Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Analysis of Short-finned Pilot Whale Conservation Measures to Amend the Pelagic Longline Take Reduction Plan

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LIST OF ACRONYMS

BAYS	bigeye, albacore, yellowfin, skipjack tuna
CAR	Caribbean
CFR	Code of Federal Regulations
CHSRA	Cape Hatteras Special Research Area
CV	Coefficient of Variation
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FEC	Florida East Coast
FMP	Fishery Management Plan
GOM	Gulf of Mexico
HMS	Highly Migratory Species
KOM	Key Outcome Memorandum
LOF	List of Fisheries
M/SI	Mortality and serious injury
MAB	Mid-Atlantic Bight
MMPA	Marine Mammal Protection Act
NCA	North Central Atlantic
NEC	Northeast Coastal
NED	Northeast Distant
NEPA	National Environmental Policy Act
NM	Nautical Mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PBR	Potential Biological Removal
PLL	Pelagic Longline
PLTRP	Pelagic Longline Take Reduction Plan (or the Plan)
PLTRT	Pelagic Longline Take Reduction Team (or the Team)
RFA	Regulatory Flexibility Analysis
RIR	Regulatory Impact Review
SAB	South Atlantic Bight
SAFE	Stock Assessment and Fisheries Evaluation
SAR	Sargasso
SARs	Stock Assessment Reports
SEFSC	Southeast Fishery Science Center
SERO	Southeast Regional Office
TUN	Tuna North
TUS	Tuna South
WNA	Western North Atlantic

1.0 INTRODUCTION

1.1 Background

The PLTRP has not met the long-term goal of reducing incidental mortalities and serious injuries of short-finned pilot whales to a level approaching the insignificance threshold as required by section 118(f)(2) of the Marine Mammal Protection Act (MMPA). As a result, NMFS is amending the Atlantic Pelagic Longline Take Reduction Plan (hereinafter called the PLTRP, or the Plan) to reduce incidental mortality and serious injury (take) of short-finned pilot whales (*Globicephala macrorhynchus)* in the Atlantic portion of the Category 1 Highly Migratory Species (HMS) Atlantic Ocean, Caribbean, Gulf of Mexico, and Large Pelagics Longline Fishery (hereinafter called the Atlantic Pelagic Longline (PLL) fishery). The implementing regulations amend existing regulations for the Atlantic PLL fishery under the PLTRP and are based on consensus recommendations from the Atlantic Pelagic Longline Take Reduction Team (hereinafter called the PLTRT, or the Team). Additional documentation, including the proposed rule for the PLTRP amendment (85 FR 81168), and supporting administrative record, is located in the Protected Resources Division of the NMFS Southeast Regional Office (SERO), St. Petersburg, Florida. For detailed information on the history and management of the PLTRP and PLTRT, Key Outcome Memos (KOMs) from meetings, and other associated documents, please see the NMFS PLTRT website.

1.2 Statutory and Regulatory Context

The National Marine Fisheries Service (NMFS) has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA, 42 U.S.C. § 4321 *et seq.*), regulations in the Code of Federal Regulations (CFR) issued by the Council on Environmental Quality (40 CFR Parts 1500-1508),[1] and guidance issued by the National Oceanic and Atmospheric Administration (NOAA) in Administrative Order 216-6A and the Companion Manual for NOAA NAO 216-6A. This EA evaluates the direct, indirect, and cumulative environmental effects that would result from the proposed actions and other reasonable alternatives. NMFS is mandated by the MMPA to reduce incidental mortality and serious injury of marine mammals associated with commercial fisheries. Section 118(f) of the MMPA requires NMFS to develop and implement take reduction plans to assist in the recovery or prevent the depletion of each strategic marine mammal stock that interacts with Category I or II fisheries (16 U.S.C. § 1387).

The MMPA defines a strategic stock as a marine mammal stock: (1) for which the level of direct human-caused mortality exceeds the potential biological removal (PBR) level; (2) which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the Endangered Species Act (ESA) in the foreseeable future; or (3) which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (16 U.S.C. § 1362(19)). The PBR level is the maximum number of animals, not including natural mortalities that can be removed annually from a stock, while allowing that stock to reach or maintain its optimum sustainable population level (16 U.S.C. § 1362(20) and 50 CFR § 229.2).

A Category I fishery is a commercial fishery that has frequent incidental mortality and serious injury of marine mammals, and a Category II fishery is a commercial fishery that has occasional incidental mortality and serious injury of marine mammals (50 CFR § 229.2). "Incidental" means, with respect to an act, a non-intentional or accidental act that results from, but is not the purpose of, carrying out an otherwise lawful action (50 CFR § 229.2). The MMPA also provides NMFS discretion to develop and implement a take reduction plan for any other marine mammal stocks that interact with a Category I fishery, which the agency determines, after notice and opportunity for

[1] This Environmental Assessment is being prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the 2020 CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020. This review began on March 7, 2016 and the agency has decided to proceed under the 1978 regulations.

public comment, has a high level of mortality and serious injury across a number of such marine mammal stocks. The Category I and II fisheries are updated annually and posted on the MMPA's List of Fisheries website.

As specified in the MMPA, the immediate goal of a take reduction plan is to reduce, within six months of its implementation, the incidental mortality or serious injury of marine mammals taken in the course of commercial fishing operations to levels less than the PBR level for the stock. The long-term goal of a take reduction plan is to reduce, within 5 years of its implementation, the incidental mortality or serious injury of marine mammals taken in the course of commercial fishing to insignificant levels approaching a zero mortality and serious injury rate (i.e., insignificance threshold or zero mortality rate goal), which is 10 percent of the PBR level for a marine mammal stock (69 FR 43338, July 20, 2004). The long-term goal takes into account the economics of the fishery, the availability of existing technology, and existing state or regional fishery management plans. The MMPA also requires NMFS to amend take reduction plans and implementing regulations as needed to meet these requirements and goals.

The Magnuson–Stevens Fishery Conservation and Management Act (MSA) defines the term "highly migratory species" as "tuna species, marlin (*Tetrapturus spp. and Makaira spp.*), oceanic sharks, sailfishes (*Istiophorus spp.*), and swordfish (*Xiphias gladius*)" 16 U.S.C. § 1802(21). Atlantic HMS are managed under the dual authority of the MSA, as amended, and the Atlantic Tunas Convention Act (ATCA). Under the ATCA, the Secretary shall promulgate such regulations as may be necessary and appropriate to carry out International Commission for the Conservation of Atlantic Tunas (ICCAT) recommendations. 16 U.S.C. § 971d(a). The authority to issue regulations under the MSA and ATCA has been delegated from the Secretary to the Assistant Administrator for Fisheries, NOAA. The Atlantic PLL fishery is managed under the Consolidated Atlantic HMS Fishery Management Plan (FMP); NMFS, 2006. NMFS published the Consolidated HMS FMP in 2006 (71 FR 40096, July 14, 2006) and has amended the FMP 11 times. Additional information regarding Atlantic HMS fishery management, the 2006 Consolidated HMS FMP and its amendments (implemented by regulations at 50 CFR part 635), and the annual HMS SAFE Reports can be found on the NMFS Atlantic HMS website.

1.3 Current Requirements of the Pelagic Longline Take Reduction Plan

The impetus for the PLTRP was a 2003 settlement agreement between NMFS and the Center for Biological Diversity that required NMFS to convene a Take Reduction Team under the MMPA by June 30, 2005, to address incidental mortality and serious injury of short-finned and long-finned pilot whales and common dolphins in the Atlantic PLL fishery, which was then, and currently is, listed as a Category I fishery in the List of Fisheries (LOF). At the time of the settlement agreement, the western North Atlantic stocks of these three species were identified as strategic stocks.

In the five years prior to the convening of the PLTRT, there were no observed mortalities or serious injuries of common dolphins in the Atlantic PLL fishery and they were reclassified as a non-strategic stock; thus, they were not addressed by the PLTRP. The SARs also reclassified long-finned and short-finned pilot whales as non-strategic stocks; however, estimated incidental mortality and serious injury levels in the Atlantic PLL fishery exceeded the insignificance threshold (although not the PBR level) for the stocks. In addition, although not included in the settlement agreement, estimated incidental mortality and serious injury levels for Risso's dolphins in the Atlantic PLL fishery also exceeded the insignificance threshold (although not the PBR level) for the stock.

Because long-finned and short-finned pilot whales and Risso's dolphins were below the PBR level and considered non-strategic stocks that interact with a Category I fishery, NMFS directed the PLTRT to develop and submit a draft Take Reduction Plan to the agency within 11 months, in accordance with the long-term goal of MMPA section 118, focusing on reducing incidental mortalities and serious injuries of pilot whales and Risso's dolphins to a level approaching the insignificance threshold within five years of implementation of the plan.

In accordance with the MMPA and the settlement agreement, NMFS convened the PLTRT in June 2005. NMFS announced the establishment of the PLTRT in the Federal Register (70 FR 36120; June 22, 2005) and selected team members according to guidance provided in MMPA section 118(f)(6)(C). There are 22 members of the PLTRT, including fishermen and representatives of the Atlantic PLL fishing industry, environmental groups, marine

mammal biologists, fisheries biologists, and representatives of the Mid-Atlantic Fishery Management Council, the Marine Mammal Commission, and NMFS.

Four professionally facilitated meetings and two full-team conference calls were held between June 2005 and May 2006. The PLTRT reached consensus at the May 2006 meeting, and on June 8, 2006, submitted to NMFS a Draft PLTRP, including recommendations for bycatch reduction measures, as well as research needs and other non-regulatory measures (PLTRT, 2006). Based on the Draft PLTRP, NMFS published a proposed (73 FR 35623; June 24, 2008) and final rule (74 FR 23349; May 19, 2009) implementing the PLTRP, which became effective on June 18, 2009 (50 CFR § 229.36).

The final PLTRP contained both regulatory and non-regulatory management measures to reduce mortality and serious injury of pilot whales (*Globicephala spp.)* and Risso's dolphins (*Grampus griseus*), in the Atlantic PLL fishery. It included three regulatory measures: 1) the creation of the Cape Hatteras Special Research Area (CHSRA; **Figure 1.1**), which had specific observer and research participation requirements for fishermen operating in that area; 2) a 20 nautical mile (nm) (37.04 km) limit on mainline length for all PLL sets within the exclusive economic zone (EEZ) portion of the Mid-Atlantic Bight (MAB) (**Figure 1.2**); and 3) a requirement that an informational placard on marine mammal handing/release guidelines must be posted inside the wheelhouse and on the working deck of all PLL vessels in the Atlantic EEZ.

In addition, the PLTRP contained the following non-regulatory measures: 1) within constraints of available funding, increase observer coverage to 12% to 15% throughout all Atlantic PLL fisheries that interact with pilot whales or Risso's dolphins; 2) encourage vessel operators (i.e., captains) throughout the fishery to maintain daily communications with other local vessel captains regarding protected species interactions, with the goal of identifying and exchanging information relevant to avoiding protected species bycatch; 3) update careful handling/release guidelines, equipment, and methods; and 4) provide quarterly reports of marine mammal interactions in the PLL fishery to the PLTRT.

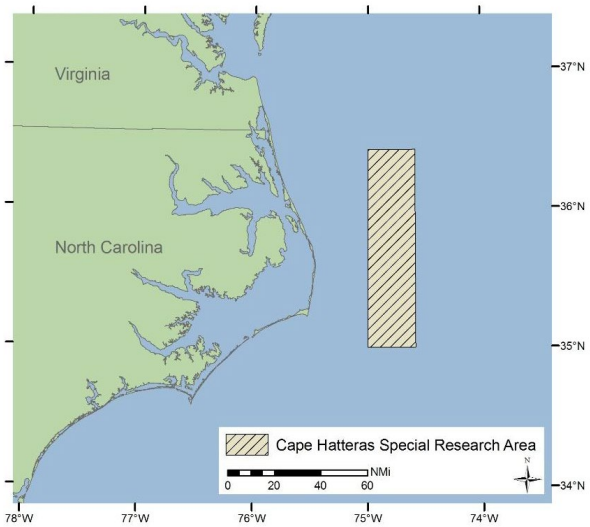

Figure 1.1. Map of the CHSRA off the coast of Cape Hatteras, North Carolina

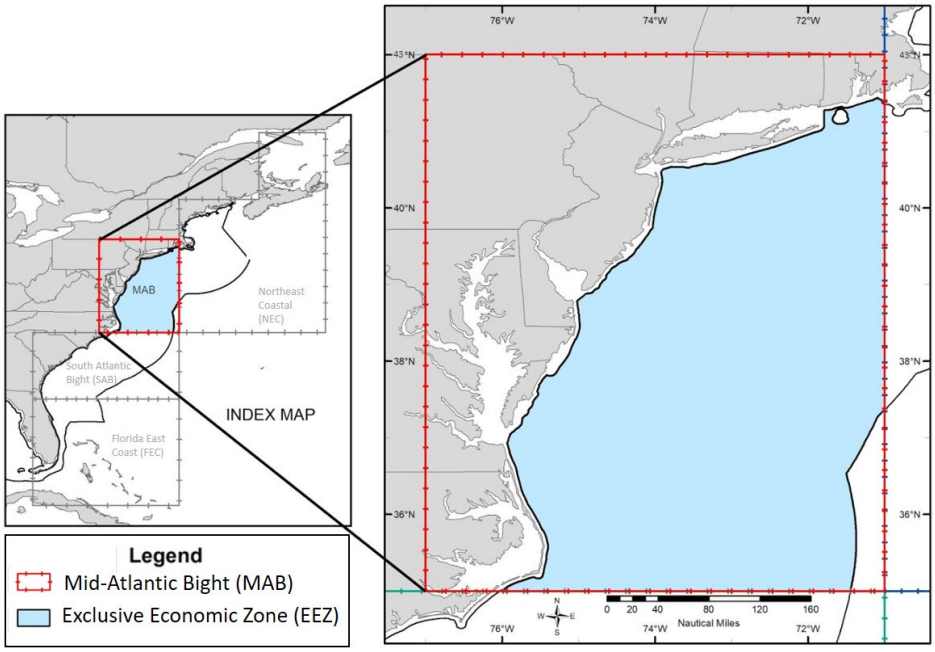

Figure 1.2. Map of the EEZ portion of the MAB. Note that Figure 1.2 has been updated to correctly reflect the northern extent of the MAB, which is located at the 43° N latitude line.

At the 2006 meeting, the PLTRT recommended NMFS develop and implement a mandatory certification program to educate owners and operators of PLL vessels about ways to reduce mortality and serious injury of marine mammals. NMFS implemented the PLTRT's recommendation using NMFS' existing regulatory authority at 50 CFR § 635.8, Workshops. The Consolidated HMS Fishery Management Plan (FMP) and the associated final rule (71 FR 58058), requires all longline fishermen to attend a NMFS workshop and earn certification in mitigation, handling, and release techniques for sea turtles, sea birds, and other protected species (NMFS 2006). Since 2007, NMFS has incorporated into these workshops education on careful handling and release techniques for marine mammals, current regulations and guidelines related to marine mammal bycatch that apply to the fishery, and an explanation of the purpose and justification for those regulations and guidelines. NMFS has adequate authority to expand and update the content of these workshops as necessary to meet the needs of the PLTRP.

1.4 Proposed Changes to the Pelagic Longline Take Reduction Plan

1.4.1 Scope

The PLTRP currently includes both short-finned and long-finned pilot whales (*Globicephala melas melas*), as well as Risso's dolphins (*Grampus griseus*). Both species of pilot whale were included in the initial PLTRP because separate abundance estimates in addition to mortality and serious injury estimates for the Atlantic PLL fishery were unknown. Risso's dolphins were included in the initial PLTRP because the mortalities and serious injuries incidental to the Atlantic PLL exceeded the insignificance threshold similar to the pilot whales (PLTRP 2006).

However, since the Plan's implementation in 2009, separate abundance estimates for long-finned and short-finned pilot whales have been developed (Waring et al., 2011). Additionally, separate mortality and serious injury estimates for the two species incidental to the Atlantic PLL fishery have been determined (Waring et al., 2014) and since then, long-finned pilot whales mortality and serious injury attributed to the Atlantic PLL fishery (Hayes et al. 2019) has been below the insignificance threshold, which is 10 percent of the PBR level. Therefore, although the initial PLTRP addressed both short-finned and long-finned pilot whales, NMFS is removing long-finned pilot whales from consideration under the Plan. Similarly, the levels of mortality and serious injury for Risso's dolphins attributed to the Atlantic PLL fishery have been below the insignificance threshold; therefore, NMFS is also removing Risso's dolphins from consideration under the Plan.

1.4.2 Regulatory Components

Since the final PLTRP became effective in June 2009, NMFS has held two professionally facilitated in-person meetings (August 2012 and December 2015) and six full Team webinars/conference calls (September 2010, June 2014, March 2015, September 2016, October 2016, and September 2019) to monitor the effectiveness of the PLTRP, as well as to review recent research and new scientific information relevant to the PLTRT and abundance, mortality, and serious injury estimates for pilot whales.

Over the years, data presented to the PLTRT indicated that the PLTRP is not working as intended to meet the long-term goal of the Plan. A key contributor to the lack of efficacy is likely an unexpected change in fishing practices several years after Plan implementation. Beginning in 2013, fishermen in the Atlantic PLL fishery shifted from setting mostly sets with a single mainline to setting sets with multiple mainline (hereinafter also referred to as "multi-sets"). A multi-set was defined, for analytical purposes, as two mainlines, where the second mainline begins 30 minutes or less after the first. Although multi-sets meet the requirements of the PLTRP, in that each mainline contains less than 20 nm in mainline length, the marine mammal bycatch reductions predicted in the PLTRP assumed only a 50% compensation in fishing effort when limiting mainlines in the MAB (NMFS, 2009). From 1992 to 2012, multiple mainlines set as part of a multi-set represented 1% of all mainlines observed in the MAB but increased to 47% from 2013-2015 (PLTRT, 2015). As a result of the lack of change in pilot whale bycatch, these new data, and the observed shift in fishing practices to use multiple mainlines, which resulted in longer soak times, the PLTRT reached consensus on regulatory recommendations to amend the PLTRP in December 2015 (**Table 1.1**; PLTRT, 2015).

However, during NMFS's analyses of the potential conservation benefits associated with the Team's December 2015 recommendations, NMFS determined that the recommendation for mainline length would not have any conservation benefit because it would still allow for sets with multiple mainlines, which increased the overall length of gear in the water and associated increased soak times, and is believed to have higher rates of pilot whale interactions than sets with a single mainline. As a result, NMFS reconvened the PLTRT in September 2016 and October 2016 via webinar/conference and the Team amended the consensus recommendation regarding mainline length (**Table 1.2**; PLTRT, 2016).

Ultimately, the PLTRT's final consensus recommendations included the following regulatory actions: (1) removal of the CHSRA and its associated observer and research participation requirements; (2) revised mainline length and setting requirements that account for the shift from setting a set with a single mainline to sets with multiple mainlines (multi-sets) in the in the EEZ portion of the MAB; and (3) establishing new requirements to make the hook the weakest part of the gear by specifying hook diameter and straightening force in addition to line diameter for the leader (also referred to as gangions or branch lines) with hook.

Table 1.1. Initial Consensus Recommendations from the December 2015 full team in-person meeting.

Recommendation Category	Description of Recommendation
Cape Hatteras Special Research Area	The PLTRT recommends the Agency repeal the Cape Hatteras Special Research Area and the associated advance call-in requirement under the PLTRP.
Mainline Length and Setting	While pelagic longline fishing in the MAB, the owner and operator of an Atlantic PLL vessel may set no more than 30 nautical miles of active gear (gear with leaders and hooks) in a 24-hour period. The PLTRT recommends that the length of mainlines and locations of breaks within a mainline be recorded in a form useful to NMFS and the PLTRT. Gear may be set either: o Multi-set: in sets with multiple mainlines separated by a least one nautical mile, with the maximum mainline length of any single mainline no longer than 20 nautical miles; or o Single-set: in sets with a single mainline with a maximum mainline length of 32 nautical miles, and continuous active gear (gear with leaders and hooks) of no more than 20 nautical miles. Any active gear in excess of 20 nautical miles must be separated from other active gear along the mainline by a gap of at least one nautical mile along the mainline in which no leaders and hooks are set.

Terminal Gear Requirements	The goal of these requirements is to make terminal hooks the weakest part of the gear. o While pelagic longline fishing in the Florida East Coast (FEC), South Atlantic Bight (SAB), MAB and Northeast Coastal (NEC), the owner and operator of an Atlantic PLL vessel must use monofilament nylon leaders and/or branch lines that all have a diameter of 1.8 mm or larger (certified by the manufacturer to at least 300 lb breaking force). o While pelagic longline fishing in the FEC, SAB, MAB and NEC, the owner and operator of an Atlantic PLL vessel must use only hooks meeting the criteria specified in 50 CFR § 635.21 and the following specifications: ▪ 16/0 or 18/0 circle hooks with hook shanks containing round wire that can be measured with a caliper or other appropriate gauge, with a wire diameter not to exceed 4.05 mm if 16/0 or 4.4 mm if 18/0; and ▪ a straightening force not to exceed 300 lb based on manufacturer's specifications. Hooks that currently meet these specifications include: 16/0 Mustad 39960D, 16/0 L- 2048-LM Eagle Claw, 16/0 Mustad 39988D, and experimental Lindgren Pitman 18/0 with no offset.

Table 1.2. Final Regulatory Consensus Recommendation for mainline length from the October 2016 full team webinar meeting.

Recommendation Category	Description of Recommendation
Mainline Length and Setting	While pelagic longline fishing in the MAB: o An owner and operator of an Atlantic PLL vessel may set no more than 30 nm of active gear (gear with leaders and hooks) with a maximum mainline length of 32 nm, and continuous active gear (gear with leaders and hooks) of no more than 20 nm. o Any active gear in excess of 20 nm must be separated from other active gear along the mainline by a gap of at least 1 nm along the mainline in which no leaders and hooks are set. o There may be no more than one mainline in the water at once (with some exception for line that may become accidentally parted after setting).

1.4.3 Non-Regulatory components

The PLTRT also reached consensus on a number of non-regulatory actions that NMFS will pursue outside of the rulemaking described herein. This will include: 1) modifying fishery observer forms to enable the collection of additional marine mammal interaction and depredation event data and 2) modifying fishery observer protocols to enable observers to collect straightened hooks and tissue samples from the hooks to help determine if and at what frequency fish or marine mammal interactions can be identified. More information on the new non-regulatory measures can be found in the December 2015 KOM (PLTRT, 2015).

1.4.4 Monitoring Strategy

The PLTRP Monitoring Strategy (NMFS, 2013) is a comprehensive plan that describes the methods for monitoring regulatory compliance and the effectiveness of the PLTRP. Compliance monitoring includes enforcement activities, research, collection of observer data, evaluation of self-reported fishing information, and education and outreach efforts. Effectiveness monitoring determining whether the long-term statutory goals described in the MMPA are being achieved. NMFS intends to update the monitoring strategy to reflect the new regulatory and non-regulatory components of the PLTRP. As part of this process, NMFS will work closely with NOAA Office of Law Enforcement (OLE) and the U.S. Coast Guard (USCG) to ensure effective enforcement of the new regulatory components of the PLTRP. To protect the integrity and covert nature of an enforcement plan, though, specific details concerning enforcement will not be shared with the public.

2.0 PURPOSE AND NEED

Mortality and serious injury of short-finned pilot whales incidental to the Atlantic PLL fishery remains high and is approaching the PBR level; therefore, the long-term goal of the plan (implementing regulations for the PLTRP are at 50 CFR § 229.36 and related definitions are at 50 CFR § 229.2) is not being met.

The purpose of the proposed actions is to reduce mortality and serious injury of short-finned pilot whales incidental to the Atlantic PLL fishery in the federal U.S. Atlantic EEZ.

The need for the actions is to satisfy NMFS' responsibilities under MMPA section 118(f) (16 U.S.C. § 1387(f)) to meet the long-term goal of the PLTRP, which is to reduce the incidental mortality or serious injury of marine mammals taken in the course of commercial fishing to insignificant levels approaching a zero mortality and serious injury rate.

2.1 Observed Interactions with Pilot whales

For more information on bycatch of marine mammals and marine turtles in the U.S. PLL Fishery see reports from the Southeast Fishery Science Center (SEFSC) on the Estimated Bycatch of Marine Mammals and Sea Turtles in the U.S. Atlantic PLL fleet which can be found by searching in the NOAA Central Library database.

The PLL fishery has had a fishery observer program (Pelagic Observer Program or POP) in place since 1992 to document finfish bycatch, characterize fishery behavior, and quantify the bycatch (hereinafter referred to as "interactions" when related to marine mammals) of protected species. Information gathered during observed interactions of marine mammal species is reviewed on a case-by-case basis. Serious injury determinations are then made based on guidelines in the NMFS Serious Injury Policy (NMFS 2012a; NMFS 2012b). Observed interactions can result in classifying animals as seriously injured (likely to lead to mortality) or not seriously injured (released alive). Observed types of injuries on pilot whales that are considered by NMFS to be serious injuries include hooks inside or embedded in the mouth and entanglements in gear or trailing gear.

The target annual observer coverage is 8% of the total reported hooks, and is allocated randomly based upon reported fishing effort during the previous calendar year for each fishing area and quarter, although levels can vary based on data needs (Garrison and Stokes, 2019). This level of observer coverage, in addition to mandatory fishery logbook reporting, allows bycatch estimates to be developed for each marine mammal species observed, stratified by area and quarter (Garrison and Stokes, 2017). Observer coverage in this fishery, as a percentage of total number of PLL sets, ranges from 12.2-17.9% for years 2014-2018 (NMFS, 20202b). Fishery observer effort is currently allocated among 11 large geographic areas (**Figure 1.1**) and calendar quarter based upon the historical fishing range of the fleet: Caribbean (CAR), Gulf of Mexico (GOM), Florida east Coast (FEC), South Atlantic Bight (SAB), Mid-Atlantic Bight (MAB), Northeast Coastal (NEC), Northeast Distant (NED), Sargasso (SAR), North Central Atlantic (NCA), Tuna North (TUN), and Tuna South (TUS).

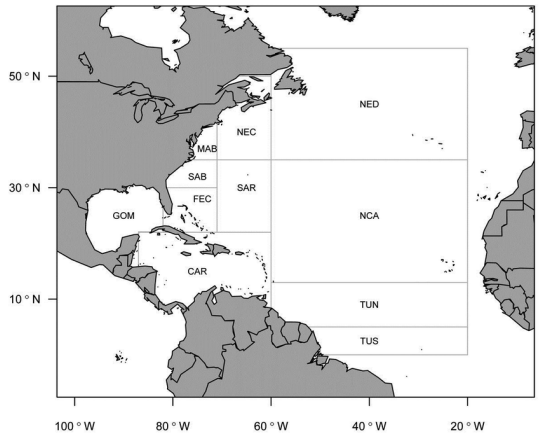

Figure 2.1. Geographical location classification of U.S. PLL fleet operations. Source: Hoolihan and Walter, 2015.

Pilot whales made up the majority of observed marine mammal interactions observed in the U.S. PLL fishery from 2014-2018 ranging from 62% to nearly 86% (**Table 1.1**). Pilot whale species are difficult to differentiate at sea and cannot be reliably visually identified during either abundance surveys or observations of fishery mortality without high-quality photographs (Rone and Pace 2012); therefore, observed interactions are predominately classified as "pilot whale" rather than to a specific species (e.g., short-finned pilot whale or long-finned pilot whale). Of the observed pilot whale interactions, the ones in the FEC, MAB, NEC, SAB accounted for 99.2% from 2014-2018 (**Table 1.2**), whereas the GOM had only one observed pilot whale interaction. Therefore, the scope of the PLTRP does not include the GOM, CAR, NCA, NED, SAR, TUN and TUS areas. The MAB had the highest proportion of observed pilot whale interactions annually from 2014-2018 and ranges from 60% to 100% per year (**Table 1.3**). Due to the high proportion of pilot whale interactions in the MAB, the Team recommended an additional measure that applies only to the MAB.

Table 2.1. Number of marine mammal observed interactions in the U.S. PLL fishery from 2014-2018. Source: Garrison and Stokes 2016, 2017, 2019 and SEFSC unpublished data.

Year	Total number of observed marine mammal interactions	Total observed pilot whale interactions	Percent pilot whales
2014	31	24	77.4%
2015	49	38	77.6%
2016	33	23	69.7%
2017	36	31	86.1%
2018	16	10	62.5%

Table 2.2 Numbers of pilot whale interactions observed per area per year from 2014-2018. Source: Garrison and Stokes 2016, 2017, 2019 and SEFSC unpublished data.

Year	NEC	MAB	SAB	FEC	GOM	CAR	NCA	NED	SAR	TUN	TUS
2014	4	19	0	1	0	0	0	0	0	0	0
2015	2	34	1	1	0	0	0	0	0	0	0
2016	6	14	1	1	1	0	0	0	0	0	0
2017	0	31	0	0	0	0	0	0	0	0	0
2018	0	8	2	0	0	0	0	0	0	0	0

Table 2.3. Proportion of observed pilot whale interactions per area per year from 2014-2018. Source: Garrison and Stokes 2016, 2017, 2019 and SEFSC unpublished data.

Year	NEC	MAB	SAB	FEC	GOM
2014	16.7%	79.2%	0.0%	4.2%	0.0%
2015	5.3%	89.5%	2.6%	2.6%	0.0%
2016	26.1%	60.9%	4.3%	4.3%	4.3%
2017	0.0%	100.0%	0.0%	0.0%	0.0%
2018	20.0%	80.0%	0.0%	0.0%	0.0%

2.2 Estimated Pilot Whale Interactions

Observers record the release condition of marine mammal interactions. Pilot whales can be hooked or entangled and this can result in the animals being released alive, released alive and suffer serious injuries that may cause them to die after being released, or are found dead. Because the two species of pilot whales are difficult to reliably identify at sea based upon visual observations, a logistic regression model is used to estimate the probability that observed pilot whale interactions (**Section 2.1**) are from short-finned or long-finned pilot whales (Garrison and Rosel 2017). This information is used to measure bycatch rates and calculate the estimated number of serious injuries and mortalities and number of animals released alive from the observed interactions (**Table 2.4; Table 2.5**).

Table 2.4. Short-finned pilot whales estimated mortality and serious injury from 2014-2018. Source: Garrison and Stokes 2016, 2017, 2019 and SEFSC unpublished data.

Year	NEC	MAB	SAB	FEC	GOM	Total	Total CV	95% CI
2014	38.2	189.9	0	5.8	0	233.9	0.24	145.9 – 373.2
2015	9.1	162.5	11.9	17.2	0	200.7	0.24	126.1 – 319
2016	11.3	86	8.6	5.1	2.2	111	0.30	63.1 – 197
2017	1	131.9	0	0	0	132.9	0.29	76.1 – 232.1
2018	0.8	77.9	23.5	0	0	102.2	0.39	48.9 – 213.8

Table 2.5. Short-finned pilot whales estimated released alive from 2014-2018. Garrison and Stokes 2016, 2017, 2019 and SEFSC unpublished data.

Year	NEC	MAB	SAB	FEC	GOM	Total	Total CV	95% CI
2014	0	41.2	0	0	0	41.2	0.51	15.8 – 103.4
2015	0	30	0	0	0	30	0.42	13.8 – 65.5
2016	3.9	7.2	6.2	0	0	17.3	0.47	7.2 – 41.2
2017	0.2	207.2	0	0	0	207.4	0.28	121 – 355.6
2018	0	51.8	0	0	0	51.8	.54	19.3 – 138.7

The estimated mean annual fishery related mortality of short-finned pilot whales, all of which is attributed to the PLL fishery, is 168 (Coefficient of Variation, or CV=0.13, years 2012-2016) accounting for more than 71% of the PBR level, which is 236 animals (Hayes et al. 2018). While estimated mortality and serious injury alone does not exceed the PBR level, the total number of estimated interactions, the combined total of mortality and serious injuries and those released alive (**Table 2.6**) are close to or exceeding the PBR level. Should the severity of interactions increase, it is possible that the number of animals with serious injuries or mortalities incidental to the PLL fishery could exceed the PBR level. Additionally, for each year 2014-2018, the estimated mortality and serious injury incidental to the Atlantic PLL fishery far exceeded the PLTRP's long-term goal of being below the insignificance threshold of 10 percent of the PBR level, which is approximately 24 animals.

Table 2.6. Total estimated interactions, the combined total of mortality and serious injury and released alive, between PLL gear and Short-finned Pilot Whales for 2014-2018. Garrison and Stokes 2016, 2017, 2019 and SEFSC unpublished data.

Year	Total estimated interactions
2014	275.1
2015	218.8
2016	128.3
2017	340.3
2018	154

3.0 MANAGEMENT ALTERNATIVES

This section describes the proposed actions and corresponding management alternatives considered for the PLTRP amendment, developed through discussions and recommendations of the PLTRT with analyses conducted by NMFS scientists. It also identifies the alternatives that are preferred by NMFS in collaboration with the PLTRT.

3.1 Action 1. Cape Hatteras Special Research Area

- Alternative 1 (No Action): Retain the CHSRA along with its associated special observer and research participation requirements as designated including all waters within the rectangular boundary defined in 50 CFR § 229.36.
- **Preferred Alternative 2**: Eliminate the CHSRA along with its associated special observer and research participation requirements.

3.2 Action 2. Mainline Length Requirements

- Alternative 1 (No Action): Pelagic longline sets must not exceed 20 nm (37.04 km) in mainline length in the EEZ portion of the MAB.
- **Preferred Alternative 2**: Pelagic longline sets in the EEZ portion of the MAB must not exceed 32 nm (59.26 km) with no more than one mainline in the water at any time. No more than 30 nm (55.56 km) total of active gear (gear with leaders or hooks) may be deployed along the mainline. A single length of active gear may not exceed 20 nm (37.04 km) and must be separated from other active gear along the mainline by a gap of at least one nm (1.85 km).
- Alternative 3: Maintain the 20 nm (37.04 km) mainline length cap in the EEZ portion of the MAB, and require pelagic longline multi-sets (sets with multiple mainlines) to be separated by at least one nm.
- Alternative 4: Maintain the 20 nm (37.04 km) mainline length cap in the EEZ portion of the MAB, but eliminate the option of multi-sets.

3.3 Action 3. Gear Requirements

Action 3 consists of two sub-actions with associated alternatives, which are new gear requirements created to make the hooks the weakest part of the gear so that they straighten before the line breaks. In Sub-Action 3.1, alternatives regarding hook size and straightening force are considered. In Sub-Action 3.2, alternatives regarding leaders (also referred to as gangions and defined as a line that serves to attach a hook, suspended at a specific target depth, to the mainline of a longline) diameter and breaking strength are considered.

3.3.1 Sub-Action 3.1: Hooks

- Alternative 1 (No Action): Maintain current hook requirements related to protecting and conserving sea turtles listed as specified at 50 CFR § 635.21. Specifically, Atlantic PLL vessels are limited, at all times, to possessing and/or using only corrodible (i.e., non-stainless steel) 18/0 or larger circle hooks with an offset not to exceed 10 degrees, or 16/0 or larger non-offset circle hooks.
- **Preferred Alternative 2**: In the EEZ portion of the FEC, SAB, MAB, and NEC fishing areas, the owner or operator of an Atlantic PLL vessel must use only circle hooks meeting the criteria specified at 50 CFR § 635.21 and the following specifications: (i) 16/0 or 18/0 circle hooks; (ii) hook shanks must be made of round wire that can be measured with a caliper or other appropriate gauge; (iii) hook wire diameter does not to exceed 4.05 mm if 16/0 or 4.4 mm if 18/0; and (iv) each hook has a straightening force not to exceed 300 lb based on manufacturer's specifications when new.
- Alternative 3: In the EEZ portion of the FEC, SAB, MAB, and NEC fishing areas, the owner or operator of an Atlantic PLL vessel must use only circle hooks meeting the criteria specified at 50 CFR § 635.21 and with a maximum wire diameter of 4.5 mm. At least some part of the hook shank must be made of round wire so that the wire diameter can be measured.

3.3.2 Sub-Action 3.2: Leaders (Gangions)

- Alternative 1 (No Action): No requirements regarding leader (gangion) material, diameter, or breaking strength.
- **Preferred Alternative 2**: In the EEZ portion of the FEC, SAB, MAB and NEC, the owner or operator of an Atlantic PLL vessel must use monofilament nylon leaders (gangions) and/or branch lines that all have a diameter of 1.8 mm or larger (certified by the manufacturer to at least 300 lb test strength when new). No other line material (e.g., wire) may be used, however, crimps and chafing gear are allowed.
- Alternative 3: In the EEZ portion of the FEC, SAB, MAB and NEC, the owner and/or operator of an Atlantic PLL vessel fishing with monofilament nylon leaders (gangions) or branch lines must have a diameter of 2.0 mm or larger. Any other line material (e.g., wire) used in a leader (gangion) and/or branch line must have a test strength certified by the manufacturer of 400 lb or greater when new.

4.0 AFFECTED ENVIRONMENT

NMFS will consider environmental impacts of the proposed actions on the physical, biological, socioeconomic, and administrative environments. This description of the affected environment provides a view on current conditions and serves as a baseline against which to compare impacts of implementing the alternatives.

4.1 Physical Environment

The geographic scope of the PLTRP amendment is the EEZ portion of the NEC, MAB, SAB, and FEC statistical fishing areas, which is equivalent to the U.S. Atlantic EEZ (**Figure 4.1**).

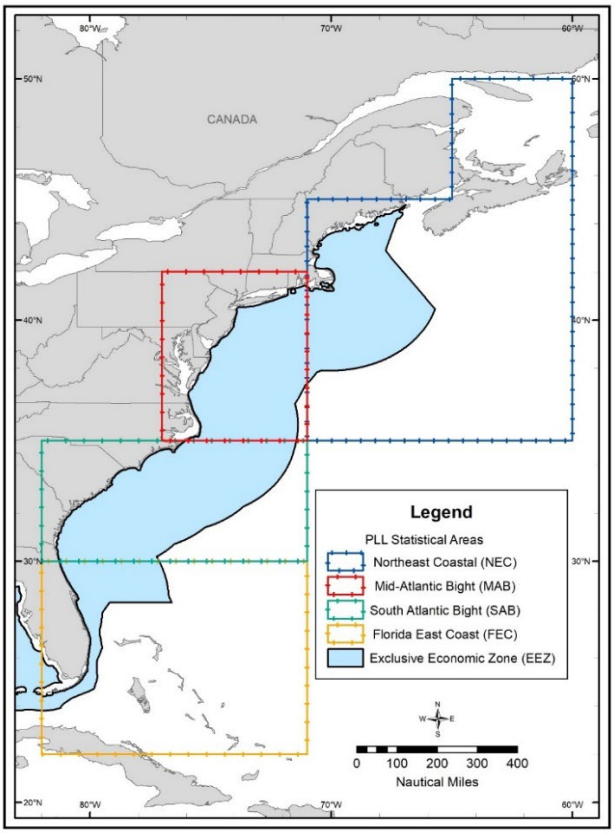

Figure 4.1. Map of U.S. Atlantic EEZ portions of the NEC, MAB, SEC, and FEC statistical fishing areas impacted by the proposed actions.

The various habitats with which many HMS are most frequently associated are coastal, continental shelf, and slope areas. The distribution of marine species along the Atlantic seaboard is strongly affected by the cold Labrador Current in the northern part, the warm Gulf Stream in the middle and southern portions of the region, and generally by the combination of high summer and low winter temperatures. For many species, Cape Hatteras forms a strong zoogeographic boundary between the Mid- and South Atlantic areas, while the Cape Cod/Nantucket Island area is a somewhat weaker zoogeographic boundary in the north. For a detailed description of HMS habitats of the Atlantic please refer to the 2006 Consolidated HMS FMP (NMFS, 2006) and its amendments, particularly Amendment 10 (NMFS, 2017) regarding essential fish habitat, hereby incorporated by reference.

Pilot whales in the western North Atlantic occur primarily along the continental shelf break from Florida to the Nova Scotia Shelf, however, south of Cape Hatteras most pilot whale sightings are expected to be short-finned pilot whales. For a detailed description of short-finned pilot whale habitat see the most recent SARs (Hayes et al. 2019) which is hereby incorporated by reference.

4.2 Biological Environment

The intended biological component that is expected to be impacted by the proposed actions is short-finned pilot whales. Other protected species occurring within the action area that may be affected by the proposed actions are detailed below.

4.2.1 Pilot Whales

Pilot whales, like some other marine mammals, have been observed depredating longline bait and/or catch. Pilot whales may perceive catch on longline gear as an easy foraging opportunity, thus increasing the risk of mortality and serious injury to these animals. Depredation may also result in loss of catch and bait, damage or loss of gear, and loss of time fishing, leading to increased vessel costs for the fishermen. Observed types of injuries on pilot whales include hooks inside or embedded in the mouth and entanglements in gear or trailing gear. These are considered by NMFS to be serious injuries because they are likely to lead to mortality. NMFS makes serious injury determinations on a case-by-case basis after reviewing observer data based on guidelines generated from the NMFS Serious Injury Policy (NMFS 2012a; NMFS 2012b).

A discussion of pilot whales' abilities and foraging ecology, which are relevant to the nature of their interactions with the longline fishery, appears in Section IV of the Draft PLTRP (PLTRT, 2006), and is incorporated by reference. These animals' behavior around commercial longline gear, particularly depredation activity, may be a key factor leading to hooking and entanglement. A description of the nature of these interactions can be found in Section III(C) of the Draft PLTRP (PLTRT, 2006), and is incorporated by reference. Additionally, geographic range, stock definition, range, abundance, and annual human-caused mortality and serious injury of Western North Atlantic (WNA) stocks of short-finned and long-finned pilot whales can be found in the 2018 SARs and are incorporated by reference.

Several issues complicate the management of the Atlantic PLL fishery with respect to reducing the mortality and serious injury of short-finned pilot whales. First, short-finned and long-finned pilot whales are difficult to distinguish in the field because of similarities in size, form, and coloration. Second, the nature of interactions between the PLL fishery and pilot whales is not well understood. These animals are difficult to study in the field and information is limited. While the exact latitudinal ranges of the two species are uncertain, south of Cape Hatteras, most pilot whale sightings are expected to be short-finned pilot whales, while north of ~42°N most pilot whale sightings are expected to be long-finned pilot whales; the area of overlap between the two species occurs primarily along the shelf break between 38°N and 40°N latitude (Garrison and Rosel 2017).

All pilot whale incidental mortality and serious injury from 2010-2013 in the Atlantic PLL fishery was assigned exclusively to short-finned pilot whales (Hayes et al. 2019). From 2014-2016, pilot whale interactions were apportioned to long-finned and short-finned pilot whales according to a logistic regression model (Garrison and Rosel 2017) and the estimated combined mortality and serious injury apportioned for long-finned pilot whales in those years was 12.9 (9.6 in 2014, 2.2 in 2015, and 1.1 in 2016), which accounted for 2.3% of the total from 2014-2016 (Hayes et al. 2019). The estimated combined mortality and serious injury apportioned for short-finned pilot whales from 2014-2016 was 544 (233 in 2014, 200 in 2015 and 111 in 2016), which accounted for 97.7% of the total from 2014-2016 (Hayes et al. 2019). Given that estimated mortality and serious injury of long-finned pilot whales is low, the analysis of the proposed actions will focus primarily on short-finned pilot whales, though NMFS expects that any beneficial actions to short-finned pilot whales will also be beneficial to long-finned pilot whales.

4.2.2 Other Protected Species

4.2.2.1 Other Marine Mammals

All marine mammals are protected under the MMPA, and a number of the large whales are also listed as endangered under the ESA. For a complete list of marine mammals found off the U.S. Atlantic coast, see the US Atlantic and Gulf of Mexico Marine Mammal SARs, which are hereby incorporated by reference. The LOF categorizes fisheries according to the level of interactions that result in incidental mortality or serious injury of marine mammals. See the 2020 LOF (85 FR 21079; May 18, 2020), hereby incorporated by reference, for a list of marine mammal species in the Atlantic and GOM that have been killed or injured incidental to the U.S. PLL fishery. The only marine mammals other than short-finned pilot whales that were estimated to have been seriously injured from 2014 – 2018 in the

NEC, MAB, SAB, and FEC were the WNA stock of long-finned pilot whales, the WNA stock of Risso's dolphins, and WNA offshore stock of common bottlenose dolphins.

4.2.2.2 Seabirds

The majority of longline interactions with seabirds occur as the gear is being set, they get hooked at the surface, and then dragged underwater where they drown (NMFS, 2018b). In general, takes of seabirds have been minimal in the fishery, most likely due to the setting of longlines at night and/or fishing in areas where birds are largely absent. Section 4.1.2 of the 2015 SAFE Report (NMFS, 2015a), hereby incorporated by reference, includes information on seabird bycatch in the PLL fishery from 1992-2014, the release status of seabird bycatch in the fishery, and preliminary expanded estimates of seabird bycatch and bycatch rates in the fishery from 2000-2012 using data from the Pelagic Observer Program. Additional information about recent seabird interactions in the PLL fishery can be found in Table 6.19 and 6.20 in the 2019 SAFE Report (NMFS, 2020b) which is incorporated by reference.

Many seabird species occur throughout the areas of the proposed actions. However, from 2012-2018, there were only 17 seabirds that had observed interactions in the NEC, MAB, and SAB, and no observed interactions occurred in the FEC or during 2018 (NMFS, 2020b).

4.2.2.3 Sea Turtles

A thorough review of the life history, status and trends, and threats for sea turtles is available in section 3.2 of the June 18, 2015 Biological Opinion on the Continued Authorization of the Fishery Management Plan for Coastal Migratory Pelagic Resources in the Atlantic and Gulf of Mexico (NMFS, 2015b), and that section is herein incorporated by reference. Additional information can be found in the Leatherback and Loggerhead recovery plans, and are hereby incorporated by reference.

Although all six species of sea turtles are found in waters where the Atlantic PLL fishery operates, the main observed sea turtle interactions with the fishery are loggerheads and leatherbacks. The 2020 HMS PLL Biological Opinion (hereinafter referred to as the 2020 PLL BiOp) found that the operation of the HMS PLL fishery is likely to adversely affect leatherback, loggerhead, hawksbill, green, olive ridley, and Kemp's ridley sea turtles. All six species of sea turtles in the U.S. are protected under the ESA. However, the 2020 PLL BiOp determined that operation of the fishery would not jeopardize the continued existence of these ESA-listed species (NMFS, 2020a).

4.2.2.4 Oceanic Whitetip Shark

NMFS determined the oceanic whitetip shark (*Carcharhinus longimanus*) warranted listing as a threatened species under the ESA (83 FR 4153; January 30, 2018). In the western Atlantic, oceanic whitetips occur from Maine to Argentina, including the Caribbean and Gulf of Mexico. The oceanic whitetip shark is a highly migratory species of shark that is usually found offshore in the open ocean, on the outer continental shelf, or around oceanic islands. See the status review report for more detailed information about the oceanic whitetip shark (Young et al. 2016), which is hereby incorporated by reference. Oceanic whitetip bycatch is observed in the action area. The 2020 PLL BiOp found that the operation of the HMS PLL fishery is likely to adversely affect oceanic whitetip sharks, however, it also concluded that the operation of the fishery would not jeopardize the continued existence of this ESA-listed species (NMFS, 2020a).

4.2.2.5 Giant Manta Ray

NMFS determined the giant manta ray (*Manta birostris*) warranted listing as a threatened species under the ESA (83 FR 2916; January 22, 2018). On the east coast of the U.S., their range occurs as far north as New Jersey and extends south of Florida past the Caribbean islands. See the status review report for more detailed information about the giant manta ray (Miller and Klimovich 2017), which is hereby incorporated by reference. As stated in the final rule to list the species, giant manta rays may be caught as bycatch in U.S. fisheries though, given the rarity of the species in the U.S. bycatch data, current levels were found to be negligible and determined to have a minimal impact on the status of the giant manta ray (9983 FR 2916). The level of bycatch of giant manta rays in the Atlantic PLL fishery is not well understood because prior to their ESA listing, observed takes were not recorded at the species level. The 2020 PLL BiOp found that the operation of the HMS PLL fishery is likely to adversely affect giant Manta Rays, however, it also concluded that the operation of the fishery would not jeopardize the continued existence of this ESA-listed species (NMFS, 2020a).

4.2.2.6 Scalloped Hammerhead Shark

Four of six identified distinct population segments (DPS) of scalloped hammerhead shark (*Sphyrna lewini*) were listed under the ESA by NMFS (79 FR 38213, July 3, 2014). The Central and Southwest Atlantic DPS bounded to the north by 28°N latitude, to the east by 30°W longitude, to the south by 36°S latitude, and to the west by the U.S. and Mexico EEZs, was listed as threatened. While there is bycatch of scalloped hammerhead sharks in the Atlantic PLL fishery, the geographic scope of the rule is limited to the U.S. EEZ and therefore, does not overlap with the DPS boundary. The 2020 PLL BiOp found that the operation of the HMS PLL fishery is likely to adversely affect the Central and Southwest Atlantic DPS of scalloped hammerhead sharks, however, it also concluded that the operation of the fishery would not jeopardize the continued existence of this ESA-listed species (NMFS, 2020a).

4.2.2.7 Target catch and bycatch of non-target species

A description of the life history, species biology, stock status and outlook, effects of regulation, and recent and ongoing research for the species targeted by the Atlantic PLL fishery, including Atlantic swordfish and Atlantic BAYS tunas (bigeye, albacore, yellowfin, skipjack) and non-target species, including Atlantic bluefin tuna, Atlantic sharks, and Atlantic billfish caught in the fishery can be found in the HMS FMP (NMFS 2006) and its amendments with annual updates summarized in the HMS Stock Assessment and Fisheries Evaluation (SAFE) Reports, which are incorporated by reference.

4.3 Socioeconomic Environment

The PLTRP amendment affects the Atlantic PLL fishery for tunas and swordfish. Consequently, this description focuses exclusively on the Atlantic PLL fishery. Current regulations prohibit use of longline gear in the recreational sector and the proposed actions do not include amendments to the recreational fishing regulations. Consequently, this description of the PLL fishery is strictly commercial.

4.3.1 Description of the Atlantic pelagic longline fishery

The U.S. PLL fishery operates year-round and primarily targets swordfish, yellowfin tuna, and bigeye tuna in various areas and seasons. Secondary target species include dolphin fish and albacore tuna. Although pelagic longline fishing gear can be modified (i.e., depth of set, hook type, etc.) to target either swordfish or tunas, vessels in the fishery target multiple species. PLL vessels are opportunistic, switching gear style and making subtle changes to the fishing configuration to target the best available economic opportunity for each individual trip. For example, when targeting swordfish, the lines generally are deployed at sunset and hauled in at sunrise to take advantage of the nocturnal near-surface feeding habits of swordfish. In general, longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. PLL vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface, although vessels of the distant water fleet undertake extended trips that include other phases of the lunar cycle. For detailed management information on the Atlantic PLL fishery see the SAFE Reports. For detailed information about the Category I listing see the LOF website. For a detailed description of the U.S. PLL fishery, see the 2020 Section 7 Biological Opinion (NMFS, 2020a). The SAFE reports, LOF, and 2020 Biological Opinion are hereby incorporated by reference.

4.3.1.1 Participants

The HMS FMP Amendment, and Consolidation of Regulations (64 FR 29090, May 28, 1999) established six different limited access permits: (1) directed swordfish, (2) incidental swordfish, (3) swordfish handgear, (4) directed shark, (5) incidental shark, and (6) Atlantic tuna longline. Any permit expired for more than one year cannot be renewed or transferred. Prior to obtaining the permits, both the vessel owner and operator must attend a Safe Handling, Release, and Identification Workshop and have their certificates of completion of that workshop on board the vessel (50 CFR § 635.8). To reduce bycatch in the U.S. PLL fishery, these permits are designed so that the swordfish directed and incidental permits are valid only if the permit holder also holds both a tuna longline and a shark permit. Similarly, the tuna longline permit is valid only if the permit holder also holds both a swordfish (directed or incidental, not handgear) and a shark permit. This permit combination requirement allows limited retention of species that might otherwise be discarded. If a vessels possessed only a shark directed or shark incidental permit, and did not also have a tuna or swordfish permit, the vessel would be allowed to only land sharks

and would have to discard all swordfish and tuna caught. The tuna longline, shark (directed and incidental), and swordfish (directed and incidental) permits are collectively also known as the "tri-pack." As of March 13, 2019, there were 248 vessels with the tri-pack (**Table 4.1**)[2]. The NMFS SERO Permits Office assigns a temporary vessel ID number when an individual acquires a permit prior to assigning the permit to a particular vessel. Any landings under any of the permits, however, must be by a vessel that is either USCG documented or state registered. As of March 13, 2019, 47 of the tri-packs had a temporary vessel ID assigned, which indicates there were no more than 201 PLL vessels that could be active as of that date as long as they had also completed the necessary requirements in addition to permits (e.g., electronic monitoring and Individual Bluefin Quota). However, the number of PLL vessels that are active and land HMS is substantially less than the number of potentially active vessels. In 2016 and 2017, the number of active vessels was 85 and 89 (NMFS 2019c), respectively, and in 2018, the number of active vessels had decreased to 76 (NMFS 2020b). Active vessels account for about one-third of the number of vessels that could be active.

Table 4.1. Number of Vessels with Valid and Renewable/Transferable Tuna Longline, Shark Directed and Incidental and Swordfish Directed and Incidental Permits, 2012-2017. Source: NMFS 2020b

Permit	2014	2015	2016	2017	2018	As of 3/13/2019
Tuna longline	246	280	280	280	280	280
Shark directed	206	224	223	221	220	219
Shark incidental	258	275	271	269	268	267
Swordfish directed	183	188	186	185	185	185
Swordfish incidental	66	72	72	72	72	71

Approximately 45% of the 201 USCG-documented or state registered PLL vessels have their hailing port in Florida. New Jersey ranks second with approximately 14% of the vessels (**Table 4.2**). PLL vessels with home ports in New Jersey have the highest combined holding capacity of approximately 1.79 million pounds.

Table 4.2. Number and percentage of Vessels and combined holding capacity by state of hailing port as of March 13, 2019. Source: NMFS SERO PIMS.

State	Number PLL Vessels	Percent PLL Vessels	Total Holding Capacity (lb)
FL	91	45.3%	1,172,550
NJ	29	14.4%	1,794,000
LA	24	11.9%	369,500
NC	14	7.0%	177,000
NY	10	5.0%	717,000
TX	7	3.5%	99,800
MA	6	3.0%	587,000
SC	5	2.5%	65,000
MD	4	2.0%	85,000

[2] As of July 14, 2020, that figure was down to 196 PLL vessels.

State	Number PLL Vessels	Percent PLL Vessels	Total Holding Capacity (lb)
PA	4	2.0%	160,000
ME	3	1.5%	150,500
Other	4	2.0%	212,000
Total	201	100%	5,589,350

There are 25 fishing communities associated with HMS fishing that have been identified that extend along the Atlantic coast from Gloucester, Massachusetts, to Islamorada, Florida, and along the Gulf of Mexico coast from Madeira Beach, Florida, to Port Aransas, Texas. Eleven of those communities are also among the top 24 hailing ports for PLL vessels. Two indices measure a community's dependence on fishing: (i) fishing engagement and (ii) fishing reliance (Jepsen and Colburn 2013). Commercial fishing engagement is based on the number of commercial fishing permits, pounds and values of landings, and number of dealers with landings within the community. Community fishing reliance is based on the value of landings per capita, the number of commercial permits per capita, the number of dealers per capita, and percentage employed in agriculture, forestry and fishing within the community.

The regulations implementing the proposed actions are expected to affect fisherman using PLL gear in the Atlantic Ocean. Of the documented and registered vessels with a tri-pack as of March 13, 2019, the top 24 hailing ports of PLL vessels are shown in **Table 4.3** and account for 64% of the permitted vessels. Although numerous fishing communities exist in this area, Barnegat Light (NJ) ranks first, and five of the other top fishing community ports are on the Atlantic coast: Fort Pierce (FL), Wanchese (NC), Pompano Beach (FL), Cape May (NJ), and Montauk (NY). There are 11 communities on both the Atlantic and GOM coasts that were identified in the 2018 SAFE Report and are also top hailing ports for PLL vessels. Community engagement for the 11 HMS communities vary from medium to high and community reliance from low to high (NMFS 2018a).

Barnegat Light and Cape May, which are top PLL hailing ports and HMS communities, are two of New Jersey's six major fishing ports. Barnegat Light is the home port of many members of the Atlantic PLL fleet. PLL vessels out of Barnegat Light target tilefish, shark, swordfish and tuna. More information about Barnegat Light and other HMS communities and PLL hailing ports can be found in the 2018 and earlier SAFE Reports and also the community snapshots and profiles. More information can be found on the NMFS Fishing Community Profiles website and are hereby incorporated by reference.

Table 4.3. Top 24 Hailing Ports of PLL Vessels. Source: NMFS SERO PIMS for jointly held permits as of March 13, 2019, and NMFS 2018a for community engagement and community reliance assessments.

State	Community of Hailing Port	Number PLL Vessel March 2019	Percent PLL Vessel March 2019	Community Engagement	Community Reliance
NJ	Barnegat Light	17	8.46%	High	High
FL	Fort Pierce	14	6.97%	Medium High	Low
LA	New Orleans	12	5.97%	-	-
LA	Dulac	11	5.47%	High	High
FL	Panama City	10	4.98%	High	Low
NC	Wanchese	10	4.98%	High	Medium High
FL	Pompano Beach	8	3.98%	Medium	Low

State	Community of Hailing Port	Number PLL Vessel March 2019	Percent PLL Vessel March 2019	Community Engagement	Community Reliance
NJ	Cape May	6	2.99%	High	High
NY	Montauk	5	2.49%	High	High
FL	Fort Lauderdale	4	1.99%	-	-
FL	Key Largo	4	1.99%	-	-
FL	Lighthouse Point	4	1.99%	-	-
FL	Madeira Beach	4	1.99%	Medium High	Medium
MD	Ocean City	4	1.99%	High	Medium
NY	New York	4	1.99%	-	-
PA	Philadelphia	4	1.99%	-	-
FL	Boynton Beach	3	1.49%	-	-
FL	Destin	3	1.49%	High	Low
FL	Key West	3	1.49%	-	-
FL	Miami	3	1.49%	-	-
FL	Stuart	3	1.49%	-	-
NJ	Point Pleasant	3	1.49%	-	-
TX	Corpus Christi	3	1.49%	-	-
TX	Galveston	3	1.49%	-	-

4.3.1.2 Landings

In 2018, there were 76 active PLL vessels (NMFS, 2020b). From 2014 through 2018, the PLL fishery landed an average of approximately 2,050 metric ton (mt) whole weight (ww) of total tuna and 1,442 mt ww of swordfish annually (**Table 4.4**). On average, from 2014-2018, the PLL fishery accounted for approximately 30% of total tuna and 95% of swordfish landings from all gears during those years (**Table 4.5**).

Table 4.4. Reported Landings (mt ww) of Atlantic tunas and swordfish by Pelagic Longline, 2014-2018. Source: NMFS, 2020b

Species/Group			2014	2015	2016	2017	2018	Average (2014-2018)
Tuna	BAYS	Bigeye	586.7	574.4	386.2	568	390.5	501.16
		Albacore	309.6	228.9	203	208.7	93	208.64
		Yellowfin	1456.2	1041.4	1300.2	1430.7	836.7	1213.04

		Skipjack	0.3	0.2	1.1	0.6	0.4	0.52
		Total	***2352.8***	***1844.9***	***1890.5***	***2208***	***1320.6***	***1923.36***
	Bluefin		221.9	87.7	105.3	115.4	102.9	126.64
	Total Tuna		***2574.7***	***1932.6***	***1995.8***	***2323.4***	***1423.5***	***2050***
Swordfish			1823.3	1592.7	1388.5	1301.5	1104.9	1442.18
Total			**4407**	**3525.3**	**3384.3**	**3624.9**	**2528.4**	**3493.98**

Table 4.5. PLL's Percentage of Atlantic Landings (mt ww), 2014 – 2018. Source: NMFS, 2020b.

Species/Group			2014	2015	2016	2017	2018	Average (2014-2018)
Tuna	BAYS	Bigeye	65.5%	53.1%	68.0%	67.9%	42.4%	58.2%
		Albacore	67.4%	64.6%	81.1%	87.6%	90.6%	74.3%
		Yellowfin	45.5%	37.2%	31.7%	32.2%	31.0%	35.2%
		Skipjack	0.2%	0.2%	0.6%	0.3%	0.5%	0.4%
		Total	***49.7%***	***42.6%***	***37.1%***	***38.6%***	***34.7%***	***40.6%***
	Bluefin		27.4%	27.4%	9.8%	10.3%	11.6%	10.0%
	Total Tuna		***52.8%***	***46.4%***	***37.0%***	***32.6%***	***34.6%***	***29.5%***
Swordfish			92.7%	92.7%	92.9%	92.7%	92.7%	94.5%
Total			**64.3%**	**60.3%**	**58.7%**	**50.8%**	**44.4%**	**44.8%**

4.3.1.3 Pelagic Longline Sets, Hooks and Trips

The number of hooks per pelagic longline set varies with line configuration and target species. In 2018, for example, the average pelagic longline set that targeted swordfish had 757 hooks, whereas the average pelagic longline set that targeted shark had 284 hooks (**Table 4.6**).

Table 4.6. Average number of hooks per PLL set, 2012 – 2016. Source: NMFS, 2020b.

Target Species	2014	2015	2016	2017	2018	Average (2014-2018)
Swordfish	780	729	758	775	704	749
Bigeye tuna	811	641	619	708	640	684
Yellowfin tuna	608	571	641	542	550	582
Mix of tuna species	670	653	702	732	629	677

Shark	293	298	274	295	260	284
Other species	NA	150	NA	643	NA	397
Mix of species	718	715	758	729	715	727

Reported numbers of trips, sets and hooks for the affected areas are described in **Tables 4.7, 4.8 and 4.9, respectively**. The FEC and NEC have experienced substantial decreases between 2014 and 2018 for numbers of trips, sets, and hooks. The MAB and SAB have experienced annual variation for numbers of trips, sets, and hooks.

Table 4.7. Reported Number of Pelagic Longline Trips by Affected Area (2012-2017). Source: Garrison and Stokes, 2013, 2014, 2016, 2017, 2019 and SEFSC unpublished data.

Area	2014	2015	2016	2017	2018
FEC	332	248	168	161	104
MAB	385	362	357	444	420
NEC	64	62	58	35	19
SAB	222	187	243	255	252

Table 4.8. Reported Number of Pelagic Longline Sets by Affected Area (2014-2018). Source: Garrison and Stokes, 2013, 2014, 2016, 2017, 2019 and SEFSC unpublished data.

Area	2014	2015	2016	2017	2018
FEC	1,816	1,378	880	805	523
MAB	2,035	2,034	1,536	2,154	1,854
NEC	573	590	417	218	60
SAB	1,461	1,261	1,139	1,185	1,222

Table 4.9. Reported Number of Pelagic Longline Hooks by Affected Area (2014-2018). Source: Garrison and Stokes, 2013, 2014, 2016, 2017, 2019 and SEFSC unpublished data.

Area	2014	2015	2016	2017	2018
FEC	1,164.6	928.2	626.7	539.4	352.6
MAB	1,231.8	1,206.4	981.7	1,343	1,138.5
NEC	510.4	519.3	379	210.5	54.1
SAB	1,134.4	1,045.7	947.5	983.6	929.5

4.3.2 Revenues and Expenses in the pelagic longline fishery

The percentage of total Atlantic HMS revenue generated by PLL declined from approximately 98% in 2013 to 68% in 2016 (**Table 4.10**). During that 4-year period, landings in the PLL fishery generated an average of 4,397 jobs, $122 million in income, and other beneficial economic impacts. However, the fishery's economic impacts declined during that time (**Table 4.11**).

Table 4.10. Total Atlantic HMS nominal revenue by pelagic longline and all gears and percentage of total Atlantic HMS revenue by pelagic longline. Source: NMFS 2018a for total Atlantic HMS revenue and NMFS 2019b for pelagic longline revenue.

Year	PLL Revenue	Total Atlantic HMS Revenue	Percentage Generated by PLL
2013	$42,572,477	$43,561,346	97.7%
2014	$34,523,359	$42,347,505	81.5%
2015	$27,042,956	$35,896,078	75.3%
2016	$25,322,560	$37,531,057	67.5%

Table 4.11. Economic impacts of the PLL fishery, not including imports, 2013 – 2016. Source: Estimates of economic impacts generated by NMFS SERO using model developed for NMFS (2016).

Year	PLL Nominal Revenue	PLL Revenue (1,000s 2017 $)	Jobs	Income (1,000s 2017$)	Value-Added (1,000s 2017$)	Sales (1,000s 2017$)
2013	$42,572,477	$45,164	5,892	$163,711	$232,176	$449,117
2014	$34,523,359	$35,979	4,694	$130,418	$184,743	$351,561
2015	$27,042,956	$27,881	3,637	$101,064	$143,329	$277,253
2016	$25,322,560	$25,778	3,363	$93,517	$132,519	$256,343
Average	**32,365,338**	**$33,701**	**4,397**	**$122,178**	**$173,192**	**$333,569**

Primary expenses associated with operating a PLL vessel include labor, fuel, bait, ice, groceries, hooks, light sticks, and other gear. Bait and fuel tend to be the largest two expenses. The crew and captain of a PLL vessel tend to be paid with shares of their vessel's net revenue after each trip. According to Atlantic HMS logbook reports, owners are typically paid 50% of net revenue, captains receive a 25% share, and crew 25% (NMFS 2018a). More information about PLL vessel expenses can be found in the 2018 and earlier SAFE Reports and in incorporated by reference.

Atlantic tunas, swordfish, and shark dealer permits are open access and required for the "first receiver" of Atlantic tunas, swordfish, and sharks. A first receiver is any entity, person, or company that takes, for commercial purposes (other than solely for transport), immediate possession of the fish, or any part of the fish, as the fish are offloaded from a fishing vessel. Most of the dealers with a Bluefin or BAYS tuna permit have both permits (**Table 4.12**).

Table 4.12. Atlantic HMS Dealer Permits, 2014 –2018. Source: NMFS 2020b.

Permit	2014	2015	2016	2017	2018
Bluefin Only	32	33	26	32	30
BAYS Only	79	79	70	70	70
Bluefin and BAYS	308	289	275	291	287
Atlantic Swordfish	195	184	191	189	193
Atlantic Sharks	96	102	107	113	108

NMFS does not collect specific information regarding the costs and revenues for Atlantic HMS dealers. In general, dealer costs include: purchasing fish; paying employees to process the fish; rent or mortgage; and supplies to process the fish. Some dealers may provide loans to the vessel owner, money for vessel repairs, fuel, ice, bait, etc. In general, outlays and revenues of dealers are not as variable or unpredictable as those of a vessel owner; however, dealer costs may fluctuate depending upon supply of fish, labor costs, and equipment repair. Although NMFS does not have specifics regarding HMS dealers, some information is available on the number of employees for processors and wholesalers in the United States provided in *Fisheries of the United States, 2018 Report* and in Table 7.11 of the 2019 SAFE Report (NMFS, 2020). Additional information on the economics of the PLL fishery and Atlantic HMS dealers and processors can be found in the annual HMS SAFE Reports.

4.4 Administrative Environment

For a description of the administrative environment see Chapter 1. Sections 1.1, 1.2, and 1.3 describe the laws under which the proposed actions were developed and within which the administrative environment must operate. Section 1.4 describes the agency's process of developing, implementing, monitoring and enforcing regulatory measures to obtain compliance. The relevant government administrators include NMFS, NOAA OLE, and the USCG.

5.0 ENVIRONMENTAL CONSEQUENCES

This section describes and analyzes the anticipated environmental consequences of implementing the preferred alternative and other alternatives on the biological, socioeconomic and administrative resources as described in the Affected Environment section (**Section 4**). It also presents the scientific and analytical basis for comparison of alternatives (see Table 5.2 in **Section 5.5**).

Because the proposed actions do not change the use of the physical environment, implementation of any of the alternatives is not expected to cause additional degradation of water quality, air quality, or the physical environment. No discernible increase in environmental contaminants or solid waste disposal is anticipated. Implementation of any of the alternatives is not expected to change the pelagic longline fishery's effects on historic or cultural resources in the area. Therefore, the physical environment is not likely to be affected by the PLTRP amendment and is not considered further in the alternatives analysis.

Similarly, the proposed actions do not substantially change the nature of the Atlantic PLL fishery. As a result, none of the alternatives are likely to affect seabirds, sea turtles, oceanic whitetip sharks, giant manta rays, scalloped hammerhead sharks, or other bycatch of non-target species, except to benefit marine mammals in a manner similar to the benefit expected to result for short-finned pilot whales. As discussed below, the proposed actions are expected to reduce bycatch of short-finned pilot whales (and thus other marine mammals) by eliminating the option to use PLL sets with multiple mainlines (i.e., multi-sets), which results in longer soak times than a PLL set with a single mainline. Additionally, the purpose of the hook specifications is to make the hook the weakest part of the terminal gear so that the hook straightens before the leader breaks. Therefore, species other than short-finned pilot whales are not considered further in the alternatives analysis.

Finally, NMFS has never utilized the requirement to place special observers and research participants on vessels in the CHSRA. As a result, those requirements have not affected the administrative environment beyond whatever resources it has taken to create the requirements and keep them in regulations. Removing or changing the regulatory requirements is not reasonably expected to result in changes from the status quo because NMFS still would not expect to place observers for research, regardless of any change in the regulatory authority to do so. Thus, nothing in Action 1 poses a reasonable potential to meaningfully change the effects on the administrative environment.

Additionally, changes considered in Action 2 through 4 also pose little potential to result in changes in effects to the administrative environment. While changes in the mainline length requirements, hook strength, and gangion strength will result in changes in fishery operations, they are not reasonably expected to result in changes to the administrative environment, beyond the effects associated with changing the regulations themselves. Administrative resources most directly affected by the changes in the gear are those dedicated to enforcement personnel responsible for enforcing the new gear requirements. Enforcement personnel – NOAA OLE and the USCG – are already responsible for enforcing the existing mainline length restrictions and would continue to play the same role in the future, merely through enforcing the new and different gear requirements. Thus, none of the alternatives in Actions 2 through 4 poses a reasonable potential to meaningfully change the effects on the administrative environment. Therefore, the administrative environment is not likely to be affected by the PLTRP amendment and is not considered further in the alternatives analysis.

5.1 Action 1. Cape Hatteras Special Research Area

The CHSRA is an area entirely within the MAB and is all waters inside and including the rectangular boundary described by the following lines: 35° N. lat., 75° W. long., 36° 25' N. lat., and 74° 35' W. long. Currently, any vessel that deploys or fishes with PLL gear in the CHSRA or intends to do so, must call NMFS SEFSC at least 48 hours, but no more than 96 hours, prior to embarking on its fishing trip. If, upon calling in, a vessel is informed by the NMFS SEFSC that no observer will be assigned and that no special research requirements will apply for that trip, then the vessel does not need to wait until its stated date and time of departure and may depart on its trip immediately. If a vessel is assigned a special observer, it must take that observer during that trip into the CHSRA and incur the costs associated with carrying that observer. If a vessel does not or cannot take the assigned observer, it is prohibited from deploying or fishing with PLL gear in the CHSRA for that trip.

5.1.1 Biological Environment – CHSRA

Alternative 1 (No Action) would continue to require advance notice to NMFS SEFSC prior to embarking on a fishing trip with PLL gear in the CHSRA and would continue to prohibit Atlantic PLL vessels from fishing in the CHSRA if it does not or cannot accommodate an observer assigned under the special observer requirements.

Preferred Alternative 2 would eliminate the CHSRA and the special observer and research participation requirements associated with vessels fishing with PLL gear in the area. Since the creation of the CHSRA, NMFS has never used the special observer and research participation requirements to assign an observer to a PLL vessel, and has no plan to do so for the foreseeable future. Thus, no PLL vessel that cannot accommodate an observer has ever been prohibited from fishing in the CHSRA. Given the absence of any effect on fishing activities, the advance notice requirement has no effect on the biological environment. Therefore, the effects of **Preferred Alternative 2** and **Alternative 1 (No Action)** are expected to be the same for **Action 1** as neither alternative would change the nature of PLL fishing or any other use of the environment in a way that implementation would be expected to change the current biological and ecological impact.

5.1.2 Socioeconomic Environment – CHSRA

Alternative 1 (No Action) would continue to require advance notice to NMFS SEFS Center prior to embarking on a fishing trip with PLL gear in the CHSRA and would continue to prohibit Atlantic PLL vessels from fishing in the CHSRA if it does not or cannot accommodate an observer assigned under the special observer requirements. Since the creation of the CHSRA, NMFS has never used the special observer and research participation requirements to assign an observer to a PLL vessel and has no plan to do so for the foreseeable future. Thus, no PLL vessel that cannot accommodate an observer has ever been prohibited from fishing in the CHSRA. Given the absence of any effect on fishing activities, the advance notice requirement has no effect on the socioeconomic environment. Therefore, **Alternative 1 (No Action)** would have no effect on the current socioeconomic environment. **Preferred Alternative 2** would eliminate the CHSRA and the special observer and research participation requirements associated with vessels fishing with PLL gear in the area. Because **Preferred Alternative 2** would not require fishermen to call NMFS SEFSC prior to embarking on a fishing trip, they would have flexibility to fish in the CHSRA when it may be best for them. Therefore, **Preferred Alternative 2** is expected to have a slightly positive benefit, as the call-in burden is relieved and fishermen will be able to fish without a 48-hour delay.

5.2 Action 2. Mainline Length Requirements

Under the requirements of the current PLTRP, Atlantic PLL single mainline sets cannot exceed 20 nm (37.04 km) in mainline length in the EEZ portion of the MAB. While the limit restricts the length of each mainline, it does not restrict the number of mainlines that can be set in the water at a time. When the mainline length limit was proposed, the assessment of potential economic impacts included, but was not restricted to, the possibility that PLL vessels would shift their fishing practices to deploy more than one mainline at a time. Although PLL vessels did not begin to compensate with more than one mainline when the regulations became effective (June 18, 2009), a major shift from setting sets with a single mainline to sets with two mainlines occurred starting in 2013.

A multi-set was defined, for analytical purposes, as a PLL set with two mainlines, where the second mainline begins setting 30 minutes or less after the first mainline has finished setting. From the time the PLTRP regulations became effective through the end of 2012, only 2.8% of all mainlines observed in the MAB were part of a multi-set. In comparison, from 2013-2018, 38% of all mainlines observed in the MAB were part of a multi-set. Although multi-sets observed in the in the MAB meet the requirements of the PLTRP regulation because each mainline contains less than 20 nm in mainline length, the use of two mainlines increases the total length of gear in the water and increases the soak time of the mainlines. The increased length of gear in the water and associated increased soak times may have limited the effectiveness of the PLTRP mainline length requirement in reducing short-finned pilot whale interactions.

A non-linear regression model was used to predict soak time based on the length of a single mainline. The model predicts that the soak time will increase until the mainline reaches approximately 20 nm and then it is predicted to level off (**Figure 5.1**). However, multi-sets also increase soak time compared to a set with a single mainline of a similar total length because of the additional time it takes to set and haul two mainlines.

Overall from 2013-2018, 24% of PLL sets observed in the MAB were classified as multi-sets with an average combined total length of 28 nm (**Figure 5.2**) and 98% of those multi-sets were longer than 20nm. Therefore, multi-sets also increase the total amount of gear in the water per mainline compared to a single mainline. Assuming all PLL vessels using single mainlines fished the maximum length of 20 nm, then a PLL vessel using multi-sets had 42% more mainline in the water. However, the average length of a single mainline set during that same time period was less than 20 nm (15 nm), which means multi-sets had on average 86% more mainline in the water than a single mainline. The PLTRP developed its consensus recommendation with the goal of limiting the amount gear in the water and reducing soak time.

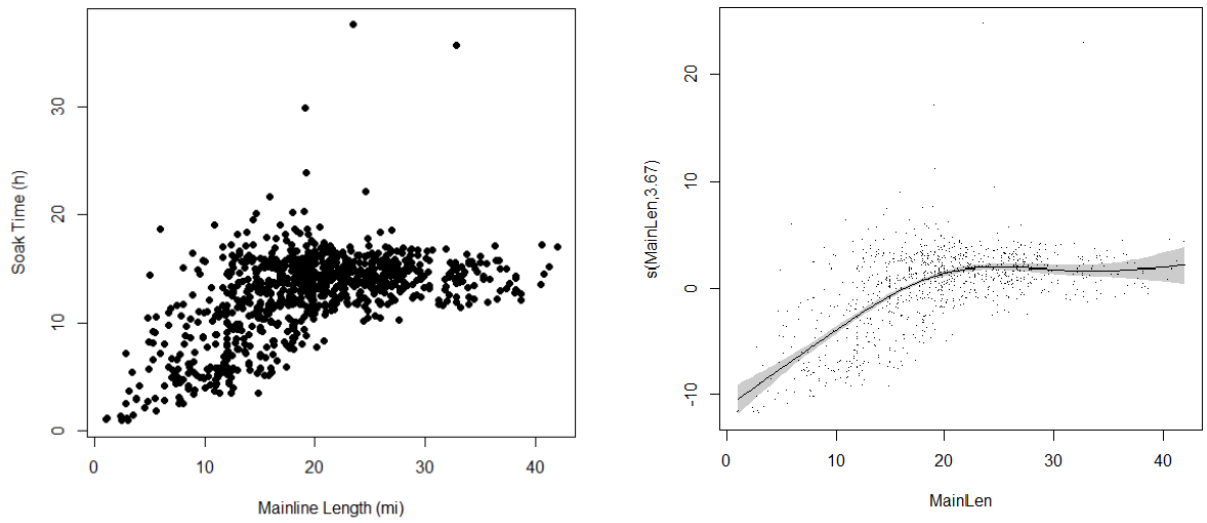

Figure 5.1. Non-linear regression analysis modeled the expected change in soak time based on mainline length.

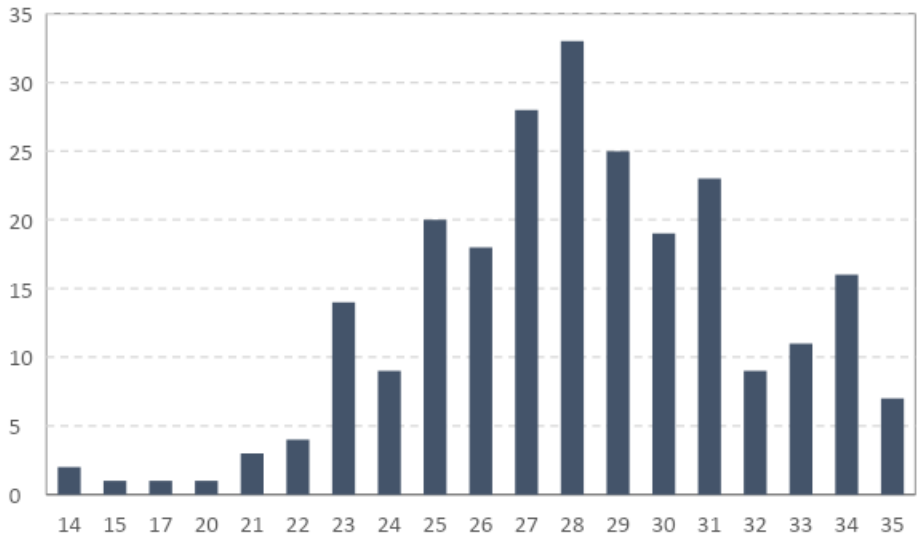

Figure 5.2. Distribution of the total length of multisets (sets containing two mainlines) observed in the MAB. The total length is the combined length the two mainline pieces of each multi-set from 2013-2018. Source: SEFSC POP data

5.2.1 Biological Environment – Mainline Length

Changes in regulatory limits on mainline length would result in changes in fishing behavior through the elimination of multi-sets, though it is not expected to substantially change the amount of gear fished. The amount of gear in the water that is eliminated from the second mainline, could be re-distributed along the first mainline through the increase in mainline length. Therefore, resulting in limited changes to the biological effects of sea turtles, seabirds, oceanic whitetip sharks, giant manta rays, scalloped hammerhead sharks, or other bycatch of non-target species associated with the fishing activity. However, the reduced soak times and elimination of active gear in the water over 30 nm is expected to result in changes to the biological effect of pilot whales, including fewer adverse effects to pilot whales. It is also expected to result in similar changes to the biological effects for other marine mammals.

Section 5.2.2 details the socioeconomic impact of this proposed action. **Preferred Alternative 2** is estimated to result in a range of impacts to the amount of gear deployed from a reduction of 0.7% of active gear to an increase of 4.8% of active within the MAB, which represents an even smaller change in active gear when considered against all Atlantic PLL sets deployed. Hence, the relative change of active gear and target catch is expected to be minimal.

NMFS modeled the number of pilot whales taken in a given PLL set as a function of mainline length, month, soak duration, latitude, and number of hooks in order to evaluate the biological effects under Action 2. Variable selection indicated that only mainline length, month, soak duration and latitude were important in predicting the number of pilot whale takes. Interestingly, the number of hooks (the traditional measure of effort) was not a significant explanatory term in the model. More detail on the model methods can be found in **Appendix A**. Observed PLL sets from 2008-2015 were used and modified to simulate the effects of three of the four alternatives. **Alternative 1 (No Action),** or "status quo", was used as the baseline for this evaluation. **Preferred Alternative 2** ("simulated 1") and **Alternative 4**, ("simulated 2") were modeled to compare against the baseline. Because distance between mainlines is not recorded in the observer data **Alternative 3** could not be modeled.

Alternative 1 (No Action) would continue to limit the mainline length for all PLL sets within the EEZ portion of the MAB to 20 nm, with no limit on the number multiple simultaneous sets. Thus, under **Alternative 1 (No Action)**, a PLL vessel could continue to deploy two mainlines separated by only a very short time and distance between the end of the first mainline and the beginning of the second mainline (i.e., "multi-sets"). These multi-sets had longer soak durations than a similar length single mainline set. To simulate **Alternative 1 (No Action)**, the "status quo," annual bycatch rates displayed as pilot whales per PLL set and pilot whales per 1000 hooks are shown in **Figure 5.3.** The data indicate a lack of annual trend and a high degree of variation associated with sampling variability.

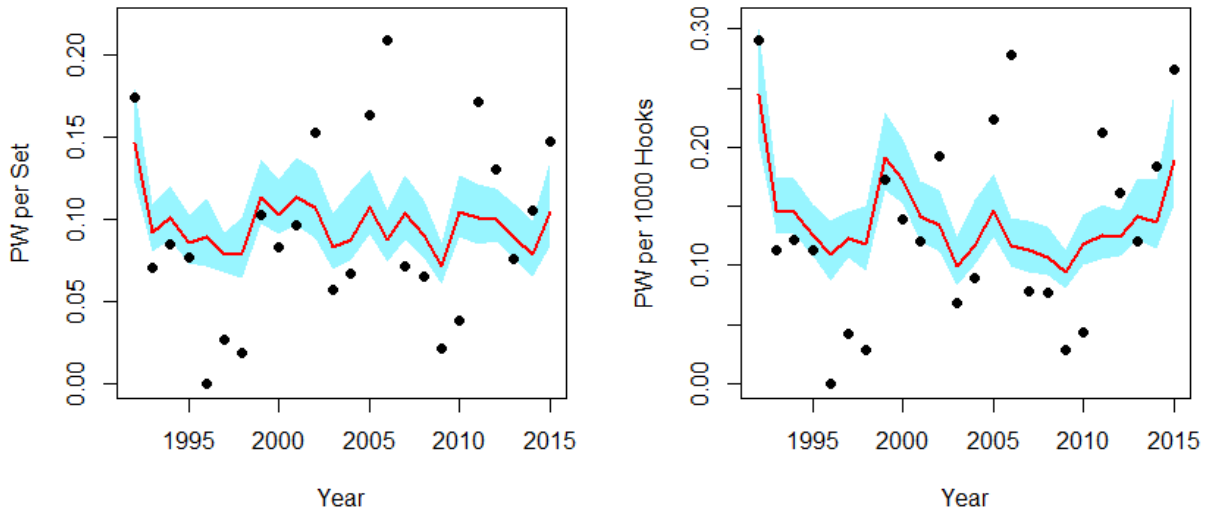

Figure 5.3. Annual pilot whale (PW) bycatch rates under status quo, or **Alternative 1 (No Action)**, conditions based on model predictions.

Preferred Alternative 2 would increase the maximum length of a mainline from 20 nm to 32 nm (59.26 km) in the EEZ portion of the MAB and eliminate the option of using multi-sets. No more than 30 nm (55.6 km) of active gear (i.e., leaders and hooks) may be deployed along the PLL set, and any active gear in excess of 20 nm (37.04 km) must be separated from other active gear by a gap of at least 1 nm with no active gear (i.e., no leaders or hooks). Therefore, this alternative was modeled as 30 nm of mainline to represent the 30 nm of active gear. Additionally, it is not possible to directly model the effect of the "gaps" in effort along the mainline, as this behavior has not been observed in the PLL fishery

To simulate **Preferred Alternative 2**, ("simulated 1,") PLL sets with two mainlines were combined by adding the mainline lengths and numbers of hooks resulting in a total length of gear. These multi-set combined lengths were then capped at 30 nm mainline length. Second, any reported mainline with a length greater than 30 nm was limited to 30 nm length. The numbers of hooks and mean soak times were modified based on regression models between mainline length and each variable. The soak duration for these modified PLL sets thus reflects the shorter soak durations typical of a single mainline set. The **Preferred Alternative 2** modeled pilot whale bycatch was then compared to the **Alternative 1 (No Action)** results to evaluate the effectiveness of this recommendation. The primary effects of the **Preferred Alternative 2** are to reduce the total number of mainlines in the water at one time, while increasing the length of a single mainline set (**Figure 5.4A**), thus reducing the soak duration by eliminating the time it takes to set and haul the second mainline (**Figure 5.4B**). The overall number of hooks fished was not affected; however, the distribution of the number of hooks per set was altered (**Figure 5.5**).

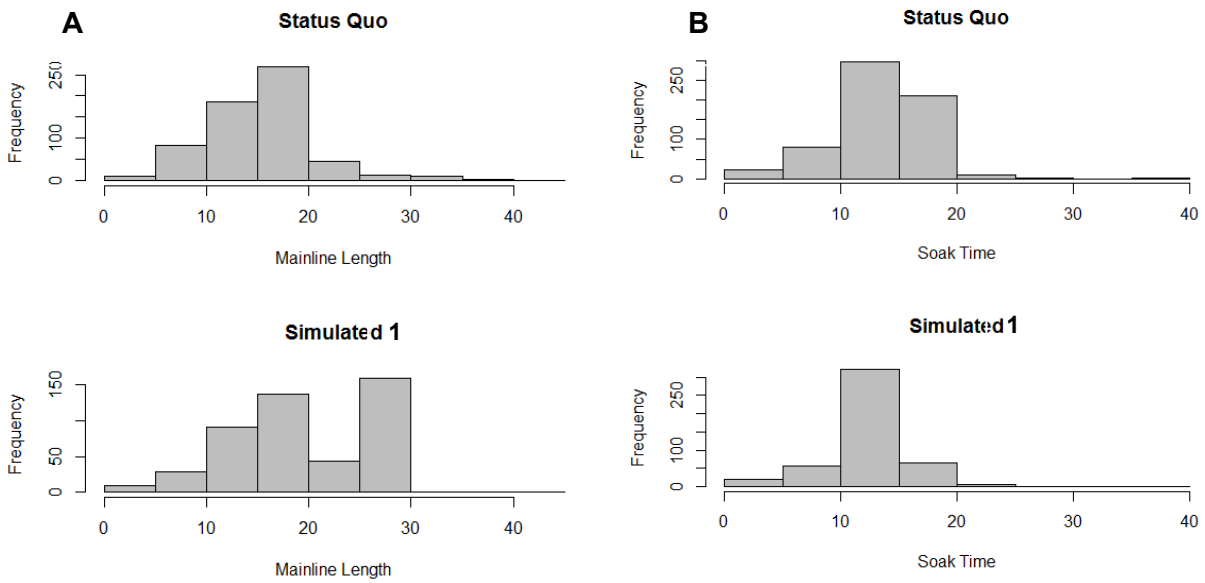

Figure 5.4. Distribution of mainline lengths (nm) (column A) and soak durations (hours) (column B) for the Status quo (Alternative 1) and Simulated 1 (Preferred Alternative 2)

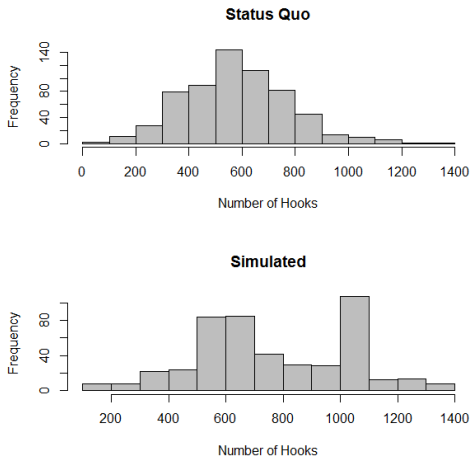

Figure 5.5. Distribution of the number of hooks for the Status quo (Alternative 1) and Simulated 1 (Preferred Alternative 2)

The bycatch rate expressed as pilot whales per PLL set was largely unchanged in the simulated data compared to the status quo. When expressed as pilot whales per hook, the bycatch rate for the simulated data was slightly lower than the status quo (**Figure 5.6**).

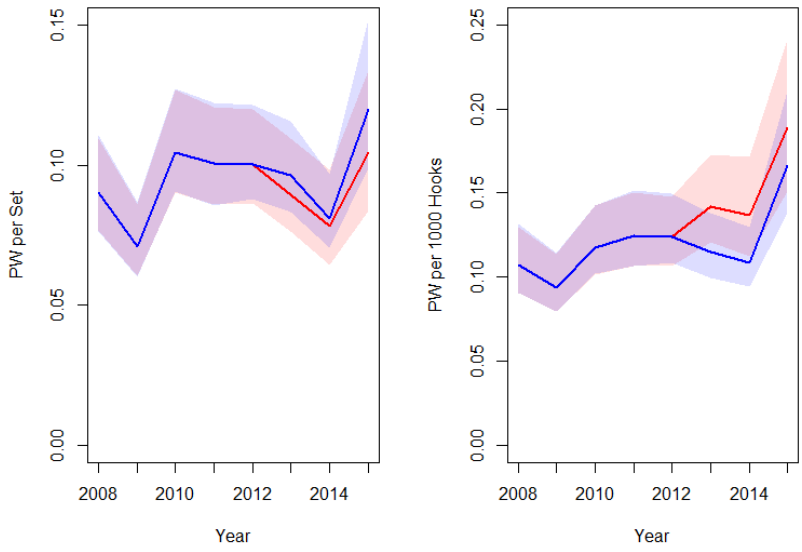

Figure 5.6. Predicted bycatch rate under the status quo (red line) and simulated 1 conditions (blue line) expressed on a per-set and a per-hook basis. 95% confidence limits are indicated.

Under **Alternative 1 (No Action)**, the model predicts a total of 57.2 pilot whale interactions from 2013-2015, while under the simulated 1, **Preferred Alternative 2** scenario, the model predicts a total of 47.3 interactions. Thus, **Preferred Alternative 2** is expected to result in a 17% reduction in the number of pilot whale interactions. The benefit calculated for **Preferred Alternative 2** does not account for any additional benefit from "gaps" in fishing effort along the mainline effects of any other changes in fishing gear such as weak hooks because this behavior has not been observed in the PLL fishery and cannot be modeled.

Alternative 3 would maintain the 20 nm mainline length limit in the EEZ portion of the MAB, and would require that multi-sets be separated by at least one nm. Although this alternative could not be modeled, it would still allow for multi-sets, which have longer soak times than a single mainline set. Additionally, because of the requirement to separate each mainline by a least 1 nm, the soak times for multi-sets would likely be increased under **Alternative 3.** Longer soak times have been associated with increased pilot whale bycatch. **Alternative 4** would maintain the 20 nm mainline length limit in the EEZ portion of the MAB, but would eliminate the option of using multi-sets. The primary effects of the **Alternative 4** are to reduce the total number of mainlines in the water at one time (**Figure 5.7A**), thus reducing soak durations by eliminating the time it takes to set and haul the second mainline (**Figure 5.7B**).

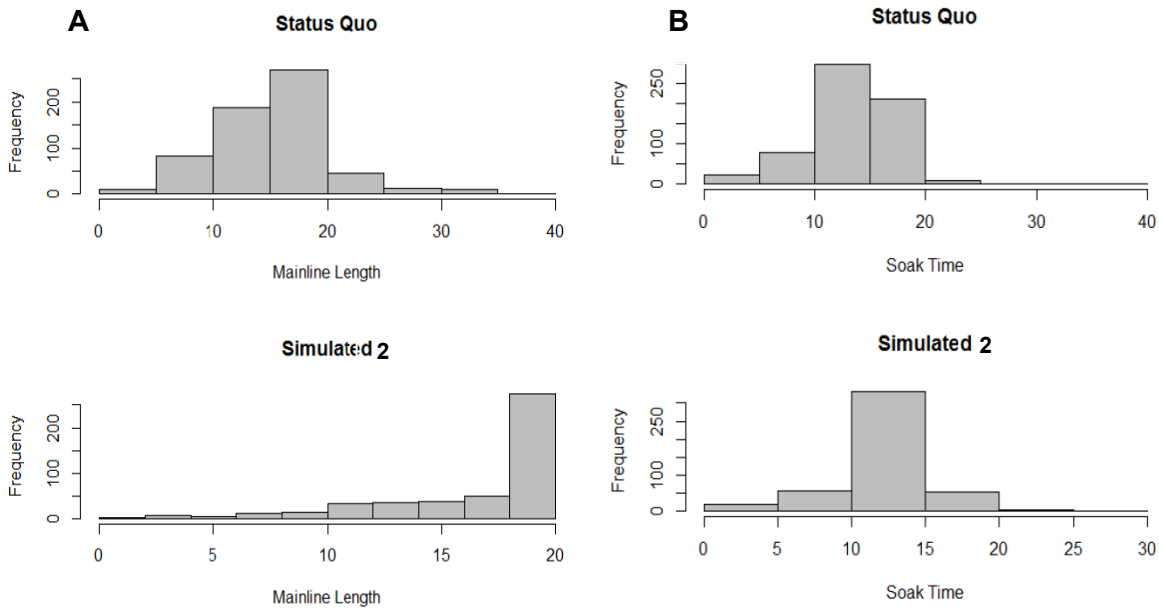

Figure 5.7. The frequency of bycaught (hooked) pilot whales comparing mainline lengths (nm) (column A) and soak durations (hours) (column B) between Status quo (Alternative 1) and Simulated 2 (Alternative 4).

Under **Alternative 1 (No Action)**, the model predicts a total of 57.2 pilot whale interactions from 2013-2015 while under the simulated 2, **Alternative 4** scenario, the model predicts a total of 48.3 interactions. Thus, **Alternative 4** is expected to result in a 15% reduction in the number of pilot whale interactions driven by of the elimination of multi-sets and shorter soak times. Therefore, **Alternative 4** has a similar conservation benefit to **Preferred Alternative 2.**

5.2.2 Socioeconomic Environment – Mainline Length

Alternative 1 (No Action) would maintain the 20 nm mainline length limit within federal waters of the MAB and would continue to allow deployment of PLL sets with multiple mainlines (multi-sets) at any one time such that their combined mainline length and length of active gear may exceed the 20 nm. As the status quo alternative, **Alternative 1** would have no effect on the average 1,573 reported PLL sets deployed in the MAB annually and, correspondingly, there would no effect on the current socioeconomic environment.

Preferred Alternative 2 would prohibit the use of more than one mainline at a time in the MAB and limit the maximum length of mainline to 32 nm and maximum length of mainline with active gear to no more than 30 nm. It would directly affect the average 373 reported PLL sets that currently deploy two mainlines at a time (multi-sets) in the MAB and especially the average 101 of 373 reported multiple mainline sets that deploy more than 30 nm of active gear at a time in the MAB. The loss of active gear due to the elimination of the second mainline for the average 272 of the 373 reported multiple mainline sets in the MAB is expected to be totally offset by an equal gain of active gear by increasing the length of the single mainline and active gear. However, the average 101 of the 373 reported multiple mainline sets that currently deploy two mainlines at a time (multi-sets) in the MAB would have an average net reduction of active gear of 4 nm per PLL set because the combined lengths of active gear currently exceeds 30 nm. The total average 404 nm reduction of active gear (101 x 4) represents a reduction of total active gear in the MAB by 1.4%. If there is a one-to-one correspondence between the length of active gear and dockside revenue from HMS harvested by that gear, there would be a corresponding 1.4% decrease in dockside revenue annually from HMS harvested within the MAB.

Preferred Alternative 2 would have no negative impact on the average 1,020 reported PLL sets that currently deploy in the MAB with a single mainline and that have less than 20 nm of active gear. It could, however, directly affect the average 180 reported PLL sets deployed in the MAB with a single mainline and the current maximum

length of active gear by increasing the allowable length of active gear from 20 nm up to the maximum (21-30 nm) per PLL set. The increase would depend on the resources and limitations of the vessels. Those increases would result in an increase in total active gear deployed in the MAB ranging from 180 (180 x 1) to 1,800 nm (180 x 10). Such an increase represents between 0.6% and 6.2% of total annual active gear deployed in the MAB, and potentially 0.6% to 6.2% increases in dockside revenue from HMS landed from the PLL single mainline sets.

When all 1,573 average annual PLL sets in the MAB are combined, this alternative is expected to result in a change in the amount of active gear deployed in the MAB ranging from a reduction of 0.7% to a gain of 4.8% (and the same corresponding range in changes to dockside revenue). The range from a reduction of 0.7% of active gear to an increase of 4.8% of active within the MAB, represents an even smaller change in active gear when considered against all Atlantic PLL sets deployed. Hence, the relative impact of **Preferred Alternative 2** on the socioeconomic environment is expected to be minimal, as further detailed in Section 6.5.2.

Alternative 3 would maintain the 20 nm (37.04 km) mainline length cap in the EEZ portion of the MAB and require PLL multi-sets to be separated by at least one nm. First, **Alternative 3** would have no effect on the average 1,200 reported PLL sets deployed in the MAB as a single mainline set. Second, **Alternative 3** would have different effects on the average 373 reported PLL sets deployed in the MAB with multiple mainlines (multi-sets). If the two mainlines set as part of a multi-set were currently separated by at least 1 nm, then **Alternative 3** would have no effect. However, **Alternative 3** would adversely affect PLL vessels that presently deploy multi-sets in the MAB that are not separated by at least one nm. If vessels that deploy multiple mainlines that are not currently separated by at least 1 nm were to maintain the same amount of active gear, but separate the two mainlines by at least 1 nm, there may be no change in landings and dockside revenues from those separated mainlines. However, there would likely be increases in trip-associated costs, which would reduce net revenue for PLL vessels that modified their multi-set deployments in this manner. If vessels that deploy multiple mainlines that are not currently separated by at least 1 nm were to eliminate the second mainline with its active gear, rather that separate the second mainline by at least 1 nm, the socioeconomic impact of the latter option under **Alternative 3** would be the same as that of **Alternative 4**. The socioeconomic impact of the former option under **Alternative 3** could be less than that of **Preferred Alternative 2**.

Alternative 4 would maintain the 20 nm (37.04 km) mainline length cap in the EEZ portion of the MAB, but would eliminate the option of using multi-sets. Like **Alternative 3**, **Alternative 4** would have no effect on the average 1,200 reported PLL sets that are presently deployed in the MAB as a single mainline. However, **Alternative 4** would adversely impact the average 373 reported multiple mainline sets that are currently deployed in the MAB with multiple mainlines (multi-sets) and have more than 20 nm of active gear in the water at a time. There would be an average reduction of active gear of 12 nm per set for an average of 272 reported multiple mainline sets and an average reduction of active gear of 16 nm per set for the 101 reported multiple mainline sets. The total annual loss of active gear in the MAB would be on average 4,880 nm which represents 1.7% of the average total active gear currently deployed in the MAB. As such, **Alternative 4** would result in the largest reduction in active gear and, correspondingly, would have the largest adverse socioeconomic impact on sets in the MAB among the alternatives.

5.3 Sub-Action 3.1 Hooks

Weak hooks have been explored as a mechanism to reduce marine mammal bycatch in PLL fisheries (e.g., Bayse and Kerstetter, 2010; Bigelow et al., 2012; Bergmann and Foster, 2015). The theory of this approach is that when the bycatch species of concern are larger than the target catch, it is possible to use a hook that will straighten and release large bycatch species while holding shape and retaining target catch (Bergmann and Foster, 2015). Several studies have specifically examined hooks used in the Atlantic PLL fishery for their ability to retain target catch, while potentially straightening to release larger marine mammals.

The majority of the Atlantic PLL fishery vessels use one of two types of hooks, either a forged hook that straightens out at a higher pull force or a bent, round wire stock hook that may be weaker (Bayse and Kerstetter, 2010). A "weak" hook is a circle hook that meets NMFS' current size and offset restrictions and is constructed of round wire stock that is thinner-gauge than other circle hooks used in the PLL fishery. Weak hooks have been used to effectively reduce bycatch of non-target species. For example, a final rule effective May 5, 2011 (76 FR 18653), required that all vessels fishing in the GOM with PLL gear onboard must possess, use, and deploy only weak hooks year-round with the goal of reducing bycatch mortality of Bluefin tuna caught by PLL vessels. In the GOM, these

weak hooks were required to be of round wire stock that is no larger than 3.65 mm in diameter (includes commercially available hook models Mustad 16/0 #39988D and Eagle Claw 16/0 # L2048LM), making them more likely to bend when a large Bluefin tuna is hooked. Using these hooks, NMFS found a 56% reduction in the bycatch of non-target Bluefin tuna in the GOM, but no significant difference in the catch of target yellowfin tuna, swordfish, dolphin fish, or escolar, compared to traditional hooks (NMFS 2011b). On April 2, 2020, NMFS published a final rule (85 FR 18812) that modified the requirement to use in the GOM for pelagic longline fishermen from year-round to a January through June requirement.

Bayse and Kerstetter (2010) compared the catch rates of target and non-target species off the coast of North Carolina using commercially available "strong" and "weak" hooks (16/0 and 18/0 models of both the Lindgren-Pitman forged carbon steel hook (strong; 18/0 has a 10° offset) and the Mustad #39960 round wire stock hook (weak)). The sets for the 16/0 hooks encountered low catch rates during the study, preventing many comparisons across different bycatch species and limiting within haul comparisons; however, catches for target and bycatch species were similar throughout the study between strong and weak hooks of both sizes (Bayse and Kerstetter, 2010). Overall, the size differences in target fish were minimal between hook types, suggesting that fishermen would have similar ex-vessel landings totals if either the "strong" or "weak" 16/0 hook were used (Bayse and Kerstetter, 2010). For 18/0 hooks examined, swordfish were caught significantly more often with strong 18/0 hooks, but these fish were significantly smaller than the fish caught by the weak hooks (Bayse and Kerstetter, 2010). In addition, nine very large swordfish were caught using the 18/0 "weak" hooks, thus proving their ability to catch large target species. Of particular note, Bayse and Kerstetter (2010) also observed a pilot whale that was hooked on the 16/0 Mustad #39960 "weak" hook during haul back of the gear. In this instance, the pilot whale straightened the hook approximately 10m from the side of the boat and subsequently swam away with limited apparent injury (Bayse and Kerstetter, 2010).

A study conducted by NMFS in the NEC, MAB, and FEC fishing areas also examined differences in catch rates of target and non-target species using 18/0 strong and weak hooks (Bergmann and Foster, 2015). This study, similar to Bayse and Kerstetter (2010), used the 18/0 Lindgren-Pitman forged carbon steel hook (with 10° offset) as the control "strong" hook, but developed an experimental Lindgren-Pitman 18/0 non-forged, round wire stock hook with no offset to test as a "weak" hook. Of the primary commercially harvested species (i.e., swordfish, bigeye tuna, yellowfin tuna), higher catch rates were observed with the experimental hook (ranging from 12% to 33.3%), with a significant increase in swordfish catch (30.6%) (Bergmann and Foster, 2015). Observed mean individual dressed weights were also higher with the experimental hook; however, there was no significant difference in the size distribution between hook types for the primary commercial species (Bergmann and Foster, 2015).

To investigate the impact different types of hooks may have on marine mammals, McLellan *et al*. 2015a and 2015b examined how longline hooks behave within the odontocete mouth by measuring the forces required to pull them through soft and hard tissues in the heads of dead stranded pelagic delphinids, including short-finned pilot whales. They specifically tested a number of hooks commonly used by the Atlantic PLL fishery vessels, including the 16/0 and 18/0 strong and weak hooks examined by Bayse and Kerstetter (2010) (Lindgren-Pitman forged carbon steel hooks and Mustad #39960), the experimental Lindgren-Pitman 18/0 weak hook examined by Bergmann and Foster (2015), as well as the commercially available Eagle Claw 16/0 #L2048M, and the Mustad 16/0 #39988D (which is one of the hook models that meets the specifications for the GOM weak hook). These studies found that the material and the manufacturing process of the hook, whether the stock was forged or not, strongly influenced its behavior in the odontocete mouth. Round wire stock, polished steel hooks that were tested responded to being pulled through lip tissue by straightening along the entire length and slicing through the lip relatively cleanly (McLellan *et al*., 2015a and 2015b). In contrast, forged (flattened) carbon steel hook types tested did not open completely, resulting in more irregular, tearing injuries to tissues, sometimes leaving broken barbs in the soft tissues (McLellan *et al*., 2015a and 2015b). In addition, larger 18/0 hooks tested, regardless of material or manufacturing process, were more likely than 16/0 hooks to be able to be hooked onto the deep, lingual surface of the mandible, particularly in smaller animals, which can result in fracturing the bone (McLellan et al., 2015a and 2015b).

The PLTRP's recommendation focused on eliminating forged (hammered flat, resulting in a "flattened" rather than a round hook) hooks and requiring round wire stock hooks to reduce the risk of severity from the types of hooking injuries that resulted during the studies. The Team also recommended reducing the wire diameter of the hook to reduce its size and strength in order to increase the chance that the hook straightened along the entire length and sliced relatively cleanly through the lip, doing the least amount of tissue damage to the animal. **Table 5.1** shows the results of the studies done by McLellan *et al*. 2015a and 2015b that the Team considered while developing their recommendations The Lindgren-Pitman forged carbon steel hooks, both 16/0 and 18/0, have wire stocks that are

forged and not round. The 16/0 Eagle Claw #L2048M and 18/0 Mustad #39960D have either too large wire diameters and/or release forces to be considered "weak hooks." There is an experimental Lindgren-Pitman 18/0 weak hook that was manufactured for the study done by Bergmann and Foster (2015) which would meet the specification in the preferred alternative. The 16/0 Mustad #39960D, has a wire diameter that meets the specifications and mean release force of 304 lb (from McLellan et al., 2015b) indicating that there were hooks tested that had a release force below 300 lb. To meet the preferred alternative requirements, the manufacturer would need to specify that the hook has a 300 lb straightening force when new. Lastly, the Mustad #39988D, which meets the specifications for the Gulf of Mexico "weak hook" under HMS regulations at 50 CFR § 635.21, would also meet the specifications of the preferred alternative.

Table 5.1. Wire diameter and release forces for hook types tested in odontocete mouths. Mean release force is the maximum force recorded from the isolated mechanical tests. Bolded hooks are ones that would meet the specifications of the preferred alternative, if certified by the manufacturer when new. Source: McLellan *et al*. 2015a and 2015b.

Size	Hook Model/Type	Wire Stock Type	Wire Diameter (mm)	Mean or Range of Release Force (lb)
16/0	**Mustad #39960D**	**Round**	**4.0**	**304**
16/0	Lindgren-Pitman forged carbon steel hook	Forged	4.5	238-355
16/0	Eagle Claw #L2048M	Round	4.1	460
16/0	**Mustad #39988D**	**Round**	**3.6**	**112-187**
18/0	Mustad #39960D	Round	4.9	260-357
18/0	Lindgren-Pitman forged carbon steel hook (with 10° offset)	Forged	5.1	291-553
18/0	**Lindgren-Pitman experimental weak hook (Bergmann and Foster, 2015)**	**Round**	**4.4**	**214**

5.3.1 Biological Environment – Hooks

Alternative 1 (No action) would continue to limit Atlantic PLL vessels, at all times, to possessing and/or using only corrodible (i.e., non-stainless steel) 18/0 or larger circle hooks with an offset not to exceed 10 degrees, or 16/0 or larger inline (non-offset) circle hooks. Current biological effects will continue under **Alternative 1 (No action).**

Preferred Alternative 2 and **Alternative 3** have additional requirements in order to make the hook weaker so that it will straighten when an interaction with a pilot whale occurs. **Preferred Alternative 2** would require 16/0 or 18/0 circle hooks to have hook shanks that contain round wire that can be measured with a caliper or other appropriate gauge, a wire diameter not to exceed 4.05 mm if 16/0 or 4.4 mm if 18/0, and a straightening force not to exceed 300 lb based on manufacturer's specifications. **Alternative 3** would require circle hooks with a maximum wire diameter of 4.5 mm and some part of the hook shank to be made of round wire so its diameter can be measured. Both

Preferred Alternative 2 and **Alternative 3** are expected to have positive effects to the biological environment because the hooks would be weaker than currently used hooks thereby releasing larger bycatch, such as pilot whales. However, because of the smaller diameter required by **Preferred Alternative 2**, the weaker hooks will straighten easier to release pilot whales causing less mandible damage. Thus **Preferred Alternative 2** is expected to have a greater positive benefit on the biological environment than **Alternative 3.**

5.3.2 Socioeconomic Environment – Hooks

Changes in the types of hooks authorized to be used in the fishery can result in changes in costs in the fishery as well as potential changes in catch. **Alternative 1** would continue to limit Atlantic PLL vessels, at all times, to possessing and/or using only corrodible (i.e., non-stainless steel) 18/0 or larger circle hooks with an offset not to exceed 10 degrees, or 16/0 or larger inline (non-offset) circle hooks and would result in no effect on the current socioeconomic environment.

Preferred Alternative 2 would require the additional following specifications to hooks used in the FEC, SAB, MAB, and NEC: (i) 16/0 or 18/0 circle hooks with hook shanks containing round wire that can be measured with a caliper or other appropriate gauge, with a wire diameter not to exceed 4.05 mm if 16/0 or 4.4 mm if 18/0; and (ii) a straightening force not to exceed 300 lb based on manufacturer's specifications. **Preferred Alternative 2** would affect PLL vessels that presently use hooks that do not meet the additional specifications. Commercial hooks that currently meet these specifications include: EC-L2048LM-16/0, MUSTAD-39988D-16/0, and Mustad 39960D-16/0. MUSTAD 39960D-16/0 and other "weak" circle hooks are currently required in the Gulf of Mexico, and many vessels affected by this proposed action also operate in the Gulf. From that, NMFS assumes that from 25% to 50% of the PLL sets deployed in the four areas use the hooks that meet the additional specifications contained in **Preferred Alternative 2**, and the vessels that deploy those sets would not experience additional adverse economic effects under **Preferred Alternative 2**. Therefore, NMFS also assumes that 50% to 75% of the PLL sets would require new hooks, and the average additional cost of these new hooks is estimated to be $0.02 per hook or $20 per box of 1,000 and an additional cost of $3.00 for replacement per 1,000 hooks. The average number of sets per trip varies across the four areas, ranging from 6 to 11, and the average number of hooks per set also varies from approximately 650 to 925. **Preferred Alternative 2** is expected to have little to no effect on baseline catches of target species and dockside revenue; however, it is also expected to increase trip-associated costs of those vessels that currently do not use hooks that meet the additional specifications, which would reduce net revenue and correspondingly the incomes of owners, captains and crews per trip.

Alternative 3 would require PLL vessels to use only circle hooks with a maximum wire diameter of 4.5 mm, with a 10-degree or less offset in the four areas, and some part of the hook shank to be made of round wire so its diameter can be measured (FEC, MAB, NEC and SAB). **Alternative 3** is expected to have little to no effect on baseline catches of target species and dockside revenues. However, NMFS assumes that larger percentages of sets and vessels presently use hooks that would not comply with **Alternative 3** than **Preferred Alternative 2**. Therefore, **Alternative 3** is expected to generate larger increases in trip-associated costs and larger decreases in incomes of owners, captains and crews per trip of the vessels affected than those under **Preferred Alternative 2**. Therefore, net effects on the socioeconomic environment are expected to be slightly negative for **Alternative 3.**

5.4 Sub-Action 3.2 Leaders (Gangions)

Observer data indicate that when monofilament branch lines break during marine mammal hookings and entanglements, animals can be released with gear still attached. If the animal were released from the gear without further injury or remaining gear, it would be much more likely to have a non-serious injury. According to the criteria NMFS uses to determine injury severity, small cetaceans that are released with gear attached with the potential to wrap around pectoral fins/flippers, peduncle, or head; or to be ingested; or to accumulate drag would be considered seriously injured (NMFS Policy Directive PD 02-238).

The PLTRT modeled its consensus recommendation on the False Killer Whale Take Reduction Team regulations and science behind similar incidents with pilot and false killer whales in the Hawaiian longline fishery. The Environmental Assessment (NMFS 2011a) associated with those regulations found that the required minimum diameter for monofilament leaders and branch lines, in combination with the required use of circle hooks, would be expected to reduce the mortality and serious injury rate of marine mammals by enabling attempts to straighten the

hook and/or bringing the animal closer to the vessel (without the branch line breaking) for disentanglement or dehooking.

The PLTRT discussed a range of target specifications for breaking force of leaders and branch lines – ranging from 300-pound breaking strength certified by the manufacturer to greater breaking strengths given the inevitable variation in actual performance. The Team agreed that leaders and branch lines must have a diameter of 1.8 mm or larger (certified by the manufacturer to have a minimum breaking strength of at least 300 pounds), and that the regulation require that lines be maintained in a manner that ensures the hook is the weakest part of the terminal gear. Therefore, the intent behind the measures contained in this proposed action is to make the hook the weakest part of the gear by limiting wire diameter and increasing leaders and branch lines size and strength, which will decrease the relative strength of the hook. If the leaders and branch lines were strong relative to the hook strength, during a marine mammal hooking or entanglement, tension could be placed on the line (without the line breaking) to allow the hook to straighten, or the animal could be brought close to the vessel for disentanglement and/or dehooking attempts. It is anticipated that line breaks would decrease under a minimum line diameter requirement, and therefore marine mammal interactions would be expected to decrease, however some line breaks during marine mammal interactions (likely leading to serious injuries) could still occur.

5.4.1 Biological Environment – Leaders

Alternative 1 (No Action) would continue to remain silent on specified diameters for leaders (also called gangions or branch lines), and therefore would have no additional effect on the current biological environment.

Preferred Alternative 2 and **Alternative 3** would strengthen the leader enough so that the hook can straighten when an interaction with a pilot whale occurs without breaking the leader. **Preferred Alternative 2** requires that monofilament nylon leaders have a diameter of 1.8 mm or larger and are certified by the manufacturer to at least 300 lb test strength when new, and no other material may be used. **Alternative 3** requires that monofilament nylon leaders have a diameter of 2.0 mm or larger and would allow other line material (e.g., wire) to be used in a leader with a test strength certified by the manufacturer of 400 lb or greater when new. For both **Preferred Alternative 2** and **Alternative 3** it is expected that the strength of the leaders will decrease over time and through use.

However, because **Action 3.1 (Preferred Alternative 2)** requires a hooks with a straightening force not to exceed 300 lb based on manufacturer's specifications, NMFS expects that **Preferred Alternative 2,** nylon leaders with a 300 lb test strength when new, may not always be sufficient to allow hooks to straighten before the line breaks. If the hook straightens at a force of 300 lb and the line breaks at 300 lb, there may be situations where the line breaks before the hook can straighten. Furthermore, if the 300 lb line weakens due to age or use, it may also break before the hook can straighten. Nevertheless, **Alternative 2** is expected to have a greater conservation benefit than **Alternative 1 (No Action)** because the line should hold while the hook straightens.

For **Alternative 3,** leaders with a 400 lb test strength when new, NMFS expects that hooks with a straightening forse of less than 400 lb would straighten first. Coupled with the hook requirements in **Action 2,** both **Preferred Alternative 2** and **Alternative 3** are expected to have positive effects on the biological environment because the leaders (gangions) would be strong enough to allow hooks with a straightening force of less than 300 lb to straighten without breaking. However, **Alternative 3** is expected to have a greater benefit to the biological environment because it would allow hooks with a straightening force less than 400 lb to straighten before the leader breaks.

5.4.2 Socioeconomic Environment – Leaders

Changes in the construction of leaders authorized to be used in the fishery can result in changes in costs in the fishery as well as potential changes in catch. **Alternative 1 (No Action)** would continue to allow leaders to have unspecified diameters. All Atlantic PLL vessels presently use monofilament nylon leaders. Thus, **Alternative 1 (No Action)** would have no effect on the current socioeconomic environment.

Preferred Alternative 2 would have no additional economic effects on the PLL vessels that presently use monofilament nylon leaders with a diameter of 1.8 mm or larger (certified by the manufacturer to at least 300 lb breaking force) in the FEC, SAB, MAB, and/or NEC. Because the large majority of monofilament nylon leaders used for commercial HMS fishing has a breaking force of at least 300 lb, most, if not all of the PLL vessels that fish in the FEC, SAB, MAB, and NEC will not experience an increase in costs or a change in target catch. Consequently,

Preferred Alternative 2 is expected to have little to no additional adverse effects on the socioeconomic environment.

Alternative 3 would have no additional economic effect on PLL vessels that presently use monofilament nylon with a diameter of 2.0 mm or larger with a breaking force certified by the manufacturer to be at least 400 lb. Information is insufficient to estimate how many vessels may not use monofilament nylon with a diameter of 2.0 mm or larger (and certified to have a breaking force of at least 400 lb). However, 400 lb breaking force monofilament nylon is estimated to cost an additional $4 to $6 per 100 yards compared to the cost of monofilament nylon line with a 300 lb breaking force. Consequently, **Alternative 3** is expected to slightly increase trip-associated costs for any PLL vessels that currently use leaders that do not meet the 400 lb breaking force requirement, and those higher trip-associated costs would reduce the incomes of owners, captains and crews per trip of those vessels.

5.5 Comparison of Alternatives

This section provides a summary of the impacts on the biological, and socioeconomic environments from implementing each alternative. The physical and administrative environments are not presented as they are not likely to be affected by the PLTRP amendment and were not considered in the alternatives analysis. Information in Table 5.2 is focused on activities and impacts where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 5.2. Summary of effects of the proposed actions and alternatives.

Action	Alternative	Location	Biological Environment	Socioeconomic Environment
1 CHSRA	1. No Action	CHSRA	No change in effects.	No change in effects.
	2. Eliminate the CHSRA and associated requirements (Preferred)		No change in effects.	Effects will be positive, as the call-in burden is relieved.
2 Mainline	1. No Action	U.S. EEZ portion of the MAB	No change in effects.	No change in effects.
	2. Single mainline sets up to 32 nm (59.26 km) allowed with no more than 30 nm (55.6 km) of active gear and any active gear in excess of 20 nm (37.04 km) must be separated from other active gear by a gap of at least 1 nm with no active gear (Preferred)		Effects expected to be positive, with decreased mainline soak time, the mortality and serious injury (M/SI) of short-finned pilot whales is expected to decrease.	Net effects are expected to be minimal as the active gear that was deployed on a second mainline can be deployed along the increased limit of the first mainline.
	3. 20 nm (37.04 km) mainline max, single mainline sets and multi-sets allowed with 1 nm between mainlines		No change in effects is expected as this alternative would still allow for multi-sets, which have longer soak times than a single mainline set.	If vessels continue to deploy the second mainline (with a 1 nm gap), then no change in effects is expected. If vessels do not deploy a second mainline then net effects are expected to be negative due to the decrease in active gear.
	4. 20 nm (37.04 km) mainline max, only single mainline set allowed		Effects are expected to be positive. This alternative eliminates multi-sets which decreases mainline soak time. The M/SI of short-finned pilot whales is expected to decrease.	Net effects are expected to be negative, with the largest decreases in active gear.

Action	Alternative	Location	Biological Environment	Socioeconomic Environment
3.1 Hooks	1. No Action	U. S. EEZ portions of the NEC, MAB, SAB, FEC	No change in effects.	No change in effects.
	2. 4.05 mm diameter if 16/0 or 4.4 mm diameter if 18/0 circle hooks, and with <300 lb straightening force (Preferred)		Effects are expected to be positive, with hooks straightening for pilot whale release with minimal injury.	Net effects are expected to be slightly negative, with some initial increased trip-associated costs for vessels that do not currently use the required hooks.
	3. 4.5 mm diameter circle hooks with at most 10-degree offset		Effects are expected to be slightly positive, with hooks straightening for pilot whale release with minimal injury.	Net effects are expected to be negative, with increased trip-associated costs.
3.2 Leaders	1. No Action		No change in effects.	No change in effects.
	2. Leaders(gangions) at 1.8 mm diameter and at least 300 lb test (Preferred)		Effects are expected to be slightly positive, with lines not breaking before hooks straighten for pilot whale release.	Little to no change in effects.
	3. Leaders (gangions) at 2.0 mm diameter and >400 lb test		Effects are expected to be positive, with lines not breaking before hooks straighten for pilot whale release.	Net effects are expected to be slightly negative, with increased trip-associated costs for vessels that do not currently use 400 lb test line.

5.6 Cumulative Effects

5.6.1 Affected Area

The immediate affected area would be the federal U.S. EEZ portions of the NEC, MAB, SEC, and FEC statistical fishing areas of the Atlantic coast, which is the geographic scope of the PLTRP. Affected species information can be found in **Section 4.2**, and though the purpose of the PLTRP amendment is to reduce the bycatch of short-finned pilot whales in the Atlantic PLL fishery it is thought that the proposed actions could also benefit other species that have interactions with Atlantic PLL gear.

5.6.2 Past Actions Impacting the Affected Area

5.6.2.1 Short-finned pilot whales and other marine mammals

Efforts have been undertaken to reduce the risk of marine mammal interactions with commercial fishing gear through the Take Reduction Team process, under section 118 of the MMPA. The past and present actions of the Teams described below are anticipated to have positive effects on marine mammals.

- In 1996, the Atlantic Offshore Cetacean Take Reduction Team was formed to address the interaction of pilot whales, sperm whales, common dolphins, bottlenose dolphins, Atlantic spotted dolphins, and pantropical spotted dolphins, with the HMS PLL, pair trawl, and pelagic driftnet fisheries for Atlantic tunas, sharks, and swordfish. A draft plan to reduce takes resulting from these types of gear was submitted in 1999, but an Atlantic Offshore Cetacean Take Reduction Plan was not finalized as a separate entity. Instead, several protective measures were implemented for these fisheries through the HMS FMP. NMFS prohibited the use of pair trawls and swordfish driftnets in Atlantic pelagic fisheries, and implemented several other Atlantic Offshore Cetacean TRT recommendations for the PLL and shark gillnet fisheries. Subsequent to the 1999 draft plan, the PLL fishery has been substantially modified to reduce bycatch of non-target species (e.g., billfish and sea turtles).
- The Atlantic Large Whale Take Reduction Plan (ALWTRP), which went into effect in 1997, currently regulates, among other fisheries, the Northeast sink gillnet fishery, which has documented takes of Risso's dolphins, a species that also interacts with the Atlantic PLL fishery. A combination of broad-based gear modifications and time/area closures has been implemented and is designed to reduce interactions between the affected fisheries and large whale species, including minke whales. The requirements of the ALWTRP may also serve to reduce the level of interactions with small cetaceans.
- The Atlantic Trawl Gear Take Reduction Team was convened in 2006 to address takes of pilot whales, white-sided dolphins, and common dolphins in the Mid-Atlantic mid-water trawl (including pair trawl), Mid-Atlantic bottom trawl, Northeast mid-water trawl (including pair trawl), and Northeast bottom trawl fisheries. The regulatory and non-regulatory strategies of this team will likely have a positive effect on some of the same species that interact with the Atlantic PLL fishery.
- The PLTRP, which went into effect in 2009, implemented a number of regulatory and non-regulatory measures to reduce bycatch of marine mammals in the Atlantic PLL fishery. Additional regulatory and non-regulatory strategies have been employed in the PLL fishery and other longline fisheries (Atlantic dolphin and wahoo; Hawaii-based PLL fishery; U.S. bottom longline, and worldwide longline fisheries) to reduce bycatch of marine mammals, sea turtles, and other species in attempts to have a positive effect on the populations of these species. These strategies are detailed in Section VI of Draft PLTRP (PLTRT, 2006); this section is incorporated by reference.

The SARs describe other sources of mortality for short-finned pilot whales, such as contaminants and water pollution. Potential contaminants include polychlorinated biphenyls (PCBs), chlorinated pesticides (DDT, DDE, etc.), and toxic chemicals. The population effect of the observed levels of these chemicals is unknown. However, a number of Federal statutes and international agreements are designed to control water pollution at the national or international level. Past and present actions examined include the Clean Water Act; the Coastal Zone Management Act of 1972; the Marine Protection, Research, and Sanctuaries Act of 1972; the Oil Pollution Act of 1990; and international laws regarding marine pollution. The continued efforts to control water pollution at the national and international level may have a positive effect on these marine mammals.

5.6.2.2 Other protected species

In addition to marine mammals, sea turtles are at risk of incidental capture in commercial fishing gear. The principal human-caused (anthropogenic) threats to sea turtles in the pelagic and benthic marine environments originate from commercial fisheries and the threat of submersion and drowning from entanglement in commercial fishing gear. Section 3.7.4 of the HMS FMP Amendment 11 (NMFS 2018b) includes information on steps NMFS has taken in recent years to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. These actions have focused on gear modifications and release guidelines, which are anticipated to have positive effects on sea turtles. This section is incorporated by reference.

Seabirds are also incidentally taken in PLL fisheries. Several initiatives exist for conservation planning of birds. The North American Bird Conservation Initiative is a framework for integrated bird conservation planning in North America, and the Waterbird Conservation for the Americas, which produced the North American Waterbird Conservation Plan, and North American Colonial Waterbird Conservation Plan. The South Atlantic Migratory Bird Initiative provides a regional framework for the conservation of birds and bird habitats that has implications at multiple scales: local, state, regional, pelagic, international, and hemispheric. This plan identifies priority species, priority habitats, priority areas, and strategies to achieve the conservation of "all birds across all habitats" in the South Atlantic region. The Waterbird Conservation Plan for the Southeast U.S. identifies marine bird species that represent the U.S. Fish and Wildlife Service's highest conservation priorities for the southeast region. Several species described in the plan are listed on the Southeast United States Priority Bird List. The list focuses on species vulnerable to incidental capture in fishing gear. Past and present actions by NMFS to reduce the interactions with the PLL fishery are presented in Section 3.7.5 of the HMS FMP Amendment 11 (NMFS 2018b). This section is incorporated by reference.

NMFS must conserve and protect target and non-target fish stocks, as well as protected species. NMFS has taken a number of actions in the past to rebuild overfished HMS stocks, prevent overfishing of HMS stocks, reduce non-target fish bycatch, and have a positive effect on target and non-target fish stock populations. These actions have included FMPs, FMP amendments, and framework actions. An overview of these actions and supporting documents can be found on the Atlantic HMS Fishery Management Plans and Amendments website. NMFS promotes management and conservation measures for the recovery and rebuilding of target species and protected resources, which provide for the continued operation of the fishery. Impacts to the communities that are supported by these fisheries must be considered in the decision-making process. Section 4.8.3 of the HMS FMP (NMFS 2006) describes cumulative economic and social impacts associated with the management measures leading up to and including the consolidated fishery management plan, and is incorporated by reference. Additional, specific information on economic and social impacts affecting HMS fishing-dependent communities can be found in Section 4.6 of the Final Environmental Impact Statement on reductions in sea turtle bycatch and mortality in the Atlantic PLL fishery, and is incorporated by reference (NMFS 2004c).

5.6.3 Present Actions Impacting the Affected Area

The Atlantic PLL fishery is managed under the Consolidated Atlantic HMS FMP published in 2006 (71 FR 40096, July 14, 2006; NMFS, 2006) and amended 11 times. The HMS regulations are located at 50 CFR part 635. For detailed management information on the Atlantic PLL fishery see the Atlantic Highly Migratory Species Stock Assessment and Fisheries Evaluation Reports, or SAFE Reports.

On April 2, 2020 HMS published a final rule regarding Pelagic Longline Bluefin Tuna Area-Based and Weak Hook Management Measures (85 FR 18812) which will begin a review process to collect and review data to evaluate the continued need for the Northeastern United States Closed Area and the Spring Gulf of Mexico Gear Restricted Area; remove the Cape Hatteras Gear Restricted Area; and adjust the Gulf of Mexico gear requirements to shorten the duration of required weak hook use from year-round to seasonal (January-June).

On May 15, 2020, NMFS completed a biological opinion on the operation of the Pelagic Longline Fishery for Atlantic Highly Migratory Species, as managed under the 2006 Consolidated Atlantic HMS Fishery Management Plan, as amended. NMFS determined that species listed under the ESA are likely to be adversely affected by the fishery. The biological opinion analyzed potential adverse effects to sea turtles as in the previous, 2004 opinion. The biological opinion also concluded there will be adverse effects to oceanic whitetip shark, scalloped hammerhead shark (Central and Southwest Atlantic DPS), and giant manta ray, which were not listed at the time of the 2004

opinion. Additionally, NMFS concluded that adverse effects to sperm whales in the Gulf of Mexico were likely based on new information on interactions that occurred since the 2004 opinion. The adverse effects to these species are primarily from capture via hooking (by taking bait or foul hooking) and/or entanglement. The opinion concluded that these effects are not likely to jeopardize the continued existence of these species. NMFS also determined that the HMS PLL fishery is not likely to adversely affect designated critical habitat. Reasonable and Prudent Measures were issued to minimize the impacts from the agency action, and terms and conditions were provided in order to implement those measures.

5.6.4 Reasonably Foreseeable Actions Impacting the Affected Area

5.6.4.1 Action

Section 3 details the proposed management actions for the Atlantic PLL fishery. **Sections 5.1, 5.2, 5.3**, and **5.4** details the analysis of each proposed action of the PLTRP amendment and **Section 5.5** details the comparison of alternatives for each proposed action. The cumulative effects of the preferred alternatives on short-finned pilot whales are likely to be positive. The PLTRP amendment is likely to have no significant, long-term impact on affected target and non-target fish stocks, but data collected may improve management of these resources.

5.6.4.1 Fisheries related actions

NMFS can reasonably expect to implement additional regulations in the future to address the management and conservation of Atlantic HMS target and non-target fish stocks. Future actions may include: consideration of data collection within existing time/area closures; changes to the electronic monitoring or individual Bluefin tuna quota requirements or other Bluefin tuna-specific regulations; modifications to EFH descriptions; modifications to tuna and swordfish quotas; modifications to various ICCAT recommendations on any species caught on pelagic longline gear including shortfin mako; and modifying handling and release requirements for sea turtles and other bycatch in other HMS fisheries; delineating critical habitat for newly listed species; and, actions taken to reduce protected species interactions in HMS fisheries. It is anticipated that the cumulative effects of reasonably foreseeable actions related to fisheries would be beneficial in nature to those fisheries.

5.6.4.2 Climate Change

The Environmental Protection Agency's climate change webpage and NOAA's Office of Science and Technology climate webpage, provide background information on climate change, including indicators that measure or anticipate effects on oceans, weather and climate, ecosystems, health and society, and greenhouse gases. The United Nations Intergovernmental Panel on Climate Change's Fifth Assessment Report also provides a compilation of scientific information on climate change (IPCC 2014), and is hereby incorporated by reference.

The global mean temperature has risen 0.61° C over the last 150 years, and the linear trend over the last 50 years is nearly twice that for the last 100 years (IPCC 2014). Ample evidence now exists supporting the wide-ranging ecological impacts of global climate change (Walther et al. 2002). There is a high confidence, based on substantial new evidence, that observed changes in marine systems are associated with rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels, and circulation. These changes include shifts in ranges and changes in algal, plankton, and fish abundance (IPCC 2014).

Therefore, climate change may impact distribution of target species for the Atlantic PLL fishery and/or the distribution of short-finned pilot whales and other protected species. This could lead to increases or decreases of protected species interactions with the Atlantic PLL fishery but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts will occur. In the near term, it is unlikely that the management measures contained in the PLTRP amendment would compound or exacerbate the ongoing effects of climate change on the PLL fishery or the protected species interactions.

5.6.4.3 Non-fishery related actions

In the U.S., the Outer Continental Shelf Lands Act (OCSLA), as amended, mandates the Secretary of the Interior, through the Bureau of Ocean Energy Management (BOEM), the authority to issue leases, easements, or rights-of-way on the Outer Continental Shelf (OCS) for the purpose of facilitating the leasing of U.S. offshore mineral and energy resources, including renewable energy resources. The Energy Policy Act of 2005, an amendment to OCSLA, delegated BOEM the authority for overseeing renewable energy developments in Federal waters (30 C.F.R. Part

585). Through these regulations, BOEM oversees responsible offshore wind energy development. Because the Atlantic PLL fishing areas encompass the entire U.S. Atlantic EEZ, it is expected that all BOEM wind energy lease areas in the U.S. Atlantic will overlap with the Atlantic PLL fishery.

Currently, 8 states along the U.S. Atlantic have offshore wind energy lease areas in active development (from north to south): Massachusetts, Rhode Island, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina. Detailed information on leases and grants that BOEM has executed since the inception of its renewable energy program can be found on BOEM's lease and grant information page and is hereby incorporated by reference.

There are 2 operational offshore wind farms in U.S. waters: the Block Island Wind Farm project, a 30 megawatt facility in Rhode Island state waters composed of 5 monopile turbines whose export cable makes landfall in Narragansett, Rhode Island, and the Coastal Virginia Offshore Wind pilot project, a 2-turbine 12-megawatt wind farm off the coast of Virginia in federal waters whose export cable makes landfall in Virginia Beach, Virginia.

To date (as of 22 August 2022), BOEM has approved the Construction and Operations Plan (COP) for 2 other commercial wind projects: the Vineyard Wind 1 Offshore Wind Energy project and the South Fork Wind Energy Project. BOEM approved the Vineyard Wind 1 COP in May 2021 and pre-construction surveys began in November 2021. Vineyard Wind 1 is planned to be a 100 monopile turbine offshore wind facility with a total capacity of 800 megawatts; the export cable is planned to come ashore in Lewis Bay, Cape Cod, Massachusetts. BOEM approved the South Fork COP in January 2022. Pre-construction surveys have not yet started for the South Fork Wind project, which is planned to be an up to 15 monopile turbine wind facility with a total capacity of approximately 180 megawatts whose export cable will come ashore in East Hampton, New York. There are an additional 13 projects along the U.S. Atlantic coast in various states of the permitting process. Therefore, in the context of offshore wind energy development, present impacts in the U.S. Atlantic Ocean are mainly from the effects of site characterization and site assessment activities in the lease areas to support the development of COPs and pre-construction surveys set forth in the approved COPs.

The impact of offshore wind energy development on the accessibility of fisheries in general, including Atlantic PLL fishing areas, has yet to be determined. Multiple large scale wind farms in the U.S. Atlantic Ocean are reasonably foreseeable in the future, however, combined effects are unknown at this time.

5.6.5 Overall Impacts Expected from Past, Present, and Future Actions

Past and present actions (e.g., take reduction plans, changes in the fishery, and bycatch reduction measures) have contributed towards reduced mortality and serious injury of these small cetaceans. The proposed actions of the PLTRP amendment considered in this EA would reduce the risk of mortality or serious injury of marine mammals due to entanglement without exacerbating the risk associated with any of the remaining stressors (e.g., bycatch in other fisheries, pollutants and contaminants, climate change, non-fishery related impacts).

Impacts from future management actions to short-finned pilot whales, other protected species, and target/non-target fish stocks are likely to be positive while impacts to fishing-dependent communities are likely to be a mix of negative, neutral, and positive. Cumulative impacts from future non-fishery management actions, such as wind farms, are unknown at this time and are being analyzed under their own NEPA processes.

In summary, the proposed actions considered in this EA would complement existing and forthcoming actions to reduce takes of other protected species. Hence, the cumulative effect of the preferred alternatives is expected to be slightly positive to positive. While certain actions have resulted in negative socioeconomic impacts, all of the past and present actions described in these sections are expected to ensure the long-term sustainability and continued economic viability of the PLL fishery consistent with applicable law.

5.6.6 Monitoring and Mitigation

The PLTRP takes a stepwise, adaptive management approach to achieving the long-term goal of reducing mortalities and serious injuries of short-finned pilot whales in the Atlantic PLL fishery to insignificant levels approaching a zero mortality and serious injury rate. As such, a take reduction plan monitoring strategy was finalized in September 2013 to monitor the effectiveness and regulatory compliance of the PLTRP. The monitoring plan is available upon request to Protected Resources Division of the NMFS Southeast Regional Office, St. Petersburg, Florida (727-824-5312).

6.0 REGULATORY IMPACT REVIEW

6.1 Introduction

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

The RIR also serves as the basis for determining whether any proposed regulations are a "significant regulatory action" under certain criteria provided in Executive Order 12866 (E.O. 12866). In addition, the RIR provides some information that may be used in conducting an analysis of the effects on small entities pursuant to the Regulatory Flexibility Act of 1980.

6.2 Problems and Objectives

The purpose and need, issues, problems, and objectives of the proposed actions are presented in **Sections 1 and 2** and are herein incorporated by reference.

6.3 Methodology and Framework for Analysis

This RIR assesses management measures from the standpoint of determining the resulting changes in costs and benefits to society. To the extent practicable, the net effects of the proposed measures for an existing fishery should be stated in terms of producer and consumer surplus, changes in profits, and employment in the direct and support industries. Where figures are available, they are incorporated into the analysis of the economic impacts of the different proposed actions and alternatives.

6.4 Description of the Fishery

A description of the Atlantic PLL fishery is contained in Chapter 4 and is incorporated herein by reference. Additional information on this fishery is also provided in the Atlantic HMS SAFE Reports.

6.5 Impacts of Management Measures

This rule would directly apply to commercial fishing vessels that use PLL gear to harvest Atlantic HMS species within four specific areas of the EEZ. Regulations prohibit the use of PLL in the recreational fishing sector of the fishery. Therefore, it does not apply to anglers or for-hire fishing businesses.

Any commercial fishing vessel that uses PLL to harvest tuna or swordfish must have an Atlantic tuna longline permit, a shark (directed or incidental) permit, and a swordfish (directed or incidental) permit. As of March 2019, 248 vessels had those three required permits; however, 47 (19.0%) of those vessels had a temporary vessel identification (ID) number assigned to them. The NMFS SERO Permits Office assigns a temporary vessel ID number when an individual acquires the permits prior to assigning the permits to a particular vessel. Any landings under any of those permits, however, must be by a vessel that is either USCG-documented or state registered. That means 47 vessels cannot participate in the Atlantic PLL fishery. Consequently, at most, 201 vessels can target tuna and/or swordfish with PLL gear. However, NMFS estimates that the number of active PLL vessels is substantially lower than 201. In 2016, 85 (33.7%) of 252 PLL vessels were active, and in 2017, 88 (34.8%) of 253 PLL vessels were active. This analysis uses the 2017 figure of 88 active vessels which can be found in the Regulatory Flexibility Analysis done for Amendment 11 to the 2006 Consolidated HMS FMP.

The economic effects, both direct and indirect, are explained as follows.

6.5.1 Action 1 – CHRSA

The proposed action (Preferred Alternative 2) would eliminate the CHSRA along with its associated special observer and research participation requirements. The CHSRA is an area entirely within the MAB and is all waters inside and including the rectangular boundary described by the following lines: 35° N. lat., 75° W. long., 36° 25' N. lat., and 74° 35' W. long. Currently, any vessel that deploys or fishes with PLL gear in the CHSRA or intends to do so, must call NMFS SEFSC at least 48 hours, but no more than 96 hours, prior to embarking on its fishing trip. If, upon calling in, a vessel is informed by the NMFS SEFSC that no observer will be assigned and that no special research requirements will apply for that trip, then the vessel does not need to wait until its stated date and time of departure and may depart on its trip immediately. If a vessel is assigned a special observer, it must take that observer during that trip into the CHSRA and incur the costs associated with carrying that observer. If a vessel does not or cannot take the assigned observer, it is prohibited from deploying or fishing with PLL gear in the CHSRA for that trip.

Since the creation of the CHSRA, NMFS has never used the special observer requirements to assign an observer to a PLL vessel and subsequently, no PLL vessel that cannot accommodate an observer has ever been prohibited from fishing in the CHSRA. Those outcomes are expected to continue and represent the baseline economic impacts. Because NMFS has never used the special observer requirements to assign an observer to a PLL vessel in the CHSRA and no PLL vessel has ever been prohibited from fishing in the CHSRA, the direct and indirect economic effects of the proposed action and the no-action alternative are expected to be the same.

6.5.2 Action 2 – Mainline Length

Preferred Alternative 2 of this proposed action would prohibit the use of multiple mainline sets (also called multi-sets or described as two mainline sets in this document) in U.S. EEZ portion of the MAB and would increase the maximum length of active gear from 20 nm to 30 nm. Currently, PLL sets must not exceed 20 nm (37.04 km) in the EEZ portion of the MAB. However, the number of mainlines and combined lengths of active gear (leaders and hooks in the water) is not currently limited, which allows vessels to deploy multiple mainlines, such that there can be continuous active gear beyond the 20-nm mainline limit in the MAB.

From 2013 through 2018, there were 1,028 total observed PLL sets deployed in the MAB. During that same time period in the MAB, there were on average 1,573 reported PLL sets annually. The percentages that apply to the 1,028 observed PLL sets are assumed to equally apply to the average annual 1,573 reported PLL sets unless otherwise noted.

Approximately 24% (244) of 1,028 observed PLL sets in the MAB during that 6-year period were sets with multiple mainlines (or multi-sets) and they were deployed during 60 trips. Thus, NMFS assumes that approximately 24% (373) of the 1,573 reported PLL sets annually in the MAB were sets that had two mainlines. Therefore, the elimination of sets with multiple mainlines by this proposed action would directly affect an annual average of 373 reported PLL sets that currently have two mainlines in the MAB. Those 373 PLL sets with two mainlines occur during 92 trips.

Of the 244 observed PLL sets with multiple mainlines in the MAB, 73% (178) had a combined active gear length of 30 nm or less and on average the combined length of the multi-sets was 28 nm. From that, NMFS assumes that approximately 73% (272) of the 373 reported multiple mainline sets with multiple mainlines in the MAB have combined active gear less than 30 nm, and on average the length of combined active gear of the multiple mainlines was 28 nm. The average length of the first mainline in the observed PLL sets with multiple mainlines is 16 nm and the average length of the second mainline is 12 nm. The elimination of the 12 nm of second mainline and its active gear would represent, on average, a reduction of active gear of approximately 43% in the MAB (**Table 6.1**). Assuming that one 1 nm of active gear is no different than another 1 nm of active gear in terms of HMS landings, then the elimination of 12 nm (43%) of active gear would result in a 43% decrease in HMS landings and associated dockside revenues for those 272 multiple mainline sets (**Table 6.1**). This proposed action, however, would also allow an increase in the maximum length of active gear from 20 nm to 30 nm. From that, NMFS expects that the loss of a second mainline for these 73% (272) PLL sets that would otherwise deploy a multi-set, would be offset by increasing the length of the single mainline and its active gear by 43%, and there would be no effect from the active gear limitation (**Table 6.1**). Therefore, the Preferred Alternative of Action 2 is expected to have no net effect on these 272 PLL sets.

Of the observed PLL sets that deploy multiple mainlines in the MAB, 27% (66) had combined active gear in excess of 30 nm, and their average combined length was 33 nm. From that, NMFS assumes that 27% (101) of the 373 reported PLL sets with multiple mainlines in the MAB have combined lengths of active gear greater than 30 nm. The average length of the first mainline and active gear is 17 nm and the average length of the second mainline and active gear is 16 nm. The elimination of the second mainline and its active gear would reduce active gear of these 101 reported multiple mainline sets by 48% in the MAB (**Table 6.1**). NMFS expects that the increase in the length of active gear from 20 nm to 30 nm would, on average, partially offset the loss of active gear caused by the elimination of the second mainline. In other words, the 101 sets with multiple mainlines would increase the length of active gear on the single mainline by 12 nm, which represents 36% of the combined active gear currently used. NMFS assumes that the average length of active gear for these 101 reported multiple mainline sets would be 29 nm, which would be within the 30 nm limit for active gear.

Under the Preferred Alternative of Action 2, there would be a net loss of 4 nm of active gear per set for 101 reported multiple mainline sets in the MAB (**Table 6.1**). With an average length of combined active gear of 33 nm, a net loss of 4 nm of active gear per PLL set would represent an average loss of approximately 12% of active gear per set. Assuming that 1 nm of active gear is the same as another 1 nm of active gear in terms of HMS landings, there would be a 12% reduction in HMS landings per set for these 101 multiple mainline sets. When dockside prices are constant, a reduction in HMS landings results in reduced dockside revenues; however, HMS prices are variable. Moreover, the vessels that deploy these 101 PLL sets could mitigate for any loss of landings per trip by increasing the number of single mainline sets deployed within the MAB or in another statistical fishing area. Nonetheless, an estimated 101 multiple mainline sets would have to reduce the length of active gear by 4 nm per set and there would be a total reduction of active gear of 404 nm annually in the MAB.

Table 6.1. Average Change in Active Gear per reported Multi-Sets by Length of Total (Combined) Active Gear.

Total Length of Active Gear (nm)	Number of PLL Multi-Sets	Average Decrease in Active Gear per Set from Elimination of Second Mainline	Average Increase in Active Gear per Set from Increase in Maximum Active Gear	Average Net Change in Active Gear per PLL Set
14 to 30	273	12 nm (43%)	12 nm (43%)	0 (0%)
Over 30	101	16 nm (48%)	12 nm (36%)	4 nm (Loss of 12%)
Total	373			404 nm (Loss)

Approximately 76% (784) of 1,028 observed PLL sets in the MAB during that 6-year period were single mainline sets. From that, NMFS assumes that approximately 76% (1,200) of the 1,573 reported PLL sets deployed annually in the MAB are single mainline sets. Consequently, the Preferred Alternative of Action 2 would not negatively affect these 1,200 reported single mainline sets by prohibiting the use of multi-sets, and could possibly benefit them by increasing the maximum mainline length. However, the benefits from the increase in the maximum length of mainline and active gear for these 1,200 reported single mainline sets would vary depending on the current length of active gear.

First, the majority of these 1,200 reported single mainline sets have less than 20 nm of active gear. From 2013 through 2018, approximately 85% (672) of observed PLL sets had less than 20 nm of active gear. Therefore, NMFS expects here that 85% (1,020) of the 1,200 reported single mainline sets with a single mainline would not be affected by the Preferred Alternative of Action 2 (**Table 6.2**). Approximately 15% (180) of the 1,200 reported single mainline sets had the maximum length of active gear. NMFS assumes that those 180 single mainline sets could, on average, increase the length of active gear by 1 to 10 nm (**Table 6.2**). Assuming that 1 nm of active gear is the same as another 1 nm of active in terms of HMS landings, the 5% to 50% increase in the length of active gear would generate a 5% to 50% increase in HMS landings, and if dockside prices were constant, there would be an associated 5% to 50% in dockside revenue from those HMS landings from these 180 reported single mainline sets. However, dockside prices of HMS are variable.

Table 6.2. Average Change in Active Gear per Set for Single-Mainline reported PLL Sets by Length of Active Gear

Length of Active Gear (nm)	Number of Single-Mainline PLL Sets	Average Change per Set from Elimination of Second Mainline	Average Change per Set from Increase in Maximum Active Gear	Average Net Change in Active Gear per PLL Set
1 to 19	1,020	NA	0 nm (0%)	0
20	180	NA	1 to 10 nm (5% to 50%)	1 to 10 nm (Gain of 5% to 50%)
Total	1,200			180 to 1,800 nm (Gain)

In summary, the Preferred Alternative for Action 2 would result in a combined net change of the amount of active gear in the MAB ranging from an annual loss of 224 nm of active gear (a 404 nm loss partially offset by a 180 nm gain) to an annual gain of 1,396 nm of active gear (an 1,800 nm gain partially offset by a 404 nm loss). It is estimated that a total of 28,846 nm of active gear is currently deployed in the MAB annually. A net loss of 224 nm of active gear would represent less than 1% (0.7%) of that total. Similarly, a net gain of 1,396 nm would represent 4.8% of that total. The above small relative changes in the amount of active gear deployed in the MAB would be expected to have associated changes in landings and dockside revenue. However, there is insufficient information to monetize that range.

6.5.3 Action 3.1 – Hooks

Currently, PLL vessels operating outside the NED are limited to possessing and/or using only either 18/0 or larger circle hooks with an offset not to exceed 10 degrees or 16/0 or larger inline (non-offset) circle hooks. The preferred alternative would also require the following specifications to hooks used in the FEC, MAB, NEC and SAB: (i) 16/0 or 18/0 circle hooks with hook shanks containing round wire that can be measured with a caliper or other appropriate gauge, with a wire diameter not to exceed 4.05 mm if 16/0 or 4.4 mm if 18/0; and (ii) a straightening force not to exceed 300 lb based on manufacturer's specifications.

The Preferred Alternative for Action 3.1 would affect PLL vessels that presently use hooks in the FEC, MAB, NEC and SAB that do not meet the additional specifications. Currently, three mass produced hooks meet the additional specifications (Mustad 39960D 16/0, Eagle Claw-L2048LM 16/0, and Mustad 39988D 16/0). NMFS assumes that none of the sets deployed in the four areas use those hooks, although it is more likely that at least 25% of the sets use the new hooks since there are hooks that meet the new specifications that are commercially available.

The price of a box or pack of 1,000 of the new hooks is estimated to range from $450 to $550 per box and is expected to be, on average, $20 to $25 more than a box of 1,000 of the currently used hooks. The average number of hooks per set in each of the four areas (FEC, MAB, NEC, and SAB) is much less than 1,000. From that NMFS expects that one box of hooks is sufficient to equip a PLL vessel for its first trip with the new hooks. The combined additional annual cost to 88 PLL vessels would be $1,760 to $2,200 for the first boxes of new hooks. NMFS assumes that the time and any associated cost to swap out any old hooks for the new hooks is negligible from average trip or seasonal preparations.

Hooks are lost or damaged during a trip and need replacement. NMFS estimates that the difference in the costs of replacing the new hooks versus replacing the currently used hooks is approximately equivalent to the cost of purchasing a box of the new hooks every sixth to seventh trip, which is $20 to $25 (2018 $) more per sixth or seventh trip. An annual average of 937 trips are made in the combined areas. NMFS estimates that each of the 88 PLL vessels makes 10 to 11 trips in the areas annually, and therefore, has to buy an additional two boxes to replace hooks that are lost or damaged a year. The combined annual added replacement cost for all 88 PLL vessels would be $3,520 to $4,400. Total cost of the Preferred Alternative for Action 3.1 would range from $5,280 to $6,600. According to the 2017 SAFE Report, the PLL fishery accounted for 64% (approximately $24 million) of the $37.6 million in dockside revenues from all Atlantic HMS landings. The additional hook cost represents from 0.02% to

0.03% of that $24 million. The new hooks are not expected to result in any decrease in either landings or economic beneficial impacts that derive from those landings.

6.5.4 Action 3.2 – Leaders

Currently, PLL vessels that fish in the FEC, MAB, NEC and SAB can use monofilament nylon leaders of unspecified diameters, which can result in leaders being the weakest component of active gear. Action 3.2 would require the vessels to use monofilament nylon leaders with a diameter of 1.8 mm or larger (certified by the manufacturer to at least 300lb breaking force) in the FEC, MAB, NEC and/or SAB.

The Preferred Alternative for Action 3.2 would have no additional economic effects on PLL vessels that presently use leaders with a diameter of 1.8 mm or larger (certified by the manufacturer to have at least 300 lb breaking force) in the four areas. NMFS expects that all, or almost all, of the PLL vessels that fish in the four areas use monofilament nylon leaders with diameters of 1.8 mm or larger and a breaking force of at least 300 lb. Consequently, the proposed action is expected to have no additional economic effects.

6.5.5 Cumulative Economic Effects Summary

In summary, an estimated 1,573 PLL sets in the MAB and 88 PLL vessels that fish the FEC, SAB, MAB and/or NEC would be directly affected by the proposed PLTRP amendment. Action 1 (Preferred Alternative 2) and Action 3.2 (Preferred Alternative 2), combined, are expected to have no additional economic impacts. Action 2 (Preferred Alternative 2) would result in a net change in the amount of active gear deployed in the MAB ranging from a net 0.7% decrease to a net 0.5% increase in active gear; however, there is insufficient information to monetize the value of that range. Action 3.1 (Preferred Alternative 2) could increase the annual hook cost of 88 PLL vessels that fish in the FEC, MAB, NEC, and SAB by $60 to $75 per vessel, which represents from 0.07% to 0.08% of annual trip costs; however, NMFS expects to have no effect on landings or economic beneficial impacts that derive directly or indirectly from those landings.

6.6 Public and Private Costs of Regulations

The preparation, implementation, enforcement, and monitoring of this or any federal action involves the expenditure of public and private resources, which can be expressed as costs associated with the regulations. Costs associated with this rule include, but are not limited to NMFS costs of documentation preparation, meeting, and other costs; NMFS administration costs of document preparation, meetings and review, and annual law enforcement costs. A preliminary estimate ranges from $200,000 to $250,000 before annual law enforcement costs.

6.7 Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a “significant regulatory action” if it is expected to result in: (1) an annual effect of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this executive order. Based on the information provided above, these proposed actions have been determined to be not economically significant for the purposes of E.O. 12866.

7.0 REGULATORY FLEXIBILITY ANALYSIS

7.1 Introduction

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

With certain exceptions, the RFA requires agencies to conduct an analysis for each proposed rule and is designed to assess the impacts of various regulatory alternatives on small entities, including small businesses, and to determine ways to minimize those impacts. The following RFA was conducted to determine if the proposed rule would have a significant economic impact on a substantial number of small entities or not.

7.2 Statement of the need for, objectives of, and legal basis for, the proposed rule

The primary purpose and need, issues, problems, and objectives of the proposed actions are presented in **Sections 1 and 2** and are incorporated herein by reference.

7.3 Identification of federal rules which may duplicate, overlap or conflict with the proposed rule.

No federal rules have been identified that duplicate, overlap or conflict with the proposed rule.

7.4 Description and estimate of the number of small entities to which the proposed actions would apply

This rule would directly apply to businesses that operate vessels that use PLL gear to harvest Atlantic HMS species within four specific statistical fishing areas of the EEZ. Regulations prohibit use of PLL in the recreational fishing sector of the fishery. Therefore, it strictly applies to businesses in the commercial fishing industry (NAICS 11411).

Any commercial fishing business with a vessel that uses PLL to harvest tuna or swordfish must have an Atlantic tuna longline permit, a shark (directed or incidental) permit, and a swordfish (directed or incidental) permit. Fishermen may harvest sharks with PLL if they possess only a federal limited access shark permit or an open access smoothhound shark permit; however, they must discard all swordfish and tunas caught. As of March, 2019, 248 vessels had those three required permits; however, 47 (19.0%) of those vessels had a temporary vessel identification (ID) number assigned to them. The NMFS SERO Permits Office assigns a temporary vessel ID number when an individual acquires the permits prior to assigning the permits to a particular vessel. Any landings under any of those permits, however, must be by a vessel that is either USCG documented or state registered. That means the 47 vessels with a temporary ID number cannot participate in the fishery. Consequently, at most, 201 vessels can target tuna and/or swordfish with PLL gear. NMFS estimates that 214 unique businesses have the 248 tri-packs and 173 unique businesses operate the 201[3] currently permitted PLL vessels.

[3] As of July 14, 2020, that figure was down to 196 PLL vessels. An estimated 159 unique businesses operate these 196 PLL vessels.

The number of Category I Atlantic Ocean, Caribbean, Gulf of Mexico, Large Pelagics Longline Fishery vessels, in the Gulf of Mexico and the Atlantic, with annual landings of HMS is substantially less than the number of vessels permitted to do so. In 2016, 85 (33.7%) of 252 PLL vessels were active, and in 2017, 88 (34.8%) of 253 PLL vessels were active. This analysis uses the 2017 figure of 88 active vessels, which can be found in the RFA for Amendment 11 to the 2006 Consolidated Highly Migratory Fishery Management Plan. NMFS estimates that 76 businesses operate the 88 active vessels.

For RFA purposes only, NMFS has established a small business size standard for businesses, including their affiliated operations, whose primary industry is commercial fishing (see 50 CFR § 200.2)[4]. A business primarily engaged in commercial fishing is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide. The maximum annual revenue for any PLL vessel between 2006 and 2016 was less than $1.9 million, which is well below the $11 million small business size standard for commercial fishing businesses established by NMFS. Therefore, 76 small commercial fishing businesses operate the 88 PLL vessels that could be directly affected by the rule.

7.5 Description and economic impacts of compliance requirements of the rule

Currently, a PLL vessel cannot fish in the CHSRA if it does not or cannot accommodate an observer assigned under the special observer requirements (50 CFR § 229.36(b)(1)). Additionally, fishermen must call NMFS SEFSC at least 48 hours (and no more than 96 hours) prior to embarking on their fishing trip to provide sufficient notice and time to arrange for special observers, who may conduct scientific research aboard the fishing vessel. If upon calling in, the vessel is assigned an observer, it must take the observer during that fishing trip. If the vessel does not take the observer, it is prohibited from deploying or fishing with PLL gear in the CHSRA for that trip. **Action 1 (Preferred Alternative 2)** would remove the CHSRA and its associated special observer and research participation requirements, including the advance notice requirements, which would give the small commercial fishing businesses flexibility to fish in those waters at times more effective for them. Therefore, the removal of the CHSRA is expected to have no adverse and slightly beneficial economic impacts on any of the small businesses that operate the 88 PLL vessels.

Operators of PLL vessels are currently allowed to deploy multiple mainline sets at one time, but each mainline length must not exceed 20 nm (37.04 km) in the EEZ portion of the MAB (50 CFR § 229.36(e). That has allowed PLL vessels to use longer lengths of active gear (leaders and hooks in the water) across multiple mainlines. Consequently, there have been PLL vessels deploying two mainlines with more than 20 nm of active gear.

Action 2 (Preferred Alternative 2) would, in the MAB, prohibit more than one mainline in the water at a time. It would also increase both the maximum length of a mainline from 20 nm (37.04 km) to 32 nm (59.26 km) and maximum length of active gear from 20 nm (37.04 km) to 30 nm (55.56 km). As more fully explained in section 6.5.2, this alternative would have an adverse impact on 101 reported PLL sets deployed in the MAB by reducing the length of active gear by 4 nm per set (because these sets currently deploy a second mainline and collectively contain more than 30 nm of active gear). The combined 404 nm reduction represents a reduction of total active gear in the MAB by 1.4%. If there is a one-to-one correspondence between the length of active gar and dockside revenue from HMS harvested by that gear, there would be a corresponding 1.4% decrease in dockside revenue annually from HMS harvested within the MAB. When PLL sets and landings from outside the MAB are included, that percentage declines significantly. **Action 2** (**Preferred Alternative 2**) would also affect 1,200 reported single mainline sets deployed in the MAB by increasing the active gear from 1 nm to 10 nm per set. Those increases would result in an increase in total active gear deployed in the MAB by those 1,200 reported single mainline sets ranging from 180 to 1,800 nm, and those increases represent a range from 0.6% to 6.2% of total annual active gear deployed in the MAB, and potentially 0.6% to 6.2% increases in dockside revenue from HMS landed from the PLL sets. When all 1,573

[4] NMFS' small business size standard for businesses applies to all businesses classified under North American Industry Classification System (NAICS) code 11411 for commercial fishing, including all businesses classified as commercial finfish fishing (NAICS 114111), commercial shellfish fishing (NAICS 114112), and other commercial marine fishing (NAICS 114119) businesses

average reported PLL sets deployed annually in the MAB a are combined, this proposed action would result in a change in the amount of active gear deployed in the MAB by the 88 PLL vessels ranging from a reduction of 0.7% to a gain of 4.8%. When PLL sets and active gear deployed outside the MAB by these PLL vessels are included in the total from all areas, these percentages decline significantly.

Action 3.1 (Preferred Alternative 2) would implement terminal gear requirements for leaders and hooks designed to make the hook the weakest part of the terminal gear in the EEZ portion of the FEC, MAB, NEC, and SAB statistical fishing areas. Hooks used in these areas would be required to meet the following criteria: to (i) 16/0 or 18/0 circle hooks with hook shanks containing round wire that can be measured with a caliper or other appropriate gauge, with a wire diameter not to exceed 4.05 mm if 16/0 or 4.4 mm if 18/0; and (ii) a straightening force not to exceed 300 lb, based on manufacturer's specifications. The proposed action would affect the small businesses with PLL vessels that presently use hooks in the FEC, MAB, NEC and SAB that do not meet the additional specifications. Currently manufactured hooks that meet the additional specifications include the Mustad 39960D 16/0, Mustad 39988D 16/0, and Eagle-Claw L2048LM 16/0. NMFS assumes that none of the sets deployed in the four areas use those hooks, although 25% or more may be a more likely figure.

The price of a box or pack of 1,000 of the new hooks is estimated to range from $450 to $550 per box and is expected to be, on average, $20 to $25 more than a box of 1,000 of the currently used hooks. The average number of hooks per set in each of the four areas (FEC, MAB, NEC, and SAB) is much less than 1,000: 671 (FEC), 622 (MAB), 905 (NEC), and 808 (SAB). From that NMFS expects that one box of hooks is sufficient to equip a PLL vessel for its first trip with the new hooks. The combined additional annual cost to 88 PLL vessels would be $1,760 to $2,200 (2018 $) for the first boxes of new hooks.

Hooks are lost or damaged during a trip and need replacement. NMFS estimates that the difference in the costs of replacing the new hooks versus replacing the currently used hooks is approximately equivalent to the cost of purchasing a box of the new hooks every sixth to seventh trip, which is $20 to $25 (2018 $) more per sixth or seventh trip. An annual average of 937 trips are made in the combined areas, and NMFS estimates that each of the 88 PLL vessels makes 10 to 11 trips in the areas annually. Hence, the average PLL vessel has to buy an additional two boxes to replace hooks that are lost or damaged a year. The 2017 Atlantic HMS SAFE Report estimates the median trip cost for a PLL vessel is $7,885 (2018 $). From that it is estimated that a typical PLL vessel makes 10 to 11 trips per year with trip costs totaling from $78,850 to $86,735 (**Table 7.1**). Action 3.1 is expected to increase annual cost from 0.07% to 0.09% per vessel.

Table 7.1. Annual Trip Cost, Average Annual Increase in Hook Costs, and Percent Increase in Annual Costs. Source: NMFS 2018a for median cost in 2016 Dollars and BLS for PPI.

Input	Annual Trip Cost (2018 $)	Added Hook Cost (2018 $)	Percent Increase
Replacement Hooks	-	$40 to $50	-
1 Initial Box Hooks	-	$20 to $25	-
Total	**$78,850 to $86,735**	**$60 to $75**	**0.07% to 0.09%**

Currently, PLL vessels that fish in the EEZ portion of the FEC, MAB, NEC and SAB can use monofilament nylon leaders of unspecified diameters, which can result in leaders being the weakest component of active gear. **Action 3.2 (Preferred Alternative 2)** would require the PLL vessels in the EEZ portion of the FEC, MAB, NEC and SAB to use monofilament nylon leaders and/or branch lines that all have a diameter of 1.8 mm or larger (certified by the manufacturer to at least 300 lb test strength when new) in those areas. No other line material could be used, however, crimps and chafing gear would be allowed. NMFS expects that almost all to all of the PLL vessels that fish in the four areas use monofilament nylon leaders with diameters and a breaking force of at least 300 lb. Consequently, the proposed action is expected to have little to no additional economic effects.

7.6 Significance of economic impacts on a substantial number of small entities

In summary, an estimated 88 vessels owned by 76 small businesses would be directly affected by this rule, and they represent approximately 36% of the 248 permitted vessels and 214 small businesses in the PLL fleet. **Action 1**

(Preferred Alternative 2) and **Action 3.2 (Preferred Alternative 2)**, combined, are expected to have little to no additional economic impacts. **Action 2 (Preferred Alternative 2)** would cause a change in the amount of active gear deployed within the MAB ranging from a 0.7% decrease to a 4.8% increase. Assuming a constant one-to-one correspondence between the length of active gear and dockside revenue, a corresponding change in dockside revenue from HMS harvested from the MAB would range from a 0.7% reduction to a 4.8% increase. When dockside revenues from HMS harvested from outside the MAB are included, however, the percentages of the net reduction or net gain decline significantly. **Action 3.1 (Preferred Alternative 2)** could increase the annual hook cost of 88 PLL vessels that fish in the FEC, MAB, NEC, and SAB by $60 to $75 per vessel, which represents from 0.07% to 0.08% of annual trip costs. Combined, the proposed actions are expected to have a net benefit for the affected small businesses. Therefore, this rule would not have a significant economic impact on a substantial number of small entities.

8.0 OTHER APPLICABLE LAWS

In accordance with legal mandates, NMFS must consider the effect of the proposed actions on small businesses, marine mammals, endangered species, essential fish habitat, and the human environment.

8.1 Coastal Zone Management Act

We determined the proposed actions are consistent, to the maximum extent practicable, with the enforceable policies of the approved coastal zone management plans of coastal states and territories affected by the rule (Florida, Georgia, South Carolina, North Carolina, Virginia, Maryland, Delaware, New York, New Jersey, Connecticut, Rhode Island, Massachusetts, New Hampshire, and Maine). When the proposed rule published, NMFS sent the rule and consistency determination to each coastal state bordering the U.S. Atlantic EEZ. These determinations were submitted for review on December 18, 2020 and all states concurred.

8.2 Endangered Species Act

The ESA imposes on all federal agencies a duty to ensure their actions do not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of the critical habitat of such species. To effectuate the ESA's requirement to avoid jeopardy and adverse modification, the ESA requires the "action" agency to consult with an "expert" agency to evaluate the effects an agency action may have on a listed species. If the action agency determines through preparation of a biological assessment or informal consultation the preferred alternative is "not likely to adversely affect" listed species or critical habitat, formal consultation is not required so long as the expert agency concurs.

On May 15, 2020, NMFS completed a biological opinion on the operation of the Pelagic Longline Fishery for Atlantic Highly Migratory Species (HMS), as managed under the 2006 Consolidated Atlantic HMS Fishery Management Plan (FMP), as amended. Pursuant to 50 CFR § 402.16, reinitiation of formal consultation is required when discretionary involvement or control over the action has been retained (or is authorized by law) and: (1) the amount of or extent of the incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered; or (4) if a new species is listed or critical habitat designated that may be affected by the identified action.

As discussed in Chapter 5 (Environmental Consequences), the proposed actions do not change the nature of the Atlantic PLL fishery and therefore, none of the alternatives are likely to affect seabirds, sea turtles, oceanic whitetip sharks, giant manta rays, scalloped hammerhead sharks, or other bycatch of non-target species. To the extent the proposed actions are expected to affect marine mammals listed under the ESA, the expectation is that these species will benefit from proposed actions that are intended to benefit short-finned pilot whales. Sections 5.2.1, 5.3.1, and 5.4.1, describe the biological effects of the preferred alternatives, specifically as it relates to bycatch of pilot whales. Each of the preferred alternatives is expected to reduce pilot whale bycatch. Thus, the proposed actions are not expected to increase the likelihood or nature of interactions with any ESA-listed species or designated critical habitat. On May 15, 2020, NMFS completed a biological opinion on the operation of the Pelagic Longline Fishery for Atlantic Highly Migratory Species (HMS), as managed under the 2006 Consolidated Atlantic HMS Fishery Management Plan (FMP), as amended. This amendment PLTRP, as a proposed rule, was considered in the biological opinion and changes from the proposed rule to final rule do not have any effect on the previously considered action.

8.3 Essential Fish Habitat

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, federal agencies must undergo a consultation process regarding any of their actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect EFH. Although the area affected by the preferred alternative (i.e.,

the Mid Atlantic Bight) was identified as EFH through several FMPs, NMFS determined that the management measures would not adversely affect the EFH of any species managed under an FMP. Further coordination on this matter was not deemed necessary unless future modifications are proposed which may adversely impact EFH.

8.4 Executive Order 12898 (Environmental Justice)

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

The proposed actions of the PLTRP amendment are expected to reduce mortality and serious injury of pilot whales, meeting requirements under the MMPA. The proposed actions are expected to result in positive impacts to the socioeconomic environment as discussed in sections 5.1.2, 5.2.2, 5.3.2, 5.4.2 and chapter 6 and 7 and not result in impacts to any environmental justice population. Among the communities identified in section 4.3, no environmental justice issues were identified or are expected to arise. However, the absence of potential environmental justice concerns cannot be assumed. Information on the race and income status for groups at the different participation levels (charter crew and employees of associated support industries, etc.) is not available.

8.5 Executive Order 13132 (Federalism)

Executive Order 13132 requires agencies to take into account any federalism impacts of regulations under development. It includes specific directives for consultation in situations in which a regulation will preempt state law or impose substantial direct compliance costs on state and local governments (unless required by statute). All of the proposed actions would occur in the Exclusive Economic Zone beyond state jurisdiction; therefore, this action does not have federalism implications as that term is defined in E.O. 13132.

8.6 Information Quality Act

The rulemaking package has undergone a pre-dissemination review by the Protected Resources Division of the Southeast Regional Office, completed on March 23, 2020, which determined this information product complies with applicable information quality guidelines implementing the Information Quality Act (Section 515 of Public Law 106-554).

8.7 Marine Mammal Protection Act

The proposed actions will not adversely affect marine mammals. Instead, the proposed actions will reduce mortality and serious injury of pilot whales due to interactions with pelagic longline commercial fishing gear. The additional protection provided by the proposed actions will further NMFS' ability to meet the mandates of Section 118 of the MMPA, specifically to reduce mortality and serious injury of marine mammals incidental to commercial fishing operations.

8.8 Magnuson-Stevens Act

The purpose of the MSA is to facilitate actions that conserve and manage fishery resources found off the coasts of the U.S. by exercising sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the Exclusive Economic Zone. In order for this mission to be fulfilled, the MSA makes provisions for the collection of reliable data, which is essential to the effective conservation, management, and scientific understanding of the fishery resources. Under the MSA, irreversible or long-term adverse effects on fishery resources and the marine environment must be avoided. Section 303 of the MSA discusses the required provisions of fishery management plans. These provisions include establishing a standardized reporting methodology to assess the

amount and type of bycatch occurring in the fishery, minimize bycatch, minimize mortality of bycatch, and prohibit, limit, condition or require the use of specified types and quantities of fishing gear to facilitate enforcement of the MSA.

8.8 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to minimize the paperwork burden for individuals, small businesses, educational and nonprofit institutions, and other persons resulting from the collection of information by or for the Federal government. The proposed actions do not contain a collection-of-information requirement for the purposes of the PRA.

8.9 Regulatory Flexibility Act (RFA), E.O. 12866, E.O. 13771 and Congressional Review Act

This rule will not have a significant economic impact on a substantial number of small entities because an estimated 88 vessels owned by 76 small businesses would be directly affected by this rule. They represent approximately 36% of the 248 permitted vessels and 214 small businesses in the PLL fleet. Actions 1 and 3.2, combined, are expected to have little to no additional economic impacts. Action 2 would increase annual dockside revenues of 20 to 21 of PLL vessels by $26,510 to $44,933 (2018 $) per vessel. Action 3.1 could increase the annual hook cost of 88 PLL vessels that fish in the FEC, MAB, NEC, and SAB by $60 to $75 per vessel, which represents from 0.07% to 0.08% of annual trip costs.

E.O. 12866 requires that the Office of Management and Budget (OMB) review proposed regulatory programs that are likely to be "significant". Pursuant to the procedures established to implement section 6 of E.O. 12866, OMB determined these actions were not significant. Because this proposed rule was not significant under E.O. 12866, it is not expected to be an E.O. 13771 regulatory action.

The Small Business Regulatory Enforcement Fairness Act of 1996 added Chapter 8 to Title 5, United States Code, to provide for congressional review, and potential disapproval, of agency rulemaking. Agencies are required to certify to OMB whether actions are "major" for purposes of these provisions, which may delay publication of rules. These actions were determined as "not major" for purposes of 5 U.S.C. 801 *et seq.* because it does not meet the significance thresholds.

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11.0 APPENDIX A

Description of GAM Model Methods

A Generalized Additive Model (GAM) was used to predict the number of pilot whales taken in a given set as a function of mainline length, month, soak duration, latitude, and number of hooks.

This is the same model presented to the PLTRT in earlier meetings. Pelagic observer program (POP) data collected from 1992-2015 in the MAB fishing region were used in this analysis. The GAM models count data (number of whales per set) using the Tweedie distribution, which is a flexible error structure that can account for "zero-inflated" data. The GAM also allows for non-linearity in the relationship between explanatory and response variables. Variable selection based upon Akaike's Information Criterion (AIC) indicated that only soak duration, mainline length, month, and latitude were important in predicting the number of pilot whale takes. It is notable that the number of hooks (the traditional measure of effort) was not a significant explanatory term in the model. The relationships between each variable and the probability of a pilot whale interaction are shown in **Figure 11.1**.

"Status quo" data was used as the baseline for this evaluation. This included the deployment of two pieces of gear which were separated by only a very short time and distance between the end of the first piece and the beginning of the second (i.e., "multi-sets"). These sets, while shorter than the 20 nm longline length requirement, also had longer soak durations than single pieces of gear.

Observed sets from 2008-2015 were modified to simulate the effect of Preferred Alternative 2. First, "multi-sets" were combined into single pieces of fishing gear by adding the mainline lengths and numbers of hooks resulting in a single piece of gear. These combined sets were then capped at 30 nm mainline length. Second, any reported set with a mainline length greater than 30 nm was set to 30 nm length. The numbers of hooks and mean soak times were modified based on regression models between mainline length and each variable. The soak duration for these modified sets thus reflects the shorter soak durations typical of single mainline sets. It is not possible to directly model the effect of the "gaps" in effort along the mainline, as this behavior has not been observed in the fishery.

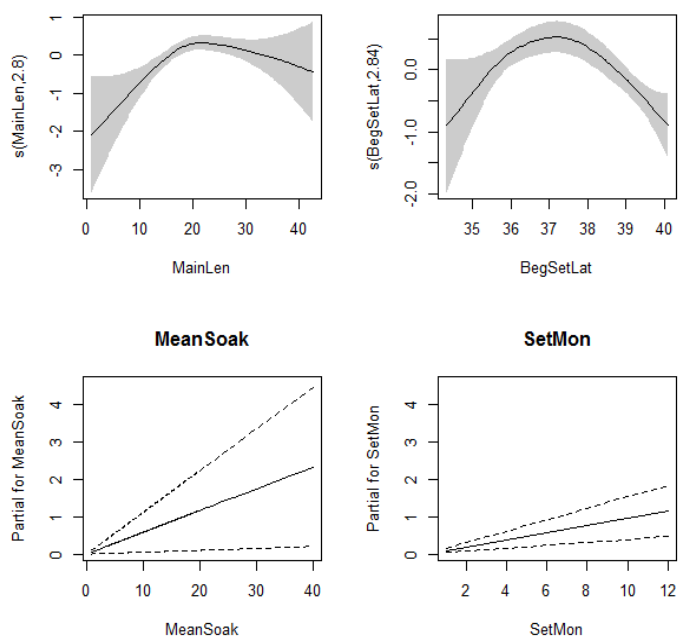

Figure 11.1. Relationships between explanatory and response variable, or probability of a pilot whale interaction, in the model. Note that both mainline length and latitude are non-linear terms. MainLen is mainline length; BegSetLat is the latitude that that the set began, MeanSoak is the mean soak duration, and SetMon is the month that the set began.