Amendment 25 (Revised)

to the

Northeast Multispecies Fishery Management Plan

Appendix VII

Cumulative Effects

This appendix includes the Cumulative Effects assessment (Section 6.7) of Amendment 25.

6.7 CUMULATIVE EFFECTS

6.7.1 Introduction

The purpose of the cumulative effects assessment (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. 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 Northeast multispecies (groundfish) 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.

Valued Ecosystem Components (VEC)

The valued ecosystem components for the groundfish fishery are generally the "place" where the impacts of management actions occur, and are identified as noted in Appendix VI, Section 5.0:

1. Regulated groundfish stocks (target and non-target);
2. Non-groundfish species (incidental catch and bycatch);
3. Protected species (ESA-listed and/or MMPA-protected);
4. Habitat, including non-fishing effects; and
5. Human Communities (including economic and social effects on the fishery and fishing communities).

The CEA identifies and characterizes the impact on the VECs by the alternatives under consideration when analyzed in the context of other past, present, and reasonably foreseeable future actions. To enhance clarity and maintain consistency, terms are as defined in Table 7 in Section 6.0.

Temporal Scope of the VECs

While the effects of historical fisheries are considered, the temporal scope of past and present actions for regulated groundfish stocks, non-groundfish species, habitat and the human environment is primarily focused on actions that have taken place since implementation of the initial NE Multispecies FMP in 1977. An assessment using this timeframe demonstrates the changes to resources and the human environment that have resulted through management under the Council process and through U.S. prosecution of the fishery, rather than foreign fleets. For ESA-listed and MMPA-protected species, the context is largely focused on the 1980s and 1990s, when NMFS began generating stock assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ. For future actions, this analysis examines the period between the expected implementation of this action (May 2026) and 2031.

Geographic Scope of the VECs

The geographic scope of the analysis of impacts to regulated groundfish stocks, non-groundfish species and habitat for this action is the total range of these VECs in the Western Atlantic Ocean, as described in the Affected Environment section of the document (Appendix VI, Section 5.0). However, the analyses of impacts presented in this framework focus primarily on actions related to the harvest of the managed resources. The result is a more limited geographic area used to define the core geographic scope within which the majority of harvest effort for the managed resources occurs. For ESA-listed and MMPA-protected species, the geographic range is the total range of each species (Appendix VI, Section 5.6).

Because the potential exists for far-reaching sociological or economic impacts on U.S. citizens who may not be directly involved in fishing for the managed resources, the overall geographic scope for human communities is defined as all U.S. human communities. Limitations on the availability of information needed to measure sociological and economic impacts at such a broad level necessitate the delineation of core boundaries for the human communities. Therefore, the geographic range for the human environment is defined as those primary and secondary ports bordering the range of the groundfish fishery (Appendix VI, Section 5.7.7) from the U.S.-Canada border to, and including, North Carolina.

Analysis of Total Cumulative Effects

A cumulative effects assessment ideally makes effect determinations based on the combination of: 1) impacts from past, present and reasonably foreseeable future actions; 2) the baseline condition 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.

6.7.1.1 Consideration of the Valued Ecosystem Components (VECs)

The valued ecosystem components for the groundfish fishery are generally the "place" where the impacts of management actions occur, and are identified in Appendix VI, Section 5.0.

- *Regulated groundfish stocks (target and non-target);*
- *Non-groundfish species (incidental catch and bycatch);*
- *Protected species (ESA-listed and/or MMPA protected);*
- *Habitat, including non-fishing effects; and*
- *Human Communities (including economic and social effects on the fishery and fishing 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.

6.7.1.2 Temporal Boundaries

Overall, while the effects of the historical groundfish fishery are important and considered in the analysis, the temporal scope of past and present actions for regulated groundfish stocks, non-groundfish species and other fisheries, the physical environment and EFH, and human communities is primarily focused on actions that occurred after FMP implementation (1977). An assessment using this timeframe demonstrates the changes to resources and the human environment that have resulted through management under the Council process and through U.S. prosecution of the fishery. 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 (2026-2031) into the future beyond the implementation of this action. 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 Section 6.7.4 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.

6.7.1.3 Geographic Boundaries

The analysis of impacts focuses on actions related to the commercial and recreational harvest of regulated groundfish. The Western Atlantic Ocean is the core geographic scope for each of the VECs. The core geographic scope for the managed species is the management unit (Appendix VI, Section 5.5). For non-

groundfish species, that range 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 regulated groundfish, and non-groundfish 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 from the U.S.-Canada border to, and including, North Carolina directly involved in the harvest or processing of regulated groundfish (see Appendix VI, Section 5.7.7).

6.7.2 Relevant Actions Other Than Those Proposed in this Document

This section summarizes the past, present, and reasonably foreseeable future actions and effects that are relevant for this cumulative effects assessment. Some past actions are still relevant to the present and/or future actions.

6.7.2.1 Fishery Management Actions

6.7.2.1.1 Managed Resources (Regulated Groundfish)

Past, present, and reasonably foreseeable future actions for regulated groundfish management include the establishment of the original FMP, all subsequent amendments and frameworks, and the setting of annual specifications (annual catch limits and measures to constrain catch and harvest). Key actions are described below.

Past and Present Actions: Groundfish stocks were managed under the MSA beginning with the adoption of a groundfish plan for cod, haddock, and yellowtail flounder in 1977. This plan relied on hard quotas (total allowable catches, or TACs), and proved unworkable. The quota system was terminated in 1982 with the adoption of the Interim Groundfish Plan, which used minimum fish sizes and codend mesh regulations for the Gulf of Maine and Georges Bank to control fishing mortality. The interim plan was replaced by the Northeast Multispecies FMP in 1986, which established biological targets in terms of maximum spawning potential and continued to rely on gear restrictions and minimum mesh size to control fishing mortality. A detailed discussion of the history of the FMP up to 2009 can be found in Amendment 16 (NEFMC 2009b).

Amendment 16, which became effective on May 1, 2010, adopted a broad suite of management measures in order to achieve the fishing mortality targets necessary to rebuild overfished stocks and meet other requirements of the MSA. Amendment 16 made major changes to the FMP. It greatly expanded the sector management program and adopted a process for setting ACLs to be set in biennial specifications packages. The Amendment adopted a system of ACLs and AMs that are designed to ensure catches remain below desired targets for each stock in the management complex. There were a host of mortality reduction measures for "common pool" (i.e. non-sector) vessels and the recreational component of the fishery. In 2011, the Council also approved Amendment 17, which allowed for NOAA-sponsored state-operated permit banks to function within the structure of Amendment 16.

There have been many framework adjustments that have updated the measures in Amendment 16. A subset is described below.

Framework 45 (May 1, 2011) adopted further modifications to the sector program and fishery specifications. Framework 47 (May 1, 2012) set specifications for some groundfish stocks for FY 2012 – 2014, modified AMs for the groundfish fishery and the administration of the scallop fishery AMs, and revised common pool management measures; modification of the Ruhle trawl definition and clarification of regulations for charter/party and recreational groundfish vessels fishing in groundfish closed areas were proposed under the RA authority.

Framework 48 (May 1, 2013) revised status determination criteria for several stocks, modified the sub-ACL system, adjusted monitoring measures for the groundfish fishery, and changed several AMs. Framework 49 (May 20, 2013) is a joint Northeast Multispecies/Atlantic Sea Scallop action that modified the dates for scallop vessel access to the year-round groundfish closed areas.

Framework 51 (May 1, 2014) modified rebuilding programs for GOM cod and American plaice, set specifications for FY2014-2016, and modified management measures in order to ensure that overfishing does not occur including additional management measures related to U.S./Canada shared stocks and yellowtail flounder in the groundfish and scallop fisheries. Framework 53 (May 1, 2015) updated status determination criteria, set specifications for FY2015-2017, adopted U.S./Canada TACs, established management measures for GOM cod that revise rolling closures and possession limits to enable GOM cod protection while providing the opportunity for the groundfish fishery to prosecute healthy stocks in other times and areas, implemented default specifications, and revised regulations governing Sector Annual Catch Entitlement (ACE) carryover. Monkfish FW9 was a joint action with the groundfish plan (FW54), and modified regulations for vessels in the days-at-sea (DAS) program.

Framework 55 incorporated stock status changes for groundfish stocks, set specifications for all groundfish stocks for FY2017-2019, adopted an additional sector and modified the sector approval process, modified the definition of a haddock separator trawl so that the separator panel is easily identifiable, made changes to the groundfish monitoring program and to the management measures for U.S./Canada TACs in order to move GB cod quota from the eastern management area to the western management area, and modified the Gulf of Maine Cod Protection Measures so that the recreational possession limit for GOM cod can once again be modified by the Regional Administrator.

Amendment 18, which became effective on May 1 and May 22, 2017, addressed fleet diversity and accumulation limits.

Framework 59 (July 20, 2020) revised the allocation between commercial and recreational fisheries for GOM cod and GOM haddock based on new data from the Marine Recreational Information Program (MRIP), along with setting specifications for some groundfish stocks for FY2020-2022, and several other minor changes to management measures.

Framework 61 (July 25, 2021) established a universal sector exemption for redfish, set specifications for roughly half of the groundfish stocks for FY2021-2023 and revised the rebuilding plan for white hake.

Framework 63 (July 15, 2022) modified recreational fishery management measures for GB cod, revised the default specifications process, and set specifications for several groundfish stocks for FY2022-2024.

Amendment 23, which became effective on December 15, 2022 and January 9, 2023, addressed improvements to the groundfish monitoring program.

Framework 65 (August 18, 2023) revised the rebuilding plan for GOM cod, set specifications for many groundfish stocks for FY2023-2025 including a GB cod catch target for the recreational fishery, temporarily removed the sector management uncertainty buffer for GOM haddock and white hake, and temporarily modified commercial accountability measures for GB cod.

Framework 66 (May 2, 2024) set specifications for several groundfish stocks for FY2024-2025, modified the trigger for implementing accountability measures for Atlantic halibut for commercial fisheries, and temporarily modified the accountability measure implementation policy for Atlantic sea scallops for the GB yellowtail flounder stock.

Reasonably Foreseeable Future Actions: The Council took final action on Framework 69 in December 2024. This framework action set specifications for several groundfish stocks for fishing years 2025-2027, U.S./Canada TACs for 2025, and incorporated revisions to scallop fishery flatfish AM triggers. The Council included in Framework 69 status determination criteria and specifications for FY2025-FY2027

for the revised cod stock units, and measures to address Phase 1 of the Atlantic Cod Management Transition Plan, but those measures have been repackaged into this action, revised Amendment 25.

In addition to the actions to adjust measures from Amendment 16, the Council is also developing Framework Adjustment 68 which aims to modify and/or replace the existing acceptable biological catch (ABC) control rule that is applied in the context of setting groundfish ABCs. The goal of this action is to modify/replace the existing groundfish ABC control rules with a tiered groundfish control rule that enables consideration for increasing uncertainty/variability in stock assessments, stock status, including unknown and rebuilt, changes in environmental conditions, productivity regimes, climate-resilient management objectives, and National Standard Guidelines. The new control rule would produce catch advice that prevents overfishing, rebuilds stocks, improves attainment of optimum yield, and seeks to minimize large changes in catch advice as appropriate. The development is ongoing and will be in coordination with the Council's Risk Policy.

6.7.2.1.2 Non-target Species (Non-groundfish)

There are Management Plans in place for non-target, non-groundfish species, including the Skate FMP, Herring FMP (jointly managed with ASMFC), Scallop FMP, Summer Flounder, Black Sea Bass, and Scup FMP (managed by the MAFMC), Monkfish FMP (jointly managed with the MAFMC), and Spiny Dogfish FMP (jointly managed with the MAFMC).

6.7.2.1.3 Physical Habitat/EFH

The EFH Omnibus Amendment 2 (Groundfish A14), effective April 2018, reviewed and updated EFH designations, identified Habitat Areas of Particular Concern (HAPC), and updated the status of current knowledge of gear impacts. It also implemented new spatial management measures throughout New England for minimizing the adverse impact of fishing on EFH that affect all species managed by the NEFMC. The Council developed a related omnibus framework (Clam Dredge Framework, June 2020, Groundfish FW60) that designated three exemption areas within the Great South Channel Habitat Management Area where clam and mussel dredges are allowed. The deep-sea coral amendment Groundfish A24, effective June 2021, was developed to protect deep-sea coral habitats throughout New England from the negative impacts of fishing gears. The amendment designated the Georges Bank Deep-Sea Coral Protection Zone between the U.S./Canada EEZ boundary, the boundary between the NEFMC and MAFMC regions, and the seaward boundary of the U.S. EEZ, with the landward boundary at the 600 m contour. The zone is a closure to all bottom-tending gears, with an exemption for the red crab pot fishery. Two mobile bottom-tending gear closures were also implemented in federal waters in eastern Maine. The Council also developed an action to establish an HAPC in Southern New England (Groundfish FW64). Measures included designating cod spawning and complex HAPCs that overlap with wind energy areas in Southern New England. Through Framework 70, the Council is revising Essential Fish Habitat designations for all life history stages of Atlantic cod. EFH designations for other groundfish stocks will be developed in a groundfish action in 2026.

6.7.2.1.4 Protected Resources

Past and Present Actions: NMFS has implemented specific actions to reduce injury and mortality of protected species from gear interactions.

NMFS developed an Atlantic trawl gear take reduction strategy (Strategy) to reduce the incidental capture of small cetaceans; the measures identified in the Strategy are voluntary for trawl fisheries. In addition, NMFS has implemented regulations pursuant to the Harbor Porpoise Take Reduction Plan (HPTRP), and Bottlenose Dolphin Take Reduction Plan (BDTRP), and Atlantic Large Whale Take Reduction Plan (ALWTRP). Under the HPTRP and BDTRP, regulations were implemented to reduce serious injury or mortality of harbor porpoise in commercial gillnet fisheries, or bottlenose dolphins in mid-Atlantic coastal

gillnet fishery and eight other coastal fisheries operating within the dolphin′s distributional range, respectively. Regulations under the ALWTRP were implemented to reduce serious injury and mortality of large whale species in commercial fixed gear (i.e., trap/pot and gillnet) fisheries; see Appendix VI for additional information on the Plan.

On May 27, 2021, the NMFS completed formal consultation pursuant to section 7 of the ESA of 1973, as amended, and issued a biological opinion (2021 Opinion) on the authorization of eight FMPs, two interstate fishery management plans (ISFMP), and the implementation of the New England Fishery Management Council's Omnibus Essential Fish Habitat (EFH) Amendment 2. On September 13, 2023, NMFS issued a 7(a)(2)/7(d) memorandum that reinitiated consultation on the 2021 Biological Opinion; this memorandum was replaced with an updated 7(a)(2)/7(d) memorandum issued by NMFS on January 8, 2025. Additional information on the reinitiation is provided in Appendix VI.

On September 26, 2022, NOAA Fisheries released a final Action Plan to reduce Atlantic sturgeon bycatch in Federal large mesh gillnet fisheries. Based on an extensive literature review, the Action Plan provides a suite of recommendations to NOAA Fisheries, the New England Fishery Management Council, and the Mid-Atlantic Fishery Management Council that should be considered, refined, and implemented in order to reduce Atlantic sturgeon bycatch in subject fisheries by 2024. As discussed further in the *"Other Fishery Management Actions"* section below, the Councils developed a related action in 2023 to reduce Atlantic sturgeon bycatch in monkfish and spiny dogfish fisheries; final action occurred in April 2024, and the final rule was issued December 2024.

In 2022, NOAA Fisheries held various forums to gather information from the public, fishing industry, and other stakeholder groups to inform any future measures for reducing sea turtle bycatch in trawl fisheries. Potential considerations to reduce sea turtle bycatch included ideas such as geographically extending the requirement of TEDs northward, other gear modifications, or reduced tow times. Although no action has been taken by NMFS to date, the agency continues to seek input on various informational needs identified at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/endangered-species-conservation/sea-turtle-bycatch-reduction-trawl.

Reasonably Foreseeable Future Actions: Currently, NMFS is working to amend the ALWTRP to reduce the risk of mortalities and serious injuries of North Atlantic right, fin, and humpback whales in all U.S. East Coast commercial fisheries regulated under the ALWTRP. On August 11, 2021, NMFS issued a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) to analyze the impacts to the environment of alternatives to amend the Plan for non-lobster trap/pot and gillnet fisheries regulated under the ALWTRP (86 FR 43996). The NOI also informed the public of upcoming scoping meetings to solicit public input. A second NOI to prepare an EIS published on September 9, 2022 that added lobster and Jonah crab trap/pot fisheries to the list of fisheries being analyzed in future amendments (87 FR 55405). These efforts to modify the Plan are still ongoing.

On July 19, 2023, NMFS issued a proposed rule to designate new areas of critical habitat and modify existing critical habitat for threatened and endangered distinct population segments (DPSs) of the green sea turtle, in areas under U.S. jurisdiction, pursuant to the ESA (88 FR 46572). The comment period on the proposed rule closed on October 17, 2023; rule making is currently ongoing.

These above measures, whether proposed or final, would likely have some degree of positive impacts on these protected species by reducing the number of interactions with fishing gear, and therefore, reducing the risk of injury and mortality to these protected species and/or adversely affecting habitat.

6.7.2.1.5 Human Communities

All actions taken under the Northeast Multispecies FMP have had effects on human communities. Many actions have included specific measures designed to improve flexibility and increase efficiency.

Amendment 18 addressed fleet diversity and accumulation limits. Amendment 23 adjusted the groundfish monitoring program, including establishing target coverage levels up to 100 percent, and is expected to have distributional impacts on individuals and ports participating in the fishery.

6.7.2.1.6 Other Fishery Management Actions

In addition to the Northeast Multispecies FMP, there are many other FMPs and associated fishery management actions for other species that impacted these VECs over the temporal scale described in Section 6.7.1.3. These include FMPs managed by the Mid-Atlantic Fishery Management Council, New England Fishery Management Council, Atlantic States Marine Fisheries Commission, and to a lesser extent, the South Atlantic Fishery Management Council. Omnibus amendments are also frequently developed to amend multiple FMPs at once. 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.

The New England Fishery Management Council and Mid-Atlantic Fishery Management Council developed a joint action to reduce bycatch of Atlantic sturgeon in the large-mesh gillnet fisheries for monkfish and spiny dogfish. The Councils took final action in April 2024, and the final rule was published in December 2024. This action establishes area-based gear requirements for vessels fishing with gillnets in the monkfish fishery, starting on January 1, 2026, and for vessels fishing with gillnets in the spiny dogfish fishery starting on May 1, 2025. This action aims to minimize bycatch of Atlantic sturgeon in the monkfish and spiny dogfish fisheries to the extent practicable and fulfill requirements of the Biological Opinion on Ten Fishery Management Plans in the Greater Atlantic Region and the New England Fishery Management Council's Omnibus Habitat Amendment 2.

6.7.2.1.7 Fishery Management Action Summary

The Council has taken many actions to manage the associated commercial fisheries in its jurisdiction. Actions taken in other FMPs, and some Omnibus Actions are described in Section 6.7.2.1. 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 1.

Table 1 – Summary effects of past, present, and reasonably foreseeable future actions on the VECs identified for Amendment 25.

VEC	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Regulated Groundfish Stocks	**Mixed** Combined effects of past actions have decreased effort, improved habitat protection, and implemented rebuilding plans when necessary. However, some stocks remain overfished	**Positive** Current regulations continue to manage for sustainable stocks	**Positive** Future actions are anticipated to continue rebuilding and strive to maintain sustainable stocks	**Short-term Negative** Several stocks are currently overfished, have overfishing occurring, or both **Long-Term Positive** Stocks are being managed to attain rebuilt status
Non-Groundfish Species	**Positive** Combined effects of past actions have decreased effort and improved habitat protection	**Positive** Current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species	**Positive** Future actions are anticipated to continue rebuilding and target healthy stocks, thus limiting the take of discards/bycatch	**Positive** Continued management of directed stocks will also control incidental catch/bycatch
Endangered and Other Protected Species	**Slight Positive** Combined effects of past fishery actions have reduced effort and thus interactions with protected resources	**Slight Positive** Current regulations continue to control effort, thus reducing opportunities for interactions	**Mixed** Future regulations will likely control effort and thus protected species interactions, but as stocks improve, effort will likely increase, possibly increasing interactions	**Mixed** Continued catch and effort controls are likely to reduce gear encounters through effort reductions. As stocks improve, effort may increase, possibly increasing interactions. Additional management actions taken under the HPTRP, BDTRP, and ALWTRP should also help mitigate the risk of gear interaction.
Habitat	**Mixed** Combined effects of effort reductions and better control of non-fishing activities have been positive but fishing activities and non-fishing activities continue to reduce habitat quality	**Mixed** Effort reductions and better control of non-fishing activities have been positive, but fishing activities and non-fishing activities continue to reduce habitat quality	**Mixed** Future regulations will likely control effort and thus habitat impacts but as stocks improve, effort will likely 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
Human Communities	**Mixed** Fishery resources have supported profitable industries and communities but increasing effort and catch limit controls have curtailed fishing opportunities	**Mixed** Fishery resources continue to support communities but increasing effort and catch limit controls combined with non-fishing impacts such as high fuel costs have had a negative economic impact	**Short-term Negative** As effort controls are maintained or strengthened, economic impacts will be negative **Long-term Positive** As stocks improve, effort will likely increase which would have a positive impact	**Short-term Negative** Revenues would likely decline dramatically in the short term and may remain low until stocks are fully rebuilt **Long-term Positive** Sustainable resources should support viable communities and economies

Impact Definitions:
-Regulated Groundfish Stocks, Non-groundfish species, Endangered and Other Protected Species: positive=actions that increase stock size and negative=actions that decrease stock size
-Habitat: positive=actions that improve habitat or reduce disturbance of habitat and negative=actions that degrade or increase disturbance of habitat
-Human Communities: positive=actions that increase revenue and well-being of fishermen and/or associated businesses and negative=actions that decrease revenue and well-being of fishermen and/or associated businesses

6.7.2.2 Non-Fishing Impacts

6.7.2.2.1 Other 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)[1], which ensures that agency actions do not jeopardize the continued existence of endangered species and their critical habitat.

[1] "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

In recent years, offshore wind energy has become an important activity in the Greater Atlantic region. This development is expected to impact all VECs, as described below. Offshore wind farms include the installation of turbines into the seabed, inter-array cables connecting the turbines, and export cables to transfer electricity to shore. Site assessment occurs over a period of a few years, construction occurs over 1-2 years, and the wind farm operates for about 25 years, though offshore wind contracts can be negotiated for up to 30 years.

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). Surface lay or shallow burial (target burial depth is typically 4-6 feet) is not the preferred approach because it places the cable at risk but may be required in bottom types where trenching is not possible or when crossing another cable. In such instances, concrete mats are used to cover the cable. The cable burial process may also 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 (Finneran 2015; Finneran 2016; Madsen *et al.* 2006; Nowacek *et al.* 2007; NRC 2000; 2003; 2005; Popper *et al.* 2014; Richardson *et al.* 1995; Thomsen *et al.* 2006).

Elevated levels of sound produced during site assessment activities, construction, and operation of offshore wind facilities will impact the soundscape[2]. Temporary, acute, noise impacts from construction activity could impact reproductive behavior and migration patterns; the long-term 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

likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat."

[2] NMFS Ocean Noise Strategy Roadmap

(Bailey et al. 2014; Bailey et al. 2010; 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; 2005; Richardson et al. 1995; Romano et al. 2004; Slabbekoorn et al. 2010; Thomsen et al. 2006; Wright et al. 2007). 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) (Forney et al. 2017; Richardson et al. 1995; Slabbekoorn et al. 2010; Thomsen et al. 2006). 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)[3] (Association 2020).

Wind farm survey and construction activities and turbine/cable placement will substantially affect NMFS existing scientific research surveys, including stock assessment surveys for fisheries and protected species[4] 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' acceptable biological catch 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. It is possible that new survey technologies will be developed that mitigate these impacts, but it is uncertain whether they will be developed, and (or) how quickly they can be adopted. NOAA and BOEM published a survey mitigation strategy in December 2022[5] and NEFSC developed draft Fisheries Survey Mitigation Plans in spring of 2024[6], with an implementation plan expected soon.

Impacts of Offshore Wind Energy Development on Socioeconomic Resources

Several potential offshore wind energy sites have been leased or identified for future wind energy development in federal waters from Maine to North Carolina (Map 1). According to BOEM, approximately 22 gigawatts (close to 2,000 wind turbines based on current technology) of Atlantic offshore wind development via 19 projects are reasonably foreseeable along the east coast by 2030 (BOEM 2021).

Offshore wind energy development is well underway within the lease areas off Rhode Island and Massachusetts. The groundfish fishery has been active in the Massachusetts/Rhode Island lease areas and is expected to be for the near future (Map 2). As of December 2024, South Fork Wind (12 turbines) is now commissioned and operational and Vineyard Wind 1 (62 turbines) is nearing completion (the project is experiencing delays due to a blade failure that occurred in summer 2024). Revolution Wind was permitted by BOEM during 2023 and construction is well under way and is expected to be in operation in 2026. Sunrise Wind (project off Rhode Island with power brought to shore in New York) began construction in summer 2024 and is expected to be in operation in 2026. In December 2024, BOEM announced the approval of the SouthCoast Wind project; construction is expected to begin in 2025. Other

[3] NMFS Ocean Noise Strategy Roadmap

[4] Changes in required flight altitudes due to proposed turbine height would affect aerial survey design and protocols (BOEM 2020).

[5] Hare et al. 2022. NOAA Fisheries and BOEM Federal Survey Mitigation Implementation Strategy - Northeast U.S. Region. https://doi.org/10.25923/jqse-x746

[6] Draft NEFSC Fisheries Survey Mitigation Plans: https://www.fisheries.noaa.gov/event/peer-review-draft-nefsc-fisheries-survey-mitigation-plans

projects in Southern New England that are earlier in the site assessment and planning phases include: New England Wind 1 and 2, Beacon Wind, and Vineyard Northeast. In 2023, the Council developed a Habitat Area of Particular Concern (HAPC) overlapping the Southern New England lease areas in order to promote conservation of cod spawning grounds and complex benthic habitats. A final rule on this measure was published in February 2024[7].

Further south in the Mid-Atlantic region, beyond the footprint of the groundfish fishery and most groundfish species, there are many other offshore wind energy leases and planning areas. In August 2024, the first two 'Central Atlantic' lease areas were auctioned off Delaware/Maryland and Virginia and BOEM is currently undertaking a second round of wind energy area (WEA) identification for subsequent leasing in the Central Atlantic.

BOEM began a planning process for the Gulf of Maine via a regional intergovernmental renewable energy task force (https://www.boem.gov/Gulf-of-Maine). In October 2024, the Department of the Interior announced the provisional winners on four lease areas in the Gulf of Maine, including three off Massachusetts and one off Maine (there were eight offshore wind energy lease areas available as part of the auction). These offshore wind leases are expected to be executed to the two auction winners in December 2024. Given the water depth in the region, floating turbines will likely be the primary type of wind turbine foundations to be deployed. The Gulf of Maine final lease areas overlap with groundfish fishing areas and the redfish sector exemption area, though do not overlap the redfish exemption area cod closure nor the redfish exemption area seasonal closure II. In addition, Pine Tree Offshore Wind LLC, in partnership with the State of Maine, holds a research lease in the Gulf of Maine southeast of Portland.

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 groundfish fishing grounds. Impacts may vary by year based on species availability. It remains unclear exactly how fishing or transiting to and from fishing grounds 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.[8] Floating wind farms are likely to cause greater displacement of fishing activity as compared to fixed turbines given the presence of floating inter-array cables and anchoring systems. 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, the effects could be both positive due to potential increased recreational catch and negative due to reduced commercial fishery catch and associated revenue, user conflicts, gear damage/loss, and increased risk of allision or collision.

Turbine structures could increase the presence of, and recreational fishing for, structure-affiliated species, including some groundfish species such as Atlantic cod. This could potentially lead to socioeconomic benefits in terms of increased for-hire fishing revenues and angler satisfaction in certain wind development areas. 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).

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[7] https://d23h0vhsm26o6d.cloudfront.net/240205-Final-Rule-HAPC-2024-02239.pdf

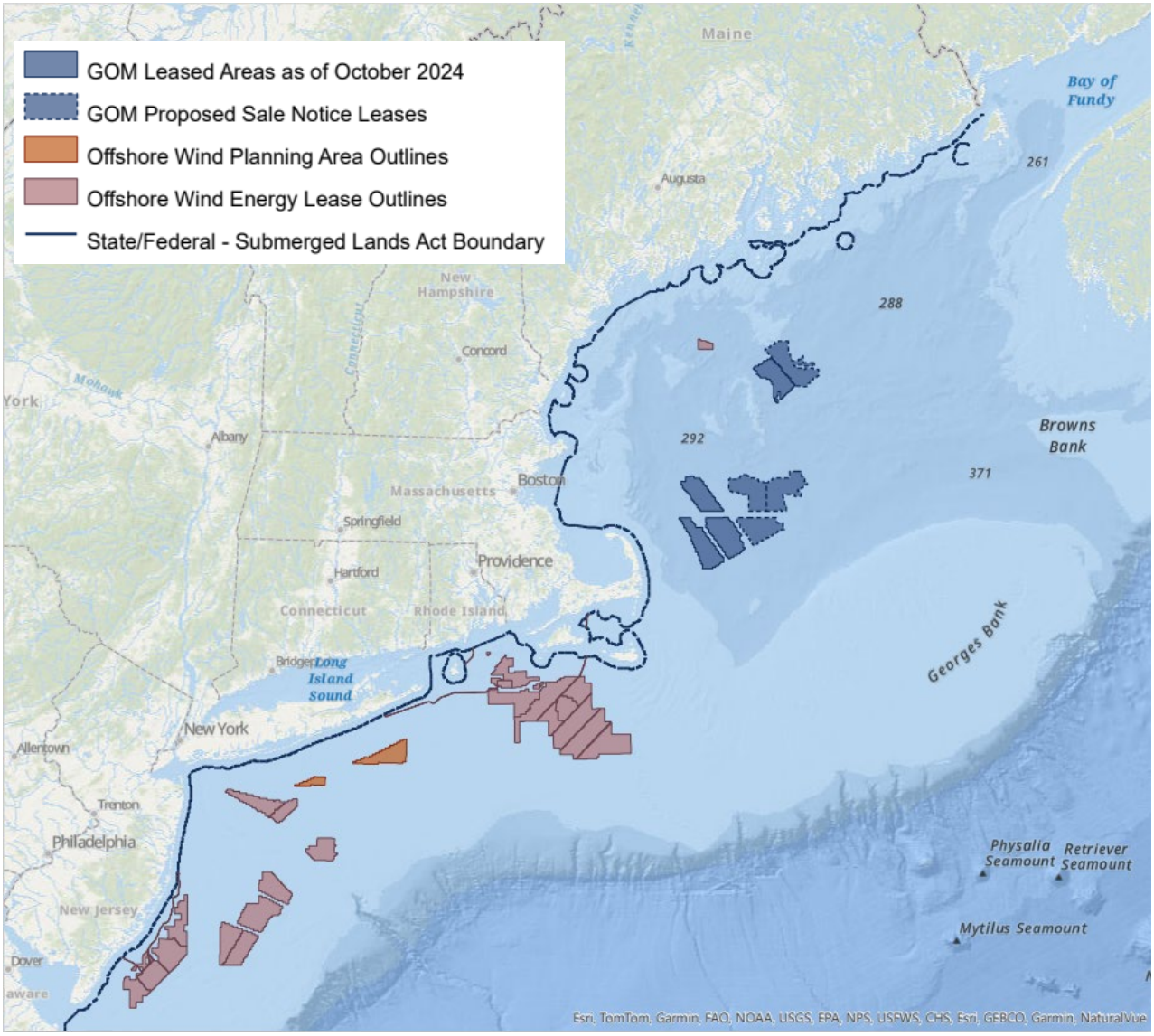
[8] The United States Coast Guard has considered transit and safety issues related to the Massachusetts and Rhode Island lease areas in a recent port access route study and has recommended uniform 1 mile spacing in east-west and north-south directions between turbines to facilitate access for fishing,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

As the number of wind farms increases, so too would the level and scope of impacts to affected habitats, marine resources, and human communities. Development of these areas may cause regional changes to fishing practices which could cause indirect effects on the groundfish resource and fishery. Overall, this analysis represents only a rough approximation of potential negative and positive effects from offshore wind energy development.

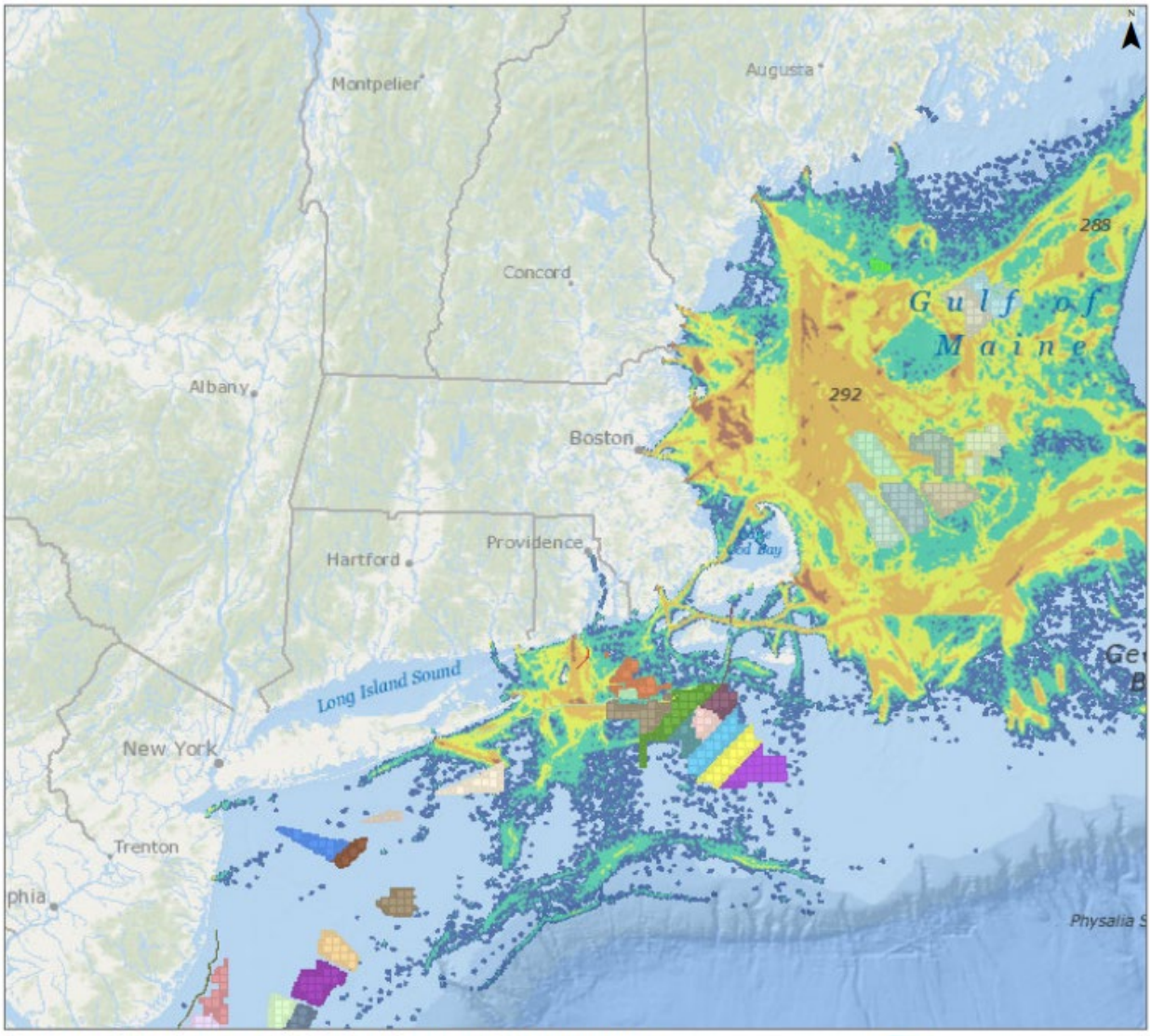
Offshore Energy Summary

The overall impact of offshore wind energy development on the affected species and their habitats at a population level is unknown but could range from slight positive impact to moderate negative, depending on the number and locations of projects that occur, and the given species. 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.

Map 1 – BOEM Wind Planning areas and Wind Leasing Areas on the Atlantic Outer Continental Shelf.



Map 2 – Northeast Multispecies FMP vessel activity (VMS, May 2015 – April 2019) relative to wind energy active lease areas (bright multicolored) and planning areas (pastel multicolored).



6.7.2.2.2 **Global Climate Change**

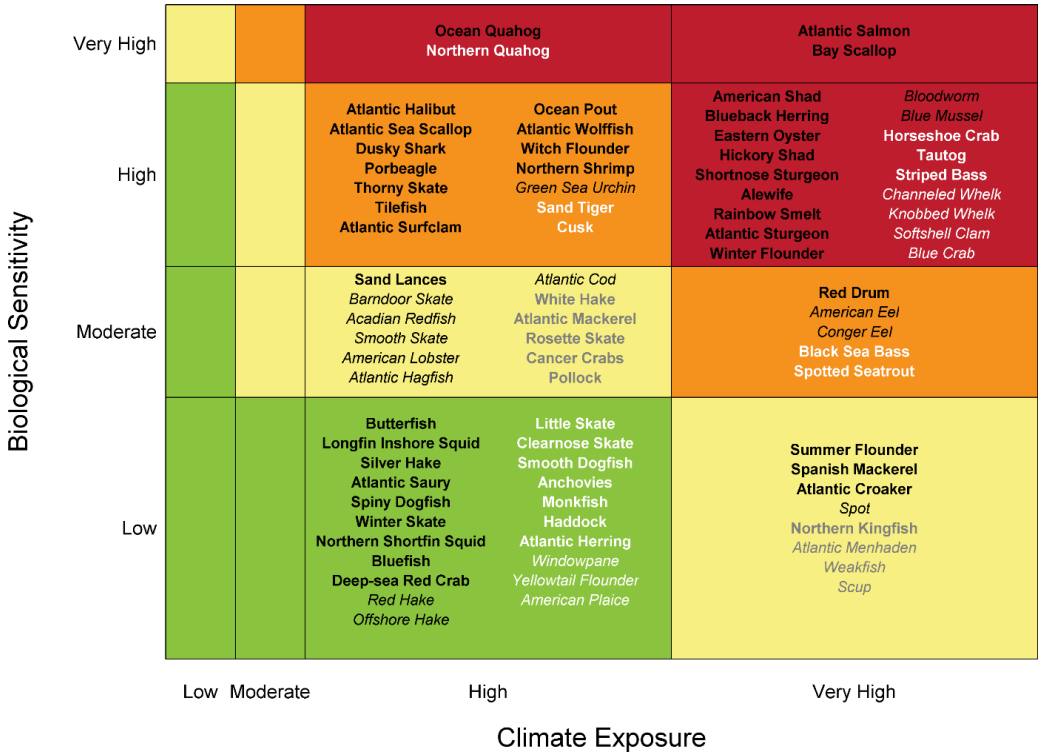
Global climate change affects all components of marine ecosystems, including human communities. Physical changes that are occurring and will continue to occur to these systems include sea-level rise, changes in sediment deposition; changes in ocean circulation; increased frequency, intensity and duration 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 (Hare et al. 2016). 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, groundfish species were scored as having a range of climate vulnerability. Winter flounder were scored as having very high climate vulnerability with high certainty (Hare et al. 2016). Witch flounder, Atlantic halibut, ocean pout, and Atlantic wolfish were scored as having high climate vulnerability with very high certainty (Hare et al. 2016). Atlantic cod and Acadian redfish were scored as having moderate climate vulnerability with high certainty, while white hake and pollock were scored as having moderate climate vulnerability with moderate certainty (Hare et al. 2016). Haddock were scored as having low climate vulnerability with moderate certainty (Hare et al. 2016). Finally, yellowtail flounder, American plaice, and windowpane flounder were scored as having low climate vulnerability with low certainty (Hare et al. 2016). Refer to the Risk Policy Matrices (Appendix V) which include a summary of climate impacts for each stock.

Overall vulnerability results for additional Greater Atlantic species, including most of the non-target species identified in this action, are shown in Figure 1 (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 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 1 – Overall climate vulnerability score for fish and invertebrates on the Northeast U.S. Continental Shelf (Hare et al. 2016).



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).

Baseline Condition for Resources, Ecosystems, and Human Communities

Table 2 and Table 3 summarize 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 2 and Table 3. As mentioned above, the CEA Baseline is then used to assess cumulative effects of the proposed management actions.

Table 2 – Cumulative effects assessment baseline conditions of regulated groundfish stocks.

VEC		Status/Trends, Overfishing	Status/Trends, Overfished	Combined Effects of Past, Present Reasonably Foreseeable Future Actions	Combined CEA Baseline Conditions
Regulated Groundfish Stocks	GB Cod*	No	***Yes***	**Negative** – short term: Several stocks are currently overfished, have overfishing occurring, or both; **Positive** – long term: Stocks are being managed to attain rebuilt status	**Negative** – short term: Overharvesting in the past contributed to several stocks being overfished or where overfishing is occurring; **Positive –** long term: Regulatory actions taken over time have reduced fishing effort and with the addition of Amendment 16, stocks are expected to rebuild in the future
	EGOM Cod*	No	***Yes***		
	WGOM Cod*	***Yes***	***Yes***		
	SNE Cod*	***Yes***	***Yes***		
	GB Haddock	No	No, Rebuilt		
	GOM Haddock	No	No, Rebuilt		
	GB Yellowtail Flounder	Unknown	***Yes***		
	SNE/MA Yellowtail Flounder	No	***Yes***		
	CC/GOM Yellowtail Flounder	No	No, Rebuilt		
	American Plaice	No	No, Rebuilt		
	Witch Flounder	Unknown	***Yes***		
	GB Winter Flounder	No	No		
	GOM Winter Flounder	No	Unknown		
	SNE/MA Winter Flounder	No	No, Rebuilt		
	Acadian Redfish	No	No, Rebuilt		
	White Hake	No	No		
	Pollock	No	No, Rebuilt		
	Northern (GOM-GB) Windowpane Flounder	No	***Yes***		
	Southern (SNE-MA) Windowpane Flounder	No	No		
	Ocean Pout	No	***Yes***		
	Atlantic Halibut	Unknown	***Yes***		
	Atlantic Wolffish	No	***Yes***		

*Stock status from 2024 management track assessment, determination by NOAA Fisheries pending

Table 3 – Cumulative effects assessment baseline conditions of non-groundfish species, habitat, protected resources, and human communities.

VEC		Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions	Combined CEA Baseline Conditions
Non-groundfish Species (principal species)	**Monkfish**	Unknown overfished and overfishing is unknown.	**Positive** – Continued management of directed stocks will also control incidental catch/bycatch.	**Positive** – Although prior groundfish management measures likely contributed to redirecting effort onto non-groundfish species, as groundfish rebuild this pressure should lessen and all of these species are also managed through their own FMP.
	Dogfish	Not overfished and overfishing is not occurring.		
	Skates	Thorny skate is overfished and overfishing is not occurring. Little skate and winter skate are not overfished but overfishing is occurring. All other skate species are not overfished and overfishing is not occurring.		
Habitat		Fishing impacts are complex and variable and typically adverse. (Non-fishing activities had historically negative but site-specific effects on habitat quality.	**Mixed** – Future regulations will likely control effort and thus habitat impacts but as stocks improve, effort will likely increase along with additional non-fishing activities. An omnibus amendment to the FMP with mitigating habitat measures is under development.	**Mixed** – Reduced habitat disturbance by fishing gear but impacts from non-fishing actions, such as climate change, could increase and have a negative impact.
Protected Resources	**Sea Turtles**	Leatherback and Kemp's ridley sea turtles are classified as endangered under the ESA; loggerhead (NW Atlantic Ocean DPS) and green (North Atlantic DPS) sea turtles are classified as threatened.	**Mixed** – Reduced gear encounters through effort reductions and management actions taken under the ESA/MMPA should help mitigate the risk of gear interactions. As stocks improve, effort may increase, possibly increasing interactions. Non-fishing activities and changes from offshore energy and global climate change could have negative impacts.	**Mixed** – Continued catch and effort controls are likely to reduce gear encounters through effort reductions, unless effort increases under improving groundfish stock conditions. Additional management actions taken under the HPTRP, BDTRP, and ALWTRP should also help mitigate the risk of gear interactions. Non-fishing activities and changes from offshore energy and global climate change could have negative impacts.
	Fish	Atlantic salmon (Gulf of Maine DPS): threatened under ESA Atlantic sturgeon: New York Bight, Chesapeake, Carolina, and South Atlantic DPSs are endangered under ESA; Gulf of Maine DPS is listed as threatened under the ESA Giant manta ray: threatened under ESA		
	Large Cetaceans	All large whales in the Northwest Atlantic are protected under the MMPA. Of these large whales, North Atlantic right, fin, blue, sei, and sperm whales are also listed as endangered under the ESA.		

VEC		Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions	Combined CEA Baseline Conditions
Protected Resources	**Small Cetaceans**	All are protected under the MMPA	**Mixed** – reduced gear encounters through effort reductions and management actions taken under the ESA and MMPA have had a positive impact	**Mixed** – reduced gear encounters through effort reductions and additional management actions taken under the ESA and MMPA.
	Pinnipeds	All are protected under the MMPA		
Human Communities		Complex and variable. Although there are exceptions, generally groundfish landings have decreased for most New England states since 2001. Declines in groundfish revenues since 2001 have also generally occurred.	**Negative** – Although future sustainable resources should support viable communities and economies, continued effort reductions over the past several years have had negative impacts on communities	**Negative –** short term: lower revenues would continue until stocks are sustainable **Positive** – long term: sustainable resources should support viable communities and economies

6.7.3 **Summary of Effects of the Proposed Actions**

Amendment 25 would set specifications and adjust management measures for the groundfish fishery to achieve the objectives of the fishery management plan (FMP). The preferred alternatives in this action are described in Section 4.0. The impacts of the proposed actions are described in Section 6.0 and summarized in Table 4 below.

Table 4 – Summary of Impacts for Valued Ecosystem Components (VECs) in Revised Amendment 25 (Council preferred in gray).

Actions and Alternatives/Options			Direct and indirect impacts				
			Managed Resources	**Non-target species**	**Habitat/ Essential Fish Habitat**	**Protected Resources**	**Human communities (economic and social impacts)**
Action 1: Incorporate Revised Atlantic Cod Stock Units in the Northeast Multispecies FMP	**Alt. 1 – No Action**		No direct or indirect impacts; see alternatives in Actions 2-5	No direct or indirect impacts; see alternatives in Actions 2-5	No direct or indirect impacts; see alternatives in Actions 2-5	No direct or indirect impacts; see alternatives in Actions 2-5	No direct or indirect impacts; see alternatives in Actions 2-5
	Alt. 2 – Status Quo						
	Alt. 3 – Revise Atlantic Cod Stock Units in the FMP						
Action 2: Atlantic Cod Status Determination Criteria	**Alt. 1 - No Action**		Negl. to -	Negl.	Negl.	No direct impacts; Indirect impacts: negl.	Economic: - Social: -
	Alt. 2 – New Status Determination for Cod Stocks		Negl. to +	Negl.	Negl.	No direct impacts; Indirect impacts: slight – to slight +	Economic: low + Social: Slight – to +
Action 3: Revised Specifications for Atlantic Cod	**Alt. 1 – No Action**		+	+	+	Slight – to moderate +	Economic: Negl. to high – Social: – to low +
	Alt 2 – Revised Specifications		- to slight +	Slight – to slight +	Slight –	Slight – to slight +	Economic: Slight – to + Social: – to low +
	Alt. 3 – Southern New England Cod Recreational Sub-ACL	Option 1 – No Action	-	No direct or indirect impacts	No direct or indirect impacts	Negl. to slight –	Economic: - Social: -
		Option 2 – Set Southern New England Cod Recreational Sub-ACL	+	No direct or indirect impacts	No direct or indirect impacts	Negl. to slight –	Economic: + Social: +

Actions and Alternatives/Options			Direct and indirect impacts				
			Managed Resources	**Non-target species**	**Habitat/ Essential Fish Habitat**	**Protected Resources**	**Human communities (economic and social impacts)**
Action 4: Commercial Fishery Management Measures – Atlantic Cod	**Alt. 1 – Common Pool Accountability Measures for Cod Stocks**	Option 1 – No Action	Negl. to -	Negl.	Negl.	Negl. to slight –	Economic: - to + Social: - to +
		Option 2 – Common Pool Trimester Total Allowable Catch (TAC) Distributions and Closures Areas for Cod Stocks	+	Negl.	Negl.	slight – to slight moderate +	Economic: - to + Social: – to +
		Option 3 – Common Pool Baseline Trip Limits for Cod Stocks	+	Negl.	Negl.	Slight – to slight moderate +	Economic: - to + Social: - to +
Action 5: Recreational Fishery Management Measures – Atlantic Cod	**Alt. 1 – Recreational Fishing Measures for Southern New England Cod**	Option 1 – No Action	-	Negl.	Negl.	Slight – to slight +	Economic: - to + Social: - to +
		Option 2 – Recreational Fishing Measures for Southern New England Cod	Slight +	Negl. to slight +	Negl.	Slight – to slight moderate +	Economic: - to + Social: - to +
	Alt. 2 – Regulatory Process for Regional Administrator to Adjust Recreational Measures for Cod Stocks	Option 1 – No Action	Negl. to +	No direct or indirect impacts	Negl.	Negl.	Economic: Negl. Social: Negl. to low –
		Option 2 – Establish a Regulatory Process for the Regional Administrator to Adjust Recreational Measures for Eastern Gulf of Maine Cod and Georges Bank Cod	Negl. to +	No direct or indirect impacts	Negl.	Negl.	Economic: Negl. Social: Negl. to low +

6.7.4 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 4 provides a summary of likely impacts found in the various groups of management alternatives contained in this action. The CEA baseline, as described above in Table 2 and Table 3 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 Section 6.7.2.2, non-fishing impacts on the VECs generally range from positive to negative.

6.7.4.1 Magnitude and Significance of Cumulative Effects on Managed Resources

Past fishery management actions taken through the Northeast Multispecies FMP and the annual specifications process such as catch limits and allocations ensure that stocks are managed sustainably and that measures are consistent with the objectives of the FMP under the guidance of the MSA. The impacts of annual specification of 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, such as accountability measures, are effective; however, these actions have generally had a positive cumulative effect on groundfish. It is anticipated that the future management actions described in Section 6.7.2.1 will have additional indirect positive effects on the target species through actions that reduce and monitor bycatch, protect habitat, and protect the ecosystem services on which the productivity of the target species depends.

As noted previously in Section 6.2, none of the preferred alternatives are expected to result in significantly increased levels of fishing effort or changes to the character of that effort relative to current conditions. Therefore, impacts of the fisheries on target species are not expected to change relative to current conditions under the preferred alternatives (i.e., generally positive for target species). The proposed actions described in this document would positively reinforce the past and anticipated positive cumulative effects on target species by achieving the objectives specified in the FMP.

When the direct and indirect effects of the Amendment 25 alternatives are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects are expected to yield non-significant positive impacts on regulated groundfish resource.*

6.7.4.2 Magnitude and Significance of Cumulative Effects on Non-target Species

The combined impacts of past federal fishery management actions on non-target species have been mixed, as decreased effort and reduced catch of non-target species continue, though some stocks are in poor status. Current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species. As noted in Section 6.2, the actions proposed by Amendment 25 would likely continue this trend. Future actions are anticipated to continue rebuilding non-target stocks and limit the take of incidental/bycatch in the groundfish fishery, particularly through mitigation measures

like sub-ACLs and AMs. The other measures proposed in this action would likely have some impacts on non-target species since fishing activity is expected to overlap with non-target species of interest. Continued management of directed stocks will also control catch of non-target species.

As noted previously in Section 6.2, none of the preferred alternatives are expected to result in significantly increased levels of fishing effort or changes to the character of that effort relative to current conditions. Therefore, impacts of the fishery on non-target species are not expected to change relative to the current condition under the preferred alternatives (i.e., slight positive for non-target species). The proposed actions in this document would positively reinforce past and anticipated cumulative effects on non-target species by achieving the objectives in the FMP.

When the direct and indirect effects of Amendment 25 alternatives are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects are expected to yield non-significant positive impacts on non-target species.*

6.7.4.3 Magnitude and Significance of Cumulative Effects on Physical Environment

Past fishery management actions taken through the Habitat amendments, the Northeast Multispecies FMP and annual specifications process have had negligible to slightly 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 Omnibus Habitat Amendment 2, EFH and Habitat Areas of Particular Concern were designated for the managed resources. It is anticipated that the future management actions described in Section 6.7.2.1 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.

Many additional non-fishing activities, as described above in Section 6.7.2.2 are concentrated near-shore and likely work either additively or synergistically to decrease habitat quality. The effects of these actions, combined with impacts resulting from years of commercial fishing activity, have negatively affected habitat. These impacts could be broad in scope. All the VECs are interrelated; therefore, the linkages among habitat quality, managed resources and non-target species productivity, and associated fishery yields should be considered. 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. Reductions in overall fishing effort and protection of sensitive habitats have mitigated some negative effects.

As noted previously in Section 6.3, none of the preferred alternatives are expected to result in significantly increased levels of fishing effort or changes to the character of that effort relative to current conditions. Although the impacted areas have been fished for many years with many different gear types, continued fishing effort will continue to impact habitats at the same effort level. Therefore, the impacts of the fishery on the physical environment are not expected to change relative to the current condition under the preferred alternatives (i.e., slight negative for physical environment).

When the direct and indirect effects of the Amendment 25 alternatives are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects are expected to yield non-significant slight negative impacts on the physical environment and EFH.*

6.7.4.4 Magnitude and Significance of Cumulative Effects on Protected Species

Given their life history dynamics, 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 Marine Mammal Protection Act and Endangered Species Act were implemented through the present).

Taking into consideration the above information and information provided in Appendix VI, past fishery management actions taken through the respective FMPs and annual specifications process, and non-fishing activities have had mixed cumulative effects on protected species. The management actions have constrained fishing effort both at a large scale and locally, and have implemented, pursuant to the ESA, MMPA, or MSA, gear modifications, requirements, and management areas. These measures and/or actions have served to reduce interactions between protected species and fishing gear. It is anticipated that future management actions, described in Section 6.7.2.1 will result in mixed effects on protected species, as continued catch and effort controls are likely to reduce gear encounters through effort reductions; however, should such controls result in improved groundfish stock conditions, effort increases are possible. Should the latter occur, additional management actions taken under ESA/MMPA would help to mitigate the risk of gear interactions.

Non-fishing activities and their impacts are described in Section 6.7.2.2. It is expected that these activities will result in both direct and indirect impacts with mixed effects on protected species. For some species, activities like offshore wind development and global climate change can constrain productivity, shift distributions, and reduce tolerance to fishing efforts. Though, for others, offshore wind development and climate change may provide some benefits including increased availability of viable habitat, food and nutrients, or decreased competition and predation. Future management actions, described in Section 6.7.2.1.4, will result in some degree of positive impacts on protected species by reducing the number of interactions with fishing gear, and designating new areas of critical habitat.

The preferred alternatives would not substantially modify current levels of fishing effort in terms of the overall amount of effort, timing, and location. They would allow existing fishing effort to continue, thereby maintaining existing tolerances to impacts from fishing effort. As described in Section 6.4, the proposed action is expected to have impacts on protected species that range from slight negative to slight positive, depending on the species.

When the direct and indirect effects of the Amendment 25 alternatives are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects are expected to yield non-significant slight negative impacts to slight positive impacts.*

6.7.4.5 Magnitude and Significance of Cumulative Effects on Human Communities

Past fishery management actions taken through the respective FMPs and annual specifications process such as catch limits and allocations have had both positive and negative cumulative effects on human communities. They have benefited domestic fisheries through sustainable fishery management but can also reduce participation in fisheries. The impacts from annual specification of management measures are largely dependent on how effective those measures are in meeting their intended objectives and the extent to which mitigating measures like AMs are effective. Quota overages may alter the timing of commercial fishery revenues such that revenues can be realized a year earlier. Fishermen may be impacted by reduced revenues in years 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.

It is anticipated that the future management actions described in Section 6.7.2.1 will result in long-term positive effects for human communities due to sustainable management practices, although additional indirect negative effects on some human communities could occur if management actions result in short-term reduced revenues. Despite the potential for negative short-term effects on human communities due

to reduced revenue, positive long-term effects are expected due to the long-term sustainability of the managed stocks.

By providing revenues and contributing to the overall functioning of and employment in coastal communities, the groundfish fishery has both direct and indirect positive social impacts. As previously described in Section 6.5 and Section 6.6, it is uncertain whether the preferred alternatives will result in substantial changes to levels of fishing effort or the character of that effort relative to current conditions. However, through implementation of this action, the Council seeks to achieve the primary objective of the MSA, which is to achieve OY from the managed fisheries.

When the direct and indirect effects of the Amendment 25 alternatives are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects are expected to yield non-significant slight negative impacts to slight positive impacts.* However, the overall combination of impacts thus far has been consistently negative for human communities.

6.7.5 **Proposed Action on all the VECs**

The Council's preferred alternatives (i.e., the proposed action) are described in Section 4.0. The direct and indirect impacts of the proposed action on the VECs are described in Section 6.0 and are summarized in the Executive Summary in Section 1.0. The magnitude and significance of the cumulative effects, including additive and synergistic effects of the proposed actions, as well as past, present, and future actions, have been taken into account (Section 6.7.4).

The preferred alternative for incorporating the revised Atlantic cod stock units into the FMP has no direct impacts, as impacts are determined from the implementing measures in Actions 2-5. The preferred alternative for setting Atlantic cod status determination criteria is expected to have negligible to positive impacts on the managed resource, negligible impacts on non-target species, no direct but slight negative to slight positive indirect impacts on protected resources, negligible impacts on the physical environment, and low positive economic impacts and slight negative to positive social impacts on human communities. For the 2025-2027 specifications, the preferred alternative is expected to have negative to slight positive impacts on the managed resource, slight negative to slight positive impacts on non-target species, slight negative impacts on the physical environment, slight negative to slight positive impacts on protected resources, slight negative to positive economic impacts on human communities, and negative to low positive social impacts on human communities. The preferred alternatives for common pool measures for Atlantic cod are expected to have negligible to positive impacts on the managed resource, negligible impacts on non-target species, slight negative to slight moderate positive impacts on protected resources, negligible impacts on the physical environment, and positive to negative economic and social impacts on human communities. The preferred alternative and option for recreational measures for Southern New England cod are expected to have slight positive impacts on the managed resource, negligible to slight positive impacts on non-target species, likely slight negative to slight moderate positive impacts on protected resources, negligible impacts on the physical environment, and positive to negative economic and social impacts on human communities. The preferred alternative and option to adjust recreational measures for Eastern Gulf of Maine and Georges Bank cod are expected to have negligible to positive impacts on the managed resource, no direct or indirect impacts on non-target species, negligible to slight negative impacts on protected resources, negligible impacts on the physical environment, and negligible to low positive economic and social impacts on human communities.

The preferred alternatives are consistent with other management measures that have been implemented in the past for the fishery. These measures are part of a broader management scheme for the groundfish fishery. This management scheme has helped to rebuild stocks and ensure long-term sustainability, while minimizing environmental impacts.

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 mixed and are expected to continue in that manner for the foreseeable future. Although some aspects of VECs may experience negative impacts if effort increases as groundfish stocks improve, continued catch and effort controls and additional management actions taken under ESA/MMPA should help mitigate the risk of gear interactions.

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 5). Cumulatively, through 2030 it is anticipated that the preferred alternatives will result in non-significant impacts on all VECs, ranging from slight negative to slight positive.

Table 5 – Summary of Cumulative Effects of the Preferred Alternatives.

	Managed Resource	**Non-Target Species**	**Habitat**	**Protected Resources**	**Human Communities**
Direct/Indirect Impacts of Preferred Alternative	Mixed (slight positive, negligible, and slight negative)	Mixed (slight positive, negligible, and slight negative)	Mixed (slight negative, negligible, and slight positive)	Mixed (low-moderate negative to slight moderate positive)	Negative to positive
Combined Cumulative Effects Assessment Baseline Conditions	Negative (short-term), positive (long-term)	Positive	Mixed	Mixed	Negative (short-term), positive (long-term)
Cumulative Effects	Slight positive	Slight positive	Slight negative	Mixed	Negative (short-term), positive (long-term)