharks (e.g., mackerel) and may be employed in non-fishing jobs currently. If fishermen exit this fishery due to prohibitive costs associated with these regulations, it is unlikely there would be significant impacts on the social structure of fishing communities. The dealers that buy fish caught in the shark gillnet fishery are also located in Florida and are likely to buy and sell other species besides sharks. If fishermen exit this fishery due to prohibitive costs associated with these regulations, it is unlikely these dealers would be significantly affected due to the small volume of fish landed by shark gillnet fishermen annually relative to landings of other fisheries and the likelihood that sharks would be landed by other gear types (and sold to local dealers) since they are managed under a restrictive quota. There is not expected to be any limitation on the availability of shark in the marketplace if gillnet fishermen were to exit the fishery.

9.2 Possible Social Impacts of the NED Area Closure

In 2000, there were 13 pelagic longline vessels that fished in the NED area, which was an increase from 10 that fished there in 1999. After the NED area was closed in the July 13, 2001 (66 FR 36711), emergency rule, there were 8 vessels that participated in the 2001 pelagic longline experimental fishery in the NED closed area. These vessels were allowed to retain and sell their catch in addition to being compensated $4,150 per set for their participation. In total, NOAA Fisheries compensated the participating vessels $769,825 to offset any loss of target catch attributable to the experimental fishing parameters. The 2001 BiOp stipulates that the NED area

is to be closed and that an experimental fishery should be conducted for no more than three years to examine the possibility of developing modified fishing practices to avoid the incidental take of sea turtles. If measures can be developed to reduce the capture or mortality of sea turtles by 55 percent, then the NED area can be reopened. NOAA Fisheries feels that the NED area experimental fishery offers the affected vessels an opportunity to avoid significant social and economic impacts from the closed area, if they participate. Because of the availability of the experimental fishery, NOAA Fisheries does not expect any significant social or community impacts to result from the closure in the short-term. If vessels do not participate or are not eligible to participate in the experimental fishery, they may experience economic and social impacts. However, there are other areas, perhaps not as lucrative, available to fishing activities. Thus, the closure could have three immediate impacts on the fishing communities in the northeast: 1) fishermen could spend more time away from home and their families, 2) fishermen could move from a community adjacent to the closed area to a community closer to open areas, or 3) fishermen could leave the fishery. Any of these choices could have large social impacts on communities, such as New Bedford, that provide support services to these vessels.

Dealers could also be affected by the NED area closure. Wilson *et al.* (1998) found that dealers that buy fish from the NED area vessels in New Bedford, annually buy approximately 60 percent swordfish, 15 percent tunas, 10 percent lobster, and 15 percent other fish such as sharks. Thus, closing the NED could have a large impact on those dealers. Unlike fishermen, dealers are not as mobile. Thus, without the experimental fishery or if the experimental fishing results in reduced catches, these dealers would either have to switch their reliance to other species of fish or go out of business. Because dealers and fishermen often form a type of business bond, it could be difficult for these dealers to integrate themselves into other fisheries. Thus, in the short-term the communities that rely on the dealers could be affected but in the long-term, NOAA Fisheries expects that most dealers would be able to forge new relationships and continue to be an important part of the fishing community.

NOAA Fisheries has little available information on equipment suppliers (e.g., tackle shops, large equipment suppliers, welders, boat-builders, machine shops, etc.). Therefore, it is difficult to estimate what the impacts of the NED area closure may be on this sector. All play important roles in outfitting pelagic longline vessels for commercial fishing. These businesses may employ many or few people in a particular town. If the impacts of the time/area closure on fishermen and dealers are large, there could be similar large social and economic impacts on this sector in the northeast. If these companies are large or supply a large and diverse number of fishing vessels throughout the Atlantic basin, any impacts are likely to be reduced.

To the extent that the public perceives U.S. pelagic longline fishermen as helping sea turtles, some fishing communities dependent on pelagic longline fishing may notice some benefits if demand for domestic seafood increases.

9.3 Possible Social Impacts of the Pelagic Longline Gear Modifications

The HMS pelagic longline fishery gear modifications required by NOAA Fisheries in this regulation include requiring the length of any gangion to be 110 percent of the length of any floatline in sets where the total length of any gangion and any floatline is less than 100 meters and requiring the use of corrodible hooks. The gangion length requirement was made effective in the 2001 BiOp emergency rule (July13, 2001 66 FR 64378) so the affected fishermen should have already altered their usual fishing behavior/gear to comply with the regulation. The corrodible hook requirement will have a delayed effective date which should allow the impacted fishermen to spread the cost of purchasing hooks over a few months.

Requiring the gangion lengths to be 110 percent of the floatline length in sets that are 100 meters or less in depth only affects those fishermen deploying shallow gear which is usually targeting swordfish. NOAA Fisheries does not expect this action to have large impacts on fishermen or their communities. To comply with this regulation, fishermen could lengthen their gangions. This option will require fishermen to buy additional monofilament and replace existing gangions. Alternatively, fishermen could shorten their floatlines. Both options will require additional labor in the short-term to adjust the length of the existing gear. Related businesses are not likely to be affected.

Regarding corrodible hooks, NOAA Fisheries is defining a corrodible hook as a hook that is non-stainless steel. As many fishermen already use these hooks, NOAA Fisheries does not expect this regulation to have large social impacts. However, NOAA Fisheries is conducting research into other specifications or definitions of corrodible hooks. Any impacts of the other definitions is unknown at this time. Those vessels that are currently rigged with stainless steel hooks will have increased direct costs of replacement hooks and crew time to re-rig the gear. This action could affect suppliers as they would have to ensure an adequate supply of non-stainless steel hooks and they may not be able to sell the stainless steel hooks already in stock.

To the extent that the public perceives U.S. pelagic longline fishermen as helping sea turtles, some fishing communities dependent on pelagic longline fishing may notice some benefits if demand for domestic seafood increases.

9.4 Possible Social Impacts of the Mortality Reduction Measures

The required measures to reduce the post release mortality of sea turtles by vessels fishing for HMS should not have a significant social impact on fishing communities. Several of them do not require any additional equipment. Instead, they slightly modify the behavior of the fisherman in an effort to improve the protection and knowledge of protected species. In some cases, fishing communities may notice benefits if the public perceives HMS fishermen as working to improve sea turtle and marine mammal survivorship (i.e., there could be some positive social impacts).

Under one of the final actions, NOAA Fisheries is requiring that the captain of a vessel using pelagic longline gear to target HMS report a lethal sea turtle take within 48 hours of returning to port. Under another final action, both the vessel operator and the observer of a shark gillnet vessel are responsible for sighting whales. The shark gillnet vessel operator is also responsible for contacting NOAA Fisheries in the event one is incidentally taken in this fishery. Both of these actions will allow NOAA Fisheries to gather more complete data concerning bycatch in these two fisheries. Because the fishing operators are not greatly affected, NOAA Fisheries expects few, if any, social impacts.

NOAA Fisheries is also requiring shark gillnet fishermen to conduct net checks every 0.5 to 2 hours to look for and remove any entangled sea turtles or marine mammals from the gear. Most shark gillnet fishermen already check the net so this action will have few impacts. However, for fishermen who do not, the use of fuel could increase and repeated checking of the net may reduce target catch particularly if a protected species is caught. It is unlikely that this alternative will affect fishing communities especially given the small number of vessels in the shark gillnet fishery.

9.5 Conclusion

Only one of the final actions for pelagic longline gear is expected to have social impacts. The NED closed area could have significant economic impacts upon the vessels that usually fish in that area of the Atlantic Ocean. However, the NED area experimental fishery that NOAA Fisheries is conducting in 2002 and 2003 (pending approval of a Section 10 permit under ESA) should allow vessels the opportunity to fish in the NED closed area using specific fishing gear or methods. This will mitigate some of the impacts of the closed area. The other final actions for pelagic longline gear are expected to have few, if any, social impacts.

The final actions for either the shark gillnet fishery or the other gear types are expected to have few, if any, social impacts on fishing communities.

10.0 OTHER CONSIDERATIONS

10.1 Consideration of Magnuson-Stevens Act Section 304 (g) Measures and National Standards

10.1.1 Evaluation of Possible Disadvantage to U.S. Fishermen in Relation to Foreign Competitors

The U.S. pelagic longline fleet in the Atlantic Ocean captures sea turtles at a rate estimated to average 986 loggerheads and 796 leatherbacks per year, based on observed takes and total reported effort from 1992 to 1999. Most of these takes occur on the high seas, rather than within the U.S. Economic Exclusive Zone (EEZ). The U.S. fleet is a small part of the international fleet that competes on the high seas for catches of tunas and swordfish. Although the U.S. fleet landed as much as 35 percent of the swordfish from the north Atlantic Ocean, north of 5^{o}N. latitude in 1990, this proportion decreased to 25 percent by 1997. For tunas, the U.S. proportion of landings was 23 percent in 1990 decreasing to 16 percent by 1997. The U.S. fleet accounts for none or virtually none of the landings of swordfish and tuna from the Atlantic Ocean, south of 5^{o}N. latitude, and does not operate at all in the Mediterranean Sea. Tuna and swordfish landings by foreign fleets operating in the tropical Atlantic and Mediterranean are greater than the catches from the north Atlantic area where the U.S. fleet operates. Even within the area where U.S. fleet operates, the U.S. portion of fishing effort, in numbers of hooks fished is less than 10 percent of the entire international fleet's effort, and likely less than that due to differences in reporting effort between ICCAT countries (NOAA Fisheries SEFSC, 2001). Since other ICCAT nations do not monitor incidental catches of sea turtles, an exact assessment of their impact is not possible. High absolute numbers of sea turtle catches in the foreign fleets have been reported from other sources, however (NOAA Fisheries SEFSC, 2001). If the sea turtle catch rates of foreign fleets, per hook, or even per pound of swordfish landed, are similar to the catch rates of the American fleet, then the American fleet may represent less than one-tenth and certainly no more than one-third of the total catch and mortality of sea turtles in North Atlantic longline fisheries.

Many sources of anthropogenic mortality of sea turtles are outside of U.S. jurisdiction and control. Mortality in the domestic and foreign longline fisheries is just one of the numerous factors affecting sea turtle populations in the Atlantic Ocean. There is a concern that reduced U.S. catch of Atlantic swordfish in the NED area could result in increased sea turtle interactions with foreign longline vessels in that same area. Vessels fishing the NED area have landed approximately 20 percent of the U.S. swordfish quota in recent years. Thus, closing the NED area could result in reduced U.S. swordfish catch than in past years (although with the experimental fishery, this would be unlikely to occur in the near future). A reduction in U.S. fishing effort could eventually result in a reduced allocation for U.S. vessels under the ICCAT catch allocation scheme and could make the implementation of international conservation efforts more difficult if the U.S. role in swordfish management is diminished. A reduced presence in the fishery might also eliminate the option of gear or other experimentation with the U.S. longline fleet, thus making it difficult to find take reduction solutions which could be transferred to other

longlining nations to effect a global reduction in sea turtle takes by pelagic longline gear. NOAA Fisheries is not aware of any foreign fleets that are currently using any conservation measures, and in the absence of a domestic fishing fleet subject to turtle conservation measures, foreign vessels would likely increase their fishing effort in the NED area and it is likely that overall turtle mortality would increase.

U.S. fishermen could be directly disadvantaged by the preferred alternatives compared to foreign competitors in the fact that they will not be able to fish in the NED area while foreign competitors could. This area is a traditional swordfish fishing area and provides much of the U.S. domestically-caught swordfish. Additionally, U.S. fishermen would have other regulations modifying their gear and their methods of fishing while foreign competitors would not. However, NOAA Fisheries hopes that the gear modifications will prove to be effective at reducing sea turtle interactions, that other nations will adopt these modifications, and that the reduced U.S. sea turtle takes will allow U.S. fishermen to fish in the NED, thereby eliminating any competitive disadvantage.

10.1.2 Provide U.S. Fishing Vessels Reasonable Opportunity to Harvest Quota

The final actions would not prevent U.S. commercial fishermen from the opportunity to land the quotas allocated to them. The final actions would close the NED area to fishermen fishing with pelagic longline gear. Fishermen who wish to continue to fish with this gear may still do so outside the closed area or during the experimental fishery NOAA Fisheries is conducting in the NED area. Participation in this experiment would allow vessels that would otherwise be displaced by the closure to fish in the NED and land their catch. NOAA Fisheries would also compensate the participating vessels to mitigate the economic losses due to complying with the experimental parameters. Regardless of the level of participation in the NED experiment, NOAA Fisheries expects that U.S. vessels would continue to fish for swordfish under quota allocated to the United States. It is possible, although the quota has not been taken in recent years, that active vessels could take the quota by fishing in open areas or using other gears.

In October 2001, there were approximately 208 fishermen with a directed swordfish limited access permit and 112 fishermen with an incidental swordfish limited access permit. In other words, in October 2001, there were approximately 320 fishermen who could use pelagic longline gear to fish for HMS. Only a few of these fishermen actually report fishing with pelagic longline gear in logbooks (considered “active”). In 2000, 171 fishermen reported fishing for HMS with pelagic longline in both the pelagic logbook and in weigh-out slips. These data indicate that there is still an opportunity for fishermen with permits to increase effort in HMS fisheries and thus fully land the quotas allocated to U.S. fishermen.

10.1.3 Pursue Comparable International Fishery Management Measures

Section 202(h) of the Magnuson-Stevens Act calls for the Secretary of State, in cooperation with the Secretary of Commerce, to seek international agreements to establish standards and measures

for bycatch reduction that are comparable to the standards and measures applicable to U.S. fishermen if they conclude that it is necessary and appropriate. On September 18, 2000, NOAA Fisheries determined that seeking international agreements with foreign nations conducting pelagic longline fishing operations for Atlantic and Pacific highly migratory species was necessary to protect endangered and threatened sea turtles. Furthermore, the June 14, 2001, BiOp requires NOAA Fisheries to pursue bilateral or multilateral agreements for the protection and conservation of sea turtles with other nations and to translate the sea turtle handling and release guidelines into several languages for distribution throughout the Atlantic and Mediterranean.

Dominant fisheries in the Atlantic include Brazil, Canada, Japan, Portugal, Spain, Taiwan, the United States, Uruguay and the nations of the Caribbean. The United States is at the forefront of conservation on this issue. In addition to establishing domestic time/area closures to minimize turtle interactions, NOAA Fisheries also requires U.S. longliners to cut away the line as close to the hook as possible on any sea turtle that is caught during fishing operations. Removing the gear from the turtle may increase its chances of survival after being released. The United States hopes to transfer some of these techniques and fishing methods to other countries with longline fleets that incidentally capture sea turtles. To support this goal, the United States intends to support a workshop in 2002 consisting of technical experts on sea turtle biology and longline fishery operations from interested nations in order to share information and discuss possible solutions to reduce incidental capture of marine turtles in these fisheries.

Additionally, the Inter-American Convention for the Protection and Conservation of Sea Turtles ("Inter-American Convention") was concluded on September 5, 1996, in Salvador, Brazil, and entered into force in May 2001. This is the first international agreement devoted solely to the protection of sea turtles. The Inter-American Convention calls for the Parties to establish national sea turtle conservation programs. Each party will agree to implement broad measures for the conservation of sea turtles, including the use of turtle excluder devices in commercial shrimp trawl vessels and the mitigation of impacts on sea turtles from other fisheries.

10.1.4 Consider Traditional Fishing Patterns and the Operating Requirements of the Fisheries

In the late 1800s, commercial fishermen in New England were pursuing swordfish, primarily with harpoons and targeting the large swordfish then available in surface waters. Pelagic longline fishing, both domestic and international, began in earnest in the North Atlantic Ocean in the early 1960s. The introduction of this gear enabled access to swordfish in deeper waters and opened new fishing areas. U.S. pelagic longline vessels follow the fish throughout their migratory range along the East Coast of the United States and up to the Grand Banks, and now catch approximately 98 percent of the U.S. Atlantic swordfish landings. To the extent that the NED area closure will prevent the distant water fishermen who use pelagic longline gear from fishing in the Grand Banks, the final actions would alter traditional fishing patterns. However, NOAA Fisheries is conducting the experimental fishery in an effort to develop fishing methods and behaviors that will reduce the interactions with and post-release mortality of sea turtles. If these

efforts are successful, the NED area could be reopened to fishing as indicated in the June 14, 2001, BiOp. The other final actions are not expected to affect traditional fishing patterns or disrupt the operations of the HMS fisheries.

10.1.5 National Standards

The analyses in this document are consistent with the national standard guidelines set forth in the 50 CFR part 600 regulations. The final actions will enhance the recovery of some protected species by reducing the incidental capture and post-release mortality of sea turtles and marine mammals. NOAA Fisheries continues to work in the international community to protect highly migratory species in the Atlantic Ocean throughout their range, while also implementing domestic measures that are consistent with domestic legislation. This rule would be consistent with NS 1 in that it would maintain optimal yield while maintaining current rebuilding plans. The analyses contained in the final rule are based on the best scientific information available (NS 2), including self-reported, observer, and stock assessment data which provide for the management of these species throughout their ranges (NS 3) . With respect to NS 4, the NED area closure could disadvantage fishermen living in the northeast United States, but this closure would be justified under NS 4 as a conservation measure with no discriminatory intent. In the NED area, approximately 8 percent of the active vessels in the pelagic longline fleet take approximately 75 percent of the loggerhead and 63 percent of the leatherback sea turtles. The final actions would require a combination of an area closure and gear modifications in an attempt to maintain fishing efficiency while providing increased protection to sea turtles and marine mammals (NS 5). The NED area closure could reduce the efficiency of the distant water fleet because they may move to less familiar fishing grounds and it may take longer to catch significant amounts of target species. NOAA Fisheries does not believe that the other final gear measures would affect fishing efficiency. With regard to NS 6, the final actions should be flexible enough to be changed under the FMP framework to accommodate biological, social, and economic variability. NOAA Fisheries will continue data collection programs with respect to these fisheries in order to assess the effectiveness of the final actions. NOAA Fisheries also considered the costs and benefits of this rulemaking in Sections 7, 8, and 9 of the FSEIS and concluded that the benefits of these regulations should be real and substantial relative to the added administrative, research, and enforcement costs, and the compliance costs to the industry (NS 7). Social impacts are discussed in Section 9 of the FSEIS. Consistent with NS 8, NOAA Fisheries has considered the impacts of these actions on fishing communities. This rulemaking specifically addresses NS 9 and would minimize bycatch and bycatch mortality in the Atlantic pelagic longline fishery as described in Section 1. In terms of NS 10, the final actions would not require fishermen to fish in an unsafe manner.

10.1.6 Coastal Zone Management Act

NOAA Fisheries has determined that these regulations will be implemented in a manner consistent to the maximum extent practicable with the enforceable policies of those coastal states in the Atlantic, Gulf of Mexico, and Caribbean that have approved coastal zone management programs.

Eleven of the 12 states that replied to the letter regarding compliance of the proposed rule with the Coastal Zone Management Act found NOAA Fisheries' proposed actions to be consistent with their coastal zone management programs. The State of Georgia objects to the consistency determination due to the continuing operation of the shark gillnet fishery in Federal waters impacting resources shared by adjacent state waters. NOAA Fisheries shares the State of Georgia's concern regarding the impact of the shark gillnet fishery on sea turtles, marine mammals, and sport fish. However, data currently available do not indicate high bycatch and bycatch mortality of protected species and other finfish in this fishery. Because the incidental capture of endangered species in the shark gillnet fishery is regulated under the ESA and the BiOp did not conclude that continuation of the shark gillnet fishery would jeopardize any endangered or threatened resources, NOAA Fisheries is not prohibiting the use of this gear at this time. This finding is consistent with national standard 2 which requires that management measures be based on the best scientific information available and with the conclusions of the BiOp. Thus, NOAA Fisheries finds that the final regulations promulgated in this rulemaking are consistent with Georgia's Coastal Zone Management Program to the maximum extent practicable.

10.2 Mitigating Measures

Most of the HMS vessels that would be affected by these regulations are likely to continue to derive their income predominantly from commercial fishing activities. Some vessel owners, however, might choose to exit all commercial fisheries as a result of this action, and might seek to be compensated for the residual value of their gear by selling their vessels and limited access permits. It is likely that participants could sell their swordfish, shark, and tuna longline category limited access permits to other interested fishermen (predominantly those fishermen in other geographic areas). Those fishermen with suitable vessels might shift to participate in recreational fisheries by converting to charter/headboat operations. As mentioned previously in this document, NOAA Fisheries is planning on conducting an experimental fishery in the NED in 2002 and possibly 2003. Similar to how it was conducted in 2001, NOAA Fisheries could compensate fishing vessels for testing gear modifications and fishing techniques in the NED closed area. This compensation and the ability to retain and sell the catch during the experiment should mitigate the economic effects of the closure in the short term.

The other gear modification measures being implemented are not expected to have significant impacts upon the affected fishermen, so mitigation measures are not necessary.

10.3 Unavoidable Adverse Impacts

The reasons for the final actions are outlined in the previous sections of this document and the DSEIS. The NS Guidelines provide a list of factors that should be considered in determining whether a bycatch reduction measure is practicable:

1. Population effects for the incidental catch species;
2. Ecological effects due to changes in the incidental catch of the species (effects on

other species in the ecosystem);
3. Changes in the incidental catch of other species of fish and the resulting population and ecosystem effects;
4. Effects on marine mammals and birds;
5. Changes in fishing, processing, disposal, and marketing costs;
6. Changes in fishing practices and behavior of fishermen;
7. Changes in research, administration, and management effectiveness;
8. Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources;
9. Changes in the distribution of benefits and costs; and,
10. Social effects.

NOAA Fisheries considered all of these factors for each alternative and has determined that the final actions are indeed practicable. The final actions are expected to result in bycatch and incidental catch reduction. They are selected because they would meet the objectives of this rulemaking and mitigate to the extent possible the impacts on fishermen and communities.

10.4 List of Agencies and Persons Consulted

Discussions relevant to the formulation of the final actions involved input from several scientific and stakeholder groups: NOAA Fisheries Southeast Fisheries Science Center, NOAA Fisheries Office of Science and Technology, NOAA Fisheries Office of Protected Resources, and the HMS and Billfish APs which include representatives from the commercial fishing industries, recreational fishing industries, environmental organizations, state representatives, and fishery management councils. Members of the public submitted relevant comments during seven scoping hearings held in 2000 concerning an emergency rule to implement the June 30, 2000, BiOp. Members of the public also had ample opportunity to provide comments during the comment period on the emergency rule published on October 13, 2000 (65 FR 60889), during the comment period on the emergency rule published on July 13, 2001 (66 FR 36711), and on the draft Biological Opinion released in April 2001.

Members of the public also had an opportunity to comment on these measures during the public comment period for the proposed rule (April 10, 2002, 67 FR 17349) and its accompanying DSEIS. During this public comment period, four public hearings were held in Panama City, FL; Barnegat Light, NJ; Riverhead, NY; and Silver Spring, MD (April 29, 2002, 67 FR 2944). The comment period on this proposed rule ended on May 20, 2002. During the public comment period, copies of the DSEIS and the proposed rule were sent to current Billfish and HMS Advisory Panel (AP) members, HMS Consulting Parties, the U.S. Coast Guard, the Department of State, the ICCAT Advisory Committee chairman, and ICCAT Commissioners.

All documents associated with the proposed and final rules can be obtained from the Highly Migratory Species Management Division, 1315 East-West Highway, F/SF1, Silver Spring, MD

20910 or by calling (301) 713-2347.

10.5 List of Preparers

This document was prepared by individuals from the Office of Sustainable Fisheries, Highly Migratory Species Management Division.

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This division also received help from other Offices including the Office of Science and Technology, the Office of Protected Resources, the Southeast Regional Office, the Southeast Fisheries Science Center, and the National Oceanic Atmospheric Administration's General Counsel for Fisheries.

10.6 Finding

NOAA Fisheries has determined that final action to close the NED to pelagic longline gear would have a significant impact on the human environment. This determination was made through consideration of the following questions (NOAA Administrative order 216-6):

1. Are the final actions expected to jeopardize the sustainability of any target or non-target species that may be affected by the action? Or will the final actions have any cumulative adverse effects on target or non-target species?

As described in Section 1 of the FSEIS, the objectives of these final actions include reducing incidental catch of marine mammals and sea turtles, reducing post-release mortality, and improving the collection of protected species data. Thus, NOAA Fisheries does not believe that the final actions in these regulations will jeopardize the sustainability of any target or non-target species nor will the final actions have any cumulative adverse effects on target or non-target species.

2. Will the final actions cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

The final actions include an area closure and gear modifications for fishing with pelagic longline gear. The final actions also includes modifying fishing behavior for the shark gillnet fishery. To the extent that these gear types may have harmed any habitats or marine life, these regulations will prevent further harm from occurring.

3. Will the final actions cause substantial adverse impact on public health or safety?

To the extent that some fishermen may decide, as a result of the NED area closure, to fish beyond the safety limitations of their vessel or experience, there could be some safety implications of these regulations. However, these regulations do not require fishermen to fish in an unsafe manner.

4. Will the final actions adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

The final actions are a result of the RPAs and TCs in the June 14, 2001, BiOp and are not expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species.

5. Will the final actions have a substantial impact on biodiversity and ecosystem function within the affected area?

The final actions are expected to enhance rebuilding of protected species, and to the extent that the swordfish quota is not fully taken, may aid in swordfish rebuilding. To the extent that overfishing may have had an impact on ecosystem function and biodiversity, these regulations could help to repair any damage caused by the fishery.

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APPENDIX A COMMENTS AND RESPONSES

NOAA Fisheries received many comments during the comment period on the April 10, 2002, proposed rule. Comments are summarized here together with responses. NOAA Fisheries would like to thank all the people who took the time to comment and attend the public hearings.

A.1 Biological Opinion

Comment: The jeopardy finding of the June 14, 2001, BiOp is fundamentally flawed and treats the Atlantic pelagic longline fishery unequally compared to other domestic and international fisheries by trying to accomplish a 10-percent increase in pelagic stage juvenile loggerhead sea turtle survivorship in the entire North Atlantic basin by imposing a 55-percent reduction in sea turtle interactions by U.S. pelagic longline fishermen alone.

Response: Currently, NOAA Fisheries is in litigation concerning the BiOp and the resulting regulations and a court decision is pending. NOAA Fisheries believes that the BiOp and implementing regulations incorporate the best available scientific information concerning sea turtle populations and the HMS fisheries and do not impose an unfair burden on U.S. fishermen.

Comment: NOAA Fisheries should attempt to quantify or account for the reductions in sea turtle mortality that have resulted from the requirement to possess and use dipnets and line clippers.

Response: Efforts are underway to examine the post-release status of sea turtles incidentally captured in the pelagic longline fishery. The BiOp provides estimated mortality rates for sea turtles ranging from 27 to 42 percent depending on where the sea turtles were hooked. The 2001 NED experimental fishery included a pilot program to assess the post-release mortality of loggerhead sea turtles and additional studies are scheduled for 2002. These analyses should provide greater insights into the reductions in mortality gained by the use of dipnets and line clippers.

Comment: NOAA Fisheries should apply a moratorium on pelagic longline, gillnet, and other fishing gears that interact with sea turtles in the Atlantic Ocean to improve the turtles' chances for survival.

Response: While the HMS BiOp concluded that the operation of the Atlantic pelagic longline fishery jeopardizes the continued existence of loggerhead and leatherback sea turtles, a reduction in mortality of 55-percent would avoid jeopardy. NOAA Fisheries can achieve this reduction in mortality without implementing a moratorium on pelagic longline gear. Regarding shark gillnet and other fishing gears, the HMS BiOp found that these activities may adversely affect but are not likely to jeopardize sea turtles, whales, and other protected species, and consequently, identified several measures to reduce mortality without the need for a moratorium of those gears. This action implements those measures; therefore, a moratorium of shark gillnet and other fishing gear

is not warranted at this time.

Comment: NOAA Fisheries should reinitiate consultation and consider more protective measures if gear restrictions do not provide the benefits anticipated in the biological opinion.

Response: NOAA Fisheries will evaluate the efficacy of the bycatch and bycatch reduction measures implemented in this action as well as the efficacy of measures already in place as the data become available for statistical analyses. If these and other measures are found to be insufficient, NOAA Fisheries will take appropriate action.

Comment: The United States must take action to increase the visibility of sea turtle conservation on an international scale with the goal of reducing international sea turtle interactions.

Response: The International Bycatch Reduction Task Force is organizing a meeting in late 2002 to address international sea turtle concerns. Also, the experiments being conducted in the NED area are intended to develop pelagic longline gear and/or fishing modifications to reduce sea turtle takes that can be transferred to international pelagic longline fleets.

Comment: Sea turtle populations are increasing.

Response: Trend information on loggerhead sea turtles demonstrates that the Florida subpopulation is increasing, but that the northern subpopulation, which has a large number of males, is relatively small and is either stable or declining. For leatherback sea turtles, there have been increases in the number of nests on some of the smaller nesting beaches, but the largest nesting beach has had a 15-percent decline in nests in recent years indicating a declining population.

A.2 Pelagic Longline Fishery

NED Area Closure

Comment: NOAA Fisheries should not close the NED area. It is unreasonable to close 2.6 million square nautical miles of the Atlantic Ocean when data show that the turtle interactions occur in a relatively small portion of the NED area and only during certain months.

Response: Based on the dynamic nature of ocean systems and the migratory nature of marine wildlife, closed areas have to be large to ensure they achieve the goal in reducing bycatch and bycatch mortality. NOAA Fisheries is aware that turtle interactions occur in a portion of the NED area; however, those interactions occur where and when pelagic longline fishing has occurred. Closing only that portion of the NED area where and when pelagic longline fishing has occurred

could result in continued or increased takes of turtles in the remaining open area of the NED area if fishermen move there. Additionally, closing only part of the NED area could decrease human safety at sea if fishermen move into unfamiliar fishing areas even further offshore than the areas currently fished or fish during other times of year when weather conditions are poor.

Comment: By closing the NED, the most productive swordfish fishing grounds available to U.S. fishermen, NOAA Fisheries will create a situation in which foreign flag fleets supplant the U.S. fleet and will likely result in more sea turtles being killed because international fleets do not follow careful sea turtle handling and release guidelines like U.S. fishermen.

Response: NOAA Fisheries is conducting an experimental fishery in the NED area using vessels of the U.S. pelagic longline fleet to test various gear configurations. The goal of the experiment is to develop pelagic longline gear and/or fishing modifications to reduce sea turtles bycatch and bycatch mortality sufficiently so that the NED area can be reopened and the technology exported to the international pelagic longline fleets. In the event that no such gear or fishing modifications are developed and the NED area remains closed to the U.S. pelagic longline fleet, NOAA Fisheries is aware that international fleets may increase fishing effort in the NED area. Regardless of the results of the NED area experiment, NOAA Fisheries intends to pursue international sea turtle conservation agreements and measures.

Comment: NOAA Fisheries should close the NED area to conventional pelagic longline gear but keep it open to fishermen who voluntarily agree to test new and innovative fishing techniques.

Response: NOAA Fisheries supports cooperative research with fishermen to develop pelagic longline gear and/or fishing modifications to reduce sea turtle interactions and is conducting an experimental fishery in the NED area using vessels of the U.S. pelagic longline fleet. That experimental fishery began in 2001 and will continue through 2003. After that time, NOAA Fisheries will evaluate the results of the experimental fishery and determine if the NED area can be reopened to pelagic longline vessels using modified fishing techniques, determine if further research is necessary and take appropriate action to conduct that research, or determine if no further research is warranted. NOAA Fisheries believes that the final action to close the NED area while also conducting the experimental fishery is essentially the same outcome as that suggested by the comment.

Comment: NED boats cannot simply go fish elsewhere as NOAA Fisheries predicts and remain profitable. Other coastal fishing areas are overcrowded, have competition with coastal longliners, and have gear conflicts with stationary lobster and crab gear.

Response: NOAA Fisheries is aware that not all other fishing areas are likely to be as profitable as the NED area for pelagic longline vessels that typically fished in the NED area. However, data available to NOAA Fisheries indicate that other areas, such as the Caribbean area, can be as

profitable as the NED area. Additionally, data available to NOAA Fisheries indicate that NED vessels already fish in other areas, including the Caribbean, during winter months; thus, switching locations is not prohibitive for NED vessels. Also, in the short term, NED vessels can volunteer to participate in the NED experimental fishery. Participating in the NED experimental fishery can be profitable for these vessels in the short-term, and, in the worst case scenario, will allow these vessels time to plan their course of action if the experimental fishery does not produce results that would allow NOAA Fisheries to reopen the NED area.

Comment: Closing the NED area after closing the Florida Straits and Charleston Bump will direct increased effort into smaller and smaller areas and will increase regulatory discards that could result in more time and area closures.

Response: NOAA Fisheries intends to analyze the impacts of the time and area closures in the Florida east coast, Charleston Bump, and DeSoto Canyon as well as the NED area closure implemented by the emergency rule as the data become available for statistical analyses. NOAA Fisheries will take appropriate action at that time to address bycatch in the remaining open areas in light of effort redistribution as warranted.

Comment: Closing the NED area will prevent U.S. fishermen from enjoying the fruits of their hard-earned success in reversing the decline of swordfish.

Response: U.S. fishermen may fish for and land swordfish in U.S. waters under its quota from the International Commission for the Conservation of Atlantic Tunas and, as swordfish stocks recover, U.S. fishermen can reasonably expect to enjoy the benefits of a sustainable swordfish fishery.

Comment: Without the establishment of a sunset provision for the NED area closure, there is no assurance that it will ever be reevaluated.

Response: The NED area is closed to achieve most of the required 55-percent reduction mandated by the HMS BiOp. The experimental fishery in the NED area is designed to develop effective sea turtle bycatch reduction measures so that an area closure will not be necessary and the NED area can be reopened. Additionally, NOAA Fisheries intends to analyze the impact of all time and area closures implemented for HMS fishermen as data become available. Based on these analyses, NOAA Fisheries will modify any closures, as appropriate.

Comment: NOAA Fisheries must close the NED area to fishing by the U.S. pelagic longline fleet to ensure that it meets its legal obligations under the ESA and avoid jeopardy by reducing sea turtle bycatch. This closure would have the additional benefit of reducing the incidence of blue shark discards by U.S. fishermen.

Response: NOAA Fisheries is implementing such a closure.

Other Alternatives

Comment: The 2001 NED area experiment found that the gangion placement relative to floatlines shows a negative effect. NOAA Fisheries should rescind this requirement on the entire U.S. fleet at this time.

Response: NOAA Fisheries is not implementing that requirement.

Comment: NOAA Fisheries should implement the alternative to prohibit setting gangions in close proximity to floatlines as the measure is projected to reduce the take of loggerhead and leatherback sea turtles by 22 and 24 percent, respectively.

Response: The 2001 experimental fishery in the NED area demonstrated that this measure is not effective in reducing the incidental capture of sea turtles and may increase the interaction rate with leatherback sea turtles. Accordingly, NOAA Fisheries is not implementing that requirement.

Comment: NOAA Fisheries must analyze and quantify the benefits and drawbacks of the proposal to have gangion lengths be 110 percent of floatline length, including the economic impact of reduced target catch. This proposed alternative may have minimal effect on sea turtle survival as ocean currents or turtle movements could tangle the line.

Response: The economic impacts of the final actions are analyzed in the FSEIS. Additionally, the FSEIS provides the best available information concerning the effectiveness and impacts of the final actions. NOAA Fisheries believes that the measure will have a positive effect on sea turtle survival although no quantitative estimate is available at this time.

Comment: NOAA Fisheries should implement the requirement for gangions to be longer than floatlines.

Response: NOAA Fisheries is implementing this requirement.

Comment: NOAA Fisheries needs to make a decision concerning the corrodible hook criteria and determine a policy for their implementation and extend it to all bycatch species and all HMS hook and line fisheries to increase post-release survival. The hooks should be used experimentally before being adopted on a larger scale.

Response: The current standard for corrodible hooks is that they be composed of non-stainless

steel. NOAA Fisheries believes that many pelagic longline fishermen already use non-stainless steel hooks so that this measure should result in little change in costs or fishing practices while providing benefits to sea turtles although no quantitative estimates are available at this time. Therefore, NOAA Fisheries believes that finalizing this measure for the Atlantic pelagic longline fleet at this time is warranted. NOAA Fisheries may revise this standard at a future date as additional information becomes available. NOAA Fisheries intends to host a conference by the end of 2002 with sea turtle biologists and veterinarians to examine this issue.

Comment: Fishermen using other fishing gears are known to interact with sea turtles and should also be required to possess and use specific handling instructions for reference during their sea turtle interactions.

Response: NOAA Fisheries intends to develop fishery-specific sea turtle handling and release guidelines. At that time, NOAA Fisheries will take the appropriate action to ensure their distribution and use.

Comment: NOAA Fisheries should require posting of sea turtle handling and release guidelines in the wheelhouse.

Response: NOAA Fisheries is implementing a measure that will require guidelines to be posted in the wheelhouse of all pelagic and bottom HMS longline vessel.

Comment: NOAA Fisheries needs to address several issues concerning sea turtle post-release survival, including differences in gear interactions between fisheries and oceans, tag reliability, and creating a strategy for research using the Atlantic pelagic longline fleet.

Response: The 2001 NED area experimental fishery included a pilot study that involved the deployment of 16 PSAT (pop-off satellite) tags on loggerhead sea turtles caught in the Atlantic pelagic longline fishery. This study is scheduled to continue during the next two years of the experimental fishery and should effectively address the issues concerning sea turtle post-release survival following interactions with Atlantic pelagic longline gear.

Comment: NOAA Fisheries should increase the level of observer coverage in the pelagic longline and shark gillnet fisheries to better monitor interactions with protected species.

Response: Observer coverage is an important way to monitor fishery interactions with protected species. NOAA Fisheries has determined the level of observer coverage necessary in the pelagic longline and shark gillnet fisheries to produce statistically rigorous estimates of protected species interactions and is implementing those coverage levels.

Comment: NOAA Fisheries should implement a measure requiring pelagic longline vessels to carry a dehooking device on board.

Response: NOAA Fisheries believes that additional information concerning what types and techniques are optimal to reduce harm to sea turtles is needed before implementing such a measure. Several designs were tested in the 2001 NED experimental fishery and will continue to be tested in the 2002 NED area experimental fishery. NOAA Fisheries will take appropriate action based on the results of the experiment.

Comment: NOAA Fisheries should implement the timely reporting of sea turtle mortalities and the proper release of incidentally caught turtles, which are important factors in assessing and reducing sea turtle mortality in the pelagic longline fishery.

Response: NOAA Fisheries is implementing a measure that requires HMS fishermen with pelagic longline on board to report lethal turtle takes within 48 hours of returning to port.

NED Experiment

Comment: NOAA Fisheries should not forgo the collection of data that may help the bycatch reduction of other incidentally caught species when conducting research to mitigate the impact of pelagic longline gear on sea turtles.

Response: Data are being collected that will permit the analysis of the impacts of the measures tested in the NED area experimental fishery on other incidentally caught species.

Comment: NOAA Fisheries should consider the impact of gear modifications on other species besides sea turtles prior to exporting them to international fisheries.

Response: The impact of gear modifications on other species will be considered prior to promulgating regulations implementing measures for the pelagic longline fishery for species besides sea turtles and prior to exporting successful sea turtle take reduction measures to international fisheries.

Comment: NOAA Fisheries should implement any additional measures found to be effective during the ongoing sea turtle research, however more attention should be paid to other protective measures such as time or area closures.

Response: NOAA Fisheries intends to implement measures found to be effective in reducing sea turtle bycatch and bycatch mortality in the NED area experiment, including time or area closures, as appropriate.

Comment: NOAA Fisheries should continue to experiment with gear modifications that would reduce the mortality of sea turtles and implement new rules in response to new data about their effectiveness.

Response: NOAA Fisheries will continue to conduct such experiments.

Comment: NOAA Fisheries should foster cooperation with the industry through truly cooperative research based on real science.

Response: NOAA Fisheries believes that the NED area experimental fishery is an example of cooperative research based on sound science.

A.3 Shark Gillnet Fishery

Comment: The requirement for shark gillnet fishermen to contact NOAA Fisheries and cease fishing in the event of a listed whale being taken will neither protect listed whales nor reduce the bycatch of these animals.

Response: According to the BiOp, the major known sources of anthropogenic mortality and injury to listed whales include entanglement in commercial fishing gear and ship strikes. However, many of the reports of whale mortality cannot be attributed to a particular source. While to date, there has not been a confirmed interaction with a listed whale in the shark gillnet fishery, NMFS believes that it is appropriate to implement regulations that will enhance the response to an interaction with a listed whale and prevent a subsequent interaction by requiring the vessel to cease fishing immediately.

Comment: NOAA Fisheries should prohibit gillnet sets within a five nautical mile radius of any sighted listed whale or, if the gear is already set, the removal of that gear from the water.

Response: NOAA Fisheries believes that current regulations under the Atlantic Large Whale Take Reduction Plan are adequate. Current regulations require shark gillnet fishermen to fish for sharks with a strikenet during times that right, humpback, fin or minke whales are present, require that no nets be set under limited visibility, prohibit setting of nets within three nautical miles of a whale, and require that gear be removed immediately from the water if a whale moves within three nautical miles of the gear.

Comment: NOAA Fisheries should implement regulations that would prevent gillnet fishing if a listed whale were taken for the rest of the season or until whales are no longer sighted in that area based on seven consecutive sighting surveys.

Response: NOAA Fisheries believes that current regulations under the Atlantic Large Whale Take Reduction Plan are adequate. Additionally, NOAA Fisheries has the authority under the Endangered Species Act to implement temporary closures to reduce takes or potential takes, as appropriate.

Comment: The net check provision will likely offer little conservation benefit for marine mammals and sea turtles unless it is coupled with disentanglement response training.

Response: The net check provision will require the shark gillnet fishermen to check their nets every 0.5 to 2 hours which should reduce the mortality of any incidentally captured protected species. Disentanglement training was provided to fishermen in this fishery although attendance was low. NOAA Fisheries may pursue additional disentanglement training for shark gillnet fishermen in the future. Additionally, the requirement to notify NOAA Fisheries if a whale is taken will allow personnel trained in disentangling these animals to respond.

Comment: NOAA Fisheries should maintain 100-percent observer coverage in the shark gillnet fishery due to the bycatch problems associated with this gear.

Response: Recently, the necessary level of observer coverage was statistically determined to be 53-percent outside right whale calving season and 100-percent coverage during right whale calving season. A statistically significant level of observer coverage would yield comparable results to 100- percent coverage. Additionally, given its limited resources, NOAA Fisheries believes that the resources that would be required to provide additional coverage outside the right whale calving season (not required statistically) are needed to provide additional observer coverage in other fisheries. NOAA Fisheries will maintain 100-percent observer coverage in this fishery during right whale calving season.

Comment: In addition to the preferred alternatives (requiring immediate reporting if a listed whale is taken; making the observer and vessel operator responsible for looking for whales; and frequent net checks), NOAA Fisheries should require fishermen to remove finfish bycatch in addition to protected species during net checks in the shark gillnet fishery.

Response: While NOAA Fisheries agrees that the preferred alternatives are appropriate for this fishery, NOAA Fisheries is concerned that requiring the removal of finfish bycatch may delay the completion of the net checks and could increase the bycatch mortality of any incidentally captured protected species. However, NOAA Fisheries encourages shark gillnet fishermen to remove finfish bycatch as quickly and with as minimal injury as practicable.

Comment: The size and low income of the shark gillnet fishery may not justify the high cost of the 100-percent observer coverage required during the right whale calving season compared to other

observer needs.

Response: NOAA Fisheries is aware that observer coverage costs for this fishery are high relative to the number of participants in this and other fisheries. NOAA Fisheries is considering the use of vessel monitoring systems to decrease observer coverage costs for this fishery. The issue of vessel monitoring systems is currently in litigation and NOAA Fisheries is waiting for a decision from the court.

Comment: Shark gillnet fishermen should be required to check their nets continuously while deployed due to the numerous interactions with sea turtles and marine mammals. The 0.5 to 2 hour period between checking nets will result in unacceptably high sea turtle and marine mammal mortality. If the fishery cannot demonstrate that the gear can be fished cleanly, that gear should be prohibited for HMS species due to high bycatch of protected species.

Response: At this time, NOAA Fisheries believes that requiring net checks every 0.5 to 2 hours is sufficient to reduce protected species bycatch mortality. Currently, the average soak time for drift gillnets is 5.6 to 7.5 hours. Thus, drift gillnet fishermen will have to check the net between 3 and 15 times during an average soak. However, NOAA Fisheries intends to review protected species bycatch mortality data in the future as data on the efficacy of this requirement become available and will re-evaluate a requirement to conduct net checks continuously or other gear restrictions in this fishery if protected species bycatch mortality is not reduced.

A.4 Enforcement

Comment: NOAA Fisheries should implement vessel monitoring systems to improve the enforceability of the closed areas. This would be less disruptive and less costly for the fishermen and the Coast Guard.

Response: This matter is currently in litigation. NOAA Fisheries is waiting for a decision from the Court.

Comment: Enforcement of the gangion length provision will be difficult at sea. NOAA Fisheries should consider developing criteria to provide guidance in this matter (for example, specify how many gangions would need to meet the 110-percent requirement to verify compliance).

Response: NOAA Fisheries will work with enforcement agents to develop guidance to enhance the enforceability of this measure.

Comment: Enforcement of the gangion placement provision will be difficult because the gear can slide on the mainline due to a variety of reasons.

Response: As this measure was found to be ineffective in reducing sea turtle bycatch in the NED area experimental fishery, NOAA Fisheries is not implementing the gangion placement requirement in this final action.

Comment: NOAA Fisheries should consider a requirement that vessels fishing with bottom longline gear in an area closed to pelagic gear should not be allowed to possess pelagic species (i.e., tuna and sharks) and conversely, require that vessels fishing with pelagic gear not be allowed to have bottom species on board (i.e., some shark species) to increase enforcement.

Response: The time and area closures currently in place for pelagic longline fishermen were designed to reduce bycatch in the pelagic longline fishery and do not apply to bottom longline fishermen. Thus, extending any closure to bottom longline fishermen would require NOAA Fisheries to conduct the appropriate analyses and rulemaking. However, NOAA Fisheries will discuss this comment with the NOAA Fisheries Office of Law Enforcement and consider its management implications.

Comment: NOAA Fisheries should prohibit possession of non-corrodible stainless steel hooks, not use of non-corrodible stainless steel hooks, because it would be difficult for the Coast Guard to enforce a use prohibition if the vessel is allowed to have both corrodible non-stainless steel and non-corrodible stainless steel hooks on board.

Response: NOAA Fisheries has modified the final action to prohibit vessels from having hooks on board other than corrodible, non-stainless steel hooks when pelagic longline gear is on board.

Comment: The proposed definition of corrodible hooks as non-stainless steel would be enforceable at sea.

Response: NOAA Fisheries has implemented this provision.