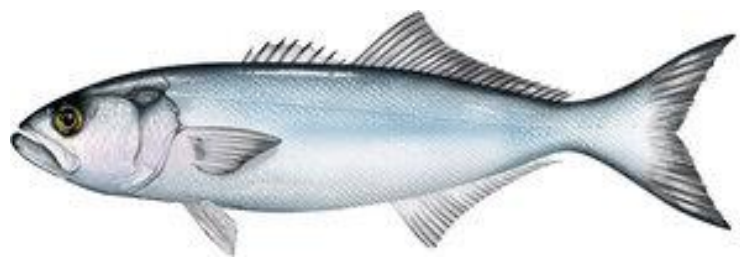
2022-2023 Bluefish Specifications

Environmental Assessment and
Regulatory Flexibility Act Analysis

October 2021



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1. EXECUTIVE SUMMARY

This document was prepared by the Mid-Atlantic Fishery Management Council (the Council or MAFMC) in consultation with the National Marine Fisheries Service (NMFS). This document was developed in accordance with all applicable laws and statutes as described in section 8.

The purpose of this action is to implement 2022-2023 commercial quotas and recreational harvest limits (RHL) for Atlantic bluefish. These measures are necessary to prevent overfishing and ensure that annual catch limits (ACLs) are not exceeded.

This document describes all evaluated management alternatives (section 5) and their expected impacts on several components of the environment (section 7).

Summary of 2022-2023 Bluefish Specifications Alternatives and Impacts

The 2022-2023 bluefish catch limit alternatives are summarized in Table 1. Alternative 2 is the preferred alternative and includes a commercial quota of 3.54 million pounds and an RHL of 13.89 million pounds for 2022. For 2023, it includes a commercial quota of 4.29 million pounds and an RHL of 22.14 million pounds. For 2022, the preferred alternative, which utilizes the Council-preferred 7-year constant fishing mortality rebuilding plan results in a 55% increase in the acceptable biological catch (ABC), a 28% increase in the commercial quota, and a 67% increase in the RHL compared to the current measures (2021). For 2023, the preferred alternative results in an 88% increase in the ABC, a 55% increase in the commercial quota, and a 167% increase in the RHL compared to the current measures. As described in sections 4 and 5, these limits were recommended by the Council and Atlantic States Marine Fisheries Commission's (ASMFC or Commission) Bluefish Board (Board) and finalized in August 2021. Alternative 2 is based on the recommendations of the Council's Scientific and Statistical Committee (SSC), which are based on the best scientific information available and are intended to prevent overfishing.

Table 1. 2022-2023 bluefish acceptable biological catch, commercial quota, and recreational harvest limit alternatives (in million pounds).

Alternative	Acceptable Biological Catch		Commercial Quota		Recreational Harvest Limit	
Year	**2022**	**2023**	**2022**	**2023**	**2022**	**2023**
Alternative 1 - No Action	N/A	N/A	N/A	N/A	N/A	N/A
Alternative 2 - *Preferred*	25.26	30.62	3.54	4.29	13.89	22.14
Alternative 3 - Non-Preferred	40.70	43.36	5.70	6.07	27.16	33.10
Not a True Alternative – Status Quo	16.28	16.28	2.77	2.77	8.34	8.34

Impacts of 2022-2023 Bluefish Specifications Alternatives on Bluefish and Non-Target Species

Under the no action alternative (alternative 1), no proposed specifications for the 2022-2023 fishery will be published (no commercial quota or RHL). Therefore, impacts to bluefish under the no action alternative are expected to range from slight negative to moderate negative due to the anticipated increases in effort (i.e., number of trips and anglers, amount of gear, soak time, etc.) compared to the current operating conditions and as a result of deviating from the ongoing rebuilding plan.

When compared to the status quo scenario (hypothetical status quo) provided for the purpose of a more realistic comparison to current conditions, all three alternatives are expected to result in a small increase in fishing effort given current market environment conditions. Impacts to bluefish under alternative 1 (no action) are much more negative (ranging from slight negative to moderate negative) compared to alternatives 2 (preferred) and 3 due to the lack of stock rebuilding requirements (i.e., no quotas or RHLs would be implemented). While alternatives 2 and 3 are both based on rebuilding projections, alternative 3 does not account for as much scientific uncertainty compared to alternative 2.

Alternatives 2 and 3 are both expected to have impacts that range from slight negative to negligible. Small increases in effort are expected, despite the larger increases in quota because it is not expected that the market environment for the commercial and recreational bluefish (and thus effort) fisheries will substantially change in 2022-2023 compared to recent years. In addition, anglers would still be bound by the federal recreational management measures (bag limits).

Impacts to non-target species under all three alternatives are expected to range from slight negative to slight positive due to the anticipated small increase in effort on the bluefish stock and the existing level of interactions with non-target species. When compared to the status quo scenario, all three alternatives are expected to result in small increases in fishing effort on bluefish, and thus, increase interactions with non-target species. For bluefish, compared to each other and a status quo, the range of impacts is slight negative to slight positive for all alternatives.

Impacts of 2022-2023 Bluefish Specifications Alternatives on Physical Habitat

When compared to a status quo, alternatives 1, 2, and 3 are expected to result in a relatively similar small increase if fishing effort. As indicated above, despite the larger increases in quota or lack of quotas (alternative 1), effort is not expected to substantially change because it is not anticipated that the market environment for the commercial and recreational bluefish (and thus effort) fisheries will substantially change in 2022-2023 compared to recent years. In addition, since the habitat where bluefish is harvested has been heavily fished for decades, the habitat status is not expected to be exacerbated by this action and differences between alternative 1 (no action), alternative 2, alternative 3, and the status quo are indistinguishable.

Impacts of 2022-2023 Bluefish Specifications Alternatives on Protected Species

Overall, all three alternatives are expected to have similar negligible to low moderate negative impacts on protected species, MMPA (non-ESA listed) species, and ESA-listed species. When compared to a status quo, alternatives 1, 2, and 3 are expected to result in increases in fishing effort on bluefish. All three alternatives offer a small increase in effort (undistinguishable from each other) that are expected to result in negligible to low moderate negative impacts on protected species.

Socioeconomic Impacts of 2022-2023 Bluefish Specifications Alternatives

Over the short term, all three alternatives are expected to result in similar increased in effort compared to the baseline (status quo) conditions. Bluefish commercial landings and recreational effort have been relatively stable for the 2018 to 2020 period. While it is possible that commercial landings may increase as a result of some of the proposed higher commercial quotas or lack of quotas (alternative 1), there is no indication that the market environment for commercially caught bluefish will substantially change in 2022-2023 compared to recent years.

Alternative 1 is expected to result in impacts that range from slight negative to slight positive for the human communities. Alternatives 2 and 3 are expected to result in socioeconomic impacts that range from slight positive to negligible. Over the short term, all three alternatives are expected to result in similar increased effort and revenue compared to the baseline (status quo) conditions. Relative to each other and the status quo alternative 1 is expected to be the most negative as it does not account for stock rebuilding requirements. While alternatives 2 and 3 would have impacts that range from negligible to slight positive compared to the status quo. However, the preferred alternative is most in line with the ongoing rebuilding plan and offers a balance between rebuilding plan progression while maintaining opportunities for increased angler satisfaction for the human communities.

Table 2. Expected impacts of 2022-2023 bluefish specifications alternatives, relative to current conditions. A minus sign (-) signifies a negative impact and a plus sign (+) signifies a positive impact. None of the impacts are expected to be significant.

Alternative	**Bluefish**	**Non-Target Species**	**Habitat**	**MMPA Protected Species** (not also ESA listed)	**ESA-Listed Species** (endangered or threatened)	**Human Communities** (Socio-economic)
1 (No Action)	Slight – to Moderate –	Slight – to Slight +	Slight – to Negligible	Negligible to Low Moderate –	Negligible to Low Moderate –	Slight – to Slight +
2 (*Preferred*)	Slight – to Slight +	Slight – to Slight +	Slight – to Negligible	Negligible to Low Moderate –	Negligible to Low Moderate –	Slight + to Negligible
3 (Non-Preferred)	Slight – to Slight +	Slight – to Slight +	Slight – to Negligible	Negligible to Low Moderate –	Negligible to Low Moderate –	Slight + to Negligible

Cumulative Impacts

The Council analyzed the impacts of all alternatives on the biological environment, physical habitat, protected species, and human communities. When the proposed action (i.e., all preferred alternatives) is considered in conjunction with all other impacts from past, present, and reasonably foreseeable future actions, it is not expected to result in any significant impacts, positive or negative; therefore, no significant cumulative effects on the human environment are associated with the proposed action (section 7.5).

Conclusions

A description of the expected environmental impacts and any cumulative impacts resulting from each of the alternatives are provided in section 7. The preferred alternatives are not associated with significant impacts to the biological, socioeconomic, or physical environment, individually or in conjunction with other actions; therefore, a "Finding of No Significant Impact" is warranted.

2. LIST OF ACRONYMS AND ABBREVIATIONS

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
ACT	Annual Catch Target
ALWTRP	Atlantic Large Whale Take Reduction Plan
AM	Accountability Measure
AO	Administrative Order
AP	Advisory Panel
ASAP	Age Structured Assessment Program
ASM	At Sea Monitoring Program
ASMFC	Atlantic States Marine Fisheries Commission
ATGTRT	Atlantic Trawl Gear Take Reduction Team
ASSRT	Atlantic Sturgeon Status Review Team
B_{MSY}	Biomass at MSY
Board	ASMFC Bluefish Management Board
CEA	Cumulative Effects Analysis
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Commission	Atlantic States Marine Fisheries Commission
Council	Mid-Atlantic Fishery Management Council
CPUE	Catch Per Unit Effort
CV	Coefficient of Variation
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
F	Fishing Mortality Rate
F_{MSY}	Fishing Mortality Rate at Maximum Sustainable Yield
FMP	Fishery Management Plan
FR	Federal Register
GAM	Generalized Additive Models
GAR	Greater Atlantic Region
GARFO	Greater Atlantic Regional Fisheries Office
GLM	Generalized Linear Model
GOM	Gulf of Maine
IRFA	Initial Regulatory Flexibility Analysis
ITS	Incidental Take Statement
LOF	List of Fisheries
MAB	Middle Atlantic Bight
MAFMC	Mid-Atlantic Fishery Management Council
MC	Monitoring Committee
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistical Survey

MRIP	Marine Recreational Information Program
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
NAO	National Oceanic and Atmospheric Administration Administrative Order
NEFSC	Northeast Fisheries Science Center
NEFOP	Northeast Fisheries Observer Program
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	Overfishing Limit
OY	Optimum Yield
PBR	Potential Biological Removal
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RHL	Recreational Harvest Limit
SARs	Stock Assessment Reports
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SBA	Small Business Administration
SI	Serious Injury
SSB	Spawning Stock Biomass
SSB_{MSY}	Spawning Stock Biomass at Maximum Sustainable Yield
SSC	Scientific and Statistical Committee
STDN	Sea Turtle Disentanglement Network
STSSN	Sea Turtle Stranding and Salvage Network
TED	Turtle Excluder Device
TRP	Take Reduction Plan
USFWS	United States Fish and Wildlife Service
VECs	Valued Ecosystem Components
VTR	Vessel Trip Report

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4. INTRODUCTION AND BACKGROUND

4.1 Purpose and Need for the Action

The purpose of this action is to establish 2022-2023 catch and landings limits for bluefish, based on the best scientific information available as recommended by the Council's SSC, and to establish management measures to ensure these limits are not exceeded. There are currently bluefish catch and landings limits in place for 2021. These limits are to be replaced with these proposed specifications and management measures as soon as possible in 2021. Therefore, this action is needed to prevent overfishing and ensure ACLs are not exceeded in these years.

In June 2021, a bluefish management track assessment, which included revised bluefish Marine Recreational Information Program (MRIP)[1] estimates and commercial landings through 2019 indicated the bluefish stock is still overfished and overfishing is not occurring. This update built upon the 2019 operational assessment with data through 2018 that first indicated the stock was overfished and overfishing was not occurring.

At the June 2021 Council meeting, the Council and Board approved a 7-year constant fishing mortality rebuilding plan as part of the Bluefish Allocation and Rebuilding Amendment in order to rebuild the stock to the spawning stock biomass target.

This document was developed in accordance with the Magnuson–Stevens Fishery Conservation and Management Act (MSA)[2] and the National Environmental Policy Act (NEPA), the former being the primary domestic legislation governing fisheries management in the U.S. Exclusive Economic Zone (EEZ). Failure to specify management measures that constrain catch to prevent overfishing would be inconsistent with the National Standards under the MSA. This document was also developed in accordance with the Bluefish FMP, which details the management regime for these fisheries. The FMP and subsequent amendments are available at http://www.mafmc.org.

4.2 The Specifications Process

The Bluefish FMP is cooperatively managed by the Council and the ASMFC. The Council and ASMFC’s Bluefish Board (the Board) meet jointly each year to consider the recommendations of the SSC and the Bluefish Monitoring Committee (MC), as well as input from Advisory Panel (AP) members, and other information, before making recommendations for annual commercial quotas, RHLs, and other commercial and recreational management measures (i.e., annual "specifications"). The Council submits these recommendations to the NMFS Greater Atlantic Regional Administrator to consider for implementation. The Regional Administrator will review the recommendations in this document and may revise them, if necessary, to achieve FMP objectives and to meet statutory requirements. An overview of the elements of the specifications process is provided below. More details on the SSC, MC, and AP recommendations relevant to this action can be found at https://www.mafmc.org/briefing/august-2021.

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[1] In July 2018, MRIP released revisions to their time series of recreational catch and landings estimates based on adjustments for a revised angler intercept methodology and a new effort estimation methodology (i.e., a transition from a telephone-based effort survey to a mail-based effort survey). The revised, or calibrated, estimates of catch and landings for most years are several times higher than the previous estimates for shore and private boat modes, substantially raising the overall bluefish catch and harvest estimates.

[2] MSA portions retained plus revisions made by the MSA Reauthorization Act of 2006.

Catch and Landings Limits and Council Risk Policy

The MSA requires that the Council's SSC provide recommendations for ABCs, prevention of overfishing, and maximum sustainable yield (MSY). The Council's catch limit recommendations cannot exceed the ABCs recommended by the SSC.

The MC is responsible for developing recommendations to the Council on management measures, including annual catch targets (ACTs), to achieve the recommended catch limits for bluefish. The ACTs may be set equal to or less than the ACLs to account for management uncertainty. Bluefish catch and landings limits are established on an annual basis for up to two years at a time, based on stock size projections for upcoming years.

The Council's current system of catch limits (ABCs, ACLs, and ACTs) was first implemented in 2012 (MAFMC 2011) and has been applied in the 2022-2023 recommendations (in conjunction with the ongoing rebuilding plan) described in this document. This system considers scientific and management uncertainty and is intended to ensure that recreational and commercial catches do not exceed the RHL and commercial quota, respectively. The amount of total catch, including landings and discards, produced in the recreational and commercial fisheries each year is contingent on how the combinations of fishery regulations (e.g., minimum fish size, gear requirements, possession limits) interact to achieve the commercial quotas and RHLs.

Each year the Council's SSC meets to recommend new or review existing ABCs for bluefish. The SSC derives ABCs using a combination of the Council's risk policy and specific methods based on the degree of uncertainty associated with information provided in the stock assessments for each species (i.e., the ABC control rule), as well as any rebuilding projections. The method used for bluefish in recent years is based on an SSC-modified OFL probability distribution. The OFL is the maximum amount of catch that can be removed from the stock without causing overfishing. Under this method, the SSC accepts the point estimate of the OFL from the stock assessment but modifies its probability distribution based on meta-analyses, the application to other similar species, and other considerations. This is done when the SSC believes that the stock assessment model did not fully capture the uncertainty associated with the OFL point estimate. Furthermore, the SSC used the Council and Board preferred rebuilding plan projections selected in Amendment 7 to the Bluefish FMP to help guide development of this specifications package.

The Council's risk policy describes the Council's tolerance for overfishing at a given level of biomass. The policy includes linear ramping with a maximum P* of 0.45 when the B/B_{MSY} ratio is less than or equal to 1.0, and a linear ramping to a maximum of 0.49 when the B/B_{MSY} ratio is equal to or greater than 1.5 and a P* equal to 0 when the B/B_{MSY} ratio less than or equal to 0.1. If B is less than B_{MSY}, then the probability of overfishing should decrease based on the linear relationship shown in Figure 1.

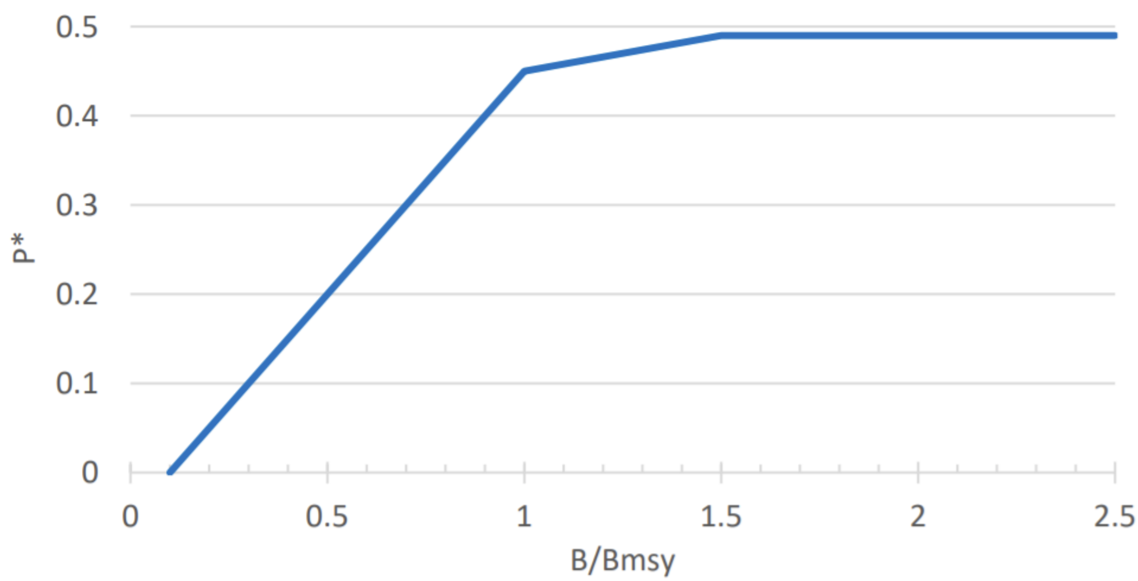

Figure 1. The Council's risk policy on overfishing.

The ABCs for bluefish include both landings and dead discards and are equal to the sum of the commercial and recreational ACLs (including management uncertainty) (Figure 2). The ACLs are apportioned into expected total landings and dead discards based on recent patterns in landings and discards and relevant consideration about the fishery in the year(s) when the ABC applies.

For bluefish, the sector-based ACLs are allocated among the commercial and recreational fisheries based on the allocation percentages in Amendment 7 to the Bluefish FMP (i.e., 14% commercial and 86% recreational). The commercial and recreational ACTs are equal to the ACL if no reduction is taken for management uncertainty. The sector specific ACTs are further broken down into TALs, which account for discards (commercial discards are assumed negligible). The commercial and recreational TALs are then further reduced should a percentage of quota be used for research set-aside (Figure 2).

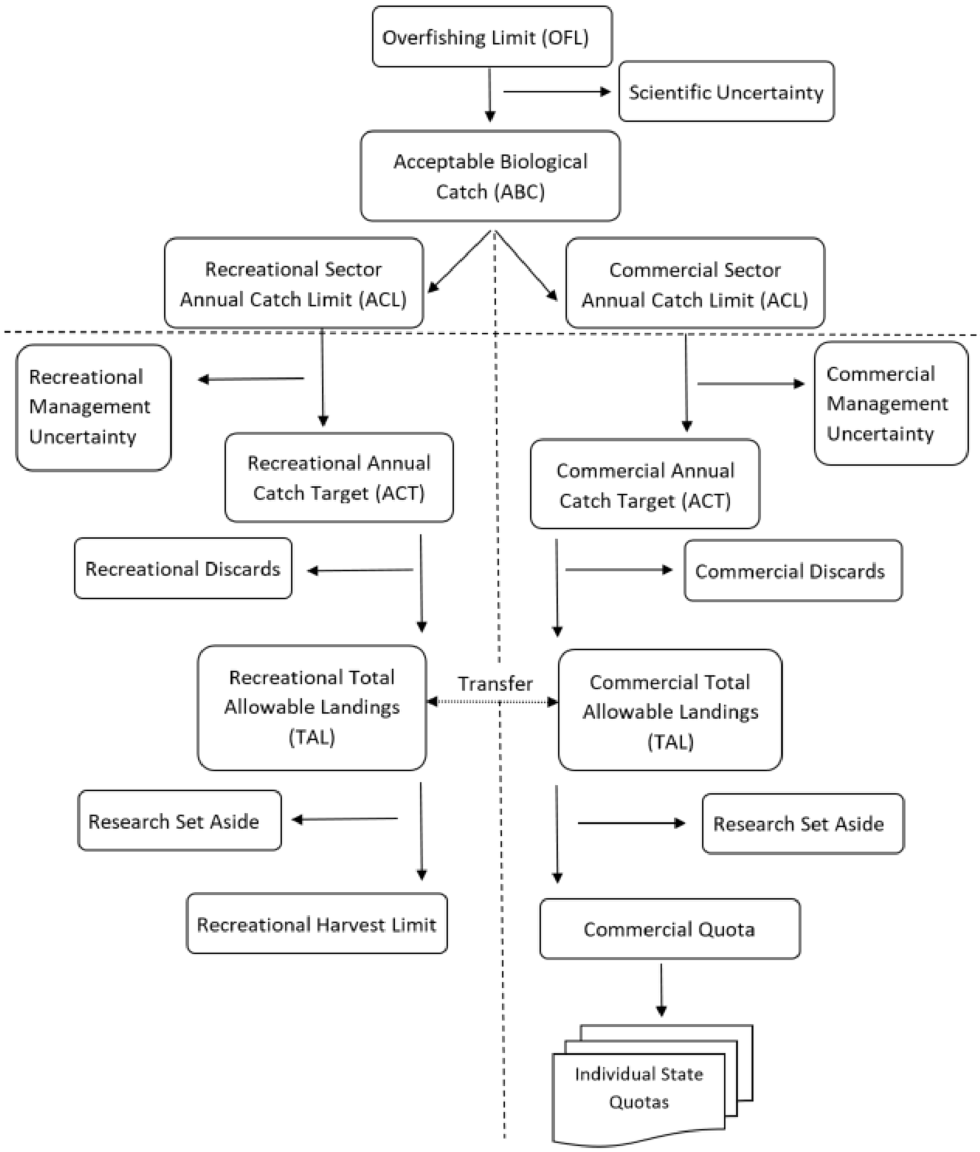

Figure 2. Flowchart for bluefish catch and landings limits.

Commercial Management Measures

A specific list of commercial management measures, as defined in the FMP, is annually reviewed as part of the specifications process. These measures include commercial minimum size limits, quotas, and minimum mesh sizes and other gear requirements. In August 2021, the Council and Board reviewed and did not recommend any modifications to commercial management measures for bluefish. Thus, no changes to the commercial measures (other than the commercial quota for 2022 and 2023) are proposed through this action.

Recreational Management Measures

The Council and Board typically consider recreational measures for the upcoming year with specifications. This year they were considered separately due to the timing of assessment results, uncertainties associated with the COVID-19 pandemic, and available recreational data in the current year that informs development of measures for the subsequent year. The Council and Board will discuss and approve 2022 and 2023 recreational management measures at their joint meeting in December 2021. Recreational measures for 2023 will be reviewed the fall of 2022.

For each fishing year, the Council and the Board identify combinations of recreational management measures (possession limits, size limits, seasons) that are likely to result in achieving, but not exceeding, the annual RHL. Each management measure, or combination of measures, provide mechanisms to control fishing effort and constrain harvest to the RHL. For example, shortening the season length would likely lead to fewer recreational trips for the target species, lower fishing effort, and a reduction in harvest. Possession limits, likewise, limit the total amount of fish that can be kept by anglers. Minimum sizes allow for fish to grow to certain size and reach maturity prior to being removed from the population. While discarding may occur due to the possession limit, size limit, or season restrictions, the assumed recreational discard mortality rate is 15%. Thus, fish discarded in the recreational fishery due to regulations have a high probability of surviving and contributing to current and future biomass.

The 2019 operational assessment of the Atlantic bluefish stock concluded that the stock is overfished but not experiencing overfishing. During their joint meeting in October 2019, the Council and Board adopted a 9.48-million-pound RHL for 2020 and 2021,[3] which was an 18% decrease compared to the 2019 RHL. Using the regulations at the time, the recreational sector was projected to land 13.27 million pounds, which would have exceeded the recommended RHL by 28.56%. Therefore, the Council and Board met to approve new recreational management measures to constrain harvest to the reduced RHL.

At the December 2019 joint meeting, the Council and Board approved a 3-fish bag limit for private anglers and shore-based fishermen and a 5-fish bag limit for for-hire fishermen, which represents a substantial reduction compared to the federal 15-fish bag limit that has been in place since 2000. These measures have remained status quo through 2021.

More recently, the 2021 operational assessment of the Atlantic bluefish stock concluded that the stock is still overfished but not experiencing overfishing. In October 2021, the Bluefish MC discussed if revisions to the current recreational management measures (3-fish bag limit for private anglers and shore-based fishermen and a 5-fish bag limit for for-hire fishermen) were necessary. The MC is recommending to the Council that status quo recreational management measure be implemented in 2022 and 2023. Recreational measures will be reviewed and approved by the Council and Board at the December 2021 Council meeting.

Accountability Measures

Accountability measures (AM) are measures that are intended to prevent ACLs from being exceeded and measures that correct or mitigate for ACL overages when they occur. The regulations associated with the AMs vary by species. A brief summary is presented here.

In 2013, the Council modified the recreational AMs for Mid-Atlantic species through the Omnibus Recreational AM Amendment and the commercial AMs in 2018 (MAFMC 2018). Under the current AMs, when the ACL, annual coastwide quota, or quota period allocation has been or is

[3] The 2021 RHL was subsequently adjusted to 8.34 million pounds to account for 2020 overages.

expected to be fully landed (depending on the species), the NMFS Regional Administrator can close the EEZ to commercial fishing for the remainder of the year or quota period. Commercial landings overage repayments (in pounds) are required if landings are in excess of the commercial quota, irrespective of if the overall ACL has been exceeded. ACL overages are evaluated by comparing a single year of landings and dead discards to the TAL/ACL.

Additionally, in the event of an ACL overage, recreational AMs no longer necessarily require a direct pound-for-pound payback of the overage amount in a subsequent fishing year. Instead, AMs are tied to stock status. Though paybacks may be required in some circumstances, any potential payback amount is scaled relative to biomass, as described below.

The ACL will be evaluated based on a single-year examination of total catch (landings and dead discards). Both landings and dead discards will be evaluated in determining if the ACL has been exceeded. If the ACL is exceeded, the appropriate AM is determined based criteria found at 50 CFR § 648.163. Descriptions of the regulations as detailed in the CFR are available at: https://www.fisheries.noaa.gov/species/bluefish#overview.

5. MANAGEMENT ALTERNATIVES

The alternatives described below propose 2022-2023 specifications for bluefish are also summarized Table 1 (section 1) and Table 19 (section).

5.1 Alternatives for 2022-2023 Bluefish Specifications

The 2021 bluefish operational assessment concluded the bluefish stock was overfished, and overfishing was not occurring in 2019 relative to the updated biological reference points. Based on the SSC's recommendation, the Council and Bluefish Board adopted an ABC of 25.26 million pounds for 2022 and 30.62 million pounds for 2023. After accounting for expected discards using the MRIP mean weight approach[4] and incorporating AMs due to the 2020 overage, this ABC translates to a commercial quota of 3.54 million pounds and a RHL of 13.89 million pounds for 2022 and a commercial quota of 4.29 million pounds and a RHL of 22.14 million pounds for 2023. In recent years, a portion of the total allowable landings above the expected recreational harvest has been transferred from the recreational fishery to the commercial fishery. However, because the recreational fishery is anticipated to fully harvest the RHL and the bluefish stock is currently overfished, no transfer between the sectors will occur. Furthermore, the Council adopted the terminal year landings (2020) as the estimate for expected recreational landings. Thus, the MC will recommend management measures that will constrain the expected recreational landings (13.58 million pounds) to the Council-approved RHL (13.89 million pounds).

Three alternatives are considered in this document for 2022-2023 bluefish specifications, as described below. The no action alternative (alternative 1; section 5.1.1) reflects the specifications for 2022 and 2023 if the Council and Board do not approve revised ABCs, commercial quotas and RHLs because the bluefish fishery has no rollover of ABCs from year to year. However, under the no action alternative, the federal recreational management measures (bag limits) would remain in place. For 2022, the preferred alternative, which utilizes the Council-preferred 7-year constant fishing mortality rebuilding plan (alternative 2) results in a 55% increase in the ABC, a 28% increase in the commercial quota, and a 67% increase in the RHL. For 2023, the preferred alternative results in an 88% increase in the ABC, a 55% increase in the commercial quota, and a 165% increase in the RHL. The non-preferred alternative (alternative 3) represents the outcome if the SSC treated the total catch estimate of the 7-year constant F rebuild projection as an ABC instead of an OFL (which allowed for the SSC to account for scientific uncertainty). For 2022, alternative 3 (non-preferred) results in a 150% increase in the ABC, a 106% increase in the commercial quota, and a 227% increase in the RHL. For 2023, alternative 3 results in a 166% increase in the ABC, a 119% increase in the commercial quota, and a 297% increase in the RHL. This recommendation (alternative 3) was not preferred because the resulting limits were associated with levels of uncertainty that the SSC was not comfortable with, especially in the first year of a rebuilding plan. Changes in the commercial quota and RHL are the focus of the impacts analysis in section 7; therefore, a meaningful comparison can be done without providing ABCs, ACLs, ACTs, and TALs for all alternatives.

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[4] This approach uses the MRIP estimated mean weight (by year, state, and wave) of harvested fish (A+B1) times the number of released fish (MRIP-B2s by year, state, and wave) and an assumed 15% release mortality. The MC generally agreed that this estimate does not fully capture recreational fishery dynamics because this approach uses the mean weight of harvested fish, not discards, and the length frequency data suggests that released fish tend to be larger than retained fish.

5.1.1 Alternative 1: No Action

NOAA Administrative Order (AO) 216-6A states that an environmental assessment (EA) must consider a reasonable range of alternatives to the proposed action, including a "no action" alternative. Consideration of the no action alternative is important because it shows what would happen if the proposed action is not taken; however, defining exactly what is meant by the no action alternative is often difficult. The President's CEQ has explained that there are two distinct interpretations of "no action." One interpretation is essentially the status quo, meaning no change from the current management. The other interpretation is when a proposed action simply does not take place.

If no limits were implemented prior to the 2022 fishing year, there would be no cap on landings starting January 1, 2022 because the bluefish fishery has no rollover of quotas. If specifications are not implemented, some measures will remain in place, but the overall management program will not be identical to that of 2021 (the typical status quo).

For the purposes of this EA, the no action alternative for bluefish commercial quota and RHL is defined as follows: (1) no proposed specifications for the 2022-2023 fishery will be published; (2) the indefinite management measures (minimum fish sizes, bag limits, possession limits, permit and reporting requirements, etc.) will remain unchanged; and (3) there will be no cap on the allowable annual catch (i.e., no ACLs) and landings (i.e., no commercial quota or RHL) for these fisheries as of January 1, 2022. The only regulatory controls on fishing effort and harvests in 2022 and 2023 would be the indefinite measures.[5]

The no action alternative has substantial implications for the bluefish fishery. It does not allow NMFS to specify and implement ACLs, commercial quotas, and RHLs for 2022 or 2023, as required by Federal regulations (50 CFR § 648) and the MSA. The no action alternative is thus inconsistent with the goals and objectives of the FMP and the implementing regulations. It may result in overfishing or cause the ACL to be exceeded, and thus is inconsistent with the MSA. For these reasons, the no action alternative for 2022-2023 specifications is not considered reasonable, however, it is still analyzed. For the purposes of better illustrating and comparing potential impacts, some analyses of the no action alternative in section 7 also include references to a status quo scenario, based on limits currently in place.

5.1.2 Alternative 2: ***Preferred***

For 2022, alternative 2 includes an ABC of 25.26 million pounds and a commercial quota of 3.54 million pounds and an RHL of 13.89 million pounds. For 2023, it includes an ABC of 30.62 million pounds and a commercial quota of 4.29 million pounds and an RHL of 22.14 million pounds. For 2022, the preferred alternative, which utilizes the Council-preferred 7-year constant fishing mortality rebuilding plan results in a 55% increase in the ABC, a 28% increase in the commercial quota, and a 67% increase in the RHL compared to the current measures (2021). For 2023, the preferred alternative results in an 88% increase in the ABC, a 55% increase in the commercial quota, and a 165% increase in the RHL compared to current measures. These recommended

[5] For the commercial fishery, there are no federal possession or fish size requirements. The federal possession limit (bag limit) in the recreational fishery is dependent on the trip/vessel: private recreational vessels - 3 fish per person, per day; for-hire vessels (party/charter-permitted vessels) - 5 fish per person, per day. Descriptions of the regulations as detailed in the CFR are available at: https://www.fisheries.noaa.gov/species/bluefish#overview

specifications are consistent with the ABC recommendations made by the SSC at their July 2021 meeting. A main point of discussion for the SSC was the Council-approved rebuilding schedule. A focal point for these discussions was the treatment of the rebuilding F proposed by the Council and its implications for generating ABCs. The Council's rebuilding policy is to achieve rebuilding within a seven-year period commencing in 2022. A constant F strategy was selected such that biomass in 2028 has a 50% chance of exceeding the B_{MSY} proxy. Given the basis for the rebuilding, the SSC determined that the constant F for rebuilding in seven years (denoted as $F_{rebuild}$,7 = 0.154) should be treated as a F_{MSY} proxy. As such, the usual Council risk policy, P* criteria, and OFL CV process should apply. Failure to include scientific uncertainty through the direct application of $F_{rebuild}$,7 alone could generate instances where the probability of overfishing exceeded 0.5 between 2022 and 2028.

In summary, the SSC recommended that a CV of 100% be applied to the OFL estimate as an appropriate ABC for bluefish. The chief uncertainty for bluefish relates to patterns in the revised MRIP estimates. Bluefish are predominantly harvested by recreational anglers who average 80% or more of landings. The new calibrated MRIP time series for bluefish resulted in a substantial increase in catch that approximately follows a similar pattern as seen in the old survey. While both black sea bass and scup MRIP catches converge in the 1980s when the telephone survey was deemed reliable, bluefish catches do not converge in the 1980s, and this adds to the uncertainty in the catch time series. In addition, the importance of dead discards has increased for this stock over time. Furthermore, because MRIP data is an important component of input data to the ASAP (Age Structured Assessment Program) model, it adds to uncertainty in model projections.

The SSC has calculated the ABC to account for scientific uncertainty in achieving the Maximum Fishing Mortality Threshold ($F_{rebuild}$). The approach for calculating the ABC involves using F-rebuild to calculate the OFL. The ABC is then calculated using the P* approach and the Council's risk policy.

These recommended specifications are also consistent with the commercial quota and RHL recommendations made by the MC at their July 2021 meeting. The MC recommended using the MRIP mean weight discard approach to calculate discards, 2020 recreational landings as the value for expected recreational landings, and no transfer for the 2022-2023 specifications package given the stock is still overfished. The MC also acknowledged that AMs were triggered for 2022 given the recreational overage of 3.65-million-pound overage in 2020.

Table 3 provides the 2022-2023 OFL projections and ABC recommendation adopted by the SSC and also describes the ACLs and other associated management measures, which were derived from the landings-based allocation as specified in the FMP by sector, with 14% allocated to the commercial sector as a commercial quota and 86% allocated to the recreational sector as an RHL. The commercial TAL was set equal to the commercial ACT of 3.54 million pounds, and the recreational TAL was set at 13.89 million pounds, which differs from the recreational ACT when subtracting estimated MRIP mean weight discards.

5.1.3 Alternative 3: Non-Preferred

The non-preferred alternative (alternative 3) represents the outcome if the SSC treated the total catch estimate (e.g., 2022 = 40.70 million pounds and 2023 = 43.36 million pounds) from the 7-year constant fishing mortality rebuilding plan as an ABC instead of an OFL (Table 4). The resulting commercial quotas and RHL. This translates to a commercial quota of 5.70 million pounds and a RHL of 27.16 million pounds for 2022. For 2023, it translates to a commercial quota of 6.07 million pounds and a RHL of 33.10 million pounds. For 2022, alternative 3 results in a 150% increase in the ABC, a 28% increase in the commercial quota, and a 226% increase in the RHL compared to the current measures (2021). For 2023, alternative 3 results in a 166% increase in the ABC, a 119% increase in the commercial quota, and a 297% increase in the RHL compared to current measures. Under this alternative, the SSC would not have made as significant of reductions for scientific uncertainty, which were discussed above in alternative 2.

Table 3. 2022-2023 bluefish catch and landings limits under Alternative 2 (preferred).

Management Measure	2022		2023		Basis
	mil lb.	mt	mil lb.	mt	
Overfishing Limit (OFL)	40.56	18,399	45.17	20,490	Stock assessment projections
ABC	25.26	11,460	30.62	13,890	Derived by SSC; Follows the rebuilding plan through NEFSC projections
ACL	25.26	11,460	30.62	13,890	Defined in FMP as equal to ABC
Commercial ACL	3.54	1,604	4.29	1,945	ABC x 14%
Commercial Management Uncertainty	0	0	0	0	Derived by the Monitoring Committee
Commercial ACT	3.54	1,604	4.29	1,945	(ACL – Commercial Management Uncertainty) x 14%
Recreational ACL	21.73	9,856	26.34	11,945	ABC x 86%
Recreational Management Uncertainty	0	0	0	0	Derived by the Monitoring Committee
Recreational ACT	21.73	9,856	26.34	11,945	(ACL – Recreational Management Uncertainty) x 86%
Recreational AMs	3.65	1,656	0	0	2022 only: 2020 ABC overage
Commercial Discards	0	0	0	0	Value used in assessment
Recreational Discards	4.19	1,901	4.19	1,901	2020 GARFO-estimated (MRIP) discards
Commercial TAL	3.54	1,604	4.29	1,945	Commercial ACT - commercial discards
Recreational TAL	13.89	6,298	22.14	10,044	Recreational ACT - recreational discards - Rec AMs
Combined TAL	17.42	7,903	26.43	11,989	Commercial TAL + Recreational TAL
Transfer	0	0	0	0	No transfer while overfished or overfishing
Expected Recreational Landings	13.58	6,160	13.58	6,160	2020 Recreational Landings
Commercial Quota	3.54	1,604	4.29	1,945	Commercial TAL +/- transfer
RHL	13.89	6,298	22.14	10,044	Recreational TAL +/- transfer

Table 4. 2021 Bluefish operational assessment ABC projection for 2022-2026 and a 7 year rebuilding projection (2022-2028) with constant fishing mortality. The rebuilding target (SSB_{MSY}) from the 2021 assessment is 201,729 mt. The projections use an estimated 2020 catch and the 2021 ABC of 7,385 mt. The 2020 total catch estimate uses dealer (cfders) data for commercial landings, MRIP harvest (A+B1) data for recreational landings, and GARFO estimated dead discards (MRIP B2 by Wave and State * Discard Mortality * Average weight). Note: Discard Mortality = 0.15 and Average Weight = (Total weight harvested (A+B1) / Total harvest in numbers (A+B1)). OFL Total Catches are catches in each year fishing at Frebuild = 0.154, prior to calculation of the associated annual ABC. The projections sample from the distribution of estimated recruitment for 1985-2019 and use the MAFMC SSC OFL CV working group recommended OFL CV = 100%.

$F_{rebuild}$ Iterative Projection 2022-2026
Total Catch, Fishing Mortality (F)
P* and Spawning Stock Biomass (SSB)
Catches and SSB in metric tons

Year	OFL Total Catch	ABC Total Catch	ABC F	ABC P* value	ABC SSB
2020	14,727	9,041	0.093	0.230	112,864
2021	15,352	7,385	0.068	0.285	135,071
2022	18,399	11,460	0.094	0.320	149,387
2023	20,490	13,890	0.102	0.362	166,096
2024	22,773	16,960	0.113	0.391	177,910
2025	24,043	19,094	0.121	0.427	192,273
2026	25,787	22,103	0.131	0.451	204,244

7-year $F_{rebuild}$ projection
Total Catch, Fishing Mortality (F)
Spawning Stock Biomass (SSB)
Catches and SSB in metric tons

Year	Total Catch	F	SSB
2020	9,041	0.093	112,892
2021	7,385	0.068	135,081
2022	18,463	0.154	146,103
2023	19,667	0.154	155,671
2024	21,113	0.154	161,005
2025	21,782	0.154	169,690
2026	23,081	0.154	178,163
2027	24,570	0.154	192,196
2028	25,646	0.154	202,299

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The affected environment consists of those physical, biological, and human components of the environment expected to experience impacts if any of the actions considered in this document were to be implemented. This document focuses on four aspects of the affected environment, which are defined as valued ecosystem components (VECs; Beanlands and Duinker 1984).

The VECs include:

- Managed species (i.e., bluefish) and non-target species
- Physical habitat
- Protected species
- Human communities

The following sections describe the recent condition of the VECs.

6.1 Managed Species and Non-Target Species

The following sections briefly describe the recent biological conditions of the bluefish stock (section 6.1.1) and non-target species (section 6.1.2). Non-target species commonly caught in the bluefish commercial fishery are described in section 6.1.2.2, and those often caught in the recreational fishery are described in section 6.1.2.3.

6.1.1 Bluefish

Bluefish (*Pomatomus saltatrix*) are distributed worldwide. In the western North Atlantic, the population ranges from Nova Scotia and Bermuda to Florida. Bluefish travel in schools of like-sized individuals and undertake seasonal migrations, moving into the Middle Atlantic Bight (MAB) during the spring, and south or farther offshore during the fall. Within the MAB they occur in large bays and estuaries as well as across the entire continental shelf. Juvenile stages have been recorded in all estuaries within the MAB, but eggs and larvae occur in oceanic waters (Able and Fahay 1998). Bluefish live to age 12 or greater (Salerno et al. 2001), and may reach a length of 3.5 feet, and a weight of 27 pounds (Bigelow and Schroeder 1953).

Bluefish eat a wide variety of prey items. The species has been described by Bigelow and Schroeder (1953) as “perhaps the most ferocious and bloodthirsty fish in the sea, leaving in its wake a trail of dead and mangled mackerel, menhaden, herring, alewives, and other species on which it preys." Bluefish born in a given year (young of the year) typically fall into two distinct size classes suggesting that there are two spawning events along the east coast. More recent studies suggest that spawning is a single, continuous event, but that young are lost from the middle portion resulting in the appearance of a split season. As a result of the bimodal size structure of juveniles, young are referred to as the spring-spawned cohort or summer-spawned cohort. In the MAB, the spring cohort appears to be the primary source of fish that recruit into the adult population.

In August 2019, a bluefish operational assessment conducted by the Northeast Fisheries Science Center (NEFSC 2019), included revised bluefish MRIP estimates through 2018, changed the stock status and biological reference points from SAW 60, which utilized data through 2014. Another operational assessment was conducted in June 2021, which included data through 2019 and confirmed the stock was still overfished with overfishing not occurring.

The $F_{35\%}$ and corresponding $SSB_{35\%}$ proxy biological reference points for bluefish were updated in the 2021 operational assessment (NEFSC 2021). The updated fishing mortality threshold $F_{35\%}$ proxy for F_{MSY} = 0.181; the updated biomass target proxy estimate for SSB_{MSY} = $SSB_{35\%}$ = 201,729 MT = 445 million pounds; the updated biomass threshold proxy estimate for ½ SSB_{MSY} = ½ $SSB_{35\%}$ = 100,865 MT = 222 million pounds; and the updated proxy estimate for MSY = $MSY_{35\%}$ = 29,549 MT = 65 million pounds (Figure 3).

Operational assessment results indicated that the bluefish stock was overfished and overfishing was not occurring in 2018 relative to the biological reference points. Fishing mortality on the fully selected age 2 fish was estimated to be 0.172 in 2019, and 95% of the updated fishing mortality threshold reference point F_{MSY} proxy = $F_{35\%}$ = 0.181 (Figure 4). There is a 90% probability that the fishing mortality rate in 2019 was between 0.140 and 0.230. The average age-0 recruitment from 1985 to 2019 was 46 million. The largest recruitment in the time series occurred in 1989 at 98 million fish, and the lowest recruitment was in 2016 at 29 million fish. Recruitment over the last 10 years has varied around the time series average. In both 2017 and 2018, recruitment estimates were above the average at 52, and 48 million fish, respectively (NEFSC 2021).

The bluefish stock has experienced a decline in SSB over the past decade, coinciding with an increasing trend in F. Recruitment has remained fairly steady, fluctuating just below the timeseries mean of 46 million fish. Both commercial and recreational fisheries have had lower catches in recent years, with poor catch in 2016 (20,370 MT), 2018 (11,288 MT), and 2019 (14,957 MT), well below the time series average of 32,034 MT. With the low catch in 2019, fishing mortality (0.172) was again estimated below the reference point (0.181). These low catches in recent years could be due to lower bluefish availability. Anecdotal evidence suggests larger bluefish stayed offshore and inaccessible to most of the recreational fishery during the past few years (NEFSC 2012).

The Council is now in year one of a rebuilding plan that follows a series of constant F projections with the goal of rebuilding in 7 years (by 2028).

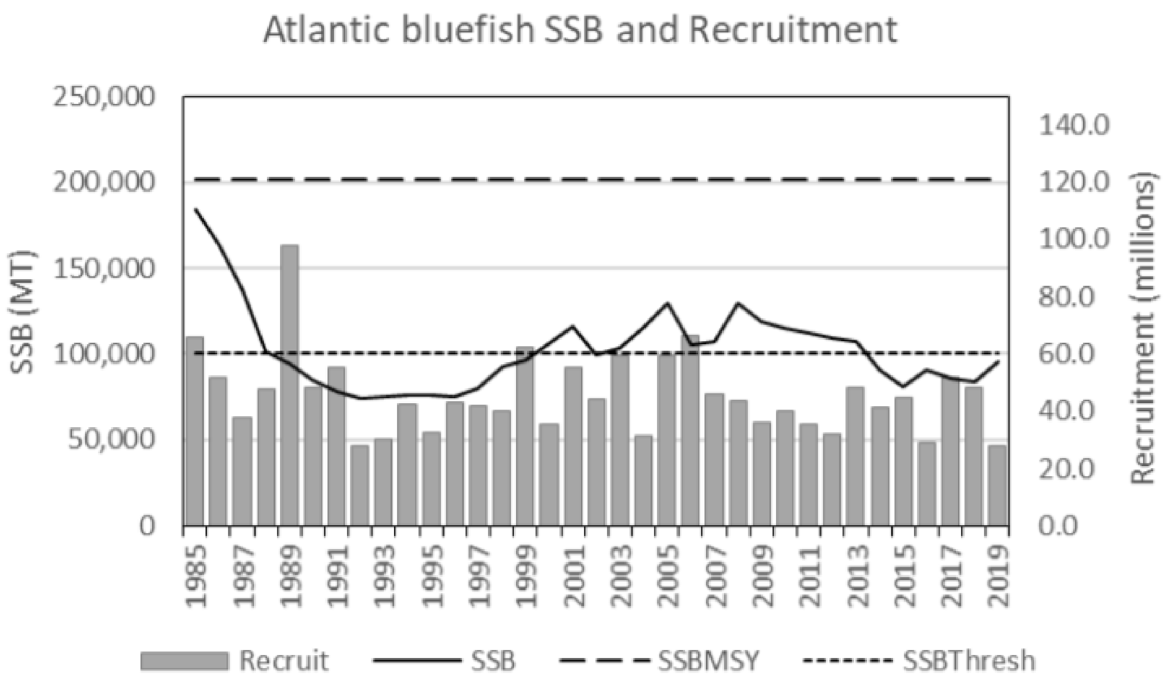

Figure 3. Atlantic bluefish spawning stock biomass (SSB; solid line) and recruitment at age 0 (R; gray vertical bars) by calendar year. The horizontal dashed line is the updated SSB_{MSY} proxy = $SSB_{35\%}$ = 201,729 mt and the dotted black line is the $SSB_{Threshold}$ = 100,865 mt.

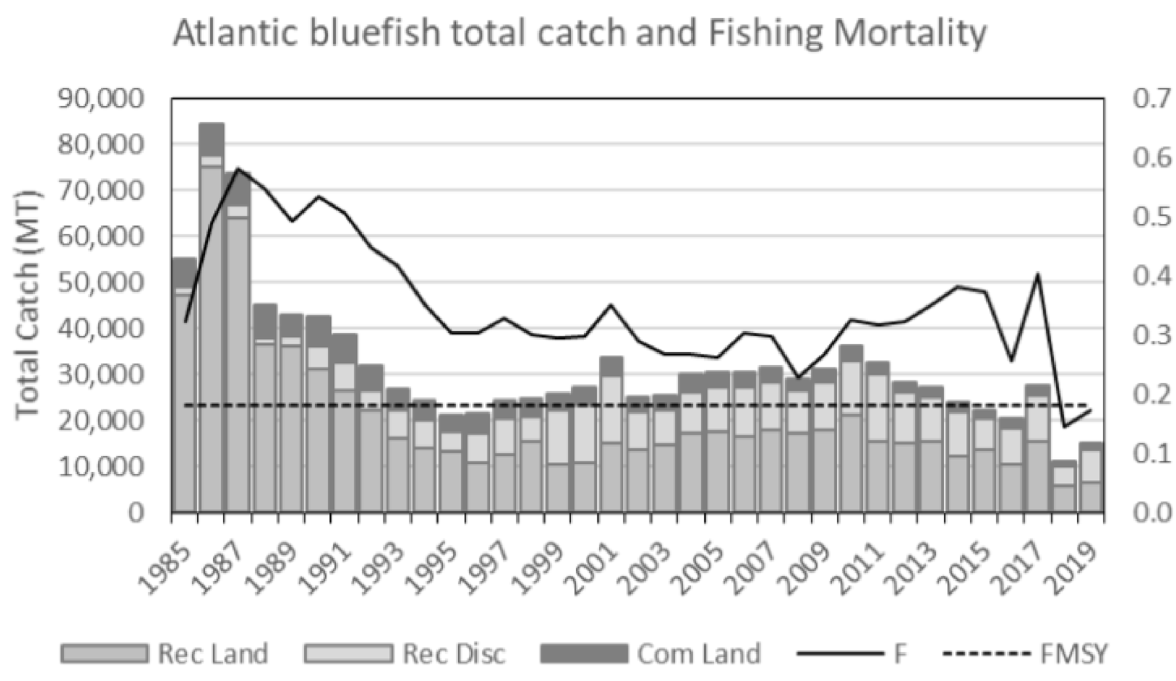

Figure 4. Total fisheries catch (metric tons; mt; solid line) and fishing mortality (F, peak at age 3; squares) for Atlantic bluefish. The horizontal dashed line is the updated F_{MSY} proxy = $F_{35\%}$ = 0.181.

6.1.2 Non-Target Species

6.1.2.1 Identification of Non-Target Species

The term "non-target species" includes species either landed or discarded (bycatch) as part of fisheries activities used to harvest bluefish. The term "bycatch," as defined by the MSA, means fish that are harvested in a fishery but that are not sold or kept for personal use. Bycatch includes the discard of whole fish at sea or elsewhere, including economic and regulatory discards, and fishing mortality due to an encounter with fishing gear that does not result in capture of fish (i.e., unobserved fishing mortality). Bycatch does not include fish released alive under a recreational catch and release fishery management program.

Recreational fishing, which dominates the catch of bluefish, is almost exclusively rod and reel, and includes shoreside recreational anglers, party/charter boats, and private recreational boats. The primary gear types used in the commercial fisheries that land bluefish include gillnets, handline, and otter trawls. Although there are other small localized fisheries, such as the beach seine fishery that operates along the Outer Banks of North Carolina that also catch bluefish, many of these fisheries do not fish exclusively for bluefish; but target a combination of species including croaker, mullet, Spanish mackerel, spot, striped bass, and weakfish. There is a lot of seasonality to both the commercial and recreational fisheries for bluefish due to the migratory nature of the species.

Management measures for both the commercial and recreational non-target species managed by the Mid-Atlantic and/or New England Fishery Management Councils include AMs to address ACL overages through reductions in landings limits in following years. AMs for these species take discards into account. These measures help to mitigate negative impacts from discards in the commercial and recreational fisheries for bluefish.

6.1.2.2 Commercial Non-Target Species

Given the mixed species nature of the bluefish fishery, incidental catch of non-target species does occur and impacts to those species are considered (Table 5 and Table 6). Bluefish catch was observed or reported by captains on trips 85 times in 2019 (Note: Given COVID-19 reduced observer trips in 2020, so data is shown for 2019). Table 5 reports the percentage of total catch on bluefish observed or captain reported hauls on a trip in 2019 using the observer database. All species reported represent 4% or greater of the observed or reported catch on a trip where bluefish was target species 1 or 2. Smooth and spiny dogfish, scup, striped bass, Atlantic bonito, and black sea bass were the most common caught non-target species on commercial bluefish trips.

Table 5. Percent of commercial non-target species caught on an observed or captain reported haul where bluefish was either target species 1 or 2 in 2019.

	% of total catch on bluefish observed or reported trips, 2019
Smooth Dogfish	39%
Spiny Dogfish	12%
Scup	11%
Striped Bass	9%
Atlantic Bonito	4%
Black Sea Bass	4%
Other	21%

Table 6. Most recent stock status information for commercial non-target species identified in this action for the bluefish fishery.

	Stock Biomass Status	Fishing Mortality Rate Status
Smooth Dogfish	Not overfished	Overfishing not occurring
Spiny Dogfish	Not overfished	Overfishing not occurring
Scup	Not overfished	Overfishing not occurring
Atlantic Bonito	Unknown - ICCAT	Unknown - ICCAT
Striped Bass	Overfished; SSB_{2017} estimated at 68,476 mt compared to the $SSB_{Threshold}$ of 91,436 mt	Overfishing occurring; F_{2017} estimated at 0.307 compared to the $F_{Threshold}$ of 0.240
Black Sea Bass	Not overfished	Overfishing not occurring

Of all non-target species caught on hauls where bluefish was target species 1 or 2 on a trip, striped bass was the only species with a negative stock status (overfished and overfishing occurring). Bluefish and striped bass co-exist in similar waters throughout their life histories. However, despite striped bass being caught on the limited number of bluefish trips, these interactions remain low. Typically, bluefish are a fallback species for fishermen that are not catching their primary target and are often bycatch in other fisheries. Overall, the impacts on non-target species are low, but are not expected to improve the stock status for striped bass. In contrast, the negative stock status of striped bass may result in less directed trips for bluefish due to fishermen preferring to target other species.

6.1.2.3 Recreational Non-Target Species

A "species guild" approach was used to examine non-target species interactions in the recreational fishery for bluefish. This analysis identified species that were caught together on 5% or more of recreational trips in 2020. The Atlantic coast was split into two regions (Maine to Virginia and North Carolina to Florida) to more effectively classify species based on region. In the north, black sea bass, striped bass, and scup were highly correlated with bluefish in the recreational fishery. In the south, Spanish mackerel king whiting, and pinfish were highly correlated with bluefish in the recreational fishery. Other frequently caught non-target species included paralichthys flounders, spotted seatrout, and lizard fish (Jeffrey Brust, NJ Division of Fish and Wildlife, pers. Comm., December 2020).

Summer flounder, scup, and black sea bass are jointly managed by the MAFMC and the ASMFC. The most recent assessments indicate the stocks are not overfished and overfishing was not occurring (2021 – summer flounder and 2021 – scup and black sea bass).

Spanish mackerel is jointly managed by the South Atlantic Fishery Management Council and the ASMFC. The most recent assessment indicates (2012) the stock is not overfished and overfishing is not occurring.

Spotted sea trout have not been assessed coastwide, therefore their overfished and overfishing status is unknown.

The status of recreational non-target species relevant to this action are summarized in Table 7.

Table 7. Stock status information for non-target species in the recreational bluefish fishery.

Species	Biomass Status	Fishing Mortality Rate Status
Summer Flounder	Not overfished	Overfishing not occurring
Scup	Not overfished	Overfishing not occurring
Black Sea Bass	Not overfished	Overfishing not occurring
Spanish Mackerel	Not overfished	Overfishing not occurring
Spotted Sea Trout	Unknown (not assessed)	Unknown (not assessed)
Striped Bass	Overfished	Overfishing occurring

6.2 Physical Environment and Essential Fish Habitat

The physical, chemical, biological, and geological components of benthic and pelagic environments are important aspects of habitat for marine species and have implications for reproduction, growth, and survival of marine species. The following sections briefly describe key aspects of physical habitats which may be impacted by the alternatives considered in this document. This information is drawn from Stevenson et al. (2004), unless otherwise noted.

6.2.1 Physical Environment

A description of the physical and biological characteristics of the environment in the mid-Atlantic subregion is found in sections 2.2 and 2.2.1 of Amendment 1. Bluefish are a migratory pelagic species found in most temperate and tropical marine waters throughout the world. Along the U.S. Atlantic coast, bluefish are commonly found in estuarine and continental shelf waters. Bluefish are a schooling species that migrate in response to seasonal changes, moving north and inshore during spring and south and offshore in the late autumn. The Atlantic bluefish fishery exploits what is considered to be a single stock of fish.

An additional description of the physical and biological characteristics of specific habitats found within the jurisdiction of the Northeast Region can be found in Stevenson et al. (2004). Bluefish inhabit the Northeast U.S. shelf ecosystem, which has been described as including the area from the Gulf of Maine (GOM) south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. The continental slope includes the area east of the shelf, out to a depth of 2000 m. Four distinct sub-regions comprise the NOAA Fisheries Northeast Region: the GMO, Georges Bank, the Mid-Atlantic Bight, and the continental slope.

The GOM is a semi-enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types.

Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents.

The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC.

The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom (Stevenson et al. 2004).

The continental shelf in this region was shaped largely by sea level fluctuations caused by past ice ages. The shelf's basic morphology and sediments derive from the retreat of the last ice sheet and the subsequent rise in sea level. Currents and waves have since modified this basic structure.

Shelf and slope waters of the Mid-Atlantic Bight have a slow southwestward flow that is occasionally interrupted by warm core rings or meanders from the Gulf Stream. On average, shelf water moves parallel to bathymetry isobars at speeds of 5 - 10 cm/s at the surface and 2 cm/s or less at the bottom. Storm events can cause much more energetic variations in flow. Tidal currents on the inner shelf have a higher flow rate of 20 cm/s that increases to 100 cm/s near inlets.

The shelf slopes gently from shore out to between 100 and 200 km offshore where it transforms to the slope (100 - 200 m water depth) at the shelf break. Numerous canyons incise the slope and some cut up onto the shelf itself. The primary morphological features of the shelf include shelf valleys and channels, shoal massifs, scarps, and sand ridges and swales. Most of these structures are relic except for some sand ridges and smaller sand-formed features. Shelf valleys and slope canyons were formed by rivers of glacier outwash that deposited sediments on the outer shelf edge as they entered the ocean. Most valleys cut about 10 m into the shelf; however, the Hudson Shelf Valley is about 35 m deep. The valleys were partially filled as the glacier melted and retreated across the shelf. The glacier also left behind a lengthy scarp near the shelf break from Chesapeake Bay north to the eastern end of Long Island. Shoal retreat massifs were produced by extensive deposition at a cape or estuary mouth. Massifs were also formed as estuaries retreated across the shelf.

Some sand ridges are more modern in origin than the shelf's glaciated morphology. Their formation is not well understood; however, they appear to develop from the sediments that erode from the shore face. They maintain their shape, so it is assumed that they are in equilibrium with modern current and storm regimes. They are usually grouped, with heights of about 10 m, lengths of 10 - 50 km and spacing of 2 km. Ridges are usually oriented at a slight angle towards shore, running in length from northeast to southwest. The seaward face usually has the steepest slope. Sand ridges are often covered with smaller similar forms such as sand waves, megaripples, and ripples. Swales occur between sand ridges. Since ridges are higher than the adjacent swales, they are exposed to more energy from water currents and experience more sediment mobility than swales. Ridges tend to contain less fine sand, silt and clay while relatively sheltered swales contain more of the finer particles. Swales have greater benthic macrofaunal density, species richness and biomass, due in part to the increased abundance of detrital food and the less physically rigorous conditions.

Sand waves are usually found in patches of 5 - 10 with heights of about 2 m, lengths of 50 - 100 m and 1 - 2 km between patches. Sand waves are primarily found on the inner shelf, and often observed on sides of sand ridges. They may remain intact over several seasons. Megaripples occur on sand waves or separately on the inner or central shelf. During the winter storm season, they may cover as much as 15% of the inner shelf. They tend to form in large patches and usually have lengths of 3 - 5 m with heights of 0.5 - 1 m. Megaripples tend to survive for less than a season. They can form during a storm and reshape the upper 50 - 100 cm of the sediments within a few hours. Ripples are also found everywhere on the shelf and appear or disappear within hours or days, depending upon storms and currents. Ripples usually have lengths of about 1 - 150 cm and heights of a few centimeters.

Sediments are uniformly distributed over the shelf in this region. A sheet of sand and gravel varying in thickness from 0 - 10 m covers most of the shelf. The mean bottom flow from the constant southwesterly current is not fast enough to move sand, so sediment transport must be episodic. Net sediment movement is in the same southwesterly direction as the current. The sands are mostly medium to coarse grains, with finer sand in the Hudson Shelf Valley and on the outer shelf. Mud is rare over most of the shelf, but is common in the Hudson Shelf Valley. Occasionally relic estuarine mud deposits are re-exposed in the swales between sand ridges. Fine sediment content increases rapidly at the shelf break, which is sometimes called the "mud line," and sediments are 70 - 100% fine on the slope. On the slope, silty sand, silt, and clay predominate (Stevenson et al. 2004).

Artificial reefs are another significant Mid-Atlantic habitat. These localized areas of hard structure were formed by shipwrecks, lost cargoes, disposed solid materials, shoreline jetties and groins, submerged pipelines, cables, and other materials (Steimle and Zetlin 2000). While some of these materials were deposited specifically for use as fish habitat, most have an alternative primary purpose; however, they have all become an integral part of the coastal and shelf ecosystem. In general, reefs are important for attachment sites, shelter, and food for many species, and fish predators such as tunas may be attracted by prey aggregations, or may be behaviorally attracted to the reef structure.

Like all the world's oceans, the western North Atlantic is experiencing changes to the physical environment due to global climate change. These changes include warming temperatures; sea level rise; ocean acidification; changes in stream flow, ocean circulation, and sediment deposition; and increased frequency, intensity, and duration of extreme climate events. These changes in physical habitat can impact the metabolic rate and other biological processes of marine species. As such, these changes have implications for the distribution and productivity of many marine species. Several studies demonstrate that the distribution and productivity of several species in the Mid-Atlantic have changed over time, likely because of changes in physical habitat conditions such as temperature (e.g., Weinberg 2005, Lucey and Nye 2010, Nye et al. 2011, Pinsky et al. 2013, Gaichas et al. 2015).

6.2.2 Essential Fish Habitat (EFH)

The MSA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (MSA Section 3). The MSA requires that Councils describe and identify EFH for managed species and "minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat" (MSA Section 303 (a)(7)).

The broad definition of EFH has led the Mid-Atlantic and the New England Fishery Management Councils to identify EFH throughout most of the Northeast U.S. Shelf Ecosystem, ranging from areas out to the shelf break to wetlands, streams, and rivers. Table 8 summarizes EFH within the affected area of this action for federally-managed species and life stages that are vulnerable to bottom tending fishing gear. EFH maps and text descriptions for these species and life stages can be found at www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper.

Information on bluefish habitat requirements, including ecological relationships, can be found in the documents titled, "Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix*, Life History and Habitat Characteristics" (Shepherd and Packer 2006). An electronic version of this source document is available at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

Bluefish are a predominantly pelagic species (Shepherd and Packer 2006). Life history data show that there are only loose associations of bluefish with any particular substrate or submerged aquatic vegetation (SAV; Shepherd and Packer 2006). Juveniles are the only life-stage that spatially and temporally co-occur on a regular basis with SAV. Bluefish juveniles and adults commonly occur in estuarine areas during the period of the year when eelgrass is present and prey on species which are associated with SAV. Some degree of linkage with SAV is likely, but given the extent to which the life cycle of bluefish occurs offshore outside the range of SAV, it is probably less than for other species (Laney 1997).

Table 8. Geographic distributions and habitat characteristics of EFH designations for benthic fish and shellfish species within the affected environment of the action.

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
American plaice	Juveniles	Gulf of Maine and bays and estuaries from Passamaquoddy Bay to Saco Bay, Maine and from Massachusetts Bay to Cape Cod Bay, Massachusetts Bay	40-180	Sub-tidal benthic habitats on mud and sand, also found on gravel and sandy substrates bordering bedrock
American plaice	Adults	Gulf of Maine, Georges Bank and bays and estuaries from Passamaquoddy Bay to Saco Bay, Maine and from Massachusetts Bay to Cape Cod Bay, Massachusetts Bay	40-300	Sub-tidal benthic habitats on mud and sand, also gravel and sandy substrates bordering bedrock
Atlantic cod	Juveniles	Gulf of Maine, Georges Bank, and Southern New England, including nearshore waters from eastern Maine to Rhode Island and the following estuaries: Passamaquoddy Bay to Saco Bay; Massachusetts Bay, Boston Harbor, Cape Cod Bay, and Buzzards Bay	Mean high water-120	Structurally-complex intertidal and sub-tidal habitats, including eelgrass, mixed sand and gravel, and rocky habitats (gravel pavements, cobble, and boulder) with and without attached macroalgae and emergent epifauna
Atlantic cod	Adults	Gulf of Maine, Georges Bank, Southern New England, and the Mid-Atlantic to Delaware Bay, including the following estuaries: Passamaquoddy Bay to Saco Bay; Massachusetts Bay, Boston	30-160	Structurally complex sub-tidal hard bottom habitats with gravel, cobble, and boulder substrates with and without emergent epifauna and macroalgae, also sandy substrates and along deeper slopes of ledges

		Harbor, Cape Cod Bay, and Buzzards Bay		
Atlantic halibut	Juveniles & Adults	Gulf of Maine, Georges Bank, and continental slope south of Georges Bank	60-140 and 400-700 on slope	Benthic habitats on sand, gravel, or clay substrates
Atlantic sea scallop	Eggs	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Inshore and offshore benthic habitats (see adults)
Atlantic sea scallop	Larvae	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Massachusetts Bay, and Cape Cod Bay	No information	Inshore and offshore pelagic and benthic habitats: pelagic larvae ("spat"), settle on variety of hard surfaces, including shells, pebbles, and gravel and to macroalgae and other benthic organisms such as hydroids
Atlantic sea scallop	Juveniles	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Great Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Benthic habitats initially attached to shells, gravel, and small rocks (pebble, cobble), later free-swimming juveniles found in same habitats as adults
Atlantic sea scallop	Adults	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Great Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Benthic habitats with sand and gravel substrates
Atlantic surfclam	Juveniles and adults	Continental shelf from southwestern Gulf of Maine to Cape Hatteras, North Carolina	Surf zone to about 61, abundance low >38	In substrate to depth of 3 ft
Atlantic wolffish	Eggs	U.S. waters north of 41˚N latitude and east of 71˚W longitude	<100	Sub-tidal benthic habitats under rocks and boulders in nests
Atlantic wolffish	Juveniles	U.S. waters north of 41˚N latitude and east of 71˚W longitude	70-184	Sub-tidal benthic habitats
Atlantic wolffish	Adults	U.S. waters north of 41˚N latitude and east of 71˚W longitude	<173	A wide variety of sub-tidal sand and gravel substrates once they leave rocky spawning habitats, but not on muddy bottom
Barndoor skate	Juveniles and adults	Primarily on Georges Bank and in Southern New England and on the continental slope	40-400 on shelf and to 750 on slope	Sub-tidal benthic habitats on mud, sand, and gravel substrates
Black sea bass	Juveniles and adults	Continental shelf and estuarine waters from the southwestern Gulf of Maine and Cape Hatteras, North Carolina	Inshore in summer and spring	Benthic habitats with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas, also offshore clam beds and shell patches in winter
Clearnose skate	Juveniles	Inner continental shelf from New Jersey to the St. Johns River in Florida and certain bays and certain estuaries including Raritan Bay, inland New Jersey bays,	0-30	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom

		Chesapeake Bay, and Delaware Bays		
Clearnose skate	Adults	Inner continental shelf from New Jersey to the St. Johns River in Florida and certain bays and certain estuaries including Raritan Bay, inland New Jersey bays, Chesapeake Bay, and Delaware Bays	0-40	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
Golden tilefish	Juveniles and adults	Outer continental shelf and slope from U.S.-Canada boundary to the Virginia-North Carolina boundary	100-300	Burrows in semi-lithified clay substrate, may also utilize rocks, boulders, scour depressions beneath boulders, and exposed rock ledges as shelter
Haddock	Juveniles	Inshore and offshore waters in the Gulf of Maine, on Georges Bank, and on the continental shelf in the Mid-Atlantic region	40-140 and as shallow as 20 in coastal Gulf of Maine	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel
Haddock	Adults	Offshore waters in the Gulf of Maine, on Georges Bank, and on the continental shelf in Southern New England	50-160	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel and adjacent to boulders and cobbles along the margins of rocky reefs
Little skate	Juveniles	Coastal waters in the Gulf of Maine, Georges Bank, and the continental shelf in the Mid-Atlantic region as far south as Delaware Bay, including certain bays and estuaries in the Gulf of Maine	Mean high water-80	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
Little skate	Adults	Coastal waters in the Gulf of Maine, Georges Bank, and the continental shelf in the Mid-Atlantic region as far south as Delaware Bay, including certain bays and estuaries in the Gulf of Maine	Mean high water-100	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
Longfin inshore squid	Eggs	Inshore and offshore waters from Georges Bank southward to Cape Hatteras	Generally <50	Bottom habitats attached to variety of hard bottom types, macroalgae, sand, and mud
Monkfish	Juveniles	Gulf of Maine, outer continental shelf in the Mid-Atlantic, and the continental slope	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on a variety of habitats, including hard sand, pebbles, gravel, broken shells, and soft mud, also seek shelter among rocks with attached algae
Monkfish	Adults	Gulf of Maine, outer continental shelf in the Mid-Atlantic, and the continental slope	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on hard sand, pebbles, gravel, broken shells, and soft mud, but seem to prefer soft sediments, and, like juveniles, utilize the edges of rocky areas for feeding
Ocean pout	Eggs	Georges Bank, Gulf of Maine, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	<100	Sub-tidal hard bottom habitats in sheltered nests, holes, or rocky crevices
Ocean pout	Juveniles	Gulf of Maine, on the continental shelf north of Cape May, New Jersey, on the southern portion of Georges Bank, and including	Mean high water-120	Intertidal and sub-tidal benthic habitats on a wide variety of substrates, including shells, rocks,

		certain bays and estuaries in the Gulf of Maine		algae, soft sediments, sand, and gravel
Ocean pout	Adults	Gulf of Maine, Georges Bank, on the continental shelf north of Cape May, New Jersey, and including certain bays and estuaries in the Gulf of Maine	20-140	Sub-tidal benthic habitats on mud and sand, particularly in association with structure forming habitat types, i.e., shells, gravel, or boulders
Ocean quahogs	Juveniles and adults	Continental shelf from southern New England and Georges Bank to Virginia	9-244	In substrate to depth of 3 ft
Offshore hake	Juveniles	Outer continental shelf and slope from Georges Bank to 34° 40'N	160-750	Pelagic and benthic habitats
Offshore hake	Adults	Outer continental shelf and slope from Georges Bank to 34° 40'N	200-750	Pelagic and benthic habitats
Pollock	Juveniles	Inshore and offshore waters in the Gulf of Maine (including bays and estuaries in the Gulf of Maine), the Great South Channel, Long Island Sound, and Narragansett Bay, Rhode Island	Mean high water-180 in Gulf of Maine, Long Island Sound, and Narragansett Bay; 40-180 on Georges Bank	Intertidal and sub-tidal pelagic and benthic rocky bottom habitats with attached macroalgae, small juveniles in eelgrass beds, older juveniles move into deeper water habitats also occupied by adults
Pollock	Adults	Offshore Gulf of Maine waters, Massachusetts Bay and Cape Cod Bay, on the southern edge of Georges Bank, and in Long Island Sound	80-300 in Gulf of Maine and on Georges Bank; <80 in Long Island Sound, Cape Cod Bay, and Narragansett Bay	Pelagic and benthic habitats on the tops and edges of offshore banks and shoals with mixed rocky substrates, often with attached macro algae
Red hake	Juveniles	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including Passamaquoddy Bay to Cape Cod Bay in the Gulf of Maine, Buzzards Bay and Narragansett Bay, Long Island Sound, Raritan Bay and the Hudson River, and lower Chesapeake Bay	Mean high water-80	Intertidal and sub-tidal soft bottom habitats, especially those that provide shelter, such as depressions in muddy substrates, eelgrass, macroalgae, shells, anemone and polychaete tubes, on artificial reefs, and in live bivalves (e.g., scallops)
Red hake	Adults	In the Gulf of Maine, the Great South Channel, and on the outer continental shelf and slope from Georges Bank to North Carolina , including inshore bays and estuaries as far south as Chesapeake Bay	50-750 on shelf and slope, as shallow as 20 inshore	Sub-tidal benthic habitats in shell beds, on soft sediments (usually in depressions), also found on gravel and hard bottom and artificial reefs
Rosette skate	Juveniles and adults	Outer continental shelf from approximately 40˚N to Cape Hatteras, North Carolina	80-400	Benthic habitats with mud and sand substrates
Scup	Juveniles	Continental shelf between southwestern Gulf of Maine and Cape Hatteras, North Carolina and in nearshore and estuarine waters between Massachusetts and Virginia	No information	Benthic habitats, in association with inshore sand and mud substrates, mussel and eelgrass beds
Scup	Adults	Continental shelf and nearshore and estuarine waters between southwestern Gulf of Maine and Cape Hatteras, North Carolina	No information, generally overwinter offshore	Benthic habitats
Silver hake	Juveniles	Gulf of Maine, including certain bays and estuaries, and on the continental shelf as far south as Cape May, New Jersey	40-400 in Gulf of Maine, >10 in Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats in association with sand-waves, flat sand with amphipod tubes, shells, and in biogenic depressions

Silver hake	Adults	Gulf of Maine, including certain bays and estuaries, the southern portion of Georges Bank, and the outer continental shelf and some shallower coastal locations in the Mid-Atlantic	>35 in Gulf of Maine, 70-400 on Georges Bank and in the Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats, often in bottom depressions or in association with sand waves and shell fragments, also in mud habitats bordering deep boulder reefs, on over deep boulder reefs in the southwest Gulf of Maine
Smooth skate	Juveniles	Offshore Gulf of Maine, some coastal bays in Maine and New Hampshire, and on the continental slope from Georges Bank to North Carolina	100-400 offshore Gulf of Maine, <100 inshore Gulf of Maine, to 900 on slope	Benthic habitats, mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine
Smooth skate	Adults	Offshore Gulf of Maine and the continental slope from Georges Bank to North Carolina	100-400 offshore Gulf of Maine, to 900 on slope	Benthic habitats, mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine
Summer flounder	Juveniles	Continental shelf and estuaries from Cape Cod, Massachusetts, to Cape Canaveral, Florida	To maximum 152	Benthic habitats, including inshore estuaries, salt marsh creeks, seagrass beds, mudflats, and open bay areas
Summer flounder	Adults	Continental shelf from Cape Cod, Massachusetts, to Cape Canaveral, Florida, including shallow coastal and estuarine waters during warmer months	To maximum 152 in colder months	Benthic habitats
Spiny dogfish	Juveniles	Primarily the outer continental shelf and slope between Cape Hatteras and Georges Bank and in the Gulf of Maine	Deep water	Pelagic and epibenthic habitats
Spiny dogfish	Female sub-adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Male sub-adults	Primarily in the Gulf of Maine and on the outer continental shelf from Georges Bank to Cape Hatteras	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Female adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Male adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Thorny skate	Juveniles	Offshore Gulf of Maine, some coastal bays in the Gulf of Maine, and on the continental slope from Georges Bank to North Carolina	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 om slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
Thorny skate	Adults	Offshore Gulf of Maine and on the continental slope from Georges Bank to North Carolina	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 om slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
White hake	Juveniles	Gulf of Maine, Georges Bank, and Southern New England, including bays and estuaries in the Gulf of Maine	Mean high water - 300	Intertidal and sub-tidal estuarine and marine habitats on fine-grained, sandy substrates in eelgrass, macroalgae, and un-vegetated habitats
White hake	Adults	Gulf of Maine, including coastal bays and estuaries, and the outer continental shelf and slope	100-400 offshore Gulf of Maine, >25 inshore Gulf of	Sub-tidal benthic habitats on fine-grained, muddy substrates and in mixed soft and rocky habitats

			Maine, to 900 on slope	
Windowpane flounder	Juveniles	Estuarine, coastal, and continental shelf waters from the Gulf of Maine to northern Florida, including bays and estuaries from Maine to Maryland	Mean high water - 60	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Windowpane flounder	Adults	Estuarine, coastal, and continental shelf waters from the Gulf of Maine to Cape Hatteras, North Carolina, including bays and estuaries from Maine to Maryland	Mean high water - 70	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Winter flounder	Eggs	Eastern Maine to Absecon Inlet, New Jersey (39° 22´N) and Georges Bank	0-5 south of Cape Cod, 0-70 Gulf of Maine and Georges Bank	Sub-tidal estuarine and coastal benthic habitats on mud, muddy sand, sand, gravel, submerged aquatic vegetation, and macroalgae
Winter flounder	Juveniles	Coastal Gulf of Maine, Georges Bank, and continental shelf in Southern New England and Mid-Atlantic to Absecon Inlet, New Jersey, including bays and estuaries from eastern Maine to northern New Jersey	Mean high water - 60	Intertidal and sub-tidal benthic habitats on a variety of bottom types, such as mud, sand, rocky substrates with attached macro algae, tidal wetlands, and eelgrass; young-of-the-year juveniles on muddy and sandy sediments in and adjacent to eelgrass and macroalgae, in bottom debris, and in marsh creeks
Winter flounder	Adults	Coastal Gulf of Maine, Georges Bank, and continental shelf in Southern New England and Mid-Atlantic to Absecon Inlet, New Jersey, including bays and estuaries from eastern Maine to northern New Jersey	Mean high water - 70	Intertidal and sub-tidal benthic habitats on muddy and sandy substrates, and on hard bottom on offshore banks; for spawning adults, also see eggs
Winter skate	Juveniles	Coastal waters from eastern Maine to Delaware Bay, including certain bays and estuaries from eastern Maine to Chincoteague Bay, Virginia, and on Georges Bank and the continental shelf in Southern New England and the Mid-Atlantic	0-90	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Winter skate	Adults	Coastal waters from eastern Maine to Delaware Bay, including certain bays and estuaries in Maine and New Hampshire, and on Georges Bank and the continental shelf in Southern New England and the Mid-Atlantic	0-80	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Witch flounder	Juveniles	Gulf of Maine and outer continental shelf and slope	50-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
Witch flounder	Adults	Gulf of Maine and outer continental shelf and slope	35-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
Yellowtail flounder	Juveniles	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	20-80	Sub-tidal benthic habitats on sand and muddy sand
Yellowtail flounder	Adults	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	25-90	Sub-tidal benthic habitats on sand and sand with mud, shell hash, gravel, and rocks

6.2.3 Fishery Impact Considerations

A baseline fishing effects analysis is provided in the Mid-Atlantic Council's specification of management measures for the 2004 fishing year (MAFMC 2003). This analysis considered 1995-2001 as the baseline time period. Baseline conditions (i.e., the distribution and intensity of bottom otter trawling in the commercial bluefish fishery) have not changed significantly since 2001. The 2004 evaluation of the habitat impacts of bottom otter trawls, gillnets, and handlines used in the commercial bluefish fishery indicated that the baseline impact of the fishery was minimal and temporary in nature. Additionally, only these gear types which contact the bottom impact physical habitat. Consequently, adverse effects of the bluefish fishery on EFH did not need to be minimized. Since commercial landings of bluefish have remained stable since 2001, the adverse impacts of the bluefish fishery have continued to be minimal during the time period 2001-2020. The FMP limits recreational specifications for bluefish to possession limits and recreational harvest limits. The principal gears used in the recreational fishery for bluefish are rod and reel and handline. The potential adverse impacts of these gears on EFH for this federally managed species in the region is minimal (Stevenson et al. 2004). Potential impacts of the amendment alternatives are evaluated in section 7.1 of this EA.

Only those gear types which contact the bottom impact physical habitat. The actions proposed in this document are relevant to both the commercial and recreational bluefish fisheries. The recreational fishery is almost exclusively a hook and line fishery. Recreational hook and line gears generally have minimal impacts on physical habitat and EFH in this region (Stevenson et al. 2004). Weighted hook and line gear can contact the bottom, but the magnitude and footprint of any impacts resulting from this contact is likely minimal. Thus, the recreational fisheries are expected to have very minor or no impacts on habitat.

The commercial fishery for bluefish is primarily prosecuted with gill net gear (Table 9) and has limited contact with the bottom. Thus, the magnitude and footprint of any impacts resulting from this contact are likely minimal.

Table 9. Percent of reported commercial landings taken by gear category for bluefish from 2020 dealer data.

Gear	Bluefish
Gillnet	52%
Unknown	24%
Otter trawl, bottom fish	15%
Handline	5%
Other	4%

Stevenson et al. (2004) compiled a detailed summary of several studies on the impacts of a variety of gear types on marine habitats. Conclusions relevant for this action are briefly summarized below with a focus on bottom trawl gear since this is the gear type used in commercial harvest that causes the greatest impact when it occurs.

Otter trawl doors can create furrows in sand, mud, and gravel/rocky substrates. Studies have found furrow depths that range from 2 to 10 cm. Bottom trawl gear can also re-suspend and disperse surface sediments and can smooth topographic features. It can also result in reduced abundance, and in some cases reduced diversity, of benthic species such as nematodes, polychaetes, and bivalves. It can also have short-term positive ecological impacts such as increased food value and increased chlorophyll production in surface sediments. The duration of these impacts varies by sediment type, depth, and frequency of the impact (e.g., a single trawl tow vs. repeated tows). Some studies documented effects that lasted only a few months. Other studies found effects that lasted up to 18 months. Impacts tend to have shorter durations in dynamic environments with less structured bottom composition compared to less dynamic environments with structured bottom. Shallower water, stronger bottom currents, more wave action, finer-grained sediments, and higher frequencies of natural disturbance are characteristics that make environments more dynamic (Stevenson et al. 2004).

The Mid-Atlantic Council developed some fishery management actions with the sole intent of protecting marine habitats. For example, in Amendment 9 to the Mackerel, Squids, and Butterfish FMP, the Council determined that bottom trawls used in Atlantic mackerel, longfin and *Illex* squid, and butterfish fisheries have the potential to adversely affect EFH for some federally-managed fisheries (MAFMC 2008). As a result of Amendment 9, closures to squid trawling were developed for portions of Lydonia and Oceanographer Canyons. Subsequent closures were implemented in these and Veatch and Norfolk Canyons to protect tilefish EFH by prohibiting all bottom trawling activity. In addition, amendment 16 to the Mackerel, Squid, and Butterfish FMP prohibits the use of all bottom-tending gear in fifteen discrete zones and one broad zone where deep sea corals are known or highly likely to occur (81 Federal Register 90246, December 14, 2016).

6.3 ESA-Listed Species and MMPA Protected Species

Numerous protected species inhabit the affected environment of the bluefish FMP (Table 10) and have the potential to be impacted by the proposed action (i.e., there have been observed/documented interactions in the fishery or with gear type(s) similar to those used in the fishery (hook and line, bottom trawl or gillnet gear)). These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972.

Table 10. Species Protected Under the ESA and/or MMPA that May Occur in the Affected Environment of the Bluefish Fishery. Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks.[1]

Species	Status[2]	Potentially impacted by this action?
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***Yes***
Humpback whale, West Indies DPS (distinct population segment) (*Megaptera novaeangliae*)[3]	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	***Endangered***	***Yes***
Sei whale (Balaenoptera borealis)	***Endangered***	***Yes***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter microcephalus	***Endangered***	***No***

Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (*Globicephala spp.*)[3]	Protected (MMPA)	Yes
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	Yes
Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[4]	***Protected (MMPA)***	***Yes***
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	Yes
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		
GOM DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk (*Brosme brosme)*	Candidate	Yes
Giant manta ray (*Brosme brosme*)	Threatened	Yes
Smalltooth sawfish (U.S. DPS) (*Pristis pectinata*)	Endangered	No
Oceanic Whitetip shark (*Carcharhinus longimanus*)	Threatened	No
Nassau grouper (*Epinephelus striatus*)	Threatened	No

<u>Pinnipeds</u>		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	Yes
<u>Corals</u>		
Elkhorn Coral (*Acropora palmata*)	Threatened	No
Staghorn Coral (*Acropora cervicornis*)	Threatened	No
Pillar Coral (*Dendrogyra cylindrus*)	Threatened	No
Rough cactus coral (*Mycetophyllia ferox*)	Threatened	No
Lobed star coral (*Orbicella annularis*)	Threatened	No
Mountainous star coral (*Orbicella faveolata)*	Threatened	No
Boulder star coral (*Orbicella franksi)*	Threatened	No
<u>Seagrass</u>		
Johnson's Sea Grass (*Halophila johnsonii)*	Threatened	No
<u>Critical Habitat</u>		
North Atlantic Right Whale	ESA (Protected)	No
Northwest Atlantic Ocean DPS of Loggerhead Sea Turtle	ESA (Protected)	No
Johnson's Sea Grass	ESA (Protected)	No
Elkhorn and staghorn corals	ESA (Protected)	No
Smalltooth sawfish (U.S. DPS)	ESA (Protected)	No

Notes:
[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3, 1972).

[2] The status of the species is defined by whether the species is listed under the ESA as endangered (species are at risk of extinction) or threatened (species at risk of endangerment), or protected under the MMPA. Note, marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species in which ESA listing may be warranted.
[3] There are two species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.
[4] This includes all stocks of bottlenose dolphins along the Atlantic coast except for the Florida Bay stock (see marine mammal stock assessment reports: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region).

Cusk (Table 10), a NMFS "species of concern," as well as a "candidate species" under the ESA, occurs in the affected environment of the bluefish fishery. Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA and also include those species for which NMFS has initiated an ESA status review through an announcement in the FR. Once a species is proposed for listing, the conference provisions of the ESA apply (see 50 CFR § 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, this species will not be discussed further in this section. However, for additional information on cusk and proactive conservation efforts being initiated for the species, visit: http://www.greateratlantic.fisheries.noaa.gov/protected/pcp/soc/cusk.html.

6.3.1 Species and Critical Habitat Not Likely to be Impacted by the Proposed Action

Based on available information, it has been determined that this action is not likely to impact multiple ESA listed and/or marine mammal protected species or any designated critical habitat (Table 10). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or based on the most recent 10 years of observer, stranding, and/or marine mammal serious injury and mortality reports, there have been no observed or documented interactions between the species and the primary gear type (i.e., hook and line, gillnet, and bottom trawl) used to prosecute the bluefish fishery (Greater Atlantic Region (GAR) Marine Animal Incident Database, unpublished data; Marine Mammal Stock Assessment Reports (SARs) for the Atlantic Region;[6] NMFS NEFSC observer/sea sampling database, unpublished data; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html; MMPA List of Fisheries (LOF): https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS 2021a).[7] In the case of critical habitat, this determination has been made because the action will not affect the essential physical and biological features of critical habitat

[6] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region
[7] For marine mammals protected under the MMPA the most recent 10 years of observer, stranding, and/or marine mammal serious injury and mortality reports are from 2009-2018; however, the GAR Marine Animal Incident Database (unpublished data) contains large whale entanglement reports for 2019. For ESA listed species, information on observer or documented interactions with fishing gear is from 2010-2019.

identified in Table 10 and therefore, will not result in the destruction or adverse modification of any species critical habitat (NMFS 2021a).

6.3.2. Species Potentially Impacted by the Proposed Action

Table 10 has a list of protected species of sea turtle, marine mammal, and fish species present in the affected environment of the bluefish fishery, and that may also be impacted by the operation of this fishery; that is, have the potential to become entangled or bycaught in the fishing gear used to prosecute the fishery. To aid in the identification of MMPA protected species potentially impacted by the action, NMFS (2021b), the MMPA LOF, and marine mammal SARS and serious injury and mortality reports were referenced (see Marine Mammal SARs for the Atlantic Region[6]; Region: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; MMPA LOF: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS NEFSC observer/sea sampling database, unpublished data; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html).

To help identify ESA listed species potentially impacted by the action, we queried the NMFS NEFSC observer/sea sampling (2010-2019), Sea Turtle Disentanglement Network (2010-2019), and the GAR Marine Animal Incident (2010-2019) databases for interactions, as well as reviewed the May 27, 2021, Biological Opinion (Opinion)[8] issued by NMFS. The 2021 Opinion considered the effects of the NMFS' authorization of ten fishery management plans (FMP),[9] including Atlantic bluefish, NMFS' North Atlantic Right Whale Conservation Framework, and the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2, on ESA-listed species and designated critical habitat. The Opinion determined that the proposed action may adversely affect, but is not likely to jeopardize, the continued existence of North Atlantic right, fin, sei, or sperm whales; the Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, leatherback, Kemp's ridley, or North Atlantic DPS of green sea turtles; any of the five DPSs of Atlantic sturgeon; GOM DPS Atlantic salmon; or giant manta rays. The Opinion also concluded that the proposed action is not likely to adversely affect designated critical habitat for North Atlantic right whales, the Northwest Atlantic Ocean DPS of loggerhead sea turtles, U.S. DPS of smalltooth sawfish, Johnson's seagrass, or elkhorn and staghorn corals. An Incidental Take Statement (ITS) was issued in the Opinion. The ITS includes reasonable and prudent measures and their implementing terms and conditions, which NMFS determined are necessary or appropriate to minimize impacts of the incidental take in the fisheries assessed in this Opinion.

As the primary concern for both MMPA protected and ESA listed species is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) data and observed records of protected species interaction with particular fishing gear types, to understand the potential risk of an interaction.

[8] NMFS' May 27, 2021, Biological Opinion on the 10 FMPs is found at: https://www.fisheries.noaa.gov/resource/document/biological-opinion-10-fishery-management-plans

[9] The ten FMPs considered in the May 27, 2021, Biological Opinion include the: (1) American lobster; (2) Atlantic bluefish; (3) Atlantic deep-sea red crab; (4) mackerel/squid/butterfish; (5) monkfish; (6) Northeast multispecies; (7) Northeast skate complex; (8) spiny dogfish; (9) summer flounder/scup/black sea bass; and (10) Jonah crab FMPs.

Information on species occurrence in the affected environment of the bluefish fishery is below, while information on protected species interactions with specific fishery gear is in section 6.3.3.

6.3.2.1 Sea Turtles

Below is a brief summary of the status and trends, as well as the occurrence and distribution of sea turtles in the affected environment of the bluefish fishery. Additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including NMFS (2021a); sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant et al. 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead (Northwest Atlantic DPS) sea turtle (NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a, 2020), Kemp's ridley sea turtle (NMFS et al. 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

Status and Trends

Four sea turtle species have the potential to be impacted by the proposed action: Northwest Atlantic Ocean DPS of Loggerhead, Kemp's ridley, North Atlantic DPS of green, and leatherback sea turtles (Table 10). Although stock assessments and similar reviews have been completed for sea turtles none have been able to develop a reliable estimate of absolute population size. As a result, nest counts are used to inform population trends for sea turtle species.

For the Northwest Atlantic Ocean DPS of loggerhead sea turtles, there are five unique recovery units that comprise the DPS. Nesting trends for each of these recovery units are variable; however, Florida index nesting beaches comprise most of the nesting in the DPS (https://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/). Overall, short-term trends for loggerhead sea turtles (Northwest Atlantic Ocean DPS) have shown increases; however, over the long-term the DPS is considered stable (NMFS 2021a).

For Kemp's ridley sea turtles, from 1980 through 2003, the number of nests at three primary nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) increased 15 percent annually (Heppell et al. 2005); however, due to recent declines in nest counts, decreased survival of immature and adult sea turtles, and updated population modeling, this rate is not expected to continue and therefore, the overall trend is unclear (NMFS and USFWS 2015; Caillouett et al. 2018). In 2019, there were 11,090 nests, a 37.61% decrease from 2018 and a 54.89% decrease from 2017, which had the highest number (24,587) of nests; the reason for this recent decline is uncertain (see NMFS 2021a). Given this and continued anthropogenic threats to the species, according to NMFS (2021a), the species resilience to future perturbation is low.

The North Atlantic DPS of green sea turtle, overall, is showing a positive trend in nesting; however, increases in nester abundance for the North Atlantic DPS in recent years must be viewed cautiously as the datasets represent a fraction of a green sea turtle generation which is between 30 and 40 years (Seminoff et al. 2015). While anthropogenic threats to this species continue, taking into consideration the best available information on the species, NMFS (2021a), concluded that the North Atlantic DPS appears to be somewhat resilient to future perturbations.

Leatherback turtle nesting in the Northwest Atlantic is showing an overall negative trend, with the most notable decrease occurring during the most recent time frame of 2008 to 2017 (NW Atlantic

Leatherback Working Group 2018). The leatherback status review in 2020 concluded that leatherbacks are exhibiting an overall decreasing trend in annual nesting activity (NMFS and USFWS, 2020). Given continued anthropogenic threats to the species, according to NMFS (2021a), the species' resilience to additional perturbation both within the Northwest Atlantic and worldwide is low.

Occurrence and Distribution

Hard-shelled sea turtles - In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (Braun-McNeill et al. 2008; Braun & Epperly 1996; Epperly et al. 1995a,b; Mitchell et al. 2003; Shoop & Kenney 1992; TEWG 2009; Blumenthal et al. 2006; Braun-McNeill & Epperly 2002; Griffin et al. 2013; Hawkes et al. 2006; Hawkes et al. 2011; Mansfield et al. 2009; McClellan & Read 2007; Mitchell et al. 2003; Morreale & Standora 2005). As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Braun-McNeill & Epperly 2004; Epperly et al. 1995a,b,c; Griffin et al. 2013; Morreale & Standora 2005), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop & Kenney 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the GOM by September, but some remain in Mid-Atlantic and Northeast areas until late fall (i.e., November). By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further south, although it should be noted that hard-shelled sea turtles can occur year-round in waters off Cape Hatteras and south (Epperly et al. 1995b; Griffin et al. 2013; Hawkes et al. 2011; Shoop & Kenney 1992).

Leatherback sea turtles - Leatherbacks, a pelagic species, are known to use coastal waters of the U.S. continental shelf and to have a greater tolerance for colder water than hard-shelled sea turtles (James *et al.* 2005; Eckert *et al.* 2006; Murphy *et al.* 2006; NMFS and USFWS 2013b; Dodge *et al.* 2014). Leatherback sea turtles engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992; James *et al.* 2005; James *et al*. 2006; Dodge *et al.* 2014). They are found in more northern waters (i.e., GOM) later in the year (i.e., similar time frame as hard-shelled sea turtles), with most leaving the Northwest Atlantic shelves by mid-November (James *et al*. 2005; James *et al*. 2006; Dodge *et al.* 2014).

6.3.2.2 Large Whales

Status and Trends

Five large whale species have the potential to be impacted by the proposed action: Humpback, North Atlantic right, fin, sei, and minke whales (Table 10). Review of large whale stock assessment reports covering the period of 2009 through 2018, indicate a decreasing trend for the North Atlantic right whale population; however, for fin, humpback, minke and sei whales, it is unknown what the population trajectory is as a trend analysis has not been conducted (Hayes et al. 2017; Hayes et al. 2018; Hayes et al. 2019; Hayes et al. 2020; Hayes et al. 2021; Waring et al. 2016). For additional information on the status of humpback, North Atlantic right, fin, sei, and minke whales, refer to the Marine Mammal SARs for the Atlantic Region provided at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.

Occurrence and Distribution
Humpback, North Atlantic right, fin, sei, and minke whales occur in the Northwest Atlantic. Generally speaking, large whales follow an annual pattern of migration between low latitude (south of 35°N) wintering/calving grounds and high latitude spring/summer/fall foraging grounds (primarily north of 41°N; see Marine Mammal SARs for the Atlantic Region[10]). This is a simplification of whale movements, particularly as it relates to winter movements. It is unknown if all individuals of a population migrate to low latitudes in the winter, although increasing evidence suggests that for some species, some portion of the population remains in higher latitudes throughout the winter (Clapham et al. 1993; Davis et at. 2017; Davis et al. 2020; Swingle et al. 1993; Vu et al. 2012; Marine Mammal SARs for the Atlantic Region[10]). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the occurrence of large whales in low latitude foraging grounds in the spring/summer/fall is well understood. Large whales consistently return to these foraging areas each year, therefore these areas can be considered important areas for whales (Davis et al. 2017; Davis et al. 2020; Payne et al. 1986; Payne et al. 1990; Schilling et al. 1992; Marine Mammal SARs for the Atlantic Region[10]). For additional information on the biology and range wide distribution of humpback, North Atlantic right, fin, sei, and minke whales, refer to the Marine Mammal SARs for the Atlantic Region.[10]

6.3.2.3 Small Cetaceans and Pinnipeds

Status and Trends
Table 10 lists the small cetaceans and pinnipeds that may be impacted by the proposed action. For most small cetaceans and pinniped populations, it is unknown what the population trajectory is as a trend analysis has not been conducted for these populations.[10] However, review of stock assessment reports covering the period of 2009 through 2018, analysis of trends in abundance were provided for several common bottlenose dolphin stocks that occur in the affected environment of the bluefish fishery (i.e., Western North Atlantic: Northern and Southern Migratory Coastal stocks, S. Carolina, Georgia Coastal stock, Northern Florida Coastal stock, and Central Florida Coastal stock) and gray seals (Hayes et al. 2017; Hayes et al. 2018; Hayes et al. 2019; Hayes et al. 2020; Hayes et al. 2021; Waring et al. 2016). The analysis suggested a possible decline in stock abundance for the common bottlenose dolphin stocks and an increasing trend for the gray seal population, respectively (Hayes et al. 2017; Hayes et al. 2018; Hayes et al. 2019; Hayes et al. 2020; Hayes et al. 2020; Waring et al. 2016). For additional information on the status of each species of small cetacean and pinniped, refer to the Marine Mammal SARs for the Atlantic Region.[11]

Occurrence and Distribution
Small cetaceans can be found throughout the year in the Northwest Atlantic Ocean (Maine to Florida); however, within this range, there are seasonal shifts in species distribution and abundance. Pinnipeds are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35 °N). For additional information on the biology and range wide distribution of each species of small cetacean and pinniped, refer to the Marine Mammal SARs for the Atlantic Region.[11]

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[10] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region

6.3.2.4 Atlantic Sturgeon

Status and Trends
As provided in Table 10, Atlantic sturgeon (all five DPSs) have the potential to be impacted by the proposed action. Population trends for Atlantic sturgeon are difficult to discern; however, the most recent stock assessment report concludes that Atlantic sturgeon, at both coastwide and DPS level, are depleted relative to historical levels (ASSRT 2007; ASMFC 2017; NMFS 2021a).

Occurrence and Distribution
The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range (ASSRT 2007; Dovel and Berggren 1983; Dadswell et al. 1984; Kynard et al. 2000; Stein et al. 2004a; Dadswell 2006; Laney et al. 2007; Dunton et al. 2010, 2015; Erickson et al. 2011; Wirgin et al. 2012; Waldman et al. 2013; O'Leary et al. 2014; Wirgin et al. 2015a,b; ASMFC 2017b).

Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein et al. 2004a,b; Erickson et al. 2011; Dunton et al. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein et al. 2004a,b; Dunton et al. 2010; Erickson et al. 2011). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon may undertake seasonal movements along the coast (Dunton et al. 2010; Erickson et al. 2011; Wipplehauser 2012); however, there is no evidence to date that all Atlantic sturgeon make these seasonal movements and therefore, may be present throughout the marine environment throughout the year.

For additional information on the biology and range wide distribution of each DPS of Atlantic sturgeon refer to: 77 FR 5880 and 77 FR 5914, the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT 2007); the ASMFC 2017 Atlantic Sturgeon Benchmark Stock Assessment and Peer Review Report (ASMFC 2017), and NMFS (2021a).

6.3.2.5 Atlantic Salmon

Status and Trends
As provided in Table 10, Atlantic salmon (GOM DPS) have the potential to be impacted by the proposed action. There is no population growth rate available for GOM DPS Atlantic salmon; however, the consensus is that the DPS exhibits a continuing declining trend (NOAA 2016; USFWS and NMFS 2018; NMFS 2021a).

Occurrence and Distribution
The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the GOM DPS extends from the GOM (primarily northern portion of the GOM), to the coast of Greenland (NMFS and USFWS 2005, 2016; Fay et al. 2006). In general, smolts, post-smolts, and adult Atlantic salmon may be present in the GOM and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay et al. 2006; USASAC 2013; Hyvarinen et al. 2006; Lacroix and McCurdy 1996; Lacroix et al. 2004, 2005; Reddin 1985; Reddin and Short

1991; Reddin and Friedland 1993; Sheehan et al. 2012; NMFS and USFWS 2005, 2016; Fay et al. 2006). For additional information on the on the biology and range wide distribution of the GOM DPS of Atlantic salmon, refer to NMFS and USFWS (2005, 2016); Fay et al. (2006); and NMFS (2021a).

6.3.2.6 Giant Manta Ray

Status and Trends

As provided in Table 10, giant manta rays have the potential to be impacted by the proposed action. While there is considerable uncertainty regarding the giant manta ray's current abundance throughout its range, the best available information indicates that in areas where the species is not subject to fishing, populations may be stable (NMFS 2021a). However, in regions where giant manta rays are (or were) actively targeted or caught as bycatch populations appear to be decreasing (Miller and Klimovich 2017).

Occurrence and Distribution

Based on the giant manta ray's distribution, the species may occur in coastal, nearshore, and pelagic waters off the U.S. east coast (Miller and Klimovich 2017). Along the U.S. East Coast, giant manta rays are usually found in water temperatures between 19 and 22°C (Miller and Klimovich 2017) and have been observed as far north as New Jersey. Given that the species is rarely identified in the fisheries data in the Atlantic, it may be assumed that populations within the Atlantic are small and sparsely distributed (Miller and Klimovich 2017).

6.3.3 Interactions Between Gear and Protected Species

Protected species are at risk of interacting with various types of fishing gear, with interaction risks associated with gear type, quantity, soak or tow duration, and degree of overlap between gear and protected species. Information on observed or documented interactions between gear and protected species is available from as early as 1989 (Marine Mammal SARs for the Atlantic Region: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NMFS NEFSC observer/sea sampling database, unpublished data). As the distribution and occurrence of protected species and the operation of fisheries (and, thus, risk to protected species) have changed over the last 30 years, we use the most recent 10 years of available information to best capture the current risk to protected species from fishing gear. For marine mammals protected under the MMPA, this primarily covers the period from 2009-2018[11]; however, the GAR Marine Animal Incident Database (unpublished data) contains large whale entanglement reports for 2019. For ESA listed species, the most recent 10 years of data on observed or documented interactions is available from 2010-2019[12]. Available information on gear interactions with a given species (or species group) is provided in the sections below. The sections

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[11] Waring et al. 2016; Hayes et al. 2017; Hayes et al. 2018; Hayes et al. 2019; Hayes et al. 2020; Hayes et al. 2021; MMPA List of Fisheries (LOF): https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://nefsc.noaa.gov/publications/crd/.

[12] ASMFC 2017; GAR Marine Animal Incident Database, unpublished data; Kocik et al. 2014; Marine Mammal SARs for the Atlantic Region: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region;NMFS 2021a; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://nefsc.noaa.gov/publications/crd/; NMFS; NEFSC observer/sea sampling database, unpublished data; GAR Sea Turtle and Disentanglement Network, unpublished data; NMFS Sea Turtle Stranding and Salvage Network, unpublished data.

to follow are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used to prosecute the multispecies bluefish fishery (i.e., recreational: hook and line; commercial: sink gillnet and bottom trawl gear).

6.3.3.1 Recreational Fisheries Interactions

The recreational bluefish fishery is primarily prosecuted with rod and reel and handline (i.e., hook and line gear). In the absence of an observer program for recreational fisheries, records of recreational hook and line interactions with protected resources are limited. However, as a dedicated observer program exists for all commercial fisheries, there is a wealth of information on observed protected species interactions with all fishing gear types and years of data assessing resultant population level effects of these interactions. Other sources of information, such as state fishing records, stranding databases, and marine mammal SARs, provide additional information that can assist in better understanding hook and line interaction risks to protected species.

6.3.3.1.1 Large whales

Large whales have been documented entangled with hook and line gear or monofilament line (GAR Marine Animal Incident Database, unpublished data; Marine Mammal SARs for the Atlantic Region[13]). Review of mortality and serious injury determinations for baleen whales between 2009-2018 shows that there have been 58 confirmed cases of hook and line and/or monofilament gear around or trailing from portions of the whale's body (Cole and Henry 2013; Henry et al. 2015; Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Henry et al. 2021). Of the 58 cases documented, the majority of them did not result in serious injury to the animal, and none of them resulted in mortality to the whale (86.0% observed/reported whales had a serious injury value of 0; 14.0% had a serious injury value of 0.75;[14] Cole and Henry 2013; Henry et al. 2017; Henry et al. 2020; Henry et al. 2021). In fact, 79.0% of the whales observed or reported with hook/line or monofilament were resighted gear free and healthy; confirmation of the health of the other remaining whales remain unknown as no resightings had been made over the timeframe of the assessment (Cole and Henry 2013; Henry et al. 2015; Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Henry et al. 2021). Based on this information, while large whale interactions with hook and line gear are possible, relative to other gear types, such as fixed gear, hook and line gear appears to represent a low source serious injury or mortality risk to any large whale.

6.3.3.1.2 Small cetaceans and pinnipeds

Reviewing the most recent 10 years of data provided in the marine mammal SARs (i.e., 2009-2018), of the small cetacean and pinniped species identified in Table 10, only bottlenose dolphin stocks and small finned pilot whales have been documented with hook and line gear (see Marine

[13] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region

[14] Any injury leading to a significant health decline (e.g., skin discoloration, lesions near the nares, fat loss, increased cyamid loads) is classified as a serious injury (SI) and will result in a SI value set at 1 (see NMFS NEFSC reference documents (baleen whale serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html

Mammal SARs for the Atlantic Region).[15] As there is no systematic observer program for rod and reel (hook and line) fisheries, most data on hook and line interactions come from stranding data and as such, mean serious injury or mortality estimates are not available; however, a minimum known count of interactions with this gear type is provided in the Marine Mammal SARs for the Atlantic Region.[16] Between 2009-2018, there have been a total of 65 bottlenose dolphin stranding cases for which hook and line gear was documented on the animal (i.e., hook and/or line was wrapped or ingested); in most instances, it could not be determined if the death or serious injury was caused by hook and line gear.[16] Over this timeframe, there were also two cases in which interactions with hook and line gear were observed or self-reported at sea with a small finned pilot whale and a bottlenose dolphin; in both cases the animal was released alive, but with serious injuries.

Based on this, although interactions with hook and line gear are possible, relative to other gear types, such as gillnet or trawl gear, hook and line gear appears to represent a low source serious injury or mortality to bottlenose dolphin stocks along the Atlantic coast and small finned pilot whales. For other species of small cetaceans or pinnipeds, hook and line gear does not appear to be a source of serious injury or mortality.

6.3.3.1.3 Sea turtles

Interactions between ESA listed species of sea turtles and hook and line gear have been documented (GAR Sea Turtle and Disentanglement Network (STDN), unpublished data; NMFS Sea Turtle Stranding and Salvage Network (STSSN), unpublished data; NMFS 2021a). Sea turtles are known to ingest baited hooks or have their appendages snagged by hooks, both of which have been recorded in the STSSN database. Although, it is assumed that most sea turtles hooked by recreational fishermen are released alive, deceased sea turtles with hooks in their digestive tract have been reported (NMFS 2021a). Some turtles will break free on their own and escape with embedded/ingested hooks and/or trailing line, while others may be cut free by fishermen and intentionally released (NMFS 2021a). These sea turtles will escape with embedded or swallowed hooks or trailing varying amounts of monofilament fishing line, which may cause post-release injury or death (e.g., constriction and strangulation of internal digestive organs; wrapped line results in limb amputation; NMFS 2021a). Given the above, hook and line gear does pose an interaction risk to sea turtles; however, the extent to which these interactions are impacting sea turtle populations is still under investigation, and therefore, no conclusions can currently be made on the impact of hook and line gear on the continued survival of sea turtle populations (NMFS 2021a).

6.3.3.1.4 Atlantic sturgeon

Interactions between ESA-listed species of Atlantic sturgeon and hook and line gear have been documented, particularly in nearshore waters (ASMFC 2017). Interactions with hook and line gear have resulted in Atlantic sturgeon injury and mortality and therefore, poses an interaction risk to these species. However, the extent to which these interactions are impacting Atlantic sturgeon

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[15] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region

[16] Marine Mammal SARs for the Atlantic Region reviewed for the period between 2009-2018 are as follows: Waring et al. 2016; and Hayes et al. 2017, 2018, 2019, 2020, 2021. All bottlenose dolphin stocks along the Atlantic coast were reviewed. Counts of interactions were summed across all stocks to get the total number of documented stranding cases in which the animal had hook and line on the animal.

DPSs is still under investigation and therefore, no conclusions can currently be made on the impact of hook and line gear on the continued survival of Atlantic sturgeon DPSs (NMFS 2011b; ASMFC 2017; NMFS 2021a).

6.3.3.1.5 Atlantic salmon

Review of NMFS (2021a), as well as the most recent 10 years of data on observed or documented interactions between Atlantic salmon and fishing gear, show that there have been no observed/documented interactions between Atlantic salmon and hook and line gear (NMFS NEFSC observer/sea sampling database, unpublished data). Based on this information, hook and line gear is not expected to pose an interaction risk to any Atlantic salmon and therefore, is not expected to be source of injury or mortality to this species.

6.3.3.1.5 Giant manta ray

Review of NMFS (2021a), as well as the most recent 10 years of data on observed or documented interactions between giant manta rays and fishing gear, show that there have been no observed/documented interactions between giant manta rays and hook and line gear (NMFS NEFSC observer/sea sampling database, unpublished data). Based on this information, hook and line gear is not expected to pose an interaction risk to giant manta rays and therefore, is not expected to be source of injury or mortality to this species

6.3.3.2 Commercial Fisheries Interactions

The bluefish commercial fishery uses gillnets, bottom otter trawls, and hook and line gear. Except for what has been provided in section 6.3.3.1, no additional information is available on commercial hook and line interactions with protected species. Given this, this section will focus on gillnet and/or bottom otter trawl gear, which are known to interact with ESA-listed and/or MMPA protected species.

6.3.3.2.1 Marine mammals

Depending on species, marine mammals have been observed seriously injured or killed in bottom trawl and/or sink gillnet gear. Pursuant to the MMPA, NMFS publishes a LOF annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). In the Northwest Atlantic, the 2021 LOF (86 FR 3028 (January 14, 2021)) categorizes commercial gillnet fisheries (Northeast or Mid-Atlantic) as Category I fisheries and commercial bottom trawl fisheries (Northeast or Mid-Atlantic) as Category II fisheries.

6.3.3.2.1.1 Large whales

Bottom Trawl Gear
Review of the most recent 10 years of observer, stranding, and/or marine mammal serious injury and mortality reports from 2009-2018, and querying the GAR Marine Animal Incident database (which contains data for 2019), showed that there have been no observed or documented

interactions with large whales and bottom trawl gear.[17] Based on this information, large whale interactions with bottom trawl gear are not expected.

Fixed Fishing Gear (e.g., Sink Gillnet Gear)

Large whale interactions (entanglements) with fishing gear have been documented in the waters of the Northwest Atlantic.[18] Information available on interactions with large whales comes from NMFS (2021a,b), reports documented in the GAR Marine Animal Incident Database (unpublished data), as well as the NMFS NEFSC's baleen whale serious injury and mortality reports (https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html). Review of the most recent ten years (i.e., 2010-2019) of data indicates that, in terms of confirmed incidences of human interactions (e.g., ship strike, entanglement), entanglement in fishing gear accounts for the majority of all large whale interactions reported and documented for humpback, North Atlantic right, fin, and minke whales. Albeit to a lesser extent, the best available data also shows that sei whales have been reported and documented entangled in fishing gear.

Based on the best available information, the greatest entanglement risk to large whales is posed by fixed gear, such as that used in sink gillnet or trap/pot fisheries (Angliss and Demaster 1998; Cassoff et al. 2011; Kenney and Hartley 2001; Knowlton and Kraus 2001; Hartley et al. 2003; Johnson et al. 2005; Whittingham et al. 2005a,b; Knowlton et al. 2012; NMFS 2014; NMFS 2021a,b; Hamilton and Kraus 2019; Cole and Henry 2013; Henry et al. 2014; Henry et al. 2015; Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Henry et al. 2021; Sharp et al. 2019; see Marine Mammal SARs for the Atlantic Region[19]). Specifically, while foraging or transiting, large whales are at risk of becoming entangled in vertical endlines, buoy lines, and/or groundlines of gillnet gear, as well as the net panels of gillnet gear that rise into the water column (Baumgartner et al. 2017; Cassoff et al. 2011; Cole and Henry 2013; Hamilton and Kraus 2019; Hartley et al. 2003; Henry et al. 2014; Henry et al. 2015; Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Henry et al. 2021; Johnson et al. 2005; Kenney and Hartley 2001; Knowlton and Kraus 2001; Knowlton et al. 2012; NMFS 2014; NMFS 2021a,b;

[17] GAR Marine Animal Incident Database (unpublished data); Marine Mammal SARs for the Atlantic Region: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NMFS NEFSC observer/sea sampling database, unpublished data ; MMPA LOF: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html

[18] GAR Marine Animal Incidence Database, unpublished data; NMFS Atlantic Large Whale Entanglement Reports: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan (for years prior to 2014, contact David Morin, Large Whale Disentanglement Coordinator, David.Morin@NOAA.gov; NMFS Marine Mammal SARs for the Atlantic Region :https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NMFS NEFSC Marine Reference Documents (baleen whale serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html; MMPA List of Fisheries: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS 2021a,b: NMFS Atlantic Large Whale Take Reduction Plan: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan

[19] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region

Whittingham et al. 2005a,b; NMFS Marine Mammal SARs for the Atlantic Region).[20] Large whale interactions (entanglements) with these features of sink gillnet gear often result in the serious injury or mortality to the whale (Angliss and Demaster 1998; Cassoff et al. 2011; Cole and Henry 2013; Henry et al. 2014, Henry et al. 2015, Henry et al. 2016; Henry et al. 2017; Henry et al. 2019; Henry et al. 2020; Henry et al. 2021; Knowlton and Kraus 2001, Knowlton et al. 2012; Moore and Van der Hoop 2012; NMFS 2014; NMFS 2021a,b; Pettis et al. 2019; Sharp et al. 2019; van der Hoop et al. 2016; van der Hoop et al. 2017). As many entanglements, and therefore, serious injury or mortality events, go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, the rate of large whale entanglement, and thus, rate of mortality and serious injury due to entanglement, are likely underestimated (Hamilton et al. 2018; Hamilton et al. 2019; Knowlton et al. 2012; Pace et al. 2017; Robbins 2009; NMFS 2021a,b).

Due to the incidences of interactions with vertical lines associated with gillnet and trap/pot gear, in addition to the endangered status of the species being affected most by these gear types (i.e., North Atlantic right and fin whales), pursuant to the MMPA, these large whale species were designated as strategic stocks. Section 118(f)(1) of the MMPA requires the preparation and implementation of a Take Reduction Plan (TRP) for any strategic marine mammal stock that interacts with Category I or II fisheries. As a result, to address and mitigate the risk of large whale entanglement in fixed fishing gear comprised of vertical lines, including gillnet gear, the Atlantic Large Whale Take Reduction Plan (ALWTRP) was implemented. The ALWTRP identifies gear modification requirements and restrictions for Category I and II gillnet fisheries in the Northeast, Mid-Atlantic, and Southeast regions of the U.S. (designated management areas); these fisheries must comply with all regulations of the ALWTRP. For further details on the ALWTRP, specifically gear modification requirements, restrictions, and management areas under the ALWTRP, see: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan.

6.3.3.2.1.2 Small cetaceans

Sink Gillnet and Bottom Trawl Gear

Small cetaceans and pinnipeds are vulnerable to interactions with sink gillnet and bottom trawl gear.[21] Reviewing marine mammal stock assessment and serious injury reports that cover the most recent 10 years data (i.e., 2009-2018), as well as the MMPA LOF's covering this time frame (i.e., issued between 2017 and 2021), Table 11 provides a list of species that have been observed (incidentally) seriously injured and/or killed by MMPA LOF Category I (frequent interactions) gillnet and/or Category II (occasional interactions) bottom trawl fisheries that operate in the affected environment of the bluefish fishery. Of the species in Table 10, gray seals, followed by

[20] Through the ALWTRP, regulations have been implemented to reduce the risk of entanglement in in vertical endlines, buoy lines, or groundlines of gillnet and pot/trap gear, as well as the net panels of gillnet gear. For ALWTRP regulations currently implemented: see https://www.fisheries.noaa.gov/action/atlantic-large-whale-take-reduction-plan-regulations-1997-2015.

[21] For additional information on small cetacean and pinniped interactions, see: NEFSC Reference documents (serious injury and mortality reports): https://apps-nefsc.fisheries.noaa.gov/rcb/publications/center-reference-documents.html; NMFS Marine Mammal SARs for the Atlantic Region: Chavez-Rosales et al. https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; MMPA LOF at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

harbor seals, harbor porpoises, short beaked common dolphins, and harps seals are the most frequently bycaught small cetacean and pinnipeds in sink gillnet gear in the GAR (Hatch and Orphanides 2014, 2015, 2016; Orphanides and Hatch 2017; Orphanides 2019, 2020). In terms of bottom trawl gear, short-beaked common dolphins, Risso's dolphins, and Atlantic white-sided dolphins are the most frequently observed bycaught marine mammal species in the GAR, followed by gray seals, long-finned pilot whales, bottlenose dolphin (offshore), harbor porpoise, harbor seals, and harp seals (Chavez-Rosales *et al.* 2017; Lyssikatos 2015; Lyssikatos et al. 2020; Lyssikatos et al. 2021).

Table 11. Small cetacean and pinniped species observed seriously injured and/or killed by Category I and II sink gillnet or bottom trawl fisheries in the affected environment of the bluefish fishery.

Fishery	Category	Species Observed or reported Injured/Killed
Northeast Sink Gillnet	I	Bottlenose dolphin (offshore)
		Harbor porpoise
		Atlantic white sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Long-finned pilot whales
		Harbor seal
		Hooded seal
		Gray seal
		Harp seal
Mid-Atlantic Gillnet	I	Bottlenose dolphin (Northern Migratory coastal)
		Bottlenose dolphin (Southern Migratory coastal)
		Bottlenose dolphin (offshore)
		Harbor porpoise
		Short-beaked common dolphin
		Harbor seal
		Harp seal
		Gray seal
Northeast Bottom Trawl	II	Harp seal

		Harbor seal
		Gray seal
		Long-finned pilot whales
		Short-beaked common dolphin
		Atlantic white-sided dolphin
		Harbor porpoise
		Bottlenose dolphin (offshore)
		Risso's dolphin
Mid-Atlantic Bottom Trawl	II	White-sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Bottlenose dolphin (offshore)
		Gray seal
		Harbor seal
Source: MMPA 2017-2021 LOFs at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries		

MMPA Section 118(f)(1) requires the preparation and implementation of a TRP for any strategic marine mammal stock that interacts with Category I or II fisheries. Thus, the Harbor Porpoise TRP (HPTRP) and the Bottlenose Dolphin TRP were developed and implemented for these species.[22] Also, due to the incidental mortality and serious injury of small cetaceans, incidental to bottom and midwater trawl fisheries operating in both the Northeast and Mid- Atlantic regions, the Atlantic Trawl Gear Take Reduction Strategy was implemented. Additional information on each TRP or Strategy is at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-take-reduction-plans-and-teams.

6.3.3.2.1.3 Sea turtles

Bottom Trawl Gear

Bottom trawl gear poses an injury and mortality risk to sea turtles (Sasso and Epperly 2006; NMFS Observer Program, unpublished data). Since 1989, the date of our earliest observer records for federally managed fisheries, sea turtle interactions with trawl gear have been observed in the GOM, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been

[22] Although the most recent U.S. Atlantic and Gulf of Mexico Marine Mammal SARs (Hayes et al. 2020) no longer designates harbor porpoise as a strategic stock, HPTRP regulations are still in place per the mandates provided in Section 118(f)(1).

observed south of the GOM (Murray 2008; Murray 2015b; Murray 2020; NMFS NEFSC observer/sea sampling database, unpublished data; NMFS 2021a; Warden 2011a,b). As few sea turtle interactions have been observed in the GOM, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with trawl gear in this region. As a result, the bycatch estimates and discussion below are for trawl gear in the Mid-Atlantic and Georges Bank.

Murray (2020) provided information on sea turtle interaction rates from 2014-2018 (the most recent five-year period that has been statistically analyzed for trawls). Interaction rates were stratified by region, latitude zone, season, and depth. The highest loggerhead interaction rate (0.43 turtles/day fished) was in waters south of 37º N during November to June in waters greater than 50 meters deep. The greatest number of estimated interactions occurred in the Mid-Atlantic region north of 39º N, during July to October in waters less than 50 meters deep. Within each stratum, interaction rates for non-loggerhead species were lower than rates for loggerheads (Murray 2020).

Based on Murray (2020)[23], from 2014-2018, 571 loggerhead (CV=0.29, 95% CI=318-997), 46 Kemp's ridley (CV=0.45, 95% CI=10-88), 20 leatherback (CV=0.72, 95% CI=0-50), and 16 green (CV=0.73, 95% CI=0-44) sea turtle interactions were estimated to have occurred in bottom trawl gear in the Mid-Atlantic region over the five-year period. On Georges Bank, 12 loggerheads (CV=0.70, 95% CI=0-31) and 6 leatherback (CV=1.0, 95% CI=0-20) interactions were estimated to have occurred from 2014-2018. An estimated 272 loggerhead, 23 Kemp's ridley, 13 leatherback, and 8 green sea turtle interactions resulted in mortality over this period (Murray 2020).

Sink Gillnet Gear

Interactions between sink gillnet gear and green, Kemp's ridley, loggerhead, and leatherback sea turtles have been observed in the GAR since 1989 (NMFS NEFSC observer/sea sampling database, unpublished data). Specifically, sea turtle interactions with gillnet gear have been observed in the GOM, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the GOM (Murray 2009a,b; Murray 2013; Murray 2018; NMFS NEFSC observer/sea sampling database, unpublished data; NMFS 2021a). As few sea turtle interactions have been observed in the GOM, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with sink gillnet gear in this region. As a result, the bycatch estimates and discussion below are for sink gillnet gear in the Mid-Atlantic and Georges Bank.

From 2012-2016 (the most recent five-year period that has been statistically analyzed for gillnets), Murray (2018) estimated that sink gillnet fisheries in the Mid-Atlantic and Georges Bank bycaught 705 loggerheads (CV=0.29, 95% CI over all years: 335-1116), 145 Kemp's ridleys (CV =0.43, 95% CI over all years: 44-292), 27 leatherbacks (CV =0.71, 95% CI over all years 0-68), and 112

[23] Murray (2020) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2008; Murray 2015b; Warden 2011a,b), where rates were estimated using generalized additive models (GAMs). Ratio estimator results may be similar to those using GAM or generalized linear models (GLM) if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007, Murray and Orphanides 2013, Orphanides 2010).

unidentified hard-shelled turtles (CV=0.37, 95% CI over all years (64-321).[24] Of these, mortalities were estimated at 557 loggerheads, 115 Kemp's ridley, 21 leatherbacks, and 88 unidentified hard-shelled sea turtles. Total estimated loggerhead bycatch was equivalent to 19 adults. The highest bycatch rate of loggerheads occurred in the southern Mid-Atlantic stratum in large mesh gear during November to June. Though only one sea turtle was observed in this stratum, observed effort was low, leading to a high bycatch rate. Bycatch rates of all other species were lower relative to loggerheads. Highest estimated loggerhead bycatch occurred in the northern mid-Atlantic from July to October in large mesh gears due to the higher levels of commercial effort in the stratum. Mean loggerhead bycatch rates were ten times those of Kemp's ridley bycatch rates in large mesh gear in the northern Mid-Atlantic from July to October (Murray 2018). Although interactions between sink gillnet gear and green sea turtles have been observed (NEFSC observer/sea sampling database, unpublished data); green sea turtles were excluded from the bycatch rate calculations in Murray (2018) because the observed interaction occurred in waters of North Carolina, and therefore, outside the study region.

6.3.3.2.1.4 Atlantic sturgeon

Sink Gillnet and Bottom Trawl Gear
Since 1989, Atlantic sturgeon interactions (i.e., bycatch) with sink gillnet and bottom trawl gear have frequently been observed in the GAR, with most sturgeon observed captured falling within the 100 to 200 cm total length range; however, both larger and small individuals have been observed (ASMFC 2007; ASMFC 2017; Miller and Shepard 2011; NMFS NEFSC observer/sea sampling database, unpublished data; NMFS 2021a; Stein et al. 2004). For sink gillnets, higher levels of Atlantic sturgeon bycatch have been associated with depths of less than 40 meters, mesh sizes of greater than 10 inches, and the months of April and May (ASMFC 2007). For otter trawl fisheries, the highest incidence of Atlantic sturgeon bycatch have been associated with depths less than 30 meters (ASMFC 2007). More recently, over all gears and observer programs that have encountered Atlantic sturgeon, the distribution of haul depths on observed hauls that caught Atlantic sturgeon was significantly different from those that did not encounter Atlantic surgeon, with Atlantic sturgeon encountered primarily at depths less than 20 meters (ASMFC 2017).

The ASMFC (2017) Atlantic sturgeon benchmark stock assessment represents the most accurate predictor of annual Atlantic sturgeon interactions in fishing gear (e.g., otter trawl, gillnet). The stock assessment analyzes fishery observer and VTR data to estimate Atlantic sturgeon interactions in fishing gear in the Mid-Atlantic and New England regions from 2000-2015, the timeframe which included the most recent, complete data at the time of the report. The total bycatch of Atlantic sturgeon from bottom otter trawls ranged between 624-1,518 fish over the 2000-2015 time series, while the total bycatch of Atlantic sturgeon from gillnets ranged from 253-2,715 fish. Focusing on the most recent five-year period of data provided in the stock assessment report,[25] the estimated average annual bycatch during 2011-2015 of Atlantic sturgeon in bottom otter trawl gear is 777.4 individuals and in gillnet gear is 627.6 individuals.

[24] Murray (2018) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2009, 2013), where rates were estimated using GAMs. Ratio estimator results may be similar to those using GAM or GLM if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007, Murray and Orphanides 2013, Orphanides 2010).
[25] The period of 2011-2015 was chosen as it is the period within the stock assessment that most accurately resembles the current trawl fisheries in the region.

6.3.3.2.1.5 Atlantic salmon

Sink Gillnet and Bottom Trawl Gear

Atlantic salmon are at risk of interacting with bottom trawl or gillnet gear (NEFSC observer/sea sampling database, unpublished data; Kocik *et al*. 2014; NMFS 2021a). Northeast Fisheries Observer Program (NEFOP) data from 1989-2019 show records of incidental bycatch of Atlantic salmon in seven of the 31 years, with a total of 15 individuals caught, nearly half of which (seven) occurred in 1992 (NMFS NEFSC observer/sea sampling database, unpublished data).[26] Of the observed incidentally caught Atlantic salmon, ten were listed as "discarded," which is assumed to be a live discard (Kocik, pers comm.; February 11, 2013). Five of the 15 were documented as lethal interactions. The incidental takes of Atlantic salmon occurred in bottom otter trawls (4) and gillnets (11). Observed captures occurred in March (2), April (2), May (1), June (3), August (1), and November (6). Given the very low number of observed Atlantic salmon interactions in gillnet and bottom trawl gear, interactions with these gear types are believed to be rare in the GAR.

6.3.3.2.1.6 Giant manta ray

Giant manta rays are potentially susceptible to capture by bottom trawl and gillnet gear based on records of their capture in fisheries using these gear types (NMFS NEFSC observer/sea sampling database, unpublished data; NMFS 2021a). Review of the most recent 10 years of NEFOP data showed that between 2010-2019, two (unidentified) giant manta rays were observed in bottom trawl gear and two were observed in gillnet gear (NMFS NEFSC observer/sea sampling database, unpublished data). Additionally, all of the giant manta ray interactions in gillnet or trawl gear recorded in the NEFOP database (13 between 2001 and 2019) indicate the animals were encountered alive and released alive. However, details about specific conditions such as injuries, damage, time out of water, how the animal was moved or released, or behavior on release is not always recorded. While there is currently no information on post-release survival, NMFS Southeast Gillnet Observer Program observed a range of 0 to 16 giant manta rays captured per year between 1998 and 2015 and estimated that approximately 89% survived the interaction and release (see NMFS reports available at: http://www.sefsc.noaa.gov/labs/panama/ob/gillnet.htm).

6.4 Human Communities

The following sections summarize impacts to the human community as they relate to the commercial and recreational bluefish fishery, however, social and economic impacts are further described in section 7.5.

6.4.1 Commercial Fishery

The bluefish commercial landings have been relatively stable for the 2018 to 2020 period, ranging from 2.16 to 2.78 million pound (Table 12). In 2020, commercial vessels landed about 2.16 million pounds of bluefish valued at approximately $1.84 million (dealer data). Average coastwide ex-vessel price of bluefish was $0.85 per pound in 2020, a ~4.5% decrease from the previous year (2019 price = $0.89 per pound). The relative value of bluefish is very low compared to other commercially landed species. In 2020, bluefish comprised less than 1% of the total value of all

[26] There is no information available on the genetics of these bycaught Atlantic salmon, so it is not known how many of them were part of the GOM DPS. It is likely that some of these salmon, particularly those caught south of Cape Cod, may have originated from the stocking program in the Connecticut River. Those Atlantic salmon caught north of Cape Cod and/or in the Gulf of Maine are more likely to be from the GOM DPS.

finfish and shellfish landed along the U.S. Atlantic coast. A time series of bluefish revenue and price is provided in Figure 5.

VTR data were used to identify all NMFS statistical areas that accounted for 5 percent or more of the Atlantic bluefish catch or areas which accounted for 5 percent or greater of the trips which caught bluefish in 2020 (Table 13). Eight statistical areas accounted for approximately 74% of the VTR-reported catch of bluefish in 2020. Statistical area 539 was responsible for the highest percentage of the bluefish caught, with statistical area 611 having the most trips that caught bluefish (Table 13). A map of the statistical areas that accounted for a percentage of the Atlantic bluefish catch is shown in Figure 6.

The top commercial landings ports for bluefish in 2020 are shown in Table 14. Five ports qualified as "top bluefish ports," i.e., those ports where 100,000 pounds or more of bluefish were landed. Wanchese, NC was the most active commercial bluefish port with almost 400,000 pounds landed. The ports and communities that are dependent on bluefish are described in Amendment 1 to the FMP (available at http://www.mafmc.org/fisheries/fmp/bluefish). Additional information on "Community Profiles for the Northeast US Fisheries" can be found at https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities.

Table 12. Bluefish commercial quotas and commercial landings from 2016 to 2020.

Year	2016	2017	2018	2019	2020
Commercial Quota	4.88	8.54	7.24	7.71	2.77
Commercial Landings	4.10	3.64	2.20	2.78	2.16

Source: 2021 Bluefish Fishery Information Document found here

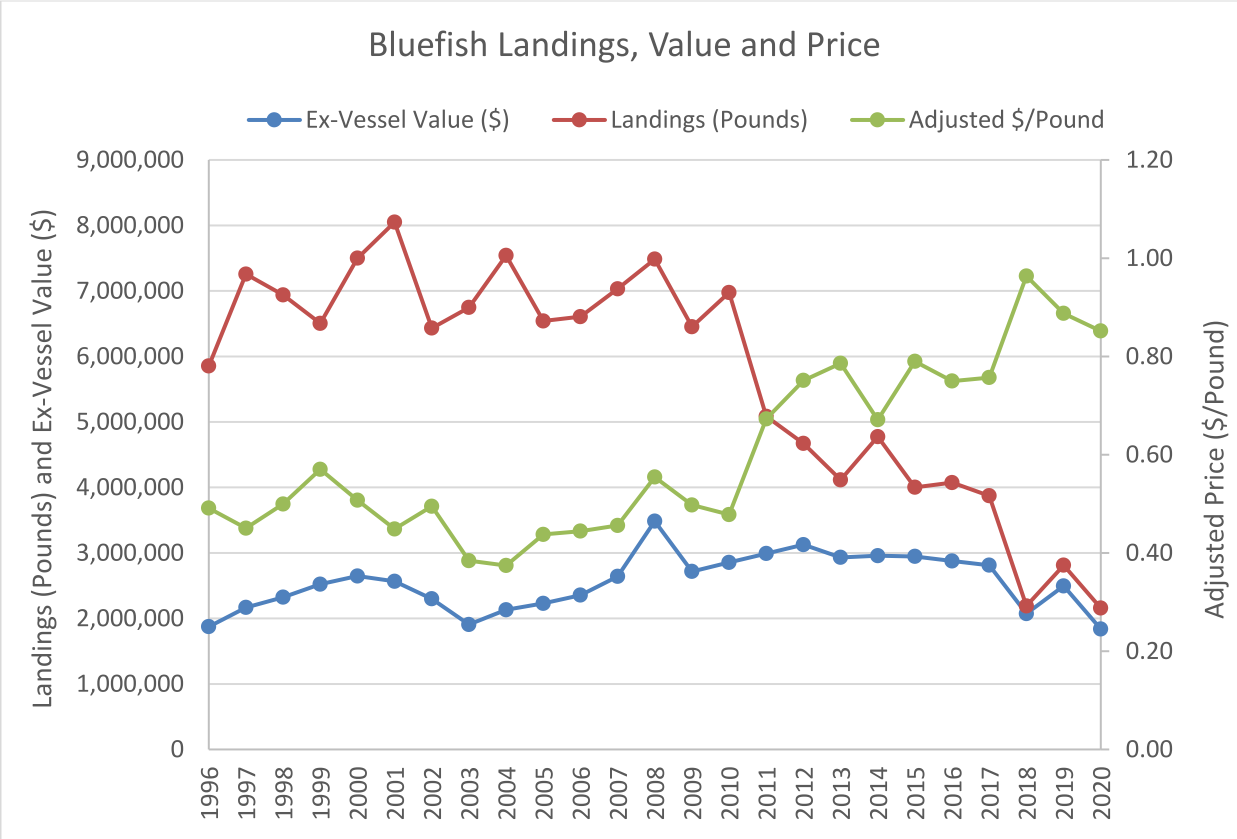

Figure 5. Landings, ex-vessel value, and price (adjusted to 2020 real dollars) for bluefish, 1996-2020.

Table 13. Statistical areas that accounted for at least 5 percent of the total bluefish catch or 5 percent or greater of the trips which caught bluefish in 2020. Source: VTR database.

Statistical Area	Pounds of bluefish caught	Percent of 2020 commercial bluefish catch	Number of trips	Percent of 2020 bluefish trips that caught bluefish
539	142,333	21%	838	20%
613	81,676	12%	615	15%
611	63,433	9%	1,100	26%
537	51,818	8%	383	9%
626	50,526	7%	36	1%
636	49,261	7%	25	1%
632	34,409	5%	18	<1%
612	32,366	5%	314	7%

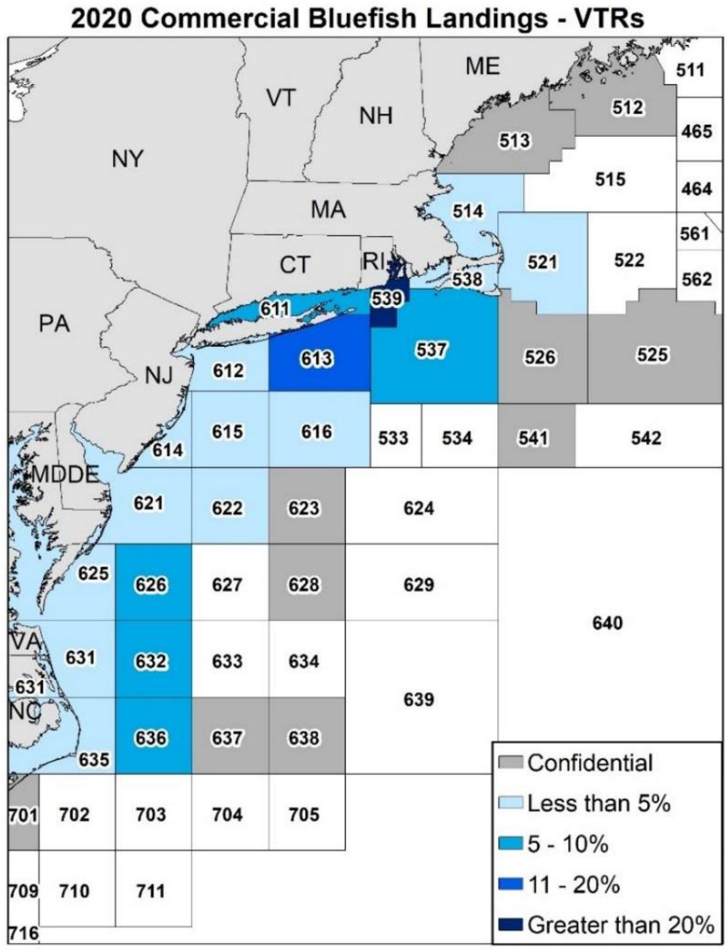

Figure 6. NMFS Statistical Areas that accounted for a percentage of the commercial bluefish landings in 2020. Source: VTR data.

Table 14. Bluefish landings in pounds by port based on NMFS 2020 dealer data.

Port[1]	Pounds	Percent of total commercial bluefish landings	Vessels (Number)
Wanchese, NC	368,942	17%	16
Hatteras, NC	269,655	12%	<10
Point Judith, RI	216,060	10%	99
Montauk, NY	151,200	7%	74
Little Compton, RI	105,941	5%	<10

[1]This table includes only the "top ports" (ports where landings of bluefish were > 100,000 pounds), and thus does not include all 2020 landings.

Federal permit data indicate that 2,351 commercial bluefish permits were issued in 2020.[27] A subset of federally permitted vessels was active in 2020 with dealer reports identifying 423 vessels with commercial bluefish permits that actually landed bluefish. Of the 307 federally permitted bluefish dealers in 2020, there were 107 dealers who actually bought bluefish.

Dealer data for 2020 indicate that the majority of the bluefish landings were taken by gillnet (52%), followed by unknown gear (24%), otter trawl/bottom fish (15%), handline (5%), and other (4%; Table 9).

6.4.2 Recreational Fishery

In 2018, the MRIP transitioned to a mail survey design that uses the National Saltwater Angler Registry. New survey designs produced very different results than those from older surveys. MRIP re-calibration work showed many effort estimations increased by ~3 times. This increase substantially altered bluefish catch, landings, and effort data for the shore and private angler modes. No change occurred for the party/charter mode as vessel operators either submit VTRs or report through a separate telephone survey.

Prior to the development of Amendment 7, the recreational bluefish allocation was 83% of the overall ACL. This applies in Council managed federal waters and Commission managed state waters. According to re-calibrated MRIP estimates, since 1981, recreational bluefish catch has fluctuated from a peak of 75.76 million fish in 1981 to a low of 24.87 million fish in 1988. Harvest fluctuated from a high of 169.63 million pounds in 1981 to a low of 13.27 million pounds in 2018. In 2020, recreational harvest was 13.58 million pounds. Thus, 2018 and 2020 were the worst years for recreational harvest across the time series. A coastwide time series of recreational harvest is provided in Figure 7.

The recreational fishery is prosecuted through three fishing modes: for-hire (party/charter), shore, and private angler. In 2020, 73% of the landings of bluefish on a coastwide basis came from shore, followed by 24% private/rental and 3% for-hire. Over the last five years (2016-2020), ~66% of the total bluefish landings came from shore, ~31% from private/rental boats, and ~4% from for-hire boats.

[27] In addition, there were 863 party/charter bluefish permit issued in 2020. A subset of federally permitted party/charter vessels was active in 2020 with VTR reports identifying 258 vessels with party/charter bluefish permits that actually landed bluefish.

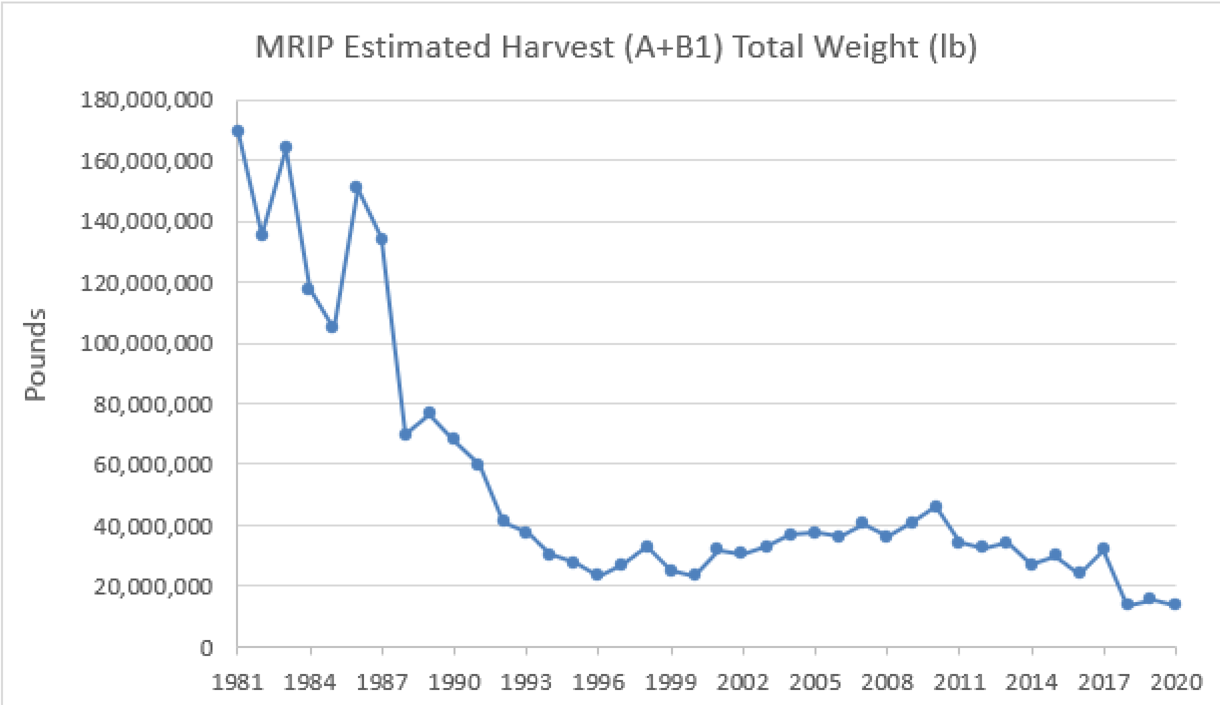

Figure 7. Recreational bluefish harvest from 1981-2020. Source: MRIP.

MRIP recreational landings decreased by approximately 13% from 2019 to 2020 (15.56 million pounds to 13.58 million pounds). The lowest recreational landings for the time series occurred in 2018 and 2020 (Table 15). This coincides with effort, as the number of recreational trips in 2018 (7.17 million) is the lowest reported in the time series.

In 2020, the greatest harvest of bluefish by weight occurred in Florida with 5.73 million pounds (Table 16). Average weights, based on dividing MRIP landings in weight by landings in number for each state, suggest that bluefish size tends to increase toward the north along the Atlantic coast for harvested fish. Furthermore, releases in the recreational fishery remain above 20 million throughout the time series.

Table 15. Number of bluefish recreational fishing trips, landings per trip, harvest, catch and releases/discards from 2000 to 2020, ME-FL. Source: MRIP.

Year	Bluefish trips[1] (N)	Recreational landings per "bluefish" trip	Recreational Harvest (N)	Recreational Harvest (lb)	Released Alive (N)	Dead Discards[2] (lb)	Catch (N)	Catch (lb)
2000	9,414,330	1.37	12,879,485	23,357,120	34,223,385	9,136,762	47,102,869	32,493,882
2001	11,184,219	1.61	18,048,645	31,654,978	42,463,607	11,145,791	60,512,252	42,800,769
2002	11,609,147	1.52	17,607,380	30,654,388	32,202,742	8,172,282	49,810,122	38,826,670
2003	11,270,920	1.46	16,411,932	32,758,670	21,334,305	6,882,295	37,746,238	39,640,965
2004	12,494,269	1.49	18,631,904	37,133,463	30,607,172	10,405,576	49,239,076	47,539,039
2005	12,816,693	1.43	18,341,452	37,742,807	30,141,215	10,584,246	48,482,667	48,327,053
2006	12,166,411	1.59	19,397,272	36,081,958	34,912,777	11,657,418	54,310,049	47,739,376
2007	13,324,958	1.44	19,189,747	40,239,101	37,123,644	10,982,452	56,313,391	51,221,553
2008	11,416,665	1.30	14,845,435	36,166,834	31,199,569	12,326,758	46,045,003	48,493,592
2009	11,805,296	1.53	18,085,386	40,731,438	31,781,201	12,394,411	49,866,587	53,125,849
2010	13,514,815	1.62	21,929,517	46,302,792	40,420,592	12,296,774	62,350,109	58,599,566
2011	11,921,366	1.75	20,814,884	34,218,748	37,475,767	9,850,040	58,290,651	44,068,788
2012	12,817,838	1.45	18,578,838	32,530,917	32,079,529	8,743,161	50,658,367	41,274,078
2013	9,353,805	2.14	19,975,051	34,398,327	33,519,613	7,733,548	53,494,664	42,131,875
2014	12,441,771	1.73	21,510,651	27,044,276	33,583,115	7,317,237	55,093,766	34,361,513
2015	9,406,704	1.46	13,725,106	30,098,649	28,423,854	10,170,472	42,148,960	40,269,121
2016	10,626,957	1.40	14,899,723	24,155,304	27,629,023	7,106,707	42,528,746	31,262,011
2017	9,952,090	1.39	13,845,806	32,071,432	28,317,327	6,767,813	42,163,133	38,839,245
2018	7,169,536	1.43	10,245,710	13,270,862	20,682,992	3,897,500	30,928,703	17,168,362
2019	8,250,853	1.47	12,137,290	15,555,889	26,494,646	4,880,759	38,631,936	20,436,648
2020	8,745,993	1.07	9,336,222	13,581,218	21,345,604	4,191,779	30,681,826	17,772,997

[1] Estimated number of recreational fishing trips where the primary target was bluefish or bluefish were harvested regardless of target. [2] Each dead discard value in weight is calculated by querying MRIP releases by year, state and mode because the weights of fish discarded vary largely from state to state. MRIP B2s by year, state and mode are multiplied by their respective average weight of a landed fish and the assumed 15% discard mortality rate.

Table 16. Estimated 2020 bluefish harvest, total catch, and average weight. Source: MRIP.

State	Harvest			Catch	Released Alive	Dead Discards
	Pounds	Number	Average Weight[1] (pounds)	Number	Number	Number
ME	0	0	0	0	0	-
NH	1,800	376	4.8	376	0	-
MA	553,242	162,128	3.4	906,269	744,141	111,621
RI	508,227	220,556	2.3	1,089,449	868,893	130,334
CT	594,546	298,383	2.0	1,407,730	1,109,347	166,402
NY	1,478,719	885,517	1.7	3,701,474	2,815,957	422,394
NJ	1,808,548	595,103	3.0	3,372,216	2,777,113	416,567
DE	94,901	53,751	1.8	219,288	165,537	24,831
MD	214,991	173,846	1.2	494,214	320,368	48,055
VA	305,092	395,751	0.8	1,172,803	777,052	116,558
NC	2,124,224	2,108,296	1.0	8,666,047	6,557,751	983,663
SC	154,420	289,339	0.5	2,187,307	1,897,968	284,695
GA	9,902	10,795	0.9	187,272	176,477	26,472
FL	5,732,605	4,142,380	1.4	7,277,380	3,135,000	470,250
Total	13,581,217	9,336,221	-	30,681,825	21,345,604	3,201,841

7. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

This EA analyzes the expected impacts of the alternatives on each VEC. The alternatives are compared to the current conditions of the VECs and to each other. These fisheries have occurred for many decades and are expected to continue into the foreseeable future. The nature and extent of the management programs for these fisheries have been examined in detail in EAs and Environmental Impact Statements prepared for previously implemented management actions.

This EA is being prepared using the 2020 CEQ NEPA Regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020, and reviews begun after this date are required to apply the 2020 regulations unless there is a clear and fundamental conflict with an applicable statute. 85 Fed. Reg. at 43372-73 (§§ 1506.13, 1507.3(a)). This EA began in 2021 and accordingly proceeds under the 2020 regulations.

The current conditions of the VECs are summarized in Table 17 and described in more detail in section 6. Impacts are described both in terms of their direction (negative, positive, or no impact) and their magnitude (slight, moderate, or high) based on the guidelines shown in Table 18.

The recent conditions of the VECs include the biological conditions of bluefish, non-target stocks, and protected species over the most recent five years (sections 6.1 and 6.3). They also include the fishing practices and levels of effort and landings in commercial and recreational fisheries for bluefish over the most recent five years, as well as the economic characteristics of the fisheries over the most recent three to five years (depending on the dataset; section 6.4). They also include recent levels of habitat availability and quality (section 6.2).

In general, alternatives which may result in overfishing or an overfished status for target or non-target species are considered to have negative impacts for those species. Conversely, alternatives which may result in decreased fishing mortality, ending overfishing, and/or rebuilding to the biomass target are considered to have positive impacts (Table 18).

As previously stated, gill nets are the predominant gear type in the commercial bluefish fishery. The recreational fishery uses hook and line gear almost exclusively. When considering the impacts of the alternatives on the habitat and protected species VECs, emphasis is placed on the commercial fisheries due to the higher potential for impacts to those VECs from gill net gear than from hook and line gear (sections 6.2.3 and 6.3.3).

Alternatives that improve the quality or quantity of habitat are expected to have positive impacts on habitat. Alternatives that degrade the quality or quantity, or increase disturbance of habitat are expected to have negative impacts (Table 18). A reduction in fishing effort is likely to decrease the time that fishing gear is in the water, thus reducing the potential for interactions between fishing gear and habitat. However, most areas where bluefish are fished have been fished by multiple fishing fleets over many decades and are unlikely to see a measurable improvement in their condition in response to a decrease in effort for an individual fishery.

The impacts of the alternatives on protected species take into account impacts to ESA-listed species, as well as impacts to non-listed MMPA protected species in good condition (i.e., marine mammal stocks whose potential biological removal (PBR) level have not been exceeded) or poor (i.e., marine mammal stocks that have exceeded or are near exceeding their PBR level) condition. For ESA-listed species, any action that has the potential to results in interaction or take a listed species is expected to have some level of negative impact to these species, including actions that reduce interactions. Actions expected to result in positive impacts on ESA-listed species include only those that contain specific measures to ensure no interactions (i.e., no take). By definition, all ESA-listed species are in poor condition and any take can negatively impact that species' recovery. The stock conditions for marine mammals not listed under the ESA varies by species; however, all are in need of protection. For marine mammal stocks that have their PBR level reached or exceeded, some level of negative impacts would be expected from alternatives that result in the potential for interactions between fisheries and those stocks. For species that are at more sustainable levels (i.e., PBR levels have not been exceeded), alternatives not expected to change fishing behavior or effort may have some level of positive impacts by maintaining takes below the PBR level and approaching the zero mortality rate goal (Table 18).

Socioeconomic impacts are considered in relation to potential changes in landings, prices, revenues, fishing opportunities, and angler satisfaction. Alternatives which could lead to increased availability of target species and/or an increase in catch per unit effort could lead to increased landings. Increased landings are generally considered to have positive socioeconomic impacts because they could result in increased revenues (for commercial and/or for-hire vessels) and angler satisfaction (for recreational fishery participants); however, if an increase in landings leads to a decrease in price or a decrease in SSB for any of the landed species, then negative socioeconomic impacts could also occur.

Table 17. Recent conditions of VECs (described in more detail in section 6).

VEC		Condition	
		Overfishing?	**Overfished?**
Target stock (section 6.1.1)	**Bluefish**	No	Yes
Non-target species (principal species listed in section 6.1.2)	Smooth Dogfish	No	No
	Spiny Dogfish	No	No
	Scup	No	No
	Atlantic Bonito	Unknown	Unknown
	Striped Bass	Yes	Yes
	Black Sea Bass	No	No
	Spanish Mackerel	No	No
	Spotted Sea Trout	Unknown Coastwide	Unknown Coastwide
Habitat (section 6.2)		Commercial fishing impacts are complex, variable, and typically adverse. Recreational fishing has minimal impacts on habitat. Non-fishing activities had historically negative but site-specific effects on habitat quality.	
Protected species (section 6.3)	**Sea turtles**	Leatherback and Kemp's ridley sea turtles are endangered; loggerhead (NW Atlantic Ocean DPS) and green (North Atlantic DPS) sea turtles are threatened.	
	Fish	Atlantic salmon, shortnose sturgeon, and the New York Bight, Chesapeake, Carolina, and South Atlantic DPSs of Atlantic sturgeon are endangered. Giant manta ray and Gulf of Maine DPS of Atlantic sturgeon are threatened. Cusk are a candidate species	
	Large whales	All large whales in the Northwest Atlantic are protected under the MMPA. North Atlantic right, fin, blue, sei, and sperm whales are also listed as endangered under the ESA.	
	Small cetaceans	Pilot whales, species of dolphins, and harbor porpoise are protected under the MMPA.	
	Pinnipeds	Gray, harbor, hooded, and harp seals are protected under the MMPA.	
Human communities (section 6.4)	**Bluefish**	Commercial landings were 2.16 million pounds in 2020, with $1.84 million ex-vessel value for an ex-vessel price of $0.85 per pound (2020 dollars). Recreational landings in 2020 were 13.58 million pounds.	

Table 18. Guidelines for defining the direction and magnitude of the impacts of alternatives on the VECs.

General Definitions				
VEC	**Resource Condition**	**Direction of Impact of Action**		
		Positive (+)	Negative (-)	No Impact (0)
Target and non-target species	Overfished status defined by the MSA	Alternatives expected to maintain biomass above the overfished threshold*	Alternatives expected to maintain or result in biomass below the overfished threshold*	Alternatives that do not impact stock status
ESA-listed protected species (endangered or threatened)	Populations at risk of extinction (endangered) or endangerment (threatened)	Alternatives that contain specific measures to ensure no interactions with protected species (i.e., no take)	Alternatives that result in interactions/take of listed species, including actions that reduce interactions	Alternatives that do not impact ESA listed species
MMPA protected species (not also ESA listed)	Stock health varies by species	Alternatives that maintain takes below PBR and approaching the Zero Mortality Rate Goal	Alternatives that result in interactions with/take of marine mammals that could result in takes above PBR	Alternatives that do not impact MMPA protected species
Physical environment / habitat	Many habitats degraded from historical effort	Alternatives that improve the quality or quantity of habitat	Alternatives that degrade the quality/quantity or increase disturbance of habitat	Alternatives that do not impact habitat quality
Human communities	Varies by fishery and community (some landings stable, some decreasing, some increasing)	Alternatives that increase revenue and social well-being of fishermen and/or communities	Alternatives that decrease revenue and social well-being of fishermen and/or communities	Alternatives that do not impact revenue or social well-being of fishermen and/or communities
	Magnitude of Impact			
A range of impact qualifiers is used to indicate any existing uncertainty	Negligible	To such a small degree to be indistinguishable from no impact		
	Slight (sl), as in slight positive or slight negative	To a lesser degree / minor		
	Moderate positive or negative	To an average degree (i.e., more than “slight”, but not “high”)		
	High, as in high positive or high negative	To a substantial degree (not significant unless stated)		
	Significant (in the case of an EIS)	Affecting the resource condition to a great degree, see 40 CFR § 1508.27.		
	Likely	Some degree of uncertainty associated with the impact		
*Actions that will substantially increase or decrease stock size, but do not change a stock status may have different impacts depending on the particular action and stock. Meaningful differences between alternatives may be illustrated by using another resource attribute aside from the overfished status, but this must be justified within the impact analysis.				

Expected Changes in Fishing Effort Under Alternatives 1-3

The expected impacts of the alternatives on the VECs are derived from consideration of both the current conditions of the VECs and expected changes in fishing effort under each alternative. It is not possible to quantify with confidence how fishing effort will change under each alternative; therefore, expected changes are described qualitatively. Fishing effort is influenced by a variety of interacting factors, including regulations (catch and landings limits, possession limits, gear restrictions, seasonal closures, etc.), availability of the species in question and other potential target species, market factors (namely, price of potential target species) and other factors.

In this document, expected changes in fishing effort under each alternative are largely based on changes in the commercial quota and RHL, assuming all other factors (availability, prices, etc.) remain similar to current conditions, unless otherwise noted. In addition, recent trends in commercial landings and recreational fishing effort are also considered. Moreover, for the purposes of better illustrating and comparing potential impacts, some analyses of the no action alternative also include references to a status quo scenario, based on limits currently in place.

The bluefish commercial landings have been relatively stable for the 2018 to 2020 period, ranging from 2.16 to 2.78 million pounds (section 6.4). While it is possible that commercial landings may increase as a result of some of the proposed higher commercial quotas, there is no indication that the market environment for commercially caught bluefish will substantially change in 2022-2023 compared to recent years. There is no information regarding how the potential changes in the recreational harvest limits for this species will affect the demand for recreational trips. Currently, the market demand for this sector is relatively stable with the number of bluefish trips ranging from 7.2 to 8.7 million trips for the 2018-2020 period (Table 15). However, it is possible that given some of the proposed higher recreational harvest limits, the demand for recreational trips may be positively impacted. It is important to note that actual fishing effort may differ from these expectations based on changes in fish availability, market factors, and other conditions which are not static and difficult to predict.

To describe anticipated changes in fishing effort, the landings limit alternatives (Table 19) are compared against current measures (2021) and recent fishery performance, with emphasis on the conditions in the most recent completed fishing year, in this case, 2020 fishing year. In 2021, the ABC = 16.28 million pounds, RHL = 8.34 million pounds, and commercial quota = 2.77 million pounds.

Of the three alternatives for the 2022-2023 bluefish quota and RHL, **alternative 1 (no action)** is expected to result in the largest increased effort and landings compared to 2021 levels, given that no quotas or RHLs would be implemented. Under these circumstances, anglers would still be bound by the federal recreational management measures (bag limits).

For **alternative 2 (preferred)**, effort is expected to slightly increase compared to 2021. The proposed RHL for 2022 and 2023 increase by 67% and 165%, respectively. The proposed commercial quota for 2022 and 2023 increase by 28% and 55%, respectively.

For **alternative 3 (non-preferred)**, effort is also expected to slightly increase compared to 2021 (but to a greater degree than alternative 2). The proposed RHL for 2022 and 2023 increase by 227% and 297%, respectively. The proposed commercial quota for 2022 and 2023 increase by 106% and 119%, respectively.

Table 19. Bluefish alternatives and associated ABCs, recreational harvest limits and commercial quotas for 2022-2023 (in million pounds).

Alternative	Acceptable Biological Catch		Commercial Quota		Recreational Harvest Limit	
Year	**2022**	**2023**	**2022**	**2023**	**2022**	**2023**
Alternative 1 - No Action	N/A	N/A	N/A	N/A	N/A	N/A
Alternative 2 - *Preferred*	25.26	30.62	3.54	4.29	13.89	22.14
Alternative 3 - Non-Preferred	40.70	43.36	5.70	6.07	27.16	33.10
Not a True Alternative – Status Quo	16.28	16.28	2.77	2.77	8.34	8.34

There is no status quo alternative being analyzed in this EA because the no action alternative results in no quotas or RHLs, as there are no rollover provisions in the bluefish FMP. However, when comparing between alternatives for all VECs, impacts are also qualitatively described under a status quo. This status quo scenario is provided to bolster the comparisons between alternatives based on how the fishery has been most recently operating.

7.1 Impacts of the Alternatives on Bluefish and Non-Target Species

The following sections describe the expected impacts of each alternative on the bluefish resource and on non-target species. The impacts are based on expected changes in fishing effort (and thus, fishing mortality and stock status) under each alternative.

7.1.1 Alternative 1: No Action

Impacts to Bluefish

Under the no action alternative, no proposed specifications for the 2022-2023 fishery will be published. The only regulatory controls on fishing effort and harvests in 2022 and 2023 and would be the indefinite measures.[28]

Considering NMFS would be unable to specify and implement ACLs, commercial quotas, and RHLs for 2022 or 2023, as required by Federal regulations (50 CFR § 648) and the MSA, the no action alternative is thus inconsistent with the goals and objectives of the FMP and the implementing regulations.

The bluefish commercial landings have been relatively stable for the 2018 to 2020 period, ranging from 2.16 to 2.78 million pounds, regardless varying commercial quota levels implemented during that period (section 6.4). In fact, on average for the 2018-2020 period combined, the commercial fishery landed about 60% of the commercial quota. In addition, the market demand for the recreational sector is relatively stable with the number of bluefish trips ranging from 7.2 to 8.7

[28] For the commercial fishery, there are no federal possession or fish size requirements. The federal possession limit (bag limit) in the recreational fishery is dependent on the trip/vessel: private recreational vessels - 3 fish per person, per day; for-hire vessels (party/charter-permitted vessels) - 5 fish per person, per day. Descriptions of the regulations as detailed in the CFR are available at: https://www.fisheries.noaa.gov/species/bluefish#overview

million trips for the 2018-2020 period (Table 15). The number of bluefish trips have been relatively stable for the 2018-2020 period regardless varying RHLs and bag limits implemented during that period. There is no indication that the market environment for commercially and recreationally caught bluefish will substantially change in 2022-2023 compared to recent years. However, it is possible that if market conditions improve, fishing behavior change, and/or fish availability increases, a small increase in effort is possible due to the lack of catch and landings limits. However, existing federal possession limits in the recreational fishery will likely constraint increase in recreational fishing effort.[29] Lastly, this alternative does not incorporate rebuilding projections for this species (section 5). Therefore, impacts to bluefish under the no action alternative are expected to range from slight negative to moderate negative due to small increase in effort and the fact that this alternative does not account for stock rebuilding requirements.

Compared to status quo, alternative 1 is expected to experience and small increase in effort in the commercial and recreational fisheries. However, the expected range of impacts for this alternative is not expected to reach high negative because of the factors listed above.

Impacts to Non-Target Species

As discussed above, commercial and recreational fishing effort under alternative 1 is expected to result in a small increase compared to the current operating conditions. Therefore, interactions with non-target species will also likely increase. Impacts are expected to range from slight negative to slight positive for non-target species due to the anticipated increases in effort on the bluefish stock.

As described in section 6.1.2, non-target species generally comprise a low portion of the bluefish commercial and recreational catch (Table 6 and Table 7). According to the most recent scientific information, all these species have a positive stock status (i.e., they are not experiencing overfishing and are not overfished) with the exception of striped bass. Therefore, even potentially increased levels of fishing effort under alternative 1 are likely to maintain the current statuses for these species because effort will still be constrained, to an extent, by other measures (in addition to a relatively minimal amount of non-target interactions to begin with). For these reasons, the expected impacts to non-target species under the no action alternative ranges from slight negative to slight positive.

7.1.2 Alternative 2: ***Preferred***

Impacts to Bluefish

Alternative 2 is the preferred alternative and includes an ABC of 25.26 million pounds, a commercial quota of 3.54 million pounds, and an RHL of 13.89 million pounds for 2022. For 2023, it includes an ABC of 30.62 million pounds, a commercial quota of 4.29 million pounds, and an RHL of 22.14 million pounds. For 2022, the preferred alternative, which utilizes the Council-preferred 7-year constant fishing mortality rebuilding plan results in a 55% increase in the ABC, a 28% increase in the commercial quota, and a 67% increase in the RHL compared to the current measures (2021). For 2023, the preferred alternative results in an 88% increase in the ABC, a 55%

[29] In October 2021, the Bluefish MC discussed if revisions to the current recreational management measures (3-fish bag limit for private anglers and shore-based fishermen and a 5-fish bag limit for for-hire fishermen) were necessary. The MC is recommending to the Council that status quo recreational management measure be implemented in 2022 and 2023. At the December 2021 Council meeting, status quo measures were approved for 2022 and 2023.

increase in the commercial quota, and a 165% increase in the RHL compared to current measures. Ultimately, these recommended specifications are consistent with the ABC recommendations made by the SSC at their July 2021 meeting. Given landings limits would have the same directional change for 2022 to 2023 under this alternative (compared to current conditions), shifts in fishing effort are considered together for both years.

The bluefish commercial landings have been relatively stable for the 2018 to 2020 period, ranging from 2.16 to 2.78 million pounds, regardless varying commercial quota levels implemented during that period (section 6.4). In fact, on average for the 2018-2020 period combined, the commercial fishery landed about 60% of the commercial quota. In addition, the market demand for the recreational sector is relatively stable with the number of bluefish trips ranging from 7.2 to 8.7 million trips for the 2018-2020 period (Table 15). The number of bluefish trips have been relatively stable for the 2018-2020 period regardless varying RHLs and bag limits implemented during that period. There is no indication that the market environment for commercially and recreationally caught bluefish will substantially change in 2022-2023 compared to recent years. However, it is possible that if market conditions improve, fishing behavior change, and/or fish availability increases, the effort in these fisheries could increase. Furthermore, existing federal possession limits in the recreational fishery (see footnote #29 on page 68) will likely constraint increase in recreational fishing effort. Under this alternative, any potential increase in effort will be limited by the commercial quota, the RHL, and other factors described in this section.

Given the increases in commercial quotas and RHLs for 2022 and 2023 but considering that the rebuilding projections guide future quotas, the expected impacts to bluefish under alternative 2 are slight negative to slight positive. This range is expected due to short term increases in effort (i.e., number of trips and anglers, amount of gear, soak time, etc.) compared to the current operating conditions and long-term progress towards rebuilding, as defined in the rebuilding projections (Table 4). Compared to status quo, alternative 2 is expected to experience a small increase in effort in the commercial and recreational fisheries due to higher catch and landings limits. Overall, the bluefish stock is expected to remain overfished through 2023, which supports the slight negative impact designation, but is working towards rebuilding under this preferred alternative (leading to the slight positive impact designation) despite the higher quotas.

Impacts to Non-Target Species

As discussed above, commercial and recreational fishing effort under alternative 2 is expected to increase for 2022 and 2023 compared to the current operating conditions given the SSC recommended ABCs and MC recommended commercial quotas and RHLs are higher than the current specifications. However, even if effort increases somewhat in the short term, it would not be expected to be enough to change behavior or total effort in a way that could change any stock statuses and will generally maintain these non-targets in their current state. Therefore, impacts are expected to range from slight negative to slight positive for non-target species due to the anticipated increases in effort on the bluefish stock.

As described in section 6.1.2, non-target species generally comprise a low portion of the bluefish commercial and recreational catch (Table 6 and Table 7). According to the most recent scientific information, all these species have a positive stock status (i.e., they are not experiencing overfishing and are not overfished) with the exception of striped bass. Therefore, levels of fishing effort under alternative 2 are likely to maintain the current statuses for these species. This is because the potential increases in effort associated with the increased commercial quotas and

RHLs are relatively small, non-target species interactions are generally minimal in this fishery. For this reason, the expected impacts to non-target species under alternative 2 ranges from slight negative to slight positive.

7.1.3 Alternative 3: Non-Preferred

Impacts to Bluefish

The non-preferred alternative (alternative 3) represents the outcome if the SSC treated the total catch estimate (e.g., 2022 = 40.70 million pounds and 2023 = 43.36 million pounds) from the 7-year constant fishing mortality rebuilding plan as an ABC instead of an OFL (Table 4). For 2022, alternative 3, which utilizes the Council-preferred 7-year constant fishing mortality rebuilding plan results in a 150% increase in the ABC, a 28% increase in the commercial quota, and a 226% increase in the RHL compared to the current measures (2021). For 2023, alternative 3 results in a 166% increase in the ABC, a 119% increase in the commercial quota, and a 297% increase in the RHL compared to current measures. Under this alternative, the SSC would not have made as significant of reductions for scientific uncertainty, which were discussed above in alternative 2 (and in section 5.1.2).

Given landings limits would have the same directional change for 2022 to 2023 under this alternative (compared to current conditions), shifts in fishing effort are considered together for both years. The discussion about the current market environment for commercially and recreationally caught bluefish described in section 7.1.2 also apply here. In general terms, it is not expected that the market environment for the commercial and recreational bluefish fisheries will substantially change in 2022-2023 compared to recent years.

Given the increases in commercial quotas and RHLs for 2022 and 2023 but considering that the rebuilding projections guide future quotas, the expected impacts to bluefish under alternative 3 are slight negative to slight positive. This range is expected due to short term increases in effort (i.e., number of trips and anglers, amount of gear, soak time, etc.) compared to the current operating conditions and long-term progress towards rebuilding, as defined in the rebuilding projections (Table 4). However, the larger increases in quotas and RHLs associated with alternative 3 do not account for the high degree of uncertainty in the bluefish fishery further describe in section 5. Compared to status quo, alternative 3 is expected to experience a small increase in effort in the commercial and recreational fisheries due to higher catch and landings limits. Overall, the bluefish stock is expected to remain overfished through 2023, which leads to a slight negative impact designation, but is working towards rebuilding under this non-preferred alternative (leading to the slight positive impact designation) despite the higher quotas.

Impacts to Non-Target Species

Given similar small increases in effort are likely under alternative 2 and 3 despite differences in the amount of quota increase as described above, the impacts on non-target species are identical to those described under section 7.1.2 (slight negative to slight positive, depending on current stock status).

Comparisons between all 3 alternatives

Bluefish

Impacts to bluefish under alternative 1 (no action) are much more negative (ranging from slight negative to moderate negative) compared to alternatives 2 and 3 given no quotas or RHLs would be implemented (i.e., not working towards rebuilding plan). Alternatives 2 and 3 are both expected to have impacts that range from slight negative to slight positive. A small increase in effort is expected under all three alternatives (despite the larger increases in quota or lack of quotas (alternative 1)) because it is not expected that the market environment for the commercial and recreational bluefish (and thus effort) fisheries will substantially change in 2022-2023 compared to recent years. Moreover, both alternatives 2 and 3 apply the rebuilding projections and have the potential to rebuild, but because alternative 3 does not account for as much scientific uncertainty, there is a lot less certainty about the timing surrounding rebuilding.

When compared to status quo (based on current limits), all three alternatives are expected to result in a small increase in fishing effort on bluefish. Increases in fishing effort under alternative 1 (no action) and the lack of stock rebuilding requirements are expected to result in more negative impacts compared to alternatives 2 and 3. Compared to each other and status quo, the range of impacts to target species is slight negative to slight positive for alternatives 2 and 3. While under any of these scenarios the bluefish stock would continue to be overfished in the short term, by applying the rebuilding plan, alternatives 2 and 3 would have more potential to rebuild the stock in the longer term.

Non-Target Species

Impacts to non-target species under all three alternatives are expected to range from slight negative to slight positive (depending on the species). When compared to status quo (based on current limits), all three alternatives are expected to result in increases in fishing effort on bluefish, and thus, increase interactions with non-target species. However, the current statuses for these non-target species is not expected to change as the market environment for the commercial and recreational bluefish fisheries have been relatively stable in recent years and effort is not expected to substantially change in 2022-2023 (in addition to a relatively minimal amount of non-target interactions to begin with). For these reasons, the range of impacts to non-target species is slight negative to slight positive for all three alternatives compared to a status quo.

7.2 Impacts of the Alternatives on Habitat

The following sections describe the expected impacts of each alternative on physical habitat. The impacts are based on expected changes in fishing effort and associated changes in interactions between fishing gear and physical habitat under each alternative.

7.2.1 Alternative 1: No Action

Under the no action alternative, no proposed specifications for the 2022-2023 fishery will be published. The only regulatory controls on fishing effort and harvests in 2022 and 2023 would be the indefinite measures. The discussion about the current market environment for commercially and recreationally caught bluefish described in section 7.1.1 also apply here. In general terms, it is not expected that the market environment for commercially and recreationally caught bluefish (and thus effort) will substantially change in 2022-2023 compared to recent years. However, due to the lack of quotas a small increase in effort is expected in the commercial and recreational fisheries compared to current conditions.

Only those gear types which contact the bottom impact physical habitat. The actions proposed in this document are relevant to both the commercial and recreational bluefish fisheries. The recreational fishery is almost exclusively a hook and line fishery. As described in section 6.2.3, recreational hook and line gears generally have minimal impacts on physical habitat and EFH in this region (Stevenson et al. 2004). Weighted hook and line gear can contact the bottom, but the magnitude and footprint of any impacts resulting from this contact is likely minimal. Thus, the recreational fisheries are expected to have very minor or no impacts on habitat. The limited commercial fishery for bluefish is primarily prosecuted with gill net gear (Table 9) and has limited contact with the bottom. Thus, the magnitude and footprint of any impacts resulting from this contact are also likely minimal. Therefore, the expected impacts to habitat under the no action alternative range from slight negative to negligible because any contact with the bottom has the potential to negatively affect EFH, but the regions where bluefish are targeted have been heavily fished for decades. Despite the anticipated increase in effort, this action will not exacerbate the impact on habitat for the reasons stated above.

7.2.2 Alternative 2: ***Preferred***

As described in section 7.1, the increases in specifications under alternative 2 are expected to have the potential to result in similar small increases in effort across all three alternatives despite varying levels of quota increase. For this reason, as well as those described above (including types of gear used in the fishery), impacts on habitat are therefore expected to be identical to those described under section 7.2.1 (slight negative to negligible).

7.2.3 Alternative 3: Non-Preferred

As described in section 7.1, the increases in specifications under alternative 3 are expected to have the potential to result in similar small increases in effort across all three alternatives despite varying levels of quota increase. For this reason, as well as those described above (including types of gear used in the fishery),impacts on habitat are therefore expected to be identical to those described under section 7.2.1 (slight negative to negligible).

Comparisons between all 3 alternatives

As summarized above, all three alternatives are expected to result in impacts that range from slight negative to negligible, despite small increases in effort. This is because of the gear types used to prosecute the bluefish fishery and since the locations are already heavily fished. Relative to each other and the status quo, the potential impact amongst these alternatives is negligible.

7.3 Impacts of the Alternatives on Protected Species

The following sections describe the expected impacts of each alternative on protected species (i.e., ESA-listed and/or MMPA protected). The impacts are based on expected changes in fishing effort and associated changes in the potential for interactions with protected species under each alternative.

As described in section 6.3, the commercial bluefish fishery is primarily prosecuted with gillnet gear, and to a lesser degree, bottom trawl gear. ESA listed and MMPA protected species are at risk of interacting with gillnet and/or bottom trawl gear (see section 6.3.3.2). Specifically, gillnet gear poses an interaction risk to protected species (both ESA listed and MMPA protected) of whales, pinnipeds, small cetaceans, sea turtles, and fish. Bottom trawl gear poses an interaction risk to non-ESA listed species of marine mammals (i.e., pinnipeds, and small cetaceans), and ESA listed species of sea turtles and fish; however, this gear type does not pose an interaction risk to any protected species of (ESA listed or MMPA protected) large whales. The risk of an interaction is strongly associated with the amount of gear in the water, the duration of time the gear is in the water (e.g., tow time, soak time), and the presence of protected species in the same area and time as the gear, with risk of an interaction increasing with increases in of any of these factors.

Hook and line gear is the dominant gear type used in the recreational bluefish fishery (see section 6.2.3). Protected species of large whales, sea turtles, fish (i.e., Atlantic sturgeon), as well as specific species of small cetaceans (i.e., small finned pilot whales, bottlenose dolphin stocks along the Atlantic coast) are vulnerable to interactions with hook and line gear, (section 6.3.3.1). Hook and line interactions with other protected species identified in section 6.3.3.1 (e.g., dolphin species (non-bottlenose), long finned pilot whale, pinnipeds, Atlantic salmon, giant manta ray) have never been observed or documented and therefore, this gear type is not expected to be source of injury or mortality to these species.

7.3.1 Alternative 1: No Action

Under the no action alternative, no proposed specifications for the 2022-2023 fishery will be published. The only regulatory controls on fishing effort and harvests in 2022 and 2023 would be the indefinite measures. The discussion about the current market environment for commercially and recreationally caught bluefish described in section 7.1.1 also apply here and for all alternatives below. In general terms, it is not expected that the market environment for the commercial and recreational bluefish fisheries (and thus effort) will substantially change in 2022-2023 compared to recent years. However, due to the lack of quotas a small increase in effort is expected in the commercial and recreational fisheries compared to current conditions.

MMPA (Non-ESA Listed) Species Impacts

Taking into consideration the above information, and the fact that there are non-listed marine mammal stocks/species whose populations may or may not be at optimum sustainable levels, impacts of the no action alternative on non-ESA listed species of marine mammals are likely to be negligible to low moderate negative.

As provided in section 6.3, there are some bottlenose dolphin stocks experiencing levels of interactions that have resulted in exceedance of their PBR levels. These stocks/populations are not at an optimum sustainable level and therefore, the continued existence of these stocks/species is at risk. As a result, any potential for an interaction is a detriment to the species/stocks ability to recover from this condition. As provided above, the risk of an interaction is strongly associated with the amount of gear in the water, the time the gear is in the water (e.g., soak or tow time), and the presence of protected species in the same area and time as the gear, with risk of an interaction increasing with increases in of any of these factors. As effort under the no action is expected to result in a small increase from current operating conditions, the no action alternative is expected to introduce slightly new or elevated interaction risks to these non-ESA listed marine mammal stocks in poor condition. Specifically, the amount of gear in the water, gear soak or tow duration, and the overlap between protected species and fishing gear (i.e., bottom trawl or gillnet gear), in space and time, is expected to change relative to current operating conditions in the fishery. Given this information, and the information provided in section 6.3), the no action alternative is likely to result in low moderate negative impacts to non-ESA listed marine mammal stocks/species in poor condition (i.e., bottlenose dolphin stocks).

Alternatively, there are also many non-ESA listed marine mammals that, even with continued fishery interactions, are maintaining an optimum sustainable level (i.e., PBR levels have not been exceeded) over the last several years. For these stocks/species, it appears that the fishery management measures that have been in place over this timeframe have resulted in levels of effort that result in interaction levels that are not expected to impair the stocks/species ability to remain at an optimum sustainable level. These fishery management measures, therefore, have resulted in indirect slight positive impacts to these non-ESA listed marine mammal species/stocks. As provided above, the lack of quotas and RHLs under the no action alternative is expected to result in a small increase in effort relative to the current operating conditions. Given this, and the fact that the potential risk of interacting with gear types used in the fishery varies between non-ESA listed marine mammal species in good condition (e.g., no observed or documented interactions between bottom trawl gear and minke whales; see section 6.3), the impacts of the no action alternative on these non-ESA listed species of marine mammals are expected to be negligible to slight negative.

ESA Listed Species Impacts

As provided in section 6.3, and summarized in section 7.3, interactions between ESA-listed species and hook and line, bottom trawl, and/or sink gillnet gear have been observed or documented. Based on this, the bluefish fishery is likely to result in some level of negative impacts to ESA listed species. Taking into consideration fishing behavior/effort under the no action alternative, as well as the fact that interaction risks with protected species are strongly associated with amount, time, and location of gear in the water, the no action alternative is expected to introduce slightly new or elevated interaction risks to ESA listed species (i.e., increase in the amount, time, and location of gear in the water). Based on this, and the fact that the potential risk of interacting with gear types used in the fishery varies between ESA listed species (e.g., interactions between ESA-listed species of large whales and bottom trawl gear have never been documented/observed; see section 6.3) the impacts of the no action alternative on ESA listed species are expected to be negligible to low moderate negative.

Summary of No Action Impacts to Protected Species
Overall, the no action alternative is expected to have negligible to low moderate negative impacts on protected species.

7.3.2 Alternative 2: ***Preferred***

Alternative 2 allows for an increase in quota. However, as discussed in 7.3.1 and 7.1.2, other restrictions and market conditions would still provide controls on effort, and any potential increase in effort would be expected to be small and generally similar across all alternatives despite differences in levels of quota increase. Therefore, the impacts on protected species are identical to those described under section 7.3.1 above (negligible to low moderate negative).

7.3.3 Alternative 3: Non-Preferred

Alternative 3 allows for a greater increase in quota than alternative 2. However, as discussed in 7.3.1 and 7.1.3, other restrictions and market conditions would still provide controls on effort, and any potential increase in effort would be expected to be small and generally similar across all alternatives despite differences in levels of quota increase. Therefore, the impacts on protected species are identical to those described under section 7.3.1 above (negligible to low moderate negative).

Comparisons between all 3 alternatives

Given the same expected small increase in effort under all three alternatives despite variations in the level of increased quota, impacts to protected species are expected to be the same across all three alternatives (negligible to low moderate negative). Based on this, relative to each other, the potential impact amongst these alternatives is negligible.

7.4 Socioeconomic Impacts of the Alternatives

The following sections describe the expected socioeconomic impacts of each alternative. The impacts are based on expected changes in commercial revenues, for-hire revenues, fishing opportunities, efficiency of fishing operations, and/or angler satisfaction, depending on the alternative.

7.4.1 Alternative 1: No Action

Under the no action alternative, no proposed specifications for the 2022-2023 fishery will be published. The only regulatory controls on fishing effort and harvests would be the indefinite measures. The discussion about the current market environment for commercially and recreationally caught bluefish described in section 7.1.1 also apply here. In general terms, it is not expected that the market environment for commercially and recreationally caught bluefish (and thus effort) will substantially change in 2022-2023 compared to recent years. However, due to the lack of quotas a small increase in effort is expected in the commercial and recreational fisheries compared to current conditions.

As described in section 7.1.1, fishing effort under this alternative is expected to increase compared to the baseline levels given no quotas would be implemented to constrain overall harvest. Ultimately, it is difficult to predict how varying quotas and a lack of quotas translate to changes in revenues given the relationship between landing and price, and other market factors.

For the commercial fishery, ex-vessel value in 2020 was $1.84 million from Maine through Florida, from a total of 2.16 million pounds of landings, resulting in an average price per pound of $0.85. Alternative 1 is likely associated with slight negative to slight positive impacts to the commercial fishery. This range of impacts is expected due to the likelihood of short-term positive impacts associated with increased effort and revenue and the fact that this alternative does not account for stock rebuilding requirements (i.e., the stock is not rebuilt in time).

For the recreational fishery, impacts are also likely to range from slight negative to slight positive. Over the short-term, increased effort and revenues for the for-hire industry and increased angler satisfaction for the private sector can be expected due to the lack of RHLs. However, long term impacts are expected to be more negative as the stock biomass would likely deviate from the ongoing rebuilding plan.

Overall impacts associated with the no action alternative (alternative 1) are expected to range from slight negative to slight positive.

7.4.2 Alternative 2: *Preferred*

Alternative 2 is the preferred alternative and includes a commercial quota of 3.54 million pounds and an RHL of 13.89 million pounds for 2022. For 2023, it includes a commercial quota of 4.29 million pounds and an RHL of 22.14 million pounds. For 2022, the preferred alternative, which utilizes the Council-preferred 7-year constant fishing mortality rebuilding plan results in a 55% increase in the ABC, a 28% increase in the commercial quota, and a 67% increase in the RHL. For 2023, the preferred alternative results in an 88% increase in the ABC, a 55% increase in the commercial quota, and a 165% increase in the RHL. These recommended specifications are consistent with the ABC recommendations made by the SSC.

Given landings limits would have the same directional change for 2022 to 2023 under this alternative (compared to current conditions), shifts in fishing effort are considered together for both years. The discussion about the current market environment for commercially and recreationally caught bluefish described in section 7.1.2 also apply here. In general terms, it is not expected that the market environment for the commercial and recreational bluefish fisheries (and thus effort) will substantially change in 2022-2023 compared to recent years. However, due to the increase in commercial quota and RHL, a small increase in effort is expected compared to current conditions.

Alternative 2 is expected to result in a small change in commercial and recreational fishing effort and potential slight increase in revenues in the commercial and party/charter fishery. As described above, it is difficult to predict how quotas translate to increases in revenues given the relationship between landing and price, and other market factors. However, impacts associated with alternative 2 are expected to result in slight positive to negligible impacts to the recreational and commercial communities. This range of impacts considers the short-term (i.e., modest increased revenue and angler satisfaction) and long-term outcomes as a result of staying on track with the 7-year rebuilding schedule.

7.4.3 Alternative 3: Non-Preferred

Given similar small increases in effort are likely under alternative 2 and 3 despite differences in the amount of quota increase as described above and in section 7.1,the socioeconomic impacts are identical to those described under section 7.4.2 (negligible to slight positive).

Comparisons between all 3 alternatives

As summarized above, alternative 1 is expected to result in impacts that range from slight negative to slight positive for the human communities. Alternatives 2 and 3 are expected to result in impacts that range from slight positive to negligible for the human communities. Over the short term, all three alternatives are expected to result in similar increased effort and revenue compared to the baseline (status quo) conditions. However, the preferred alternative is most in line with the ongoing rebuilding plan and offers a balance between rebuilding plan progression while maintaining opportunities for increased angler satisfaction for the human communities.

7.5 Cumulative Effects Analysis

The purpose of the CEA is to consider the combined effects of many actions on the human environment over time that would be missed if each action were evaluated separately. It is not practical to analyze the cumulative effects of an action from every conceivable perspective. Rather, the intent is to focus on those effects that are truly meaningful. The following remarks address the significance of the expected cumulative impacts as they relate to the federally managed bluefish fishery.

A cumulative effects assessment makes effect determinations based on a combination of: 1) impacts from past, present, and reasonably foreseeable future actions; 2) the baseline conditions of the VECs (the combined effects from past, present, and reasonably foreseeable future actions plus the present condition of the VEC); and 3) impacts of the alternatives under consideration for this action.

7.5.1 Consideration of the VECs

The valued ecosystem components for the bluefish fishery are generally the "place" where the impacts of management actions occur and are identified in section 7.

- *Target Species and Non-target species*
- *Physical environment / Essential Fish Habitat*
- *Protected species*
- *Human communities*

The CEA identifies and characterizes the impacts on the VECs by the alternatives under consideration when analyzed in the context of other past, present, and reasonably foreseeable future actions.

7.5.2 Geographic Boundaries

The analysis of impacts focuses on actions related to the commercial and recreational harvest of bluefish. The Western Atlantic Ocean is the core geographic scope for each of the VECs. The core geographic scopes for the managed species are the management units for bluefish described in section 6.1. For non-target species, those ranges may be expanded and would depend on the range of each species in the Western Atlantic Ocean. For habitat, the core geographic scope is focused on EFH within the EEZ but includes all habitat utilized by bluefish and non-target species in the Western Atlantic Ocean. The core geographic scope for protected species is their range in the Western Atlantic Ocean. For human communities, the core geographic boundaries are defined as those U.S. fishing communities in coastal states from Maine through Florida directly involved in the commercial or recreational harvest or processing of bluefish (section 6.4).

7.5.3 Temporal Boundaries

Overall, while the effects of the historical bluefish fisheries are important and considered in the analysis, the temporal scope of past and present actions for bluefish and non-target species and other fisheries, the physical environment and EFH, and human communities is primarily focused on actions that occurred after FMP implementation (1990 for bluefish). For protected species, the scope of past and present actions is focused on the 1980s and 1990s (when NMFS began generating stock assessments for marine mammals and sea turtles that inhabit waters of the U.S. EEZ) through the present.

The temporal scope of future actions for all VECs extends about five years (2025) into the future. The dynamic nature of resource management for these species and lack of information on projects that may occur in the future make it difficult to predict impacts beyond this timeframe with any certainty. The impacts discussed in this section are focused on the cumulative effects of the proposed action (i.e., the suite of preferred alternatives) in combination with the relevant past, present, and reasonably foreseeable future actions over these time scales.

7.5.4 Actions Others Than Those Proposed in this Document

The impacts of the alternatives considered in this document are described in sections 7.1 through 7.4. The sections below present meaningful past, present, and reasonably foreseeable future actions other than the alternatives considered in this document and include the establishment of the original FMP, all subsequent amendments and frameworks, and the setting of annual specifications (ACLs and measures to constrain catch and harvest). Key actions are described below.

Fishery Management Actions

Bluefish FMP (Past and Present) Actions

The historical management practices of the Council have resulted in positive impacts on the health of the bluefish stock (section 6.1) with the exception of recent years, which led to an overfished status (driven mainly by the recalibration of the MRIP estimates). The Council has taken numerous actions to manage the commercial and recreational fisheries for this species. The specifications process is intended to provide the opportunity for the Council and NMFS to regularly assess the status of the fishery and to make necessary adjustments to ensure that there is a reasonable expectation of meeting the objectives of the FMP and the targets associated with any rebuilding programs under the FMP. The MSA is the statutory basis for federal fisheries management. To the degree with which this regulatory regime is complied, the cumulative impacts of past, present, and reasonably foreseeable future federal fishery management actions on the VECs should generally be associated with positive long-term outcomes. Constraining fishing effort through regulatory actions can often have negative short-term socioeconomic impacts. The fishery has ACLs and AMs which are regularly adjusted to ensure landings are constrained to the catch and landings limits. These impacts are usually necessary to bring about long-term sustainability of a given resource, and as such, should, in the long-term, promote positive effects on human communities, especially those that are economically dependent upon the bluefish fishery.

Non-fishing activities that introduce chemical pollutants, sewage, changes in water temperature, salinity, dissolved oxygen, and suspended sediment into the marine environment pose a risk to all of the identified VECs. Human-induced non-fishing activities tend to be localized in nearshore areas and marine project areas where they occur. Examples of these activities include, but are not limited to agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging and the disposal of dredged material. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the managed resource, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these VECs to the impacts of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities. The overall impact to the affected species and their habitats on a population level is likely neutral to slight negative, since a large portion of these species have a limited or minor exposure to these local non-fishing perturbations.

In addition to guidelines mandated by the MSA, NMFS reviews these types of effects through the review processes required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for certain activities that are regulated by federal, state, and local authorities. The jurisdiction of these activities is in "waters of the U.S." and includes both riverine and marine habitats.

Reasonably Foreseeable Future Actions

The Council and Commission recently began using a newly revised time series of recreational catch estimates in management, including incorporating these estimates into the recent stock assessment and resulting catch limits proposed through this action. The revised time series of recreational data prompted re-evaluation of allocations within the FMP, both between the commercial and recreational sectors and within the commercial sector. One or more FMP actions may be initiated in the next 5 to 10 years to follow-up on the allocations set through Amendment 7.

The Council and Commission continue to develop specifications every two years following updated management track assessment, and each year, the specifications are reviewed. Every time a new specifications package is developed, an action is initiated to implement the specifications package.

Other Fishery Management Actions

In addition to the Bluefish FMP, many other FMPs and associated fishery management actions for other species have impacted these VECs over the temporal scale described in section 7.5.3. These include FMPs managed by the Mid-Atlantic Fishery Management Council, New England Fishery Management Council (NEFMC), ASMFC, and to a lesser extent from the South Atlantic Fishery Management Council. Actions associated with other FMPs and omnibus amendments have included measures to regulate fishing effort for other species, measures to protect habitat and forage species, and fishery monitoring and reporting requirements.

For example, the NEFMC's omnibus habitat amendment revised EFH and habitat area of particular concern designations for NEFMC-managed species; revised or created habitat management areas, including gear restrictions to protect vulnerable habitat from fishing gear impacts; and established dedicated habitat research areas. This action is expected to have overall positive impacts on habitat and EFH, with expected long-term positive implications for target and non-target species, while having mixed socioeconomic impacts on various user groups.

The MAFMC's omnibus forage amendment, implemented in 2017, prohibited the development of new and expansion of existing directed commercial fisheries on unmanaged forage species in mid-Atlantic federal waters until the Council has had an adequate opportunity to assess the scientific information relating to any new or expanded directed fisheries and consider potential impacts to existing fisheries, fishing communities, and the marine ecosystem. This action is thought to have ongoing positive impacts to target species, non-target species, and protected species, by protecting a forage base for these populations and limiting the expansion of any existing fishing effort on forage stocks.

The convening of take reduction teams for marine mammals over the temporal scope described in section 7.5.3 has had positive impacts for marine mammals via recommendations for management measures to reduce mortality and serious injury to marine mammals. These actions have had indirect positive impacts on target species, non-target species, and habitat as they have improved monitoring of fishing effort and reduced the amount of gear in the water. However, these measure may have had indirect negative impacts on human communities through reduced fishery efficiency.

In the reasonably foreseeable future, the MAFMC and NEFMC are considering modifications to observer coverage requirements through an omnibus amendment that considers measures that would allow the Councils to implement industry-funded monitoring coverage in some FMPs above levels required by the Standard Bycatch Reporting Methodology in order to assess the amount and type of catch, monitor ACLs, and/or provide other information for management. This action could have long-term positive impacts on target species, non-target species, and protected species through improved monitoring and scientific data on these stocks. This could potentially result in negative socioeconomic impacts to commercial fishing vessels due to increased costs.

The MAFMC and the ASMFC are working on a recreational reform initiative that considers improvements to management of the recreational fisheries for summer flounder, scup, black sea bass, and bluefish. This joint initiative will address a range of recreational management issues through technical guidance documents, frameworks/addenda, and an amendment. The Recreational Harvest Control Rule Framework/Addendum will be the first management action developed through this initiative. The overarching goal of the harvest control rule is to rely less on expected fishery performance compared to a catch or harvest limit when setting recreational bag, size, and season limits, and instead to use a more holistic approach that places greater emphasis on stock status indicators and trends. After completion of the harvest control rule Framework/Addendum, the Council and Commission will further develop and consider the following topics through a separate framework/addendum or technical guidance documents. Some of these topics may also be incorporated into the Harvest Control Rule Framework/Addendum: 1) better incorporating MRIP uncertainty into the management process; 2) guidelines for maintaining status quo recreational bag, size, and season limits from one year to the next; 3) a process for setting multi-year recreational management measures; 4) changes to the timing of the recommendation for federal waters recreational management measures. The Council and Commission also initiated an amendment to consider options for managing for-hire recreational fisheries separately from other recreational fishing modes (referred to as sector separation) and to also consider options related to recreational catch accounting such as private angler reporting and enhanced vessel trip report requirements for for-hire vessels. This amendment will be further developed after completion of the Recreational Harvest Control Rule Framework/Addendum. This action could have overall positive impacts on habitat and EFH and protected species, with expected long-term positive implications for target and non-target species, while having mixed socioeconomic impacts on various user groups.

As with the bluefish actions described above, other FMP actions have had positive long-term cumulative impacts on managed and non-target species because they constrain fishing effort and manage stocks at sustainable levels. As previously stated, constraining fishing effort can have negative short-term socioeconomic impacts and long-term positive impacts. These actions have typically had slight negative impacts on habitat, due to continued fishing operations preventing impacted habitats from recovering; however, some actions had long-term positive impacts through designating or protecting important habitats. FMP actions have also had a range of impacts on protected species, including generally slight negative to negligible impacts on ESA-listed species, and slight negative to slight positive impacts on non ESA-listed marine mammals, depending on the species.

Fishery Management Action Summary

The Council has taken many actions to manage the associated commercial and/or recreational bluefish fisheries. The MSA is the statutory basis for federal fisheries management. The cumulative impacts on the VECs of past, present, and reasonably foreseeable future federal fishery management actions under the MSA should generally be associated with positive long-term outcomes because they constrain fishing effort and manage stocks at sustainable levels. Constraining fishing effort through regulatory actions can have negative short-term socioeconomic impacts. These impacts are sometimes necessary to bring about long-term sustainability of a resource, and as such should promote positive effects on human communities in the long-term. A summary of the cumulative impacts of past, present, and reasonably foreseeable future actions on each VEC is provided in Table 20.

Table 20. Summary of expected impacts of combined past, present, and reasonably foreseeable future actions on each VEC.

VEC	Past Actions (P)	Present Actions (Pr)	Reasonably Foreseeable Future Actions (RFFA)	Combined Effects of Past, Present, and Future Actions
Managed Resources	**Positive** Combined effects of past actions have decreased effort, improved habitat protection	**Slight Negative to Slight Positive** Current regulations continue to manage for a sustainable stock. The ongoing rebuilding plan will increase overall biomass	**Positive** Future actions are anticipated to strive to maintain a sustainable stock	**Positive** Stocks are being managed sustainably
Non-Target Species	**Positive** Combined effects of past actions have decreased effort and reduced bycatch	**Slight Negative to Slight Positive** Current regulations continue to decrease effort/increase efficiency and reduce bycatch	**Positive** Future regulations are being developed to improve monitoring and address bycatch issues	**Positive** Decreased effort/increased efficiency and reduced bycatch continue; most non-target stocks continue to be sustainably managed under ACLs/AMs
Habitat	**Mixed** Combined effects of effort reductions and better control of non-fishing activities have been positive, but fishing activities and non-fishing activities have reduced habitat quality	**Slight Negative to Negligible** Effort reductions and better control of non-fishing activities have been positive, but fishing activities continue to reduce habitat quality	**Mixed** Future regulations will likely control effort and habitat impacts but as stocks improve, effort may increase along with additional non-fishing activities	**Mixed** Continued fisheries management will likely control effort and thus fishery related habitat impacts but fishery and non-fishery related activities will continue to reduce habitat quality
Protected Resources	**Mixed** Combined effects of past fishery actions have reduced effort and thus interactions with protected resources,	**Negligible to Low Moderate Negative** Current regulations continue to control effort, thus reducing opportunities for interactions,	**Mixed** Future regulations (MSA, ESA, MMPA) will likely control effort and thus protected species interactions, but as stocks improve effort will likely increase, possibly increasing interactions	**Mixed** Continued effort controls along with past regulations will likely help stabilize protected species interactions
Human Communities	**Mixed** Management actions have imposed requirements that reduced short-term revenues and increased costs; however, stock improvements have led to community benefits and in the long term	**Slight Negative to Negligible** Management actions continue to constrain effort, at times reducing short-term revenues, however, stock improvements continue to benefit human communities in the long term; price and revenues are generally increasing	**Mixed** Future regulations will likely control effort and thus reduce revenues at times, but long-term maintenance of sustainable stock will lead to long-term benefits to human communities	**Mixed** Continued fisheries management will impose requirements that may reduce short-term revenues or increase costs; sustainable management should improve community benefits in long-term

Non-Fishing Impacts

Nearshore Human Activities

Non-fishing activities that occur in the marine nearshore and offshore environments and connected watersheds can cause the loss or degradation of habitat and/or affect the fish and protected species that utilize those areas. The impacts of most nearshore, human-induced, non-fishing activities tend to be localized in the areas where they occur, although effects on species could be felt throughout their populations since many marine organisms are highly mobile. For offshore projects, some impacts may be localized while others may have regional influence, especially for larger projects. The following discussion of impacts is based on past assessments of activities and assumes these activities will continue as projects are proposed.

Examples of non-fishing activities include point source and non-point source pollution, shipping, dredging/deepening, wind energy development, oil and gas development, construction, and other activities. Specific examples include at-sea disposal areas, oil and mineral resource exploration, aquaculture, construction of offshore wind farms, and bulk transportation of petrochemicals. Episodic storm events and the restoration activities that follow can also cause impacts. The impacts from these activities primarily stem from habitat loss due to human interaction and alteration or natural disturbances. These activities are widespread and can have localized impacts on habitat related to accretion of sediments, pollutants, habitat conversion, and shifting currents and thermoclines. For protected species, primary concerns associated with non-fishing activities include vessel strikes, dredge interactions (especially for sea turtles and sturgeon), and underwater noise. These activities have both direct and indirect impacts on protected species. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and as such may indirectly constrain the productivity of managed species, non-target species, and protected species. Decreased habitat suitability tends to reduce the tolerance of these VECs to the impacts of fishing effort. Non-fishing activities can cause target, non-target, and protected species to shift their distributions away from preferred areas, and may also lead to decreased reproductive ability and success (from current changes, spawning disruptions, and behavior changes), disrupted or modified food web interactions, and increased disease. While localized impacts may be more severe, the overall impact on the affected species and their habitats on a population level is unknown, but likely to have impacts that mostly range from no impact to slight negative, depending on the species and activity.

Non-fishing activities permitted by other Federal agencies (e.g., beach nourishment, offshore wind facilities) require examinations of potential impacts on the VECs. The MSA imposes an obligation on other Federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH (50 CFR § 600.930). NMFS and the eight regional fishery management councils engage in this review process by making comments and recommendations on federal or state actions that may affect habitat for their managed species. Agencies need to respond to, but do not necessarily need to adopt these recommendations. Habitat conservation measures serve to potentially minimize the extent and magnitude of indirect negative impacts federally-permitted activities could have on resources under NMFS' jurisdiction. In addition to guidelines mandated by the MSA, NMFS evaluates non-fishing effects during the review processes required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for certain activities that are regulated by Federal, state, and local authorities. Non-fishing activities must also meet the mandates under the ESA, specifically Section 7(a)(2)[30], which ensures that agency actions do not jeopardize the continued existence of endangered species and their critical habitat.

In recent years, offshore wind energy and oil and gas exploration have become more relevant activities in the GAR. They are expected to impact all VECs, as described below.

Impacts of offshore wind energy development on Biological Resources (Target species, Non-target species, Protected Species) and the Physical Environment

Construction activities may have both direct and indirect impacts on marine resources, ranging from temporary changes in distribution to injury and mortality. Impacts could occur from changes to habitat in the areas of wind turbines and cable corridors and increased vessel traffic to and from these areas. Species that reside in affected wind farms year round may experience different impacts than species that seasonally reside in or migrate through these areas. Species that typically reside in areas where wind turbines are installed may return to the area and adapt to habitat changes after construction is complete. Inter-array and electricity export cables will generate electromagnetic fields, which can affect patterns of movement, spawning, and recruitment success for various species. Effects will depend on cable type, transmission capacity, burial depth, and proximity to other cables. Substantial structural changes in habitats associated with cables are not expected unless cables are left unburied (see below). However, the cable burial process may alter sediment composition along the corridor, thereby affecting infauna and emergent biota. Taormina et al. (2018) provide a recent review of various cable impacts, and Hutchinson et al. (2020) and Taormina et al. (2020) examine the effects of electromagnetic fields in particular.

The full build out of offshore wind farms will result in broad habitat alteration. The wind turbines will alter hydrodynamics of the area, which may affect primary productivity and physically change the distribution of prey and larvae. It is not clear how these changes will affect the reproductive success of marine resources. Scour and sedimentation could have negative effects on egg masses that attach to the bottom. Benthic habitat will be altered due to the placement of scour protection at wind turbine foundations, and over cables that are not buried to target depth in the sediment, converting soft substrates into hard substrates. This could alter species composition and predator/prey relationships by increasing favorable habitat for some species and decreasing habitat for others. The placement of wind turbines will also establish new vertical structure in the water column, which could serve as reefs for bottom species, fish aggregating devices for pelagic species, and substrate for the colonization of other species, e.g., mussels. Various authors have studied these types of effects (e.g., Bergström et al. 2013, Dannheim et al. 2019, Degraer et al. 2019, Langhamer 2012, Methratta and Dardick 2019, Stenberg et al. 2015).

Elevated levels of sound produced during site assessment activities, construction, and operation of offshore wind facilities will impact the soundscape.[31] Temporary, acute, noise impacts from construction activity could impact reproductive behavior and migration patterns; the long-term

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[30] "Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an "agency action") is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat."

[31] See NMFS Ocean Noise Strategy Roadmap: https://cetsound.noaa.gov/Assets/cetsound/documents/Roadmap/ONS_Roadmap_Final_Complete.pdf

impact of operational noise from turbines may also affect behavior of fish and prey species, through both vibrations in the immediate area surrounding them in the water column, and through the foundation into the substrate. Depending on the sound frequency and source level, noise impacts to species may be direct or indirect (Finneran 2015; Finneran 2016; Nowacek et al. 2007; NRC 2000; NRC 2003; NRC 2005; Madsen et al. 2006; Piniak 2012; Popper et al. 2014; Richardson et al. 1995; Thomsen et al. 2006). Exposure to underwater noise can directly affect species via behavioral modification (avoidance, startle, spawning) or injury (sound exposure resulting in internal damage to hearing structures or internal organs) (Bailey et al. 2010; Bailey et al. 2014; Bergström et al. 2014; Ellison et al. 2011; Ellison et al. 2018; Forney et al. 2017; Madsen et al. 2006; Nowacek et al. 2007; NRC 2003; NRC 2005; Richardson et al. 1995; Romano et al. 2004; Slabbekoorn et al. 2010; Thomsen et al. 2006; Wright et al. 2007). Indirect effects are likely to result from changes to the acoustic environment of the species, which may affect the completion of essential life functions (e.g., migrating, breeding, communicating, resting, foraging)[32] (Forney et al. 2017; Richardson et al. 1995; Slabbekoorn et al. 2010; Thomsen et al. 2006).

Wind farm survey and construction activities and turbine/cable placement will substantially affect NMFS scientific research surveys, including stock assessment surveys for fisheries and protected species[33] and ecological monitoring surveys. Disruption of such scientific surveys could increase scientific uncertainty in survey results and may significantly affect NMFS' ability to monitor the health, status, and behavior of marine resources and protected species and their habitat use within this region. Based on existing regional Fishery Management Councils' ABC control rule processes and risk policies (e.g., 50 CFR §§ 648.20 and 21), increased assessment uncertainty could result in lower commercial quotas and recreational harvest limits that may reduce the likelihood of overharvesting and mitigate associated biological impacts on fish stocks. However, this would also result in lower associated fishing revenue and reduced recreational fishing opportunities, which could result in indirect negative impacts on fishing communities.

Impacts of Offshore Wind Energy Development on Socioeconomic Resources

One offshore wind pilot project off Virginia installed two turbines in 2020**.** Several potential offshore wind energy sites have been leased or identified for future wind energy development in federal waters from Massachusetts to North Carolina (see BOEM map below – Figure 8). According to BOEM, approximately 22 gigawatts (close to 2,000 wind turbines based on current technology) of Atlantic offshore wind development via 17 projects are reasonably foreseeable along the east coast (BOEM 2020a). [BOEM has recently begun a planning process for the GOM via a regional intergovernmental renewable energy task force (https://www.boem.gov/Gulf-of-Maine). It is not clear at this time where development might occur in the GOM. Given the water depth in the region, floating turbines will likely be the primary type of wind turbine foundations to be deployed in the area.] As the number of wind farms increases, so too would the level and scope of impacts to affected habitats, marine resources, and human communities.

Offshore wind energy development is being considered in parts of the outer continental shelf that overlap with the bluefish resource, specifically on the Atlantic coast where commercial

[32] See NMFS Ocean Noise Strategy Roadmap (footnote #2)
[33] Changes in required flight altitudes due to proposed turbine height would affect aerial survey design and protocols (BOEM 2020a).

stakeholders deploy gill nets. The bluefish fishery has been active in these areas at present and is expected to be for the near future (see section 6). The social and economic impacts of offshore wind energy on fisheries could be generally negative due to the overlap of wind energy areas with productive bluefish fishing grounds. Impacts may vary by year based on the cyclical nature of abundance present in the bluefish fishery.

There could also be social and economic benefits in the form of jobs associated with construction and maintenance, and replacement of some electricity generated using fossil fuels with renewable sources (AWEA 2020).

It remains unclear how fishing or transiting to and from fishing grounds (whether or not those grounds are within a wind farm) might be affected by the presence of a wind farm. While no offshore wind developers have expressed an intent to exclude fishing vessels from wind turbine arrays once construction is complete, it could be difficult for operators to tow bottom-tending mobile gear or transit amongst the wind turbines, depending on the spacing and orientation of the array and weather conditions.[34] If vessel operators choose to avoid fishing or transiting within wind farms, effort displacement and additional steaming time could result in negative socioeconomic impacts to affected communities, including increased user conflicts, decreased catch and associated revenue, safety concerns, and increased fuel costs. If vessels elect to fish within wind farms, effects could be both positive and negative due to increased catch rates, reduced catch and associated revenue, user conflicts, gear damage/loss, and increased risk of allision or collision.

Impacts of Oil and Gas Development on Biological and Socioeconomic Resources

For oil and gas, this timeframe could include leasing and possible surveys, depending on the direction of BOEM’s 5-year planning process in the North and Mid-Atlantic regions. (Note that there are fewer oil and gas development activities in the region than offshore wind; therefore, the non-fishing impacts focus more heavily on offshore wind.) Seismic surveys to detect and quantify mineral resources in the seabed impact marine species and the acoustic environment within which marine species live. These surveys have uncertain impacts on fish behaviors that could cumulatively lead to negative population level impacts. For protected species (sea turtle, fish, small cetacean, pinniped, large whale), the severity of these behavioral or physiological impacts is based on the species’ hearing threshold , the overlap of this threshold with the frequencies emitted by the survey, as well as the duration of time the surveys would operate, as these factors influence exposure rate (Ellison et al. 2011; Ellison et al. 2018; Finneran 2015; Finneran 2016; Madsen et al. 2006; Nelms et al. 2016; Nowacek et al. 2007; Nowacek et al. 2015; NRC 2000; NRC 2003; NRC 2005; Piniak 2012; Popper et al. 2014; Richardson et al. 1995; Thomsen et al. 2006; Weilgart 2018). If fishery resources are affected by seismic surveys, then so in turn the fishermen targeting these resources would be affected. However, such surveys could increase jobs, which may provide some positive effects on human communities (BOEM 2020b). It is important to understand that seismic surveys for mineral resources are different from surveys used to characterize submarine

[34] The United States Coast Guard has considered transit and safety issues related to the Massachusetts and Rhode Island lease areas in a recent port access route study, and has recommended uniform 1 mile spacing in east-west and north-south directions between turbines to facilitate access for fishing, transit, and search and rescue operations. Future studies in other regions could result in different spacing recommendations (UCSG 2020).

geology for offshore wind installations, and thus these two types of activities are expected to have different impacts on marine species.

Offshore Energy Summary

The overall impact of offshore wind energy and oil and gas exploration on the affected species and their habitats at a population level is unknown, but likely to range from no impact to moderate negative, depending on the number and locations of projects that occur. The individual project phases (site assessment, construction, operation, and decommissioning) as well as different aspects of the technology (foundations, cables/pipelines, turbines) will have varying impacts on resources. Mitigation efforts, such as habitat conservation measures, time of year construction restrictions, layout modifications, and fishery compensation funds could lessen the magnitude of negative impacts as well. The overall impact on socioeconomic resources is likely slight positive to moderate negative; potentially positive due to a potential increase in jobs and recreational fishing opportunities, but negative due to displacement and disruption of commercial fishing effort.

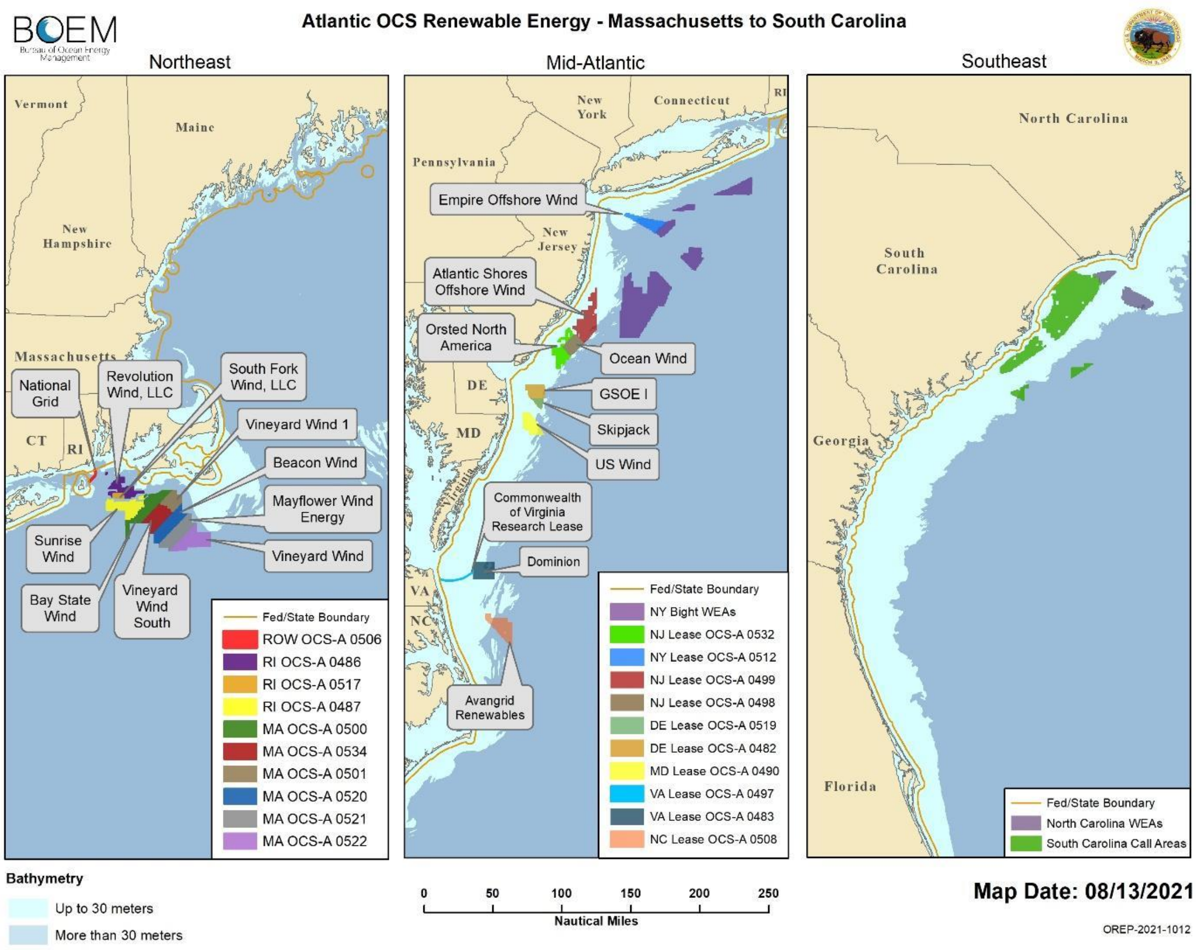

Figure 8. Map of BOEM Wind Planning areas, Wind Energy Areas, and Wind Leasing Areas on the Atlantic Outer Continental Shelf.

Global Climate Change

Global climate change affects all components of marine ecosystems, including human communities. Physical changes that are occurring and will continue to occur to these systems include sea-level rise, changes in sediment deposition; changes in ocean circulation; increased frequency, intensity and duration of extreme climate events; changing ocean chemistry; and warming ocean temperatures. The rates of physical and chemical changes in marine ecosystems have been most rapid in recent decades (Johnson et al. 2019). Emerging evidence demonstrates that these physical changes are resulting in direct and indirect ecological responses within marine ecosystems, which may alter the fundamental production characteristics of marine systems (Stenseth et al. 2002). The general trend of changes can be explained by warming causing increased ocean stratification, which reduces primary production, lowering energy supply for higher trophic levels and changing metabolic rates. Different responses to warming can lead to altered food-web structures and ecosystem-level changes. Shifts in spatial distribution are generally to higher latitudes (i.e., poleward) and to deeper waters as species seek cooler waters within their normal temperature preferences. Climate change will also potentially exacerbate the stresses imposed by fishing and other non-fishing human activities and stressors. Survival of marine resources under a changing climate depends on their ability to adapt to change, but also how and to what degree those other human activities influence their natural adaptive capacity.

Results from the Northeast Fisheries Climate Vulnerability Assessment indicate that climate change could have impacts on Council-managed species that range from negative to positive, depending on the adaptability of each species to the changing environment (Hare et al. 2016).

Based on this assessment, bluefish was determined to have a moderate vulnerability to climate change. The exposure of bluefish to the effects of climate change was determined to be "high" due to the impacts of ocean surface temperature, ocean acidification, and air temperature. Exposure to all three factors occurs during all life stages. Bluefish is an obligate estuarine-dependent species. Spawning occurs on the shelf and juveniles inhabit estuaries. Adults make seasonal north-south migrations exposing them to changing conditions inshore and offshore. The distributional vulnerability of bluefish was ranked as "high," given that bluefish spawn in shelf waters and eggs and larvae are broadly dispersed. Adults use a range of habitats including estuarine, coastal, and shelf. The life history of the species has a strong potential to enable shifts in distribution. Bluefish were thus determined to have low biological sensitivity to climate change (Hare et al. 2016).[35]

Overall vulnerability results for additional Greater Atlantic species, including most of the non-target species identified in this action, are shown in Figure 9 (Hare et al. 2016). While the effects of climate change may benefit some habitats and the populations of species through increased availability of food and nutrients, reduced energetic costs, or decreased competition and predation, a shift in environmental conditions outside the normal range can result in negative impacts for those habitats and species unable to adapt. This, in turn, may lead to higher mortality, reduced growth, smaller size, and reduced reproduction or populations. Thus, already stressed populations are expected to be less resilient and more vulnerable to climate impacts. Climate change is

[35] Climate vulnerability profiles for individual species are available at:
https://www.st.nmfs.noaa.gov/ecosystems/climate/northeast-fish-and-shellfish-climate-vulnerability/index

expected to have impacts that range from positive to negative depending on the species. However, future mitigation and adaptation strategies to climate change may mitigate some of these impacts. The science of predicting, evaluating, monitoring and categorizing these changes continues to evolve. The social and economic impacts of climate change will depend on stakeholder and community dependence on fisheries, and their capacity to adapt to change. Commercial and recreational fisheries may adapt in different ways, and methods of adaptation will differ among regions. In addition to added scientific uncertainty, climate change will introduce implementation uncertainty and other challenges to effective conservation and management.

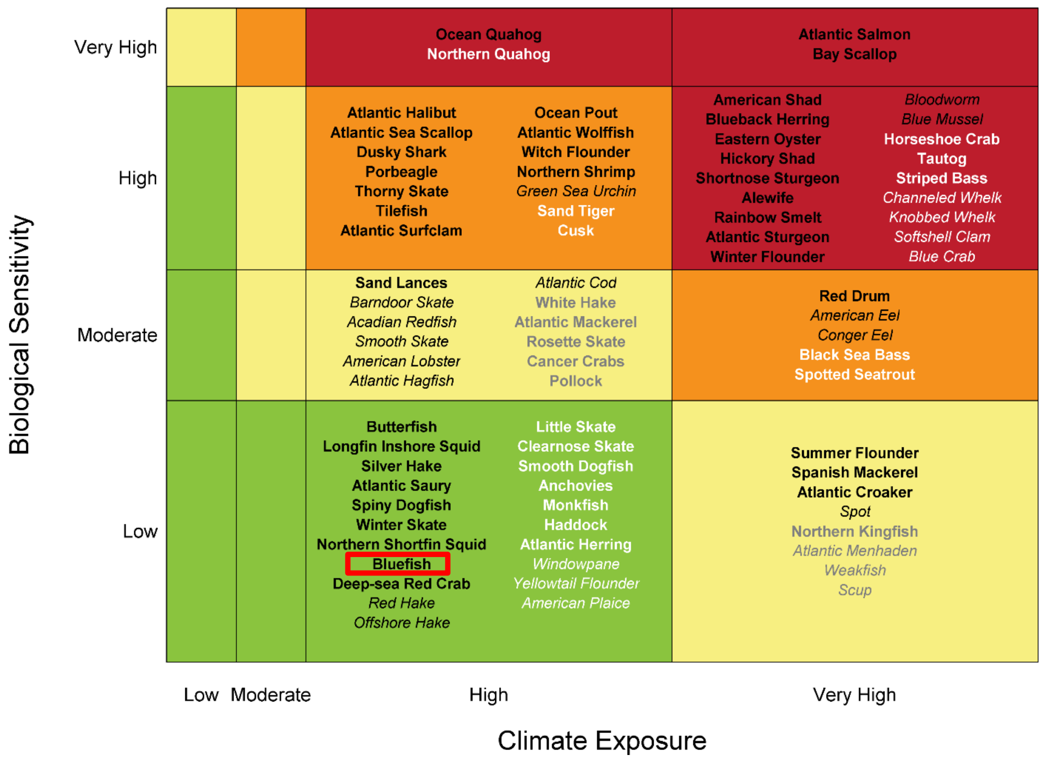

Figure 9. Overall climate vulnerability score for Greater Atlantic species, with bluefish highlighted with a red box. Overall climate vulnerability is denoted by color: low (green), moderate (yellow), high (orange), and very high (red). Certainty in score is denoted by text font and text color: very high certainty (>95%, black, bold font), high certainty (90–95%, black, italic font), moderate certainty (66–90%, white or gray, bold font), low certainty (<66%, white or gray, italic font). Figure source: Hare et al. 2016.

Baseline Condition for the Resources, Ecosystems, and Human Communities

For the purposes of this CEA, the baseline condition is considered as the present condition of the VECs plus the combined effects of the past, present, and reasonably foreseeable future actions.

Table 20 (above) summarizes the added effects of the condition of the VECs (i.e., status/trends/stresses from Affected environment and impacts) and the sum effect of the past, present, and reasonably foreseeable future actions (from previous summary table or Past, present, reasonably foreseeable future action section above). The resulting CEA baseline for each VEC is exhibited in the last column of Table 20 and further detailed in section 6. As mentioned above, the CEA Baseline is then used to assess cumulative effects of the proposed management actions.

Ultimately, target and non-target species are being managed sustainably, as management measures are continuously adjusted based on biomass levels and interactions. Increased fishing effort on bluefish will continue to interact with habitat that has been subject to fishing pressure for decades. However, the gear used in the bluefish fisheries already has limited interaction with habitat and this is not projected to be exacerbated over time. For protected species continued catch and effort controls, as well, as additional management actions taken under the ESA and/or MMPA are likely to reduce or mitigate the risk of gear interactions. Finally, human communities will experience different impacts in the short term versus the long term. However, overall, long term impacts are expected to increase landings/revenues, and ultimately, angler satisfaction.

Summary of Effects of the Proposed Actions

The preferred alternatives and impacts of the proposed actions are described in section 7 and summarized in Table 21.

Table 21. Incremental impacts of the proposed actions and preferred alternative.

Alternative	**Bluefish**	**Non-Target Species**	**Habitat**	**MMPA Protected Species** (not also ESA listed)	**ESA-Listed Species** (endangered or threatened)	**Human Communities** (Socio-economic)
Alternative 2 (*Preferred*)	Slight – to Slight +	Slight – to Slight +	Slight – to Negligible	Negligible to Low Moderate -	Negligible to Low Moderate -	Slight + to Negligible

7.5.5 Magnitude and Significance of Cumulative Effects

In determining the magnitude and significance of the cumulative impacts of the preferred alternatives, the incremental impacts of the direct and indirect impacts should be considered, on a VEC-by-VEC basis, in addition to the effects of all actions (those identified and discussed relative to the past, present, and reasonably foreseeable future actions of both fishing and non-fishing actions). Table 21 provides a summary of likely impacts found in the various groups of management alternatives contained in this action. The CEA baseline that, as described above in Table 20 represents the sum of past, present, and reasonably foreseeable future actions and conditions of each VEC. When an alternative has a positive impact on the VEC, for example, reduced fishing mortality on a managed species, it has a positive cumulative effect on the stock size of the species when combined with “other” actions that were also designed to increase stock size. In contrast, when an alternative has negative effects on a VEC, such as increased mortality, the cumulative effect on the VEC would be negative and tend to reduce the positive effects of the other actions. The resultant positive and negative cumulative effects are described below for each VEC. As seen above in the non-fishing impacts section, non-fishing impacts on the VECs generally range from no impact to slight negative.

7.5.5.1 Magnitude and Significance of Cumulative Effects on Managed Species and Non-Target Species

Past fishery management actions taken through the respective FMPs have had a positive cumulative effect on the managed species. It is anticipated that the future management actions described in section 7.5.4 will have additional indirect positive effects on the managed species through actions which reduce and monitor bycatch, protect habitat, and protect the ecosystem services on which the productivity of managed species depends. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to the managed species have had positive cumulative effects.

Catch limits, commercial quotas, and RHLs for bluefish have been specified to ensure that the stock is managed sustainably and that measures are consistent with the objectives of the FMP under the guidance of the MSA. Recreational and commercial management measures (such as possession limits, size limits, seasons, and gear restrictions) are designed to ensure that catch and landings limits are not exceeded. The impacts of annual specification of catch limits and other management measures are largely dependent on how effective those measures are in meeting the objectives of preventing overfishing and achieving optimum yield, and on the extent to which mitigating measures are effective. The proposed actions described in this document would positively reinforce the past and anticipated positive cumulative effects on the managed species by achieving the objectives specified in the respective FMPs. Therefore, the proposed action would have a positive, but not significant, effect on the managed species in consideration with other past, present, and reasonably foreseeable future actions (section 7.5.4).

7.5.5.2 Magnitude and Significance of Cumulative Effects on Physical Environment

Past fishery management actions taken through the respective FMPs and annual specifications process have had positive cumulative effects on habitat. The actions have constrained fishing effort both at a large scale and locally and have implemented gear requirements which may reduce impacts on habitat. As required under these FMP actions, EFH and Habitat Areas of Particular Concern were designated for the managed resources. It is anticipated that the future management actions described in section 7.5.4 will result in additional direct or indirect positive effects on habitat through actions which protect EFH and protect ecosystem services on which these species' productivity depends. These impacts could be broad in scope. All the VECs are interrelated; therefore, the linkages among habitat quality, managed and non-target species productivity, and associated fishery yields should be considered. For habitat, there are direct and indirect negative effects from actions which may be localized or broad in scope; however, positive actions that have broad implications have been, and will likely continue to be, taken to improve the condition of habitat. Some actions, such as coastal population growth and climate change may indirectly impact habitat and ecosystem productivity; however, these actions are beyond the scope of NMFS and Council management. As described in section 7.2, the impacts of the proposed actions on habitat are expected to have slight negative to negligible impacts. The preferred alternative is expected to maintain or slightly increase fishing effort compared to 2020. Although the impacted areas have been fished for many years with many different gear types and therefore will not likely be further impacted by these measures, continued fishing effort maintains impacts on habitat. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to habitat have had cumulative effects ranging from slight negative to slight positive. Therefore, the relevant past, present, and reasonably foreseeable future actions, including the proposed action, are cumulatively expected to have slight negative to slight positive, but not significant effects on habitat (section 7.5.4).

7.5.5.3 Magnitude and Significance of Cumulative Effects on Protected Species

Given their life history, large changes in protected species abundance over long time periods, and the multiple and wide-ranging fisheries management actions that have occurred, the cumulative impacts on protected species were evaluated over a long time frame (i.e., from the early 1970s when the MMPA and ESA were implemented through the present). Past fishery management actions have contributed to a long-term trend toward positive cumulative effects on protected species through the reduction of fishing effort and implementation of gear requirements, and thus a reduction in potential interactions. It is anticipated that future management actions, summarized in section 7.5.4, will result in additional indirect positive effects on protected species. These impacts could be broad in scope. The preferred alternatives may modify current levels of fishing effort in terms of the overall amount of effort, timing, or location due to a 55% increase in the ABC, a 28% increase in the commercial quota, and a 67% increase in the RHL in 2022. For 2023, the preferred alternative results in an 88% increase in the ABC, a 55% increase in the commercial quota, and a 165% increase in the RHL. As described in section 7.3, this is expected to have negligible to low moderate negative impacts on protected species. For protected species continued catch and effort controls, as well, as additional management actions taken under the ESA and/or MMPA are likely to reduce or mitigate the risk of gear interactions. Overall, the relevant past, present, and reasonably foreseeable future actions, including the proposed action, are cumulatively expected have mixed effects on most protected species (section 7.5.4).

7.5.5.4 Magnitude and Significance of Cumulative Effects on Human Communities

Past fishery management actions taken through the respective FMPs have had both positive and negative cumulative socioeconomic effects by benefiting domestic fisheries through sustainable fishery management practices while also sometimes reducing the ability of some individuals to participate in fisheries. Sustainable management practices are, however, expected to yield broad positive impacts to fishermen, their communities, businesses, and the nation as a whole. It is anticipated that the future management actions described in 7.5.4 will result in positive effects for human communities due to sustainable management practices, although additional indirect negative effects on some communities could occur if management actions result in reduced revenues. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to human communities have had overall positive cumulative effects.

Catch limits, commercial quotas, and RHLs for each of the managed species have been specified to ensure that these stocks are managed in a sustainable manner and that management measures are consistent with the objectives of the FMPs under the guidance of the MSA. Recreational and commercial management measures (such as the season and possession limit measures considered in this document) are designed to ensure that catch and landings limits are not exceeded, and to ensure that the fisheries are managed efficiently and benefit the human communities that rely on them. The impacts from annual specification of management measures on the managed species are largely dependent on how effective those measures are in meeting their intended objectives and the extent to which mitigating measures are effective. Quota overages may alter the timing of commercial fishery revenues such that revenues can be realized a year earlier. Impacts to some fishermen may be caused by unexpected reductions in their opportunities to earn revenues from commercial fisheries in the year during which the overages are deducted. Similarly, recreational fisheries may have decreased harvest opportunities due to reduced harvest limits as a result of overages and more restrictive management measures (e.g., minimum fish size, possession limits, fishing seasons) implemented to address overages.

Despite the potential for negligible short-term effects on human communities, positive long-term effects are expected due to the long-term sustainability of the managed stocks, as the stock progresses through the ongoing 7-year rebuilding plan. Therefore, the proposed action would have a positive, but not significant effect on human communities when considered with other past, present, and reasonably foreseeable future actions (section 7.5.4).

7.5.6 Proposed Action on all the VECs

The Council's preferred alternatives (i.e., the proposed action) are described in section 5. The direct and indirect impacts of the proposed action on the VECs are described in sections 7.1 through 7.4. The magnitude and significance of the cumulative effects, including additive and synergistic effects of the proposed action, as well as past, present, and future actions, have been taken into account (section 7.5.5).

When considered in conjunction with all other pressures placed on the fisheries by past, present, and reasonably foreseeable future actions, the preferred alternatives are not expected to result in any significant impacts, positive or negative. The preferred action for implementing catch and landings limits for bluefish in 2022 and 2023 is expected to have slight negative to slight positive impacts on bluefish (because the stock is projected to maintain its overfished status in the short term), slight negative to slight positive impacts on non-target species, slight negative to negligible impacts on habitat, negligible to low moderate negative on protected species, and negligible to slight positive impacts on human communities.

The preferred alternatives are consistent with other management measures that have been implemented in the past for these fisheries.

The regulatory atmosphere within which federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of managed species, habitat, and human communities. Consistent with NEPA, the MSA requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, impacts on all VECs from past, present and reasonably foreseeable future actions have generally been positive and are expected to continue in that manner for the foreseeable future. This is not to say that some aspects of the VECs are not experiencing negative impacts, but rather that when considered as a whole and as a result of the management measure implemented in these fisheries, the overall long-term trend is positive.

There are no significant cumulative effects associated with the preferred alternatives based on the information and analyses presented in this document and in past FMP documents (Table 20).

8. APPLICABLE LAWS

Magnuson-Stevens Fishery Conservation and Management Act (MSA)

8.1.1 National Standards

Section 301 of the MSA requires that FMPs contain conservation and management measures that are consistent with the ten National Standards. The Council continues to meet the obligations of National Standard 1 by adopting and implementing conservation and management measures that will continue to prevent overfishing, while achieving, on a continuing basis, the optimum yield (OY) for bluefish and the U.S. fishing industry. The Council uses the best scientific information available (National Standard 2) and manages bluefish throughout their range (National Standard 3). These management measures do not discriminate among residents of different states (National Standard 4) and they do not have economic allocation as their sole purpose (National Standard 5). The measures account for variations in the fishery (National Standard 6), they avoid unnecessary duplication (National Standard 7). They take into account the fishing communities (National Standard 8) and they promote safety at sea (National Standard 10). The proposed actions are consistent with National Standard 9, which addresses bycatch in fisheries. The Council has implemented many regulations that have indirectly reduced fishing gear impacts on EFH. By continuing to meet the National Standards requirements of the MSA through future FMP amendments, framework actions, and the annual specification setting process, the Council will ensure that cumulative impacts of these actions will remain positive overall for the managed species, the ports and communities that depend on these fisheries, and the Nation as a whole.

8.1.2 Essential Fish Habitat Assessment

EFH assessments are required for any action that is expected to have an adverse impact on EFH, even if the impact is only minimal and/or temporary in nature (50 CFR § 600.920 (e) (1-5)).

Description of Action

As previously described, the proposed action would implement catch and landings limits for the commercial and recreational bluefish sectors for 2022-2023. The proposed actions are described in more detail in section 5.

Potential Adverse Effects of the Action on EFH

The types of habitat impacts caused by the gears used in the bluefish fishery (predominantly gill net in the commercial fishery; predominantly hook and line gear in the recreational fishery) are summarized in section 6.2.3.

As described in section 7, under the proposed 2022-2023 bluefish specifications, the commercial quota and RHL are expected to increase compared to current levels. Therefore, fishing effort for bluefish is expected to slightly increase in 2022-2023. The locations of fishing are not expected to change and the amount of gear in the water and duration of time that gear is in the water are not expected to substantially increase or in a manner that would cause meaningful increased negative impacts on habitat. The habitats that are impacted by bluefish have been impacted by many fisheries over many years. The levels of fishing effort expected under the preferred alternative are not expected to cause additional habitat damage, but they are expected to limit the recovery of previously impacted areas. Thus, the proposed action for bluefish is expected to have slight negative to negligible impacts on habitat and EFH.

Proposed Measures to Avoid, Minimize, or Mitigate Adverse Impacts of This Action

Measures in the Bluefish FMP which impact EFH were considered in Amendment 1 (MAFMC 2000). Hook and line are the principal gears used in the recreational fishery for bluefish while gill net and trawl are used in the commercial fishery. These gears have minimal adverse impacts on EFH in the region (Stevenson et al. 2004). These characteristics of the fisheries have not changed since Amendment 1. None of the alternatives included in this document were designed to avoid, minimize, or mitigate adverse impacts on EFH.

Section 6.2.3 lists examples of management measures previously implemented by the Council with the intent of minimizing the impacts of various fisheries on habitat. None of these measures substantially restrict the bluefish fishery.

Conclusions

Overall, the preferred alternatives are expected to have slight negative to negligible impacts on EFH; therefore, an EFH consultation is not required.

8.2 Endangered Species Act

Pursuant to section 7 of the Endangered Species Act (ESA), NOAA's National Marine Fisheries Service (NMFS) issued a Biological Opinion (Opinion) on May 27, 2021, that considered the effects of the NMFS' authorization of ten fishery management plans (FMP), NMFS' North Atlantic Right Whale Conservation Framework, and the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2, on ESA-listed species and designated critical habitat. The ten FMPs considered in the Opinion include the: (1) American lobster; (2) Atlantic bluefish; (3) Atlantic deep-sea red crab; (4) mackerel/squid/butterfish; (5) monkfish; (6) Northeast multispecies; (7) Northeast skate complex; (8) spiny dogfish; (9) summer flounder/scup/black sea bass; and (10) Jonah crab FMPs. The American lobster and Jonah crab FMPs are permitted and operated through implementing regulations compatible with the interstate fishery management plans (ISFMP) issued under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (ACA), the other eight FMPs are issued under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

The 2021 Opinion determined that NMFS' authorization of ten FMPs, NMFS' North Atlantic Right Whale Conservation Framework, and the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2 may adversely affect, but is not likely to jeopardize, the continued existence of North Atlantic right, fin, sei, or sperm whales; the Northwest Atlantic Ocean DPS of loggerhead, leatherback, Kemp's ridley, or North Atlantic DPS of green sea turtles; any of the five DPSs of Atlantic sturgeon; GOM DPS Atlantic salmon; or giant manta rays. The Opinion also concluded that the proposed action is not likely to adversely affect designated critical habitat for North Atlantic right whales, the Northwest Atlantic Ocean DPS of loggerhead sea turtles, U.S. DPS of smalltooth sawfish, Johnson's seagrass, or elkhorn and staghorn corals. An ITS was issued in the Opinion. The ITS includes reasonable and prudent measures and their implementing terms and conditions, which NMFS determined are necessary or appropriate to minimize impacts of the incidental take in the fisheries assessed in this Opinion.

Given the information provided above, it has been determined that the proposed action is within the scope of the Bluefish FMP considered in the 2021 Opinion and will not create impacts to ESA-listed species or critical habitat that go above and beyond those considered in the 2021 Opinion completed by NMFS.

8.3 Marine Mammal Protection Act

Section 7.3 contains an assessment of the impacts of the proposed action on marine mammals. A final determination of consistency with the MMPA will be made by the agency during rulemaking for this action.

8.4 Coastal Zone Management Act

The Coastal Zone Management Act of 1972, as amended, provides measures for ensuring productive fishery habitat while striving to balance development pressures with social, economic, cultural, and other impacts on the coastal zone. The Council will submit this document to NMFS. NMFS will determine whether the proposed actions are consistent to the maximum extent practicable with the coastal zone management programs for each state (Maine through North Carolina).

8.5 Administrative Procedure Act

Sections 551-553 of the Federal Administrative Procedure Act establish procedural requirements applicable to informal rulemaking by federal agencies. The purpose of these requirements is to ensure public access to the Federal rulemaking process and to give the public notice and opportunity to comment before the agency promulgates new regulations.

The Administrative Procedure Act requires solicitation and review of public comments on actions taken in the development of an FMP and subsequent amendments and framework adjustments. There were many opportunities for public review, input, and access to the rulemaking process during the development of the proposed management measures described in this document and during the development of this document. This action was developed through a multi-stage process that was open to review by affected members of the public. The public had the opportunity to review and comment specifically on 2022-2023 proposed revisions to catch and landings limits during the SSC Meeting held on July 21-23, 2021, during the Bluefish MC Meeting held on July 26, 2021, during the Bluefish AP Meetings held on and June 17, 2021, and during the Council/Board meeting held on August 10-12, 2021.

The public will have further opportunity to comment on this document and the proposed management measures once NMFS publishes a request for comments notice in the *Federal Register*.

8.6 Section 515 (Data Quality Act)

Utility of Information Product

The proposed action would implement catch and landings limits for the commercial and recreational bluefish fisheries for 2022 and 2023. This document includes a description of the alternatives considered, the preferred actions and rationale for selection, and any changes to the implementing regulations of the FMP. As such, this document enables the implementing agency (NMFS) to decide on implementation of annual specifications (i.e., management measures) and this document serves as a supporting document for the proposed rule.

The preferred alternatives were developed consistent with the FMP, MSA, and other applicable laws, through a multi-stage process that was open to review by affected members of the public. The public had the opportunity to review and comment on management measures during a number of public meetings (section 8.6). The public will have further opportunity to comment on this action once NMFS publishes a request for comments notice in the Federal Register.

Integrity of Information Product

This information product meets the standards for integrity under the following types of documents: Other/Discussion (e.g., Confidentiality of Statistics of the MSA; NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics; 50 CFR § 229.11, Confidentiality of information collected under the Marine Mammal Protection Act).

Objectivity of Information Product

The category of information product that applies here is "Natural Resource Plans." Section 8 describes how this document was developed to be consistent with any applicable laws, including MSA. The analyses used to develop the alternatives (i.e., policy choices) are based upon the best scientific information available. The most up to date information was used to develop the EA which evaluates the impacts of those alternatives (section 7). The specialists who worked with these core data sets and population assessment models are familiar with the most recent analytical techniques and are familiar with the available data and information relevant to the bluefish fishery.

The review process for this specifications document involves Council, NEFSC, GARFO, and NMFS headquarters. The NEFSC technical review is conducted by senior level scientists with specialties in fisheries ecology, population dynamics and biology, as well as economics and social anthropology. The Council review process involves public meetings at which affected stakeholders can comment on proposed management measures. Review by GARFO is conducted by those with expertise in fisheries management and policy, habitat conservation, protected resources, and compliance with the applicable law. Final approval of the specifications document and clearance of the rule is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

8.7 Paperwork Reduction Act

The Paperwork Reduction Act concerns the collection of information. The intent of the Paperwork Reduction Act is to minimize the federal paperwork burden for individuals, small businesses, state and local governments, and other persons, as well as to maximize the usefulness of information collected by the federal government. There are no changes to the existing reporting requirements previously approved under this FMP for vessel permits, dealer reporting, or vessel logbooks. This action does not contain a collection-of-information requirement for purposes of the Paperwork Reduction Act.

8.8 Relative to Federalism/Executive Order 13132

This document does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order 13132.

8.9 Executive Order 12898 (Environmental Justice)

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations provides guidelines to ensure that potential impacts on these populations are identified and mitigated, and that these populations can participate effectively in the NEPA process (EO 12898 1994). NOAA guidance NAO 216-6A, Companion Manual, Section 10(A) requires the consideration of EO 12898 in NEPA documents. Agencies should also encourage public participation, especially by affected communities, during scoping, as part of a broader strategy to address environmental justice issues. Minority and low-income individuals or populations must not be excluded from participation in, denied the benefits of, or subjected to discrimination because of their race, color, or national origin.

Although the impacts of this action may affect communities with environmental justice concerns, the proposed actions should not have disproportionately high effects on low income or minority populations. The proposed actions would apply to all participants in the affected area, regardless of minority status or income level. There is insufficient demographic data on participants in the bluefish fishery (i.e., vessel owners, crew, dealers, processors, employees of supporting industries) to quantify the income and minority status of potentially affected fishery participants. However, it is qualitatively known that people of racial or ethnic minorities constitute a substantial portion of the employees in the seafood processing sector. Without more data, it is difficult to fully determine how this action may impact various population segments. The public comment process is an opportunity to identify issues that may be related to environmental justice, but none have been raised relative to this action. The public has never requested translations of documents pertinent to the bluefish fishery.

For primary port communities relevant to this action see section 7.4. The NOAA Fisheries Community Social Vulnerability Indices, especially the poverty, population composition, and personal disruption indices can help identify the communities where environmental justice may be of concern.

8.10 Regulatory Flexibility Act Analysis

This section provides analysis to address the requirements of the Regulatory Flexibility Act. In addition, many of their requirements duplicate those of the MSA and/or NEPA; therefore, this section contains several references to previous sections of this document.

The Regulatory Flexibility Act (RFA), first enacted in 1980, and codified at 5 U.S.C. 600-611, was designed to place the burden on the government to review all new regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization can have a bearing on its ability to comply with Federal regulations. Major goals of the RFA are: 1) to increase agency awareness and understanding of the impact of their regulations on small business; 2) to require that agencies communicate and explain their findings to the public; and 3) to encourage agencies to use flexibility and to provide regulatory relief to small entities.

The RFA emphasizes consideration of alternatives that may minimize significant adverse impacts on small entities, while still achieving the stated objective of the action. When an agency publishes a proposed rule, it must either, (1) certify that the proposed action will not have a significant adverse impact on a substantial number of small entities and provide a supporting factual basis, or (2) if such a certification cannot be supported by a factual basis, prepare and make available for public review an Initial Regulatory Flexibility Analysis that describes the impact of the proposed rule on small entities.

The sections below provide the supporting analysis to assess whether the preferred alternatives will have a "significant impact on a substantial number of small entities."

8.10.1 Basis and Purpose of the Rule

This action is taken under the authority of the MSA and regulations at 50 CFR § 648. Section 4.1 of this document summarizes the purpose and need and objectives of this action. The proposed action (i.e., the suite of preferred alternatives) includes a commercial quota of 3.54 million pounds and an RHL of 13.89 million pounds for 2022 and a commercial quota of 4.29 million pounds and an RHL of 22.14 million pounds for 2023. (alternative 2; section 5.1.2)

As described in sections 4 and 5, the proposed commercial quotas and RHLs are consistent with the best scientific information available and are intended to prevent overfishing.

Additional non-preferred alternatives were also considered. All alternatives are described in detail in section 5. For the purposes of the RFA, only the preferred alternatives and those non-preferred alternatives which would minimize negative impacts to small businesses are considered.

As indicated in section 7, the bluefish commercial landings have been relatively stable for the 2018 to 2020 period, ranging from 2.16 to 2.78 million pounds, regardless varying commercial quota levels implemented during that period (section 6.4). In fact, on average for the 2018-2020 period combined, the commercial fishery landed about 60% of the commercial quota. In addition, the market demand for the recreational sector is relatively stable with the number of bluefish trips ranging from 7.2 to 8.7 million trips for the 2018-2020 period (Table 15). The number of bluefish trips have been relatively stable for the 2018-2020 period regardless varying RHLs and bag limits implemented during that period. There is no indication that the market environment for commercially and recreationally caught bluefish will substantially change in 2022-2023 compared to recent years. Therefore, a small relatively similar increase in effort is expected under all three alternatives.

Compared to the preferred alternative for 2022-2023 bluefish commercial quotas and RHLs (i.e., alternative 2), alternatives 1 and 3 are expected to result is similar commercial landings and recreational effort given current market conditions. However, alternative 3 is inconsistent with the purpose and need of this action (section 4.1), as it would not be expected to prevent overfishing, which could in turn yield adverse socioeconomic impacts in the long-term. In addition, alternative 3, while based on stock projections, it does not account for the same level of scientific uncertainty used to derive the catch and landings when compared to alternative 2 (see sections 5 and 7). Alternatives 1 and 3 are not considered further in this section.

8.10.2 Description and Number of Regulated Entities

The entities (i.e., the small and large businesses) that may be affected by this action include fishing operations with commercial bluefish permits, and those with federal party/charter permits for bluefish. Private recreational anglers are not considered "entities" under the RFA, thus economic impacts on private anglers are not considered here.

For RFA purposes only, NMFS established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (50 CFR § 200.2). A business primarily engaged in 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.

In order to identify firms, vessel ownership data,[36] which have been added to the permit database, was used to identify all the individuals who own fishing vessels. With this information, vessels were grouped together according to common owners. The resulting groupings were then treated as a fishing business, for purposes of identifying small and large firms.

According to the ownership database, 526 affiliate firms landed bluefish during the 2018-2020 period, with 521 of those business affiliates categorized as small business (Table 22).[37] The three-year average (2018-2020) combined gross receipts (all species combined) for all small entities only was $197,251,017 and the average bluefish receipts was $899,490; this indicates that bluefish revenues contributed approximately 0.46% of the total gross receipts for these small entities (Table 22). In addition, there were 5 firms categorized as large entities with a combined gross receipts of $110,918,617 and combined bluefish receipts of $19,641, as such, bluefish receipts as a proportion of gross receipts are 0.02% for those large firms.

According to the vessel ownership data 361 for-hire affiliate firms generated revenues from fishing recreationally for various species during the 2018-2020 period; all of those business affiliates are categorized as small business.[38] It is not possible to derive what proportion of the overall revenues for these for-hire firms came from specify fishing activities (e.g., summer flounder, scup, black sea bass, bluefish, groundfish, golden tilefish, weakfish, striped bass, tautog, pelagics). Nevertheless, given the popularity of bluefish as a recreational species in the Mid-Atlantic and New England regions, it is likely that revenues generated from bluefish may be significant for some if not all of these firms. The three-year average (2018-2020) combined gross receipts (all for-hire fishing activity combined) for the small entities was $49,916,903, ranging from less than $10,000 for 105 entities (lowest value $46) to over $1,000,000 for 8 entities (highest value $3,587,272).

8.10.3 Expected Economic Impacts of Proposed Action on Regulated Entities

The expected impacts of the proposed action were analyzed by employing quantitative approaches to the extent possible. Effects on profitability associated with the proposed management measures should be evaluated by looking at the impact of the proposed measures on individual business entities' costs and revenues. Changes in gross revenues were used as a proxy for profitability. Where quantitative data were not available, qualitative analyses were conducted.

Expected Impacts on Commercial Entities

Under the proposed action for bluefish, alternative 2 is the preferred alternative and includes a commercial quota of 3.54 million pounds for 2022 and 4.29 million for 2023. This represents an increase in quota of 28% in 2022 and 55% in 2023 compared to the current quota level. As indicated in section 7, bluefish commercial landings have been relatively stable for the 2018 to 2020 period, ranging from 2.16 to 2.78 million pounds. While it is possible that commercial

[36] Affiliate database for 2018-2020 was provided by the NMFS NEFSC Social Science Branch. This is the latest affiliate data set available for analysis.
[37] For the 2018-2020 period, 1,507 firms held Federal Open Access Commercial Bluefish permits.
[38] For the 2018-2020 period, 708 firms held Federal Open Access Charter/Party permits.

landings may increase as a result of some of the proposed higher commercial quotas, there is no indication that the market environment for commercially caught bluefish will substantially change in 2022-2023 compared to recent years. This is expected to lead to a slight increased levels of commercial landings and revenues compared to 2021. Revenues in 2022 and 2023 are uncertain and will depend not only on the quota, but also on availability of bluefish, market factors (e.g., price of bluefish compared to alternative species), weather, and other factors. For a detailed discussion of the economic impacts tied to the alternatives addressing the commercial entities, see section 7.4.

Due to the slightly higher dependence on bluefish for the small businesses compared to the large businesses, the small businesses may feel the effects of this action to a greater extent than the large businesses. However, when considered as a group, the small businesses did not rely on bluefish for a notable amount of their annual income; though when considered individually, some businesses are more dependent on this species than others.

The smaller of the small business affiliates (based on annual receipts from all commercial fishing activities) tended to have a greater reliance on bluefish than the larger small business affiliates. These smaller affiliates may experience the negative impacts of the proposed action for bluefish to a greater extent than the larger affiliates which derive a lower proportion of their annual revenues from bluefish.

Table 22. Average annual total gross receipts from all commercial fishing activities during 2018-2020 for the small businesses/affiliates likely to be affected by the proposed action, as well as annual receipts from commercial landings of bluefish.

Revenue (millions of dollars)	Count of affiliates	2018-2020 avg. gross receipts (all firms combined)	2018-2020 avg. bluefish receipts (all firms combined)	Bluefish receipts as proportion of gross receipts
< 0.5	436	45,371,837	663,189	1.46%
0.5 to 1	35	25,477,653	75,053	0.29%
1 to < 2	31	46,436,705	94,944	0.20%
2 to < 5	14	44,168,617	57,187	0.13%
5-11	5	35,796,205	9,116	0.03%
All affiliates	521	197,251,017	899,490	0.46%

Note: Businesses were classified as small or large based on their revenues in 2020 only. Only those businesses which reported commercial fishing revenue during 2018-2020 are shown.

Because all permit holders may not be actively fishing and land any bluefish, the more immediate impact of the rule may be felt by the 526 firms that are active participants.[39]

[39] An active participant was defined as being any firm that reported having landed one or more pounds of bluefish in the Northeast affiliate data during calendar year 2018-2020. The dealer data used to create the affiliate data file covers activity by unique vessels that hold a Federal permit and provides summary data for vessels that fish exclusively in

As indicated above in this RFA, the primary units of observation when performing the threshold analysis (presented below) are the small business firms identified above. However, the affiliate database used to identify small/large business firms that have recently participated in the bluefish fishery does not contain detailed ownership data for business entities in the South Atlantic Region. To further assess the impacts of the proposed regulations, South Atlantic Trip Ticket Report data was used identify vessels that have recently participated in the bluefish fishery, given not all Trip Ticket data is captured in the dealer database. South Atlantic Trip Ticket Reports indicate that on average 703 vessels (663 in 2018, 704 in 2019, and 742 in 2020) landed bluefish in North Carolina for the 2018-2020 period (Alan Bianchi, NC Division of Marine Fisheries, pers. comm., 2021). Some of these vessels may be included among the business entities identified as landing bluefish in the affiliate data during the 2018-2020 period, as such, double counting is possible. In addition, up to 444 vessels on average (433 in 2018, 460 in 2019, and 439 in 2020) may have landed bluefish in Florida's east coast for the 2018-2020 period (Steve Brown, FL Fish and Wildlife Conservation Commission, pers. comm., 2021). Bluefish landings in Georgia and South Carolina were very small in the 2018-2020 period; as such, it was assumed that no commercial bluefish fishing activity for those two states took place in 2018-2020.

Vessels that landed bluefish in North Carolina during the 2018-2020 period generated on average $634,551 in revenues from all commercial fishing activity combined.

Vessels that landed bluefish in Florida's east coast during the 2018-2020 period generated on average $13,602,870 in revenues from all commercial fishing activity combined. For those entities, bluefish landings contribute with $214,678 or 1.58% of the total value of all fishing activity.

Expected Impacts on Recreational Entities

As previously stated, 361 for-hire affiliate firms generated revenues from recreational fishing for various species during 2018-2020. All of those business affiliates are categorized as small businesses. It is not possible to derive what proportion of the overall revenues for these for-hire firms came from fishing activities for an individual species. Nevertheless, given the popularity of bluefish as a recreational species in the Mid-Atlantic and New England, revenues generated from this species is likely very important for many of these firms at certain times of the year. The three-year average (2018-2020) combined gross receipts (all for-hire fishing activity combined) for these small entities was $49,916,903, ranging from less than $10,000 for 105 entities (lowest value $46) to over $1,000,000 for 8 entities (highest value $3.6 million).

Alternative 2 is the preferred alternative and includes an RHL of 13.89 million pounds for 2022 and 22.14 million pounds for 2023. This represents an increase in RHL of 67% in 2022 and 165% in 2023 compared to the current RHL. As indicated in section 7, the market demand for the recreational sector is relatively stable with the number of bluefish trips ranging from 7.2 to 8.7 million trips for the 2018-2020 period. The number of bluefish trips have been relatively stable for the 2018-2020 period regardless varying RHLs and bag limits implemented during that period. There is no indication that the market environment for commercially and recreationally caught bluefish will substantially change in 2022-2023 compared to recent years. Recreational angler

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state waters. It is possible that if a company owns a state-waters only boat and a federal boat, that connection will not be detected in the affiliation data. Vessels that fish for bluefish in state waters only and sell their product to non-federal dealers will not be captured in the affiliate data at the firm level. Therefore, revenues for all firms in the affiliate data base may be underestimated which could lead to a larger number of small entities than actually exist.

satisfaction and party/charter revenues is expected to be slightly higher when compared to the current RHL. However, it is difficult to predict with certainty how the bluefish RHL will affect demand for party/charter boat trips compared to 2020 and 2021, which will in part be driven by the 3 and 5-fish bag limits for shore/private and for-hire anglers, respectively. These management measures may continue to result in anglers transferring effort away from a species with more restrictive measures towards those with more liberal measures, resulting in little change in overall fishing effort or demand for party/charter trips where multiple species can be caught together.

8.11 Conflict with Other Federal Rules

This action does not duplicate, overlap, or conflict with other Federal rules.

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10. LIST OF AGENCIES AND PERSONS CONSULTED

In preparing this document, the Council consulted with NMFS, the New England and South Atlantic Fishery Management Councils, USFWS, and the states of Maine through North Carolina through their membership on the Mid-Atlantic and New England Fishery Management Councils. The advice of NMFS GARFO personnel was sought to ensure compliance with NMFS formatting requirements.

Copies of this document and other supporting documents are available from Dr. Christopher M. Moore, Executive Director, Mid-Atlantic Fishery Management Council, Suite 201, 800 North State Street, Dover, DE 19901, (302) 674-2331, http://www.mafmc.org/