Framework Adjustment 3

to the

Atlantic Herring

Fishery Management Plan (FMP)

Prepared by the
New England Fishery Management Council

in consultation with

Mid-Atlantic Fishery Management Council

National Marine Fisheries Service

Atlantic States Marine Fisheries Commission

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EXECUTIVE SUMMARY

This document contains the New England Fishery Management Council's recommendations for Framework Adjustment 3 to the Atlantic Herring Fishery Management Plan (FMP), consistent with the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Herring FMP approved by the National Marine Fisheries Service (NMFS) on October 27, 1999. Framework 3 proposes to establish a process for setting and modifying catch caps for river herring and shad (RH/S) in the Atlantic herring fishery. Framework 3 also proposes specific river herring and shad catch caps for the 2014 and 2015 fishing years. This document contains information and supporting analyses required under other applicable law, including the National Environmental Policy Act (NEPA), Regulatory Flexibility Act (RFA), and Executive Order 12866. The actions proposed in this framework adjustment also relate to management objectives associated with minimizing bycatch in the Atlantic herring fishery, the primary focus of Amendment 5 to the Herring FMP.

The MSA defines "bycatch" as fish that are harvested in a fishery, but are not retained (sold, transferred, or kept for personal use), including economic discards and regulatory discards. 16 U.S.C. § 1802(2). The MSA mandates the reduction of "bycatch," as defined, to the extent practicable. 16 U.S.C.§ 1851(a)(9). Incidental catch, on the other hand, is typically considered to be non-targeted species that are harvested while fishing for a target species and is retained and/or sold. In contrast to bycatch, there is no statutory mandate to reduce incidental catch. When non-target species are encountered in the Atlantic herring fishery, they are either discarded (bycatch) or they are retained and sold as part of the catch (incidental catch). The majority of catch by herring vessels on directed trips is Atlantic herring, with extremely low percentages of bycatch (discards). Due to the high-volume nature of the Atlantic herring fishery, non-target species, including river herring (blueback herring and alewives), shad (hickory and American), and some groundfish, are generally retained once the fish are brought on board. Amendment 5 FEIS at 173. This is particularly true with species like river herring and shad, which are other pelagic fish that look very similar to Atlantic herring and can be sold along with herring. The Council seeks to minimize river herring and shad bycatch/bycatch mortality to the extent practicable by minimizing all catch of river herring and shad in the Atlantic herring fishery, and the RH/S catch caps proposed in this framework adjustment are intended to meet that goal.

Alternative 2, the Council's ***Preferred Alternative*** (Section 2.3, p. 10) proposes to establish a process for setting and modifying catch caps for river herring and shad in the Atlantic herring fishery and identifies the vessels and areas to which the caps would apply. It includes reporting requirements, measures that become effective when a catch cap is reached, and other related provisions. Once the RH/S catch cap process is established in this framework adjustment, future catch caps for RH/S could be specified through the Atlantic herring fishery specifications or other herring-related action. Also included in Alternative 2 are specifications for RH/S catch caps by gear type and area for the 2014 and 2015 fishing years.

For the 2014 and 2015 fishing years, the Council selected as its *Preferred Options* annual "median" RH/S catch caps for the midwater trawl fishery in the GOM, CC, and SNE/MA RH/S Catch Cap areas and a "median" RH/S catch cap for the bottom trawl fishery in the SNE/MA RH/S Catch Cap areas (summarized below, see Sections 2.3.2 – 2.3.5 for the complete range of options considered by the Council). No RH/S catch cap is proposed for the GB Catch Cap Area in 2014-2015; if the catch of river herring/shad is documented to increase in this area, a RH/S catch cap would automatically be considered during the following specifications process. The proposed RH/S catch caps for 2014-2015 would not affect trips/vessels landing less than 6,600 pounds of Atlantic herring or herring vessels using other gear types, including purse seines.

Preferred Options for 2014-2015 RH/S Catch Caps

RH/S Catch Cap Area	Preferred Option: 2014-2015 RH/S Catch Cap (mt)
GOM	85.5
CC	13.3
SNE/MA	MWT – 123.7 BT – 88.9
GB	N/A

Affected Environment

The descriptive and analytic components of this document are constructed in a consistent manner. During the development of this action, a series of valued ecosystem components, or VECs were identified. VECs represent the resources, areas, and human communities that may be affected by a proposed management action or alternative(s), and by other actions that have occurred or will occur outside the action proposed in this framework adjustment. VECs are the focus of an EA since they are the "place" where the impacts of management actions are exhibited. The Affected Environment section (Section 3.0, p. 25) is designed to enhance the readers' understanding of the historical, current, and near-future conditions (baselines and trends) relative to each VEC in order to fully understand the anticipated environmental impacts of the management alternatives that were considered in this document. For the purposes of the Atlantic herring management program, the VECs described and considered in the analyses are: Atlantic herring (Section 3.1, p. 25); river herring and shad (RH/S) (Section 3.2, p. 28); other non-target species (Section 3.3, p. 57); physical environment and essential fish habitat (EFH) (Section 3.4, p. 60); protected resources (Section 3.5, p. 69); and fishery-related businesses and communities (Section 3.6, p. 82).

The impacts of the Framework 3 alternatives on each VEC are summarized below.

Impacts on Atlantic Herring Resource (Section 4.1, p. 124)

Relative to the no action alternative, the RH/S catch cap process and provisions established through this framework adjustment (Alternative 2, ***Preferred Alternative***) are not expected to substantially impact the Atlantic herring resource because they are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the fishery specifications process. In the future, the RH/S catch caps established through this action may result in the closure of one or more RH/S Catch Cap Areas, but the impacts of future RH/S catch caps will be analyzed when the catch caps are specified by the Council. Generally, if Atlantic herring catch is less than expected, there could be a positive impact on the Atlantic herring resource. However, the provisions proposed for specifying RH/S catch caps (by gear and area) under the ***Preferred Alternative*** are intended to provide opportunity for the directed herring fleet to utilize the total ACL for Atlantic herring (OY) if it can continue to avoid RH/S. The area-based approach proposed for distributing RH/S catch caps is intended to reduce the likelihood that reaching one or more RH/S catch caps in a fishing year would result in closure of the directed herring fishery in all management areas.

While there are no measurable impacts on the Atlantic herring resource expected from establishing the RH/S catch cap process and provisions in this framework adjustment, the potential to reduce total Atlantic herring catch in a fishing year could be *low positive*. There may be long-term benefits if the RH/S catch cap process and related provisions improve catch monitoring and promotes sustainable management of the Atlantic herring resource and herring fishery. As catch information for the herring fishery continues to improve, better estimates can be incorporated into future stock assessments, thereby potentially reducing some uncertainties associated with the assessment data/models, improving biomass and fishing mortality estimates, and enhancing the Council's ability to successfully manage Atlantic herring and other resources at long-term sustainable levels.

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate catch that is less than (or equal to) the status quo. According to the analysis presented in this document, Atlantic herring catch could decline by up to 9% in 2014 and 2015 under the *Preferred Options* for specifying RH/S catch caps if the fleet does not continue to avoid catching RH/S. If the fleet continues to avoid RH/S, there may be opportunity to utilize most or all of the Atlantic herring ACL during 2014 and 2015. A specific change in Atlantic herring catch resulting from the 2014-2015 RH/S catch caps is difficult to predict, and any resulting impact on the Atlantic herring resource cannot be quantified. Changes in herring catch, and therefore impacts, will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the herring fishery in 2014 and 2015 is fully utilized (the total ACL for 2014-2015 is higher than 2008-2012).

Overall, however, because the Atlantic herring resource is considered to be rebuilt and catch will remain within the bounds of the 2013-2015 Atlantic herring fishery specifications, the impacts of the *Preferred Options* for specifying 2014 and 2015 RH/S catch caps on the Atlantic herring resource are expected to be *neutral*. Any resulting impacts under any of the options considered

by the Council are not expected to change or jeopardize the status of the Atlantic herring resource.

Impacts on RH/S (Section 4.2, p. 127)

Relative to the no action alternative, the impacts of Alternative 2 (***Preferred Alternative***) are expected to be *likely positive* for the RH/S species. The measures proposed in this framework adjustment establish a mechanism to control/limit RH/S catch in the Atlantic herring fishery. They also provide incentives for the industry to continue to reduce bycatch and avoid RH/S interactions to the extent possible. While data are not robust enough at this time to determine a biologically-based RH/S catch cap and/or the potential impacts of such a catch cap on the RH/S stocks, setting a cap on the catch of these species in the Atlantic herring fishery is a proactive action intended to manage and minimize catch to the extent practicable while allowing the Atlantic herring fishery to continue to operate and fully utilize OY in the upcoming fishing years if RH/S can be avoided.

Specific biological impacts will be influenced by changes in herring fleet behavior and shifts in the distribution/aggregation of stocks/sub-stocks from changes in fishing activity, environmental factors, climate change, restoration efforts, and other factors. Overall, though, the long-term impacts of establishing a process for catch caps on RH/S are likely to be positive. The catch of RH/S in the directed Atlantic herring fishery would likely be less under this alternative when compared to the no action alternative because it would be capped, and there would be a regulatory incentive for the fleet to avoid RH/S. Generally, lower catches should result in positive impacts on the stock(s). In contrast, selecting the no action alternative would likely be negative for the RH/S stocks because the expected benefits of catch limitations under Alternative 2 would not be realized.

By specifying RH/S catch caps for 2014/2015 and encouraging the Atlantic herring fleet to avoid RH/S, the proposed catch caps should produce a positive impact to RH/S stocks in 2014 and 2015, but the extent is unknown because there are no absolute abundance estimates for RH/S stocks, and there is no way to link the catch cap amount (or catch under a cap) to RH/S fishing mortality. In general, the lower the catch cap is, the less RH/S will be caught by the herring fishery in 2014/2015, and presumably the higher the benefit, but the degree to which this may occur is unknown. The *Preferred Options* limit RH/S catch in 2014/2015 in all sectors of the directed herring fishery (gears/areas) that have the most significant interaction with RH/S; these options therefore have the greatest potential to benefit the RH/S stocks. Thus, all of the options considered by the Council for specifying catch caps would likely benefit RH/S more than taking no action or not setting a catch cap in these areas. The impacts of the proposed 2014-2015 RH/S catch caps on RH/S, therefore, are *unknown but likely positive.*

Impacts on Other Non-Target Species (Section 4.3, p. 133)

Relative to the no action alternative, the RH/S catch cap process proposed in Alternative 2 (***Preferred Alternative***) is not expected to impact other non-target species because it is not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the fishery specifications process. . The resulting impacts of the RH/S catch cap process on other non-target species, therefore, are *negligible.*

The provisions proposed for specifying RH/S catch caps (by gear and area) under the ***Preferred Alternative*** are intended to provide opportunity for the directed herring fleet to utilize the total ACL for Atlantic herring (OY) if it can continue to avoid RH/S. Any changes in fishing patterns and/or fishing effort resulting from the action proposed in this framework adjustment are not likely to cause substantial changes in the catch of other non-target species in the directed herring fishery and therefore would not influence the biological status of other non-target species. The resulting impacts of the ***Preferred Alternative*** on other non-target species, therefore, are likely *negligible*.

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate Atlantic herring catch that is less than (or equal to) the status quo. According to the analysis presented in this document, Atlantic herring catch could decline by up to 9% in 2014 and 2015 under the *Preferred Options* for specifying RH/S catch caps if the fleet does not continue to avoid RH/S. If the fleet continues to avoid RH/S, catch may decline less than 9% or not at all. A specific decline in catch is difficult to predict, and any resulting impact on non-target species is even more difficult to predict and cannot be quantified. The impacts of the proposed 2014/2015 RH/S catch caps on other non-target species will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the ABC specified for these fishing years. For these reasons, the impacts of these cap specifications on other non-target species are *unknown but likely neutral*.

Impacts on the Physical Environment and EFH (Section 4.4, p. 136)

Given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery (see Amendment 5), establishing a process for RH/S catch caps is not expected to have a measurable influence on the total magnitude of adverse effects across the fishery. Thus, as far as EFH impacts are concerned, there is no measureable difference between any of the alternatives/options considered by the Council in this framework adjustment. Thus, the proposed action would not have any adverse effects on EFH as compared to the no action alternative. Impacts on the Physical Environment and EFH are determined to be *negligible*.

Impacts on Protected Resources (Section 4.5, p. 139)

Relative to the no action alternative, the RH/S catch cap process proposed in Alternative 2 (***Preferred Alternative***) is not expected to impact protected resources because it is not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the herring fishery specifications process. . Any changes in fishing patterns and/or fishing effort resulting from this action are not likely to substantially impact interactions with protected resources in the directed herring fishery and therefore are not likely to influence the biological status of protected resources. Moreover, the ongoing management protected resources interactions in the Atlantic herring fishery would continue to address fishing mortality and the conservation of protected resources. The resulting impacts on protected resources, therefore, are *negligible.*

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate Atlantic herring catch that is less than (or equal to) the status quo. According to the analyses presented in this document, Atlantic herring catch could decline by up to 9% in 2014 and 2015 under the *Preferred Options* for specifying RH/S catch caps. If the fleet continues to avoid RH/S, catch in 2014 and 2015 may decline less than 9% or not at all. A specific decline in catch is difficult to predict. Impacts on protected resources, will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the ABC specified for these fishing years.

Overall, the expected impacts of the proposed 2014-2015 RH/S catch caps on protected resources are *unknown but likely neutral*. Because Atlantic herring catch will remain within the bounds of the 2013-2015 Atlantic herring fishery specifications, impacts from the proposed RH/S catch caps for 2014-2015 are not expected to change or jeopardize the status of any protected resources.

Impacts on Fishery-Related Businesses and Communities (Section 4.6, p. 142)

Relative to the no action alternative, the long-term impact of the catch cap process/provisions established Alternative 2 (***Preferred Alternative***) on fishery-related businesses and communities is *low positive*. Establishing a process for setting RH/S catch caps provides an incentive for participants in the directed herring fishery to find innovative, low-cost solutions to avoid river herring and shad, such as the SMAST/SFC/MA DMF River Herring Bycatch Avoidance Project. This collaboration allows herring fishery participants to collaborate in observations and facilitate monitoring/sampling that will lead to the development of avoidance strategies. The approach proposed in this framework adjustment therefore enhances industry-based bycatch reduction initiatives and builds on the approach adopted by the Council in Amendment 5 to the Herring FMP. It also reduces the likelihood that more restrictive limits will be imposed in the future if the industry can continue to reduce and avoid RH/S interactions. The proposed gear-specific and area-specific allocations of RH/S catch cap minimize negative impacts for those herring vessels with fewer observed encounters with RH/S. The area-based approach should also reduce the likelihood that reaching one or more RH/S catch caps in a fishing year would result in closure of the directed herring fishery in all management areas. The smaller closure area proposed for the SNE/MA RH/S Catch Cap Area would allow vessels to continue the directed fishery for mackerel in the offshore areas.

Collectively, the impact of the proposed 2014-2015 RH/S catch caps on fishery-related businesses and communities is expected to be *low negative*. Compared to the no action alternative (no RH/S catch caps for 2014 and 2015), the *Preferred Options* are expected to increase constraints on participants in the limited access Atlantic herring fishery, likely resulting in short-term negative socioeconomic impacts, but the proposed measures could have long-term benefits from promoting a sustainable fishery. Additionally, the potential to improve the RH/S stock abundance that a catch cap affords would have positive long-term impacts on the businesses and communities that depend on these species.

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate catch that is less than (or equal to) the status quo. The largest impact on Atlantic herring catch will be for midwater trawl vessels in Herring Management Areas 2 and 3. However, the proposed RH/S catch caps for 2014 and 2015 are not expected to preclude directed Atlantic herring fishing in all areas and provide midwater trawl vessels an opportunity to fish in Area 3 (Georges Bank) without a RH/S catch cap, thereby potentially mitigating some of the negative impacts.

Summary of Impacts of Framework 3 Alternatives on VECs

VEC →	Atlantic Herring Resource	River Herring/Shad	Other Non-Target Species	Physical Environment/EFH	Protected Resources	Fishery-Related Businesses and Communities
Alternative 1 (No Action)	*Negligible* Status quo fishing under 2013-2015 herring fishery specifications	*Unknown but Likely Negative* No limits on RH/S catch in herring fishery	*Negligible* Status quo fishing under 2013-2015 herring fishery specifications and provisions in other FMPs	*Negligible* Minimal/temporary nature of adverse effects on EFH in the herring fishery (see Am 5)	*Negligible* Status quo fishing under 2013-2015 herring fishery specifications and provisions in other FMPs	*Neutral* Status quo fishing under 2013-2015 herring fishery specifications; impacts may be positive and/or negative
Alternative 2 (*Preferred Alternative*)						
Alternative 2 Process/Provisions	*Low Positive* Long-term benefits from improved catch monitoring and promoting sustainable management	*Likely Positive* Implements mechanism to limit/manage catch in herring fishery and promotes bycatch avoidance/reduction	*Negligible* Provisions for RH/S catch management do not affect other non-target species	*Negligible* Provisions for RH/S catch management do not affect EFH	*Negligible* Provisions for RH/S catch management do not affect protected resources	*Low Positive* Promotes industry-based bycatch reduction and long-term sustainable management; supports Am 5 objectives; encourages coordination with MAFMC to address overlap with mackerel fishery
2014/2015 RH/S Catch Caps	*Neutral* Catch may be affected but will remain within bounds of 2013-2015 herring fishery specifications	*Unknown but Likely Positive* Cannot be quantified but limits RH/S catch and may reduce it from recent levels; provides incentive to reduce/avoid interactions with RH/S	*Unknown but Likely Neutral* Specific impacts will depend on changes in herring fishing effort; overall catch will remain within bounds of 2013-2015 herring specifications	*Negligible* Minimal/temporary nature of adverse effects on EFH in the herring fishery (see Am 5)	*Unknown but Likely Neutral* Specific impacts will depend on changes in herring fishing effort; overall catch will remain within bounds of 2013-2015 herring specifications	*Low Negative* May preclude fishing in some areas; no cap on GB and smaller closure area in SNE/MA may mitigate some negative impacts

LIST OF ACRONYMS

ACL	Annual Catch Limit
ACCSP	Atlantic Coastal Cooperative Statistics Program
AM	Accountability Measure
ASMFC	Atlantic States Marine Fisheries Commission or Commission
B	Biomass
CZMA	Coastal Zone Management Act
DMF	Division of Marine Fisheries
DMR	Department of Marine Resources
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
E.O.	Executive Order
ESA	Endangered Species Act
F	Fishing Mortality Rate
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
FW	Framework
FY	Fishing Year
GB	Georges Bank
GMRI	Gulf of Maine Research Institute
GOM	Gulf of Maine
IRFA	Initial Regulatory Flexibility Analysis
IVR	Interactive Voice Response
M	Natural Mortality Rate
MA DMF	Massachusetts Division of Marine Fisheries
MAFMC	Mid-Atlantic Fishery Management Council
ME DMR	Maine Department of Marine Resources
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistical Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSB	Mackerel, Squid, Butterfish
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
mt	Metric Tons

NB	New Brunswick
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fisheries Observer Program
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NSGs	National Standard Guidelines
OFL	Overfishing Limit
OY	Optimum Yield
PDT	Plan Development Team
PS/FG	Purse Seine/Fixed Gear
RFA	Regulatory Flexibility Act
RFFA	Reasonably Foreseeable Future Action
RIR	Regulatory Impact Review
RH/S	River Herring/Shad
RSA	Research Set-Aside
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SSB	Spawning Stock Biomass
SSC	Scientific and Statistical Committee
SFA	Sustainable Fisheries Act
SFC	Sustainable Fisheries Coalition
SMAST	UMASS Dartmouth School of Marine Science and Technology
TC	Technical Committee
TRAC	Transboundary Resource Assessment Committee
TRT	Take Reduction Team
VMS	Vessel Monitoring System
VTR	Vessel Trip Report

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1.0 INTRODUCTION AND BACKGROUND

This document contains the New England Fishery Management Council's recommendations for Framework Adjustment 3 to the Atlantic Herring Fishery Management Plan (FMP), consistent with the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Atlantic Herring FMP approved by the National Marine Fisheries Service (NMFS) on October 27, 1999. Framework 3 proposes to establish a process for setting and modifying catch caps for river herring and shad (RH/S) in the Atlantic herring fishery. Framework 3 also proposes specific RH/S catch caps for the 2014 and 2015 fishing years. This document also contains information and supporting analyses required under other applicable law, including the National Environmental Policy Act (NEPA), Regulatory Flexibility Act (RFA), and Executive Order 12866.

The New England Council developed Amendment 5 to improve the catch monitoring program for the Atlantic herring fishery and addresses bycatch issues through responsible management. Amendment 5 established the authority to develop catch caps for RH/S through a framework adjustment to the Atlantic Herring FMP. While the language in Amendment 5 that authorizes this framework adjustment does not explicitly refer to the shad species, the Council's intent clearly is to also include the shads as species to which catch caps developed in this action would apply. The Council considered shad throughout the development of Amendment 5, and there is information and analysis in the Amendment 5 EIS to demonstrate this. Shad is identified separately in the Amendment 5 Affected Environment as a component of the Non-Target Species/Other Fisheries, and detailed biological and fishery information about shad is provided in the Amendment 5 EIS. One of the first major elements of the Amendment 5 EIS analysis quantitatively evaluates the overlap between river herring and shad and supports the conclusion that measures proposed in Amendment 5 to address river herring will have similar impacts on shad. For these reasons, the inclusion of the shad species in this framework adjustment better addresses the purpose and need for this action, identified in Section 1.1 of this document. Section 2.1 of this document provides additional background information regarding the inclusion of shad in the action proposed in this framework adjustment.

For the purposes of this document, the term "river herring" refers to the species of alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), and the term "shad" refers to the species of American shad (*Alosa sapidissima*) and hickory shad (*Alosa mediocris*). Collectively, these four species are referred to throughout this document as "RH/S." The catch caps in this document are proposed apply to all four species collectively at this time, which is consistent with Herring PDT recommendations and advice from NMFS (see discussion in Section 2.1).

List of Framework 3 Appendices

Appendix I. *Background Data (NERO)*

Appendix II. *Calculating 2014-2015 RH/S Catch Cap Options for the Atlantic Herring Fishery (Herring PDT)*

Appendix III. *Predicting the Potential Impacts of RH/S Catch Caps on Atlantic Herring Fishery Participants (Herring PDT)*

Catch, Bycatch, and Incidental Catch

The MSA defines "bycatch" as fish that are harvested in a fishery, but are not retained (sold, transferred, or kept for personal use), including economic discards and regulatory discards. 16 U.S.C. § 1802(2). The MSA mandates the reduction of "bycatch," as defined, to the extent practicable. 16 U.S.C.§ 1851(a)(9). Incidental catch, on the other hand, is typically considered to be non-targeted species that are harvested while fishing for a target species and is retained and/or sold. In contrast to bycatch, there is no statutory mandate to reduce incidental catch. When non-target species are encountered in the Atlantic herring fishery, they are either discarded (bycatch) or they are retained and sold as part of the catch (incidental catch). The majority of catch by herring vessels on directed trips is Atlantic herring, with extremely low percentages of bycatch (discards). Due to the high-volume nature of the Atlantic herring fishery, non-target species, including river herring (blueback herring and alewives), shad (hickory and American), and some groundfish, are generally retained once the fish are brought on board. This is particularly true with species like r fish that look very similar to Atlantic herring and can be sold along with herring. The Council seeks to minimize river herring and shad bycatch/bycatch mortality to the extent practicable by minimizing all catch of river herring and shad in the Atlantic herring fishery, and the RH/S catch caps proposed in this framework adjustment are intended to meet that goal.

State Management of RH/S (ASMFC)

Targeting river herring and shad occurs almost exclusively in State waters, and river herring and shad are managed under the Atlantic States Marine Fisheries Commission's (ASMFC) Shad and River Herring Fishery Management Plan (FMP), which was developed in 1985. A more detailed description of the ASMFC Interstate Management Program for RH/S can be found in Section 3.2.3 of this document (p. 40).

Federal Management (NEFMC and MAFMC)

In Federal waters, the Atlantic herring fishery is managed by the New England Fishery Management Council (NEFMC) through the Atlantic Herring FMP and its associated amendments and framework adjustments. Most recently, Amendment 5 to the Herring FMP established the authority to develop catch caps for RH/S through a framework adjustment to the Atlantic Herring FMP. Amendment 5 was developed by the New England Council to improve the catch monitoring program for the Atlantic herring fishery and addresses bycatch issues through responsible management. Amendment 5 was adopted by the Council on June 20, 2012. On July 18, 2013, Amendment 5 was partially approved by NMFS. The approved measures in Amendment 5 include:

- Revisions to fishery management program provisions (permitting provisions, dealer and vessel reporting requirements, operational provisions for carrier vessels and transfers at-sea, requirements for vessel monitoring systems);
- Revisions to vessel requirements to improve at-sea sampling by observers;
- Management measures to discourage the discarding of catch before it has been sampled by observers;
- Establishment of River Herring Monitoring/Avoidance Areas; and

- Expansion of sea sampling requirements on midwater trawl vessels fishing in the year-round groundfish closed areas.

The management measures approved in Amendment 5 became effective on March 17, 2014. The information and analyses presented in Amendment 5 to the Atlantic Herring FMP form the basis for implementing a RH/S catch cap through this framework adjustment, including the necessary reporting and monitoring provisions to ensure its effectiveness. In Amendment 5, the Herring Plan Development Team (PDT) provided a detailed discussion paper addressing the development of river herring catch caps, including a discussion of the potential challenges associated with implementing and monitoring, as well as the potential impacts of catch caps (see Amendment 5 Appendix VII, Herring PDT 2010).

As noted above, the Council adopted a long-term river herring bycatch avoidance approach in Amendment 5, based on the continuing cooperative project between the Sustainable Fisheries Coalition (SFC), the UMASS Dartmouth School of Marine Science and Technology (SMAST), and the Massachusetts Division of Marine Fisheries (MADMF). This project focuses on industry-based alosine bycatch avoidance (see Section 3.6.4 of this document for detailed information about the bycatch avoidance project). The overall concept of the SFC/SMAST/MADMF project is to allow the Atlantic herring fishery to avoid areas with relatively high river herring encounters when river herring have been encountered at a threshold level. This project provides information for vessels to move out of river herring bycatch hotspots during certain times. When combined with the appropriate incentives (a catch cap, for example), the avoidance program would likely allow herring vessels to continue to operate while effectively minimizing interactions with these non-target species. Quickly following the completion of Amendment 5, the Council initiated the development of this framework adjustment (January 2014).

On August 2, 2012, the United States District Court for the District of Columbia issued a remedial order in the civil action Flaherty, et al. v. Blank, et al. to address deficiencies with respect to Amendment 4 to the Atlantic Herring Fishery Management Plan (FMP). A letter from NOAA Fisheries Service (NMFS) was provided to the New England Fishery Management Council (NEFMC) on August 31, 2012, describing the legal deficiencies identified by the Court:

1. NMFS did not satisfy its obligation to independently determine whether the NEFMC's designation of "stocks in the fishery" complied with the Magnuson-Stevens Fisheries Conservation and Management Act (MSA);
2. NMFS did not adequately consider whether Amendment 4 complied with National Standard 9's requirement to minimize bycatch to the extent practicable; and
3. NMFS failed to consider the environmental impacts of alternatives to the acceptable biological catch (ABC) control rule and accountability measures (AMs).

The letter from NMFS also described the Amendment 4 Court Order. The Council responded to the letter from NMFS by including consideration of RH/S as stocks in the Atlantic herring fishery on the list of management priorities for 2013. NMFS submitted to the court a consideration of the stocks in the fishery decision along with a determination that Amendment 4, including Amendment 5 bycatch provisions as included in the Amendment 5 EIS, complied with

National Standard 9. In addition to these submissions, several other elements of the Amendment 4 Court Order were addressed by the Council through the development of the 2013-2015 Atlantic herring fishery specifications package and Framework 2 to the Herring FMP, and additional information about these issues can be found in the 2013-2015 Atlantic herring fishery specifications package. With the completion of the 2013-2015 specifications package and this framework adjustment (to establish RH/S catch caps), the Council continues to address important management priorities in the Atlantic herring fishery, which still include consideration of adding RH/S as stocks in the fishery. This issue will continue to be explored by the Council through cooperation and continue discussion with the Mid-Atlantic Fishery Management Council (see additional discussion below). On February 19, 2014, the Court issued an opinion ruling that NMFS complied with the Court's remedial order.

At this time, Mid-Atlantic Fishery Management Council (MAFMC) addresses RH/S bycatch issues primarily through its Mackerel, Squid, and Butterfish (MSB) FMP. Recently, Amendment 14 to the Mackerel Squid Butterfish (MSB) FMP was developed in coordination with Amendment 5 to the Herring FMP and proposes a comprehensive catch monitoring system for the mackerel, squid, and butterfish (MSB) fishery. Many of the actions contained with both amendments have been developed to compliment and/or replicate each other to avoid conflicting overlaps of restrictions on vessels that participate in both the herring and mackerel fisheries. The timelines for Amendment 5 and Amendment 14 were designed to complement each other and allow public comment sessions to occur simultaneously. Amendment 14 to the MSB FMP considered adding river herring and shad as "stocks in the fishery" but deferred further action on this issue to Amendment 15 (see below).

Amendment 15 was initiated by the Mid-Atlantic Fishery Management Council in 2013 to consider measures for direct river herring and shad management. Preliminary development of the amendment specifically considered whether the current management framework for river herring and shad is sufficient for conservation and management of these species and whether Federal management under the MSA would address any deficiencies and/or inefficiencies. In August 2013, Mid-Atlantic Fishery Management Council staff presented a discussion document to the Mid-Atlantic Council outlining management issues related to incorporating RH/S as stocks in the Atlantic mackerel fishery. The Mid-Atlantic Council determined additional conservation and management of river herring and shad in the Squid, Mackerel, Butterfish FMP was not warranted at this time. The Mid-Atlantic Council also agreed to form an oversight Committee to specifically monitor and evaluate the effectiveness of the catch caps and continue to work to reduce Federal fisheries' impacts on the RH/S stocks. Additionally, the Mid-Atlantic Council agreed to reconsider Federal management of river herring and shad in 3 years. The New England Fishery Management Council intends to remain actively engaged in this process and all RH/S conservation and restoration efforts. At its November 2013 meeting, the New England Council approved 2014 management priorities for Atlantic herring, including development of a NE Council staff white paper to more explicitly consider/explore issues related to adding RH/S as stocks in the Atlantic herring fishery.

River Herring ESA Petition and Determination

On August 5, 2011, the National Marine Fisheries Service (NMFS) received a petition from the Natural Resources Defense Council (NRDC), requesting that alewife and blueback herring be listed each as threatened throughout all or a significant portion of their range under the Endangered Species Act (ESA). Based on the best scientific and commercial information available, NMFS determined that listing alewife and blueback herring as threatened or endangered under the ESA is not warranted at this time. The determination was published in the *Federal Register* on August 12, 2013. Additional information about the ESA petition and NMFS' determination can be found in Section 3.2.2.4 of this document (p. 38).

While neither species of river herring is currently considered endangered or threatened, both species are at low abundance compared to historical levels, and NMFS indicated that monitoring both species is warranted. Given the uncertainties and data deficiencies for both species, NMFS committed to revisiting both species of river herring in 3 – 5 years. During this 3- to 5-year period, NMFS intended to coordinate with ASMFC, the MAFMC, and the NEFMC on a strategy to develop a long-term and dynamic conservation plan (e.g., priority activities and areas) for river herring considering the full range of both species and with the goal of addressing many of the high priority data gaps for river herring.

The Council acknowledged concerns about the river herring and shad stocks in Amendment 5 when it developed a comprehensive catch monitoring program and long-term measures to address river herring bycatch (discussed above). Information presented to the Council during the development of Amendment 5 suggests that little is known about the impact of river herring bycatch in the herring fishery on the river herring resource. In turn, the Council determined that the most effective measures implemented in Amendment 5 to address river herring bycatch would be those that increase catch monitoring and bycatch accounting, and promote cooperative efforts with the industry to minimize bycatch to the extent practicable. This framework adjustment is intended to further the objectives by implementing RH/S catch caps to minimize bycatch and further support river herring and shad conservation and restoration efforts.

While data are not robust enough at this time to determine a biologically-based RH/S catch cap and/or the potential effects of such a catch cap on the RH/S species, the Council has clearly expressed support for setting RH/S catch caps in the herring fishery proactively, and in as timely a manner as possible. The framework adjustment process established in Amendment 5 provides the mechanism to implement the RH/S catch caps. The Council believes that a RH/S catch cap will provide a strong incentive for the industry to avoid RH/S and help to minimize its overall catch. A RH/S catch cap, in combination with the management measures implemented in Amendment 5, should form the basis for a long-term approach to managing RH/S catch. The Council supports this approach as the most effective, least costly manner to allow the industry to manage its own non-targeted catch. As data improves, so will the ability to perform analyses to inform management decisions and support effective, long-term management that minimizes bycatch to the extent practicable.

1.1 PURPOSE AND NEED

The purpose of this framework adjustment is to establish a process for setting river herring and shad (RH/S) catch caps in the Atlantic herring fishery, and to specify RH/S catch caps for the 2015 and 2015 fishing years.

This action is needed to continue minimizing bycatch/bycatch mortality, as required by National Standard 9 and other provisions of the MSA. This action is also needed to promote long-term sustainable management and meet the goals and objectives outlined in Amendment 5 to the Atlantic Herring FMP.

1.2 GOALS AND OBJECTIVES

The first goal of Framework 3 is to establish a process for setting river herring/shad (RH/S) catch caps in the Atlantic herring fishery to achieve the following objectives:

- Provide strong incentive for the industry to continue to avoid river herring/shad and reduce river herring/shad catch to the extent practicable;
- Enhance coordination with the Mid-Atlantic Council to address overlapping fisheries; and
- Promote flexibility to adjust the catch cap(s) in the future as more information becomes available.

The second goal of this framework adjustment is to specify RH/S catch caps and related measures in the Atlantic herring fishery for the 2014 and 2015 fishing years. The RH/S catch caps and related measures specified for 2014 and 2015 are intended to allow the directed Atlantic herring fleet to fully utilize the yield available to the fishery if the fleet can continue to avoid RH/S.

2.0 PROPOSED MANAGEMENT ACTION AND OTHER ALTERNATIVES CONSIDERED

The management alternatives/options considered in Framework 3 establish a process for setting and modifying catch caps for river herring and shad in the Atlantic herring fishery. In this document, the term *river herring* is used to refer to the species of alewife and blueback herring, and the term *shad* is used to refer to the species of American shad and hickory shad. Together, the four species of river herring and shad are referred to as "*RH/S*."

Alternative 2, described below, is the Council's ***Preferred Alternative***, selected at the September 2013 meeting. This alternative establishes the process for setting RH/S catch caps in the Atlantic herring fishery and identifies the vessels and areas to which the caps would apply. It includes reporting requirements, measures that become effective when a catch cap is reached, and other related provisions. Once the catch cap process is established in this framework adjustment, future catch caps for RH/S could be specified through the Atlantic herring fishery specifications or other herring-related action. Also included in Alternative 2 are the specifications for RH/S catch caps by gear type and area for the 2014 and 2015 fishing years.

2.1 BACKGROUND

As previously mentioned, Amendment 5 to the Herring FMP established the authority and intent to develop the RH/S catch caps proposed in Framework 3. The Council initiated Framework 3 at its January 2013 meeting, shortly following the completion of Amendment 5 and the 2013-2015 Atlantic herring fishery specifications. A more thorough discussion regarding the development of the Framework 3 alternatives occurred at the June 2013 New England Council meeting, after a joint meeting of the Herring PDT and Mid-Atlantic Council's MSB Monitoring Committee (May 2013), a Herring Committee meeting (June 2013), and a Mid-Atlantic Fishery Management Council meeting (June 2013), at which RH/S catch caps were specified for the 2014 Atlantic mackerel fishery.

While the language in Amendment 5 that authorizes this framework adjustment does not explicitly refer to the shad species, the Council's intent clearly is to also include the shads as species to which catch caps developed in this action would apply. The Council considered shad throughout the development of Amendment 5, and there is information and analysis in the Amendment 5 EIS to demonstrate this. Shad is identified separately in the Amendment 5 Affected Environment as a component of the *Non-Target Species/Other Fisheries*, and detailed biological and fishery information about shads is provided in the Amendment 5 EIS. One of the first major elements of the Amendment 5 EIS analysis quantitatively evaluates the overlap between river herring and shad and supports the conclusion that measures proposed in Amendment 5 to address river herring will have similar impacts on shad. For these reasons, the inclusion of the shad species in this framework adjustment better addresses the purpose and need for this action, identified in Section 1.1. Additional information is provided in the Affected Environment (Section 3.0) and throughout the discussion of impacts of the Framework 3 alternatives (Section 4.0).

When beginning develop the alternatives for Framework 3, the Council reaffirmed its intent that catch caps established in this framework adjustment should apply to both river herring and shad. The Council passed the following two motions (June 2013 Council Meeting):

> That the Council clarify its intent that the provision in Amendment 5 to establish catch caps for river herring through a framework adjustment applies to both river herring and shad
>
> To add the river herring/shad catch cap species to the list of items that could be modified in the future through a framework adjustment or the fishery specifications process

The Council considered available fishery information, technical recommendations, and public comment, and provided the following guidance to Council staff and the Herring PDT for further developing alternatives/options in Framework 3:

- **At this time, the alternatives to establish catch cap(s) should apply collectively to all four RH/S species.** The catch of each species would continue to be monitored/reported individually but would apply to a collective catch cap(s), based on the measures approved by the Council in this framework adjustment. The Council may specify separate catch caps for these species in the future, if there is a need to do so. Given available data, the MAFMC is proposing to establish one catch cap for all four species of river herring and shad as well. Since the NEFMC intends to coordinate efforts to address RH/S catch with the MAFMC (see goals and objectives in Section 1.2 of this document), the catch caps should be structured in a similar manner in both fisheries, at least as a starting point. Without coordination, there is greater risk of creating loopholes that could undermine the intent of the measures and/or producing unforeseen impacts resulting from an early fishery closure.

  Moreover, observed removals of the shad species in both the herring and mackerel fisheries have been very low, making it very challenging to establish and monitor species-specific caps for these fisheries. During Framework 3 discussions, NMFS staff acknowledged the monitoring and administrative challenges that may be associated with establishing separate caps for the two river herring and two shad species in the herring and mackerel fisheries at this time. The Herring PDT also noted that the analyses in Amendment 5 show that the overlap between river herring and shad is such that any measures implemented to conserve or protect river herring will likely have a similar effect on the shad species. In turn, the Council recommended adding RH/S catch cap species to the list of items that could be modified in the future through either a framework adjustment or the fishery specifications process. For example, if Framework 3 establishes one cap for all four RH/S species collectively, any need to divide the cap into a greater number of species-specific caps in the future could be addressed during the fishery specifications process, when future cap amounts are set.

  The intent of the action proposed in this framework adjustment is to provide flexibility for the New England Council to work cooperatively with the Mid-Atlantic Council in the future so that RH/S catch caps in the overlapping area(s) can be developed jointly between the two Councils, or at least with enhanced coordination. During the development of this action, the Herring PDT and MAFMC MSB Monitoring Committee discussed the overlap between the herring and mackerel fisheries in the southern New England/Mid-Atlantic area, and both technical groups recommend a coordinated approach in this area in the future to promote efficiency and reduce complexity (see May 23, 2013 Herring PDT/MSB/Monitoring Committee Report). To the extent possible, the PDT/MC agrees that the New England and Mid-Atlantic Councils should consider aligning the RH/S catch caps in the southern New England area in future fishing years once this framework adjustment is implemented. While a combined RH/S catch cap is not proposed for the 2014 and 2015 fishing years, the provisions established through this action would allow the New England Council to consider a coordinated or combined RH/S catch cap with the Mid-Atlantic Council in the future during the Atlantic herring specifications process. This is consistent with the goals and objectives of this framework adjustment and may help address the purpose and need described in Section 1.1 of this document.

- **The Council considered how to divide the RH/S catch caps by area in Framework 3 and recommends that the river herring statistical area clusters developed by the Herring PDT in the Amendment 5 analysis should form the basis for spatially distributing the proposed RH/S catch caps.** During Framework 3 discussions, the Council considered whether the RH/S catch caps should be divided by herring management area or another spatial distribution. There was also some discussion about establishing a fishery-wide catch cap, but there was little to no support for this approach due to the spatial/temporal nature of the herring fishery. Concerns about addressing RH/S interactions along the backside of Cape Cod (Statistical Area 521) were identified as a potential problem if RH/S catch caps are divided by herring management area (three herring management areas merge along the backside of Cape Cod).

  The statistical area clusters to identify river herring "hotspots" developed by the Herring PDT in Amendment 5 are based on considerable technical spatial analysis of river herring interactions in the Atlantic herring fishery during the 2005-2009 fishing years. As a result of the Herring PDT's recent work in Amendment 5, the Council recommended that these areas be re-evaluated and established as the proposed RH/S catch cap areas in Framework 3 (June 2013 Council Meeting; see also May 23, 2013 Herring PDT/MSB MC Report and June 2013 Herring Committee Meeting Summary). The Herring PDT analysis in Amendment 5 also evaluates the overlap between the river herring and shad species (summarized in Section 3.2.5, p. 53) and supports the potential for the proposed RH/S catch cap areas to address and manage herring fishery interactions with the shad species as well.

- **In this framework adjustment, to simplify RH/S catch cap monitoring and accounting, the Council recommends establishing a threshold level of herring landings, above which RH/S catch from the trip would be counted against the corresponding RH/S catch cap.** The Council's intent with respect to the Amendment 5 management measures to address RH/S bycatch is to apply these measures to herring limited access vessels – Categories A, B, and C. The open access incidental catch allowance threshold of 3 mt **(6,600 pounds)** is recommended by the Council as an appropriate threshold to consider for determining which trips count against catch caps in the Atlantic herring fishery. Trips with herring landings greater than 3 mt would occur only by limited access herring vessels. This recommendation is consistent with the Mid-Atlantic Fishery Management Council's approach for the RH/S catch caps proposed in the Atlantic mackerel fishery (trips landing greater than 20,000 pounds of mackerel). Vessels must possess a limited access mackerel permit to catch/land more than 20,000 pounds of mackerel.

  With the implementation of Amendment 5 to the Herring FMP (March 17, 2014), a new herring permit category has been established for limited access mackerel vessels fishing in Areas 2/3 (Category E); Category E vessels will operate under a herring possession limit of 20,000 pounds in Areas 2/3, and the catch caps proposed in this framework adjustment would apply to any trips landing more than 6,600 pounds on these vessels as well.

  The Council considered a 20,000-pound threshold for Atlantic herring landings to identify trips subject to the RH/S catch cap but agreed that the proposed 6,600-pound threshold is more appropriate for the herring fishery and more consistent with the intent to apply the catch caps to limited access herring vessels (June 2013 Council Meeting; see also May 23, 2013 Herring PDT/MSB MC Report and June 2013 Herring Committee Meeting Summary).

- The Council recommended that provisions for RH/S catch cap overage paybacks or carryovers be considered in the future through a framework adjustment.

2.2 ALTERNATIVE 1: NO ACTION

Under this alternative, the Council would not establish a process to set catch caps for RH/S for the Atlantic herring fishery, and the Council would not specify RH/S catch caps for the 2014 and 2015 fishing years in this document. The catch of RH/S in the Atlantic herring fishery would continue to be managed under the provisions in the Atlantic Herring FMP (described at: http://www.nero.noaa.gov/regs/info.html).

2.3 ALTERNATIVE 2 (*PREFERRED ALTERNATIVE*): ESTABLISH RH/S CATCH CAPS (PROCESS AND RELATED PROVISIONS)

The ***Preferred Alternative*** proposes to establish a process for setting and modifying catch caps for river herring and shad (RH/S) in the Atlantic herring fishery. *Catch* includes both bycatch (discards) and landed incidental catch. The elements of Alternative 2, described below, establish the process for setting and modifying RH/S catch caps in the Atlantic herring fishery and include identification of species, areas, and trips that would be subject to the catch caps; changes to reporting requirements for limited access herring vessels (and new Category E herring vessels); and provisions that would trigger the closure of an area to directed herring fishing for a particular gear type.

When the Council selected Alternative 2 as the ***Preferred Alternative*** at its September 2013 meeting, it also selected RH/S catch cap amounts for the 2014 and 2015 fishing years; Sections 2.3.2 – 2.3.5 of this document (beginning on p. 18) describe the options that the Council considered for the 2014 and 2015 RH/S catch cap amounts and identifies the Council's *Preferred Options*. Future RH/S catch cap amounts (2016 and beyond) would be specified by the Council during the Atlantic herring fishery specifications process. In the event of any regulatory delay implementing the RH/S catch cap(s) at the start of the herring fishing year (January 1), the previous year's RH/S catch cap(s) and related provisions would apply until the new cap(s)/provisions are implemented; catch during that fishing year would apply to the new RH/S cap(s) once they become effective.

Rationale: The Council's ***Preferred Alternative*** creates an immediate incentive for the limited access herring fleet to avoid RH/S and allows for the possibility of the Atlantic herring ACL to be fully utilized in 2014 and 2015 if the fleet can continue to avoid RH/S. The ***Preferred Alternative*** would likely help reduce RH/S catch in the directed herring fishery over time when compared to taking no action. This alternative was selected because it is consistent with the goals and objectives of Amendment 5 to the Herring FMP, specifically: (1) to implement measures to improve the long-term monitoring of catch (landings and bycatch) in the herring fishery; (2) to implement other management measures as necessary to ensure compliance with the MSA; and (3) to implement management measures to address bycatch in the Atlantic herring fishery. It supports the action in Amendment 5 that adopts a long-term river herring bycatch

avoidance strategy and allows RH/S catch caps to be implemented through a framework adjustment.

While data are not robust enough at this time to determine a biologically-based RH/S catch cap and/or the potential effects of such a catch cap on the RH/S stocks, the Council believes that a RH/S catch cap will provide a strong incentive for the industry to avoid river herring and help to minimize its overall catch. The ***Preferred Alternative*** therefore forms the basis for a long-term approach to managing RH/S catch that relies on industry-based avoidance. The Council supports this approach as the most effective, least costly manner to allow the industry to manage its own bycatch.

During the development of this framework adjustment, the Council considered various elements of the RH/S catch cap program, including trips/vessels and areas to which the caps should apply. The Council's rationale for adopting the proposed elements of the catch cap process is discussed in Section 2.1 of this document (p. 7).

2.3.1 Alternative 2 Provisions

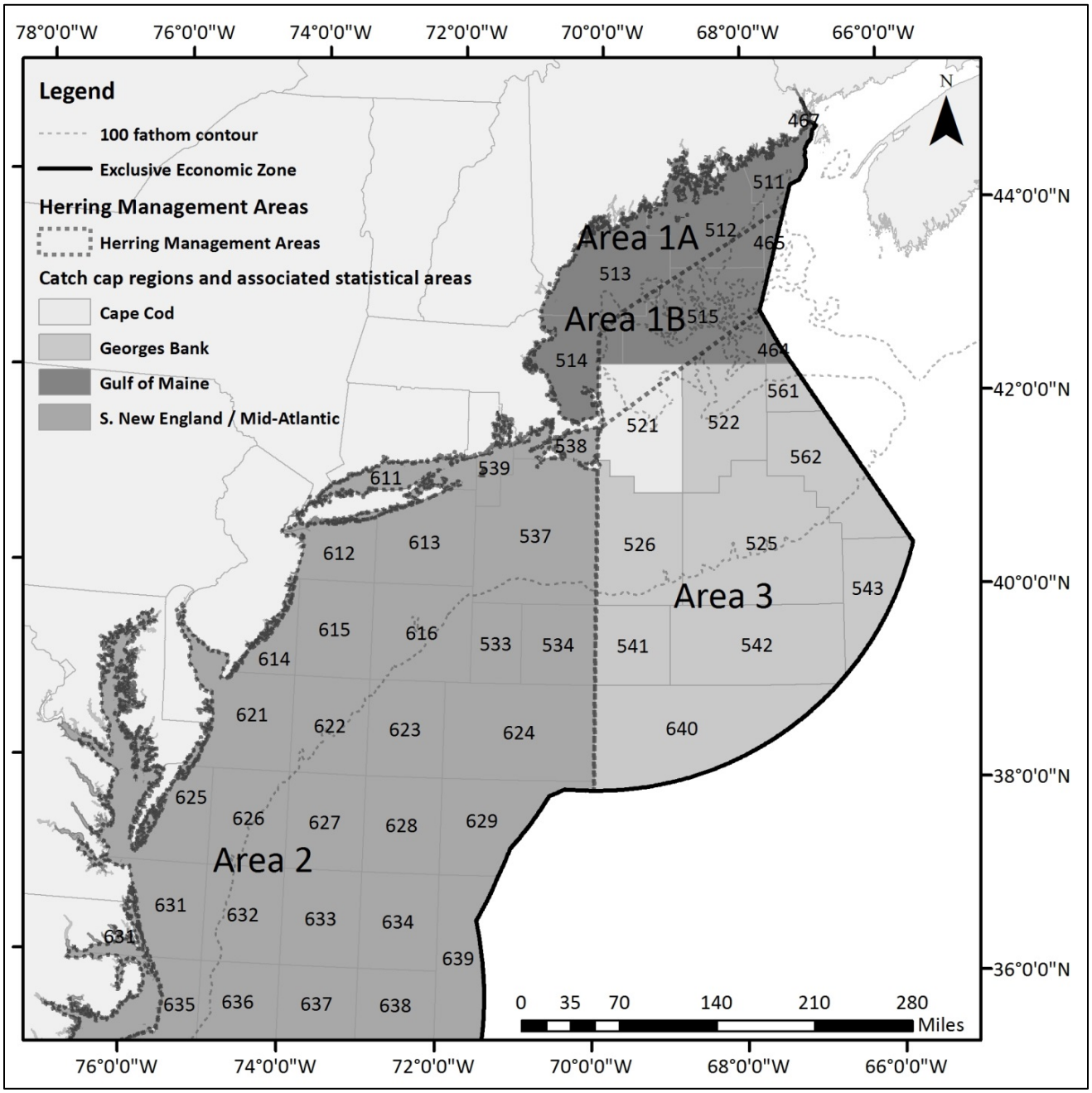
Species, Trips/Vessels, Areas

As previously noted (Section 2.1), the proposed RH/S catch caps would include both river herring and shad collectively (four species). The RH/S catch caps are also proposed to be area-specific and gear-specific. The RH/S catch caps would apply at the start of the Atlantic herring fishing year (January 1) by gear type, as determined by the Council during the specifications process, to the RH/S Catch Cap Areas shown in Figure 1.

During the fishing year, catch of RH/S from all trips landing more than 6,600 pounds of Atlantic herring would apply against the RH/S catch caps for the specified fishing gears in the Catch Cap Areas. When the catch trigger is reached for a gear type in a RH/S Catch Cap Area, vessels fishing with that gear type would be restricted to a 2,000 pound herring possession limit in the associated closure area (identified in Figure 2 on p. 16) for the remainder of the fishing year. Unless further modified by the Council, the RH/S Catch Cap Areas for the Atlantic herring fishery would be defined based on the following statistical area clusters:

1. **The Gulf of Maine (GOM) RH/S Cap Area** includes the portions of Statistical Areas 464, 465, 467, 511, 512, 513, 514, 515 in the U.S. EEZ.
2. **The Cape Cod (CC) RH/S Cap Area** includes Statistical Area 521.
3. **The Southern New England/Mid-Atlantic (SNE/MA) RH/S Cap Area** is consistent with Herring Management Area 2 and includes the portions of Statistical Areas in the U.S. EEZ that fall in Management Area 2.
4. **The Georges Bank (GB) RH/S Cap Area** includes portions of Statistical Areas 522, 525, 526, 541, 542, 543, 561, 562, and 640 in the U.S. EEZ.

Figure 1 Proposed RH/S Catch Cap Areas



Note: The closure areas associated with the above catch cap areas are shown in Figure 2 on p. 16.

Trip Notification Requirements and RH/S Catch Cap Monitoring

Under Alternative 2 (*Preferred Alternative*), trip notification requirements would be consistent with Amendment 5 for Atlantic herring vessels subject to the RH/S catch caps. Amendment 5 requires all limited access herring vessels (as well as Category D vessels fishing with midwater trawl gear in Areas 1A, 1B, and/or 3), mackerel vessels that obtain the new Area 2/3 permit for 20,000 pounds of herring (Category E), and all herring carrier vessels to notify the Northeast Fisheries Observer Program (NEFOP) through a pre-trip notification system prior to any trip where the operator may harvest, possess, or land Atlantic herring. These vessels also must declare that they are participating in the herring fishery through VMS by entering the code "HER" and a gear code prior to leaving port. Amendment 5 requires the vessels identified above to notify NMFS Law Enforcement via VMS of the time and place of offloading at least six hours prior to landing or, if fishing ends less than six hours before landing, immediately upon leaving the fishing grounds. The Council may consider adjustments to trip notification requirements in the future as necessary to ensure the effectiveness of the RH/S catch caps.

The RH/S catch cap estimation and monitoring methodology would be determined by NMFS NERO, generally consistent with the approaches utilized for the haddock catch cap in the herring fishery, in consultation with the Council. The details of the catch estimation and cap monitoring methods will be published by NMFS during the implementation of this framework adjustment. In general, trips with observers that retain more than 6,600 pounds of Atlantic herring would be used to determine the ratio of RH/S caught to all species retained on observed cap trips. For all trips that land more than 6,600 pounds of Atlantic herring, the current RH/S ratio would be applied to the combined total landings to generate a RH/S catch estimate for all herring cap trips during the fishing year.

Proposed Modifications to VMS Reporting by Herring Vessels

Under Alternative 2 (*Preferred Alternative*), VMS reporting requirements for herring vessels would be modified so that total catch by statistical area can be provided to facilitate monitoring of the catch caps. Atlantic herring vessels subject to VMS reporting requirements would be required to report total catch (kept and discarded) by statistical area so that the appropriate expansions can be made from the observed catch in those areas to monitor all catch caps that apply to herring fishing vessels.

Reporting Catch by Statistical Area – Example Catch Report

This report ***(example)*** is required by all limited access and Category E herring vessels on all declared herring trips. For each day of a declared trip, this report must be submitted by 9 AM the following day. Negative reports (0 lb) must be submitted when no fish were caught.

Note: VTR serial number must be the same number reported to the seafood dealer receiving the landings at the end of the trip. If you use multiple pages of the VTR on the trip, record the serial number from the first VTR page used.

Vessel Trip Report (VTR) Serial Number: _____
Date fish caught: Month (01-12) _____
Day (01-31) _____
Gear used to fish: (MWT, PS, BT) _____

SPECIES	AREA 1A	AREA 1B	AREA 2	AREA 3
Herring kept (lbs)	_____	_____	_____	_____
Herring discarded (lbs)	_____	_____	_____	_____

Report all fish kept (herring and non-herring species) and the Stat Area in which the fish were caught. If fish were caught in multiple Stat Areas in one day, report the fish kept (lbs) in each Stat Area.

All Fish Kept (lbs) _____ Stat/Chart Area ____

All Fish Kept (lbs) _____ Stat/Chart Area ____

All Fish Kept (lbs) _____ Stat/Chart Area ____

RH/S Catch Triggers and Closure Areas

The Council considered two options that would trigger the closure of the directed Atlantic herring fishery for a particular gear type in the associated closure areas identified below in Figure 2. **Option 2 represents the Council's *Preferred Option***.

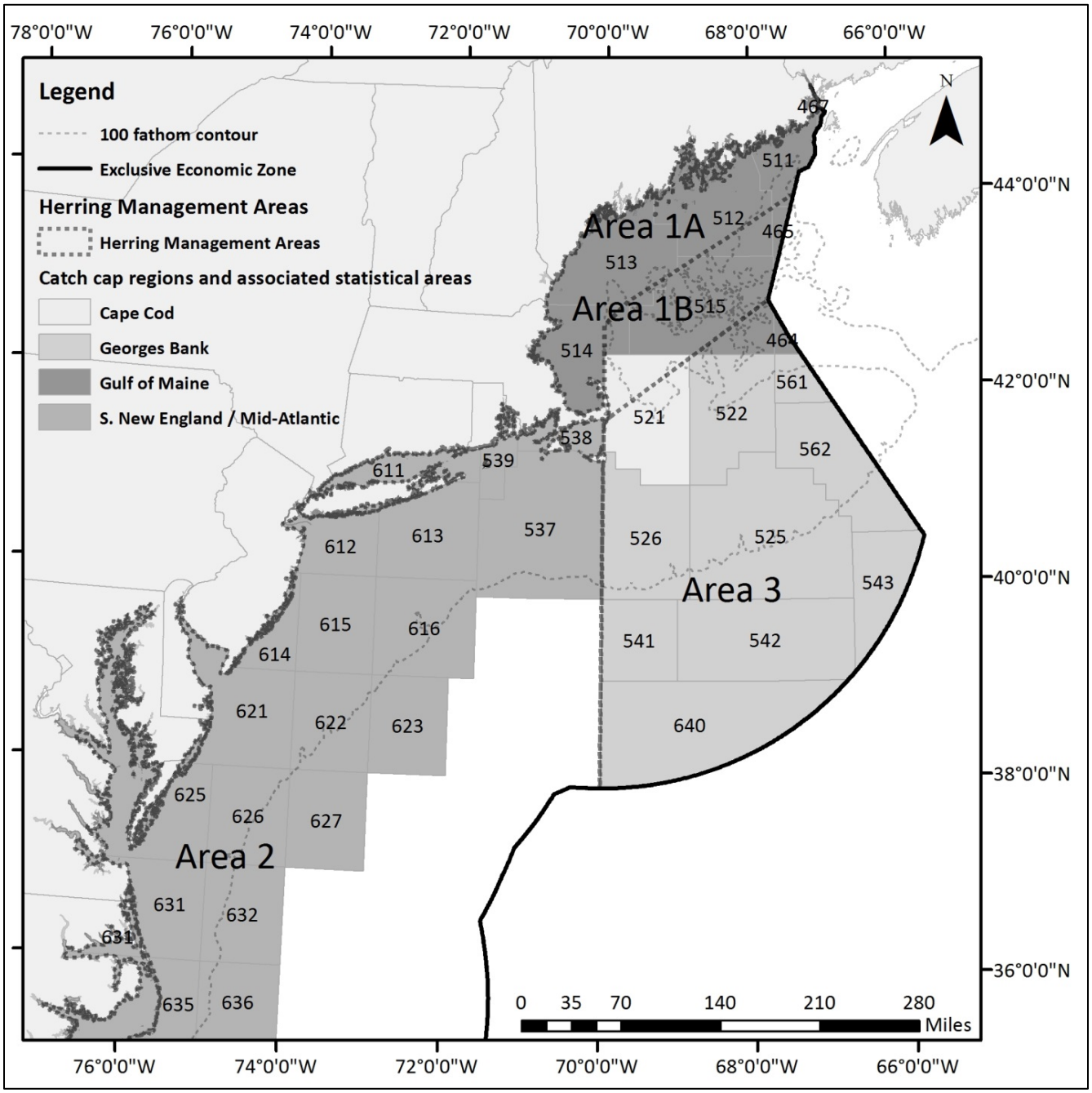
1. **Option 1 (100%):** When a RH/S catch cap for a gear type is reached in a RH/S Catch Cap Area (Figure 1), the directed herring fishery for that gear type would close in the associated closure area (see below in Figure 2), and all vessels fishing with that gear type in the closure area would be subject to a possession limit of 2,000 pounds of Atlantic herring for the remainder of the fishing year. Vessels using other gear types in the closure area would not be affected. Vessels participating in the herring fishery outside of the RH/S catch cap closure area would be able to use any gear type (consistent with other regulations) until the herring sub-ACL trigger is reached in a herring management area/areas.

   This option is consistent with the accountability measure for the haddock catch cap that applies to herring midwater trawl vessels.

2. **Option 2 (95% projection, *Preferred Option)*:** When 95% of the RH/S catch for a gear type under a catch cap is projected to be reached in a RH/S Catch Cap Area (Figure 1), the directed herring fishery for that gear type would close in the associated closure area (see below in Figure 2), and all vessels fishing with that gear type in the closure area would be subject to a possession limit of 2,000 pounds of Atlantic herring for the remainder of the fishing year. Vessels using other gear types in the closure area would not be affected. Vessels participating in the herring fishery outside of the RH/S catch cap closure area would be able to use any gear type (consistent with other regulations) until the herring sub-ACL trigger is reached in a herring management area/areas.

   The trigger in this option is consistent with the trigger proposed by the Mid-Atlantic Fishery management Council for the RH/S catch cap in the Atlantic mackerel fishery.

Figure 2 Proposed Closure Areas for Associated RH/S Catch Caps



Management Measures That Can be Modified in the Future through the Atlantic Herring Specifications Process and/or Framework Adjustment

Amendment 5 to the Atlantic Herring FMP established the authority and intent to develop the RH/S catch caps proposed in this framework adjustment. The intent of this framework adjustment is to establish a process and related provisions for specifying catch caps for RH/S in the Atlantic herring fishery. This document also includes amounts for gear-specific 2014 and 2015 RH/S catch caps. Future catch cap amounts (and other related provisions) can be specified through the Atlantic herring fishery specifications process or another action (framework adjustment, amendment). The Council will consider RH/S catch caps at least every three years as part of the Atlantic herring fishery specifications process; the next specifications process for the will occur during 2015 for the 2016-2018 fishing years.

Measures/provisions related to the RH/S catch cap process that are considered/analyzed in this framework document can be modified in the future through the Atlantic herring fishery specification process; new or additional provisions (for example, new accountability measures to become effective when a catch cap is reached) could be implemented through another framework adjustment or herring-related management action (amendment), but not through the specifications process.

The following provisions could be modified through the Atlantic herring specifications process, if appropriate, or through a framework or amendment. If the scope of these measures is beyond that which can be changed through the specifications, these measures would require a framework adjustment or amendment:

- Specification of catch caps for any of the four RH/S species individually or in any combination;
- Specification of a joint RH/S catch cap for the herring and mackerel fisheries in the southern New England/Mid-Atlantic area, in coordination with the Mid-Atlantic Fishery Management Council (see additional discussion below);
- Vessels/trips subject to RH/S catch caps;
- Distribution of RH/S catch caps by area and/or gear type, including modifications to the proposed cap areas;
- Trip notification and reporting requirements for herring vessels subject to RH/S catch caps;
- Management measures that become effective when the RH/S catch cap is reached; and
- Closure areas associated with RH/S catch caps.

As noted above, the Council may consider specifying a joint RH/S catch cap in cooperation with the Mid-Atlantic Fishery Management Council in the future, to address the overlapping herring and mackerel fisheries. Framework 3 proposes gear-specific RH/S catch cap amounts for 2014 and 2015 (see following sub-sections), with implementation expected sometime during the 2014 fishing year. The MSB specifications will include a river herring/shad (RH/S) catch cap for the 2014 mackerel fishery, and the Mid-Atlantic Council will consider a 2015 cap during the MSB specifications process in 2014. There will be an opportunity for the two Councils to better align

the catch caps in the overlapping southern New England/Mid-Atlantic area for the 2016 fishing year and beyond. The Herring PDT/MSB MC recommends that the two Councils consider developing a joint catch cap for the overlapping area (Southern New England/Area 2 herring fishery – see May 2013 Herring PDT/MSB MC Report). For these reasons, the Council is building flexibility into the RH/S catch cap process established in this framework adjustment to allow these kinds of modifications to the catch caps to occur more expeditiously in the future, including development of a joint herring/mackerel fishery RH/S catch cap for the southern New England/Mid-Atlantic area. The intent is to coordinate this effort through fishery specifications and not necessitate another framework adjustment to consider this management approach. This is consistent with the goals and objectives identified in Section 1.2 of this document.

2.3.2 Specification of 2014/2015 RH/S Catch Caps in the Gulf of Maine (GOM) RH/S Catch Cap Area

The Gulf of Maine (GOM) RH/S Catch Cap Area includes the portions of Statistical Areas 464, 465, 467, 511, 512, 513, 514, 515 in the U.S. EEZ (see Figure 1 on p. 12).

During Framework 3 discussions, the Council considered distributing the 2014-2015 RH/S catch caps in the GOM catch cap area in the following ways: (A) no RH/S catch cap; (B) one RH/S cap for all gears; or (C) a RH/S catch cap for purse seine, midwater trawl, and/or bottom trawl gear types. Once the Council identified the gear types to which 2014-2015 RH/S catch caps would apply in this area, it selected the *Preferred Option* for 2014 and 2015 catch caps based on the median value of estimated RH/S catch from 2008-2012 (June 2013 Herring Committee and Council Meetings).

The table below identifies the proposed 2014-2015 RH/S catch caps for the GOM Catch Cap Area (shaded rows) as well as the other options considered by the Council. The Herring PDT's methodology for developing the RH/S catch cap options, as well as supporting information and analysis, is provided in Appendix II of this document. Detailed background data from NERO (Appendix I) were supplemented by the Herring PDT with ME DMR and MA DMF portside sampling data to increase sample size, reduce variability/uncertainty, and generate the best estimates of RH/S catch possible on which to base the proposed catch caps.

Table 1 Options for 2014/2015 RH/S Catch Caps in the GOM RH/S Catch Cap Area (mt)

Gear	Metric/Option	2014/2015 RH/S Catch Cap Options (MT) Gulf of Maine Area
ALL GEARS COMBINED	LOW	6.8
ALL GEARS COMBINED	HIGH	182.7
ALL GEARS COMBINED	MEDIAN	87.7
ALL GEARS COMBINED	WEIGHTED MEAN	77.4
BOTTOM TRAWL	LOW	0.0
BOTTOM TRAWL	HIGH	0.1
BOTTOM TRAWL	MEDIAN	0.0
BOTTOM TRAWL	WEIGHTED MEAN	0.0
MIDWATER TRAWL	LOW	5.6
MIDWATER TRAWL	HIGH	180.2
MIDWATER TRAWL	MEDIAN	85.5
MIDWATER TRAWL	WEIGHTED MEAN	96.3
PURSE SEINE	LOW	0.5
PURSE SEINE	HIGH	2.5
PURSE SEINE	MEDIAN	1.9
PURSE SEINE	WEIGHTED MEAN	1.7

Note: The shaded row(s) represent the Council's preferred option(s) for specifying 2014 and 2015 RH/S catch caps.

The Council's rationale for the *Preferred Option* is discussed in Section 2.3.5 of this document.

2.3.3 Specification of 2014/2015 RH/S Catch Caps in the Cape Cod (CC) RH/S Catch Cap Area

The Cape Cod (CC) RH/S Cap Area includes Statistical Area 521 (see Figure 1 on p. 12).

During Framework 3 discussions, the Council considered distributing the 2014-2015 RH/S catch caps in the CC Catch Cap Area in the following ways: (A) no RH/S catch cap; (B) one RH/S cap for all gears; or (C) a RH/S catch cap for midwater trawl gear only. Once the Council identified the gear types to which 2014-2015 RH/S catch caps would apply in this area, it selected the *Preferred Option* for 2014 and 2015 catch caps based on the median value of estimated RH/S catch from 2008-2012 (June 2013 Herring Committee and Council Meetings).

The table below identifies the proposed 2014-2015 RH/S catch caps for the CC Catch Cap Area (shaded rows) as well as the other options considered by the Council. The Herring PDT's methodology for developing the RH/S catch cap options, as well as supporting information and analysis, is provided in Appendix II of this document. Detailed background data from NERO (Appendix I) were supplemented by the Herring PDT with ME DMR and MA DMF portside sampling data to increase sample size, reduce variability/uncertainty, and generate the best estimates of RH/S catch possible on which to base the proposed catch caps.

Table 2 Options for 2014/2015 RH/S Catch Caps in the Cape Cod RH/S Catch Cap Area (mt)

Gear	Metric/Option	2014/2015 RH/S Catch Cap Options (MT) Cape Cod Area
ALL GEARS COMBINED	LOW	0.0
ALL GEARS COMBINED	HIGH	59.9
ALL GEARS COMBINED	MEDIAN	13.3
ALL GEARS COMBINED	WEIGHTED MEAN	32.5
MIDWATER TRAWL	LOW	0.0
MIDWATER TRAWL	HIGH	59.9
MIDWATER TRAWL	MEDIAN	13.3
MIDWATER TRAWL	WEIGHTED MEAN	32.5

Note: The shaded row(s) represent the Council's preferred option(s) for specifying 2014 and 2015 RH/S catch caps.

The Council's rationale for the *Preferred Option* is discussed in Section 2.3.5 of this document.

2.3.4 Specification of 2014/2015 RH/S Catch Caps in the Southern New England/Mid-Atlantic (Southern New England/MA) RH/S Catch Cap Area

The Southern New England/Mid-Atlantic (SNE/MA) RH/S Catch Cap Area is consistent with Management Area 2 and includes portions of Statistical Areas 533, 534, 537, 538, 539, 611, 612, 613, 614, 615, 616, 621, 622, 623, 624, 625, 626, 627, 628, 629, 631, 632, 633, 634, 635, 636, 637, 638, and 639, and other statistical areas in the U.S. EEZ that fall in Herring Management Area 2 (see Figure 1 on p. 12).

During Framework 3 discussions, the Council considered distributing the 2014-2015 RH/S catch caps in the SNE/MA Catch Cap Area in the following ways: (A) no RH/S catch cap; (B) one RH/S cap for all gears; or (C) a RH/S catch cap for midwater trawl, and/or bottom trawl gear types. Once the Council identified the gear types to which 2014-2015 RH/S catch caps would apply in this area, it selected the *Preferred Option* for 2014 and 2015 catch caps based on the median value of estimated RH/S catch from 2008-2012 (June 2013 Herring Committee and Council Meetings).

The table below identifies the proposed 2014-2015 RH/S catch caps for the SNE/MA Catch Cap Area (shaded rows) as well as the other options considered by the Council. The Herring PDT's methodology for developing the RH/S catch cap options, as well as supporting information and analysis, is provided in Appendix II of this document. Detailed background data from NERO (Appendix I) were supplemented by the Herring PDT with ME DMR and MA DMF portside sampling data to increase sample size, reduce variability/uncertainty, and generate the best estimates of RH/S catch possible on which to base the proposed catch caps.

Table 3 Options for 2014/2015 RH/S Catch Caps in the Southern New England/Mid-Atlantic RH/S Catch Cap Area (mt)

Gear	Metric/Option	2014/2015 RH/S Catch Cap Options (MT) SNE/MA Area
ALL GEARS COMBINED	LOW	160.1
ALL GEARS COMBINED	HIGH	811.3
ALL GEARS COMBINED	MEDIAN	228.1
ALL GEARS COMBINED	WEIGHTED MEAN	295.2
BOTTOM TRAWL	LOW	0.0
BOTTOM TRAWL	HIGH	104.4
BOTTOM TRAWL	MEDIAN	88.9
BOTTOM TRAWL	WEIGHTED MEAN	61.5
MIDWATER TRAWL	LOW	71.2
MIDWATER TRAWL	HIGH	811.3
MIDWATER TRAWL	MEDIAN	123.7
MIDWATER TRAWL	WEIGHTED MEAN	235.3

Note: The shaded row(s) represent the Council's preferred option(s) for specifying 2014 and 2015 RH/S catch caps.

The Council's rationale for the *Preferred Option* is discussed below in Section 2.3.5 of this document.

2.3.5 Specification of 2014/2015 RH/S Catch Caps in the Georges Band (GB) RH/S Catch Cap Area

The Georges Bank (GB) RH/S Cap Area includes portions of Statistical Areas 522, 525, 526, 541, 542, 543, 561, 562, and 640 in the U.S. EEZ (see Figure 1 on p. 12).

During Framework 3 discussions, the Council considered distributing 2014-2015 RH/S catch caps in the GB RH/S Catch Cap Area in the following ways: (A) no RH/S catch cap; (B) one RH/S cap for all gears; or (C) a RH/S catch cap for midwater trawl gear only. Within these gear distributions, the Council considered options for 2014 and 2015 catch caps based on the low, high, median, and weighted mean values of estimated RH/S catch from 2008-2012. The table below identifies the 2014-2015 RH/S catch cap options considered by the Council for the GB Catch Cap Area. Because of low observed RH/S catch, the Council recommends that RH/S catch caps not be established in the GB Catch Cap Area during the 2014 and 2015 fishing years. This is consistent with Herring PDT recommendations as well as guidance received from NMFS NERO regarding the specification of 2014/2015 RH/S catch caps and the importance of limiting the number of catch caps established at this time based on the resources currently available to monitor them effectively. If the catch of river herring/shad is documented to increase in the GB Catch Cap Area, a catch cap would automatically be considered during the following herring fishery specifications process.

The Herring PDT's methodology for developing the RH/S catch cap options, as well as supporting information and analysis, is provided in Appendix II of this document. Detailed background data from NERO (Appendix I) were supplemented by the Herring PDT with ME DMR and MA DMF portside sampling data to increase sample size, reduce variability/uncertainty, and generate the best estimates of RH/S catch possible on which to base the proposed RH/S catch caps.

Table 4 Options for 2014/2015 RH/S Catch Caps in the Georges Bank RH/S Catch Cap Area (mt)

Gear	Metric/Option	2014/2015 RH/S Catch Cap Options (MT) Georges Bank Area
ALL GEARS COMBINED	LOW	0.0
ALL GEARS COMBINED	HIGH	2.2
ALL GEARS COMBINED	MEDIAN	0.6
ALL GEARS COMBINED	WEIGHTED MEAN	1.1
MIDWATER TRAWL	LOW	0.0
MIDWATER TRAWL	HIGH	2.2
MIDWATER TRAWL	MEDIAN	0.6
MIDWATER TRAWL	WEIGHTED MEAN	1.1

Note: The Council recommends that no RH/S catch caps be specified for 2014 and 2015 in the GB RH/S Catch Cap Area.

Rationale: The Council selected the median option as the *Preferred Option* for specifying 2014-2015 RH/S catch caps in the GOM, CC, and SNE/MA Catch Cap Areas because this option creates a strong incentive for the herring midwater trawl fleet (and bottom trawl fleet in southern New England) to minimize RH/S catch, while still providing the opportunity to fully utilize the herring ACL if the fleet can continue to avoid RH/S. It also incentives participation in the SMAST/SFC/MADMF river herring bycatch avoidance program discussed in Section 3.6.4 of this document. This option is consistent with the goals and objectives of Framework 3 (Section 1.2). It is also consistent with the Mid-Atlantic Fishery Management Council's specification of the RH/S catch cap in the Atlantic mackerel fishery (236 mt, median value 2005-2012).

Because of low observed RH/S catch in the Georges Bank Cap Area, the Council recommends that RH/S catch caps not be established in this area during the 2014 and 2015 fishing years. This is consistent with fishery data provided in Appendix I and II, as well as the Herring PDT recommendations. Not establishing a RH/S catch cap in the Georges Bank Cap Area in 2014 and 2015 may also mitigate any impacts on midwater trawl vessels from a closure in other areas, if fish availability and other factors allow for a redirection of some effort into this area.

The selection of gears to which the RH/S catch caps would apply during 2014/2015 – midwater trawl gear in the GOM and CC RH/S Catch Cap Areas, and both midwater trawl and bottom trawl gear in the SNE/MA Catch Cap Area – is based on recent fishery data that indicate where RH/S interactions are occurring, and to what extent they may be occurring by each gear type utilized in the herring fishery. The approach that the Council chose for the proposed 2014-2015 RH/S catch cap specifications is consistent with Herring PDT recommendations as well as guidance received from NMFS NERO regarding the specification of 2014/2015 RH/S catch caps and the importance of limiting the number of catch caps established at this time based on the resources currently available to monitor them effectively.

2.4 ALTERNATIVES CONSIDERED BUT REJECTED

This framework adjustment addresses a single issue; the action alternative (preferred) is to establish a RH/S catch cap process for the Atlantic herring fishery. Within the action alternative (Section 2.3), specifications for the 2014 and 2015 RH/S catch caps are also proposed (Section 2.3.2 – 2.3.5). The elements of the ***Preferred Alternative*** – species, vessels/trips, areas, notification and reporting requirements, monitoring – were developed by the Council, in consultation with the Herring Committee, Herring Advisory Panel, and Herring PDT during several public meetings in 2013.

At the initial Framework 3 Council meeting (June 2013), the Council considered available fishery information, technical recommendations, and public comment, and provided the specific guidance to staff and the Herring PDT for further developing alternatives/options in Framework 3. Specifically, during the development of the ***Preferred Alternative***, the Council considered: separate catch caps for the individual RH/S species; approaches to coordinating management with the Mid-Atlantic Council to address the overlap of the herring and mackerel fisheries in the southern New England area; different spatial distributions of catch caps (fishery-wide, by management area); different thresholds to identify trips to which the catch caps would apply; and provisions for addressing catch cap overages and underages. The Council determined that none of these alternatives would be feasible and therefore would not be consistent with the purpose and need identified in Section 1.1 of this document. Section 2.1, p. 7 of this document provides a detailed discussion of these alternatives considered by the Council during the development of the action proposed in this framework adjustment. The Council reviewed all available information and analyses and selected the final management measures for this framework adjustment at its September 2013 meeting.

Also, as noted throughout this document, RH/S catch caps were considered first by the Council in Amendment 5, so various elements of the Framework 3 catch cap process/provisions have been discussed for several years. The Herring PDT provided a white paper in 2010 (see Amendment 5 appendices) that analyzes area-based, gear-based, and seasonal approaches to specifying river herring catch caps in the directed Atlantic herring fishery, as well as two possible methods for calculating river herring catch caps. The Herring PDT's white paper formed the basis of the ***Preferred Alternative***. The Council determined that the other management approaches presented in the white paper, as well as those identified above, would not meet the purpose and need for this action; therefore, these approaches were not further considered at this time.

3.0 AFFECTED ENVIRONMENT

The Affected Environment is described in this document based on valued ecosystem components (VECs). VECs represent the resources, areas, and human communities that may be affected by the management measures under consideration in this amendment. VECs are the focus since they are the "place" where the impacts of management actions are exhibited. The six VECs explicitly considered in Framework 3 include: Atlantic Herring; River Herring and Shad (RH/S); Other Non-Target Species; Physical Environment and Essential Fish Habitat (EFH); Protected Resources; and Fishery-Related Businesses and Communities. Background information regarding each VEC is provided in the following subsections.

3.1 ATLANTIC HERRING RESOURCE

3.1.1 Background

A complete description of the Atlantic herring resource can be found in Section 5.1 of the FEIS for Amendment 5 to the Atlantic Herring FMP. Updated information to supplement that presented in Amendment 5 can be found in Framework 2 to the Herring FMP (which includes the 2013-2015 herring fishery specifications). The following subsections update biological information through 2012 where possible and summarize the stock status for Atlantic herring. Based on the best available scientific information and according to the most recent stock assessment (SAW 54, June 2012), the Atlantic herring resource is not overfished at this time and overfishing is not occurring (the stock is considered rebuilt).

The Atlantic herring (*Clupea harengus*), is widely distributed in continental shelf waters of the Northeast Atlantic, from Labrador to Cape Hatteras. Herring can be found in every major estuary from the northern Gulf of Maine to the Chesapeake Bay. They are most abundant north of Cape Cod and become increasingly scarce south of New Jersey (Kelly and Moring 1986) with the largest and oldest fish found in the southern most portion of the range (Munro 2002). Spawning occurs in the summer and fall, starting earlier along the eastern Maine coast and southwest Nova Scotia (August – September) than in the southwestern GOM (early to mid-October in the Jeffreys Ledge area) and GB (as late as November – December; Reid et al. 1999). In general, GOM herring migrate from summer feeding grounds along the Maine coast and on GB to SNE/MA areas during winter, with larger individuals tending to migrate farther distances. Presently, herring from the GOM (inshore) and GB (offshore) stock components are combined for assessment purposes into a single coastal stock complex.

3.1.2 Stock Assessment/Resource Condition (SAW 54, June 2012)

The Stock Assessment Review Committee (SARC) of the 54th Northeast Regional Stock Assessment Workshop (SAW 54) met in June 2012 to review the Northeast regional benchmark stock assessment of Atlantic herring in Woods Hole, MA. A statistical catch-at-age model (Age Structured Assessment Program, ASAP; Legault and Restrepo 1999) was proposed as the best scientific information for determining Atlantic herring stock status. The SARC 54 Panel recognized natural mortality (M), the 2008 year class, and Biological Reference Points (BRPs) as scientific uncertainties. The spawning stock biomass (SSB) was estimated at 517,930 mt in 2011, and fishing mortality rate at age 5 (F) was estimated to be 0.14. More detailed information about the stock assessment can be found in the 2013-2015 Atlantic herring fishery specifications package. Summary information is provided below.

Biological Reference Points (BRPs)

The BRPs from SAW/SARC 54 seen in Table 5 differ due to (1) differences in natural mortality assumptions between assessments (i.e., SAW/SARC 54 used age-and time-varying M with a 50% increase beginning in 1996 and TRAC 2009 used 0.2 for all ages and years), and (2) the methods used to estimate the BRPs (Fox model was used in TRAC 2009 and the Beverton-Holt (BH) stock-recruitment curve estimated within ASAP for SAW/SARC 54).

Table 5 Atlantic Herring Biological Reference Points

Reference Points	TRAC 2009	SAW/SARC 54 (June 2012)
F_{MSY}	0.27	0.27
B_{MSY}	670,000 mt (1/2 SSB_{MSY} = 335,300)	157,000 mt (1/2 SSB_{MSY} = 78,500)
MSY	178,000 mt	53,000 mt

Spawning Stock Biomass (SSB)

The herring total and spawning stock biomass increased after 2009, mostly due to the large 2008 year class. The estimated 2011 January 1 total biomass of Atlantic herring was 1,322,446 mt. Based on the ASAP model, SSB was 517,930 mt in 2011. SSB declined during 1997-2010, and ranged from 180,527 mt in 1982 to a max of 1,936,769 mt in 2009. Total biomass and SSB showed similar trends over time, but 1-2 year lags caused by total biomass being reflected immature recruits rather than SSB.

Fishing Mortality (F)

Fishing mortality (F) rates in 2010 and 2011 were relatively low due to the presence of the strong 2008 year class, which increased the stock biomass. Fishing mortality in 2011 equaled 0.14, but is not representative of fishing mortality rates in recent years which averaged 0.23 during 2000-2009.

Natural Mortality (M)

Natural mortality assumptions in SAW 54 were based on a combination of the Hoenig and Lorenzen methods, with the Hoenig method providing the scale of natural mortality and the Lorenzen method defining how natural mortality declined with age (Hoenig 1983; Lorenzen 1996). Natural mortality rates during 1996-2011 were increased by 50% to resolve a retrospective pattern and to ensure that the implied levels of consumption were consistent with observed increases in estimated consumption of herring. Consumption estimates were based on food habits data primarily for groundfish, but also informed by consumption estimates from marine mammals, highly migratory species, and seabirds. The 50% increase in natural mortality implies a decrease in sustainable yield (i.e. lower MSY absent the increase), such that monitoring for changes in predator consumption rates remains of particular importance.

Stock Status – Overfishing Definition

The current overfishing definition (Atlantic Herring FMP, 1999) for Atlantic herring is provided below.

> *If stock biomass is equal or greater than B_{MSY} , overfishing occurs when fishing mortality exceeds F_{MSY}. If stock biomass is below B_{MSY} , overfishing occurs when fishing mortality exceeds the level that has a 50 percent probability to rebuild stock biomass to B_{MSY} in 5 years ($F_{Threshold}$). The stock is in an overfished condition when stock biomass is below ½ B_{MSY} and overfishing occurs when fishing mortality exceeds $F_{Threshold}$. These reference points are thresholds and form the basis for the control rule.*
>
> *The control rule also specifies risk-averse fishing mortality targets, accounting for the uncertainty in the estimate of F_{MSY}. If stock biomass is equal to or greater than $1/2B_{MSY}$, the target fishing mortality will be the lower level of the 80 percent confidence interval about F_{MSY}. When biomass is below B_{MSY} , the target fishing mortality will be reduced consistent with the five-year rebuilding schedule used to determine $F_{Threshold}$.*

The 2012 SAW 54 benchmark assessment results estimated that Atlantic herring SSB in 2011 was 517,930 mt, which is well above B_{MSY} (157,000 mt). Estimated fishing mortality in 2011 was 0.14, which is below F_{MSY} (0.27). Therefore, the stock is not overfished and overfishing is not occurring. In fact, the Atlantic herring resource is considered to be rebuilt.

3.2 RIVER HERRING AND SHAD (RH/S)

River herring and shad are the primary non-target species of concern in this framework adjustment and are therefore considered separately from other non-target species. For the purposes of this document, the term "river herring" refers to the species of alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), and the term "shad" refers to the species of American shad (*Alosa sapidissima*) and hickory shad (*Alosa mediocris*). Collectively, these four species are referred to throughout this document as "RH/S."

3.2.1 Life History and Migration

Shad and river herring are anadromous fish that spend the majority of their adult lives at sea, only returning to freshwater in the spring to spawn. Historically, shad and river herring spawned in virtually every river and tributary along the coast. The oceanic ranges of all four species extend beyond the northern and southern latitudinal range of the NEFSC spring and fall surveys, which occur from the Gulf of Maine to Cape Hatteras, NC (35° 30' to 44° 30' N). The geographic range of blueback herring in the northwest Atlantic extends from Cape Breton, Nova Scotia, to the St. Johns River in FL and the range of American shad extends from the Sand Hill River in Labrador to the St. John's River in FL (Page and Burr 1991). The geographic range of alewife extends from Red Bay, Labrador, to SC. Hickory shad have a narrower geographic range than these three species and is most abundant between Cape Cod, MA and the St. John's River in FL, but is also infrequently found in the Gulf of Maine (Munroe 2002).

Shad

American shad stocks are river-specific; that is, each major tributary along the Atlantic coast appears to have a discrete spawning stock. The percentage of shad that survive to spawn more than once decreases from north to south. Shad that spawn in more northerly rivers may survive to spawn again (referred to as iteroparity), while shad native to the rivers south of Cape Fear, North Carolina die after spawning (referred to semelparity). Mature females (ages five and older) produce a large quantity of eggs that are released into the water column and are fertilized by mature males (ages four and older). American shad adults that are iteroparous return to the sea soon after spawning and migrate northward to summer feeding grounds in the Gulf of Maine, while the fertilized eggs are carried by river currents, develop into larvae which begin to feed four to seven days after hatching. Larvae drift downstream into tidal freshwater reaches of the spawning rivers, and gradually mature into juveniles. In early to late summer, juvenile shad migrate out of their nursery areas to the sea. Immature American shad will remain in the ocean for three to five years.

Table 6 shows the typical migration patterns, as determined by their locations during different months, for the various age classes of fish described above, by the state in which the migration is occurring. The columns are marked by "SA" (Some Activity), which denotes that some shad have been seen in the area during that time period, and "PA" (Peak Activity), denoting that the number of shad in the area are at a peak. The table indicates that the further north the rivers are, the later the fish will begin and conclude their migration during the year.

Table 6 Typical Migration Patterns and Locations for American Shad

		January		February		March		April		May		June		July		August		September		October		November		December	
		1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30
Maine	adult immigration						SA	SA	SA	PA	PA	PA	PA	PA	PA	SA									
	adult emmigration												SA	SA	PA	PA	SA								
	spawning										SA	SA	PA	PA	PA	SA									
	incubation										SA	SA	PA	PA	PA	SA									
	juvenile freshwater residence											SA	PA	PA	PA	PA	PA	PA	PA	PA	SA	SA			
	juvenile emigration													SA	SA	SA	PA	PA	PA	PA	SA	SA			
New Hampshire	adult immigration									SA	PA	PA	SA												
	adult emmigration																								
	spawning																								
	incubation																								
	juvenile freshwater residence											PA	PA	PA	PA	SA	SA	SA	SA	SA	SA				
	juvenile emigration															SA	SA	SA	SA	SA	SA				
Massachusetts	adult immigration								SA	SA	PA	PA	PA	SA	SA										
	adult emmigration									SA	PA	PA	PA	SA	SA										
	spawning									SA	PA	PA	PA	SA	SA										
	incubation									SA	SA	PA	PA	PA	SA										
	juvenile freshwater residence										SA	PA	PA	PA	PA	PA	PA	SA	SA	SA					
	juvenile emigration													SA	SA	SA	PA	PA	SA	SA	SA				
Rhode Island	adult immigration							SA	SA	PA	PA	PA	SA												
	adult emmigration									SA	SA	PA	PA	SA	SA										
	spawning									SA	SA	PA	PA	PA	SA										
	incubation									SA	SA	PA	PA	PA	SA										
	juvenile freshwater residence										SA	SA	SA	PA	PA	PA	PA	PA	PA	SA	SA	SA	SA		
	juvenile emigration													SA	SA	SA	SA	SA	PA	PA	PA	SA	SA		
Connecticut	adult immigration							SA	SA	PA	PA	SA	SA												
	adult emmigration										SA	SA	PA	PA	SA										
	spawning									SA	PA	PA	SA												
	incubation									SA	PA	PA	SA	SA											
	juvenile freshwater residence											SA	SA	PA	PA	PA	PA	PA	PA	SA	SA	SA			
	juvenile emigration													SA	SA	SA	SA	PA	PA	PA	SA	SA			
New York	adult immigration							SA	PA	PA	SA	SA													
	adult emmigration								SA	PA	PA	SA													
	spawning								SA	PA	PA	SA													
	incubation								SA	PA	PA	SA													
	juvenile freshwater residence										PA	PA	PA	PA	PA	PA	SA	SA	SA	SA					
	juvenile emigration													SA	SA	SA	SA	SA	SA	SA	SA				
New Jersey	adult immigration			SA	SA	SA	SA	PA	PA	PA	PA	SA													
	adult emmigration							SA	SA	SA	SA	SA													
	spawning						SA	SA	PA	PA	PA	SA													
	incubation						SA	SA	PA	PA	PA	SA													
	juvenile freshwater residence											SA	SA	PA	PA	PA	PA	SA	SA	SA	SA	SA			
	juvenile emigration													SA	SA	SA	SA	SA	SA	SA	SA	SA			

Source: ASMFC

River Herring

Alewife and blueback herring are known as "river herring" and managed collectively by ASMFC. Alewives spawn in rivers, lakes, and tributaries from northeastern Newfoundland to South Carolina, but are most abundant in the Mid-Atlantic and the Northeast states. Blueback herring prefer to spawn in swift flowing rivers and tributaries from Nova Scotia to northern Florida, but are most numerous in waters from the Chesapeake Bay south. Mature alewife (ages three to eight) and blueback herring (ages three to six) migrate rapidly downstream after spawning. Larvae begin to feed three to five days after hatching, and transform gradually into the juvenile stage. Juveniles remain in tidal freshwater nursery areas in spring and early summer, but may also move upstream with the encroachment of saline water. As water temperatures decline in the fall, juveniles move downstream to more saline waters. Little information is available on the life history of juvenile and adult alewife and blueback herring after they emigrate to the sea as young-of-the-year or yearlings, and before they mature and return to freshwater to spawn.

Table 7 and Table 8 show the typical migration patterns, as determined by their locations during different months, for the various age classes of fish described above, by the state in which the migration is occurring. The columns are marked by "SA" (Some Activity), which denotes that some blueback or alewife have been seen in the area during that time period, and "PA" (Peak Activity), denoting that the number of blueback or alewife in the area are at a peak.

Table 7 Typical Migration Patterns and Locations for Alewife

		January		February		March		April		May		June		July		August		September		October		November		December	
		1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30
Maine	adult immigration							SA	SA	SA	SA	PA	PA	PA	SA										
	adult emmigration											SA	SA	PA	PA	PA	SA								
	spawning									SA	PA	PA	PA	SA											
	incubation										SA	PA	PA	SA											
	juvenile freshwater residence										SA	PA	PA	PA	PA	PA	PA	PA	PA	PA	PA	SA			
	juvenile emigration													SA	SA	PA	PA	PA	PA	PA	PA	SA	SA		
New Hampshire	adult immigration								SA	PA	PA	SA													
	adult emmigration									SA	PA	PA	SA	SA											
	spawning									PA	PA	SA													
	incubation									SA	PA	PA	SA												
	juvenile freshwater residence										SA	PA	PA	PA	PA	PA	SA	SA	SA	SA	SA				
	juvenile emigration													SA	SA	SA	SA	SA	SA	SA	SA				
Massachusetts	adult immigration								SA	SA	PA	PA	SA	SA											
	adult emigration										SA	PA	PA	SA	SA										
	spawning									SA	PA	PA	SA	SA											
	incubation									SA	SA	PA	PA	PA	SA										
	juvenile freshwater residence									SA	PA	PA	PA	PA	PA	PA	SA	SA	SA	SA	SA	SA			
	juvenile emigration													SA	SA	SA	PA	PA	PA	SA	SA	SA	SA		
Rhode Island	adult immigration							SA	PA	PA															
	adult emmigration																								
	spawning																								
	incubation																								
	juvenile freshwater residence																								
	juvenile emigration																								
Connecticut	adult immigration							SA	SA	PA	PA	SA	SA												
	adult emmigration										SA	SA	PA	PA	SA										
	spawning									SA	PA	PA	SA												
	incubation									SA	PA	PA	SA	SA											
	juvenile freshwater residence											SA	SA	PA	PA	PA	PA	PA	PA	SA	SA	SA			
	juvenile emigration													SA	SA	PA	PA	PA	PA	PA	SA	SA			
New York	adult immigration							SA	PA	PA	SA	SA													
	adult emmigration								SA	PA	SA	SA	SA												
	spawning							SA	PA	PA	PA	SA	SA												
	incubation							SA	PA	PA	PA	SA	SA												
	juvenile freshwater residence							SA	SA	PA	PA	PA	PA	PA	PA	PA	SA	SA	SA						
	juvenile emigration													SA	SA	SA	SA	SA	SA	SA	SA				
New Jersey	adult immigration			SA	SA	SA	SA	PA	PA	PA	PA	SA													
	adult emmigration							SA	SA	SA	SA	SA													
	spawning							SA	PA	PA	PA	SA													
	incubation							SA	PA	PA	PA	SA													
	juvenile freshwater residence											SA	SA	PA	PA	PA	PA	SA	SA	SA	SA				
	juvenile emigration													SA	SA	SA	SA	SA	SA	SA	SA				

Source: ASMFC

Table 8 Typical Migration Patterns and Locations for Blueback Herring

		January		February		March		April		May		June		July		August		September		October		November		December	
		1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-30
Maine	adult immigration					SA	SA	SA	PA	PA	PA	PA	SA												
	adult emmigration										SA	SA	PA	PA	SA	SA	SA	SA	SA	SA	SA	SA			
	spawning								SA	SA	PA	PA	PA	SA											
	incubation								SA	SA	PA	PA	PA	SA											
	juvenile freshwater residence								SA	SA	PA	PA	PA	PA	PA	PA	PA	PA	PA	PA	PA	SA	SA		
	juvenile emigration													SA	SA	PA	PA	PA	PA	PA	PA	SA	SA	SA	
New Hampshire	adult immigration									SA	PA	PA	SA	SA											
	adult emmigration										SA	PA	PA	SA											
	spawning									SA	PA	PA	PA	SA											
	incubation										SA	PA	PA	SA											
	juvenile freshwater residence										SA	PA	PA	PA	PA	PA	SA	SA	SA	SA	SA				
	juvenile emigration															SA	SA	SA	SA	SA	SA				
Massachusetts	adult immigration					SA	SA	PA	PA	PA	SA														
	adult emigration								SA	SA	PA	PA	SA	SA											
	spawning						SA	SA	PA	PA	SA	SA													
	incubation							SA	PA	PA	PA	SA													
	juvenile freshwater residence							SA	SA	PA	PA	PA	PA	PA	PA	PA	SA	SA	SA	SA	SA	SA	SA		
	juvenile emigration												SA	PA	PA	SA	SA	PA	PA	PA	PA	SA	SA	SA	
Rhode Island	adult immigration					SA	SA	PA	PA	PA	SA														
	adult emmigration							SA	PA	PA	SA	SA	SA												
	spawning						SA	PA	PA	PA	SA														
	incubation						SA	PA	PA	PA	PA	SA													
	juvenile freshwater residence								SA	PA	PA	PA	PA	PA	PA	PA	PA	PA	PA	SA	SA	SA	SA		
	juvenile emigration											SA	SA	SA	SA	SA	SA	SA	PA	PA	PA	SA	SA		
Connecticut	adult immigration				SA	SA	PA	PA	PA	SA															
	adult emmigration				SA	SA	SA	PA	PA	SA															
	spawning				SA	SA	SA	SA	SA	SA															
	incubation					SA	PA																		
	juvenile freshwater residence							SA	SA	PA	PA	SA	SA	SA	SA	SA	SA	SA	SA	SA					
	juvenile emigration									SA	PA	PA	SA	SA	SA	SA	SA	SA	SA	SA					
New York	adult immigration						SA	PA	PA	PA	SA														
	adult emmigration							SA	SA	PA	SA	SA													
	spawning							SA	PA	PA	PA	SA													
	incubation							SA	PA	PA	PA	SA													
	juvenile freshwater residence							SA	SA	PA	PA	PA	PA	PA	PA	PA	SA	SA	SA						
	juvenile emigration													SA	SA	SA	SA	SA	SA	SA	SA				
New Jersey	adult immigration			SA	SA	SA	SA	PA	PA	PA	PA	SA													
	adult emmigration							SA	SA	SA	SA	SA													
	spawning							SA	PA	PA	PA	SA													
	incubation							SA	PA	PA	PA	SA													
	juvenile freshwater residence											SA	SA	PA	PA	PA	PA	SA	SA	SA	SA	SA			
	juvenile emigration													SA	SA	SA	SA	SA	SA	SA	SA	SA			

Source: ASMFC

3.2.2 Status of RH/S Stocks

3.2.2.1 NEFSC Survey Indices

The NEFSC conducts annual bottom trawl surveys, between the Gulf of Maine and Cape Hatteras, North Carolina, using a stratified random design. Details regarding the survey design and sampling protocols are described in Azarovitz (1981). Inshore strata (8-27 m) and offshore strata (27-366 m) have been most consistently sampled by the SRVs *Albatross IV* and *Delaware II* since the fall of 1975 and spring of 1976. Although winter surveys (February) were conducted during 1992- 2007, the sampling area only covered a subset of offshore strata (e.g., no sampling in the GOM) and employed sampling gear different from that used during the spring and fall surveys. For this document, relative abundance and biomass indices for the RH/S species from the NEFSC spring (1976-2011) and fall (1975-2010) trawl surveys were examined; detailed survey data and methods utilized to generate survey catch estimates is provided in the FEIS for the MAFMC's Amendment 14 to the MSB FMP as well as NMFS' extinction risk analysis, which was conducted as part of the ESA-listing review for river herring (NEFSC 2013; see http://www.nero.noaa.gov/prot_res/candidatespeciesprogram/RiverHerringSOC.htm). Relevant information regarding survey trends for these species is summarized below.

Indices of relative abundance (stratified mean number per tow) and biomass (stratified mean kg per tow) were reviewed for alewife, blueback herring, and American shad using data from NEFSC spring and fall bottom trawl surveys. Indices were not available for hickory shad because the species was caught in low numbers at only a few stations during a few years (i.e., at 18 stations during 9 years and at 16 stations during 10 years for the spring and fall surveys, respectively). The distribution of each species during the NEFSC spring and fall surveys depends on the timing of the survey in relation to the timing of seasonal and annual migration patterns of each of the four RH/S species. The timing of the spring and fall surveys has been variable, and this may have affected availability of the subject species to the survey gear. In general, sampling during the fall and spring surveys occurred during September-November and March-April, respectively, in a south to north direction.

Spring and fall survey indices for river herring and American shad exhibited considerable inter-annual variability, and in general, were more informative for the spring surveys because each of the species was caught at more stations (Figure 3 – Figure 5). Fall relative abundance of blueback herring has been above the median since 2002 and the 2009, and 2010 indices were the highest of the time series (Figure 3). Spring relative abundance has been above the median since 2006. Alewives were caught at more stations and in higher numbers than blueback herring, and an obvious increase in fall relative abundance is evident for 2008-2010, the highest three years of the time series (Figure 4). Spring relative abundance of alewives was above the median during 2008-2011 and was the highest of the time series in 2011. Inter-annual variability in the fall relative abundance of American shad was extremely high, but has been above the median during most years since 1992 (Figure 5). Spring relative abundance of American shad has fluctuated above and below the median for multi-year periods and was highest during 1990-1997, but then declined through 2005 but has generally been above the median since 2006.

Figure 3 Blueback Herring Relative Abundance (#/tow) and Biomass (kg/tow) Indices and Percent Positive Tows for NEFSC Fall (1975-2010) and Spring (1976-2011) Bottom Trawl Surveys

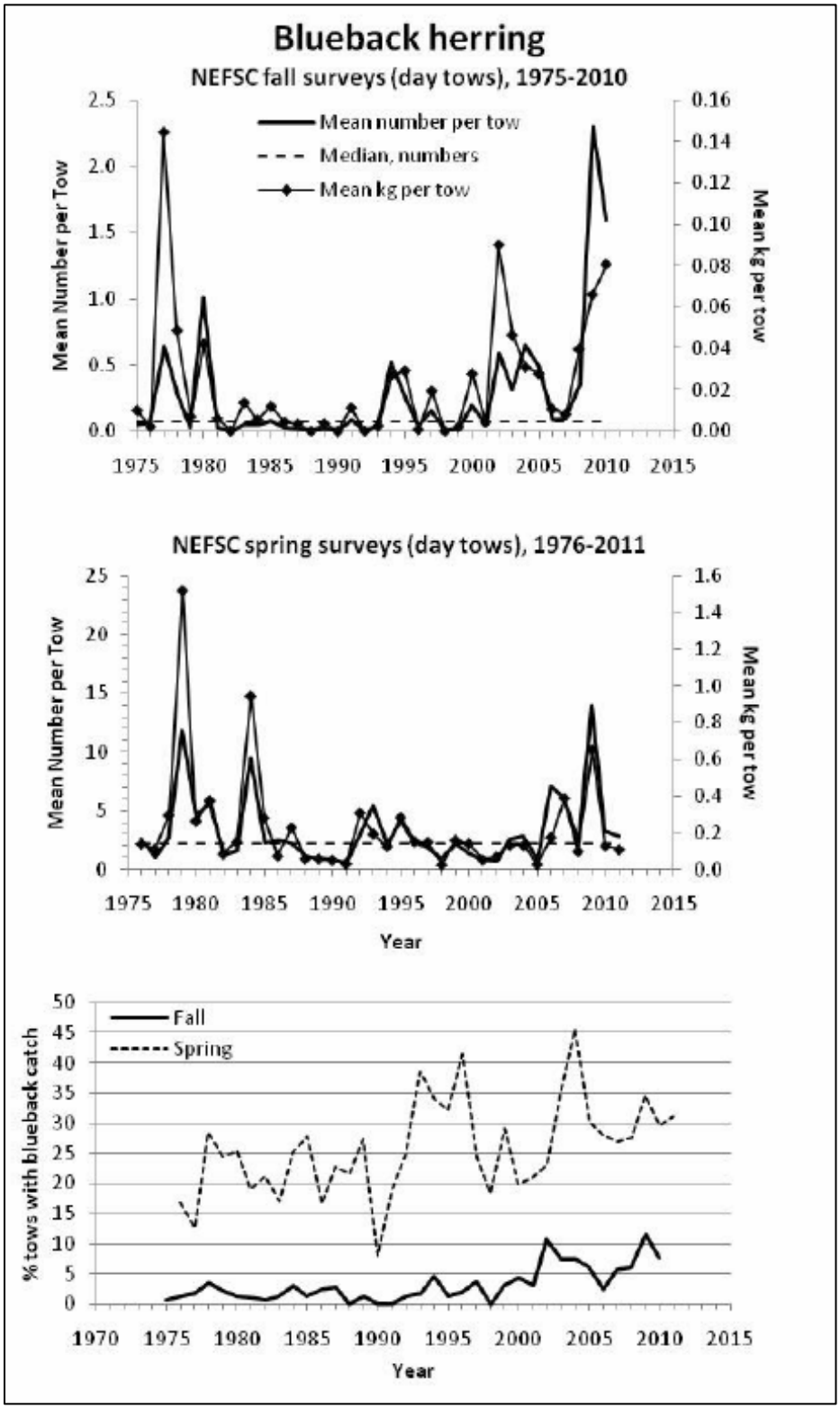


Figure 4 Alewife Relative Abundance (#/tow) and Biomass (kg/tow) Indices and Percent Positive Tows for NEFSC Fall (1975-2010) and Spring (1976-2011) Bottom Trawl Surveys

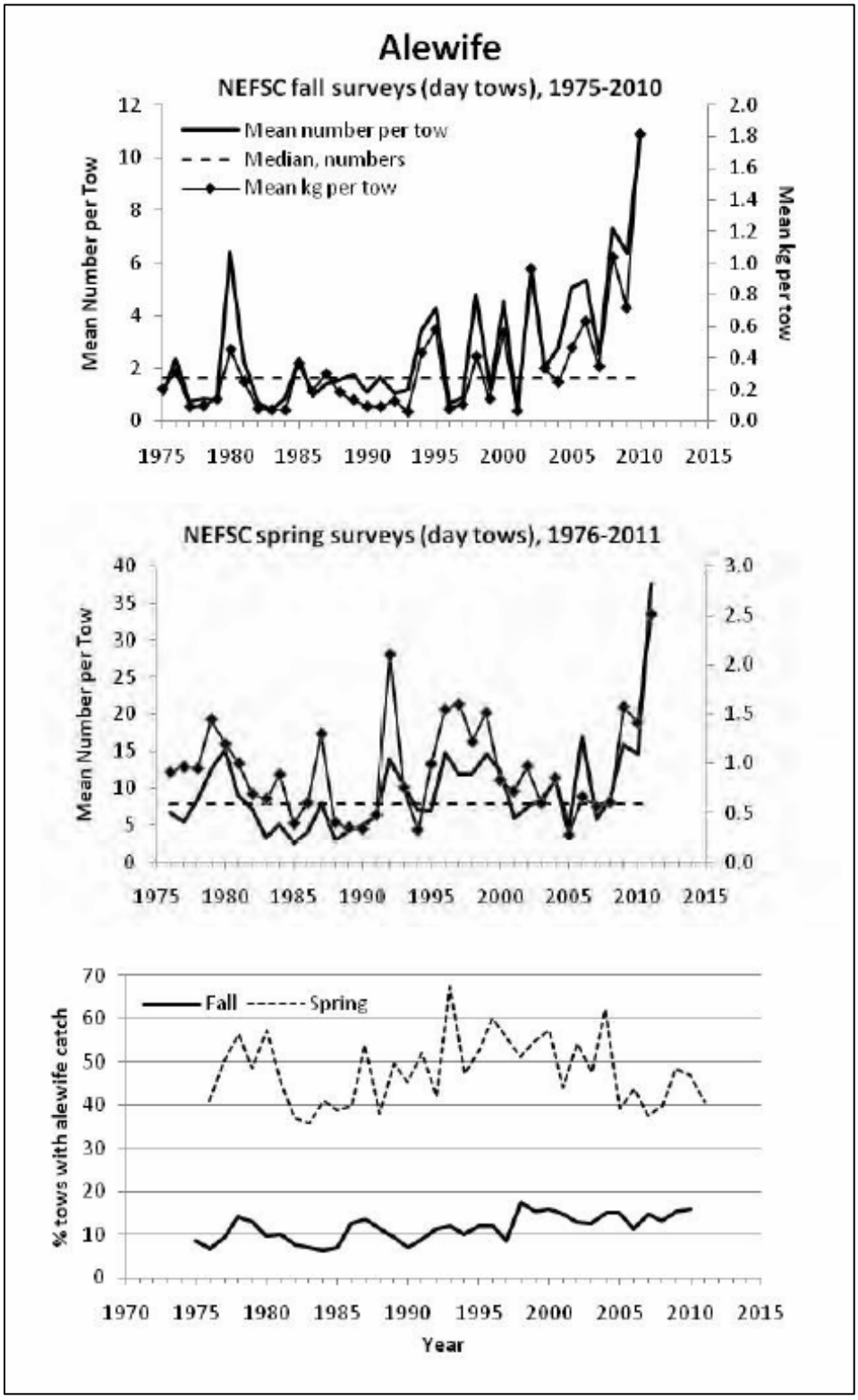
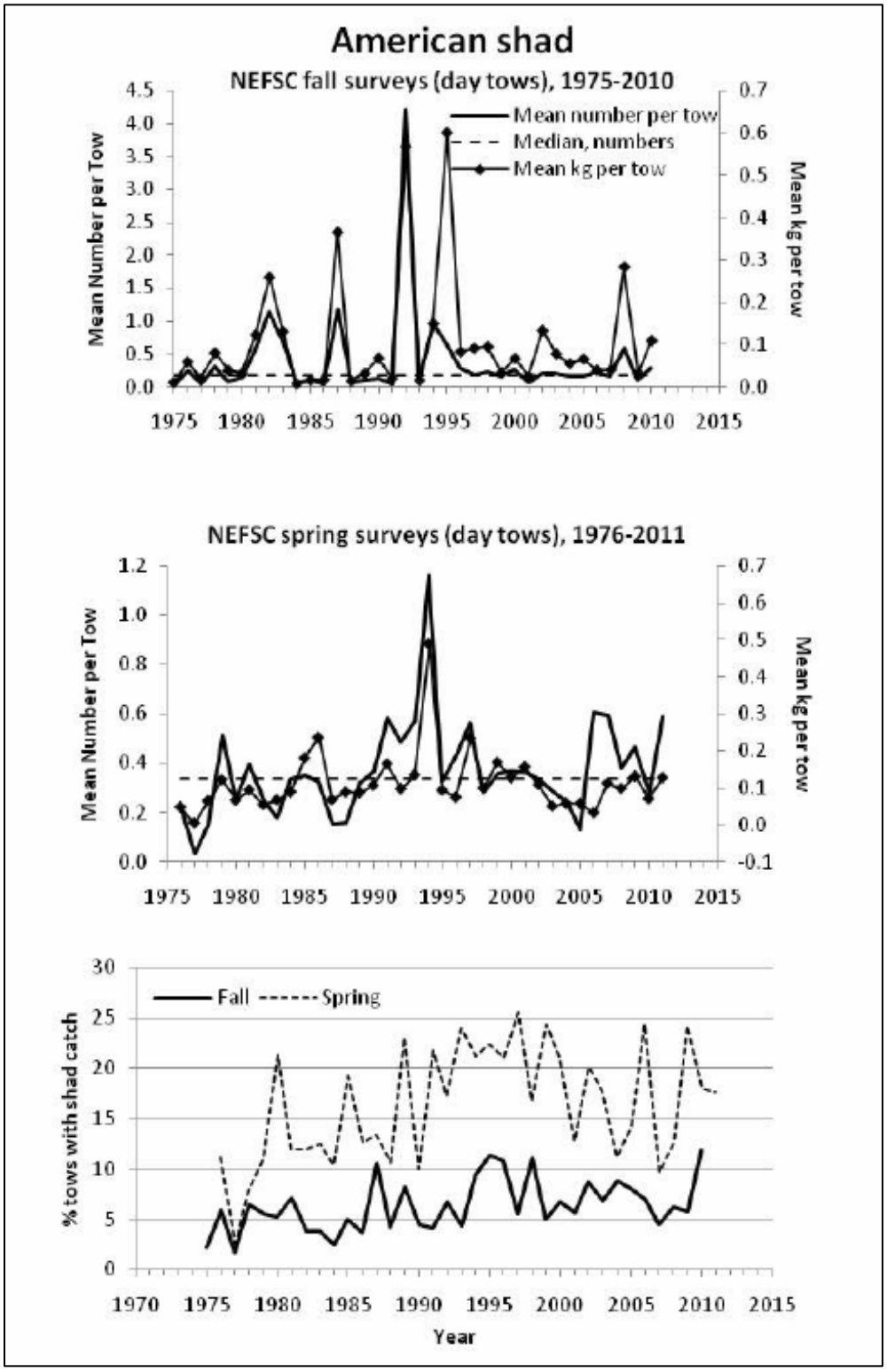


Figure 5 American Shad Relative Abundance (#/tow) and Biomass (kg/tow) Indices and Percent Positive Tows for NEFSC Fall (1975-2010) and Spring (1976-2011) Bottom Trawl Surveys



3.2.2.2 Shad Stock Assessment

A stock assessment for American shad was completed in 1997 and submitted for peer review in early 1998 based on new information and the ASMFC RH/S Board recommended terms of reference. The 1998 assessment estimated fishing mortality rates for nine shad stocks and general trends in abundance for 13 shad stocks. A coastwide American shad stock assessment was completed and accepted in 2007 and found that American shad stocks are currently at all-time lows and do not appear to be recovering. Recent declines of American shad were reported for Maine, New Hampshire, Rhode Island, and Georgia stocks, and for the Hudson (NY), Susquehanna (PA), James (VA), and Edisto (SC) rivers. Low and stable stock abundance was indicated for Massachusetts, Connecticut, Delaware, the Chesapeake Bay, the Rappahannock River (VA), and some South Carolina and Florida stocks. Stocks in the Potomac and York Rivers (VA) have shown some signs of recovery in recent years. There are no coastwide reference points for American shad. There is currently no stock assessment available for hickory shad.

The 2007 assessment of American shad identified primary causes for stock decline as a combination of overfishing, pollution, and habitat loss due to dam construction. In recent years, coastwide harvests have been on the order of 500-900 mt, nearly two orders of magnitude lower than in the late 19th century. Given these findings, the peer review panel recommended that current restoration actions need to be reviewed and new ones need to be identified and applied. The peer review panel suggested considering multiple approaches including a reduction in fishing mortality, enhancement of dam passage, mitigation of dam-related fish mortality, stocking, and habitat restoration.

3.2.2.3 2012 River Herring Stock Assessment

The ASMFC completed the river herring benchmark stock assessment and peer review in 2012, examining 52 stocks of alewife and blueback herring with available data in US waters. The stock assessment technical team examined indices from fishery-dependent (directed river herring landings and bycatch estimates in ocean fisheries) and fishery-independent (young-of-year indices, adult net and electrofishing indices, coastal waters trawl surveys, and run count indices) datasets. From this information, the status of 23 stocks was determined to be *depleted* relative to historic levels, and one stock was increasing. Statuses of the remaining 28 stocks could not be determined, citing times-series of available data being too short. "*Depleted*" was used, rather than "*overfished* and "*overfishing*," due to many factors (i.e., directed fishing, incidental fishing/bycatch, habitat loss, predation, and climate change) contributing to the decline of river herring populations. Furthermore, the stock assessment did not determine estimates of river herring abundance and fishing mortality due to lack of adequate data. For many of these reasons, the stock assessment team suggested reducing the full range of impacts on river herring populations.

3.2.2.4 Petition for River Herring ESA Listing/Determination

On August 5, 2011, the National Marine Fisheries Service (NMFS) received a petition from the Natural Resources Defense Council (NRDC), requesting that alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) be listed each as threatened throughout all or a significant portion of their range under the Endangered Species Act (ESA). NRDC requested that NMFS designate distinct population segments of alewife and blueback herring as specified in the petition (Central New England, Long Island Sound, Chesapeake Bay, and Carolina for alewives, and Central New England, Long Island Sound, and Chesapeake Bay for blueback herring). NMFS reviewed the petition and published a positive 90-day finding on November 2, 2011, determining that the information in the petition, coupled with information otherwise available to the agency, indicated that the petitioned action may be warranted. As a result of the positive finding, the Agency is required to review the status of the species to determine if listing under the ESA is warranted.

The Atlantic States Marine Fisheries Commission (ASMFC) completed a stock assessment for river herring in May 2012, which they had been conducting since 2008, covering over 50 river specific stocks throughout the species U.S. range. This represented a significant effort on behalf of the ASMFC and the coastal states from Maine to Florida. NMFS recognized this extensive effort to compile the most current information on the status of these stocks throughout their range in the United States and, in order to not duplicate this effort, has been working cooperatively with ASMFC. NMFS used the information from the stock assessment as a critical component in the ESA listing decision for these two species. Due to the nature of the stock assessment, it did not contain all elements necessary for making a listing determination under the ESA; therefore, NMFS identified the additional required elements and held workshops focused on addressing this information. The three workshops organized for this purpose addressed river herring stock structure, extinction risk analysis (ERA), and climate change. Reports from the stock structure and ERA workshop and working group meeting were compiled and are being independently peer reviewed by the Center for Independent Experts, and the report from the climate change workshop has been compiled and is also being reviewed. The peer review reports and additional climate change analysis and extinction risk modeling results were made available during 2013.

NMFS' ERA (http://www.nero.noaa.gov/prot_res/candidatespeciesprogram/RiverHerringSOC.htm) investigated trends in river herring relative abundance for each species range-wide as well as for each identified stock complex. This analysis found that the abundance of alewife range-wide significantly increased over time (mid 1970s-2012), but the increase in blueback herring abundance was not significant (see p.7 of the analysis, Figures 8 and 9). These range-wide analyses incorporated data from fishery independent surveys with the widest geographic extent, specifically the Northeast Fisheries Science Center spring and fall bottom trawl surveys and Canada's Department of Fisheries and Oceans (DFO) Scotian Shelf survey. Stock-specific analyses incorporated run count data and stock-specific fishery-independent surveys. Stock-specific analyses indicated that the abundance of the Canadian alewife stock complex was significantly increasing, the abundance of the mid-Atlantic blueback herring stock complex was significantly decreasing, and all other analyzed stock complexes were not significantly increasing or decreasing in abundance.

NMFS used these reports and the modeling results along with the 2012 ASMFC river herring stock assessment and other best available information to develop a listing determination that was published in the *Federal Register* on August 12, 2013. Based on the best scientific and commercial information available, NMFS determined that listing alewife and blueback herring as threatened or endangered under the ESA is not warranted at this time. NMFS' review of the information pertaining to the five ESA section 4(a)(1) factors does not support the assertion that there are threats acting on either alewife or blueback herring or their habitat that have rendered either species to be in danger of extinction or likely to become so in the foreseeable future, throughout all or a significant portion of its range.

While neither species of river herring is currently endangered or threatened, both species are at low abundance compared to historical levels, and NMFS indicated that monitoring both species is warranted. In its findings, NMFS acknowledged that there are significant data deficiencies for both species, and there is uncertainty associated with available data. There are many ongoing restoration and conservation efforts and new management measures that are being initiated/considered that are expected to benefit the species; however, it is not possible at this time to quantify the positive benefit from these efforts. Given the uncertainties and data deficiencies for both species, NMFS committed to revisiting both species in 3 – 5 years. NMFS has determined that this is an appropriate timeframe for considering this information in the future as a 3- to 5-year timeframe equates to approximately one generation time for each species, and it is therefore unlikely that a detrimental impact to either species could occur within this period. Additionally, it allows for time to complete ongoing scientific studies (e.g., genetic analyses, ocean migration patterns, climate change impacts) and for the results to be fully considered. Also, it allows for the assessment of data to determine whether the preliminary reports of increased river counts in many areas along the coast in the last two years represent sustained trends. During this 3- to 5-year period, NMFS intended to coordinate with ASMFC on a strategy to develop a long-term and dynamic conservation plan (e.g., priority activities and areas) for river herring considering the full range of both species and with the goal of addressing many of the high priority data gaps for river herring.

In early August, when NOAA Fisheries published the ESA listing decision for river herring, NMFS indicated that it would partner with ASMFC to form a Technical Expert Working Group (TEWG). The TEWG will be focused on developing a dynamic conservation plan to help restore river herring throughout their range from Canada to Florida, identifying and implementing important conservation efforts, and conducting research to fill in some of the critical data gaps for these species. NOAA Fisheries has provided funds to ASMFC and have been working with them on plans for this process. NOAA Fisheries and ASMFC are currently working on forming TEWG membership and scheduling the working group's first meeting before the end of the year. NOAA Fisheries plans to continue to coordinate with all of management partners including the Mid-Atlantic and the New England Fishery Management Councils to maximize resources and identify ways to complement ongoing efforts to promote river herring restoration.

3.2.3 RH/S Management

Directed fisheries for river herring and shad occur almost exclusively in State waters and are therefore managed by the Atlantic States Marine Fisheries Commission (ASMFC). The ASMFC Fishery Management Plan for Shad & River Herring, approved in 1985, was one of the very first FMPs developed by the ASMFC. Amendment 1 was adopted in 1998 and focuses on American shad regulations as well as and monitoring programs to improve data collection and stock assessment capabilities.

Amendment 2 to the ASMFC Interstate Fisheries Management Plan for Shad and River Herring was approved in 2009 and implemented a precautionary approach to river herring management. Amendment 2 requires states or jurisdictions to close all state fisheries by January 1, 2012, with exceptions for systems with a sustainable fishery. A sustainable fishery is defined as one that demonstrates that the river herring stock can support a commercial and/or recreational fishery without diminishing future stock reproduction and recruitment. Under Amendment 2, river herring from any state waters fishery may not be landed without an approved plan requesting State fishery proposals must contain 'sustainability targets' that are subject to Shad and River Herring Technical Committee (TC) review and Shad & River Herring Management Board (Board) approval. States with approved plans are required to submit annual updates of the achievement and maintenance of sustainability targets. The TC has reviewed proposals from Maine, New Hampshire, New York, North Carolina and South Carolina and the Board approved all plans. The 2012 sustainability plan deadline was implemented in order to allow states with a lengthy legislative process adequate time to develop and implement proposals.

In 2010, the Board approved Amendment 3, which revises American shad regulatory and monitoring programs in place under Amendment 1. The Amendment was developed in response to the 2007 American shad stock assessment, which found that most American shad stocks were at all-time lows and did not appear to be recovering. Amendment 3 is similar to the management program required for river herring. The Amendment prohibits state waters commercial and recreational fisheries beginning January 1, 2013, unless a state or jurisdiction has a sustainable management reviewed by the TC and approved by the Board. These management plans must be submitted to the TC for review by August 1, 2011. The Amendment defines a sustainable fishery as "a commercial and/or recreational fishery that will not diminish the potential future stock reproduction and recruitment." Submitted plans must clearly demonstrate that the state's or jurisdiction's American shad fisheries meet this new definition of sustainability through the development of sustainability targets which must be achieved and maintained. The Amendment allows any river systems to maintain a catch and release recreational fishery. States and jurisdictions are also required to identify local significant threats to American shad critical habitat and develop a plan for mitigation and restoration.

Table 9 and Table 10 show current state regulations as of October 2013 for both the commercial and recreational RH/S fisheries.

Table 9 2013 State River Herring Regulations for Commercial Vessels

	SFMP Target	Season	Area Restrictions	Time Restriction	Gear Restrictions	Reporting	License	Effort Controls
ME	235 fish/acre	Yes		3 days / week escapement period		voluntary and mandatory	rights granted	Yes
NH	Harvest level that results in a harvest % that does not exceed 20% of the Great Bay Indicator Stock (provides 80% escapement level).		closures due to fishway proximity	no harvest on Wednesday	no mobile gear in state waters; restrictions on gill nets w/in inland waters	required	Yes	
MA	**Moratorium since 2005**							
RI	**Moratorium since 2006**							
CT	**Moratorium since 2002**							
NY	**Juvenile recruitment threshold**	Yes	Hudson River Only	Yes	Yes	Mandatory reporting	Yes	
NJ	**Moratorium beginning 2012**							
PA	**Moratorium beginning 2012**							
DE	**Moratorium beginning 2012**							
MD	**Moratorium beginning 2012**							
DC	**Moratorium beginning 2012**							
PRFC (bycatch fishery)	**Moratorium beginning 2012***							
VA	**Moratorium beginning 2012**							
NC	**Moratorium since 2007; 7,500 pound research set-aside; 4,000 pound limit and a permit holder restrictions (125 – 250 pounds) for the Chowan River**							
SC	**Exploitation rate and juvenile abundance**	Yes	Santee-Cooper Only		Yes	Yes	Yes	10 bushels or 250 pound / day limit
GA	**No fishery**							
FL	**No fishery**							

Source: ASMFC

Table 10 2013 State River Herring Regulations for the Recreational Fishery

	Season	Time Closure	Closed Area	Gear Restrictions	Creel Limit
ME	Yes		unlawful to fish w/in 150 ft of dam w/fishway	Hook-and-line and dip net	12 fish/day for personal use
NH	Exeter River - April 1 to June 30	No harvest on Wednesday on all rivers; Except Exeter River - harvest allowed Saturday and Monday only	closures due to fishway proximity		coastal net fishery - one tote/day
MA	**Moratorium since 2005**				
RI	**Moratorium since 2006**				
CT	**Moratorium since 2002**				
NY			Hudson River Only; not within 825 ft of dam	yes	10fish/day - individual anglers; 50 fish/boat
NJ	**Moratorium Beginning 2012**				
PA	**Moratorium Beginning 2012**				
DE	**Moratorium Beginning 2012**				
MD	**Moratorium Beginning 2012**				
DC	**Moratorium Beginning 2012**				
PRFC	**Moratorium Beginning 2012***				
VA	**Moratorium Beginning 2012**				
NC	**Moratorium since 2007**				
SC	Yes		Santee-Cooper River Only	hook and line and cast nets only	1 bushel / person / day
GA	No Fishery				
FL	No Fishery				

Source: ASMFC

3.2.4 RH/S Catch Information

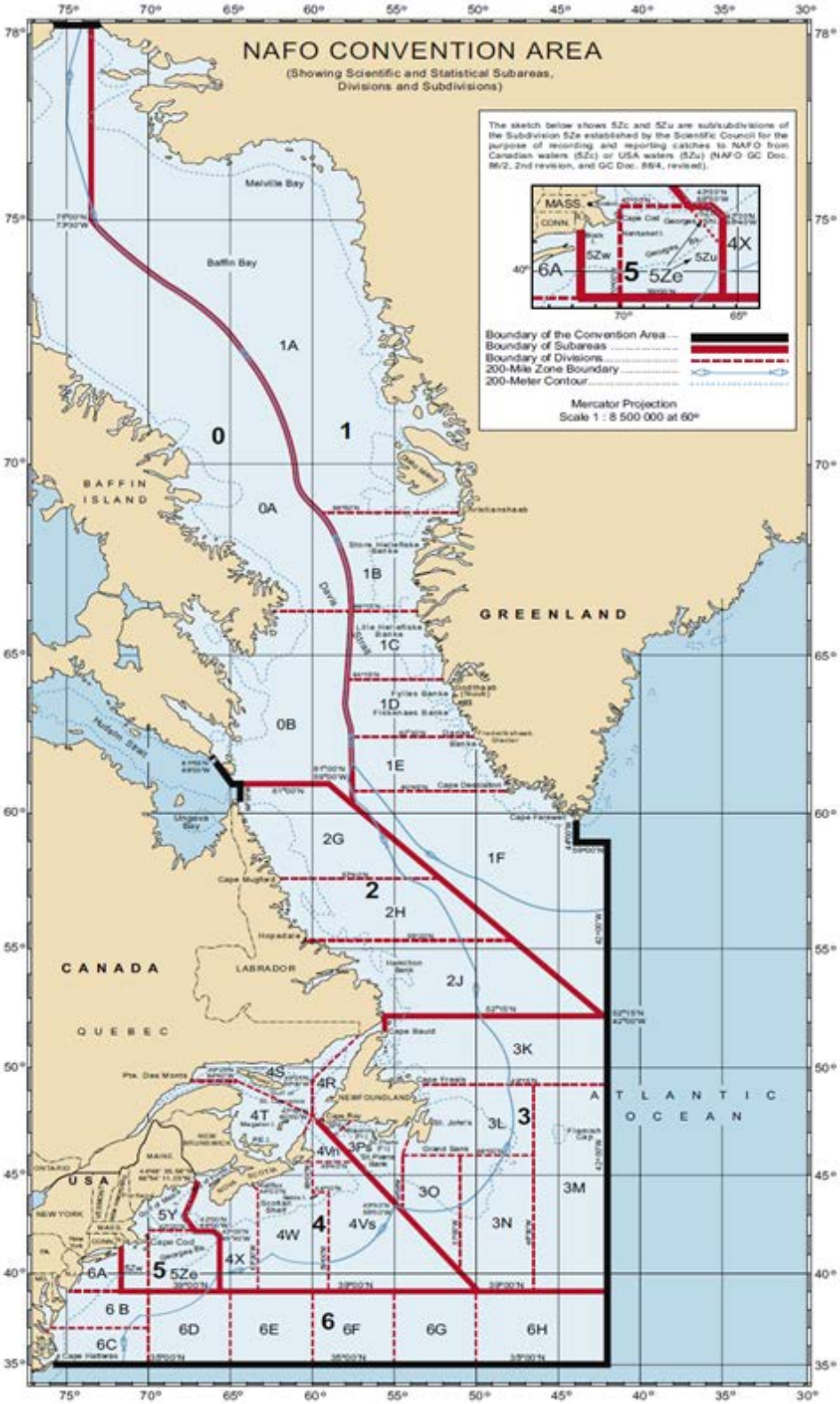
3.2.4.1 Historical River Herring Catch – NAFO (1960-2009)

The Northwest Atlantic Fisheries Organization (NAFO) is an intergovernmental fisheries science and management body founded in 1979, preceded by the International Commission of the Northwest Atlantic Fisheries (ICNAF), 1949-1978. Under the NAFO Convention, countries fishing within the (NAFO) Regulatory Area (RA) for certain NAFO managed species are required to report catches. The RA is an area outside of the coastal 200 nautical mile limit and within the NAFO Convention Area (Figure 6). In 1983, the United States established the Exclusive Economic Zone (EEZ) out to 200 nautical miles. Prior to that time, several foreign fleets along with the U.S. fished within the would-be U.S. EEZ. These fleets reported catches to NAFO.

Historical river herring (alewife and blueback herring) catches by the U.S. and other countries are summarized using the NAFO database 21-A (Table 11, Figure 7). These include 1960-2009 catches reported in NAFO areas 5 and 6A-C, which generally overlap the EEZ. Reported catches from unknown areas and areas outside of NAFO areas were omitted. In addition, no river herring catches were reported for 6D, which overlaps the U.S. EEZ. The NAFO database is available at http://www.nafo.int. Note that in the NAFO database, 'blueback shad' is the same as blueback herring.

Foreign countries catching river herring included Bulgaria, Germany, Spain, Poland, Romania, and Russia. Reported NAFO foreign river herring catch began in 1967 and ceased in 1990, peaking in 1973 at 36,154 mt with the majority of catch by Russia (former USSR). By comparison, the total catch for US and foreign vessels combined in 1973 was 37,192 mt. US river herring catch peaked in 1961 at 10,205 mt and again in 1973 at 10,797 mt. Prior to and following the establishment of the EEZ, river herring catches fell for both US and foreign countries. No river herring catches were reported from 1994-2001 and 2003-2006.

Figure 6 NAFO Convention Area



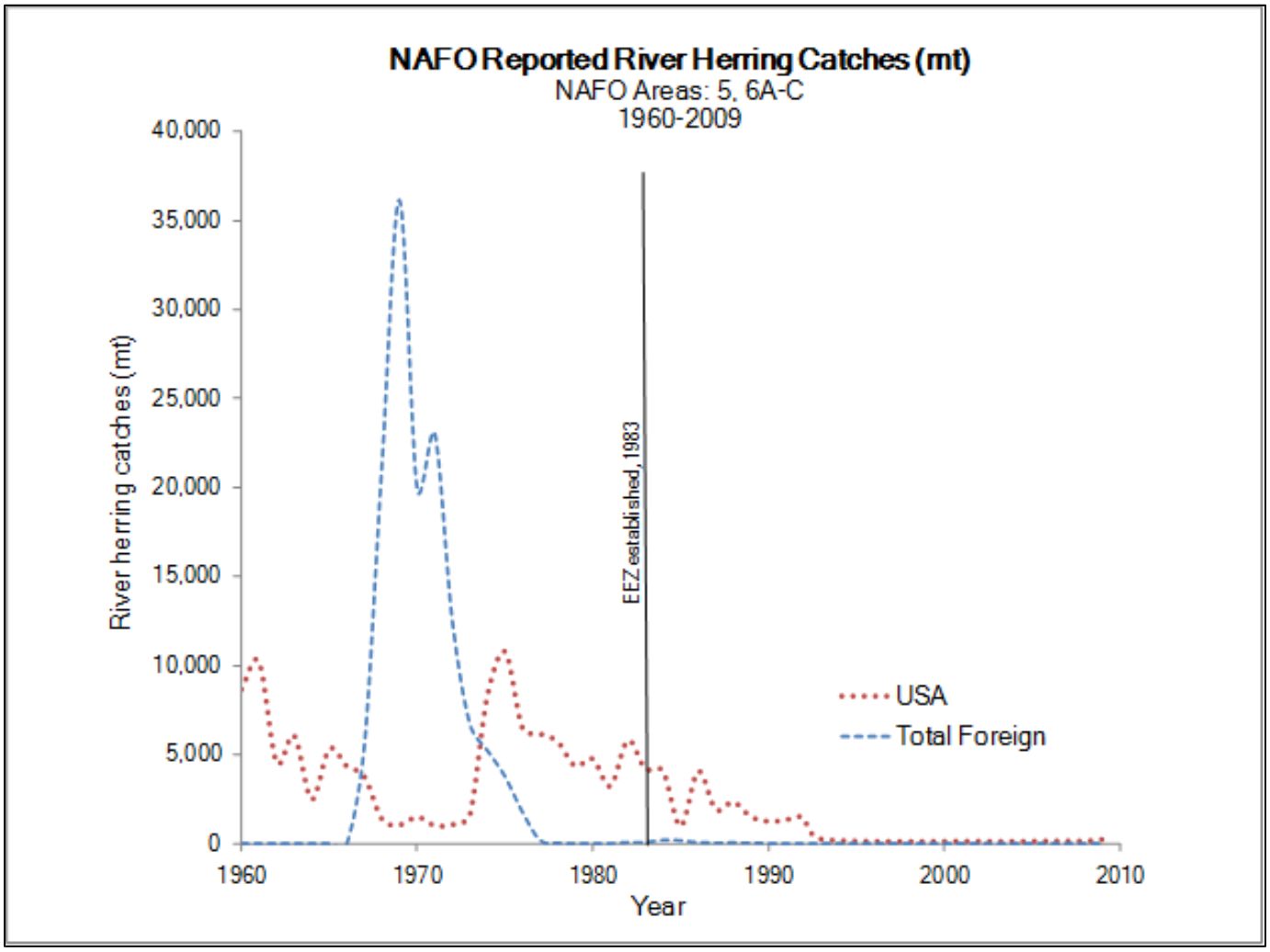
Source: NAFO, available at http://www.nafo.int/

Table 11 NAFO River Herring Catch (mt) by Country, 1960-2009

	NAFO River Herring Catches (mt)								
	Country								
Year	Bulgaria	Germany	Spain	Poland	Romania	Russia	Total Foreign	USA	Total
1960	0	0	0	0	0	0	0	8669	8669
1961	0	0	0	0	0	0	0	10205	10205
1962	0	0	0	0	0	0	0	4572	4572
1963	0	0	0	0	0	0	0	6071	6071
1964	0	0	0	0	0	0	0	2485	2485
1965	0	0	0	0	0	0	0	5326	5326
1966	0	0	0	0	0	0	0	4344	4344
1967	0	0	0	0	0	5531	5531	3754	9285
1968	0	0	0	0	0	21235	21235	1368	22603
1969	514	113	0	0	0	35527	36154	1038	37192
1970	672	190	0	0	0	19089	19951	1493	21444
1971	1039	8409	0	2225	95	11289	23057	1005	24062
1972	512	3481	0	1888	0	6693	12574	1057	13631
1973	811	1630	0	3251	0	1065	6757	1563	8320
1974	773	2659	0	1088	252	473	5245	8293	13538
1975	553	2121	0	62	0	1039	3775	10797	14572
1976	256	1260	0	14	0	244	1774	6482	8256
1977	0	69	0	0	0	120	189	6162	6351
1978	0	0	11	0	0	21	32	5730	5762
1979	0	0	0	0	0	12	12	4358	4370
1980	0	0	2	1	0	0	3	4762	4765
1981	0	0	0	10	0	0	10	3215	3225
1982	0	0	0	81	0	0	81	5799	5880
1983	0	0	0	77	0	0	77	4184	4261
1984	0	8	0	198	0	0	206	4075	4281
1985	0	23	0	157	0	0	180	960	1140
1986	0	17	0	47	0	0	64	4058	4122
1987	0	27	0	22	0	0	49	1911	1960
1988	0	29	0	30	0	0	59	2337	2396
1989	0	23	0	24	0	0	47	1509	1556
1990	0	14	0	0	0	0	14	1237	1251
1991	0	0	0	0	0	0	0	1327	1327
1992	0	0	0	0	0	0	0	1456	1456
1993	0	0	0	0	0	0	0	250	250
2002	0	0	0	0	0	0	0	129	129
2007	0	0	0	0	0	0	0	143	143
2008	0	0	0	0	0	0	0	130	130
2009	0	0	0	0	0	0	0	231	231

Source: 1960-2009 catches reported in NAFO areas 5 and 6A-C, database 21-A, available at http://www.nafo.int/

Figure 7 NAFO River Herring Catch (mt), 1960-2009



Source: 1960-2009 catches reported in NAFO areas 5 and 6A-C, database 21-A, available at http://www.nafo.int/

3.2.4.2 U.S. RH/S Landings (ACCSP)

The Atlantic Coastal Cooperative Statistics Program (ACCSP) ACCSP is a cooperative state-federal program established in 1995 that designs, implements, and conducts marine fisheries statistics data collection programs and integrates those data into a single data management system that will meet the needs of fishery managers, scientists, and fishermen. The scope of the ACCSP encompasses commercial, recreational, and for-hire fishery-dependent statistics for all living marine resources.

In keeping with its principles to ensure that fisheries-dependent commercial/recreational catch and effort data are complete, accurate, consistent, and compatible, the ACCSP opened the online Data Warehouse in 2002 and created the Standard Atlantic Fisheries Information System (SAFIS) in 2003. ACCSP continues to manage the data warehouses and provide comprehensive confidential and non-confidential data to various user groups and stakeholders. ACCSP supports various data collection programs along the Atlantic coast for the collection of fishery-dependent commercial landings data.

Table 12 summarizes RH/S landings by state group (North Atlantic (ME, NH, MA, RI, CT) and Mid-Atlantic (NY, NJ, DE, MD, VA) from the ACCSP Data Warehouse for 2007-2012. During this six-year time period, total landings of RH/S in the NE and MA states averaged 1,539,600 pounds (698 mt). Alewife represents the vast majority of these landings. 2012 landings by NE and MA states were the highest of the time series (1.76 million pounds, valued at just under $500,000). While the directed river herring fishery occurs primarily in NE states, the directed fishery for shad occurs primarily in Mid-Atlantic and South Atlantic States. According to the information provided by ACCSP and ASMFC (see Table 13 in the following sub-section), it appears that about another 500,000-600,000 pounds of American shad are landed in state waters fisheries in NC and SC. On average, the additional shad landings bring the annual total landings from directed RH/S fisheries to around 2-2.1 million pounds (900-950 mt).

Table 12 RH/S Landings and Revenues for Mid-Atlantic and North Atlantic State Groups, 2007-2012 (ACCSP)

YEAR	COMMON NAME	MID-ATLANTIC		NORTH ATLANTIC		TOTAL	
		LBS.	$$$	LBS.	$$$	LBS.	$$$
2007	ALEWIFE	141,524	$45,151	742,323	$149,696	883,848	$194,847
	HERRING, BLUEBACK	17,526	$5,024	*	*	17,526	$5,024
	HERRINGS, RIVER	16,255	$221			16,255	$221
	SHAD, AMERICAN	189,536	$208,800	53,151	$38,640	242,687	$247,440
2007 Total		**364,841**	**$259,195**	**795,474**	**$188,336**	**1,160,316**	**$447,531**
2008	ALEWIFE	238,515	$36,731	1,180,340	$255,106	1,418,855	$291,836
	HERRING, BLUEBACK	10,609	$3,465	*	*	10,609	$3,465
	HERRINGS, RIVER	14,845	$360			14,845	$360
	SHAD, AMERICAN	55,895	$50,825	755	$690	56,650	$51,515
2008 Total		**319,864**	**$91,380**	**1,181,095**	**$255,796**	**1,500,959**	**$347,176**
2009	ALEWIFE	237,096	$44,438	1,392,570	$300,478	1,629,665	$344,916
	HERRING, BLUEBACK	6,202	$1,625	36,936	$367	43,138	$1,992
	HERRINGS, RIVER	12,977	$176			12,977	$176
	SHAD, AMERICAN	22,980	$14,953	31,028	$61,323	54,008	$76,277
2009 Total		**279,255**	**$61,193**	**1,460,534**	**$362,168**	**1,739,788**	**$423,360**
2010	ALEWIFE	211,606	$37,531	1,349,751	$292,030	1,561,356	$329,560
	HERRING, BLUEBACK	7,410	$1,226	36,528		43,938	$1,226
	HERRINGS, RIVER	13,283				13,283	
	SHAD, AMERICAN	16,754	$9,652	25,312	$30,591	42,066	$40,243
2010 Total		**249,053**	**$48,409**	**1,411,590**	**$322,621**	**1,660,643**	**$371,030**
2011	ALEWIFE	129,594	$33,484	1,155,489	$291,691	1,285,083	$325,174
	HERRING, BLUEBACK	19,181	$3,805	67,486		86,667	$3,805
	HERRINGS, RIVER	*	*	*	*		
	SHAD, AMERICAN	17,128	$18,996	27,020	$30,659	44,148	$49,655
2011 Total		**165,903**	**$56,284**	**1,249,995**	**$322,349**	**1,415,898**	**$378,634**
2012	ALEWIFE	46,656	$5,614	1,609,216	$426,488	1,655,871	$432,101
	HERRING, BLUEBACK	*	*	44,150		44,150	$0
	HERRINGS, RIVER	*	*				
	SHAD, AMERICAN	16,275	$13,228	43,729	$49,570	60,004	$62,797
2012 Total		**62,930**	**$18,841**	**1,697,095**	**$476,057**	**1,760,025**	**$494,899**

*Source: ACCSP. * denotes confidential data.*

3.2.4.3 Recent RH/S Landings by State (ASMFC)

Shad

Since the early 1800s, the American shad supported major commercial fisheries along the Atlantic coast and was one of the most valuable food fish of the U.S. Atlantic coast before World War II. The estimated U.S. Atlantic coast catch in 1896 was 50 million pounds, but it declined to approximately 10 million pounds per year between 1930 and 1960 and to about 2 million by 1976. Ocean harvest contributed about 11% of total Atlantic coast landings in 1978; this contribution increased yearly to approximately 67% by 1996 as ocean landings increased and in-river landings declined. The closure of the ocean-intercept fishery in 2005 lowered the coastwide total landings of American shad. Total coastwide harvest has averaged approximately 540,000 pounds annually since 2005.

Based upon landings data provided in ASMFC Compliance Reports from individual states and jurisdictions, 2011 in-river American shad landings totaled 642,535 pounds, a 14% increase from 2010 landings of 563,209 pounds. Combined landings from North Carolina and South Carolina (not shown in Table 13 below) accounted for 91% of the commercial harvest during 2011. The remainder of the in-river commercial harvest came from Connecticut, New Jersey, Delaware, PRFC, and Virginia. In 2011, Maine, New Hampshire, Massachusetts, Rhode Island, Pennsylvania, Maryland, DC and Florida reported no directed shad harvest in their state Compliance Reports. The National Marine Fisheries Service reported landings of shad totaling 642,535 in 2011. Each state is required to annually document that American shad ocean bycatch did not exceed 5% of the total landings (in pounds) on a per trip basis. Shad bycatch landings from ocean waters in 2011 comprised 8,683 pounds (VTR reports), or about 1.35% of the coastwide total.

Table 13 Commercial Shad Landings (Lbs) by State from Maine to New Jersey, 1999-2011

Year	ME	NH	MA	RI	CT	NY	NJ	Total
1999	77	1,667	101	20,076	20,219	97,631	121,009	**260,780**
2000	132	2,695	122	7,854	48,724	81,159	116,624	**257,310**
2001	216	368	477	30,777	26,869	60,170	122,543	**241,420**
2002	8	0	192	39,553	49,034	86,876	125,341	**301,004**
2003	2	1	503	17,548	50,407	61,098	107,036	**236,595**
2004	4	49	12	6,652	30,086	39,868	98,760	**175,431**
2005	88	3,877	0	191,312	69,333	90,932	25	**355,567**
2006	0	0	0	2,292	38,547	9,271	62,920	**113,030**
2007	0	0	0	783	51,572	50,040	58,981	**161,376**
2008	0	0	0	0	7,344	22,720	6,761	**36,825**
2009	0	0	0	176	40,998	10,204	2,660	**54,038**
2010	7,140	0	0	0	24,187	11,375	14,363	**57,065**
2011	0	0	0	0	32,183	2,606	12,167	**46,956**

Source: ASMFC; Recreational numbers included where available.

River Herring

River herring formerly supported significant commercial and recreational fisheries throughout their range. Fisheries were traditionally executed in rivers, estuaries, and coastal waters using weirs, traps, dip nets and gillnets. Commercial landings of river herring declined 95% from over 13 million pounds in 1985 to about 700,000 pounds in 2005. In 2011, river herring landings were reported from Maine, New Hampshire, New York, New Jersey, Delaware, Maryland, the Potomac River Fisheries Commission, North Carolina, and South Carolina, totaling 1,489,565, a 27% decrease from 2010 (2,052,601 pounds). The majority of the river herring landings (77%) were reported by the state of Maine (1.1 million pounds, with an additional 536,000 pounds of shad landings), followed by South Carolina (17%) and Maryland (3%). There is a moratorium for Massachusetts, Connecticut, Rhode Island, and Pennsylvania; New Jersey reported zero state-reported catch. Although recreational harvest data are scarce, most harvest is believed to come from the commercial industry.

Table 14 Commercial River Herring Landings (Lbs) by State from Maine to New Jersey, 1999-2011

Year	ME	NH	MA	RI	CT	NY	NJ	Total
1999	312,375	0	0	0	0	6,051	1,377	**319,803**
2000	246,680	0	0	77,985	574	98,845	2,246	**426,330**
2001	646,660	0	0	20	0	39,293	3,915	**689,888**
2002	819,554	0	0	0	12	40,716	4,669	**864,951**
2003	613,385	0	0	0	0	40,076	3,667	**657,128**
2004	543,172	0	89	0	0	36,685	7,131	**587,077**
2005	341,311	0	0	0	0	26,984	4,326	**372,621**
2006	1,178,758	0	0	0	0	23,505	3,414	**1,205,677**
2007	740,915	0	0	0	0	28,571	223	**769,709**
2008	1,170,469	8,137	0	0	0	0	631	**1,179,237**
2009	1,383,130	9,443	0	0	0	83	0	**1,392,656**
2010	1,334,515	7,392	31	36,232	0	17,142	1,517	**1,396,829**
2011	1,151,395	4,094	0	0	0	13,389	1,855*	**1,168,878**

**Includes in-river and coastal harvest*
Source: ASMFC; Recreational numbers included where available.

3.2.4.4 River Herring/Shad Catch by Atlantic Herring Vessels

River herring and shad are non-target species that are caught and/or landed incidentally in the Atlantic herring fishery. Some non-target species may be caught by the same gear while fishing for Atlantic herring, and may be sold assuming the vessel has proper authorization or permit(s) and the regulations allow for the sale of the species. When landed and sold, the non-targeted species are considered "incidental catch." Because of the high-volume nature of the Atlantic herring fishery, some non-targeted catch that is landed incidentally is not separated and identified as such; this is particularly true with species like river herring and shad, other alosine pelagic fish that look very similar to Atlantic herring. Sometimes, river herring and shad are referred to as bycatch in the herring fishery even if they are landed as incidental catch.

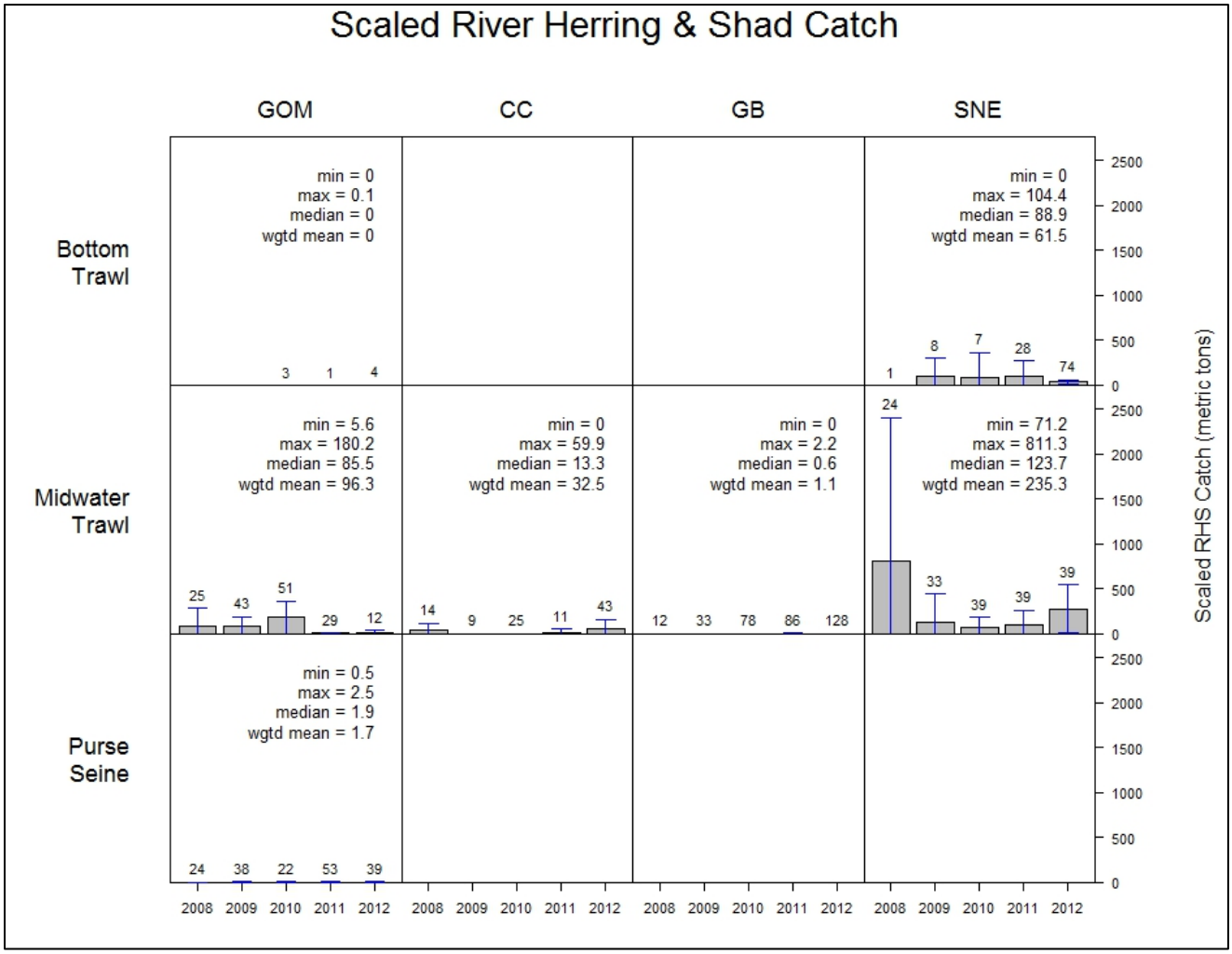
In addition to reported catch (fishermen and dealers), information about river herring/shad catch by vessels participating the Atlantic herring fishery comes from **sea sampling (NEFOP observers)** and **portside sampling (ME DMR and MA DMF)**. During the development of Amendment 5, the Herring PDT conducted a study of the comparability of portside sampling and sea sampling methods to estimate the catch of RH/S in the Atlantic herring fishery. The comparability of each sampling program was estimated by two methods – a simulation model as well as empirical data. Furthermore, four different sampling protocols were evaluated: 1) at-sea sampling (AS), 2) portside unsorted sampling (PU), 3) portside sorted sampling (PS), 4) portside lot sampling (PL). The comparison focused on midwater trawl vessels because they present a greater challenge in sampling at-sea, thus benefitting the most from additional portside sampled trips.

The Herring PDT analysis in Amendment 5 showed little disagreement between the PU and AS sampling protocols. The other two portside methods (PS and PL) had inherent biases and were not recommended for use in estimating catch. Currently, RH/S catch estimates in the Atlantic herring fishery are derived from AS sampling alone, and this analysis provides evidence that portside sampling (PU) can be used to effectively increase the sampling coverage of this fishery and generate better RH/S catch estimates for the fishery. The Herring PDT therefore incorporated portside sampling data into the methodology utilized to develop the RH/S catch cap options for 2014 and 2015. A more thorough discussion of the Herring PDT analysis is provided in Appendix II of this document. Summary information is provided below.

To develop the 2014-2015 RH/S catch cap options, the Herring PDT created a master dataset that includes observed RH/S catch cap trips from 2008-2012 from the NEFOP, ME DMR, or MA DMF databases. Any trip that landed > 6,600 lbs Atlantic herring (AH) where the whole catch was systematically sampled for catch of river herring and shad (RH/S) was included in this analysis (i.e., NEFOP, MADMF, or MEDMR). For each sampled trip, the amount of RH/S catch (kept and discarded) was divided by the total landed catch of all species ("kept-all") to derive a RH/S catch ratio. The mean RH/S catch ratio was then calculated for each year, gear, and area combination. These ratios were then multiplied by the total amount of kept-all on all trips that caught >6,600 lbs of Atlantic herring. To account for annual changes in the scale of the herring fishery, each RH/S amount was further multiplied by an expansion factor, standardized to the 2013-2015 Atlantic herring ACL. The resulting values represent the estimated amount of RH/S

catch that would have occurred in a year, gear, area combination if the herring fishery operated at the scale of the 2013-2015 Atlantic herring ACL (Figure 8 below, see Appendix II for more information).

Figure 8 Estimated Annual RH/S Catch (mt) by Gear and Catch Cap Area



3.2.5 Overlap Between River Herring and Shad in the Atlantic Herring Fishery

As part of the analyses in Amendment 5 to the Atlantic Herring FMP, the Herring PDT evaluated the overlap between river herring and shad to determine whether the management measures designed to minimize river herring bycatch in the Atlantic herring fishery would have similar impacts on shad bycatch. Based on this analysis, the Herring PDT concluded that management measures implemented to address river herring bycatch in the Atlantic herring fishery would likely have similar impacts on the shad species. This supports inclusion of the shad species in the action proposed in this framework adjustment to establish RH/S catch caps.

While there is significant overlap between shad and river herring, shads have a more southern distribution in general. The majority of shad is caught in state waters south of Virginia, outside of the range of the Atlantic herring fishery (see Section 3.2.4.3 of this document). For Amendment 5, though, the Herring PDT evaluated the coincidence of shad and river herring relative to encounters in the Atlantic herring fishery. Bycatch estimates from NEFOP observed trips that landed over 2,000 pounds of Atlantic herring from 2005 to 2009 were examined. Of the 1,099 individual hauls that were observed, 287 (26%) encountered river herring and 102 (9%) encountered shad (Table 15). Almost two-thirds of the hauls that caught shad also caught river herring, and over 80% of the shad catch came from hauls that also caught river herring (Table 16). The level of coincidence between the two species groups is even greater when the spatial distribution of bycatch events is considered. Only 4% of the ten-minute squares with observed tows had shad bycatch and no river herring bycatch (Table 17, Figure 9, Figure 10, and Figure 11). Furthermore, the shad caught from those areas only account for 1% of the total shad bycatch.

Table 15 Numbers of NEFOP Observed Hauls with River Herring (RHERR) and/or Shad on Trips that Landed Over 2,000 lbs. of Atlantic Herring, 2005-2009

	Bottom Trawl	Midwater Trawl	Purse Seine	Total
total observed hauls	169	768	162	1,099
hauls with RHERR	102	178	7	287
hauls with SHAD	17	84	1	102
hauls with both RHERR and SHAD	8	57	1	66
hauls with SHAD, but no RHERR	9	27	-	36

Source: MA DMF

Table 16 Estimated River Herring (RHERR) and Shad Bycatch from NEFOP Observed Trips that Landed over 2,000 lbs. of Atlantic Herring, 2005-2009

Estimated Bycatch (pounds)	Bottom Trawl	Midwater Trawl	Purse Seine	Total
total RHERR bycatch	44,319	540,771	1,041	586,131
total SHAD bycatch	1,974	45,587	128	47,689
total SHAD from hauls with no RHERR	1,165	6,790	-	7,955

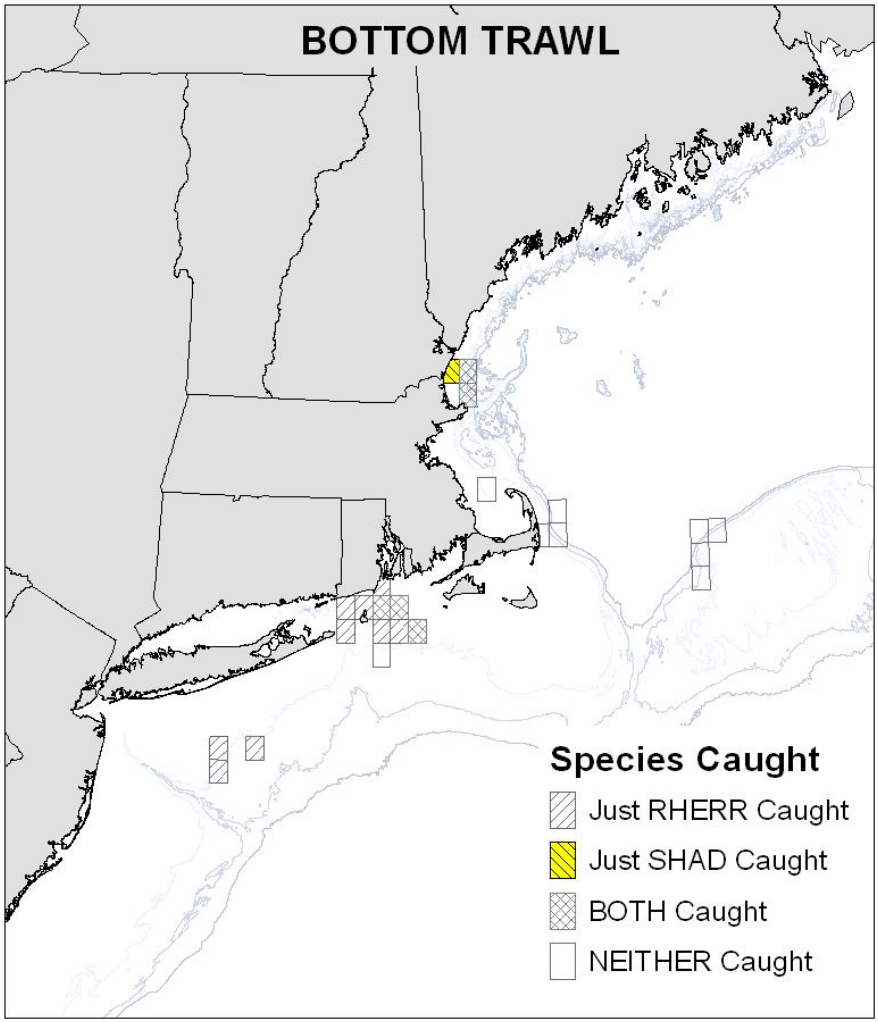
Source: MA DMF

Table 17 Numbers of 10-Minute Squares with Observed Hauls that Encountered Shad, but Not River Herring (RHERR)

	Bottom Trawl	Midwater Trawl	Purse Seine	Total
10-min squares with observed hauls	24	175	29	194
10-min squares with SHAD but no RHERR	1	6	0	7
Shad bycatch (lbs.) from 10-min squares with no RHERR	300	222	0	522

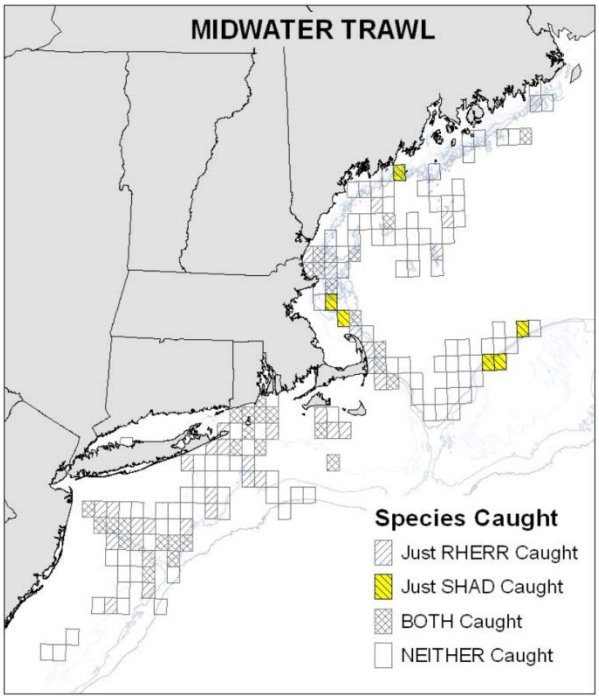
Source: MA DMF

Figure 9 Map of Overlap of Species Caught (Shad and River Herring) by Bottom Trawl Vessels



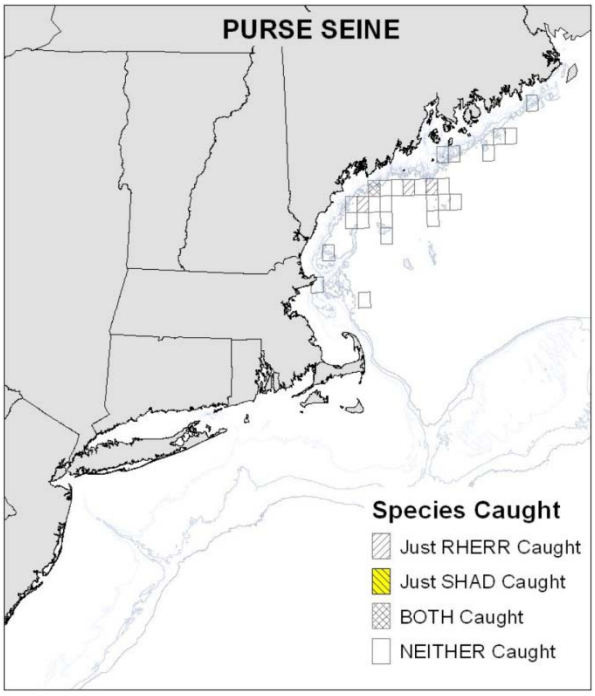
Source: MA DMF

Figure 10 Map of Overlap of Species Caught (Shad and River Herring) by Midwater Trawl Vessels



Source: MA DMF

Figure 11 Map of Overlap of Species Caught (Shad and River Herring) by Purse Seine Vessels



Source: MA DMF

3.3 OTHER NON-TARGET SPECIES

Non-target species refers to species other than Atlantic herring which are caught/landed by federally permitted vessels while fishing for herring. These non-target species may be caught by the same gear while fishing for Atlantic herring, and may be sold assuming the vessel has proper authorization or permit(s). River herring and shad are non-target species of particular concern in the Atlantic herring fishery. Because of the nature of the action proposed in this framework adjustment, the RH/S species have been identified as a separate VEC (see Section 3.2), and impacts of the alternatives/options considered in this action on RH/S are evaluated in greater detail in Section 4.2 of this document. Other non-target species are described in this section (see FEIS for Amendment 5 to the Herring FMP for more detailed information).

Non-target species are generally identified through sea sampling (observer) data collected by the Northeast Fisheries Observer Program (NEFOP). Table 18 summarizes NEFOP observer coverage rates by gear type and herring management area during the 2012 fishing year. Coverage rates in this table are calculated based on NEFOP observed herring pounds caught/VTR-reported herring pounds landed.

Table 18 2012 NEFOP Coverage Rates by Gear Type and Herring Management Area (Pounds Observed/Pounds Landed)

Gear Type	Atlantic Herring Management Area			
	1A	1B	2	3
Midwater Trawl (Single)	6.40%	0%	2.60%	71.20%
Pair Trawl	17.60%	36.50%	23.80%	75%
Purse Seine	16.30%	N/A	N/A	0%
Small Mesh Bottom Trawl	4.90%	0%	24.30%	0%

Note: 2012 NEFOP observer data are final; VTR data are preliminary.

Measures proposed in Framework 3 would apply to vessels/trips landing more than 6,600 pounds of Atlantic herring (i.e., a RH/S catch cap trip). The RH/S catch caps proposed for 2014 and 2015 are based on expanded catch estimates from sampling during the 2008-2012 fishing years. Table 19 summarizes NEFOP coverage rates by RH/S Catch Cap Area and gear type for 2008-2012. For this time period, coverage rates were generally 14% (purse seine), 20-54% (midwater trawl/pair trawl), and 3%-10% (bottom trawl) on trips that landed more than 6,600 pounds of herring. Coverage was particularly high (>50%) on midwater trawl trips in the proposed Cape Cod and Georges Bank Catch Cap Areas. The observer data were supplemented with portside sampling data to develop the 2014/2015 catch cap options considered in this framework adjustment. Complete coverage/sampling levels, including portside sampling, are provided in Appendix II of this document.

Table 19 Summary of NEFOP Observer Coverage (% of Trips) on RH/S Catch Cap Trips by Year, Gear Type, and RH/S Catch Cap Area, 2008-2012

Total Cap Trips Taken* (>6,600 lbs Atlantic herring)							
Gear	**Catch Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total**
Bottom Trawl	**GOM**	5	18	24	7	26	**80**
	SNE/MA	71	134	98	120	90	**513**
	Total BT	76	152	122	127	116	**593**
Midwater Trawl	**CC**	39	16	41	28	52	**176**
	GB	36	104	89	183	169	**581**
	GOM	87	115	109	66	25	**402**
	SNE/MA	154	189	116	77	151	**687**
	Total MWT	316	424	355	354	397	**1,846**
Purse Seine	**GOM**	243	225	205	265	275	**1,213**
	Total PS	243	225	205	265	275	**1,213**
GRAND TOTAL		**635**	**801**	**682**	**746**	**788**	**3,652**
NEFOP At-Sea Observed Cap Trips* (>6,600 lbs Atlantic herring)							
Gear	**Catch Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total**
Bottom Trawl	**GOM**	0	0	0	0	2	**2**
	SNE/MA	1	8	7	17	19	**52**
	Total BT	1	8	7	17	21	**54**
Midwater Trawl	**CC**	11	9	23	11	36	**90**
	GB	12	33	78	77	114	**314**
	GOM	16	40	40	25	8	**129**
	SNE/MA	24	26	34	34	22	**140**
	Total MWT	63	108	175	147	180	**673**
Purse Seine	**GOM**	24	35	22	51	35	**167**
	Total PS	24	35	22	51	35	**167**
GRAND TOTAL		**88**	**151**	**204**	**215**	**236**	**894**
NEFOP Coverage (% of Cap Trips Observed)* (>6,600 lbs Atlantic herring)							
Gear	**Catch Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total**
Bottom Trawl	**GOM**	0%	0%	0%	0%	8%	**3%**
	SNE/MA	1%	6%	7%	14%	21%	**10%**
	Total BT	1%	5%	6%	13%	18%	**9%**
Midwater Trawl	**CC**	28%	56%	56%	39%	69%	**51%**
	GB	33%	32%	88%	42%	67%	**54%**
	GOM	18%	35%	37%	38%	32%	**32%**
	SNE/MA	16%	14%	29%	44%	15%	**20%**
	Total MWT	20%	25%	49%	42%	45%	**36%**
Purse Seine	**GOM**	10%	16%	11%	19%	13%	**14%**
	Total PS	10%	16%	11%	19%	13%	**14%**
GRAND TOTAL		14%	19%	30%	29%	30%	**24%**

The FEIS for Amendment 5 to the Atlantic Herring FMP includes comprehensive information about non-target species caught in the herring fishery. Catch/discards of all species on observed trips are summarized by permit category and gear type in Section 5.2.1 of Amendment 5. Overall, the data indicate that the four species/species groups that comprise the majority of the observed catch (either discarded or kept) in total pounds for the paired and single midwater trawl vessels, Category A and B are Atlantic herring, Fish NK (primarily fish that are pumped to a paired vessel without an observer onboard (kept), and some unobserved fish that are discarded/released), Atlantic mackerel, and dogfish. Observed non-target species catch on limited access purse seine vessels was similar in terms of primary species composition. Other non-target species catch was more variable on midwater trawl vessels (versus purse seine), but in general, bycatch represents a very small fraction of total catch by limited access herring midwater trawl and purse seine vessels. Detailed information about the Fish NK and Herring NK categories is provided in Section 6.3.2.1.5 of the Amendment 5 FEIS.

The composition of observed catch of non-target species on bottom trawl vessels is more variable (see Table 14 – Table 20 in the Amendment 5 FEIS). Squid is the most common species caught by herring vessels fishing with bottom trawls. The majority of the species are haddock, skate, Atlantic cod, and flounders on large-mesh bottom trawl vessels when fishing for herring. However, observed catch from the small mesh vessels with herring permits appears to differ. The Category A and B bottom trawl vessels fishing small mesh catch primarily squid, Atlantic mackerel, Atlantic herring, and butterfish; Category C bottom trawl vessels fishing with small mesh are observed to catch primarily silver hake, other fish, scup, and squid.

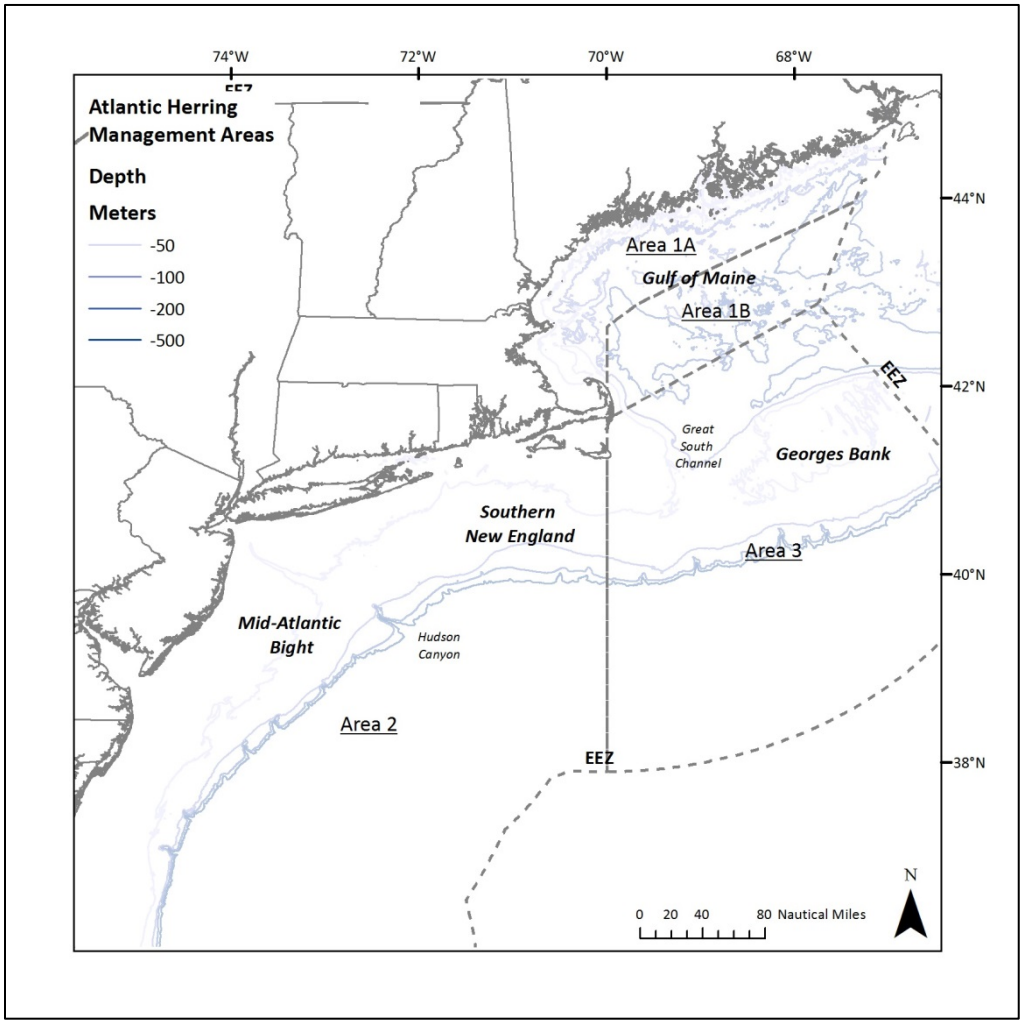
The overlap between Northeast multispecies (groundfish) and the herring fishery is diverse; herring vessel operation overlaps in similar areas and times as multispecies vessel operation. As such, herring vessels encounter and some may land various groundfish species. With respect to incidental catch and bycatch, haddock in particular are occasionally caught higher in the water column and encountered more frequently by herring vessels than other groundfish species. Framework 46 to the Northeast Multispecies FMP modified the bycatch regulations for the Atlantic herring fishery and adjusted the cap on the amount of haddock that could be caught by midwater trawl herring vessels. When the cap is reached, catches of herring from a large part of the GOM and GB areas are limited to 2,000 pounds per trip for all herring vessels. Additional information about the incidental catch of groundfish in the Atlantic herring fishery can be found in the FEIS for Amendment 5 as well as Framework 2 to the Herring FMP.

3.4 PHYSICAL ENVIRONMENT AND EFH

3.4.1 Physical Environment

The Atlantic herring fishery is prosecuted in four areas defined as 1A, 1B, 2, and 3 (Figure 12). These areas collectively cover the entire northeast U.S. shelf ecosystem, which has been defined as the Gulf of Maine south to Cape Hatteras, North Carolina, extending from the coast seaward to the edge of the continental shelf, including offshore to the Gulf Stream (Sherman et al. 1996). Three distinct sub-regions, the Gulf of Maine, Georges Bank, and the southern New England/Mid-Atlantic region, were described in the Affected Environment section of Amendment 5 to the Atlantic Herring FMP, based on a summary compiled for the gear effects technical memo authored by Stevenson et al. (2004). Roughly, Areas 1A and 1B cover the Gulf of Maine, Area 2 covers southern the New England/Mid-Atlantic region, and Area 3 covers Georges Bank.

Figure 12 Atlantic Herring Management Areas and the Northeast U.S. Shelf Ecosystem



3.4.2 Essential Fish Habitat (EFH)

Since 1996, the MSA has included a requirement to evaluate the potential adverse effects of the Atlantic herring fishery on Atlantic herring EFH and on the EFH of other species. The EFH final rule specifies that measures to minimize impacts should be enacted when adverse effects that are 'more than minimal' and 'not temporary in nature' are anticipated.

The magnitude of adverse effects resulting from a fishery's operations is generally related to (1) the location of fishing effort, because habitat vulnerability is spatially heterogeneous, and (2) the amount of fishing effort, specifically the amount of seabed area swept or bottom time. To the extent that adoption of a particular alternative would shift fishing to more vulnerable habitats, and/or increase seabed area swept, adoption would be expected to cause an increase in habitat impacts as compared to no action. If adoption of an alternative is expected to reduce seabed area swept or cause fishing effort to shift away from more vulnerable into less vulnerable habitats, a decrease in habitat impacts would be expected. The magnitude of an increase or decrease in adverse effects relates to the proportion of total fishing effort affected by a particular alternative.

Bearing in mind that both the direction and magnitude of changes are difficult to predict, because changes in fishing behavior in response to management actions can be difficult to predict, potential shifts in adverse effects are discussed for each of the alternatives proposed in this action. However, changes in the magnitude of fishing effort as a result of individual measures should be viewed in the context of the overall impacts that the herring fishery is estimated to have on seabed habitats. *Specifically, previous analyses have concluded that adverse effect to EFH that result from operation of the herring fishery do not exceed the more than minimal or more than temporary thresholds.*

An assessment of the potential effects of the directed Atlantic herring commercial fishery on EFH for Atlantic herring and other federally-managed species in the Northeast region of the U.S. was conducted as part of an EIS that evaluated impacts of the Atlantic herring fishery on EFH (NMFS 2005). This analysis was included in Appendix VI, Volume II of the FEIS for Amendment 1 to the Atlantic Herring FMP. It found that midwater trawls and purse seines do occasionally contact the seafloor and may adversely impact benthic habitats utilized by a number of federally-managed species, including EFH for Atlantic herring eggs. However, after reviewing all the available information, the conclusion was reached that if the quality of EFH is reduced as a result of this contact, the impacts are minimal and/or temporary and, pursuant to MSA, do not need to be minimized, i.e., that there was no need to take specific action at that time to minimize the adverse effects of the herring fishery on benthic EFH. This conclusion also applied to pelagic EFH for Atlantic herring larvae, juveniles, and adults, and to pelagic EFH for any other federally-managed species in the region.

EFH for Atlantic Herring

The EFH designation for Atlantic herring was developed as part of EFH Omnibus Amendment 1 in 1998. EFH Omnibus Amendment 2, which includes updates to the EFH designation for herring, as well as for other NEFMC-managed species, is currently in development. Based on the 1998 designation, which is currently in effect, EFH for Atlantic herring is described in as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated in Figure 13 through Figure 16 and in Table 20 and meet the following conditions:

Eggs: Bottom habitats with a substrate of gravel, sand, cobble and shell fragments, but also on aquatic macrophytes, in the Gulf of Maine and Georges Bank as depicted in Figure 13. Eggs adhere to the bottom, forming extensive egg beds which may be many layers deep. Generally, the following conditions exist where Atlantic herring eggs are found: water temperatures below 15° C, depths from 20 - 80 meters, and a salinity range from 32 - 33‰. Herring eggs are most often found in areas of well-mixed water, with tidal currents between 1.5 and 3.0 knots. Atlantic herring eggs are most often observed during the months from July through November.

Larvae: Pelagic waters in the Gulf of Maine, Georges Bank, and southern New England that comprise 90% of the observed range of Atlantic herring larvae as depicted in Figure 14. Generally, the following conditions exist where Atlantic herring larvae are found: sea surface temperatures below 16° C, water depths from 50 – 90 meters, and salinities around 32‰. Atlantic herring larvae are observed between August and April, with peaks from September through November.

Juveniles: Pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras as depicted in Figure 15. Generally, the following conditions exist where Atlantic herring juveniles are found: water temperatures below 10° C, water depths from 15 – 135 meters, and a salinity range from 26 – 32‰.

Adults: Pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras as depicted in Figure 16. Generally, the following conditions exist where Atlantic herring adults are found: water temperatures below 10° C, water depths from 20 – 130 meters, and salinities above 28‰.

Spawning Adults: Bottom habitats with a substrate of gravel, sand, cobble and shell fragments, but also on aquatic macrophytes, in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Delaware Bay as depicted in Figure 16. Generally, the following conditions exist where spawning Atlantic herring adults are found: water temperatures below 15° C, depths from 20 - 80 meters, and a salinity range from 32 - 33‰. Herring eggs are spawned in areas of well-mixed water, with tidal currents between 1.5 and 3.0 knots. Atlantic herring are most often observed spawning during the months from July through November.

All of the above EFH descriptions include those bays and estuaries listed in Table 20, according to life history stage. The Council acknowledges potential seasonal and spatial variability of the conditions generally associated with this species.

Table 20 EFH Designation of Estuaries and Embayments for Atlantic Herring

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay		m,s	m,s	m,s	
Englishman/Machias Bay	s	m,s	m,s	m,s	s
Narraguagus Bay		m,s	m,s	m,s	
Blue Hill Bay		m,s	m,s	m,s	
Penobscot Bay		m,s	m,s	m,s	
Muscongus Bay		m,s	m,s	m,s	
Damariscotta River		m,s	m,s	m,s	
Sheepscot River		m,s	m,s	m,s	
Kennebec / Androscoggin Rivers		m,s	m,s	m,s	
Casco Bay	s	m,s	m,s	s	
Saco Bay		m,s	m,s	s	
Wells Harbor		m,s	m,s	s	
Great Bay		m,s	m,s	s	
Merrimack River		M	m		
Massachusetts Bay		s	s	s	
Boston Harbor		s	m,s	m,s	
Cape Cod Bay	s	s	m,s	m,s	
Waquoit Bay					
Buzzards Bay			m,s	m,s	
Narragansett Bay		s	m,s	m,s	
Long Island Sound			m,s	m,s	
Connecticut River					
Gardiners Bay			s	s	
Great South Bay			s	s	
Hudson River / Raritan Bay		m,s	m,s	m,s	
Barnegat Bay			m,s	m,s	
Delaware Bay			m,s	s	
Chincoteague Bay					
Chesapeake Bay				s	

S ≡ The EFH designation for this species includes the seawater salinity zone of this bay or estuary (salinity > 25.0‰).

M ≡ The EFH designation for this species includes the mixing water / brackish salinity zone of this bay or estuary (0.5 < salinity < 25.0‰).

F ≡ The EFH designation for this species includes the tidal freshwater salinity zone of this bay or estuary (0.0 < salinity < 0.5‰).

These EFH designations of estuaries and embayments are based on the NOAA Estuarine Living Marine Resources (ELMR) program (Jury et al. 1994; Stone et al. 1994).

Figure 13 EFH Designation for Atlantic Herring Eggs

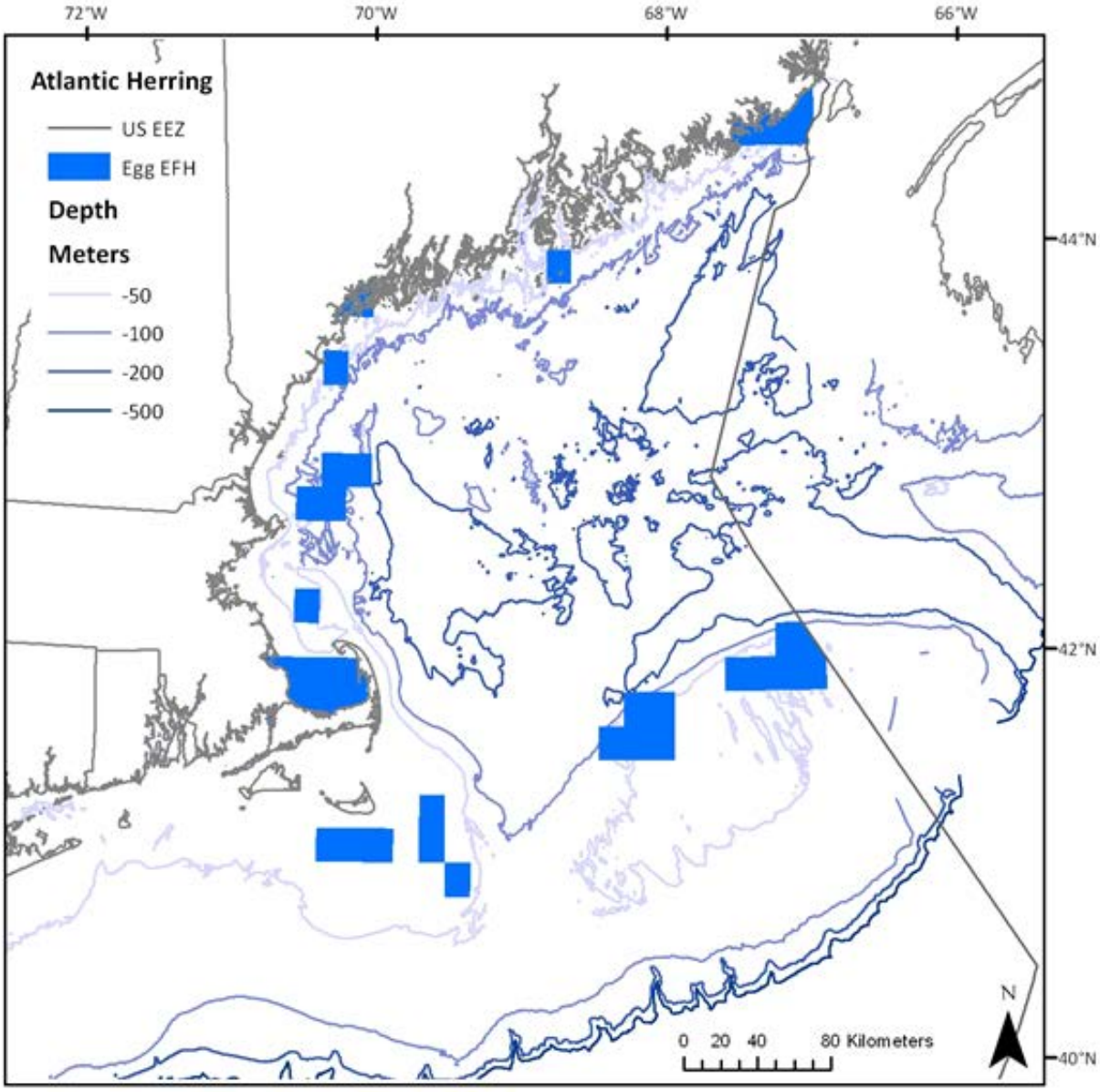


Figure 14 EFH Designation for Atlantic Herring Larvae

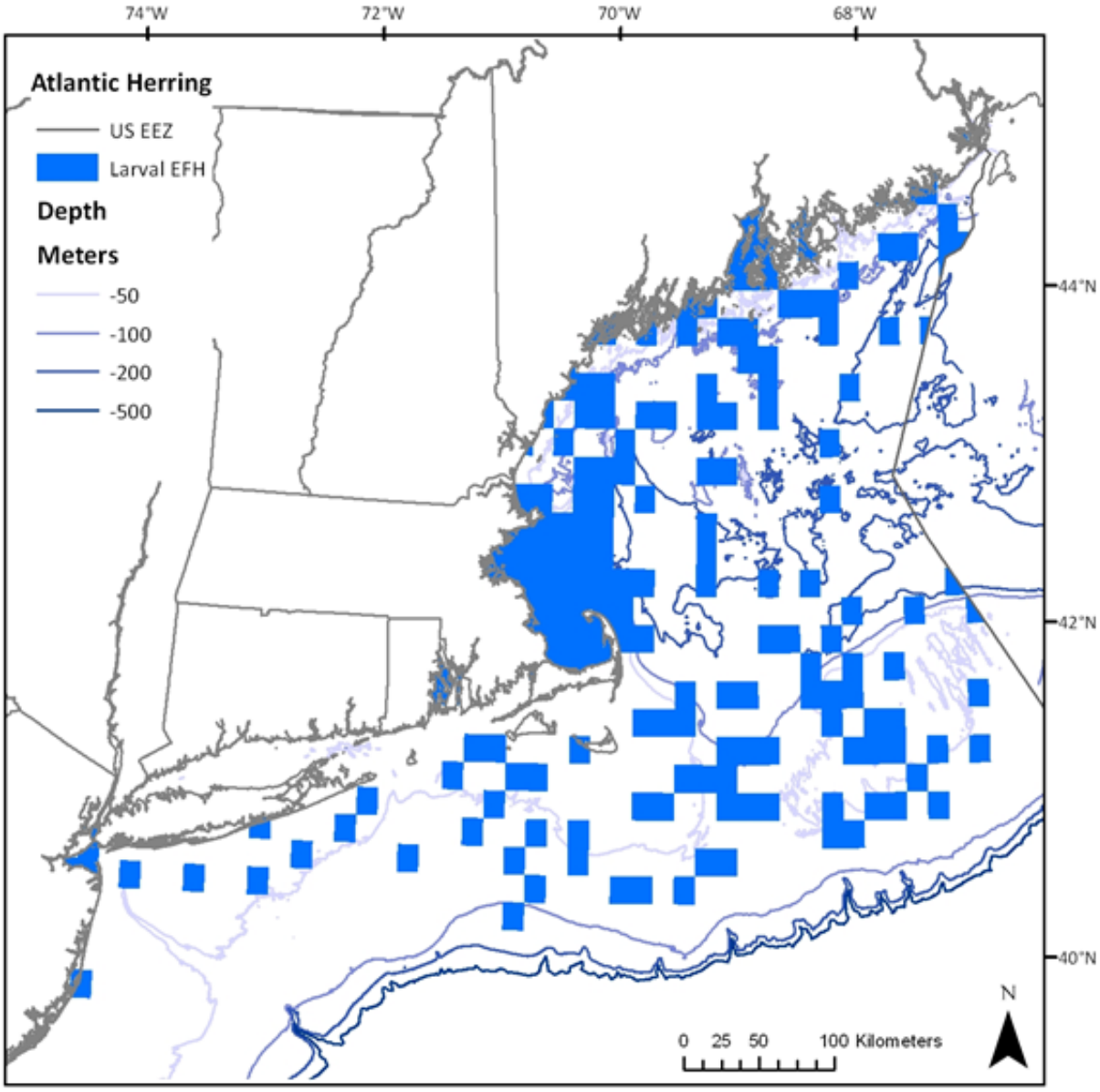


Figure 15 EFH Designation for Atlantic Herring Juveniles

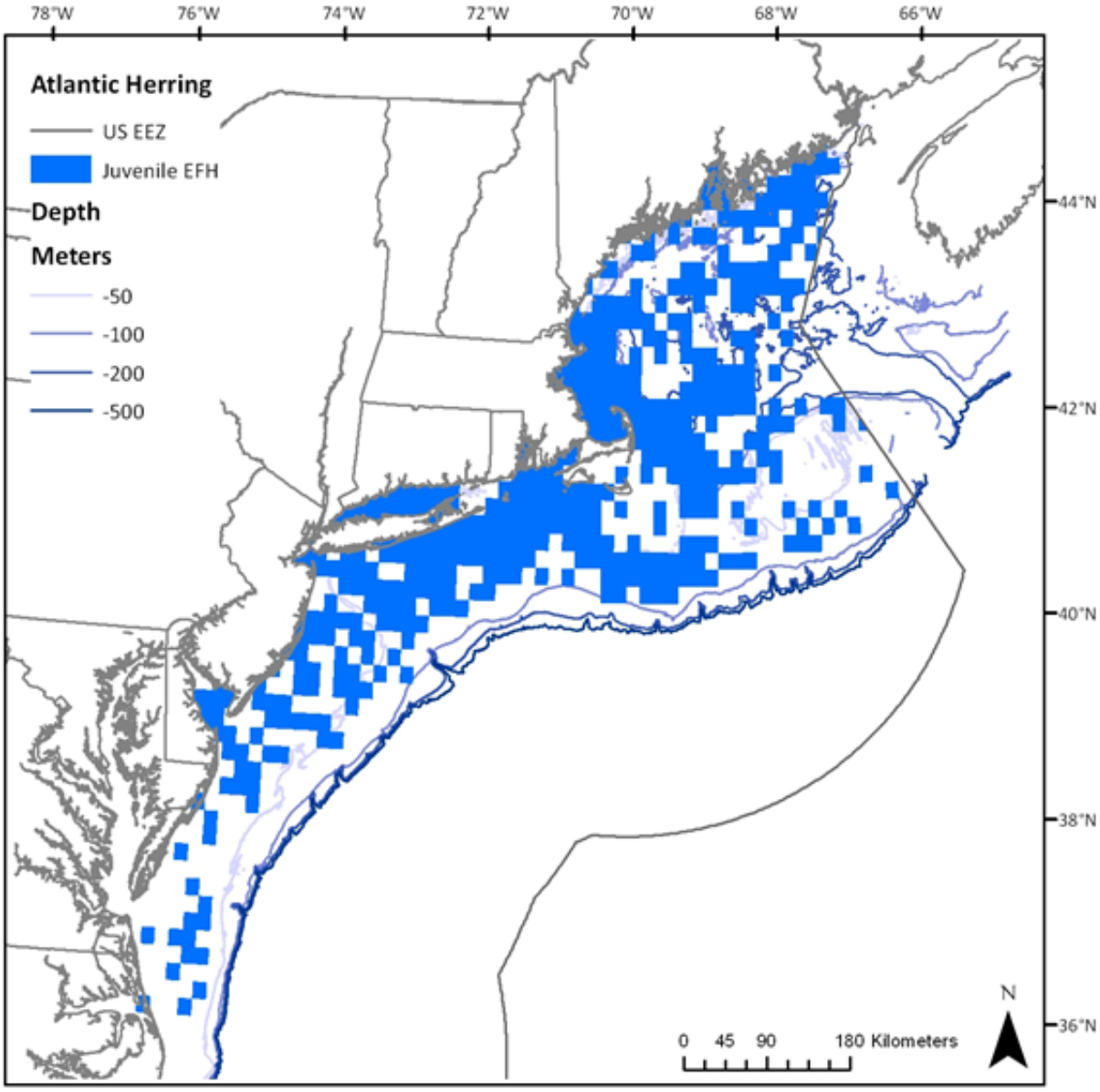
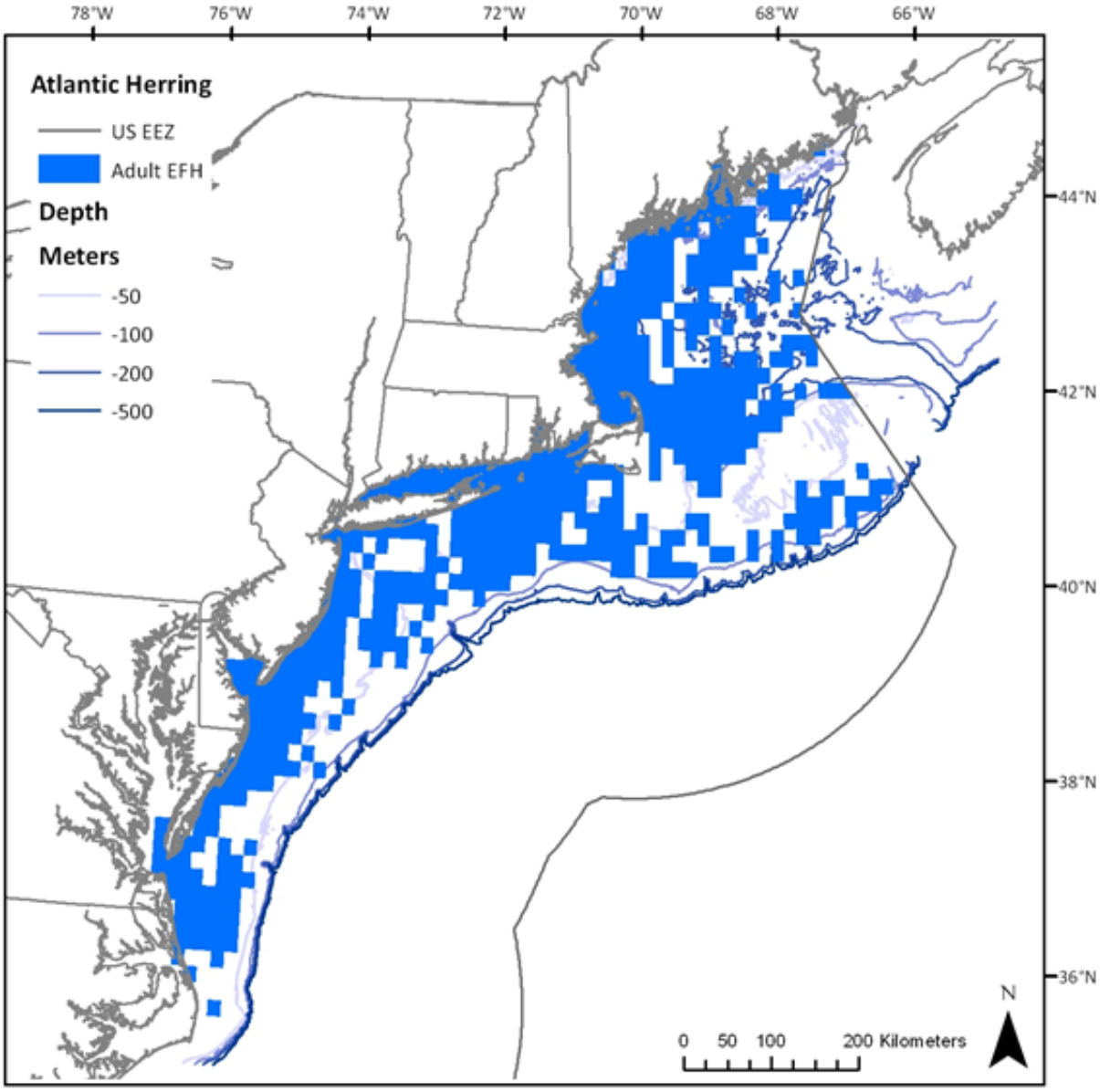


Figure 16 EFH Designation for Atlantic Herring Adults



EFH for Other Species

The environment that could potentially be affected by the Proposed Action has been identified as EFH for the benthic life stages of the species listed in Table 21. Additional information can be found in the FMP document that most recently updated each species' EFH designation (last column in Table 21). NOAA's EFH Mapper is also a good source of information and is a useful way to visualize the designations in a particular location: http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html.

Table 21 Listing of Sources for Current EFH Designation Information

Species	Management Authority	Plan Managed Under	Action where EFH designation was last updated
Monkfish	NEFMC, MAFMC	Monkfish	Amendment 1
Atlantic herring	NEFMC	Atlantic Herring	Original FMP
Atlantic salmon	NEFMC	Atlantic salmon	Original FMP
Atlantic sea scallop	NEFMC	Atlantic Sea Scallop	Amendment 9
American plaice	NEFMC	NE Multispecies	Amendment 11
Atlantic cod	NEFMC	NE Multispecies	Amendment 11
Atlantic halibut	NEFMC	NE Multispecies	Amendment 11
Atlantic wolffish	NEFMC	NE Multispecies	Amendment 16
Haddock	NEFMC	NE Multispecies	Amendment 11
Ocean pout	NEFMC	NE Multispecies	Amendment 11
Offshore hake	NEFMC	NE Multispecies	Amendment 12
Pollock	NEFMC	NE Multispecies	Amendment 11
Red hake	NEFMC	NE Multispecies	Amendment 12
Redfish	NEFMC	NE Multispecies	Amendment 11
Silver hake	NEFMC	NE Multispecies	Amendment 12
White hake	NEFMC	NE Multispecies	Amendment 11
Windowpane flounder	NEFMC	NE Multispecies	Amendment 11
Winter flounder	NEFMC	NE Multispecies	Amendment 11
Witch flounder	NEFMC	NE Multispecies	Amendment 11
Yellowtail flounder	NEFMC	NE Multispecies	Amendment 11
Barndoor skate	NEFMC	NE Skate Complex	Original FMP
Clearnose skate	NEFMC	NE Skate Complex	Original FMP
Little skate	NEFMC	NE Skate Complex	Original FMP
Rosette skate	NEFMC	NE Skate Complex	Original FMP
Smooth skate	NEFMC	NE Skate Complex	Original FMP
Thorny skate	NEFMC	NE Skate Complex	Original FMP
Winter skate	NEFMC	NE Skate Complex	Original FMP
Red crab	NEFMC	Red Crab	Original FMP
Spiny dogfish	MAFMC/NEFMC	Spiny Dogfish	Original FMP
Atlantic surfclam	MAFMC	Atlantic Surfclam Ocean Quahog	Amendment 12
Ocean quahog	MAFMC	Atlantic Surfclam Ocean Quahog	Amendment 12
Bluefish	MAFMC	Bluefish FMP	Amendment 1
Atlantic mackerel	MAFMC	Squid, Mackerel, Butterfish	Amendment 11
Butterfish	MAFMC	Squid, Mackerel, Butterfish	Amendment 11
Longfin squid	MAFMC	Squid, Mackerel, Butterfish	Amendment 11
Shortfin squid	MAFMC	Squid, Mackerel, Butterfish	Amendment 11

Note: Current as of December 2012.

Table 21 continued.

Black sea bass	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Amendment 12
Scup	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Amendment 12
Summer flounder	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Amendment 12
Tilefish	MAFMC	Tilefish	Amendment 1

Note: Current as of December 2012.

3.5 PROTECTED RESOURCES

There are numerous protected species that inhabit the environment within the Atlantic Herring FMP management unit that are afforded protection under the Endangered Species Act of 1973 (ESA; i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act of 1972 (MMPA), and are under NMFS' jurisdiction. As listed in Table 22, 18 marine mammal, sea turtle, and fish species are classified as endangered or threatened under the ESA; the remaining species in Table 22 are protected by the MMPA and are known to interact with the Atlantic herring fishery. Non ESA-listed species protected by the MMPA that utilize this environment and have no documented interaction with the herring fishery will not be discussed in this document.

3.5.1 Species Present in the Area

Table 22 lists the species, protected either by the ESA, the MMPA, or both, that may be found in the environment that would be utilized by the Atlantic herring fishery. Table 22 also includes one candidate fish species (species being considered for listing as an endangered or threatened species), as identified under the ESA.

Candidate species are those petitioned species that are actively being considered for listing as endangered or threatened under the ESA, as well as those species for which NMFS has initiated an ESA status review that it has announced in the Federal Register. Cusk is known to occur within the action area of the herring fishery. Candidate species receive no substantive or procedural protection under the ESA; however, NMFS recommends considering conservation actions to limit the potential for adverse effects on candidate species. The Protected Resources Division of the NMFS Northeast Regional Office has initiated review of recent stock assessments, bycatch information, and other information for these candidate species which will be incorporated in the status review reports. The results of those efforts are needed to accurately characterize recent interactions between fisheries and the candidate species in the context of stock sizes. Any conservation measures deemed appropriate for these species will follow the information from these reviews. Please note that the conference provisions apply only if a candidate species is proposed for listing (and thus becomes a proposed species, see 50 CFR 402.10).

Table 22 Species Protected Under the ESA and MMPA That May Occur in the Operations Area for the Atlantic Herring Fishery

Species	Status
Cetaceans	
North Atlantic right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sperm whale (*Physeter macrocephalus*	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Pilot whale (*Globicephala spp*.)	Protected
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Bottlenose dolphin (*Tursiops truncatus*)[b]	Protected
Sea Turtles	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered[c]
Loggerhead sea turtle (*Caretta caretta*)	
NWA DPS	Threatened
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered
Fish	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Cusk *(Brosme brosme)*	Candidate
Atlantic sturgeon *(Acipenser oxyrinchus)*	
GOM DPS	Threatened
NYB DPS	Endangered
CB DPS	Endangered
SA DPS	Endangered
CAR DPS	Endangered
Pinnipeds	
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Harp seal (*Phoca groenlandicus*)	Protected
Hooded seal (*Cystophora cristata*)	Protected

Notes:

[a] MMPA-listed species occurring on this list are only those species that have a history of interaction with similar gear types within the action area of the Atlantic Herring Fishery, as defined in the 2010 List of Fisheries.

[b] Bottlenose dolphin (*Tursiops truncatus*), Western North Atlantic coastal stock is listed as depleted.

[c] Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.

3.5.2 Species Potentially Affected

It is expected that the sea turtle, cetacean, and pinniped species discussed below have the potential to be affected by the operation of the herring fishery. Background information on the range-wide status of sea turtle and marine mammal species that occur in the area and are known or suspected of interacting with fishing gear (demersal gear including trawls, gillnets, and longline types) can be found in a number of published documents. These include sea turtle status reviews and biological reports (NMFS and USFWS 1995; Marine Turtle Expert Working Group (TEWG) 1998, 2000; NMFS and USFWS 2007a, 2007b; Leatherback TEWG 2007), recovery plans for ESA-listed cetaceans and sea turtles (NMFS 1991, 2005, 2010, and 2011; NMFS and USFWS 1991a, 1991b; NMFS and USFWS 1992), the marine mammal stock assessment reports (e.g., Waring et al. 2006; 2007; 2009, 2010, 2011, and 2013), and other publications (e.g., Clapham et al. 1999, Perry et al. 1999, Best et al. 2001, Perrin et al. 2002).

Additional ESA background information on the range-wide status of these species and a description of critical habitat can be found in a number of published documents including recent sea turtle (NMFS and USFWS 1995, TEWG 2000, NMFS SEFSC 2001, NMFS and USFWS 2007), loggerhead recovery team report (NMFS and USFWS 2008), status reviews and stock assessments, Recovery Plans for the humpback whale (NMFS 1991), right whale (NMFS 1991a, NMFS 2005), right whale EIS (August 2007), and the marine mammal stock assessment report (Waring et al. 2013) and other publications (e.g., Perry et al. 1999; Clapham et al. 1999; IWC 2001 a). A recovery plan for fin and sei whales is also available and may be found at the following web site http://www.NOAAFisheries.noaa.gov/prot_res/PR3/recovery.html (NOAA Fisheries unpublished).

3.5.2.1 Sea Turtles

The Northwest Atlantic DPS of loggerhead, leatherback, Kemp's ridley, and green sea turtles occur seasonally in southern New England and Mid-Atlantic continental shelf waters north of Cape Hatteras, North Carolina. In general, turtles move up the coast from southern wintering areas as water temperatures warm in the spring (James et al. 2005a, Morreale and Standora 2005, Braun-McNeill and Epperly 2004, Morreale and Standora 1998, Musick and Limpus 1997, Shoop and Kenney 1992, Keinath et al. 1987). The trend is reversed in the fall as water temperatures cool. By December, turtles have passed Cape Hatteras, returning to more southern waters for the winter (James et al. 2005a, Morreale and Standora 2005, Braun-McNeill and Epperly 2004, Morreale and Standora 1998, Musick and Limpus 1997, Shoop and Kenney 1992, Keinath et al. 1987). Hard-shelled species are typically observed as far north as Cape Cod whereas the more cold-tolerant leatherbacks are observed in more northern Gulf of Maine waters in the summer and fall (Shoop and Kenney 1992, STSSN database http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp).

A final listing determination was published on September 22, 2011 (76 FR 58867that designates four DPSs (Northwest Atlantic, South Atlantic, Southeast Indo-Pacific, Southwest Indian) as threatened, and five DPSs (Northeast Atlantic, Mediterranean, North Indian, North Pacific, South Pacific) as endangered.

In general, sea turtles are a long-lived species and reach sexual maturity relatively late (NMFS SEFSC 2001; NMFS and USFWS 2007a, 2007b, 2007c, 2007d). Sea turtles are injured and killed by numerous human activities (NRC 1990; NMFS and USFWS 2007a, 2007b, 2007c, 2007d). Nest count data are a valuable source of information for each turtle species since the number of nests laid reflects the reproductive output of the nesting group each year. A decline in the annual nest counts has been measured or suggested for four of five western Atlantic loggerhead nesting groups through 2004 (NMFS and USFWS 2007a), however, data collected since 2004 suggests nest counts have stabilized or increased (TEWG 2009). Nest counts for Kemp's ridley sea turtles as well as leatherback and green sea turtles in the Atlantic demonstrate increased nesting by these species (NMFS and USFWS 2007b, 2007c, 2007d).

3.5.2.2 Large Cetaceans

The most recent Marine Mammal Stock Assessment Report (SAR) (Waring et al. 2013) reviewed the current population trend for each of these cetacean species within U.S. EEZ waters, as well as providing information on the estimated annual human-caused mortality and serious injury, and a description of the commercial fisheries that interact with each stock in the U.S. Atlantic. Information from the SAR is summarized below.

The western North Atlantic baleen whale species (North Atlantic right, humpback, fin, sei, and minke) follow a general annual pattern of migration from high latitude summer foraging grounds, including the Gulf and Maine and Georges Bank, to low latitude winter calving grounds (Perry et al. 1999, Kenney 2002). However, this is an oversimplification of species movements, and the complete winter distribution of most species is unclear (Perry et al. 1999, Waring et al. 2013). Studies of some of the large baleen whales (right, humpback, and fin) have demonstrated the presence of each species in higher latitude waters even in the winter (Swingle et al. 1993, Wiley et al. 1995, Perry et al. 1999, Brown et al. 2002, Patrician et al. 2009). Blue whales are most often sighted on the east coast of Canada, particularly in the Gulf of St. Lawrence, and occurs only infrequently within the U.S. EEZ (Waring et al. 2010).

For North Atlantic right whales, the available information suggests that the population is increasing at a rate of 2.6 percent per year during 1990-2009, and the total number of North Atlantic right whales is estimated to be at least 444 animals in 2009 (Waring et al. 2013). The minimum rate of annual human-caused mortality and serious injury to right whales averaged 3.0 per year during 2006 to 2010 (Waring et al. 2013). Of these, 1.8 per year resulted from fishery interactions.

The North Atlantic population of humpback whales is estimated to be 11,570, although the estimate is considered to be negatively biased (Waring et al. 2013). The best estimate for the Gulf of Maine stock of humpback whales is 823 whales (Waring et al. 2013). The population trend was considered positive for the Gulf of Maine population, but there are insufficient data to estimate the trend for the larger North Atlantic population. Based on data available for selected areas and time periods, the minimum population estimates for other western North Atlantic whale stocks are 3,269 fin whales, 208 sei whales, 440 blue whales, 3,539 sperm whales, and

6,909 minke whales (Waring et al. 2010). Insufficient data exist to determine trends for any other large whale species.

The ALWTRP was revised with publication of a new final rule (72 FR 57104, October 5, 2007) that is intended to continue to address entanglement of large whales (right, humpback, and fin) in commercial fishing gear and to reduce the risk of death and serious injury from entanglements that do occur.

On October 5, 2010, NOAA's Fisheries Service (NMFS) published a notice of a 90-day petition finding and notice of 12-month determination for North Atlantic right whale critical habitat in the Federal Register. NMFS was already conducting an ongoing analysis and evaluation of new information not available at the time of the original 1994 critical habitat designation prior to the receipt of this petition. Three critical habitat areas currently exist, established in 1994, two of which occur in the northeast region: feeding grounds in Cape Cod Bay and the Great South Channel.

3.5.2.3 Small Cetaceans

Numerous small cetacean species (dolphins; pygmy and dwarf sperm whales; pilot and beaked, whales; and the harbor porpoise) occur within [the area from Cape Hatteras through the Gulf of Maine]. Seasonal abundance and distribution of each species in [Mid-Atlantic, Georges Bank, and/or Gulf of Maine] waters varies with respect to life history characteristics. Some species primarily occupy continental shelf waters (e.g., white sided dolphins, harbor porpoise), while others are found primarily in continental shelf edge and slope waters (e.g., Risso's dolphin, pilot whales), and still others occupy all three habitats (e.g., common dolphin, spotted dolphins, striped dolphins). Information on the western North Atlantic stocks of each species is summarized in Waring et al. (2011). Some additional updated information about small cetaceans can be found at http://www.nmfs.noaa.gov/pr/sars/species.htm.

With respect to harbor porpoise, the most recent Stock Assessment Reports show that the number of harbor porpoise takes (927 animals/year from 2005-2009) exceed this stocks Potential Biological Removal (PBR) level calculated for this species (701 animals) and is therefore a strategic stock. The most recent amendment to the Harbor Porpoise Take Reduction Plan (HPTRP) occurred in 2010. Observer information collected from 1999 through 2007 indicated an increase in porpoise bycatch throughout the geographic area covered by the HPTRP in both New England and Mid-Atlantic waters in commercial sink gillnet gear. The Harbor Porpoise Take Reduction Team developed measures to reduce takes, and NMFS published a proposed rule on July 21, 2009 (74 Federal Register 36058) with five alternatives including no action. The comment period on this rule ended on August 20, 2009 and the final rule was published on February 19, 2010 (75 Federal Register 7383).

The following changes were implemented in the 2010 amendments to the HPTRP:

New England

- Expand the size of the Massachusetts Bay Management Area, as well as pinger use to include November;
- Establish the Stellwagen Bank Management Area and require pingers from November 1 through May 31;
- Establish the Southern New England Management Area where pingers are required from December 1 through May 31; and
- Establish the Cape Cod South Expansion Consequence Closure Area and Coastal Gulf of Maine Consequence Closure Area. These areas would be closed to gillnetting for two to three months if harbor porpoise bycatch levels exceed specific bycatch thresholds.

Mid-Atlantic

- Establish the MudHole South Management Area, with a seasonal closure and gear modifications for large and small mesh gear;
- Modify the northern boundary of the waters off New Jersey Management Area to intersect with the southern shoreline of Long Island, NY at 72° 30' W longitude; and
- Modify tie-down spacing requirement for large mesh gillnets in all Mid-Atlantic management areas (waters off New Jersey, MudHole North and South, and Southern Mid-Atlantic Management Areas).

The Atlantic Trawl Gear Take Reduction Team (ATGTRT) was organized in 2006 to implement a plan to address the incidental mortality and serious injury of long-finned pilot whales, short-finned pilot whales, common dolphins, and Atlantic white-sided dolphins in several trawl gear fisheries. In lieu of a TRP, the ATGTRT agreed to develop an Atlantic Trawl Gear Take Reduction Strategy (ATGTRS). The ATGTRS identifies informational and research tasks as well as education and outreach needs the ATGTRT believes are necessary to provide the basis for achieving the ultimate MMPA goal of achieving ZMRG. The ATGTRS also identifies several potential voluntary measures that can be adopted by certain trawl fishing sectors to potentially reduce the incidental capture of marine mammals. These voluntary measures are as follows:

- Reducing the numbers of turns made by the fishing vessel and tow times while fishing at night; and
- Increasing radio communications between vessels about the presence and/or incidental capture of a marine mammal to alert other fishermen of the potential for additional interactions in the area.

3.5.2.4 Pinnipeds

Of the four species of seals expected to occur in the area, harbor seals have the most extensive distribution with sightings occurring as far south as 30° N (Katona et al. 1993, Waring et al. 2011). Gray seals are the second most common seal species in U.S. EEZ waters, occurring primarily in New England (Katona et al. 1993; Waring et al. 2011). Pupping for both species occurs in both U.S. and Canadian waters of the western north Atlantic with the majority of harbor seal pupping likely occurring in U.S. waters and the majority of gray seal pupping in Canadian waters, although there are at least three gray seal pupping colonies in U.S. waters as well. Harp and hooded seals are less commonly observed in U.S. EEZ waters. Both species form aggregations for pupping and breeding off eastern Canada in the late winter/early spring, and then travel to more northern latitudes for molting and summer feeding (Waring et al. 2011). Both species have a seasonal presence in U.S. waters from Maine to New Jersey, based on sightings, stranding, and fishery bycatch (Waring et al. 2011). Some additional updated information about pinnipeds can be found at http://www.nmfs.noaa.gov/pr/sars/species.htm.

3.5.2.5 Atlantic Sturgeon DPSs

Atlantic sturgeon is an anadromous species that spawns in relatively low salinity, river environments, but spends most of its life in the marine and estuarine environments from Labrador, Canada to the Saint Johns River, Florida (Holland and Yelverton 1973, Dovel and Berggen 1983, Waldman et al. 1996, Kynard and Horgan 2002, Dadswell 2006, ASSRT 2007). Tracking and tagging studies have shown that subadult and adult Atlantic sturgeon that originate from different rivers mix within the marine environment, utilizing ocean and estuarine waters for life functions such as foraging and overwintering (Stein et al. 2004a, Dadswell 2006, ASSRT 2007, Laney et al. 2007, Dunton et al. 2010). Fishery-dependent data as well as fishery-independent data demonstrate that Atlantic sturgeon use relatively shallow inshore areas of the continental shelf; primarily waters less than 50 m (Stein et al. 2004b, ASMFC TC 2007, Dunton et al. 2010). The data also suggest regional differences in Atlantic sturgeon depth distribution with sturgeon observed in waters primarily less than 20 m in the Mid-Atlantic Bight and in deeper waters in the Gulf of Maine (Stein et al. 2004b, ASMFC TC 2007, Dunton et al. 2010). Available information on population sizes for each Atlantic sturgeon DPS is very limited. Based on the best available information, NMFS has concluded that bycatch, vessel strikes, water quality and water availability, dams, lack of regulatory mechanisms for protecting the fish, and dredging are the most significant threats to Atlantic sturgeon.

Comprehensive information on current abundance of Atlantic sturgeon is lacking for all of the spawning rivers (ASSRT 2007). There are no total population size estimates for any of the five Atlantic sturgeon DPSs at this time. However, there are two estimates of spawning adults per year for two river systems (e.g., 870 spawning adults per year for the Hudson River, and 343 spawning adults per year for the Altamaha River). These estimates represent only a fraction of the total population size as Atlantic sturgeon do not appear to spawn every year and additionally, these estimates do not include sub-adults or early life stages. Detailed life history information may be found in the 2007 Atlantic Sturgeon Status Review, available at:

http://sero.nmfs.noaa.gov/pr/esa/Sturgeon/Atl%20Sturgeon/atlanticsturgeon2007.pdf.

There is no documented bycatch of Atlantic sturgeon in midwater trawls and herring purse-seine gear, which makes up the majority of the herring fishing effort. Otter trawl gear is known to capture Atlantic sturgeon and has been known to be used in the herring fishery. However, otter trawl gear make up a very small percentage of the herring fishery effort and it is highly unlikely that this gear would interact with any Atlantic sturgeon.

3.5.3 Species Not Likely to be Affected

The action being considered in this EA is not likely to adversely affect shortnose sturgeon, the Gulf of Maine distinct population segment (DPS) of Atlantic salmon, hawksbill sea turtles, blue whales, or sperm whales, all of which are listed as endangered species under the ESA. Shortnose sturgeon and salmon belonging to the Gulf of Maine DPS of Atlantic salmon occur within the general geographical areas fished by the herring fishery, but they are unlikely to occur in the area where the fishery operates given their numbers and distribution. Therefore, none of these species are likely to be affected by the herring fishery. The following discussion provides the rationale for these determinations. Although there are additional species that may occur in the operations area that are not known to interact with the specific gear types that would be used by the herring fleet, impacts to these species are still considered due to their range and similarity of behaviors to species that have been adversely affected.

Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. Shortnose sturgeon can be found in rivers along the western Atlantic coast from St. Johns River, Florida (although the species is possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range (i.e., south of Chesapeake Bay), while some northern populations are amphidromous (NMFS 1998). Since the herring fishery would not operate in or near the rivers where concentrations of shortnose sturgeon are most likely found, it is highly unlikely that the fishery would affect shortnose sturgeon.

The wild populations of Atlantic salmon found in rivers and streams from the lower Kennebec River north to the U.S. - Canada border are listed as endangered under the ESA. These populations include those in the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers and Cove Brook. Juvenile salmon in New England rivers typically migrate to sea in May after a 2- to 3-year period of development in freshwater streams, and remain at sea for two winters before returning to their U.S. natal rivers to spawn. Results from a 2001 post-smolt trawl survey in Penobscot Bay and the nearshore waters of the Gulf of Maine indicate that Atlantic salmon post-smolts are prevalent in the upper water column throughout this area in mid- to late May. Therefore, commercial fisheries deploying small-mesh active gear (pelagic trawls and purse seines within 10 m of the surface) in nearshore waters of the Gulf of Maine may have the potential to incidentally take smolts. However, it is highly unlikely that the approval of this EA would affect the Gulf of Maine DPS of Atlantic salmon given that operation of the herring fishery would not occur in or near the rivers where concentrations of Atlantic salmon are likely to be found and herring fishing gear used by the fleet

operates in the ocean at or near the bottom rather than near the water surface. Thus, this species is not considered further in this EA.

The hawksbill turtle is uncommon in the waters of the continental U.S. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America. Hawksbills feed primarily on a wide variety of sponges but also consume bryozoans, coelenterates, and mollusks. The Culebra Archipelago of Puerto Rico contains especially important foraging habitat for hawksbills. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands. There are accounts of hawksbills in south Florida and individuals have been sighted along the east coast as far north as Massachusetts; however, east coast sightings north of Florida are rare (NMFS 2009a). Since operation of the herring fishery would not occur in waters that are typically used by hawksbill sea turtles, it is highly unlikely that its operations would affect this turtle species.

Blue whales do not regularly occur in waters of the U.S. EEZ (Waring et al. 2010). In the North Atlantic, blue whales are most frequently sighted in the St. Lawrence from April to January (Sears 2002). No blue whales were observed during the Cetacean and Turtle Assessment Program (CeTAP) surveys of the mid- and north Atlantic areas of the outer continental shelf (CeTAP 1982). Calving for the species occurs in low latitude waters outside of the area where the herring fishery operates. Blue whales feed on euphausiids (krill) that are too small to be captured in fishing gear. Given that the species is unlikely to occur in areas where the herring fishery operates, and given that the operation of the fishery would not affect the availability of blue whale prey or areas where calving and nursing of young occurs, the Proposed Action would not be likely to adversely affect blue whales.

Sperm whales occur in waters of the EEZ. However, the distribution of the sperm whales in the EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring et al. 2007). In contrast, the herring fishery would operate in continental shelf waters. The average depth of sperm whale sightings observed during the CeTAP surveys was 1792 m (CeTAP 1982). Female sperm whales and young males almost always inhabit open ocean, deep water habitat with bottom depths greater than 1000 m and at latitudes less than 40° N (Whitehead 2002). Sperm whales feed on large squid and fish that inhabit the deeper ocean regions (Perrin et al. 2002). Given that sperm whales are unlikely to occur in areas (based on water depth) where the herring fishery would operate, and given that the operation of the fishery would not affect the availability of sperm whale prey or areas where calving and nursing of young occurs, the Proposed Action would not be likely to adversely affect sperm whales. Although large whales and marine turtles may be potentially affected through interactions with fishing gear, it is likely that the continued authorization of the herring fishery should not have any adverse effects on the availability of prey for these species. Right whales and sei whales feed on copepods (Horwood 2002, Kenney 2002). The herring fishery would not affect the availability of copepods for foraging right and sei whales because copepods are very small organisms that would pass through herring fishing gear rather than being captured in it. Humpback whales and fin whales also feed on krill as well as small schooling fish (e.g., sand lance, herring, mackerel) (Aguilar 2002, Clapham 2002). The TRAC Status Report of 2006 suggests that although predator consumption estimates have increased since the mid-1980s, the productive potential of the herring stock complex has improved in recent years. The proposed

management measures may provide a benefit to the protected resources by providing a greater quantity of food available. Moreover, none of the turtle species are known to feed upon herring.

3.5.4 Interactions Between Gear and Protected Resources

Commercial fisheries are categorized by NMFS based on a two-tiered, stock-specific fishery classification system that addresses both the total impact of all fisheries on each marine mammal stock as well as the impact of individual fisheries on each stock. The system is based on the numbers of animals per year that incur incidental mortality or serious injury due to commercial fishing operations relative to a stock's Potential Biological Removal (PBR) level (the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population). Tier 1 takes into account the cumulative mortality and serious injury to marine mammals caused by commercial fisheries while Tier 2 considers marine mammal mortality caused by the individual fisheries; Tier 2 classifications are used in this EA to indicate how each type of gear proposed for use in the Proposed Action may affect marine mammals. Table 23 identifies the classifications used in the List of Fisheries (LOF) for FY 2012 (76 FR 73912; November 29, 2011), which are broken down into Tier 2 Categories I, II, and III.

Table 23 Descriptions of the Tier 2 Fishery Classification Categories

Category	Category Description
Tier 2, Category I	A commercial fishery that has frequent incidental mortality and serious injury of marine mammals This classification indicates that a commercial fishery is, by itself, responsible for the annual removal of 50 percent or more of any stock's potential biological removal (PBR) level.
Tier 2, Category II	A commercial fishery that has occasional incidental mortality and serious injury of marine mammals. This classification indicates that a commercial fishery is one that, collectively with other fisheries, is responsible for the annual removal of more than 10 percent of any marine mammal stock's PBR level and that is by itself responsible for the annual removal of between 1 percent and 50 percent, exclusive of any stock's PBR.
Tier 2, Category III	A commercial fishery that has a remote likelihood of, or no known incidental mortality and serious injury of marine mammals. This classification indicates that a commercial fishery is one that collectively with other fisheries is responsible for the annual removal of: a. Less than 50 percent of any marine mammal stock's PBR level, or b. More than 1 percent of any marine mammal stock's PBR level, yet that fishery by itself is responsible for the annual removal of 1 percent or less of that stock's PBR level. In the absence of reliable information indicating the frequency of incidental mortality and serious injury of marine mammals by a commercial fishery, the Assistant Administrator would determine whether the incidental serious injury or mortality is "remote" by evaluating other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, qualitative data from logbooks or fisher reports, stranding data, and the species and distribution of marine mammals in the area or at the discretion of the Assistant Administrator.

Interactions between gear and a given species occur when fishing gear overlaps both spatially and trophically with the species' niche. Spatial interactions are more "passive" and involve unintentional interactions with fishing gear. Trophic interactions are more "active" and occur when protected species attempt to consume prey caught in fishing gear and become entangled in the process. Spatial and trophic interactions can occur with various types of fishing gear used by herring fishery through the year. Large and small cetaceans and sea turtles are more prevalent within the operations area during the spring and summer, although they are also relatively abundant during the fall and would have a higher potential for interaction with herring vessels during these seasons. Although harbor seals may be more likely to occur in the operations area between fall and spring, harbor and gray seals are year-round residents; therefore, interactions could occur year-round. The uncommon occurrences of hooded and harp seals in the operations area are more likely to occur during the winter and spring, allowing for an increased potential for interactions during the winter.

Although interactions between deployed gear and protected species would vary, all the species identified in Table 24 have the potential to be affected by the operation of the Atlantic herring fishery. The herring fishery is prosecuted by midwater trawl gear (single), paired midwater trawls, purse seines, stop seines and weirs. A full description of the gear used in the herring fishery is provided in the Amendment 1 FEIS. Only the first three are considered to be primary gears in the Atlantic herring fishery. Weirs and stop seines are responsible for a only a small fraction of herring landings, operate exclusively within State waters, and are not regulated by the Federal FMP, and therefore will not be discussed further in this document relative to protected species. It should be noted, however, that both gear types have accounted for interactions with protected species, notably minke whales and harbor porpoise, as well as harbor and gray seals. Animals, particularly pinnipeds, may be released alive.

Table 24 Marine Mammals Impacts Based on Herring Gear (Based on 2012 List of Fisheries)

Fishery		Estimated Number of Vessels/Persons	Marine Mammal Species and Stocks Incidentally Killed or Injured
Category	**Type**		
Tier 2, Category II	Mid-Atlantic midwater trawl (including pair trawl)	669	Bottlenose dolphin, WNA offshore Common dolphin, WNA Long-finned pilot whale, WNA Risso's dolphin, WNA Short-finned pilot whale, WNA White-sided dolphin, WNA
Tier 2, Category II	Northeast midwater trawl (including pair trawl)	887	Harbor seal, WNA Long-finned pilot whale, WNA Short-finned pilot whale, WNA White-sided dolphin, WNA
Tier 2 Category II	Gulf of Maine Atlantic herring purse seine	>6	Harbor seal, WNA Gray Seal, WNA
Tier 2, Category III	Gulf of Maine herring and Atlantic mackerel stop seine/weir	Unknown	Gray seal, Northwest North Atlantic Harbor porpoise, GME/BF Harbor seal, WNA Minke whale, Canadian East Coast White-sided dolphin, WNA

Due to the remote likelihood of interactions denoted by the List of Fisheries designations for the purse seine fishery and stop seines and weirs, discussion of these fisheries will only be where necessary. This discussion will instead focus on the proposed measures and associated midwater trawl activities.

Given the target species of this fishery and because herring is a primary prey species for seals, porpoises and some whales, levels of protected species interactions with the fishery are likely for the midwater and pair trawl. The NOAA Fisheries Northeast Fisheries Science Center incidental take reports are published on the Northeast Fisheries Science Center website - http://www.nefsc.noaa.gov/femad/fishsamp/fsb/. A number of takes have occurred in the past four years by the midwater trawl fishery, as indicated in Table 25.

Table 25 Number of MWT Incidental Takes Recorded by Fisheries Observers

Protected Species Encountered	2011 (To August)	2010	2009	Total
Grey Seal	10	5	1	6
Harbor Seal	3	4	1	5
Common Dolphin		1		1
Dolphin Unk.		1		1
Mammal Unk.		1		1
Seal Unk.	8	1		1

Although the incidents are isolated to observed herring trips, the table indicates that grey seals and harbor seals are the most likely to be taken in the herring fishery. Both gray and harbor seals are distributed inshore during the period of highest activity in the herring fishery, from May through October. Interactions are most likely to occur in Area 1A. Although these species have had documented interactions with the herring purse seine/fixed gear fishery, the animals, if observed, are often released alive.

3.5.5 Actions to Minimize Interactions with Protected Species

To minimize potential impacts to certain cetaceans, herring vessels are required to adhere to measures in the ALWTRP, although the gear regulated are seldom used in the directed herring fishery. This was developed to reduce the incidental take of large whales, specifically the right, humpback, fin, and minke whales in certain Category I or II commercial fishing efforts that utilize traps/pots and gillnets. The ALWTRP calls for the use of gear markings, area restrictions, and use of weak links, and neutrally buoyant groundline. Fishing vessels would be required to implement the ALWTRP in all areas where gillnets were used. In addition, the HPTRP would be implemented in the Gulf of Maine to reduce interactions between the harbor porpoise and gillnets; the HPTRP implements gear specifications, seasonal area closures, and in some cases, the use of pingers (acoustic devices that emit a loud sound) to deter harbor porpoises and other marine mammals from approaching the nets. Gillnets are not used in the herring fishery, however.

3.6 FISHERY-RELATED BUSINESSES AND COMMUNITIES

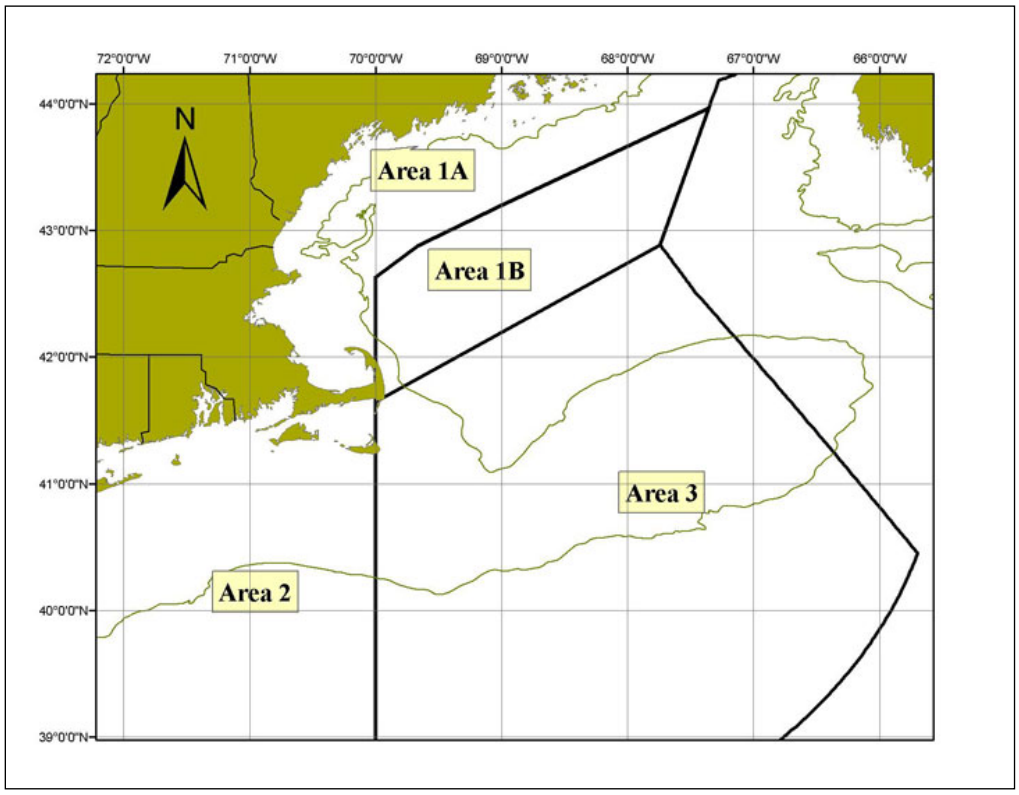
The U.S. Atlantic herring fishery occurs over the Mid-Atlantic shelf region from Cape Hatteras to Maine, including an active fishery in the inshore GOM and seasonally on GB. The herring resource is managed as one stock complex, but this stock is thought to be comprised of inshore and offshore components that segregate during spawning. In recognition of the spatial structure of the herring resource, the herring annual catch limit (ACL) is divided into sub-ACLs and assigned to four herring management areas. Area 1 is the Gulf of Maine (GOM) divided into an inshore (Area 1A) and offshore section (Area 1B); Area 2 is located in the coastal waters between MA and NC, and Area 3 is on Georges Bank (GB) (Figure 17).

The herring fishery is generally prosecuted south of New England in Area 2 during the winter (January-April), and oftentimes as part of the directed mackerel fishery. There is overlap between the herring and mackerel fisheries in Area 2 and in Area 3 during the winter months, although catches in Area 3 tend to be relatively low. The herring summer fishery (May-August) is generally prosecuted throughout the GOM in Areas 1A, 1B and in Area 3 (GB) as fish are available. Restrictions in Area 1A have pushed the fishery in the inshore GOM to later months (late summer). The midwater trawl (single and paired) fleet is restricted from fishing in Area 1A in the months of January through September because of the Area 1A sub-ACL split (0% January-May) and the purse seine-fixed gear only area (all of Area 1A) that is effective June-September. A sub-ACL split for Area 1B (0% January – April, 100% May – December) may be effective for all vessels during the 2014 and 2015 fishing years (pending approval by NMFS).

Fall fishing (September-December) tends to be more variable and dependent on fish availability; the Area 1A sub-ACL is always fully utilized, and the inshore Gulf of Maine fishery usually closes sometime around November. As the 1A and 1B quotas are taken, larger vessels become increasingly dependent on offshore fishing opportunities (Georges Bank, Area 3) when fish may be available.

Businesses related to the Atlantic herring fishery include fishing vessel owners and employees (captains/crew) and herring dealers and processors. Refer to the Amendment 5 FEIS (Section 4.5) for information in addition to that provided in the following subsections.

Figure 17 Atlantic Herring Management Areas



The 2013-2015 Atlantic herring fishery specifications were recently approved by NMFS concurrently with Framework 2 to the Herring FMP, which allows the Council to split sub-ACLs seasonally (by month) and establishes provisions for the carryover of some un-utilized sub-ACL during the specifications process. The specifications summarized below in Table 26 are effective for the 2013-2015 fishing years (initial allocations, not including overage deductions, carryovers, or set-aside deductions). Updated 2014 specifications, based on 2012 overage deductions, are provided in Section 0 (p. 87).

Table 26 2013-2015 Atlantic Herring Fishery Specifications (Initial)

SPECIFICATION	2013-2015 ALLOCATION (MT)
Overfishing Limit (OFL)	169,000 – 2013 136,000 – 2014 114,000 – 2015
Acceptable Biological Catch (ABC)	114,000
U.S. Optimum Yield (OY)/Annual Catch Limit (ACL)	107,800
Domestic Annual Harvesting (DAH)	107,800
Domestic Annual Processing (DAP)	103,800
U.S. At-Sea Processing (USAP)	N/A
Border Transfer (BT)	4,000
Sub-ACL Area 1A	31,200
Sub-ACL Area 1B	4,600
Sub-ACL Area 2	30,000
Sub-ACL Area 3	42,000
Research Set-Aside (RSA)	3% of each sub-ACL
Fixed Gear Set-Aside (1A)	295

**Sub-ACL numbers do not include overage deductions, carryovers, or RSA deductions.*

Seasonal Splits for 2014 and 2015

- Area 1A: 0% January-May; 100% June-December
- Area 1B: 0% January-April; 100% May-December

3.6.1 Atlantic Herring Catch 2003-2013

The Atlantic herring ACL and management area sub-ACLs are tracked/ monitored based on the total catch – landings and discards – which are provided and required by herring permitted vessels through daily vessel monitoring system (VMS) catch reports and weekly vessel trip reports (VTRs) as well as through Federal/state dealer data. Herring harvesters are required to report discards in addition to landed catch through these independent methods.

Changes to methods for monitoring Atlantic herring catch by Federally-permitted vessels (limited access and open access) started during the 2010-2012 specifications cycle due to overages in 2010, which resulted in the need for a more timely catch reporting system to better monitor catch against sub-ACLs. NMFS revised vessels reporting requirements (76 FR 54385) on September 2011; limited access herring vessels are now required to report herring catch daily via vessel monitoring systems (VMS), open access herring vessels are required to report catch weekly via the interactive voice response (IVR) system, and all herring-permitted vessels are required to submit vessel trip reports (VTRs) weekly. The current methods for estimating Atlantic herring catch and monitoring ACLs/sub-ACLs are described below.

Atlantic Herring Catch Estimation Methods

Catch in the Atlantic herring fishery is estimated and tracked for sub-ACL monitoring using data provided by herring-permitted vessels (VMS catch reports and VTRs) combined with Federal/state dealer data. VMS catch reports are used to verify and determine catch when VTR and/or dealer records are unavailable, but VTR and dealer reports, once received, are used to determine final catch by area. Limited access herring vessels report catch daily via VMS, open access herring vessels report catch weekly via the IVR system, and all herring-permitted vessels submit VTRs weekly. Dealers also submit their reports weekly. The monitoring week extends from Sunday through Saturday. Vessel VTR reports and dealer reports are submitted by midnight on the following Tuesday.

Atlantic herring kept provided on the VMS catch reports are used as an initial place holder and summed by the VTR serial number provided on each VMS catch report. Once VTR and dealer reports are received, summed kept is matched to VMS catch reports using VTR serial number, and the kept from VMS catch reports drops out of the calculation. However, unmatched VMS catch reports are retained and included in the weekly herring report calculation by area.

Herring management area reported on VMS catch reports is assigned to the matched VTR and dealer reports using VTR serial number. If VTR and dealer reports do not match to a VMS catch report, herring management area is determined using the statistical area, latitude, and longitude provided on the VTR reports. If no statistical area is reported on the VTR, then a combination of recent fishing activity and a review of the scanned images of the original VTR are used to assign landings to herring management area. If catch in multiple areas are reported for the same VTR serial number on VMS catch reports, then kept associated with that VTR serial number on the VTR and dealer reports are prorated using area proportions from the VMS catch reports. Once all matching is completed, summed dealer kept by area for a given VTR serial number is used in the weekly herring report unless VTR kept is greater than 90% of dealer kept, in which case

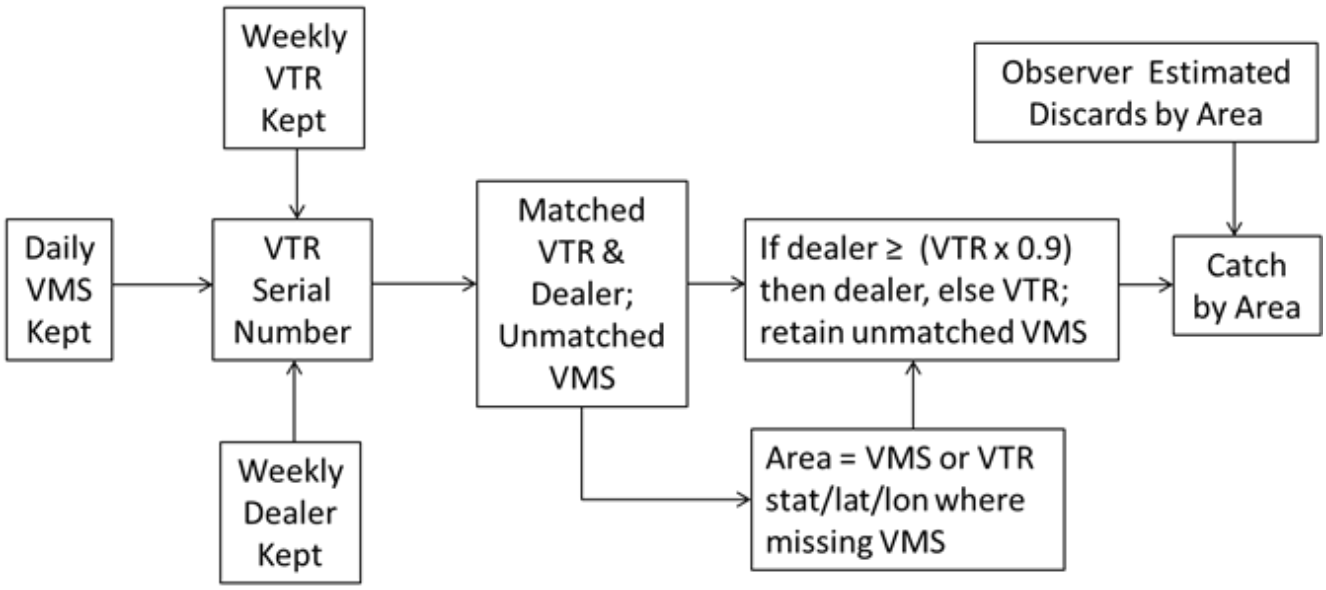
VTR kept is used assuming missing dealer reports. As stated above, kept from unmatched VMS reports are also included in the area summation.

Discards of Atlantic herring by area are determined using the following formula, where NK = herring unknown:

$$\frac{Observed\ Atlantic\ Herring\ Discards + Atlantic\ Herring\ NK}{Observed\ Kept\ All\ Species} \times Vessel\ Kept\ All$$

Only discard and kept all data from observed hauls are used in calculating the discard ratio using data from the observer database. Discard ratios are determined for each area and gear type, and then multiplied by vessel kept all by area and gear type. Estimated discards for all gear types are then summed by area, resulting in a fleet-wide estimate of discards for Atlantic herring. Estimated discards by area are then added to the summed herring kept by area from VMS, VTR, and dealer reports as described in the previous section, providing total catch by area. A schematic of data flow is provided in Figure 18.

Figure 18 Atlantic Herring Weekly Reporting Calculation (Catch by Area)



Atlantic Herring Catch 2003-2013

Table 27 summarizes recent Atlantic herring catch estimates by year and management area from 2003-2012. The following bullets describe how these estimates were derived:

- 2003-2006 herring catch estimates are provided from quota management implemented by NMFS through the Atlantic Herring FMP and are based on interactive voice reporting (IVR) data from the call-in system used to monitor TACs. Reported herring discards are included in the totals.
- 2007-2009 herring catch estimates are based on IVR data supplemented with dealer data. Reported discards are included in the totals.
- 2010-2012 herring catch estimates are based on a comprehensive methodology developed by NMFS in response to Amendment 4 provisions and the need to better monitor sub-ACLs (see previous description of NMFS' catch estimation methods).

Table 27 Atlantic Herring Catch by Year and Management Area, 2003-2012

YEAR	AREA (sub-ACL)	CATCH (MT)	QUOTA (MT)	PERCENT of QUOTA CAUGHT
2003	1A	61,516	60,000	103%
2003	1B	5,271	10,000	53%
2003	2	13,835	50,000	28%
2003	3	20,985	60,000	35%
2004	1A	60,095	60,000	100%
2004	1B	9,044	10,000	90%
2004	2	12,992	50,000	26%
2004	3	11,074	60,000	18%
2005	1A	61,102	60,000	102%
2005	1B	7,873	10,000	79%
2005	2	14,203	30,000	47%
2005	3	12,938	50,000	26%
2006	1A	59,989	60,000	100%
2006	1B	13,010	10,000	130%
2006	2	21,270	30,000	71%
2006	3	4,445	50,000	9%
2007	1A	49,992	50,000	100%
2007	1B	7,323	10,000	73%
2007	2	17,268	30,000	58%
2007	3	11,236	55,000	20%
2008	1A	42,257	43,650	97%
2008	1B	8,671	9,700	89%
2008	2	20,881	30,000	70%
2008	3	11,431	60,000	19%
2009	1A	44,088	43,650	101%
2009	1B	1,799	9,700	19%
2009	2	28,032	30,000	93%
2009	3	30,024	60,000	50%
2010	1A	28,424	26,546	107%
2010	1B	6,001	4,362	138%
2010	2	20,831	22,146	94%
2010	3	17,596	38,146	46%
2011	1A	30,676	29,251	105%
2011	1B	3,530	4,362	81%
2011	2	15,001	22,146	68%
2011	3	37,038	38,146	97%
2012	1A	24,302	27,668	88%
2012	1B	4,307	2,723	158%
2012	2	22,482	22,146	102%
2012	3	39,471	38,146	103%

Source: NMFS.
Note the shaded rows indicate overages.

Table 28 summarizes total Atlantic herring catch as a percentage of the total available catch in each year from 2003-2012 based on NMFS catch estimation methods. Catch by the U.S. fishery has been somewhat consistent over the time period (and in previous years), averaging about 91,500 mt, with the highest catch of the time series observed in 2009 and lowest in 2008. However, the quota allocated to the fishery (stockwide ACL/OY) has decreased 50% over the ten-year period. The herring fishery has therefore become more fully utilized in recent years and utilized 100% of the total ACL in 2012.

Table 28 Total Annual Atlantic Herring Catch 2003-2012

YEAR	TOTAL HERRING CATCH (MT)	TOTAL QUOTA ALLOCATED (MT)	PERCENT OF TOTAL QUOTA CAUGHT
2003	101,607	180,000	57%
2004	93,205	180,000	52%
2005	96,116	150,000	64%
2006	98,714	150,000	66%
2007	85,819	145,000	59%
2008	83,240	143,350	58%
2009	103,943	143,350	73%
2010	72,852	91,200	80%
2011	86,245	93,905	92%
2012	90,561	90,683	100%

Source: NMFS.

Due to the of the high volume and seasonal nature of the Atlantic herring fishery and restrictions on fishing times, recent sub-ACL overages have tended to occur primarily in the most active areas of the fishery and in years when substantial reductions in the quota have been implemented. Since the implementation of herring quota management in 2001, there have been no stockwide herring ACL overages, and sub-ACL quota overages (shaded rows in the tables) have been relatively infrequent and minor in scale. In terms of magnitude, the largest sub-ACL overage occurred in management Area 1B during the 2006 fishing year, where 3,000 mt of additional herring were caught (about 6.6 million pounds, see Table 27). Some of this overage may have been attributable to mis-reporting of management area fished and may have been addressed through the management area boundary changes implemented in Amendment 1.

Table 29 provides the Atlantic herring catch estimates from 2011 and 2012 and resulting sub-ACL specifications for 2013 and 2014. To account for the 2010 overages in Areas 1A and 1B, NMFS reduced the 2012 sub-ACLs in Areas 1A and 1B. The resulting 2012 sub-ACL for Area 1A was 24,668 mt (reduced from 26,546 mt), and the sub-ACL for Area 1B was 2,723 mt (reduced from 4,362 mt, see Table 29). Due to the under harvest of the New Brunswick weir fishery in 2012, an additional 3,000 mt was allocated to Area 1A on November 1, 2012. An additional 295 mt was also allocated to Area 1A on November 1, 2012 due to the under harvest of the fixed gear fisheries west of Cutler, Maine. The total Area 1A sub-ACL for the 2012 fishing year was therefore 27,668 mt.

The Final Rule for Framework 2 and the 2013-2015 Atlantic herring fishery specifications was published by NMFS on October 2, 2013. Because of Atlantic herring stock status (rebuilt, overfishing not occurring), acceptable biological catch (ABC) and the stockwide herring ACL were increased from 2010-2012 levels, and additional catch is available to the fishery for 2013-2015. When the 2013 fishery specifications were implemented by NMFS (applied retroactively for the 2013 fishing year), the 2011 Area 1A overage was deducted from the final 2013 Area 1A sub-ACL and the stockwide 2013 herring ACL. With the overage deduction, the resulting 2013 sub-ACL for Area 1A is slightly higher than the 2012 Area 1A sub-ACL. The 2013-2015 herring specifications package also includes a 295 mt fixed gear set-aside in Area 1A and a 3% research set-aside (RSA) for all management areas (set-asides are not reflected in the numbers provided in Table 29). Year-end catch totals for 2012 indicate that there were sub-ACL overages for Areas 1B, 2, and 3, and an underage in Area 1A. As a result, 2012 overage deductions and carryovers will be reflected in the 2014 sub-ACLs. NMFS published the Proposed Rule for the 2014 sub-ACL adjustments in the Federal Register on November 22, 2013; the proposed adjustments are shown below in Table 29.

Table 29 2011 and 2012 Atlantic Herring Catch – Overages, Underages, and Resulting 2013 and 2014 Sub-ACLs

YEAR	AREA	CATCH (MT)	SUB-ACL (MT)	% SUB-ACL CAUGHT	2013 SUB-ACL (MT)
2011	1A	30,676	29,251	105%	29,775
2011	1B	3,530	4,362	81%	4,600
2011	2	15,001	22,146	68%	30,000
2011	3	37,038	38,146	97%	42,000
TOTAL		**86,245**	**93,905**	**92%**	**106,375**
YEAR	**AREA**	**CATCH (MT)**	**SUB-ACL (MT)**	**% SUB-ACL CAUGHT**	***2014 SUB-ACL (MT)***
2012	1A	24,302	27,668	87.8%	33,967
2012	1B	4,307	2,723	158%	3,016
2012	2	22,482	22,146	102%	29,664
2012	3	39,471	38,146	104%	40,675
TOTAL		**90,561**	**90,683**	**99.9%**	**107,322**

Source: NMFS.
Note the shaded rows indicate overages and underages.
2013 Sub-ACLs are based on the NMFS Final Rule published October 2, 2013. 2014 sub-ACLs are based on the NMFS Proposed Rule published November 22, 2013.
Sub-ACLs presented in the table for 2013 and 2014 do not reflect any set-asides for research and/or fixed gear fishing.

As noted above, Framework 2 to the Atlantic Herring FMP was developed concurrently with the 2013-2015 fishery specifications and authorizes the Council to split annual catch limits (ACLs) assigned to the four herring management areas (sub-ACLs) seasonally (by month) during the specifications process. It also establishes a general policy for authorizing annual carryover of unutilized sub-ACL (up to 10%) under specific conditions. Seasonal (monthly) splits of sub-ACLs in Areas 1A and 1B will be implemented for the 2014 and 2015 fishing years, and carryover provisions will apply in 2014, 2015, and beyond.

The Council also implemented additional accountability measures for the herring fishery in the 2013-2015 specifications package; the AMs will remain effective beyond the 2015 fishing year. Under the new AMs (effective September 30, 2013), the trigger for closing the directed herring fishery in a management area is reduced to 92% of the sub-ACL (not including RSAs). When 92% of a management area sub-ACL is projected to be reached, the directed herring fishery in that area will close, and all herring permit holders will be limited to 2,000 pounds of herring per trip in that area for the remainder of the fishing year. In addition, the new AMs establish a trigger for closing the directed herring fishery in all management areas. The trigger for closing the directed herring fishery in all management areas will be 95% of the stockwide Atlantic herring ACL. When 95% of the stockwide ACL for herring is projected to be reached, the directed herring fishery in all management areas would close, and all herring permit holders would be limited to 2,000 pounds of herring per trip for the remainder of the fishing year. These AMs were adopted by the Council to further prevent the stockwide Atlantic herring ACL and management area sub-ACLs from being exceeded during the fishing year, as well as improve the likelihood that the total ACL (OY) can be caught on a continuing basis while preventing overfishing.

Table 30 reports 2013 Atlantic herring catch by management area based on NMFS' quota monitoring methods as of November 21, 2013. The sub-ACL for Area 1A was reached, and the directed herring fishery in Area 1A closed on October 15, 2013. The directed herring fishery in Area 3 closed on October 24, 2013, consistent with a new accountability measure in the 2013-2015 specifications, which triggers closure of the directed herring fishery in a management area when 92% of the sub-ACL is projected to be reached.

Table 30 2013 Atlantic Herring Sub-ACLs and Catch YTD

AREA	2013 CATCH (MT)	SUB-ACL (MT)	% SUB-ACL CAUGHT
1A	29,884	29,775	100.4%
1B	2,021	4,600	43.9%
2	19,662	30,000	65.6%
3	38,692	42,000	92.1%
TOTAL	**90,259**	**106,375**	**84.9%**

Source: NMFS.
Note: Catch estimates are updated as of November 21, 2013.
Sub-ACLs presented in the table for 2013 and 2014 do not reflect any set-asides for research and/or fixed gear fishing.

3.6.2 Atlantic Herring Vessels

This section provides information regarding the vessels participating in the Atlantic herring fishery from 2008-2013. In this section, a herring trip is defined liberally as any trip in which at least one pound of Atlantic herring is retained.

3.6.2.1 Permits

Atlantic herring vessel permit categories are: Category A limited access all management areas; Category B limited access Areas 2 and 3 only; Category C limited access incidental catch of 25 mt per trip; and Category D open access incidental catch of 3 mt per trip. With the implementation of Amendment 5 (March 17, 2014), a new permit category has been created for limited access mackerel vessels that did not qualify for a limited access herring permit in Amendment 1 (Category E); vessels in this new permit category will fish under a 20,000 pound herring possession limit in Areas 2/3.

At this time, Category A and B vessels comprise the majority of the directed herring fishery. Many of the Category A, B, and C vessels are also active in the Atlantic mackerel fishery (managed by the MAFMC).

Since 2008, the number of vessels with either a limited access or an open access Atlantic herring permit has decreased annually (Table 31). This includes an annual decrease in limited access directed fishery vessels (Categories A and B), with 42 permitted in 2011. One cause could have been the substantial cuts in herring catch limits in the 2010-2012 specifications from prior levels.

In 2011, 29 of the 42 (69%) Category A and B vessels were active (defined broadly as landing at least one pound of Atlantic herring during the fishing year). For the Category C vessels, 9 of 44 (20%) were active. Just 89 of the 1,991 (4.5%) Category D vessels were active. Although there have been far fewer active limited access versus open access vessels, data presented in the remainder of this section show that the limited access fishery comprises over 99% of the fishery in terms of revenue.

Table 31 Fishing Vessels with Federal Atlantic Herring Permits, 2008-2013

Permit Category	2008		2009		2010		2011		2012		2013	
	All	Active	All	Active	All	Active	All	Active	All	Active	All	Active
A	44	28	44	29	42	29	38	29	36	24	36	n.d.
B, C	5	2	4	3	4	3	4	2	4	3	4	n.d.
C	53	12	51	15	49	19	44	10	41	13	43	n.d.
Total LA	**102**	**42**	**99**	**47**	**95**	**51**	**86**	**41**	**81**	**40**	**82**	n.d.
D	2,390	78	2,373	78	2,277	99	1,991	84	1,869	80	1,791	n.d.

Source: NMFS Permit database (http://www.nero.noaa.gov/permits/permit.html) and VTR database.

Notes: Active vessels are defined as having landed at least one pound of Atlantic herring. This includes pair trawl vessels whose partner vessel landed the catch. Permit data for 2008-2011 are as of November 2012. Permit data for 2012-2013 are as of August 23, 2013.

3.6.2.2 Fishing Gear

Atlantic herring vessels primarily use purse seines, single midwater trawls or midwater pair trawls for fishing gear, with the midwater pair trawl fleet harvesting the majority of landings from 2008 to 2012 (63%; Table 32). Some vessels use multiple fishing areas. The midwater pair trawl fleet uses all management areas, while the purse seine fishery focuses in Area 1A and the midwater trawl (single) is most active in Area 3. Small mesh otter trawls for bottom fish comprise 5% of the fishery, and other gear types (e.g. pots, traps, shrimp trawls, handlines) comprise less than 1% of the herring fishery.

Table 32 Fishing Gear Distribution of Total Herring Landings (mt) from Atlantic Herring Management Areas (2008-2012)

Gear Type	Area 1A (mt)	Area 1B (mt)	Area 2 (mt)	Area 3 (mt)	Total
Otter Trawl, Bottom Fish	639 (0.4%)	2 (0.0%)	18,768 (18.5%)	121 (0.1%)	**19,530 (4.6%)**
Midwater Otter Trawl	6,713 (4.1%)	3,527 (15.1%)	7,803 (7.7%)	20,389 (15.3%)	**38,431 (9.1%)**
Midwater Pair Trawl	64,476 (39.5%)	15,562 (66.8%)	74,955 (73.8%)	112,858 (84.6%)	**267,851 (63.6%)**
Purse Seine	90,445 (55.4%)	4,199 (18.0%)	0 (0.0%)	0 (0.0%)	**94,643 (22.5%)**
Other	996 (0.6%)	0 (0.0%)	15 (0.0%)	0 (0.0%)	**1,011 (0.2%)**
Total	**163,269 (100%)**	**23,289 (100%)**	**101,542 (100%)**	**133,368 (100%)**	**421,467 (100%)**

Source: VTR database. Data are updated as of August 23, 2013.

Within the RH/S Catch Cap Areas proposed in this framework adjustment (see Figure 1 on p. 12), the Gulf of Maine Catch Cap Area had the largest amount of Atlantic herring landings, from 2008-2012 (Table 33), and the Cape Cod Catch Cap Area had the least. While the purse seine component of the fishery had just 23% of the landings in these areas overall, in the Gulf of Maine, purse seines landed the most amount of Atlantic herring.

Table 33 Fishing Gear Distribution of Total Herring Landings from Proposed RH/S Catch Cap Areas (2008-2012)

Gear Type	GOM (mt)	CC (mt)	SNE/MA (mt)	GB (mt)	Total
Otter Trawl, Bottom Fish	639 (0.4%)	2 (0.0%)	18,768 (18.5%)	120 (0.1%)	**19,530 (4.6%)**
Midwater Otter Trawl	7,621 (4.4%)	4,394 (12.3%)	7,803 (7.7%)	18,614 (16.8%)	**38,431 (9.1%)**
Midwater Pair Trawl	69,532 (40.1%)	31,290 (87.7%)	74,955 (73.8%)	92,074 (83.1%)	**267,851 (63.6%)**
Purse Seine	94,634 (54.6%)	9 (0.0%)	0 (0.0%)	0 (0.0%)	**94,643 (22.5%)**
Other	996 (0.6%)	0 (0.0%)	15 (0%)	0 (0.0%)	**1,011 (0.2%)**
Total	**173,432 (100%)**	**35,695 (100%)**	**101,542 (100%)**	**110,808 (100%)**	**421,467 (100%)**

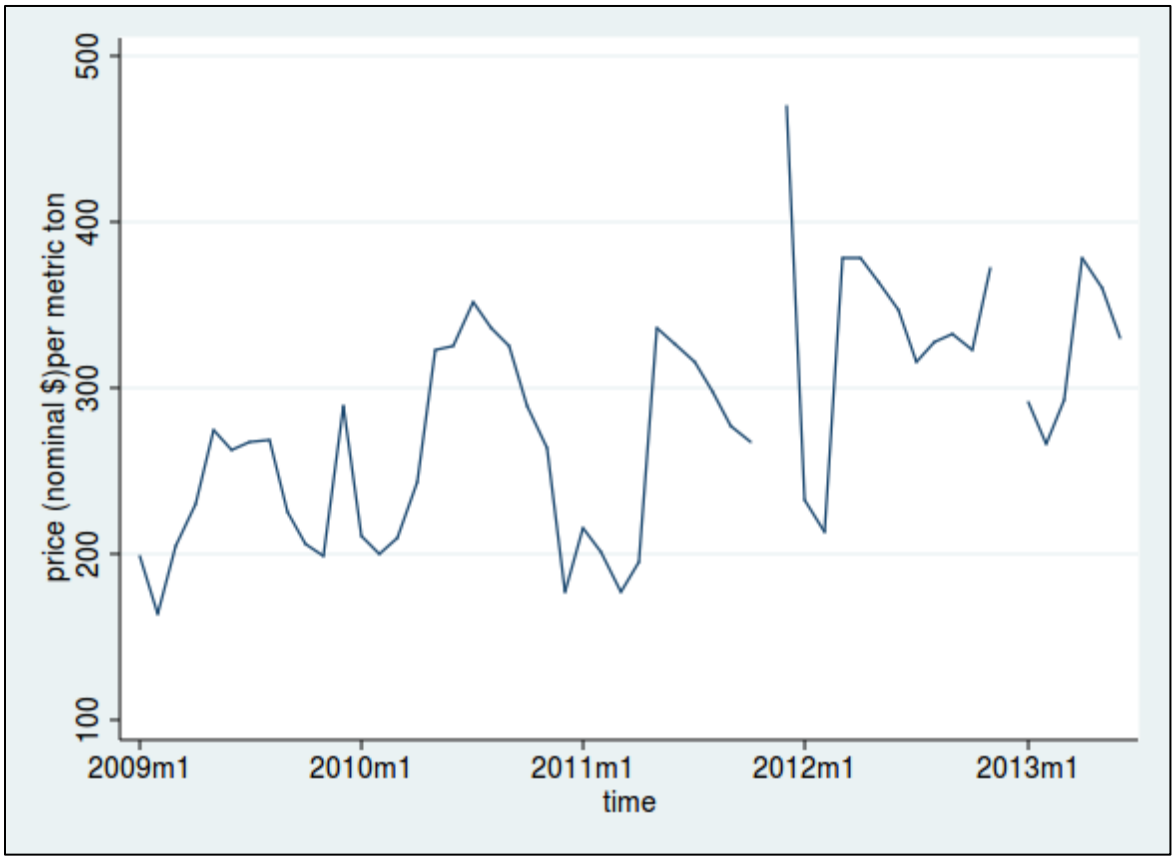
Source: VTR database. Data are as of August 23, 2013.

3.6.2.3 Economic Factors

Herring Prices

Average Atlantic herring prices have increased from approximately $221/mt in 2009 to approximately $300/mt in 2012. For January-June 2013, herring prices averaged $306/mt. Figure 19 plots the monthly average prices for Atlantic herring, omitting December of 2011 and 2012 (prices were quite high during these months, but quantities were very low, and these months are not representative of normal operating conditions for the directed herring fishery).

Figure 19 Average Monthly Price of Atlantic Herring, 2009-2013



3.6.3 Overlap Between the Atlantic Herring and Atlantic Mackerel Fisheries

The overlap between the Atlantic herring and Atlantic mackerel fisheries is important, as many of the same vessels and processing plants participate in both of these fisheries, and many of the participants are primarily or entirely economically dependent on these two fisheries. Many pair trawl vessels and midwater trawl vessels are dependent on herring and mackerel although pair trawl vessels are generally less dependent on herring than mackerel. Most bottom trawl vessels are not significantly dependent on either herring or mackerel, while purse seine vessels were almost entirely reliant on herring and menhaden. A more detailed description of the Atlantic mackerel fishery can be found in the Final EIS for Amendment 5 to the Herring FMP, and the EIS for Amendment 14 to the Atlantic Mackerel, Squid, and Butterfish (MSB) FMP.

3.6.3.1 Background

The MAFMC manages the Atlantic mackerel fishery. For the 2012 fishing year, the MAFMC adopted an ABC of 80,000 mt per the recommendation of its SSC (http://www.mafmc.org/fmp/msb_files/2012_Specs/SSC_Report_25-26_May_2011.pdf). After accounting for Canadian catch, the Council also specified recreational-commercial allocations and buffers for management uncertainty such that the effective proposed U.S. commercial quota for 2012 is 33,821 mt. This is much higher than 2011 landings (less than 1,000 mt) but also substantially lower than quotas as recently as 2010 (115,000 mt). 2012 landings will likely be around 6,000 mt according to preliminary data. The limited access program, detailed below, became effective for Atlantic mackerel on March 1, 2012.

Amendment 11 to the MSB FMP (76 FR 68642, November 7, 2011) implemented a limited access system consisting of tiered limited access and open access components. The qualifying criteria for the limited access component are a valid Federal Fisheries Permit for mackerel as of March 21, 2007 and a certain level of mackerel landings during a specified time period as detailed below:

- Tier 1: At least 400,000 pounds landed in any one year 1997-2005
- Tier 2: At least 100,000 pounds landed in any one year 3/1/1994-2005
- Tier 3: At least 1,000 pounds in any one year 3/1/1994-2005.
    - Tier 3 would be capped for a maximum catch up to 7% of the commercial quota, set annually during the specifications process (no other allocations).
- Open Access: All other vessels.

Amendment 11 sets initial trip limits for each tier, with all trip limits adjustable via specifications:

- Tier 1: No trip limit
- Tier 2: 135,000 lb per trip or calendar day
- Tier 3: 100,000 lb per trip or calendar day
- Open access: 20,000 lb per trip or calendar day

All permit categories are subject to a 20,000 lb trip limit during a closure of the mackerel fishery (if the sub-ACL is projected to be reached).

Of the vessels with Atlantic herring limited access permits, all obtained either a limited or an open access mackerel permit (Table 34). Most of the Tier 1 mackerel vessels also hold limited access directed herring permits.

Table 34 Atlantic Mackerel Limited Access Program, 2012

			Total	Herring Permit Category			
				A	B,C	C	Total
Mackerel Permit Category	Limited Access	Tier 1	24	19	0	4	**23 (96%)**
		Tier 2	25	1	1	6	**8 (32%)**
		Tier 3	77	2	1	8	**11 (14%)**
	Open Access		1,630	14	2	23	**39 (2%)**
		Total	**1,756**	**36 (100%)**	**4 (100%)**	**41 (100%)**	

Source: NMFS Permit databases http://www.nero.noaa.gov/permits/permit.html (November 2012)
Note: Percentages indicate percent of the total permit holders in that category.

3.6.3.2 Herring/Mackerel Overlap in RH/S Catch Cap Areas

Table 35 summarizes VTR data from Atlantic herring trips in the Gulf of Maine RH/S Cap Area (see Figure 1 on p. 12) that would have been subject to a RH/S catch cap during 2008-2012 based on the proposed 6,600-pound landings threshold for identifying cap trips. This information suggests that there is very little, if any, overlap with the directed mackerel fishery, and consequently, very little potential for trips in this area to be subject to both RH/S catch caps. From 2008-2012, about 325-250 trips taken in the Gulf of Maine Cap Area landed more than 6,600 pounds of Atlantic herring. Very few of these trips landed any amount of Atlantic mackerel – less than three in 2010 and seven trips in 2011. Of these trips, almost none of them met the proposed 20,000 pound threshold for a RH/S catch cap in the mackerel fishery.

Table 35 Gulf of Maine RH/S Cap Area: 2008-2012 Trips

Year	# Herring Cap Trips (>3 mt)	Herring Landings (mt)	# Herring Cap Trips with Mackerel Landings	# Mackerel Cap Trips (>20,000 lbs)	% Trips Affected by Both Caps
2008	324	45,344	0	0	0.0
2009	341	45,922	0	0	0.0
2010	355	27,369	C	C	0.3
2011	350	29,906	7	0	0.0
2012	339	23,684	0	0	0.0

Note: "C" denotes less than three trips; detailed information cannot be reported for data confidentiality reasons.

Table 36 summarizes VTR data from Atlantic herring trips in the Cape Cod RH/S Cap Area (Statistical Area 521, see Figure 1 on p. 12) that would have been subject to a RH/S catch cap during 2008-2012 based on the proposed 6,600-pound landings threshold for identifying cap trips. This information suggests that there may be some overlap with the directed mackerel fishery in this area, but the overlap is small based on recent effort in the herring and mackerel fisheries. During these years, and average of 37 trips landed more than 6,600 pounds of herring. A small percentage of these trips landed any mackerel, and three trips in 2012 would have also met the proposed 20,000-pound threshold for the mackerel RH/S catch cap. While the potential for trips in this area to be affected by both RH/S catch caps appears to be small at this time, it is important to note that effort and landings in the mackerel fishery have been very low in recent years, especially 2010-2012. The potential for overlapping trips is likely to increase if effort in the mackerel fishery increases.

Table 36 Cape Cod RH/S Cap Area (521): 2008-2012 Trips

Year	# Herring Cap Trips (>3 mt)	Herring Landings (mt)	# Herring Cap Trips with Mackerel Landings	# Mackerel Cap Trips (>20,000 lbs)	% Trips Affected by Both Caps
2008	39	7,750	0	0	0.0
2009	15	2,495	0	0	0.0
2010	42	5,655	C	C	2.4
2011	31	5,334	0	0	0.0
2012	57	12,367	7	3	5.3

Note: "C" denotes less than three trips; detailed information cannot be reported for data confidentiality reasons.

Table 37 summarizes VTR data from Atlantic herring trips in the Georges Bank RH/S Cap Area (see Figure 1 on p. 12) that would have been subject to a RH/S catch cap during 2008-2012 based on the proposed 6,600-pound landings threshold for identifying cap trips. This information suggests that there may be some overlap with the directed mackerel fishery in this area, but the extent of the overlap appears to be small, with few trips during this time frame that would have met the landings thresholds for both RH/S catch caps (herring and mackerel fisheries). Six herring cap trips in this area in 2011 landed some Atlantic mackerel but not enough to meet the proposed 20,000-pound threshold for a RH/S catch cap trip in the mackerel fishery. There was more overlap in 2009, when participation in the mackerel fishery was higher than the most recent years. Therefore, the potential for overlapping trips in this area may increase if effort in the mackerel fishery increases.

Table 37 Georges Bank RH/S Cap Area: 2008-2012 Trips

Year	# Herring Cap Trips (>3 mt)	Herring Landings (mt)	# Herring Cap Trips with Mackerel Landings	# Mackerel Cap Trips (>20,000 lbs)	% Trips Affected by Both Caps
2008	35	7,814	C	0	0.0
2009	112	27,601	9	8	7.1
2010	90	14,306	C	C	1.1
2011	200	32,634	6	0	0.0
2012	183	30,161	0	0	0.0

Note: "C" denotes less than three trips; detailed information cannot be reported for data confidentiality reasons.

Table 38 summarizes VTR data from Atlantic herring trips in the Southern New England/Mid-Atlantic RH/S Cap Area (see Figure 1 on p. 12) that would have been subject to a RH/S catch cap during 2008-2012 based on the proposed 6,600-pound landings threshold for identifying cap trips. The information suggests that there is considerable overlap between the herring and mackerel fisheries in this area, with the potential for about 1/3 of trips in this area to be affected by both RH/S catch caps if effort in the mackerel fishery increases to levels observed prior to 2011 (landings of mackerel in 2011 and 2012 were very low). With the exception of the 2012 fishing year, about 25-50% of herring cap trips in this area landed some amount of mackerel. Most of those trips in 2008 and 2009 met the threshold for a mackerel cap trip (20,000 pounds); fewer trips met the mackerel cap threshold in more recent years.

Table 38 Southern New England/Mid-Atlantic RH/S Cap Area: 2008-2012 Trips

Year	# Herring Cap Trips (>3 mt)	Herring Landings (mt)	# Herring Cap Trips with Mackerel Landings	Mackerel Landings on Herring Cap Trips (mt)	# Mackerel Cap Trips (>20,000 lbs)	% Trips Affected by Both Caps
2008	220	22,534	96	7,518	82	37.3
2009	311	27,481	121	11,850	99	31.8
2010	259	21,878	124	8,156	81	31.3
2011	217	14,852	58	259	10	4.6
2012	266	21,649	36	2,751	21	7.9

Note: "C" denotes less than three trips; detailed information cannot be reported for data confidentiality reasons.

3.6.3.3 Proposed RH/S Catch Cap for 2014 Atlantic Mackerel Fishery

MAFMC Preferred Alternative 1b – 236 metric tons (mt) River Herring and Shad Cap

Under the Mid-Atlantic Council's ***Preferred Alternative*** for establishing a RH/S catch cap for the mackerel fishery in 2014, trips landing more than 20,000 pounds of mackerel would count as "cap trips" for purposes of monitoring the RH/S cap on the mackerel fishery. The exact cap estimation methodology will be developed by NMFS in cooperation with the Council during implementation, but the basic operation of the cap would mirror the haddock catch cap on midwater trawl vessels . As such, trips with observers that retain more than 20,000 pounds of mackerel are used to determine the ratio of RH/S caught to all species retained on observed cap trips. For all trips that land more than 20,000 pounds of mackerel, the current RH/S ratio is applied to their combined total landings to generate a RH/S catch estimate for all mackerel trips. 20,000 pounds was chosen as the mackerel trip definition because that is the current mackerel incidental trip limit and trips landing 20,000 or less pounds of mackerel account for only about 1.5% of mackerel landings (2004-2012) (and typically have other species accounting for most of the catch on those trips). Once cap trips were projected to have caught 95% of the 236 mt RH/S cap, then the directed mackerel fishery would be closed and a 20,000 pound mackerel trip limit would be instituted, as would currently occur if the directed mackerel fishery closes.

236 mt of RH/S is the estimated median amount of RH/S that would have been caught had the commercial mackerel fishery landed its current quota of 33,821 mt over 2005-2012 based on analysis of observer and landings data. In some of those years the mackerel fishery landed more than 33,821 mt (2005 and 2006) but in most years the mackerel fishery landed less than 33,821 mt (2007-2012). By using 236 metric tons, the mackerel fishery could likely catch its full mackerel quota if it achieves a relatively low RH/S encounter rate (relative to 2005-2012), but would be shut down earlier if it does not. By restricting the mackerel fishery in years when high RH/S encounter rates occur, this quota would reduce RH/S catches in those years of high encounter rates.

3.6.4 River Herring Bycatch Avoidance Project (SMAST/SFC/MA DMF)

The following information is provided by Dr. N. David Bethoney, Project Coordinator

Midwater trawling accounts for the majority of US landings of Atlantic herring and mackerel. Since fisheries managers alerted the industry in 2006 that the river herring species complex was depressed, minimizing incidental catch of river herring and American shad (alosines) has become a goal of the midwater trawl fleet. To help achieve this goal, members of the midwater trawl fishery joined with the Massachusetts Division of Marine Fisheries (MA DMF) and the University of Massachusetts Dartmouth School of Marine Science and Technology (SMAST) to develop alosine (river herring and shad) bycatch avoidance methods. This collaboration with the industry sought to (1) create a bycatch avoidance fleet communication system, (2) additional support for portside sampling and (3) a predictive model of where alosines are likely to occur in space and time.

Since January 2011, herring midwater trawl vessels and some small mesh bottom trawl vessels have participated in six alosine bycatch avoidance systems coordinated by SMAST and MA DMF. Much of the work has occurred during times and in locations where observed encounters with alosines have been highest, i.e., in the southern New England/Mid-Atlantic area, as well as some focused work around Cape Cod. In 2011, the project also included a small area in the Gulf of Maine. During 2013, participation in the program included all herring midwater trawl vessels and several bottom trawl vessels fishing in Area 2 (southern New England/Mid-Atlantic).

Methods

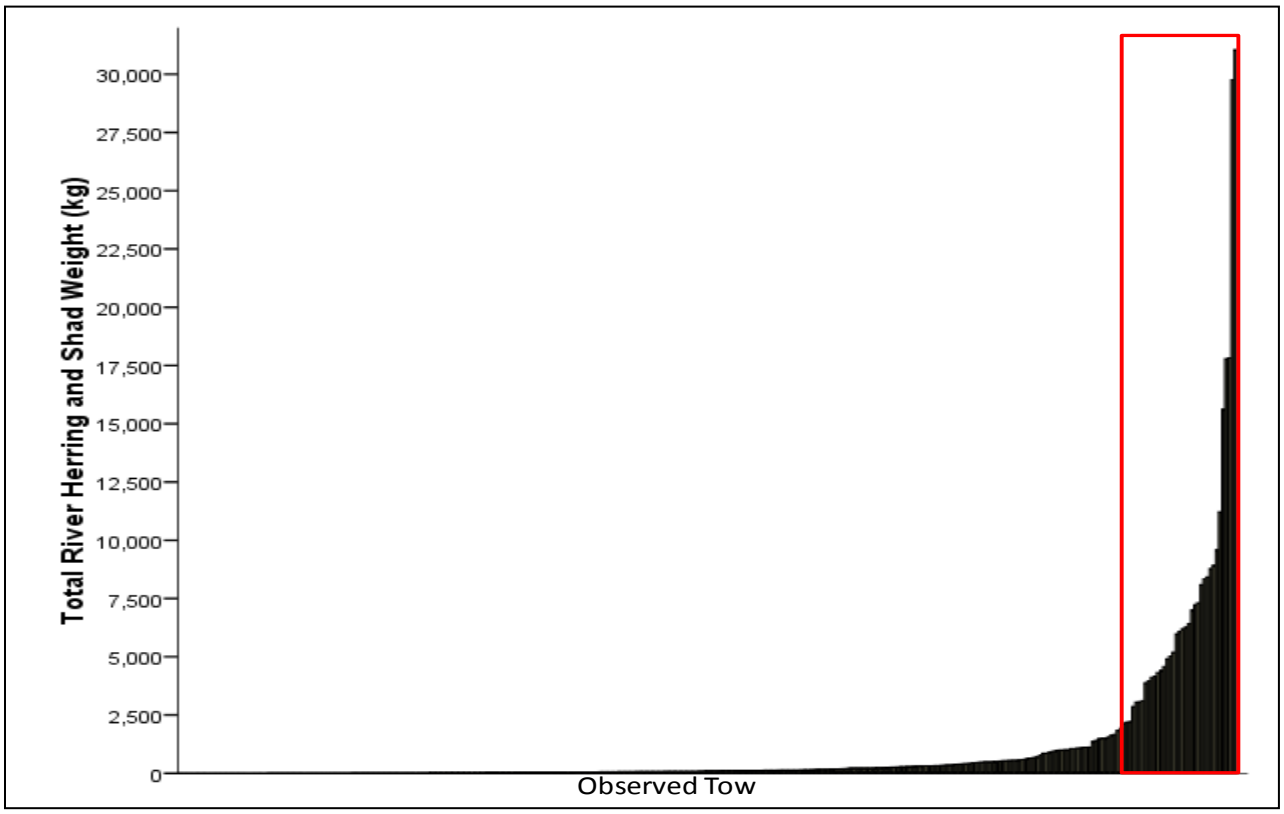
The voluntary bycatch avoidance systems operated under the hypothesis that alosines do not continuously school with Atlantic herring and Atlantic mackerel while at sea. Therefore, with enough information and clear, quick communication, areas for vessels to fish that contain adequate amounts of target species but not large amounts of alosines could be identified. The following steps were taken to implement the initial voluntary bycatch avoidance program for midwater trawl vessels landing in Massachusetts during the 2011 winter fishery (Bethoney et al. 2013a).

Determine Catch Information Source: One requirement of a near-real time information system is a reliable data source that systematically calculates bycatch rates and discloses fishing locations (Gauvin et al. 1996). In 2011, two programs, the NEFOP and the MA DMF portside sampling program, provided these data. The MA DMF portside sampling program sampled approximately 50% of all Massachusetts midwater trawl landings and about 60% to 85% of all midwater trawl landings occur in Massachusetts (NMFS Vessel Trip Reports 2008 through 2012). Edited trip level catch composition was available in less than 48 hours after a vessel lands. Tow locations were available through MA DMF trip logs voluntarily completed by vessel captains.

In 2009 and 2010, the NEFOP sampled about 40% of Atlantic herring midwater trips at-sea. About two-thirds of the samples were taken from July to December when alosines are caught less frequently by midwater trawl vessels (NEFMC 2013). Uncorrected tow level data was available about 5 days after a vessel landed (Beagley personal comm.). Due to coverage rates and timeliness, the MA DMF portside sampling program was the primary information source for this project, while NEFOP data provided tow level catch information when possible, especially for trips with multiple tows and high alosine bycatch.

Determine Thresholds to Classify Alosine Catches: Thresholds to classify catches of alosines were established. Large catches of alosine in the midwater trawl fishery are uncommon but account for the vast majority of alosine bycatch. From January 2000 through September 2010, the top 10% of tows with alosine bycatch (all tows with greater than 2,000kg of alosines) accounted for over 80% of NEFOP observed alosine midwater trawl bycatch by weight (Figure 20). Thresholds were set to identify trips with these large tows. Ratio thresholds were used instead of hard numbers to avoid biases created by small tow or trip sizes. A ratio of 1:81kg (Alosine: Target species) identified a trip in the top 10% of alosine bycatch events, while a ratio of 1:425 suggested a lower bycatch event (Table 39). These ratios were used to classify trips as having high (1:80, greater than 1.25% alosines), low (1:425, less than 0.2% alosines), or moderate (between 1:80 and 1:425) amounts of alosine bycatch.

Figure 20 Midwater Trawl Tows Observed by the Northeast Fisheries Observer Program from January 2000 to September 2010, Ranked by Amount of Alosine Bycatch



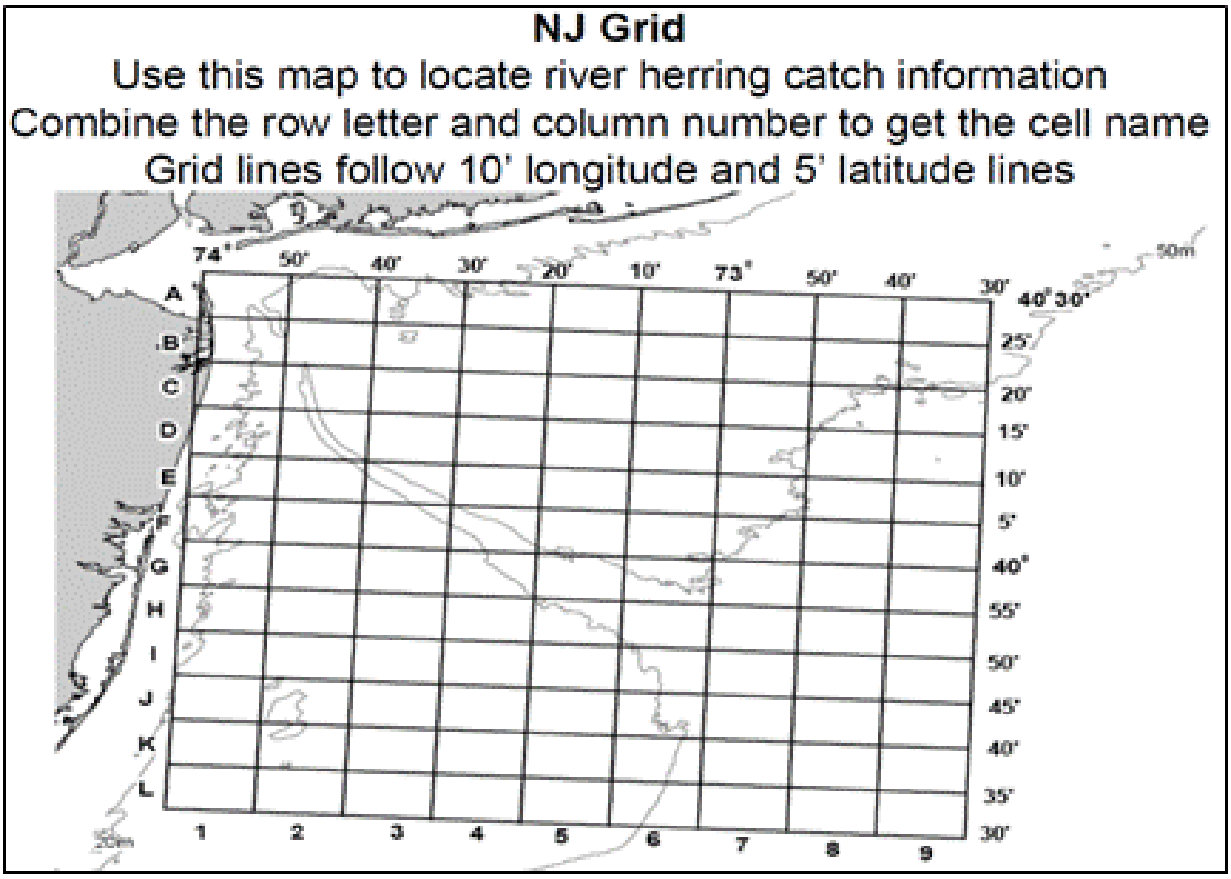
**Of the 343 tows shown in the figure, the 35 tows with the most bycatch (grey box, top 10%) account for about 80% of observed bycatch and were used to define a high bycatch tow or trip.*

Table 39 Alosine Bycatch Ratios from Trips Sampled by MA DMF Portside Sampling Program, May 2008 – July 2010

Trip Rank (Total Alosine Bycatch)	Alosine: Target Ratio (kg)
1	1:49
2	1:26
3	1:63
4	1:81
5	1:72
6	1:64
14-55	>1:425

Reduce Spatial Scale: The winter 2011 information system was focused on a single known high bycatch area to reduce and assess the spatial scale of bycatch patterns. Based on historic MA DMF port sampling, NEFOP data and PDT analyses an approximate 60x70 nm area off the coast of New Jersey was identified as the avoidance area (Figure 21). This area was transformed into a coded grid with discrete spatial units using the 10' longitude and 5' latitude lines. The grid was distributed to vessel captains, owners and crew through mail and in person. Grid cell size was determined through industry advice and the median distance of NEFOP observed tows without turns (≈5nm). Tows were assigned to specific grid cells based upon tow start locations provided by captains through completion of MA DMF trip logs. To account for uncertainty of tow location, tow start coordinates were buffered with a 5nm radius. This buffer along with depth contours were used to assign tows to grid cells.

Figure 21 Area of Focus for the Winter 2011 Bycatch Avoidance System



A handout of this map was distributed to captains and used to communicate bycatch information.

This general approach was used to create similar avoidance systems in the falls of 2011 and 2012 and the winters of 2012 and 2013. The fall 2011 and 2012 systems targeted an area in the Gulf of Maine. Information indicating alosine bycatch was unlikely to occur at depths greater than 73m was circulated prior to the launching of the fall bycatch communication systems. In the winter of 2012, the scope of the avoidance system was expanded to include an area off Rhode Island. Due to differences in the paces of the fisheries, in 2011 captains were asked to avoid high bycatch cells for two weeks, but in 2012 this time period was reduce to one week. In the winter of 2013, the scope was further expanded to include the majority of the inshore area of Atlantic herring management Area 2 and east of Cape Cod. At-sea observations from NEFOP and NOAA Study Fleet were also incorporated into the information system beginning in the winter of 2012.

Outcomes

Many figures in this section refer to Bethoney 2013. This published dissertation contains additional detailed information about the results and evaluation of the avoidance project and alosine distribution at-sea (see References in Section 6.0 of this document).

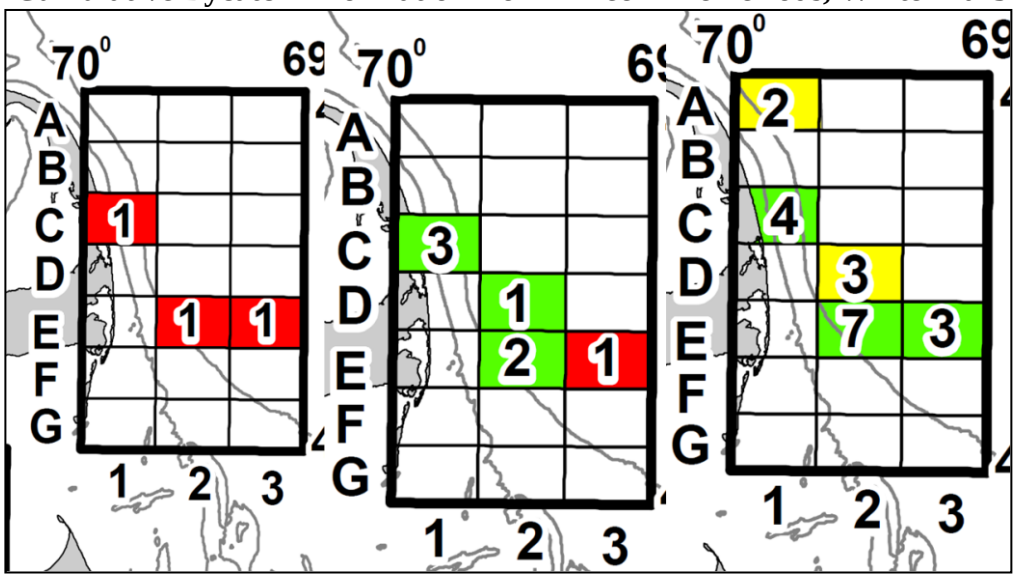
Fleet communication systems were successfully implemented during all target fisheries. Captains and processing plant managers notified the MA DMF and SMAST through e-mail of vessel departure and landing times, hail weights, landing ports and other information. These emails allowed MA DMF portside samplers to meet vessels at ports and sample entire offloads. A high percent of MA DMF trip logs (containing spatial, temporal and qualitative tow information) were completed by captains of participating vessels during all systems. Edited and expanded catch data were relayed by portside samplers to SMAST less than 48 hours after vessels completed their offloads. Catch information, tow information from MA DMF trip logs, and any available NEFOP information was then accumulated and transformed into bycatch advisories that were emailed to vessels.

Cumulative bycatch information was available publicly through the SMAST website (http://www.umassd.edu/smast/smastnewsyoucanuse/bycatchavoidanceprograms)

High levels of cooperation by industry members and fishing patterns within the avoidance area suggest that bycatch information was valued. Participation increased each year and in the winter of 2013 all active midwater trawl vessels were involved in the program. The overall behavior of the vessels within the avoidance area also provides evidence of cooperation (Bethoney 2013, Figures 4.4, 4.5, 4.7). In the winter of 2011, the significant shift in tow locations away from the high bycatch area to the southeast could have been due to the availability target species, but the timing of this shift coincided with bycatch advisories and avoidance of a known high bycatch area. Re-entry into the high bycatch cell shows that target species were present in both the northwest and southeast portions of the avoidance grid simultaneously. Similar to the winter, in the fall of 2011, effort in deeper waters could have been due to the availability of target species. Two shallow, inshore tows were made in response to the announcement of area closure within 24 hrs. (Herring Processing Facility Manager, personal comm., NOAA 2013). This suggests vessels were passing over fishable densities of target species to fish in the deeper, northeast part of the avoidance grid.

In 2012, the overall shift in fleet effort was due to information indicating mackerel were in the New Jersey area and the reports of high bycatch in the Rhode Island area (Midwater trawl captains, personal comm.). The pair of vessels that did re-enter the high bycatch cell, communicated their intent and changed their fishing methods in an attempt to reduce bycatch (Midwater trawl captain, personal comm.). In 2013, high river herring bycatch events were more widespread and common south of Cape Cod than in previous years (SMAST 2013). After an advisory on January 21, 2013 identified high bycatch in the Cape Cod area, vessels avoided this area for a week and did not have any additional high bycatch events in the area (Figure 22).

Figure 22 Cumulative Bycatch Information from Three Time Periods, Winter 2013



From left to right: 1/21, 1/28, 4/5. Numbers inside cells indicate the number of tows within each cell. Red indicates areas with high alosine bycatch while yellow and green indicate moderate and low respectively.

The appearance of distinct spatial and temporal bycatch patterns within the target areas suggests vessels can avoid large catches of alosines. Based on the occurrence of high and moderate catches of alosines, it appears that alosines initially were absent from the northwestern part of the avoidance 2011 grid in large quantities, but moved into this area as the winter progressed (Bethoney 2013, Figure 4.3, Table 4.2). As effort shifted further offshore to the southeast later in the season, no high or moderate catches of alosines occurred, suggesting a high abundance of target fishes but not alosines (Bethoney 2013, Table 4.2). The life history of alosines supports this pattern. Overwintering aggregations of shad off the Middle Atlantic Bight move inshore as early as the beginning of February and continue a northward, coastal route venturing into rivers as the spring progresses (Talbot and Sykes 1958, Neves and Depres 1979, Dadswell et al. 1987). The oceanic migration routes of river herring are likely similar to shad (Rulifson 1984, Greene et al. 2009). In addition, the only re-entry into a high bycatch cell, after about 8 days, resulted in another high bycatch event. This displays a degree of temporal stability in the bycatch pattern, which is essential to an effective avoidance system (Gauvin et al.1996, Abbot and Whilen 2010).

In 2012, an exploitable pattern within the avoidance grids was identified, but repeated high bycatch events outside the areas of focus were problematic. Vessels fished within the Rhode Island grid for over a month without a high bycatch event (Bethoney 2013, Figure 4.6). Trips in the Rhode Island grid averaged about 200 mt of Atlantic herring and, until January 30th, no trip in this area caught over 1,000 kg of alewife or blueback herring. This suggests large schools of alosines were not intermixed with Atlantic herring in this near-shore area. After high bycatch events in the Rhode Island grid, effort shifted to the New Jersey grid where effort and target catch were approximately equal, but alosines bycatch was minimal (Bethoney 2013, Table 4.3). Conversely, effort outside of the avoidance grids resulted in a disproportionally high amount of bycatch (Bethoney 2013, Table 4.3). Though some of this bycatch came from a known high bycatch area, large amounts of blueback herring were caught in an area where catches >1,233 lbs river herring were not observed in any year from 2005 to 2009 (Bethoney 2013, Figure 4.6, Cournane et al. 2013). In contrast to 2011, only low bycatch events were documented within the New Jersey avoidance area despite effort in similar areas at similar times (specifically cell E3, Bethoney 2013, Figures 4.3, 4.6).

Preliminary results from 2013 suggest that river herring were in much higher abundance in the Rhode Island area. Though effort in the New Jersey area was minimal, bycatch was similar to 2011 (SMAST 2013). No exploitable pattern was found in either of these areas as high bycatch events appeared to coincide with effort (SMAST 2013). However east of Cape Cod, high bycatch events occurred only in late January and, after a week without effort, vessels fished in this area without another high bycatch event. This catch pattern and the known migratory behavior of alosines, suggests that large amounts of alosines may have passed through this area before late January to reach southern wintering grounds.

Relationship to Amendment 5 and Framework 3

As previously noted, Amendment 5 to the Atlantic Herring FMP implements a two-phase river herring bycatch avoidance strategy developed in cooperation with the fishing industry working in partnership with MA DMF and SMAST. It also establishes a mechanism to develop RH/S catch caps through a framework adjustment to the Herring FMP. Under the Amendment 5 provisions, a long-term river herring bycatch avoidance strategy for the Atlantic herring fishery would be developed and reviewed through a two-phase approach, beginning in Amendment 5 and continuing with the establishment of river herring catch caps in this framework adjustment.

Catch caps for RH/S established in Framework 3 may result in synergy between regulatory and voluntary bycatch mitigation efforts. The avoidance systems could provide fishermen with a tool that will help them stay below alosine catch limits, enabling them to fully harvest Atlantic herring and mackerel quotas. This could increase the incentive to voluntarily avoid alosine bycatch, by creating tangible economic consequences. However, continued creation of alosine catch caps based on historical catch could undermine the avoidance system. This method of cap determination creates an incentive for the fleet to maintain an alosine catch history. Thus, participation may not occur until alosine limits are close to being reached or could incentivize the fleet to target areas with high amounts of alosines if Atlantic herring quotas are close to being reached.

Continuing Efforts/Funding

Though the distribution of alosines on the scale of this study varies from year to year, catch patterns suggesting midwater trawl vessels can be moved to areas with low alosine bycatch and adequate levels of target species using the scale of this study have been observed. However, the effectiveness of the program to reduce bycatch is dependent on the speed in, which the location of low bycatch areas can be identified and shared. Reduction of the time-lag between catch events and communication could be achieved by further incorporating at-sea observers in the avoidance system.

In 2013, select midwater boats and at-sea observers successfully worked together to email bycatch data to the river herring avoidance program hours after tows were completed. This collaboration could be expanded and refined in subsequent years. Additionally, environmental conditions related to target species and alosine abundance could be used to make the winter communication system proactive instead of reactive (Bethoney et al. 2013b). Near-real time monitoring of effort and bycatch events in relation to environmental conditions has begun and could be expanded in the future (MARACOOS 2013).

When developing its final recommendations for the 2013-2015 herring fishery specifications, the Council identified river herring bycatch avoidance and portside sampling as top priorities for cooperative research to be funded by herring RSA in 2014 and 2015. Monitoring – through both at-sea and portside sampling – and avoidance are critical steps to better understand the nature and extent of bycatch in the fishery and work with the industry to minimize it to the extent practicable. The measures developed by the Council in Amendment 5 promote cooperation with industry and acknowledge the need to better understand bycatch problems in order to develop effective solutions. With enough information and clear, quick communication, areas for vessels to fish that contain adequate amounts of target species but not large amounts of alosines can be identified. Continuation of this project, which has been joined by nearly every major participant in the herring and mackerel midwater trawl fleets, provides a mechanism to develop and implement the long-term strategies outlined in Amendment 5.

The SMAST/MA DMF midwater trawl bycatch avoidance project was funded by the National Fish and Wildlife Foundation (NFWF) in 2011 through 2013. The Nature Conservancy funded the work with bottom trawl fishery in 2012 and 2013. SMAST and MA DMF have applied for funding for this program through the 2014 and 2015 herring research set-asides (RSAs). If funded, the project will (1) include portside sampling for at least 50% of midwater trawl landings in Massachusetts; (2) estimate the total amount of river herring taken by midwater trawl vessels during 2014 and 2015; (3) describe the length, number, and maturity of river herring incidental catch by location and time; (4) continue near real-time river herring avoidance communication systems for the midwater trawl fleet; and (5) place net sensors on midwater trawl gear. SMAST would manage the project through its duration (January 2014 – December 2015). The project will therefore cover the time period for which catch caps are proposed in this framework adjustment (2014 and 2015 fishing years).

3.6.5 Fishing Communities

In this document, for the purposes of gaining a better perspective on the nature of the Atlantic herring fishery and the character of the affected human environment, a broader interpretation of fishing community has been applied to include almost all communities with a substantial involvement in or dependence on the Atlantic herring fishery. In terms of National Standard 8 (NS 8), some of the communities identified in this section may not fit the strict interpretation of the criteria for substantial dependence on fishing. The fishing communities that meet the legal definition (as promulgated through NS 8) are likely to be considered a subset of the broader group of communities of interest that are engaged in the herring fishery and identified in this document. A description concerning NS 8 is seen below.

In the 1996 amendments to the MSA, Congress added provisions directly related to social and economic factors for consideration by Councils and NMFS. NS 8 of the MSA states that:

Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

NS 8 requires the consideration of impacts on fishing communities. Section 316 of MSA defines a fishing community as:

"A community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community."

Because herring is widely used as bait for the lobster fishery, especially in Maine, it is not practical to identify every community with substantial involvement in the lobster fishery (and consequently some level of dependence on the herring fishery) for assessment in this document. Instead, some of the communities of interest were selected, in part, because of their involvement in or dependence on the lobster fishery; assessment of the impacts of the Amendment 1 measures on these communities should provide enough context to understand the potential impacts on any community with substantial involvement in the lobster fishery. Parallels can be drawn between the communities that are identified in this section and other similar communities engaged in the lobster fishery.

NS 8 requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. "Sustained participation" is interpreted as continued access to the fishery within the constraints of the condition of the resource.

Communities of Interest

The following five criteria were used in Amendments 1 and 5 to the Herring FMP to define *Communities of Interest* for the Atlantic herring fishery, which must meet at least one criterion:

1. Atlantic herring landings of at least 10M pounds (4,536 mt) per year from 1997-2008, or anticipated landings above this level based on interviews and documented fishery-related developments.
2. Infrastructure dependent in part or whole on Atlantic herring.
3. Dependence on herring as lobster and/or tuna bait.
4. Geographic isolation in combination with some level of dependence on the Atlantic herring fishery.
5. Utilization of Atlantic herring for value-added production.

Based on the above criteria, there are 11 *Communities of Interest* for the Atlantic herring fishery, identified below and further evaluated in Amendment 5 to the FMP for Atlantic Herring (Section 4.5.3), Also, community profiles of each are available from the NEFSC Social Sciences Branch website(Clay et al. 2007). Since Amendment 1, this list has changed slightly with changes in harvesting and processing sectors.

1. Portland, Maine
2. Rockland, Maine
3. Stonington/Deer Isle, Maine
4. Vinalhaven, Maine
5. Lubec/Eastport, Maine
6. Sebasco Estates, Maine
7. NH Seacoast (Newington, Portsmouth, Hampton/Seabrook)
8. Gloucester, Massachusetts
9. New Bedford, Massachusetts
10. Southern Rhode Island (Point Judith, Newport, North Kingstown)
11. Cape May, New Jersey

3.6.5.1 Home Ports

Of the Atlantic herring *Communities of Interest*, Gloucester and New Bedford, Southern RI, and Cape May are homeports with largest concentrations of vessels that have Atlantic Herring limited access directed fishery permits, Categories A and B (Table 40). Mid-Coast ME, Portland and Seacoast NH also are home to a few of these permit holders. Beyond the communities of interest, a few Category A and B permit holders have homeports in Bath, Cundys Harbor, Hampden, Owls Head, and West Rockport ME; Boston and Woods Hole MA; and Wanchese NC. For the most part, these vessels use a community of interest as a landing port (NMFS 2012).

The communities of interest also reflect concentrated locations of other stakeholders such as the lobster fishing industry members who use herring as bait. Another community of interest that is more dispersed and thus may not be reflected in this listing is that comprised of the stakeholders who rely on herring as forage to attract their target species (e.g., tuna fishermen, recreational fishermen and whale watch companies).

Table 40 Distribution of Atlantic Herring Permit Holders in 2012 which have an Atlantic Herring Community of Interest as a Homeport

Homeport		Permit Category				
		A	B,C	C	D	Total
Maine	Portland	2	0	1	36	**39**
	Rockland	1	0	0	3	**4**
	Stonington/Deer Isle	1	0	0	0	**1**
	Vinalhaven	0	0	0	2	**2**
	Lubec/Eastport	0	0	0	2	**2**
	Sebasco Estates	0	0	0	3	**3**
	Maine, other	5	0	5	180	**190**
New Hampshire	Seacoast	2	0	4	90	**96**
Massachusetts	Gloucester	5	0	2	155	**162**
	New Bedford	5	0	2	195	**202**
	Massachusetts, other	5	1	1	356	**363**
Rhode Island	Southern	3	3	7	115	**128**
New Jersey	Cape May	6	0	8	85	**99**
	New Jersey, other	0	0	0	184	**184**
Other States*		1	0	11	463	**475**

Source: NMFS permit databases. http://www.nero.noaa.gov/permits/permit.html. Data are updated as of July 2013.

**Includes Alabama, Connecticut, Delaware, Florida, Georgia, Maryland, North Carolina, New York, New York, Pennsylvania, Texas, and Virginia*

3.6.5.2 Landing Ports

Atlantic herring harvested from Areas 1A and 1B are landed in fishing communities in Maine, New Hampshire, and Massachusetts, whereas herring from Areas 2 and 3 are landed in a wider range of ports (Table 41). Communities in Rhode Island and New Jersey fish in Area 2 for herring almost exclusively. Portland, Rockland, Gloucester, and New Bedford are ports with the most herring landings in recent years. Within New Jersey, Cape May is the most active landing port.

Table 41 Landing Port Distribution of Atlantic Herring Landings from Management Areas (2008-2012)

Landing Port		Area 1A (mt)	Area 1B (mt)	Area 2 (mt)	Area 3 (mt)
Maine	Portland	25%	20%	0.0%	26%
	Rockland	27%	14%	0.0%	11%
	Stonington/Deer Isle	8.0%	12%	0.0%	0.0%
	Vinalhaven	1.7%	3.9%	0.0%	2.3%
	Lubec/Eastport	0.0%	0.0%	0.0%	0.0%
	Sebasco Estates	0.0%	0.0%	0.0%	0.0%
	Maine, other	6.1%	1.1%	0.0%	4.0%
New Hampshire	Seacoast	2.5%	0.7%	0.1%	0.9%
Massachusetts	Gloucester	22%	45%	10%	44%
	New Bedford	6.9%	4.4%	53%	12%
	Massachusetts, other	1.1%	0.1%	3.6%	0.0%
Rhode Island	Southern	0.0%	0.0%	22%	0.1%
New Jersey	Cape May	0.0%	0.0%	12%	0.0%
	New Jersey, other	0.0%	0.0%	0.0%	0.0%
Other States		0.0%	0.0%	0.1%	0.0%
Total		**163,269 (100%)**	**23,289 (100%)**	**101,542 (100%)**	**133,368 (100%)**

Source: NMFS VTR database. Data are updated as of August 23, 2013.

3.6.5.3 Community Descriptions

1. Portland, Maine

Portland is the largest city in Maine, with a population of 66,194 (Bureau 2010). Of the civilian employed population 16 years and older, 0.3% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (29.3%) is the largest industry sector (Bureau 2011). Portland's waterfront provides most of the community's fishing industry infrastructure (e.g., Portland Fish Exchange) alongside other industries including recreation, tourism, light industry, transportation, cargo, and marine-related research. Portland's landings come primarily from the large mesh groundfish species and from lobster. Herring brings in about 8.6% of the dollar value of landings in Portland. Portland ranked third in herring landings in the region, taking a six-year (2005-2010) average (13.5K mt) Taking a four-year average (2007-2010), Portland ranked fourth among ports with herring revenue ($3.1M) (Dealer and VTR data).

2. Rockland, Maine

Rockland has a total population of 7,297 (Bureau 2010). Of the civilian employed population 16 years and older, 3.1% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (18.3%) is the largest industry sector (Bureau 2011). Other than fishing and boat building/repair, other stabilizing businesses include furniture and playground equipment manufacturing, biotechnology industries, wholesale distribution, marine-related businesses, seaweed processing, metal fabricating, and food related industries. Rockland's landings come primarily from lobster and herring. Herring brings in about 36% of the dollar value of landings in Rockland. Rockland ranked fourth in herring landings in the region, taking a six-year (2005-2010) average (12.5K mt) Taking a four-year average (2007-2010), Rockland ranked second among ports with herring revenue ($3.4M), though 2009 and 2010 revenues were noticeably lower (Dealer and VTR data).

3. Stonington/Deer Isle, Maine

Stonington and Deer Isle have a total population of 3,018 (Bureau 2010). Of the civilian employed population 16 years and older, 29% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). This is the largest industry sector (Bureau 2011). Deer Isle is home to the Commercial Fisheries News, the widely-read monthly fishing industry newspaper for the Atlantic coast. Stonington is one of the few Maine fishing communities that have secured waterfront access for commercial fishing, because property values have remained stable relative to other coastal cities. Stonington's landings come primarily from lobster. Herring brings in about 0.10% of the dollar value of landings in Stonington and Deer Isle. Stonington and Deer Isle landed 3.9K mt of herring on average over six years (2005-2010). Taking a four-year average (2007-2010), Stonington ranked fifth among ports with herring revenue ($1.0M), though 2009 and 2010 revenues were noticeably lower (Dealer and VTR data). Stonington and Deer Isle are involved in the Atlantic herring fishery primarily through their dependence on herring for lobster bait.

4. Vinalhaven, Maine

The island town of Vinalhaven has a total population of 1,165 (Bureau 2010). Of the civilian employed population 16 years and older, 32.4% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). This is the largest industry sector (Bureau 2011). Vinalhaven is intimately involved with the Atlantic herring fishery because of its dependence on lobster bait. Many of the year-round residents are participants in the lobster fishery. Several lobster bait dealers, including floating stations and a co-op, are located in Vinalhaven. Vinalhaven has several packaging and wholesale companies, including Vinalhaven Lobster Co., Vinalhaven Fishermen's Co-op, Inland Seafood and Alfred Osgood, that ship lobster to Portland and other mainland locations for processing and distribution. Bait dealers on Vinalhaven pay a higher price for bait than dealers on the mainland, as there is limited bait storage capacity on the island and insufficient space on the ferry that transports goods and people from the mainland to make regular bait transshipments during the height of the lobster season. Herring brings in about 2.7% of the dollar value of landings in Vinalhaven. Vinalhaven ranked ninth in herring landings in 2004 (2,674 mt) and tenth cumulatively from 1995-2004 (24,779 mt).

5. Lubec/Eastport, Maine

Lubec and Eastport have a total population of 2,690 (Bureau 2010). Of the civilian employed population 16 years and older, 5.4% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (31%) is the largest industry sector (Bureau 2011). Lubec and Eastport has a diversity of employment, including medical centers, schools, an apparel company, and an Atlantic salmon aquaculture facility. Eastport also has the only Nori seaweed processing plant in the US. Eastport and Lubec are involved in a diversity of fisheries, including lobster, scallops, urchin, clams, and sea cucumbers. No herring landings were reported in Lubec/Eastport in 2004. Lubec and Eastport are representative of geographically isolated small ports that depend on herring for lobster bait.

6. Sebasco Estates, Maine

Sebasco Estates is a small village within the town of Phippsburg, which has a total population of 2,216 (Bureau 2010). Of the civilian employed population of Phippsburg 16 years and older, 5.2% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (22.6%) is the largest industry sector (Bureau 2011). Herring brings in about 0.076% of the dollar value of landings in Sebasco Estates. Several lobster bait dealers, large and small, are located in this area. Sebasco Estates is involved in the Atlantic herring fishery primarily due to its dependence on herring for lobster bait, and is representative of small ports that depend on herring for lobster bait.

7. NH Seacoast – Newington, Portsmouth, Hampton/Seabrook

Newington has a total population of 753 (Bureau 2010). Of the civilian employed population of Newington 16 years and older, 1.0% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (15.8%) is the largest industry sector (Bureau 2011). Major employers in Newington include Fox Run Mall (retail**)** and Neslab (light manufacturing lab equipment). Herring brings in about 4.8% of the dollar value of landings in Newington. Newington ranked fifth in herring landings in 2004 (5,660 mt) and 12th cumulatively from 1995-2004 (16,805 mt), with herring landings increasing in more recent years. Newington is primarily dependent on the herring fishery because of the bait it provides for lobster operations based in Great Bay estuary. Commercial fisheries in the Great Bay estuary include herring, alewives, mummichogs (*Fundulus sp.*) and tomcod, eels, and smelt. Newington has several large and small herring bait dealers, and freezer facilities to store lobster bait. The Little Bay Lobster Company and the Shafmaster Fleet Services both harvest and deliver lobster nationally and internationally. The Newington fishing industry also competes with other water-dependent industries, including tallow, steel scrap and wood chip export industries.

Portsmouth has a total population of 20,779 (Bureau 2010). Of the civilian employed population of Portsmouth 16 years and older, 0.7% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (25.5%) is the largest industry sector (Bureau 2011). Portsmouth is somewhat involved in the herring fishery, primarily through its dependence on herring for lobster and tuna bait. Herring brings in about 1.2% of the dollar value of landings in Portsmouth. The port is centrally-located with good transportation infrastructure and provides other fishing related services. Portsmouth ranked 13th in herring landings in 2004 (800 mt) and 11th cumulatively from 1995-2004 (18,060 mt).

Hampton and Seabrook have a total population of 24,123 (Bureau 2010). Of the civilian employed population 16 years and older, 0.5% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (21.5%) and retail trade (21.8%) are the largest industry sector, in Hampton and Seabrook, respectively (Bureau 2011). Hampton and Seabrook are somewhat involved in the herring fishery through their dependence on herring for lobster and tuna bait. Herring brings in about 0.2% of the dollar value of landings in Hampton and Seabrook. Only 2 mt of herring were reported to have been landed in Hampton in 2004. Seabrook ranked 17th in herring landings in 2004 (96 mt).

8. Gloucester, Massachusetts

Gloucester has a total population of 28,789 (Bureau 2010). Of the civilian employed population of Gloucester 16 years and older, 2.2% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (25.5%) is the largest industry sector (Bureau 2011). Herring brings in about 11% of the dollar value of landings in Gloucester. Gloucester was the top-ranked port for herring landings in 2004 (26,891 mt) and cumulatively from 1995-2004 (227,579 mt). Taking a four-year average (2007-2010), Gloucester ranked first among ports with herring revenue ($6.4M) (Dealer and VTR data). Gloucester lobster fishermen depend on the harvested herring as bait for their traps and tuna fishermen use herring as bait for their lines. Several lobster bait dealers and a pumping station for offloading herring are located in Gloucester. In addition, Cape Seafoods, one of the largest processors of herring for frozen export, is located at the State Pier and owns several dedicated pelagic fishing vessels.

9. New Bedford, Massachusetts

New Bedford has a total population of 95,072 (Bureau 2010). Of the civilian employed population of New Bedford 16 years and older, 1.2% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (26.1%) is the largest industry sector (Bureau 2011). New Bedford contains approximately 44 fish wholesale companies, 75 seafood processors and some 200 shore side industries (Hall-Arber et. al. 2001). Maritime International, which has one of the largest U.S. Department of Agriculture-approved cold treatment centers on the East Coast, is also located in New Bedford. Herring brings in about 0.7% of the dollar value of landings in New Bedford. New Bedford ranked fourth in herring landings in 2004 (7,791 mt) and seventh cumulatively from 1995-2004 (31,089 mt). Taking a four-year average (2007-2010), New Bedford ranked third among ports with herring revenue ($6.4M) (Dealer and VTR data).

10. Southern Rhode Island – Point Judith, Newport, North Kingstown

Census data are not available for Point Judith itself, but are available for the county subdivision "Narragansett Pier CDP" which includes Point Judith. Narragansett Pier CDP has a total population of 3,409 (Bureau 2010). Of the civilian employed population of Narragansett Pier CDP 16 years and older, 0.5% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (27.7%) is the largest industry sector (Bureau 2011). Several lobster bait dealers are located in Point Judith, and some herring is trucked to Maine from Point Judith for processing. Landings of herring in Point Judith were much higher in the early 1990s, possibly due to increased participation in the Atlantic mackerel fishery. Today, herring brings in about 1.2% of the dollar value of landings in Point Judith. Point Judith ranked 10th in herring landings in 2004 (2,129 mt) and fourth cumulatively from 1995-2004 (71,289 mt). Taking a four-year average (2007-2010), Point Judith ranked seventh among ports with herring revenue ($469K) (Dealer and VTR data).

Newport has a total population of 24,672 (Bureau 2010). Of the civilian employed population of Newport 16 years and older, less than 0.01% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (25.1%) is the largest industry sector (Bureau 2011). Herring brings in less than 0.01% of the dollar value of landings in Newport. Newport is marginally involved in the Atlantic herring fishery, and ranked 15th in herring landings in 2004 (313 mt) and 17th cumulatively from 1995-2004 (3,757 mt). Aquidneck Lobster Co., Dry Dock Seafood, International Marine Industries Inc., Long Wharf Seafood, Neptune Trading Group Ltd., Parascandolo and Sons Inc., and Omega Sea are wholesalers and retailers of seafood in Newport.

North Kingstown has a total population of 26,486 (Bureau 2010). Of the civilian employed population of North Kingstown 16 years and older, 1.1% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Educational services and health care and social assistance (25.4%) is the largest industry sector (Bureau 2011). Herring brings in about 6.9% of the dollar value of landings in North Kingstown, which is involved in the herring fishery primarily through its involvement in the bait market. North Kingstown ranked 12th in herring landings in 2004 (1,065 mt) and fifth cumulatively from 1995-2004 (69,094 mt). Several lobster bait dealers and freezer facilities are located in North Kingstown, and some herring is trucked to Maine from North Kingstown for processing. North Kingston's Sea Freeze, Ltd. is the largest producer of sea-frozen fish on the U.S. east coast. It supplies sea-frozen and land-frozen fish to domestic and international markets including bait products to long-line fleets. Sea Freeze owns two freezer trawlers that provide *Illex* and *Loligo* squid, mackerel and herring to the Sea Freeze facilities. Although herring is among the least financially valuable species that Sea Freeze harvests and processes, it is nevertheless important to the business due to its year round availability.

11. Cape May, New Jersey

Cape May has a total population of 3,607 (Bureau 2010). Of the civilian employed population of Cape May 16 years and older, less than 0.01% are employed in the agriculture, forestry, fishing, hunting, or mining sectors (2007-2011 average). Arts, entertainment, recreation, accommodation and food services (19.3%) is the largest industry sector (Bureau 2011). Herring brings in about 0.6% of the dollar value of landings in Cape May. Only 8 mt of herring were reported to have been landed in Cape May in 2004. A pumping station for offloading herring and Lund's Fisheries, a processor of herring and mackerel, are located in Cape May. Lunds' also owns a number of dedicated pelagic fishing vessels, and is a member of the Garden State Seafood Association. There are also two other exporters of seafood in Cape May: the Atlantic Cape Fisheries Inc., which exports marine fish and shellfish, oysters, scallops, clams and squids; and the Axelsson and Johnson Fish Company Inc., which exports shad, marine fish, conch, American lobster, lobster tails, scallops and whole squid.

3.6.6 Canadian Herring Fisheries

Catch of the Gulf of Maine/Georges Bank Atlantic herring stock complex in Canadian waters consists primarily of fish caught in the New Brunswick (NB) weir fishery (the SARC 54 Panel noted that the Atlantic herring stock on the Scotian Shelf region is unknown). The NB weir fishery is described in detail in Framework 2 to the Herring FMP and the 2013-2015 herring fishery specifications package.

- The NB weir fishery catch is quite variable and dropped to just under 6,500 mt in 2008. The NB weir fishery landings totaled about 30,944 mt in 2007 and 6,448 mt in 2008.
- The most recent five-year average of NB weir landings (2007–2011) is 11,218 mt, and the most recent ten-year average (2002-2011) is 12,358 mt.
- Extremely low landings during the 2008 fishing year decreased these moving averages, especially the ten-year average.
- The 2010 fishing year had NB weir landings of 10,958 mt and decreased in 2011 to 3,711 mt.

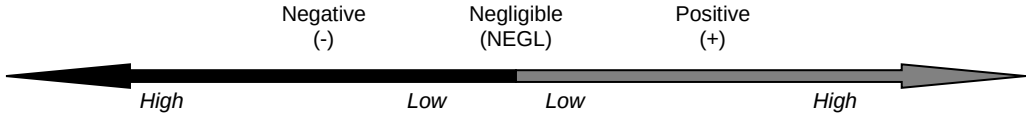
4.0 IMPACTS OF FRAMEWORK 3 ALTERNATIVES

This section addresses the potential impacts of the action proposed in Framework 3 as well as other alternatives/options considered by the Council. The Framework 3 analysis was developed by the Herring PDT. The impacts of the Framework 3 alternatives on each VEC identified in Section 3.0 of this document are discussed in the following subsections. The detailed Herring PDT analyses and supporting technical documents are included in the three appendices and are summarized/referenced in the following discussion..

In general, the descriptive and analytic components of this document are constructed in a consistent manner. The Affected Environment for Framework 3 (Section 3.0) traces the history of each VEC since the implementation of Amendment 1 to the Herring FMP (in 2006) through Amendment 5 (finalized by the Council in 2013) and addresses the impacts of all related management actions. The Affected Environment section is designed to enhance the readers' understanding of the baseline conditions and recent trends in order to fully understand the anticipated environmental impacts of the management measures under consideration in this framework adjustment. The impacts of these measures are assessed in the following sub-sections of this document using a similar structure to that found in the Affected Environment. To enhance clarity and maintain consistency, the terms described in Table 42 are used to summarize the impacts of each alternative/option on the VECs in this document. If impacts are determined to be neutral, the reasons for making such a determination are provided in the discussion.

Table 42 Terms Used in Tables to Summarize Cumulative Impacts on Framework 3 VECs

Impact Definition			
	Direction		
VEC	**Positive (+)**	**Negative (-)**	**Negligible (Negl)**
Atlantic Herring; RH/S, Other Non-Target Species, and Protected Resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
Impact Qualifiers:			
Low **(L, as in low positive or low negative)**	To a lesser degree		
High **(H; as in high positive or high negative)**	To a substantial degree		
Likely	Some degree of uncertainty associated with the impact		



The Atlantic herring fishery is administered in accordance with the Atlantic Herring FMP, as modified by applicable amendments and framework adjustments. The Herring FMP was developed by the Council and implemented by NMFS in 2000. The Atlantic herring fishery has been managed by catch quotas (now called ACLs) since the Herring FMP was implemented. The specification-setting process is the primary management tool used to administer the Atlantic herring fishery and was modified in Amendment 1 (from annual to every three years) and Amendment 4 for consistency with the new ACL/AM provisions in the reauthorized MSA. Amendment 4 (76 FR 11373, March 2, 2011) established a trigger for closing the directed herring fishery in a management area and the provision that any overages would be deducted from future harvest levels (Accountability Measures, AMs).

The 2013-2015 Atlantic herring fishery specifications (see Table 26 on p. 84) established annual Atlantic herring harvest levels for each of four management areas (Figure 17, p. 83), established a 95% total herring ACL trigger, and modified the suite of existing AMs to reduce the sub-ACL trigger to 92%. Framework 2 to the Atlantic Herring FMP was implemented concurrently with the 2013-2015 fishery specifications and modifies the specifications process to allow for seasonal sub-ACL splitting (by month) and un-utilized sub-ACL carryovers (up to 10% per management area). The AMs were adopted by the Council to further prevent the stockwide Atlantic herring ACL and management area sub-ACLs from being exceeded during the fishing year, as well as improve the likelihood that the total ACL (OY) can be caught on a continuing basis while preventing overfishing.

4.1 IMPACTS ON THE ATLANTIC HERRING RESOURCE

A description of the Atlantic herring resource is provided in Section 3.1 of this document, and additional information can be found in the FEIS for Amendment 5 to the Herring FMP. As previously noted, fishing mortality on Atlantic herring is managed primarily through the overall herring ACL (reduced from the overfishing limit and acceptable biological catch to address scientific uncertainty and management uncertainty) and sub-ACLs that are intended to minimize risk to individual stock components while maximizing opportunities for the herring fishery to achieve OY. Based on the best available scientific information (SAW 54, June 2012), the Atlantic herring resource is not overfished (the stock complex is considered rebuilt), and overfishing is not occurring.

4.1.1 Impacts of Alternative 1 (No Action) on the Atlantic Herring Resource

Under the no action alternative, the Council would not establish a process to set catch caps for RH/S in the Atlantic herring fishery, and the Council would not specify RH/S catch caps for the 2014 and 2015 fishing years. Without taking action in this framework adjustment, the status quo would be maintained. The catch of Atlantic herring would continue under the 2013-2015 fishery specifications.

Due to the continuing management of the Atlantic herring fishery through the Herring FMP and fishery specifications, selection of the no action alternative in this framework adjustment would not be expected to affect the status of the Atlantic herring resource, and the no action alternative is therefore expected to have a *negligible* impact on the Atlantic herring resource. While there are no short-term impacts expected from taking no action, some of the benefits that may result from the provisions proposed in this framework adjustment over the long-term (discussed below), although minor, may not be realized.

4.1.2 Impacts of Alternative 2 (*Preferred Alternative*) on the Atlantic Herring Resource

Alternative 2 (***Preferred Alternative***, Section 2.3, p. 10) establishes a process for setting and modifying catch caps for river herring and shad in the Atlantic herring fishery and identifies the vessels and areas to which the caps would apply. It includes reporting requirements, measures that become effective when a catch cap is reached, and other related provisions. Once the RH/S catch cap process is established in this framework adjustment, future catch caps for RH/S could be specified through the Atlantic herring fishery specifications or other herring-related action. Also included in Alternative 2 are specifications for RH/S catch caps by gear type and area for the 2014 and 2015 fishing years. The impacts of the proposed RH/S catch cap process/provisions on the Atlantic herring resource are discussed in this section; the impacts of the proposed 2014/2015 RH/S catch caps are discussed in Section 4.1.3.

Overall, the RH/S catch cap process and provisions established through this framework adjustment are not expected to substantially impact the Atlantic herring resource because they are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the fishery specifications process. In the future, the RH/S catch caps established through this action may result in the closure of one or more RH/S Catch Cap Areas, but the impacts of future RH/S catch caps will be analyzed when the catch caps are specified by the Council.

The spatial distribution of (1) the proposed RH/S catch caps, (2) the Atlantic herring ACL, and (3) fishing effort in the direct herring fishery suggests that there may be potential to reduce Atlantic herring catch during the fishing year under this alternative. In general, if Atlantic herring catch is less than expected, there could be a positive impact on the Atlantic herring resource. However, the provisions proposed for specifying RH/S catch caps (by gear and area) under this alternative are intended to provide opportunity for the directed herring fleet to utilize the total ACL for Atlantic herring (OY) if it can continue to avoid RH/S. The RH/S Catch Cap Areas (Figure 1) and related closure areas (Figure 2) are different than the herring management areas (Figure 17); this area-based approach reduces the likelihood that reaching one or more RH/S catch caps in a fishing year would result in closure of the directed herring fishery in all management areas.

While there are no measurable impacts on the Atlantic herring resource expected from establishing the RH/S catch cap process and provisions in this framework adjustment, the potential to reduce total Atlantic herring catch in a fishing year could be positive. Moreover, there may be long-term benefits if the RH/S catch cap process and related provisions improve catch monitoring and promotes sustainable management of the Atlantic herring resource and herring fishery. As catch information for the herring fishery continues to improve, better estimates can be incorporated into future stock assessments, thereby potentially reducing some uncertainties associated with the assessment data/models, improving biomass and fishing mortality estimates, and enhancing the Council's ability to successfully manage Atlantic herring and other resources at long-term sustainable levels. The impacts of Alternative 2 on the Atlantic herring resource, therefore, are expected to be *low positive* when compared to taking no action.

4.1.3 Impacts of Proposed 2014/2015 RH/S Catch Caps on the Atlantic Herring Resource

For the 2014 and 2015 fishing years, the Council selected as its *Preferred Options* annual "median" RH/S catch caps for the midwater trawl fishery in the GOM, CC, and SNE/MA RH/S Catch Cap areas and a "median" RH/S catch cap for the bottom trawl fishery in the SNE/MA RH/S Catch Cap areas (summarized below, see Sections 2.3.2 – 2.3.5 for the complete range of options considered by the Council). No RH/S catch cap is proposed for the GB Catch Cap Area in 2014-2015; if the catch of river herring/shad is documented to increase in this area, a catch cap would automatically be considered during the following specifications process. The proposed RH/S catch caps for 2014-2015 would not affect trips/vessels landing less than 6,600 pounds of Atlantic herring or herring vessels using other gear types, including purse seines.

Preferred Options for 2014-2015 RH/S Catch Caps

RH/S Catch Cap Area	Preferred Option: 2014-2015 RH/S Catch Cap (mt)
GOM	85.5
CC	13.3
SNE/MA	MWT – 123.7 BT – 88.9
GB	N/A

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate catch that is less than (or equal to) the status quo. According to Table 48 (p. 156), Atlantic herring catch could decline by up to 9% in 2014 and 2015 under the *Preferred Options* for specifying RH/S catch caps if the fleet does not continue to avoid catching RH/S. If the fleet avoids RH/S, there may be opportunity to utilize most or all of the Atlantic herring ACL during 2014 and 2015. The proposed 2014/2015 RH/S catch caps do not affect the purse seine fishery in the Gulf of Maine or the directed herring fishery on Georges Bank (midwater trawl), and part of Area 2 would also remain open if the RH/S catch cap is reached in the southern New England/Mid-Atlantic area. A specific change in Atlantic herring catch resulting from the 2014-2015 RH/S catch caps is difficult to predict, and any resulting impact on the Atlantic herring resource cannot be quantified. Changes in herring catch, and therefore impacts, will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the herring fishery in 2014 and 2015 is fully utilized (the total ACL for 2014-2015 is higher than 2008-2012).

The continued collaborative effort between herring fishermen, SMAST, and MA DMF is expected to increase the potential for RH/S avoidance and better ensure that the fleet can fully utilize the available annual herring yield. High levels of cooperation and participation by industry members in the avoidance program has been documented. The overall behavior of the vessels within the program's avoidance areas also provides evidence of cooperation, and the appearance of distinct spatial and temporal bycatch patterns within the target areas suggests vessels can avoid large catches of alosines. The RH/S catch caps established in this framework adjustment may result in synergy between regulatory and voluntary bycatch mitigation efforts. The avoidance systems could provide fishermen with a tool that will help them stay below

alosine catch limits, enabling them to fully utilize the available herring quota. For additional information/discussion, see Section 3.6.4 of this document (River Herring Bycatch Avoidance Project, p. 104).

Regardless of the changes in catch that may result from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the herring ABC specified for these fishing years and evaluated in the 2013-2015 specifications package. Because the Atlantic herring resource is considered to be rebuilt and total herring catch will remain within the bounds of the 2013-2015 Atlantic herring fishery specifications, the impacts of the *Preferred Options* for specifying 2014 and 2015 RH/S catch caps on the Atlantic herring resource are expected to be *neutral*. Comparatively, this is the case under the other options considered by the Council, although the options associated with lower RH/S catch caps in 2014-2015 would have a higher likelihood of closing the directed herring fishery and reducing aggregate Atlantic herring catch in any given fishing year. Any resulting impacts under any of the options considered by the Council are not expected to change or jeopardize the status of the Atlantic herring resource.

4.2 IMPACTS ON RIVER HERRING/SHAD

River herring and shad are non-target species that may be caught incidentally by vessels in the directed Atlantic herring fishery. A description of the river herring and shad (RH/S) resources is provided in Section 3.2 of this document (p. 28); additional information can be found in the FEIS for Amendment 5 to the Atlantic Herring FMP. The ASMFC completed the river herring benchmark stock assessment and peer review in 2012, examining 52 stocks of alewife and blueback herring with available data in US waters. The stock assessment technical team examined indices from fishery-dependent (directed river herring landings and bycatch estimates in ocean fisheries) and fishery-independent (young-of-year indices, adult net and electrofishing indices, coastal waters trawl surveys, and run count indices) datasets. From this information, the status of 23 stocks were determine to be *depleted* relative to historic levels, and one stock was increasing. Statuses of the remaining 28 stocks could not be determined, citing times-series of available data being too short. "*Depleted*" was used, rather than "*overfished* and "*overfishing*," due to many factors (i.e., directed fishing, incidental fishing/bycatch, habitat loss, predation, and climate change) contributing to the decline of river herring populations. Furthermore, the stock assessment did not determine estimates of river herring abundance and fishing mortality due to lack of adequate data. For many of these reasons, the stock assessment team suggested reducing the full range of impacts on river herring populations.

The impacts of the alternatives considered by the Council in Framework 3 on RH/S are discussed in the following subsections. As discussed in the following sub-sections, the impacts of Alternative 2 (***Preferred Alternative***) are expected to be *positive* for the RH/S species. However, specific biological impacts on river herring and shad stocks cannot be quantified at this time due to a lack of information; the biological impacts will be influenced by changes in directed Atlantic herring fleet behavior and shifts in the distribution/aggregation of stocks/sub-stocks from changes in fishing activity, environmental factors, climate change, restoration efforts, and other factors.

As part of the analyses in Amendment 5 to the Atlantic Herring FMP, the Herring PDT evaluated the overlap between river herring and shad to determine whether the management measures designed to minimize river herring bycatch in the Atlantic herring fishery would have similar impacts on shad bycatch. Based on this analysis, the Herring PDT concluded that management measures implemented to address river herring bycatch in the Atlantic herring fishery would likely have similar impacts on the shad species (see Section 3.2.5 of this document for more information). For this reason, the impacts of the alternatives considered in this framework adjustment on the river herring and shad species are assessed and discussed together in the following subsections.

4.2.1 Impacts of Alternative 1 (No Action) on RH/S

Under the no action alternative, the Council would not establish a process to set catch caps for RH/S in the Atlantic herring fishery, and the Council would not specify RH/S catch caps for the 2014 and 2015 fishing years. Without taking action in this framework adjustment, the status quo would be maintained. The incidental catch of RH/S in the Atlantic herring fishery would continue to be managed under the provisions in the Atlantic Herring FMP and other applicable State and Federal regulations.

RH/S species would not benefit from catch restrictions and efforts to reduce bycatch in the directed Atlantic herring fishery under the no action alternative. It is likely that a reduction in RH/S catch that may be realized under Alternative 2 (see following sub-section); any resulting benefits to the RH/S stocks would not be realized under the no action alternative. However, the measures in place under the ASMFC and States would continue for both shad and river herring, additional conservation and restoration efforts would continue throughout the range of the species, and measures to address/minimize non-target catch and bycatch in the Herring FMP and other FMPs would remain effective.

While data are not robust enough at this time to determine a biologically-based RH/S catch cap and/or the potential impacts of such a catch cap on the RH/S stocks, setting a cap on the catch of these species in the Atlantic herring fishery is a proactive action intended to manage and minimize catch to the extent practicable while allowing the Atlantic herring fishery to continue to operate and fully utilize OY in the upcoming fishing years if RH/S can be avoided. Just as the impacts of a RH/S catch cap cannot be quantified, the biological impacts of the no action alternative on RH/S cannot be determined at this time either. However, catch of RH/S in the directed Atlantic herring fishery would likely be greater under the no action alternative because it would not be capped, and there would not be a regulatory incentive for the Atlantic herring fleet to avoid RH/S. Generally, higher catches could result in negative impacts on the stock(s), particularly if the stock(s) are not in good condition. Due to the depleted status of many of the RH/S stocks and concerns about the impact of catch and catch mortality in the Atlantic herring fishery, it is likely that there would be a benefit to RH/S stocks from taking proactive action to establish RH/S catch caps. The impacts of not establishing a process to set RH/S catch caps in the herring fishery under Alternative 1 (no action) on RH/S, therefore, are *unknown but likely negative*.

Moreover, the no action alternative in this framework adjustment is not consistent with the Council's long-term efforts to address/manage RH/S catch in the Atlantic herring fishery, initiated in Amendment 5, supported in the 2013-2015 fishery specifications and RSAs, and furthered with the initiation of this framework adjustment in January 2014. It is also not consistent with the goals and objectives of this framework adjustment, specified in Section 1.2 of this document (p. 6).

4.2.2 Impacts of Alternative 2 (*Preferred Alternative*) on RH/S

Alternative 2 (***Preferred Alternative***, Section 2.3, p. 10) establishes a process for setting and modifying catch caps for river herring and shad in the Atlantic herring fishery and identifies the vessels and areas to which the caps would apply. It includes reporting requirements, measures that become effective when a catch cap is reached, and other related provisions. Once the RH/S catch cap process is established in this framework adjustment, future catch caps for RH/S could be specified through the Atlantic herring fishery specifications or other herring-related action. Also included in Alternative 2 are specifications for RH/S catch caps by gear type and area for the 2014 and 2015 fishing years. The impacts of the proposed RH/S catch cap process/provisions on the RH/S VEC are discussed in this section; the impacts of the proposed 2014/2015 RH/S catch caps on RH/S are discussed in Section 4.2.3.

The provisions proposed for specifying RH/S catch caps apply to the limited access directed herring fishery, which, according to information presented in Amendment 5 and Section 3.6 of this document, lands the vast majority of Atlantic herring (98% or more). This alternative should therefore address concerns about the impacts of RH/S catch/bycatch in the Atlantic herring fishery because it will address RH/S catch throughout the fishery and provide incentive for the fleet to continue to avoid RH/S and reduce its catch. The area-based distribution of RH/S catch caps proposed under this alternative are defined based on the best available information about observed RH/S encounters in the directed herring fishery (see Herring PDT analysis in Amendment 5 for more information). The Council's selection of the 95% trigger option to close the herring fishery if a RH/S catch cap is reached should ensure that the RH/S catch caps will not be exceeded.

While data are not robust enough at this time to determine a biologically-based RH/S catch cap and/or the potential impacts of such a catch cap on the RH/S stocks, setting a cap on the catch of these species in the Atlantic herring fishery is a proactive action intended to manage and minimize catch to the extent practicable while allowing the Atlantic herring fishery to continue to operate and fully utilize OY in the upcoming fishing years if RH/S can be avoided. The catch of RH/S in the directed Atlantic herring fishery would likely be less under this alternative when compared to the no action alternative because it would be capped, and there would be a regulatory incentive for the fleet to avoid RH/S. Generally, lower catches should result in positive impacts on the stock(s).

Moreover, taking action under this alternative will provide the Council with the ability to link RH/S catch in the Atlantic herring fishery to RH/S stock status and fishing mortality as better scientific information becomes available in the future. It is possible that this process will allow for future RH/S catch caps in the Atlantic herring fishery to be set such that their impacts on the RH/S stocks can be determined. Due to the depleted status of many of the RH/S stocks and concerns about the impact of RH/S catch/bycatch and associated mortality in the Atlantic herring fishery, there is likely to be a biological benefit to establishing RH/S catch caps. The impacts of Alternative 2 on RH/S, therefore, are expected to be *likely positive* when compared to the no action alternative.

4.2.3 Impacts of Proposed 2014/2015 RH/S Catch Caps on RH/S

For the 2014 and 2015 fishing years, the Council selected as its *Preferred Options* annual "median" RH/S catch caps for the midwater trawl fishery in the GOM, CC, and SNE/MA RH/S Catch Cap areas and a "median" RH/S catch cap for the bottom trawl fishery in the SNE/MA RH/S Catch Cap areas (summarized below, see Sections 2.3.2 – 2.3.5 for the complete range of options considered by the Council). No RH/S catch cap is proposed for the GB Catch Cap Area; if the catch of river herring/shad is documented to increase in this area, a catch cap would automatically be considered during the following specifications process. The proposed RH/S catch caps for 2014-2015 would not affect trips/vessels landing less than 6,600 pounds of Atlantic herring or herring vessels using other gear types, including purse seines.

Preferred Options for 2014-2015 RH/S Catch Caps

RH/S Catch Cap Area	Preferred Option: 2014-2015 RH/S Catch Cap (mt)
GOM	85.5
CC	13.3
SNE/MA	MWT – 123.7 BT – 88.9
GB	N/A

Potential Impacts on RH/S Catch by Atlantic Herring Vessels

As part of the analysis for this framework adjustment, the Herring PDT projected RH/S catch under the 2014-2015 catch cap options considered by the Council. The resulting simulated RH/S catch on trips landing more than 6,600 pounds of Atlantic herring under the status quo and the *Preferred Options for 2014-2015* is shown in Table 43 and Table 44. Average, standard deviation, and the 90th percentile of RH/S catch is presented for each gear-RH/S area combination and for the aggregate herring catch in each RH/S Catch Cap Area. Note that the totals for each RH/S Catch Cap Area are not equal to the sum of catch by each gear. The "Average" columns can be interpreted as the most likely outcomes. The 90th percentile of catch reflect "bad" fishing years in which RH/S catch caps are reached. One way to interpret this column is that there is a 10% chance that RH/S catch will be greater than that value. For example, the simulation model predict that there is a 10% chance that the RH/S catch by

midwater trawl vessels in the GOM area will be greater than 73.3 mt under the RH/S catch cap proposed for 2014-2015.

Table 43 Simulated RH/S Catch (mt) by RH/S Catch Cap Area and Gear Under the Status Quo (No Action)

	Gear	Average	Std. Dev.	90th percentile
GOM	Bottom Trawl	0.4	0.6	1.0
Catch Cap Area	Purse Seine	2.2	1.5	4.3
	Midwater Trawl	38.5	29.7	76.9
	Total	**41.1**	**29.8**	**79.1**
Cape Cod	Bottom Trawl	0.0	0.0	0.0
Catch Cap Area	Purse Seine	0.0	0.0	0.0
	Midwater Trawl	69.5	117.0	213.0
	Total	**69.5**	**117.0**	**213.0**
SNE/MA	Bottom Trawl	51.3	23.5	83.7
Catch Cap Area	Purse Seine	0.0	0.0	0.0
	Midwater Trawl	160.3	73.1	257.9
	Total	**211.6**	**77.8**	**314.6**
All Areas	**Grand Total**	**323.2**	**144.9**	**513.3**

***The shaded "Average" column represents the most likely outcome from the simulation model.*

Table 44 Simulated RH/S Catch (mt) by RH/S Catch Cap Area and Gear Under the *Preferred Options for 2014-2015 RH/S Catch Caps*

	Gear	Average	Std. Dev.	90th percentile
GOM	Bottom Trawl	0.4	0.3	1.0
Catch Cap Area	Purse Seine	2.2	1.5	4.3
	Midwater Trawl	35.9	22.5	73.3
	Total	**38.5**	**22.6**	**76.1**
Cape Cod	Bottom Trawl	0.0	0.0	0.0
Catch Cap Area	Purse Seine	0.0	0.0	0.0
	Midwater Trawl	7.8	5.1	13.1
	Total	**8.0**	**5.1**	**13.1**
SNE/MA	Bottom Trawl	50.0	19.6	83.5
Catch Cap Area	Purse Seine	0.0	0.0	0.0
	Midwater Trawl	110.5	20.2	123.4
	Total	**160.2**	**28.8**	**196.7**
All Areas	**Grand Total**	207.7	38.2	257.8

***The shaded "Average" column represents the most likely outcome from the simulation model.*

In general, the *Preferred Options* for specifying RH/S catch caps for the 2014 and 2015 Atlantic herring fishing years will likely result in aggregate RH/S catch that is less than or equal to the status quo. Simulation results for total RH/S catch by RH/S area and total RH/S catch for the entire fishery are also included in Table 43 and Table 44. The RH/S catch caps dramatically reduce the variability of RH/S catch, especially in the Cape Cod and Southern New England RH/S Catch Cap Areas.

Because the options considered by the Council for specifying RH/S catch caps in 2014-2015 only differ in degree, the impacts are considered together. By encouraging the directed herring fleet to avoid RH/S, or by shutting down the directed herring fishery if the RH/S cap is reached, these options should reduce RH/S catch and limit RH/S catch by the Atlantic herring fishery when compared to the status quo. This should produce a positive impact to RH/S stocks in 2014 and 2015, but the extent is unknown because there are no absolute abundance estimates for RH/S stocks, and there is no way to link the RH/S catch cap amount (or RH/S catch under a cap) to RH/S stock status or fishing mortality at this time.

The RH/S catch cap options for 2014 and 2015 were developed by the Council based on observed RH/S catch in the directed herring fishery from 2008-2012. The Council did not select the option to specify a RH/S catch cap for purse seine or bottom trawl vessels in the GOM Catch Cap Area during 2014 and 2015. Based on available data (detailed in Appendix I and II), encounters with RH/S by these gear types in the GOM have been very low. Specification of RH/S catch caps for these gear types in the GOM Catch Cap Area during 2014 and 2015 therefore would not likely impact RH/S.

The *Preferred Options* limit RH/S catch in 2014/2015 in all sectors of the directed herring fishery (gears/areas) that have the most significant interaction with RH/S; these options therefore have the greatest potential to benefit the RH/S stocks. Comparatively, the lower the RH/S catch cap is, the less RH/S will be caught by the Atlantic herring fishery in 2014/2015, and presumably the higher the benefit to RH/S stocks, but the degree to which this may occur is unknown. All of the options considered by the Council for specifying RH/S catch caps in 2014 and 2015 would likely benefit RH/S more than taking no action or not setting a catch cap in these areas.

Overall, the options with the lowest RH/S catch caps would provide the most benefit to RH/S stocks, and the options with the highest catch caps would provide the least benefit; the *Preferred Options* will likely provide an intermediate benefit. Again, without absolute abundance information for RH/S whether there is a substantial benefit and if so how much, cannot be determined. The impacts of the proposed 2014-2015 RH/S catch caps on RH/S, therefore, are *unknown but likely positive.*

4.3 IMPACTS ON OTHER NON-TARGET SPECIES

The FEIS for Amendment 5 to the Atlantic Herring FMP includes comprehensive information about non-target species caught in the Atlantic herring fishery. A summary is provided in Section 3.3 of this document (p. 57). In general, interactions between the Atlantic herring fishery and non-target species are managed through provisions required to minimize bycatch/bycatch mortality to the extent practicable (National Standard 9) as well as other required and discretionary provisions of the MSA. Available data indicate that the majority of catch by Atlantic herring vessels on directed trips is Atlantic herring, with low percentages of bycatch (see Section 3.3 of this document as well as the FEIS for Amendment 5).

River herring and shad are non-target species in the Atlantic herring fishery that are directly addressed by the action proposed in this framework adjustment; background information about RH/S is provided in Section 3.2, and impacts of both the no action alternative and the ***Preferred Alternative*** on the RH/S species are discussed in Section 4.3 of this document. For this reason, impacts on RH/S are not considered in the following discussion of impacts on other non-target species.

Overall, available data indicate that the four species/species groups that comprise the majority of the observed catch (either discarded or kept) on midwater trawl vessels are Atlantic herring, Fish NK (primarily fish that are pumped to a paired vessel without an observer onboard (kept), and some unobserved fish that are discarded/released), Atlantic mackerel, and dogfish. Observed non-target species catch on limited access purse seine vessels is similar in terms of primary species composition. Other non-target species catch is more variable on midwater trawl vessels (versus purse seine), but in general, bycatch represents a very small fraction of total catch by limited access herring midwater trawl and purse seine vessels. Detailed information about the Fish NK and Herring NK categories is provided in Section 6.3.2.1.5 of the Amendment 5 FEIS.

The composition of observed catch of non-target species on bottom trawl vessels is more variable (see Table 14 – Table 20 in the Amendment 5 FEIS). Squid is the most common species caught by Atlantic herring vessels fishing with bottom trawls. Category A and B bottom trawl vessels catch primarily squid, Atlantic mackerel, Atlantic herring, and butterfish; Category C bottom trawl vessels are observed to catch primarily silver hake, other fish, scup, and squid.

4.3.1 Impacts of Alternative 1 (No Action) on Other Non-Target Species

Under the no action alternative, the Council would not establish a process to set catch caps for RH/S in the Atlantic herring fishery, and the Council would not specify RH/S catch caps for the 2014 and 2015 fishing years. Without taking action in this framework adjustment, the status quo would be maintained. If the no action alternative is selected, the catch of non-target multispecies (groundfish) in the Atlantic herring fishery would continue to be addressed through current management measures (Framework 46 to the Multispecies FMP, which establishes provisions for the haddock catch cap and incidental catch of other multispecies in the Atlantic herring fishery). The catch of other non-target species in the Atlantic herring fishery would continue to be addressed and minimized to the extent practicable by the provisions in the Atlantic Herring FMP.

Due to the continuing management of the catch of other non-target species catch in the herring fishery through the Atlantic Herring FMP, selection of the no action alternative in this framework adjustment would not be expected to affect the status of any non-target species, and the no action alternative is therefore expected to have a *negligible* impact on non-target species.

4.3.2 Impacts of Alternative 2 (*Preferred Alternative*) on Other Non-Target Species

Alternative 2 (***Preferred Alternative***, Section 2.3, p. 10) establishes a process for setting and modifying catch caps for river herring and shad in the Atlantic herring fishery and identifies the vessels and areas to which the catch caps would apply. It includes reporting requirements, measures that become effective when a catch cap is reached, and other related provisions. Once the RH/S catch cap process is established in this framework adjustment, future catch caps for RH/S could be specified through the Atlantic herring fishery specifications or other herring-related action. Also included in Alternative 2 are specifications for RH/S catch caps by gear type and area for the 2014 and 2015 fishing years. The impacts of the proposed RH/S catch cap process/provisions on non-target species are discussed in this section; the impacts of the proposed 2014/2015 RH/S catch caps are discussed in Section 4.3.3.

The action proposed in this framework adjustment specifically addresses the non-targeted catch of river herring and shad in the Atlantic herring fishery. Overall, the RH/S catch cap process and provisions established under this alternative are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the herring fishery specifications process. The spatial distribution of (1) the proposed RH/S catch caps, (2) the Atlantic herring ACL, and (3) fishing effort in the directed herring fishery suggests that there may be potential to change the distribution of herring fishing effort under this alternative. In general, if fishing patterns change substantially, there may be some impacts on the catch of other non-target species by the herring fleet, but these impacts cannot be predicted. Other non-target species catch may increase or decrease depending on when and how directed herring fishing effort changes as a result of the proposed action. In the future, the impacts of specific RH/S catch caps on other non-target species will be evaluated in the action that specifies the caps (this action specifies RH/S catch caps for 2014/2015, and impacts of these caps are discussed in the following sub-section).

The provisions proposed for specifying RH/S catch caps (by gear and area) under the ***Preferred Alternative*** are intended to provide opportunity for the directed herring fleet to utilize the total ACL for Atlantic herring (OY) if it can continue to avoid RH/S. The RH/S Catch Cap Areas (Figure 1) and related closure areas (Figure 2) are different than the herring management areas (Figure 17); this area-based approach reduces the likelihood that reaching one or more RH/S catch caps in a fishing year would result in closure of the directed herring fishery in all management areas and/or substantial shifts in herring fishing effort.

Any changes in fishing patterns and/or fishing effort resulting from this action are not likely to cause substantial changes in the catch of other non-target species in the directed herring fishery and therefore would not influence the biological status of other non-target species. Overall, the ongoing management of other non-target species catch in the Atlantic herring fishery (for example, the haddock catch cap and groundfish possession restrictions), as well as the management of other non-target species through Federal and Interstate FMPs (Multispecies FMP, MSB FMP, etc.), will continue to address fishing mortality and the biological status of other non-target species. The resulting impacts of this alternative on other non-target species, therefore, are likely *negligible*.

4.3.3 Impacts of Proposed 2014/2015 RH/S Catch Caps on Other Non-Target Species

For the 2014 and 2015 fishing years, the Council selected as its *Preferred Options* annual "median" RH/S catch caps for the midwater trawl fishery in the GOM, CC, and SNE/MA RH/S Catch Cap areas and a "median" RH/S catch cap for the bottom trawl fishery in the SNE/MA RH/S Catch Cap areas (summarized below, see Sections 2.3.2 – 2.3.5 for the complete range of options considered by the Council). No RH/S catch cap is proposed for the GB Catch Cap Area; if the catch of river herring/shad is documented to increase in this area, a catch cap would automatically be considered during the following specifications process. The proposed RH/S catch caps for 2014-2015 would not affect trips/vessels landing less than 6,600 pounds of Atlantic herring or herring vessels using other gear types, including purse seines.

Preferred Options for 2014-2015 RH/S Catch Caps

RH/S Catch Cap Area	Preferred Option: 2014-2015 RH/S Catch Cap (mt)
GOM	85.5
CC	13.3
SNE/MA	MWT – 123.7 BT – 88.9
GB	N/A

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate Atlantic herring catch that is less than (or equal to) the status quo. According to Table 48 (p. 156), Atlantic herring catch could decline by up to 9% in 2014 and 2015 under the *Preferred Options* for specifying RH/S catch caps if the fleet does not continue to avoid RH/S. If the fleet continues to avoid RH/S, catch may decline less than 9% or not at all. A specific decline in catch is difficult to predict, and any resulting impact on non-target species is even more difficult to predict and cannot be quantified. Impacts on non-target species, will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the ABC specified for these fishing years.

Overall, the expected impacts of the proposed 2014-2015 RH/S catch caps on non-target species are *unknown but likely neutral*. Because Atlantic herring catch will remain within the bounds of the 2013-2015 Atlantic herring fishery specifications, impacts from the proposed RH/S catch caps for 2014-2015 are not expected to change or jeopardize the status of any non-target species. Comparatively, this is the case under the other options considered by the Council, although the options with lower catch caps would have a higher likelihood of closing the directed fishery and reducing aggregate Atlantic herring catch in 2014 and 2015.

4.4 IMPACTS ON THE PHYSICAL ENVIRONMENT AND EFH

A general description of the physical environment and EFH is provided in Section 3.4 of this document (p. 60). An assessment of the potential effects of the directed Atlantic herring commercial fishery on EFH for Atlantic herring and other federally-managed species in the Northeast region of the U.S. was conducted as part of an EIS that evaluated impacts of the Atlantic herring fishery on EFH (NMFS 2005). This analysis was included in Appendix VI, Volume II of the FEIS for Amendment 1 to the Atlantic Herring FMP. It found that midwater trawls and purse seines do occasionally contact the seafloor and may adversely impact benthic habitats utilized by a number of federally-managed species, including EFH for Atlantic herring eggs. However, after reviewing all the available information, the conclusion was reached that if the quality of EFH is reduced as a result of this contact, the impacts are minimal and/or temporary and, pursuant to MSA, do not need to be minimized, i.e., that there was no need to take specific action at that time to minimize the adverse effects of the herring fishery on benthic EFH. This conclusion also applied to pelagic EFH for Atlantic herring larvae, juveniles, and adults, and to pelagic EFH for any other federally-managed species in the region. Additional information can be found in the FEIS for Amendment 1 to the Atlantic Herring FMP, which was updated in the FEIS for Amendment 5 to the Atlantic Herring FMP.

The impacts of each of the alternatives considered by the Council in Framework 3 on the Physical Environment and EFH are discussed in the following subsections. Overall, given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery, the alternatives under consideration are expected to have a negligible impact on the physical environment and EFH.

4.4.1 Impacts of Alternative 1 (No Action) on the Physical Environment and EFH

Under the no action alternative, the Council would not establish a process to set catch caps for RH/S in the Atlantic herring fishery, and the Council would not specify RH/S catch caps for the 2014 and 2015 fishing years. Without taking action in this framework adjustment, the status quo would be maintained. The incidental catch of RH/S in the Atlantic herring fishery would continue to be managed under the provisions in the Atlantic Herring FMP and other applicable State and Federal regulations.

Given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery (see Amendment 5), maintaining the status quo for the Atlantic herring fishery is not expected to impact the physical environment and EFH. Selecting the no action alternative in this case would therefore result in a *negligible* impact.

4.4.2 Impacts of Alternative 2 (*Preferred Alternative*) on the Physical Environment and EFH

Alternative 2 (***Preferred Alternative***, Section 2.3, p. 10) establishes a process for setting and modifying catch caps for river herring and shad in the Atlantic herring fishery and identifies the vessels and areas to which the caps would apply. It includes reporting requirements, measures that become effective when a catch cap is reached, and other related provisions. Once the RH/S catch cap process is established in this framework adjustment, future catch caps for RH/S could be specified through the Atlantic herring fishery specifications or other herring-related action. Also included in Alternative 2 are specifications for RH/S catch caps by gear type and area for the 2014 and 2015 fishing years. The impacts of the proposed RH/S catch cap process/provisions on the physical environment and EFH are discussed in this section; the impacts of the proposed 2014/2015 RH/S catch caps are discussed in Section 4.4.3.

Overall, the RH/S catch cap process and provisions established through this framework adjustment are not expected to impact the physical environment and EFH because they are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the fishery specifications process. The resulting impacts on the physical environment and EFH, therefore, are determined to be *negligible*.

Given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery (see Amendment 5), establishing a process for RH/S catch caps is not expected to have a measurable influence on the total magnitude of adverse effects across the fishery. Thus, as far as EFH impacts are concerned, there is no measureable difference between any of the alternatives/options considered by the Council in this framework adjustment. Thus, the proposed action would not have any adverse effects on EFH as compared to the no action alternative.

4.4.3 Impacts of Proposed 2014/2015 RH/S Catch Caps on the Physical Environment and EFH

For the 2014 and 2015 fishing years, the Council selected as its *Preferred Options* annual "median" RH/S catch caps for the midwater trawl fishery in the GOM, CC, and SNE/MA RH/S Catch Cap areas and a "median" RH/S catch cap for the bottom trawl fishery in the SNE/MA RH/S Catch Cap areas (summarized below, see Sections 2.3.2 – 2.3.5 for the complete range of options considered by the Council). No RH/S catch cap is proposed for the GB Catch Cap Area; if the catch of river herring/shad is documented to increase in this area, a catch cap would automatically be considered during the following specifications process. The proposed RH/S catch caps for 2014-2015 would not affect trips/vessels landing less than 6,600 pounds of Atlantic herring or herring vessels using other gear types, including purse seines.

Preferred Options for 2014-2015 RH/S Catch Caps

RH/S Catch Cap Area	Preferred Option: 2014-2015 RH/S Catch Cap (mt)
GOM	85.5
CC	13.3
SNE/MA	MWT – 123.7 BT – 88.9
GB	N/A

Given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery (see Amendment 5), establishing a process for RH/S catch caps is not expected to have a measurable influence on the total magnitude of adverse effects across the fishery. Thus, as far as EFH impacts are concerned, there is no measureable difference between any of the alternatives/options considered by the Council in this framework adjustment. Thus, the proposed action would not have any adverse effects on EFH as compared to the no action alternative. The impacts of the 2014-2015 RH/S catch cap specifications are therefore determined to be *negligible*.

4.5 IMPACTS ON PROTECTED RESOURCES

A description of protected resources is provided in Section 3.5 of this document (p. 69). The Atlantic herring fishery operates using midwater trawl and paired midwater trawl gear, purse seines, stop seines, and weirs. A component of the directed Atlantic herring fishery, particularly in the southern New England/Mid-Atlantic area, also uses small mesh bottom trawl gear. Currently, there is a NMFS List of Fisheries for 2012 that places the herring purse seines, midwater trawl fishery, including pair trawls, in Category II, denoting a fishery that has been determined to have occasional serious injury and mortality of marine mammals (Table 24). The stop seine and weir fishery is considered to have a remote likelihood of interactions and is listed in Category III. This gear type has the ability to release entrapped animals alive and, as reported in the NMFS sea sampling database, has considerable success with pinnipeds. Purse seines operating in the Atlantic herring fishery are known to take several species of seals and harbor porpoise, while midwater trawl gear (including paired midwater trawls) has had documented interactions with pilot whales, white-sided dolphins and seals. Lack of observer coverage hampers quantitative discussions of impacts, but in recent years observer coverage has increased in an effort to minimize interactions with protected species, thus providing better documentation (Table 25).

4.5.1 Impacts of Alternative 1 (No Action) on Protected Resources

Under the no action alternative, the Council would not establish a process to set catch caps for RH/S in the Atlantic herring fishery, and the Council would not specify RH/S catch caps for the 2014 and 2015 fishing years. Without taking action in this framework adjustment, the status quo would be maintained. The incidental catch of RH/S in the Atlantic herring fishery would continue to be managed under the provisions in the Atlantic Herring FMP and other applicable State and Federal regulations.

Due to the ongoing management of interactions with protected resources in the Atlantic herring fishery, as well as conservation efforts directed towards protected resources, selection of the no action alternative in this framework adjustment would not be expected to affect the status of any protected resources, and the no action alternative is therefore expected to have a *negligible* impact on protected resources.

4.5.2 Impacts of Alternative 2 (*Preferred Alternative*) on Protected Resources

Alternative 2 (***Preferred Alternative***, Section 2.3, p. 10) establishes a process for setting and modifying catch caps for river herring and shad in the Atlantic herring fishery and identifies the vessels and areas to which the caps would apply. It includes reporting requirements, measures that become effective when a catch cap is reached, and other related provisions. Once the RH/S catch cap process is established in this framework adjustment, future catch caps for RH/S could be specified through the Atlantic herring fishery specifications or other herring-related action. Also included in Alternative 2 are specifications for RH/S catch caps by gear type and area for the 2014 and 2015 fishing years. The impacts of the proposed RH/S catch cap process/provisions on protected resources are discussed in this section; the impacts of the proposed 2014/2015 RH/S catch caps are discussed in Section 4.5.3.

The action proposed in this framework adjustment specifically addresses the catch of river herring and shad in the Atlantic herring fishery. Overall, the RH/S catch cap process and provisions established under this alternative are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the herring fishery specifications process. The spatial distribution of (1) the proposed RH/S catch caps, (2) the Atlantic herring ACL, and (3) fishing effort in the directed herring fishery suggests that there may be potential to change the distribution of herring fishing effort under this alternative. In general, if fishing patterns change substantially, there may be some impacts on interactions with protected resources by the herring fleet, but these impacts cannot be predicted. The potential for interaction with protected resources may increase or decrease depending on when and how directed herring fishing effort changes as a result of the proposed action. In the future, the impacts of specific RH/S catch caps on protected resources will be evaluated in the action that specifies the caps (this action specifies RH/S catch caps for 2014/2015, and impacts of these caps are discussed in the following sub-section).

The provisions for specifying RH/S catch caps (by gear and area) under this alternative are intended to provide opportunity for the directed herring fleet to continue fishing and utilize the total ACL for Atlantic herring (OY) if it can continue to avoid RH/S. The RH/S Catch Cap Areas (Figure 1) and related closure areas (Figure 2) are different than the herring management areas (Figure 17); this area-based approach reduces the likelihood that reaching one or more RH/S catch caps in a fishing year would result in closure of the directed herring fishery in all management areas and/or substantial shifts in herring fishing effort.

Any changes in fishing patterns and/or fishing effort resulting from this action are not likely to substantially impact interactions with protected resources in the directed herring fishery and therefore are not likely to influence the biological status of protected resources. Moreover, the ongoing management protected resources interactions in the Atlantic herring fishery would continue to address fishing mortality and the conservation of protected resources. The resulting impacts of this alternative on protected resources, therefore, are likely *negligible*.

4.5.3 Impacts of Proposed 2014/2015 RH/S Catch Caps on Protected Resources

For the 2014 and 2015 fishing years, the Council selected as its *Preferred Options* the "median" RH/S catch caps for the midwater trawl fishery in the GOM, CC, and SNE/MA RH/S Catch Cap areas and the "median" RH/S catch cap for the bottom trawl fishery in the SNE/MA RH/S Catch Cap areas (summarized below, see Sections 2.3.2 – 2.3.5 for the complete range of options considered by the Council). No RH/S catch cap is proposed for the GB Catch Cap Area; if the catch of river herring/shad is documented to increase in this area, a catch cap would automatically be considered during the following specifications process. The proposed RH/S catch caps for 2014-2015 would not affect trips/vessels landing less than 6,600 pounds of Atlantic herring or herring vessels using other gear types, including purse seines.

Preferred Options for 2014-2015 RH/S Catch Caps

RH/S Catch Cap Area	Preferred Option: 2014-2015 RH/S Catch Cap (mt)
GOM	85.5
CC	13.3
SNE/MA	MWT – 123.7 BT – 88.9
GB	N/A

Some quantitative information exists for those species potentially affected by the Atlantic herring fishery. This information is summarized in Section 3.5 of this document and Section 4.2.1.4 of the 2013-2015 Atlantic herring fishery specifications package. The 2013-2015 Atlantic herring fishery specifications were determined to have unknown but potentially low-negative impacts on protected resources because the additional fishing effort allowed under the specifications could increase the risk of encounter with inshore protected species, in particular harbor porpoises, grey seals, and harbor seals which are seasonally abundant in the GOM. The potential increased fishing effort expected under the specifications, however, is not likely to jeopardize the status of any protected resources.

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate Atlantic herring catch that is less than (or equal to) the status quo. According to Table 48 (p. 156), Atlantic herring catch could decline by up to 9% in 2014 and 2015 under the *Preferred Options* for specifying RH/S catch caps. If the fleet continues to avoid RH/S, catch in 2014 and 2015 may decline less than 9% or not at all. A specific decline in catch is difficult to predict, and any resulting impact on protected resources is even more difficult to predict and cannot be quantified. Impacts on protected resources, will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the ABC specified for these fishing years.

Overall, the expected impacts of the proposed 2014-2015 RH/S catch caps on protected resources are *unknown but likely neutral*. Because Atlantic herring catch will remain within the bounds of the 2013-2015 Atlantic herring fishery specifications, impacts from the proposed RH/S catch caps for 2014-2015 are not expected to change or jeopardize the status of any protected resources. Comparatively, this is the case under the other options considered by the Council, although the options with lower catch caps would have a higher likelihood of closing the directed fishery and reducing aggregate Atlantic herring catch.

4.6 IMPACTS ON FISHERY-RELATED BUSINESSES AND COMMUNITIES

A description fishery-related businesses and communities is provided in Section 3.6 of this document (p. 82). The analysis of impacts to the *Fishery-Related Businesses and Communities* VEC characterizes the magnitude and extent of the economic and social impacts likely to result from the alternatives considered in this action as compared to the no action alternative. Appendix III of this document provides a more detailed description of the data and methods used by the Herring PDT to evaluate the potential impacts of the RH/S catch cap options for 2014 and 2015 on participants in the Atlantic herring fishery. The discussion below draws on the analysis in Appendix III and addresses the general impacts of the Framework 3 alternatives on fishery-related businesses and communities.

The current interpretation of National Standard 8 (NS8) requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. Thus, continued overall access to fishery resources is a consideration, but not a guarantee that fishermen will be able to use a particular gear type, harvest a particular species of fish, fish in a particular area, or fish during a certain time of the year.

A fundamental difficulty exists in forecasting economic and social change relative to fishery management alternatives, since communities or other societal groups are constantly evolving in response to numerous external factors, such as market conditions, technology, alternate uses of waterfront, and tourism. Certainly, management regulations influence the direction and magnitude of economic and social change, but attribution is difficult with the tools and data available. While this analysis focuses generally on the economic and social impacts of the proposed fishing regulations, external factors may also influence change, both positive and negative, in the affected communities. In addition, the external factors may lead to unanticipated consequences of a regulation, due, for example, to cumulative impacts. In many cases, these factors contribute to a community's vulnerability, its ability to adapt to new or different fishing regulations.

When examining potential economic and social impacts of management measures, it is important to consider impacts on the following: the fishing fleet (vessels grouped by fishery, primary gear type, and/or size); vessel owners and employees (captains and crew); herring dealers and processors; final users of herring; community cooperatives; fishing industry associations; cultural components of the community; and fishing families. Furthermore, there are other stakeholders who may be affected, such as those with businesses that rely on herring as forage (e.g., the whale watch industry). While some management measures may have a short-term negative impact on some communities, these should be weighed against potential long-term benefits to all communities which can be derived from a sustainable herring fishery.

The social impact factors outlined below can be used to describe the Atlantic herring fishery, its sociocultural and community context and its participants. These factors or variables are considered relative to the management alternatives and used as a basis for comparison between alternatives. Use of these kinds of factors in social impact assessment is based on NMFS guidance (NMFS 2007) and other texts (e.g., Burdge 1998). Longitudinal data describing these social factors region-wide and in comparable terms is limited. While this analysis does not quantify the impacts of the management alternatives relative to the social impact factors, qualitative discussion of the potential changes to the factors characterizes the likely direction and magnitude of the impacts.

The social impact factors fit into five categories:

1. *Size and Demographic Characteristics* of the fishery-related workforce residing in the area; these determine demographic, income, and employment effects in relation to the workforce as a whole, by community and region.
2. The *Attitudes, Beliefs, and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding the behavior of fishermen on the fishing grounds and in their communities.
3. The effects of the proposed action on *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities, as well as effects on the community's social structure, politics, etc.
4. The *Non-Economic Social Aspects* of the proposed action; these include lifestyle, health, and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.
5. The *Historical Dependence on and Participation in* the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights (NMFS 2007).

In general, the economic effects of regulations can be categorized into regulations that change costs (including transactions costs such as search, information, bargaining, and enforcement costs) or change revenues (by changing market prices or by changing the quantities supplied). These economic effects may be felt by the directly regulated entities. They may also be felt by related industries. For the herring fishery, this might include, for example, participants in the lobster fishery, zoos, and purchasers of herring for food.

4.6.1 Impacts of Alternative 1 (No Action) on Fishery-Related Businesses and Communities

Under Alternative 1 (no action), the Council would not establish a process to set catch caps for RH/S for the Atlantic herring fishery, and the Council would not specify catch caps for the 2014 and 2015 fishing years. Without taking action in this framework adjustment, the status quo would be maintained. The incidental catch of RH/S in the Atlantic herring fishery would continue to be managed under the provisions in the Atlantic Herring FMP. This alternative would result in no additional economic or social impacts on participants in the Atlantic herring fishery.

However, selecting the no action alternative could affect participants in the herring fishery negatively in the future, if the catch of RH/S is not managed in a proactive manner. Taking the action proposed in this framework adjustment to establish a process for specifying and adjusting annual RH/S catch caps encourages industry to develop long-term bycatch avoidance strategies. It is consistent with the measures to address river herring bycatch adopted in Amendment 5 and may result in positive impacts on fishery participants by reducing bycatch through industry-based initiatives. The benefits of a RH/S catch cap process may not be fully realized if the no action alternative is selected. There could be perceptions of inequity among fishery participants if no action is taken in this framework adjustment, because some participants in the herring fishery may be affected by a RH/S catch cap established by the MAFMC for the mackerel fishery. If selecting the no action alternative leads to a lack of coordination with the MAFMC, this might cause distrust in management among industry participants, which could lead to a negative impact on the formation of *Attitudes* and *Beliefs.*

With no RH/S catch caps specified for 2014 and 2015, there could be a higher degree of consistency and predictability for herring industry operations and a steady supply of herring for the market over the short-term, as the fishery would continue to operate under the 2013-2015 herring specifications and sub-ACLs. The *Size and Demographic Characteristics* of the fishery-related workforce would likely be unchanged, as would the *Historical Dependence on and Participation in* the fishery.

Considering that the no action alternative may have both positive and negative impacts, the overall impacts of the no action alternative on fishery-related businesses and communities is expected to be *neutral*.

4.6.2 Impacts of Alternative 2 (*Preferred Alternative*) on Fishery-Related Businesses and Communities

The ***Preferred Alternative*** (Section 2.3, p. 10) proposes to establish a process for setting and modifying catch caps for RH/S in the Atlantic herring fishery. *Catch* includes both bycatch (discards) and landed incidental catch. This alternative also includes a range of options for specifying the 2014 and 2015 RH/S catch cap amounts. Potential impacts of the procedural provisions proposed in Alternative 2 are discussed in Section 4.6.2.1. Overall, the long-term impact of the catch cap process/provisions established Alternative 2 on fishery-related businesses and communities is *low positive*. This alternative enhances industry-based bycatch reduction initiatives and builds on the approach adopted by the Council in Amendment 5 to the Herring FMP. The gear-specific and area-specific allocations of RH/S catch cap minimize negative impacts for those herring vessels with fewer observed encounters with RH/S.

Section 4.6.2.2 contains a discussion of the potential impacts of the proposed 2014-2015 RH/S catch caps. Complete analysis can be found in Appendix III of this document. The RH/S catch caps specified for 2014 and 2015 are expected to have a *low negative* impact, but the catch caps are not likely to preclude herring fishing in *all* areas and provide midwater trawl vessels an opportunity to fish in Area 3 (Georges Bank) without a RH/S catch cap, thereby potentially mitigating some of the negative impacts.

4.6.2.1 Impacts of Alternative 2 Process/Provisions

Alternative 2 establishes a process for setting and modifying catch caps for river herring and shad in the Atlantic herring fishery and identifies the vessels and areas to which the caps would apply. It includes reporting requirements, measures that become effective when a catch cap is reached, and other related provisions. Once the RH/S catch cap process is established in this framework adjustment, future catch caps for RH/S could be specified through the Atlantic herring fishery specifications or other herring-related action. Also included in Alternative 2 are specifications for RH/S catch caps by gear type and area for the 2014 and 2015 fishing years. Since only limited access herring vessels (permit categories A/B/C) are allowed to land more than 6,600 pounds of Atlantic herring, these are the vessels that this alternative would directly impact. When Amendment 5 is implemented, Category E vessels landing more than 6,600 pounds of Atlantic herring also will be affected by the Framework 3 measures.

The trips landing more than 6,600 pounds of Atlantic herring accounted for 96% of all Atlantic herring landings between 2008 and 2012. While Alternative 2 would directly impact the active limited-access herring vessels, it may indirectly impact users of herring, such as lobster harvesters and others who use herring as bait. Dependence on herring as lobster bait is discussed in greater detail in the Amendment 5 EIS.

General Discussion of Positive Impacts: Relative to the no action alternative, Alternative 2 could have several positive impacts on fishery-related businesses and communities. RH/S catch caps are unlikely to have a significant negative social impact on herring-dependent communities, as long as present harvesters are able to continue fishing without significant disruption.

Establishing a process for setting RH/S catch caps provides an incentive for participants in the directed herring fishery to find innovative, low-cost solutions to avoid river herring and shad, such as the SMAST/SFC/MA DMF River Herring Bycatch Avoidance Project (Section 3.6.4). This collaboration allows herring fishery participants to collaborate in observations and facilitate monitoring/sampling that will lead to the development of avoidance strategies. Social science research has documented improved effectiveness of regulations developed with a participatory and/or collaborative approach (Johnson & van Denson 2007). Providing the industry with an opportunity to develop a communication network and bycatch avoidance strategy could ultimately reduce costs associated with bycatch avoidance, because the industry would likely prioritize cost-effectiveness when developing strategies. Moreover, communication networks developed for river herring avoidance might be used for other reasons, for example, safety-related circumstances that arise suddenly or other fisheries or fishing-related problems.

Having a RH/S catch cap in inshore areas may incentivize fishing offshore. Since many of the small-scale herring operations, as well as stakeholders who rely on herring as forage for their species of interest, would like to see midwater trawl and pair-trawl operations restricted to offshore areas, Alternative 2 could positively affect the well-being of these sectors. To the extent that the caps successfully lead to increases in RH/S abundance, establishing caps would increase the sense of well-being of those whose businesses rely on herring as forage, and RH/S stocks could eventually be of less concern. It would likely lead to improved coordination with the MAFMC, resulting in greater trust in management among the industry, a positive impact on the formation of *Attitudes* and *Beliefs.*

To the extent that the caps successfully limit catch of RH/S, the herring catch may be cleaner, requiring less culling. Some buyers of Atlantic herring, such as aquaria, prefer to not have river herring mixed in with the Atlantic herring as feed (John Dayton, General Curator, New England Aquarium, personal communication, 2013). Packing and freezing Atlantic herring with some river herring mixed in can limit marketability (Chris Joy, Seafreeze Ltd., personal communication, 2013).

General Discussion of Negative Impacts: Alternative 2 could result in some negative impacts on fishery-related businesses and communities as well. If the RH/S catch cap is reached for a gear type in the directed fishery in a particular area(s), the resultant closure of the directed fishery could reduce fishing profits in the herring fishery. This could lead to lower employment and a decrease in the *Size and Demographic Characteristics* of the fishery-related workforce. Fishermen could hold negative *Attitudes* and *Beliefs* towards management if herring fishing is closed part-way through the year. Interruption in the supply of herring could raise the cost of bait for the lobster fishery and other users, thereby potentially affecting the *Size and Demographic Characteristics* of the lobster industry. Additional reporting burdens could produce negative *Attitudes* about management. Closing the fishery to certain gear types in certain areas may cause resentment or conflict between fishing groups, a negative social impact

in the form of changes to *Social Structures and Organizations*. Closing the directed herring fishery inshore could incentivize some smaller vessels to fish offshore, which may lead to unsafe fishing conditions, a negative impact on the *Non-Economic Social Aspects* of the action.

Use of RH/S Catch Cap Areas and Gear-Specific Distribution: Alternative 2 specifies clustered statistical RH/S Catch Cap Areas (Figure 1) to distribute catch caps annually, by gear type. This approach has several positive impacts when compared to a RH/S cap applied broadly across all Atlantic herring management areas and gears. It avoids closing the directed herring fishery in all areas due to exceeding the cap in a certain area or due to catch by a particular gear type, which may not be considered fair within the industry. The proposed RH/S catch cap areas were developed by the Herring PDT based on areas with the highest observed encounters with RH/S during 2008-2012, so distributing the cap by these areas should reflect the spatial distribution of the fishery and minimize impacts to vessels with fewer RH/S encounters. Vessels fishing in offshore areas are noticeably less likely to encounter RH/S than other areas. The costs of RH/S catch caps to the herring industry may outweigh the benefits to RH/S, which remain unclear; however, the proposed area-specific and gear-specific distributions mitigate negative impacts to the extent possible.

Participants in the Atlantic herring fishery are accustomed to fishing and reporting catch within the herring management area boundaries, so establishing RH/S catch caps using other boundaries may cause some confusion, reporting burden, and enforcement challenges, at least during the initial year(s). However, streamlined reporting requirements are proposed to facilitate compliance, monitoring, and enforcement of both the RH/S catch caps and the current haddock catch cap (see Section 2.3 and further discussion below). This should reduce complexity and any confusion associated with the establishment of new/different catch cap areas in the fishery. Overall, the positive aspects of this approach will likely outweigh the negative aspects in the long-run.

Catch Reporting: Alternative 2 requires that, in addition to reporting herring by herring management area through the ACL-monitoring system (daily VMS reports), limited access herring vessels would have to report total catch (kept and discarded) by statistical area, so that the appropriate expansions can be made from the observed catch in those areas to monitor both the haddock catch caps (Framework 46) and any RH/S catch caps that may be established (see example catch report in Section 2.3). This would eliminate current requirements for vessels to report catch by haddock stock area through VMS and should simplify VMS reporting requirements. Instead of reporting catch by haddock stock area, herring management area, and RH/S catch cap area, vessels would be required to report herring catch by management area and all catch by statistical area. This would provide NERO staff with the information it needs to monitor all catch caps applied to herring vessels. Alternative 2 should therefore streamline the administrative burden of reporting (a transactions cost) for fishermen under multiple catch caps; overall, long-term improvement in how the fishery is managed, specifically, management that includes real-time, accurate catch monitoring, would be positive.

Trip Notification: There are no changes to trip notification requirements proposed in this framework adjustment. Trip notification requirements would be consistent with Amendments 5 for herring vessels subject to the RH/S catch caps. Certainty about regulations and the future of the herring fishery is a substantial benefit for business and household planning.

RH/S Catch Triggers and Closure Areas: The Council considered two options that would trigger the closure of the directed Atlantic herring fishery for a particular gear type in the associated closure areas identified in Figure 2: 1) once the RH/S catch cap has been reached, or 2) when 95% of the cap is projected to be reached. Option 1 would be consistent with the accountability measure in place for the haddock catch cap that applies to herring midwater trawl vessels. Option 2 is consistent with the provisions proposed by the MAFMC for the RH/S catch cap in the Atlantic mackerel fishery. The Council selected Option 2 as the *Preferred Option*.

Both options would lead to greater coordination and consistency for the fishery, albeit in different ways. Given reporting timeframes and precision of the data, it is likely that there would be little difference between the two options in terms of when an area would be closed. Thus, the difference in impacts to fishing businesses and communities would likely be negligible between these two options. Any negative impacts would result from foregone fishing opportunities if a trigger resulted in premature closure of the directed fishery in an area. Option 2 (*Preferred Option*) is a projection and provides a degree of buffer to not exceed the RH/S catch cap.

When a RH/S catch cap for a gear type is reached in a RH/S Catch Cap Area, the directed herring fishery for that gear type would close in the associated closure area (Figure 2, p. 16), and all vessels fishing with that gear type would be subject to a possession limit of 2,000 pounds of Atlantic herring per trip for the remainder of the fishing year. Vessels using other gear types in the closure area would not be affected. The remainder of the herring fishery (in non-overlapping areas) would stay open to all gear types (consistent with other regulations) until the sub-ACL trigger is reached in a management area or areas. This would, in essence, close the directed herring fishery in the specific RH/S catch cap area for the remainder of the year to any gear types that reach the cap. This could have negative consequences on fishing businesses and communities reliant on those gear types in terms of foregone profits. It could reduce the *Size and Demographic Characteristics* of the fishery and alter the *Historical Dependence on and Participation* in the fishery. The impacts would depend on when the catch cap area closes relative to nearby areas available for directed herring fishing, as well as the ability of affected vessels to access the open areas.

Within the Southern New England/Mid-Atlantic RH/S Catch Cap Area, the Council-selected closure area would not apply to the offshore blocks (Figure 2). Thus, the offshore part of Area 2 would remain open even if the cap is reached in this area, and trips landing more than 2,000 pounds of Atlantic herring would still be allowed in the offshore areas. Any negative impacts resulting from closure of the inshore area may be mitigated for larger midwater trawl vessels that are able to successfully target Atlantic herring offshore.

The smaller closure area for the SNE/MA RH/S Catch Cap Area would allow vessels to continue the directed fishery for mackerel in the offshore areas. Without this provision, vessels targeting mackerel are likely to forego a mackerel trip if they are limited to 2,000 pounds of herring, because of the difficulty of avoiding herring when targeting mackerel. However, if the RH/S catch cap in the SNE/MA area for the mackerel fishery is reached, the smaller closure area for the Atlantic herring fishery would not benefit the mackerel vessels.

Alternative 2 allows specification of a joint catch cap for the herring and mackerel fisheries in the Southern New England/Mid-Atlantic area, in coordination with the MAFMC. In this area, 4.9%-37.3% of the trips between 2008 and 2012 would have been affected by RH/S catch caps in both the herring and mackerel fisheries (Table 38). A joint cap, while not selected as the preferred alternative in this action, may be considered by both Councils in the future. This approach could reduce management and administrative complexity and improve the enforceability of and compliance with catch caps for both fisheries. For these reasons, the MAFMC's Mackerel-Squid-Butterfish Monitoring Committee (MSB MC) and the NEFMC's Herring PDT expressed support for future consideration of this approach during the development of Framework 3 (see May 23, 2013 Herring PDT/MSB MC Report). In a given area, it would be simpler if fishermen operated under one RH/S catch cap. If and when this coordinated management effort occurs in the future, the *Attitudes and Beliefs* of stakeholders towards management would likely improve.

4.6.2.2 Impacts of 2014/2015 RH/S Catch Cap Specifications on Fishery-Related Businesses and Communities

During the development of this action, the Council considered several options for specifying 2014/2015 RH/S catch caps based on RH/S catch estimates for each gear type – bottom trawl, midwater trawl, purse seine – from 2008-2012 in the proposed RH/S Catch Cap Areas (see Appendix I for detailed fishery background data). The complete range of options considered for 2014/2015 catch caps is provided in Appendix II of this document. The *Preferred Options* for setting RH/S catch caps during the 2014 and 2015 fishing years are based on the median annual estimated RH/S catch (adjusted for changes in the Atlantic herring ACL) during the 2008-2012 time period.

General consequences of Atlantic herring fishery closures for fishing-related businesses and communities are described above. Impacts of the 2014-2015 RH/S catch caps selected by the NEFMC are described below. The complete Herring PDT analysis, including a description of the simulation model that was initially used to predict RH/S and Atlantic herring catch under the proposed catch caps, can be found in Appendix III of this document. After the Council selected final measures for Framework 3 (September 2013), the simulation model was updated by the Herring PDT to investigate impacts associated with gear-specific and area-specific RH/S catch cap allocations, and more specifically, the impacts of the *Preferred Options* for 2014-2015. The updated model results are discussed in the following subsections.

4.6.2.2.1 Impacts of Proposed 2014/2015 RH/S Catch Caps in the Gulf of Maine (GOM) RH/S Catch Cap Area

The Council selected as its *Preferred Option*, an annual "median" catch cap (85.5 mt) in the GOM RH/S Catch Cap Area to apply to trips by midwater trawl vessels landing more than 6,600 pounds of Atlantic herring in 2014/2015. This represents the median value of the range of observations utilized to develop the 2014/2015 RH/S catch cap options (2008-2012, see Appendix I and II for complete data and the full range of options considered in this action). In the GOM RH/S Catch Cap Area, the midwater trawl gear type comprised 44.5% of the total herring landings from 2008-2012 (see Table 35 on p. 99).

In the Herring PDT's simulation model, the *Preferred Option* for 2014-2015 closes the directed herring fishery for midwater trawl vessels in the GOM Catch Cap Area 5.9% of the time (based on 1,000 model runs); the average closure date for this area in the Herring PDT's simulation model is October 28. The closure would include Area 1A, most of Area 1B, and a small portion of Area 3 (see Figure 2 on p. 16). Should the directed midwater trawl fishery for Atlantic herring close in the GOM Catch Cap Area during 2014 or 2015, and if fishing effort is not redirected to other areas, there would likely be some negative impacts on the midwater trawl participants in the form of foregone revenues or higher costs relative to the no action alternative.

Midwater trawl vessels can only fish for Atlantic herring in the inshore GOM (Area 1A) from October-December due to current restrictions in the fishery. Access to the offshore portion of the GOM (Area 1B) will be restricted to May-December in 2014 and 2015 based on the sub-ACL split implemented in the specifications. In the event of a RH/S catch cap closure, midwater trawl vessels fishing in the GOM are likely to redirect effort to the parts of Area 3 that remain open, depending on fish availability and other factors. These vessels are large enough that they can fish safely offshore, but there may be increased costs involved (e.g., fuel). It is possible that other user groups (purse seine, bottom trawl) could experience increases in herring catch and revenues in the GOM Catch Cap Area if the midwater trawl participants are further displaced.

Because midwater trawl access to the Gulf of Maine is already constrained by the restriction of Area 1A to purse seine/fixed gear from June-September (Herring FMP Amendment 1), ASMFC spawning area restrictions and "days out," as well as sub-ACL splits for 2014 and 2015, the addition of a cap for RH/S triggering a closure for midwater gear could lead to negative outcomes due to the cumulative impact of all of these limitations. Other businesses dependent on herring for bait (e.g., lobster fishery) or food could also be negatively affected. However, if the RH/S stock abundance is improved due to a catch cap, positive long-term impacts on the businesses and communities that depend on these species to attract recreational fishermen, for example, could result.

Overall, the impacts of the proposed 2014-2015 Gulf of Maine RH/S catch caps on fishery-related businesses and communities are expected to be *low negative*; the degree of impacts would depend on industry-based initiatives to reduce/eliminate RH/S bycatch.

4.6.2.2.2 Impacts of Proposed 2014/2015 RH/S Catch Caps in the Cape Cod (CC) RH/S Catch Cap Area

The Council selected as its *Preferred Option*, an annual "median" catch cap (13.3 mt) in the CC RH/S Catch Cap Area to apply to trips by midwater trawl vessels landing more than 6,600 pounds of Atlantic herring in 2014/2015. This represents the median value of the range of observations utilized to develop the 2014/2015 RH/S catch cap options (2008-2012, see Appendix I and II for complete data and the full range of options considered in this action). In the CC Catch Cap Area, the midwater trawl gear type comprised >99.0% of the total Atlantic herring landings from 2008-2012 (see Table 36 on p. 100); only midwater trawl vessels make trips in this area that land more than 6,600 pounds of Atlantic herring. Thus, reaching the RH/S catch cap in the CC Catch Cap Area is likely to be equivalent to closing the directed fishery for Atlantic herring in this area.

In the Herring PDT's simulation model, the *Preferred Option* for 2014-2015 closes the directed herring fishery for midwater trawl vessels in the Cape Cod Catch Cap Area 24.9% of the time (based on 1,000 model runs); the average closure date for this area in the Herring PDT's simulation model is August 5. The closure would include portions of Area 1B and Area 3 (see Figure 2 on p. 16). Should the directed midwater trawl fishery for Atlantic herring close in the CC Catch Cap Area during 2014 or 2015, and if fishing effort is not redirected to other areas, there would likely be some negative impacts on the midwater trawl participants in the form of foregone revenues or higher costs relative to the no action alternative. Midwater trawl vessels fishing in the Cape Cod RH/S Catch Cap Area (Statistical Area 521) are likely to redirect effort to the parts of Area 1B, Area 2, and Area 3 that would remain open, depending on fish availability and other issues. These vessels are large enough that they can fish safely offshore, but there may be increased costs involved (e.g., fuel).

The potential to improve the RH/S stock abundance that a catch cap affords would have positive impacts on the businesses and communities that depend on these species, such as those that attract recreational fishermen. Overall, however, the impacts of the proposed 2014-2015 Cape Cod RH/S catch caps on fishery-related businesses and communities are expected to be *low negative*, and would depend on industry-based initiatives to reduce/eliminate RH/S bycatch.

4.6.2.2.3 Impacts of Proposed 2014/2015 RH/S Catch Caps in the Southern New England/Mid-Atlantic (SNE/MA) RH/S Catch Cap Area

The Council selected as its *Preferred Option*, an annual "median" catch cap in the SNE/MA RH/S Catch Cap Area for both bottom trawl (88.9 mt) and midwater trawl (123.7 mt) vessels to apply on trips landing more than 6,600 pounds of Atlantic herring in 2014/2015. This represents the median value of the range of observations utilized to develop the 2014/2015 RH/S catch cap options (2008-2012, see Appendix I and II for complete data and the full range of options considered in this action). In the SNE/MA RH/S Catch Cap Area, the bottom trawl and midwater trawl gear types comprised 18.5% and 81.5% of the total herring landings from 2008-2012, respectively (see Table 38 on p. 102).

The SNE/MA RH/S Catch Cap Area overlaps identically with Atlantic herring Management Area 2, but under the provisions proposed in Alternative 2 (Section 2.3.1, p. 11), only the inshore portion of the SNE/MA RH/S Catch Cap Area would close if the RH/S catch cap is reached, allowing the midwater trawl and/or bottom trawl vessels to continue to fish offshore until the sub-ACLs are reached (see Figure 2 on p. 16 for proposed closure area). In the Herring PDT's simulation model, the *Preferred Option* for 2014-2015 closes the directed herring fishery for midwater trawl vessels in the SNE/MA Catch Cap Area 65.1% of the time and for bottom trawl vessels 9.3% of the time (based on 1,000 model runs); the average closure date for this area in the Herring PDT's simulation model is April 3 for midwater trawl vessels and September 9 for bottom trawl vessels. Should the midwater and bottom trawl fisheries close in the inshore portion of Area 2 during 2014 or 2015, and if fishing effort is not redirected to other areas, there would likely be some negative impacts on the midwater trawl and bottom trawl participants in the form of foregone revenues or higher costs relative to the no action alternative. Midwater trawl participants are likely to be more impacted.

Most of the bottom trawl effort in the Atlantic herring fishery occurs inshore, so these vessels are less likely to benefit from keeping the offshore area open in the event that the RH/S catch cap is reached. Given that 96% of Atlantic herring landings from bottom trawl vessels came from the SNE/MA area from 2008-2012, redirection of fishing effort to other areas for these fishermen is unlikely. This option may incentivize participation in the industry-based River Herring Bycatch Avoidance Project, particularly for the bottom trawl sector which has had lower participation rates to date (see Section 3.6.4 of this document).

As previously noted, the smaller closure area for the SNE/MA RH/S Catch Cap Area would allow some vessels to continue to pursue Atlantic mackerel in the offshore areas, as long as the RH/S catch cap in the SNE/MA area for the mackerel fishery is not reached. In addition, provisions in the *Preferred Alternative* allows future specification of a joint RH/S catch cap for the herring and mackerel fisheries in the SNE/MA area, in coordination with the MAFMC. If and when this coordination occurs in the future, complexity would be reduced and compliance improved, leading to improved *Attitudes and Beliefs* of stakeholders towards management.

The potential to improve the RH/S stock abundance that a RH/S catch cap affords would have positive impacts on the businesses and communities that depend on these species, such as those that attract recreational fishermen. Overall, however, the impacts of the proposed 2014-2015 SNE/MA RH/S catch caps on fishery-related businesses and communities are expected to be *low negative*; the degree of impacts will depend on industry-based initiatives to reduce/eliminate RH/S bycatch.

4.6.2.2.4 Impacts of Proposed 2014/2015 RH/S Catch Cap in the Georges Bank (GB) RH/S Catch Cap Area

The Council selected as its *Preferred Option* that no RH/S catch cap be set in the GB RH/S Catch Cap Area during the 2014 and 2015 fishing years. This includes most of Area 3 (Figure 1). In this area, the status quo would be maintained for 2014 and 2015, resulting in no additional negative economic or social impacts on participants in the Atlantic herring fishery. In the GB RH/S Catch Cap Area, the midwater trawl gear type comprised >99.0% of the total Atlantic herring landings from 2008-2012 (see Table 37 on p. 101). Thus, should the directed herring fishery close in the other Catch Cap Areas during the fishing year, some midwater trawl effort may be redirected into the GB RH/S Catch Cap Area. This may offset some negative impacts of a RH/S catch cap closure on the midwater trawl fishery, as these vessels would be able to fish in this area. If the catch of RH/S by herring vessels is documented to increase in the GB Catch Cap Area, a catch cap for this area would automatically be considered during the next fishery specifications process.

The impacts of the proposed 2014 and 2015 Georges Bank catch caps (no RH/S catch cap) on fishery-related businesses and communities, therefore, is *neutral*. However, not setting a catch cap in 2014 and 2015 for this area may mitigate negative impacts that result in closures for midwater trawl vessels in other RH/S Catch Cap Areas.

4.6.2.3 Overall Impacts of the Proposed 2014/2015 RH/S Catch Caps on Fishery-Related Businesses and Communities

For the 2014 and 2015 fishing years, the Council selected as its *Preferred Options* annual "median" RH/S catch caps for the midwater trawl fishery in the GOM, CC, and SNE/MA RH/S Catch Cap areas and a "median" RH/S catch cap for the bottom trawl fishery in the SNE/MA RH/S Catch Cap areas (summarized below in Table 45, see Sections 2.3.2 – 2.3.5 for the complete range of options considered by the Council). No RH/S catch cap is proposed for the GB Catch Cap Area in 2014-2015; if the catch of river herring/shad is documented to increase in this area, a catch cap would automatically be considered during the following specifications process. The proposed RH/S catch caps for 2014-2015 would not affect trips/vessels landing less than 6,600 pounds of Atlantic herring or herring vessels using other gear types, including purse seines.

Table 45 Preferred Options for 2014-2015 RH/S Catch Caps

RH/S Catch Cap Area	Preferred Option: 2014-2015 RH/S Catch Cap (mt)
GOM	85.5
CC	13.3
SNE/MA	MWT – 123.7 BT – 88.9
GB	N/A

Collectively, the impact of the proposed 2014-2015 RH/S catch caps on fishery-related businesses and communities is expected to be *low negative*. Compared to the no action alternative (no RH/S catch caps for 2014 and 2015), the *Preferred Options* are expected to increase constraints on participants in the limited access Atlantic herring fishery, likely resulting in short-term negative socioeconomic impacts, but the proposed measures could have long-term benefits from promoting a sustainable fishery. Additionally, the potential to improve the RH/S stock abundance that a catch cap affords would have positive long-term impacts on the businesses and communities that depend on these species.

Potential Impacts on Atlantic Herring Catch

As previously noted, catch of Atlantic herring and RH/S is estimated under both the status quo (no action) and the Council's *Preferred Options* for 2014/2015 using a simulation model developed by the Herring PDT. The general approach of the simulation model is that under a RH/S catch cap, the directed herring fishery would operate in a similar fashion as it did in recent years without a RH/S catch cap. Therefore, the VTR records of for the directed herring fishery are representative of Atlantic herring (and total) catch, and the observer records are representative of RH/S catch rates. At-sea sampling data (see Appendix II) were used to construct RH/S catch ratios (RH/S catch/total kept) at the trip level. To account for a higher Atlantic herring ACL in 2014-2015, the simulation model allows for (but does not require) a moderate increase in the herring fishery over the 2010-2012 fishing years. Closures are implemented in the model when the either the RH/S catch cap or the herring sub-ACLs are reached. The methodology utilized in the Herring PDT's simulation model are more fully described in Appendix III of this document.

The most appropriate application of the model results is to compare the predicted change between scenarios under a RH/S catch cap(s) to the status quo (no action) scenario, which does not include a RH/S catch cap. Simulated Atlantic herring catch under the status quo and the Council's *Preferred Options* are shown in Table 46 – Table 48. The complete results from the simulation, including results for the other options considered by the Council, are provided in Appendix III of this document. Average, standard deviation, and 10th percentile of projected catch is shown in the following tables for each gear/management area combination and for the aggregate catch in each management area under both status quo and the *Preferred Options* for 2014/2015. Note that the totals for each zone are not equal to the sum of catch by each gear. The "Average" columns can be interpreted as the most likely outcomes. The 10th percentiles of catch reflect "bad" fishing years in which RH/S catch caps are reached. One way to interpret this column is that there is a 10% chance that Atlantic herring catch will be less than the value. For

example, according to Table 47, the simulation model predicts that there is a 10% chance that the Atlantic herring catch by midwater trawl vessels in Area 1B will be less than 1,467 mt.

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate catch that is less than (or equal to) the status quo. The largest impact on Atlantic herring catch will be for midwater trawl vessels in Herring Management Areas 2 and 3, where catch declined in the projection by approximately 23% and 8%, respectively (see Table 48). Variability of catches in the simulation model is reflected by the standard deviation of the simulation results. For all but one gear-area combination, the variability of catch increases under the *Preferred Options*. This increase in variability of aggregate herring catch is attributed to the closures that are consequences of reaching the RH/S caps. Simulation results for total catch by Atlantic herring management area and total herring catch for the fishery are also included in in Table 46 – Table 48.

When comparing the simulation results, it appears that relative to the status quo (no action), aggregate Atlantic herring catch could decline by up to 9% under the *Preferred Options* for RH/S catch caps 2014/2015. In addition, variability in catch (as seen by comparing the standard deviation of catch) increases, and the fishery outcomes in "bad" years are also worse.

Table 46 Simulated Atlantic Herring Catch (mt) by Herring Management Area and Gear Under the Status Quo (No Action)

	Gear	Average	Std. Dev.	10th percentile
Area 1A	Bottom Trawl	83	21	56
	Purse Seine	22,103	1,589	20,092
	Midwater Trawl	8,856	1,591	6,821
	Total	**31,043**	**140**	**30,838**
Area 1B	Bottom Trawl	0	0	0
	Purse Seine	779	385	269
	Midwater Trawl	3,659	439	3,093
	Total	**4,437**	**230**	**4,255**
Area 2	Bottom Trawl	4,544	586	3,788
	Purse Seine	0	0	0
	Midwater Trawl	20,472	2,028	17,850
	Total	**25,015**	**2,084**	**22,274**
Area 3	Bottom Trawl	26	31	0
	Purse Seine	0	0	0
	Midwater Trawl	33,141	2,884	29,332
	Total	**33,167**	**2,884**	**29,349**
All Areas	**Grand Total**	**93,663**	**3,320**	**89,272**

**Initial sub-ACL allocations for 2014/2015 are 31,200 mt Area 1A, 4,600 mt Area 1B, 30,000 mt Area 2, and 42,000 mt Area 3 (total 107,800 mt).*

***The shaded "Average" column represents the most likely outcome from the simulation model.*

Table 47 Simulated Atlantic Herring Catch (mt) by Herring Management Area and Gear Under the *Preferred Options for 2014-2015 RH/S Catch Caps*

	Gear	Average	Std. Dev.	10th percentile
Area 1A	Bottom Trawl	83	21	56
	Purse Seine	22,102	1,588	20,106
	Midwater Trawl	8,672	1,734	6,473
	Total	**30,861**	**836**	**30,759**
Area 1B	Bottom Trawl	0	0	0
	Purse Seine	779	386	274
	Midwater Trawl	2,980	977	1,467
	Total	**3,758**	**944**	**2,181**
Area 2	Bottom Trawl	4,476	619	3,684
	Purse Seine	0	0	0
	Midwater Trawl	15,687	4,471	9,477
	Total	**20,161**	**4,486**	**13,788**
Area 3	Bottom Trawl	26	31	0
	Purse Seine	0	0	0
	Midwater Trawl	30,404	3,588	25,861
	Total	**30,437**	**3,593**	**25,895**
All Areas	**Grand Total**	**85,217**	**6,150**	**76,959**

**Initial sub-ACL allocations for 2014/2015 are 31,200 mt Area 1A, 4,600 mt Area 1B, 30,000 mt Area 2, and 42,000 mt Area 3 (total 107,800 mt).*

***The shaded "Average" column represents the most likely outcome from the simulation model.*

Table 48 Percentage of Atlantic Herring Catch Relative to the Status Quo Under the *Preferred Options for 2014-2015 RH/S Catch Caps*

	Gear	Average	10th percentile
Area 1A	Bottom Trawl	100%	100%
	Purse Seine	100%	100%
	Midwater Trawl	98%	95%
	Total	99%	100%
Area 1B	Bottom Trawl	-	-
	Purse Seine	100%	102%
	Midwater Trawl	81%	47%
	Total	85%	51%
Area 2	Bottom Trawl	99%	97%
	Purse Seine	-	-
	Midwater Trawl	77%	53%
	Total	81%	62%
Area 3	Bottom Trawl	100%	-
	Purse Seine	-	-
	Midwater Trawl	92%	88%
	Total	92%	88%
All Areas	**Grand Total**	**91%**	**86%**

**Initial sub-ACL allocations for 2014/2015 are 31,200 mt Area 1A, 4,600 mt Area 1B, 30,000 mt Area 2, and 42,000 mt Area 3 (total 107,800 mt).*

***The shaded "Average" column represents the most likely outcome from the simulation model.*

Potential Impacts on Revenues

The action proposed in this framework adjustment would affect limited access (Category A, B, or C) vessels active in the Atlantic herring fishery. It will not affect open access (Category D) vessels that are fishing for herring. With the implementation of Amendment 5 (March 17, 2014), mackerel vessels fishing under the new Category E permit in Areas 2 and 3 also would be affected. For this analysis, only revenue impacts for the limited access vessels are examined. First, the herring catch, location, and gear used during 2010-2012 were extracted for each limited access vessel. Simulated vessel-level revenues are computed based on the reduction in gear/management area herring catch projected in Table 49.

There are 94 vessels that hold limited access Atlantic herring permits. Of these, 35 vessels caught Atlantic herring during 2010-2012. Projected changes in revenues and herring revenues under the status quo and the *Preferred Options* for 2014-2015 are provided in Table 49. The rows labeled "likely" uses the reductions in Atlantic herring catch based on the average simulation outcome. The rows labeled "poor" uses the reduction in Atlantic herring catch based on the 5th percentile of the simulation outcomes.

Another way to understand the likely effect of the proposed action on fishing vessels is to examine the fraction of *status-quo* revenue that each vessel is likely to earn if the Council's *Preferred Option* is enacted. This is presented with a set of histograms in Figure 23. Under the Council's *Preferred Option,* the likely outcome is for vessels to have a minimal reduction in revenue. Most fishing vessels experience Atlantic herring revenue decreases of less than 5% (Figure 23a) and total revenue decreases of less of than 10% (Figure 23c). Many are projected to experience no decreases in revenues. Therefore, fishing vessels are expected to experience minor, if any, impacts on herring and total revenues from the RH/S catch caps proposed for 2014 and 2015.

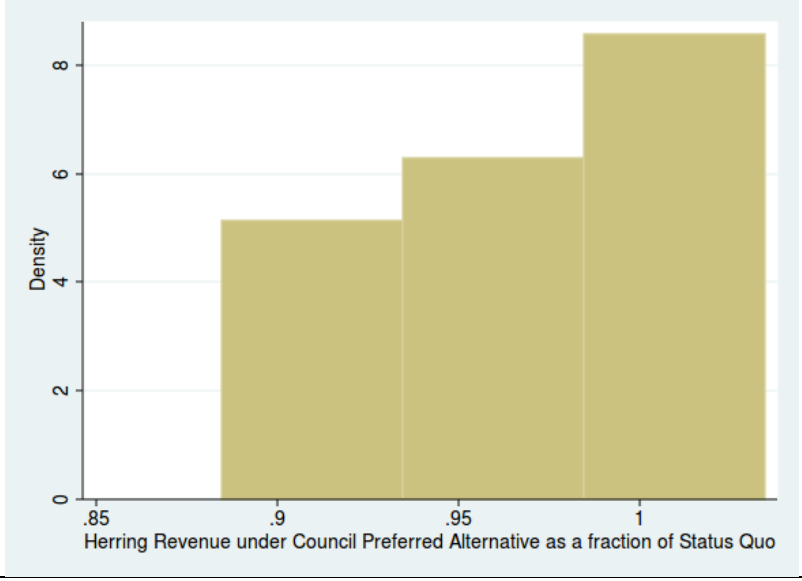
However, a "poor" outcome resulting from high catch of RH/S and resultant closures of certain areas could result in some vessels experiencing large (20% or greater) decreases in Atlantic herring revenues and total revenues (Figure 23b and c). If the Council had selected the "low" catch cap option for the RH/S Catch Cap Areas in 2014 and 2015, closures would quite likely be triggered for the directed Atlantic herring fishery. Relative to the *Preferred Options*, the low option would have resulted in more negative impacts to fishery-related businesses and communities during the 2014 and 2015 fishing years (see Appendix III for more information about the impacts of other options considered by the Council).

Table 49 Projected Vessel-Level Revenues Under Status Quo and the "Likely" and "Poor" Outcomes for the *Preferred Options for 2014-2015 RH/S Catch Caps*

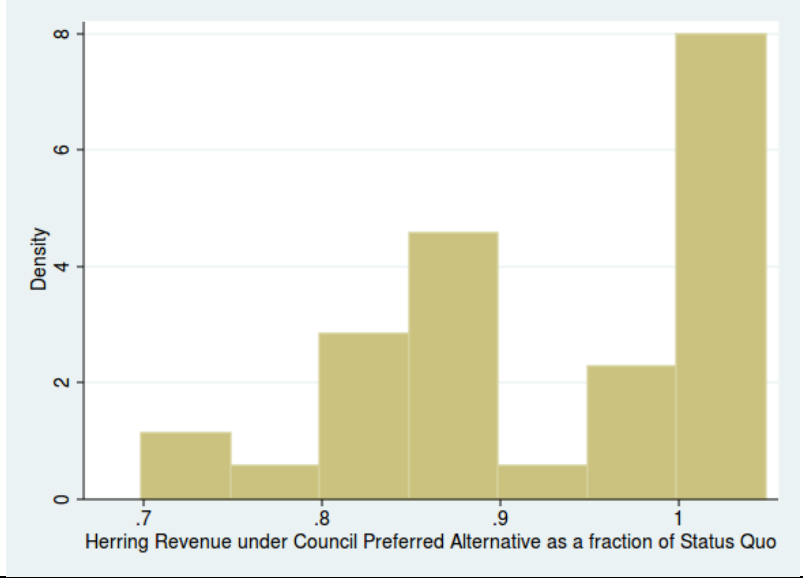
	Total Revenues	Herring Revenues
Status Quo		
Average	$1,168,272	$625,812
Range	$326,675-$1,521,318	$18,936-$902,677
Preferred Options "Likely"		
Average	$1,138,797	$596,337
Range	$316,787-$1,485,316	$18,936-$841,442
Preferred Options "Poor"		
Average	$1,092,655	$550,195
Range	$316,787-$1,485,316	$18,936-$733,142

Figure 23 Histograms of Projected Vessel-Level Herring Revenues and Total Revenues Under Status Quo (No Action) and the *Preferred Options* for 2014/2015 RH/S Catch Caps

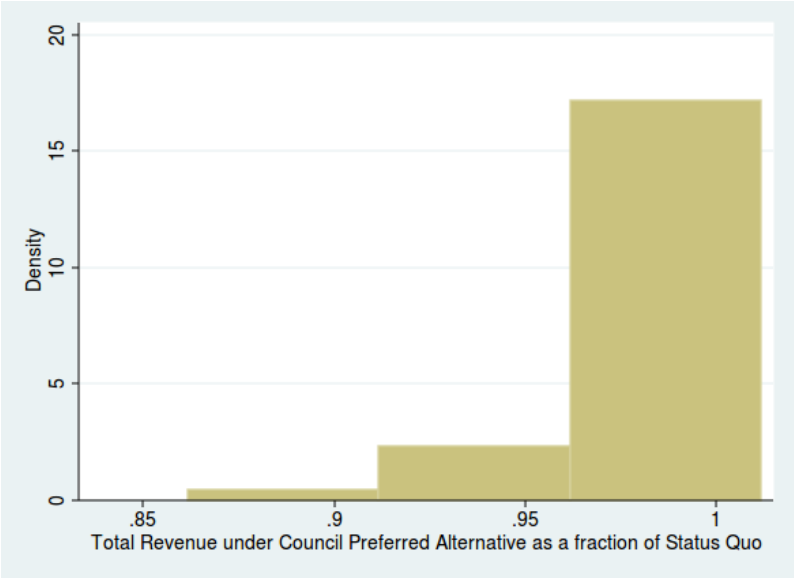
(a): "Likely" outcome for Atlantic herring revenues



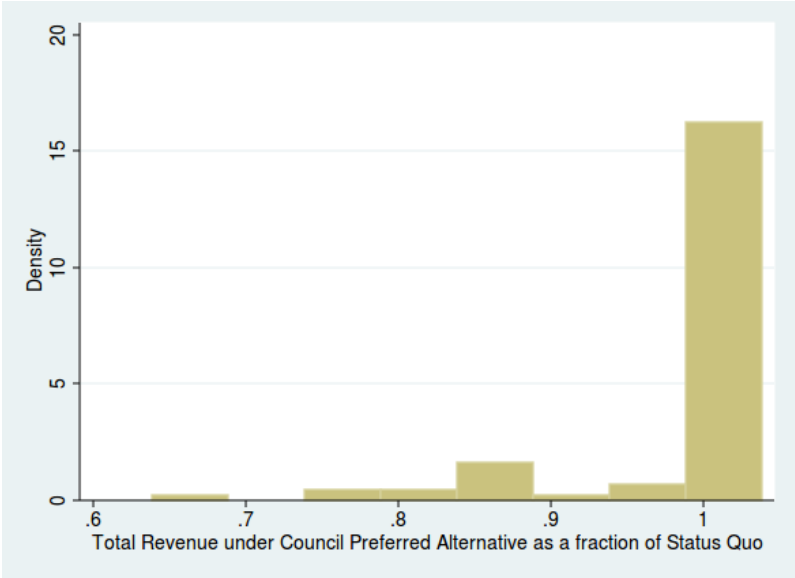
(b): "Poor" outcome for Atlantic herring revenues



(c): "Likely" outcome for total revenues



(d): "Poor" outcome for total revenues



4.7 CUMULATIVE EFFECTS ASSESSMENT

A cumulative effects assessment (CEA) is a required part of an EIS or EA according to the Council on Environmental Quality (CEQ) (40 CFR part 1508.7) and NOAA's policy and procedures for NEPA, found in NOAA Administrative Order 216-6. The purpose of the CEA is to integrate into the impact analyses the combined effects of many actions over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective but, rather, the intent is to focus on those effects that are truly meaningful. This section serves to examine the potential direct and indirect effects of the measures proposed in Framework 3 together with past, present, and reasonably foreseeable future actions that affect the environment related to the Atlantic herring fishery.

The regulatory atmosphere within which Federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of resources, 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 (except short-term impacts to human communities) from past, present and reasonably foreseeable future actions, when combined with baseline conditions, 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 various VECs are not experiencing negative impacts, but rather that when taken as a whole and compared to the level of unsustainable effort that existed prior to and just after the fishery came under management control, the overall long-term trend is positive.

The following analysis will identify and characterize the impact on the environment from Fw 3 when analyzed in the context of other past, present, and reasonably foreseeable future actions. It should be noted that the predictions of potential synergistic effects from multiple actions, past, present and/or future will generally be qualitative in nature.

4.7.1 Valued Ecosystem Components (VECs)

Consistent with the guidelines for CEA, cumulative effects can be more easily identified by analyzing the impacts of the Proposed Action on valued ecosystem components (VECs). The affected environment is described in this document based on VECs that were identified for consideration relative to the proposed specifications. VECs represent the resources, areas, and human communities that may be affected by a Proposed Action or alternatives and by other actions that have occurred or will occur outside the Proposed Action. VECs are generally the "place" where the impacts of management actions are exhibited. An analysis of impacts is performed on each VEC to assess whether the direct/indirect effects of an alternative adds to or subtracts from the effects that are already affecting the VEC from past, present and future actions outside of the Proposed Action (i.e., cumulative effects).

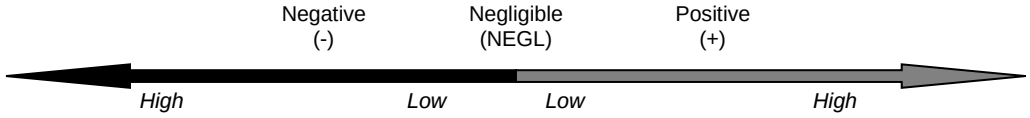
The Affected Environment is described in this document (Section 3.0) based on VECs that were identified specifically for Framework 3. The VECs for consideration in this assessment include:

1. Atlantic Herring (Section 3.1);
2. River Herring/Shad (Section 3.2);
3. Non-Target Species (Section 3.3);
4. Physical Environment and Essential Fish Habitat (EFH) (Section 3.4);
5. Protected Resources (Section 3.5); and
6. Fishery-Related Businesses and Communities (Section 3.6).

The descriptive and analytic components of this document are constructed in a consistent manner. The Affected Environment for Framework 3 traces the history of each VEC since the implementation of Amendment 1 to the Herring FMP (in 2006) through Amendment 5 (finalized by the Council in 2013) and consequently addresses the impacts of past actions. The Affected Environment section is designed to enhance the readers' understanding of the historical, current, and near-future conditions (baselines and trends) in order to fully understand the anticipated environmental impacts of the management alternatives and independent measures under consideration in this amendment. The direct/indirect and cumulative impacts of these alternatives and measures are assessed in Section 4.7.7 of this document using a similar structure to that found in the Affected Environment. To enhance clarity and maintain consistency, the following terms in Table 50 are used to summarize impacts:

Table 50 Terms Used in Tables to Summarize Cumulative Impacts on Framework 3 VECs

Impact Definition			
	Direction		
VEC	**Positive (+)**	**Negative (-)**	**Negligible (Negl)**
Atlantic Herring; RH/S, Other Non-Target Species, and Protected Resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
Impact Qualifiers:			
Low (L, as in low positive or low negative)	To a lesser degree		
High (H; as in high positive or high negative)	To a substantial degree		
Likely	Some degree of uncertainty associated with the impact		



**In some cases, terms like "more" and "most" are used for the purposes of comparing management alternatives to each other.*

4.7.2 Spatial and Temporal Boundaries

The geographic area that encompasses the physical, biological and human communities impacts to be considered in the cumulative effects analysis are described in detail in Section 3.0 of this document (Affected Environment). The geographic range for impacts to fish species is the range of each fish species in the western Atlantic Ocean. The physical environment, including habitat and EFH, is bounded by the range of the Atlantic herring fishery, from the Gulf of Maine through the mid-Atlantic Bight, and includes adjacent upland areas (from which non-fishing impacts may originate). For protected species, the geographic range is the total range of Atlantic herring. The geographic range for fishery-related businesses and communities is defined in the Affected Environment as well.

Overall, while the effects of the historical herring fishery are important and are considered in the analysis, the temporal scope of past and present actions for Atlantic herring, RH/S, non-target species, the physical environment and EFH, protected species, fishery-related businesses and communities is focused principally on actions that have occurred since 1996, when the MSA was amended and implemented new fisheries management and EFH requirements. The temporal scope for marine mammals begins in the mid-1990s, when NMFS was required to generate stock assessments for marine mammals that inhabit waters of the U.S. EEZ that create the baseline against which current stock assessments are evaluated. For turtle species, the temporal scope begins in the 1970s, when populations were noticed to be in decline. The temporal scope for Atlantic herring is focused more on the time since the Council's original Herring FMP was implemented at the beginning of the 2001 fishing year. The Atlantic Herring FMP serves as the primary management action for the Atlantic herring fishery and has helped to shape the current condition of the herring resource.

The temporal scope of the management measures proposed in this document generally extends five years into the future for all VECs. This period was chosen because of the dynamic nature of resource management and lack of specific information on projects that may occur in the future, which make it difficult to predict impacts beyond this time frame with any certainty. This is also the rebuilding time frame for the Atlantic herring resource, as defined in the Atlantic Herring FMP, should the resource become overfished and subject to a rebuilding program in the future. While the Framework 3 measures are evaluated on this time horizon, the temporal scope of the proposed 2014 and 2015 RH/S catch cap amounts extends only through the years of the specifications themselves.

4.7.3 Analysis of Total Cumulative Effects

A cumulative effects assessment ideally makes effect determinations based on the culmination of the following: (1) impacts from past, present and reasonably foreseeable future actions; plus (2) the baseline condition for resources and human communities (note – the baseline condition consists of the present condition of the VECs plus the combined effects of past, present and reasonably foreseeable future actions); plus (3) impacts from the Proposed Action and alternatives.

A description of past, present and reasonably foreseeable future actions is presented in Table 51. The baseline conditions of the resources and human community are subsequently summarized in Section 4.7.5 although it is important to note that beyond the stock managed under this FMP and protected species, quantitative metrics for the baseline conditions are not available. Finally, a brief summary of the impacts from the alternatives contained in this specifications is included. The culmination of all these factors is considered when making the cumulative effects assessment.

4.7.4 Past, Present, and Reasonably Foreseeable Future Actions

Table 51 (p. 178) summarizes the combined effects of other past, present and reasonably foreseeable future actions that affect the VECs, i.e., actions other than those alternatives under development in this document.

Note that most of the actions affecting the VECs related to this action and considered in Table 51 come from fishery-related activities (e.g., Federal fishery management actions). As expected, these activities have fairly straightforward effects on environmental conditions, and were, are, or will be taken, in large part, to improve those conditions. The reason for this is the statutory basis for Federal fisheries management – the reauthorized Magnuson-Stevens Act (MSA). That legislation was enacted to promote long-term positive impacts on the environment in the context of fisheries activities. More specifically, the MSA stipulates that management comply with a set of National Standards that collectively serve to optimize the conditions of the human environment. Under this regulatory regime, the cumulative impacts of past, present, and future Federal fishery management actions on the VECs should be expected to result in positive long-term outcomes. Nevertheless, these actions are often associated with offsetting impacts. For example, constraining fishing effort frequently results in negative short-term socio-economic impacts for fishery participants. However, these impacts are usually necessary to bring about the 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 managed resource.

Non-fishing activities are also considered when determining the combined effects from past, present and reasonably foreseeable future actions. Activities that have meaningful effects on the VECs include the introduction of chemical pollutants, sewage, changes in water temperature, salinity, dissolved oxygen, and suspended sediment into the marine environment. These activities pose a risk to the all of the identified VECs in the long term. Human induced non-fishing activities that affect the VECs under consideration in this document are those that tend to be concentrated in near shore areas. 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 resources, 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.

4.7.4.1 Atlantic Herring Resource

Past and Present Actions: Atlantic herring management measures were implemented in two related, but separate FMPs in 1999 – one by the federal government (NEFMC 1999, amended in 2006) and one by the states (ASMFC 1999, amended in 2006). The status of the Atlantic herring resource is updated in Section 3.1.2 of this document, and the herring fishery is summarized in Section 3.6 of this document. The offshore stock has recovered from its collapse in the early 1970s and, overall, the coastal Atlantic herring resource is not overfished, and overfishing is not occurring. There is more concern for the inshore stock since it receives more fishing pressure, but the most recent benchmark assessment (SAW 54, July 2012) indicates that the herring resource is in a "rebuilt" condition (above the biomass target) and that fishing mortality is well below the overfishing threshold. Additional past and present actions that affect the herring resource are discussed in the other VEC sections.

The Atlantic States Marine Fisheries Commission manages the Atlantic herring fishery in State waters. The ASMFC adopted Amendment 2 in March of 2006, which revised management area boundaries, biological reference points, the specification process, research set-asides, internal waters processing operations, and measures to address fixed gear fisheries and required fixed gear fishermen to report herring catches through the IVR program. Further discussion can be found in the 2013-2015 Atlantic Herring specifications package.

The ASMFC also adopted an Addendum in 2010 which modified Amendment 1 (Amendment 1) and Amendment 2 (Amendment 2) to the Interstate Fisheries Management Plan for Atlantic Sea Herring by changing the specification setting process and associated definitions. Based on the difficulty of having two sets of acronyms, one for the NEFMC plan and one for the ASMFC plan, for one cooperatively managed species the addendum was developed to establish an identical set of definitions and acronyms as those that the NEFMC is required to use under MSA. The addendum also established a new specification setting process that is more in line with the ASMFC Sea Herring Section's usual process for setting specifications while taking into account the new process that was enacted by the NEFMC. To date, ASMFC management remains generally consistent with Federal management through the Herring FMP.

Amendment 4 to the Atlantic Herring FMP, as enacted by the NEFMC in 2010, primarily responded to the requirements of the MSA and NEPA. The amendment established provisions for ACLs by first defining terms to bring the FMP into compliance with the new requirements of the MSA, setting an interim ABC control rule, eliminating JVP, IWP, TALFF and reserve specifications, establishing provisions for sub-ACLs, and modifying the specifications process to utilize these elements. Three Accountability Measures (AMs) were also established in Amendment 4: an in-season AM that closes the directed herring fishery in a management area when there is a projection that 95% of the sub-ACL is reached, an AM for overage deductions, which subtracts the amount of an ACL or sub-ACL overage from subsequent ACLs/sub-ACLs, and another AM which established provisions for closing the directed herring fishery if the haddock catch cap (Framework 43 and 46 to the Multispecies FMP, see below) is reached. Currently, Amendment 4 is under court order and pending further action as of August 2012.

In 2006, Framework 43 to the Northeast Multispecies FMP was enacted, which modified the restrictions for herring vessels so that herring fishing could continue on Georges Bank, but prohibited certain herring vessels from discarding haddock and limited possession of other groundfish to small amounts. It also adopted a cap on the amount of haddock that could be caught by certain herring vessels. In 2011, Framework 46 changed these catch cap provisions so that they would apply only to midwater trawl vessels with a herring permit, because these vessels caught nearly all of the haddock caught by the herring fishery. Catches of haddock by midwater trawl vessels fishing in Herring Management Areas 1A, 1B, and 3 that are documented by at-sea observers are now extrapolated to an estimate of the total catch of haddock. Individual estimates are then developed for each haddock stock (GOM and GB haddock). The cap is then applied based on the multispecies fishing year (May 1 through April 30), and is 1 percent of the Acceptable Biological Catch (ABC) of each stock. If the haddock catch estimate extrapolated from observer reports exceeds a stock-specific cap, midwater trawl vessels are limited to catching 2,000 pounds of Atlantic herring in a relevant area. If there is an overage of the cap, the cap for the following year is reduced by the amount of the overage. In order to monitor the cap, midwater trawl vessels fishing in Herring Management Areas 1A, 1B, and 3 are also required to report total kept catch by haddock stock area and gear used.

The ASMFC is currently developing Draft Addendum V to Amendment 2 to the Interstate Fishery Management Plan for Atlantic Herring. The Draft Addendum proposes measures to refine and consolidate Atlantic herring spawning regulations, which include: (1) refining sampling protocols; (2) providing flexibility to change spawning boundaries based on Technical Committee input through Section action; and (3) consolidating all spawning regulations into one document. The Draft Addendum responds to observed changes in Atlantic herring spawning behavior (size of spawning fish and extent of spawning area) as well as the need to clarify spawning regulations so that they are interpreted and applied consistently among the implementing states.

The Atlantic herring fishery specifications for the 2013-2015 fishing years are currently effective and are summarized in Table 26 (p. 84). Framework 2 to the Atlantic Herring FMP was implemented by NMFS concurrently with the 2013-2015 herring fishery specifications on September 30, 2013. Framework 2 authorizes the Council to split sub-ACLs in all herring management areas seasonally (by month) during the specifications process. It also establishes a general policy for authorizing annual carryover of unutilized sub-ACL (up to 10%) under specific conditions. Seasonal (monthly) splits of sub-ACLs in Areas 1A and 1B are effective for the 2014 and 2015 fishing years, and carryover provisions apply as well.

The Council also implemented additional accountability measures for the herring fishery in the 2013-2015 specifications package; the AMs will remain effective beyond the 2015 fishing year. Under the new AMs (effective September 30, 2013), the trigger for closing the directed herring fishery in a management area is reduced to 92% of the sub-ACL (not including RSAs). When 92% of a management area sub-ACL is projected to be reached, the directed herring fishery in that area will close, and all herring permit holders will be limited to 2,000 pounds of herring per trip in that area for the remainder of the fishing year. In addition, the new AMs establish a trigger for closing the directed herring fishery in all management areas. The trigger for closing the directed herring fishery in all management areas will be 95% of the stockwide Atlantic

herring ACL. When 95% of the stockwide ACL for herring is projected to be reached, the directed herring fishery in all management areas would close, and all herring permit holders would be limited to 2,000 pounds of herring per trip for the remainder of the fishing year. These AMs were adopted by the Council to further prevent the stockwide Atlantic herring ACL and management area sub-ACLs from being exceeded during the fishing year, as well as improve the likelihood that the total ACL (OY) can be caught on a continuing basis while preventing overfishing.

Reasonably Foreseeable Future Actions: Amendment 5 to the Atlantic Herring FMP was approved by NEFMC in June 2012. After review and revision, the final submission for Amendment 5 was presented to NMFS on March 25, 2013, and measures approved in Amendment 5 just recently became effective (March 17, 2014). The focus of Amendment 5 is to establish a comprehensive catch monitoring program for the Atlantic herring fishery, address river herring bycatch, establish criteria for midwater trawl vessel access to groundfish closed areas, and adjust other aspects of the fishery management program to keep the Herring FMP in compliance with the MSA.

In November 2013, the NEFMC voted to initiate Framework 4 to the Atlantic Herring FMP, which will address disapproved elements of Amendment 5 relating to dealer weighing requirements and measures to address net slippage. The first Framework 4 meeting will occur at the January 2014 NEFMC meeting. This action will move forward as soon as possible. The NEFMC and MAFMC are also working with NMFS to develop an omnibus amendment to implement provisions for industry-funded monitoring across all fisheries. This amendment will also include provisions for observer coverage in the Atlantic herring and mackerel fisheries. The target implementation date for the omnibus amendment is the 2015 fishing year. The NEFMC also agreed, as part of its management priorities for 2014, to continue to explore issues related to adding RH/S as stocks in the Atlantic herring fishery, and to participate in coordinated RH/S conservation efforts with NMFS and the Mid-Atlantic Council.

An Omnibus EFH Amendment is likely to be implemented in foreseeable future. This amendment could positively affect Atlantic herring via increased protection of benthic habitats used by the species from the adverse effects of various regional fisheries. Further, NMFS is currently in a rule-making process to propose changes to the Harbor Porpoise Take Reduction Plan which are intended to reduce harbor porpoise mortalities (75 FR 7383, February 19, 2010 and 75 FR 12698, March 17, 2010). This action would likely result in vessels facing additional restrictions, possibly resulting in positive impacts to herring and other species taken incidentally.

The sea turtle strategy is a gear-based approach to addressing sea turtle bycatch. NMFS is proposed and made final changes to the regulatory requirements for trawl fisheries to protect sea turtles. As described in the turtle Strategy Final EIS (77 FR 29905 May 21, 2012), NMFS allowed the use of new materials and modified existing approved TED designs to other trawl fisheries and also modified the geographic scope of the TED requirements. This measure is likely to be neutral for the herring resource as it will not affect herring directly.

During 2015, Atlantic herring stock information will be reviewed, and the Council will develop the Atlantic herring fishery specifications for the 2016-2018 fishing years. The 2016-2018 fishery specifications package will include the specification of ACLs and sub-ACLs for the Atlantic herring fishery, as well as RH/S catch caps for 2016-2018 if the action proposed in this framework adjustment is approved/implemented.

4.7.4.2 River Herring and Shad

Past and Present Actions: The ASMFC Fishery Management Plan for Shad & River Herring, approved in 1985, was one of the very first FMPs developed by the ASMFC. Amendment 1 was adopted in 1998 and focuses on American shad regulations as well as and monitoring programs to improve data collection and stock assessment capabilities. Amendment 2 to the ASMFC Interstate Fisheries Management Plan for Shad and River Herring was approved in 2009 and implemented a precautionary approach to river herring management. Amendment 2 requires states or jurisdictions to close all state fisheries by January 1, 2012, with exceptions for systems with a sustainable fishery. A sustainable fishery is defined as one that demonstrates that the river herring stock can support a commercial and/or recreational fishery without diminishing future stock reproduction and recruitment. Under Amendment 2, river herring from any state waters fishery may not be landed without an approved plan requesting State fishery proposals must contain 'sustainability targets' that are subject to Shad and River Herring Technical Committee (TC) review and Shad & River Herring Management Board (Board) approval. States with approved plans are required to submit annual updates of the achievement and maintenance of sustainability targets. The TC has reviewed proposals from Maine, New Hampshire, North Carolina and South Carolina and the Board approved all plans. The 2012 sustainability plan deadline was implemented in order to allow states with a lengthy legislative process adequate time to develop and implement proposals.

In 2010, the Board approved Amendment 3, which revises American shad regulatory and monitoring programs in place under Amendment 1. The amendment was developed in response to the 2007 American shad stock assessment, which found that most American shad stocks were at all-time lows and did not appear to be recovering. Amendment 3 is similar to the management program required for river herring. The amendment prohibits state waters commercial and recreational fisheries beginning January 1, 2013, unless a state or jurisdiction has a sustainable management reviewed by the TC and approved by the Board. The amendment defines a sustainable fishery as "a commercial and/or recreational fishery that will not diminish the potential future stock reproduction and recruitment." Submitted plans must clearly demonstrate that the state's or jurisdiction's American shad fisheries meet this new definition of sustainability through the development of sustainability targets which must be achieved and maintained. The amendment allows any river systems to maintain a catch and release recreational fishery. States and jurisdictions are also required to identify local significant threats to American shad critical habitat and develop a plan for mitigation and restoration.

Reasonably Foreseeable Future Actions: Amendment 5 to the Atlantic Herring FMP was approved by NEFMC in June 2012. After review and revision, the final submission for Amendment 5 was presented to NMFS on March 25, 2013, and measures approved in Amendment 5 just recently became effective (March 17, 2014). The focus of Amendment 5 is to establish a comprehensive catch monitoring program for the Atlantic herring fishery, address river herring bycatch, establish criteria for midwater trawl vessel access to groundfish closed areas, and adjust other aspects of the fishery management program to keep the Herring FMP in compliance with the MSA. The amendment also establishes a long-term strategy for river herring bycatch avoidance/minimization through industry-based avoidance and, presumably, a catch cap for river herring. Provisions are included in the amendment to allow for the implementation of a RH/S catch cap through this framework adjustment.

Amendment 14 to the Mackerel Squid Butterfish (MSB) FMP was developed concurrently to Amendment 5 by the Mid-Atlantic Fishery Management Council. Many of the actions contained with both amendments have been developed to compliment and/or replicate each other so as to avoid conflicting overlaps of restrictions on vessels that participate in both the herring and mackerel fisheries. Actions proposed in Amendment 14 include: vessel reporting measures, dealer reporting measures, at-sea observation optimization measures, other sampling and monitoring measures such as port-side monitoring, at-sea observer coverage requirements, mortality caps on river herring, restrictions in areas of high river herring catch, mesh requirements, and the potential addition of river herring as a stock in the fishery. The ways in which these actions overlap can be seen in Table 196 of the Amendment 5 (FEIS). Similarly, the timelines for Amendment 5 and Amendment 14 were designed to complement each other and allow public comment sessions to occur simultaneously.

In November 2013, the NEFMC voted to initiate Framework 4 to the Atlantic Herring FMP, which will address disapproved elements of Amendment 5 relating to dealer weighing requirements and measures to address net slippage. The first Framework 4 meeting will occur at the January 2014 NEFMC meeting. This action will move forward as soon as possible. The NEFMC and MAFMC are also working with NMFS to develop an omnibus amendment to implement provisions for industry-funded monitoring across all fisheries. This amendment will also include provisions for observer coverage in the Atlantic herring and mackerel fisheries. The target implementation date for the omnibus amendment is the 2015 fishing year. The NEFMC also agreed, as part of its management priorities for 2014, to continue to explore issues related to adding RH/S as stocks in the Atlantic herring fishery, and to participate in coordinated RH/S conservation efforts with NMFS and the Mid-Atlantic Council.

In early August 2013, when NOAA Fisheries published the ESA listing decision for river herring, NMFS indicated that it would partner with ASMFC to form a technical expert working group (TEWG). The TEWG will be focused on developing a dynamic conservation plan to help restore river herring throughout their range from Canada to Florida, identifying and implementing important conservation efforts, and conducting research to fill in some of the critical data gaps for these species. NOAA Fisheries has provided funds to ASMFC and have been working with them on plans for this process. NOAA Fisheries and ASMFC are currently working on forming TEWG membership and scheduling the working group's first meeting before the end of the year. NOAA Fisheries plans to continue to coordinate with all of

management partners including the Mid-Atlantic and the New England Fishery Management Councils to maximize resources and identify ways to complement ongoing efforts to promote river herring restoration.

During 2015, Atlantic herring stock information will be reviewed, and the Council will develop the Atlantic herring fishery specifications for the 2016-2018 fishing years. The 2016-2018 fishery specifications package will include the specification of ACLs and sub-ACLs for the Atlantic herring fishery, as well as RH/S catch caps for 2016-2018 if the action proposed in this framework adjustment is approved/implemented.

4.7.4.3 Other Non-Target Species

Past and Present Actions: Updated information about other non-target species affected by the Atlantic herring fishery is provided in Section 3.3 of this document. Recent years suggest that Atlantic herring, spiny dogfish, Atlantic mackerel, and haddock have represented the majority of observed bycatch by directed herring vessels. Bycatch of haddock in the Atlantic herring fishery was addressed through Framework 43 and Framework 46 to the Northeast Multispecies FMP, as well as the 2010-2012 Atlantic Herring fishery specifications and Amendment 5 to the Atlantic Herring FMP.

The Northeast Multispecies FMP has a multitude of management measures, a full summary of which has been provided in the most recent Framework to the FMP, Framework 46 (which can be found in Appendix III). Groundfish was considered as its own VEC in that Framework, however groundfish is a portion of the non-target species VEC being considered herein, and as such, the summary of the effects of past, present, and reasonably foreseeable future actions that was used in that Framework will be considered here. In summary, past actions to the regulated groundfish stocks have created mixed effects, as the combined effects of past actions have decreased effort, improved habitat protection, and implemented rebuilding plans when necessary, but some stocks remain overfished. Present actions created a positive effect, as sustainable stocks were the purpose of the regulations, as was the case for foreseeable future actions as well. Overall, the combined effects had a short-term negative, but long-term positive effect.

In 2006, Framework 43 to the Northeast Multispecies FMP was enacted, which modified the restrictions for herring vessels so that herring fishing could continue on Georges Bank, but prohibited certain herring vessels from discarding haddock and limited possession of other groundfish to small amounts. It also adopted a cap on the amount of haddock that could be caught by certain herring vessels. In 2011, Framework 46 changed these catch cap provisions so that they would apply only to midwater trawl vessels with a herring permit, because these vessels caught nearly all of the haddock caught by the herring fishery. Catches of haddock by midwater trawl vessels fishing in Herring Management Areas 1A, 1B, and 3 that are documented by at-sea observers are now extrapolated to an estimate of the total catch of haddock. Individual estimates are then developed for each haddock stock (GOM and GB haddock). The cap is then applied based on the multispecies fishing year (May 1 through April 30), and is 1 percent of the Acceptable Biological Catch (ABC) of each stock. If the haddock catch estimate extrapolated from observer reports exceeds a stock-specific cap, midwater trawl vessels are limited to

catching 2,000 pounds of Atlantic herring in a relevant area. If there is an overage of the cap, the cap for the following year is reduced by the amount of the overage. In order to monitor the cap, midwater trawl vessels fishing in Herring Management Areas 1A, 1B, and 3 are also required to report total kept catch by haddock stock area and gear used.

Reasonably Foreseeable Future Actions: The final submission for Amendment 5 to the Atlantic Herring FMP was presented to NMFS on Dec 21, 2012 and approved by NEFMC in June 2012. Measures approved in Amendment 5 just recently became effective (March 17, 2014). The focus of Amendment 5 is to establish a comprehensive catch monitoring program for the herring fishery, address river herring bycatch, establish criteria for midwater trawl vessel access to groundfish closed areas, and adjust other aspects of the fishery management program to keep the Herring FMP in compliance with the MSA. A foreseeable future action that will likely affect non-target species is the development of observer coverage requirements (disapproved in Amendment 5), as well as the funding options that pertain to this measure. An FMAT team has been recently put together by NMFS to discuss funding options surrounding this matter, and both the New England and Mid-Atlantic Fishery Management Councils have agreed to develop an omnibus amendment to all Northeast Region FMPs to implement mechanism for cost-sharing between the industry and the government. Implementation of the omnibus amendment is anticipated for 2015.

Amendment 14 to the Mackerel Squid Butterfish (MSB) FMP was developed concurrently to Amendment 5 by the Mid-Atlantic Fishery Management Council. Many of the actions contained in both amendments have been developed to compliment and/or replicate each other so as to avoid conflicting overlaps of restrictions on vessels that participate in both the herring and mackerel fisheries. In some cases, however, the actions contained in both amendments present some conflict with each other. Actions proposed in Amendment 14 include: vessel reporting measures, dealer reporting measures, at-sea observation optimization measures, other sampling and monitoring measures such as port-side monitoring, at-sea observer coverage requirements, mortality caps on river herring, restrictions in areas of high river herring catch, mesh requirements, and the potential addition of river herring as a stock in the fishery. The ways in which these actions overlap can be seen in Table 196 of the Amendment 5 (FEIS). Similarly, the timelines for Amendment 5 and Amendment 14 were designed to complement each other and allow public comment sessions to occur simultaneously. The implementation of Amendment 14 just recently occurred (March 26, 2014).

Implementation of the Omnibus EFH Amendment may also result in additional habitat protections for which there is an indirect positive effect to bycatch/incidental catch species and other fisheries, as they would also receive protection. As with Allocated Target Species, if revisions are made to the Harbor Porpoise Take Reduction Plan, vessels could face additional restrictions, possibly resulting in positive impacts to bycatch through effort reductions.

The sea turtle Strategy is a gear-based approach to addressing sea turtle bycatch. NMFS is currently considering proposing changes to the regulatory requirements for trawl fisheries to protect sea turtles. As described in a NOI to prepare an EIS (74 FR 88 May 8, 2009), NMFS is considering expanding the use of TEDs to other trawl fisheries and modifying the geographic scope of the TED requirements. TED requirements would likely have a positive effect on

bycatch and discards as they would likely exclude some of these species from capture in the cod-end.

4.7.4.4 Physical Environment and EFH

Past and Present Actions: The Atlantic herring EFH designation, which was developed as part of an EFH Omnibus Amendment prepared by NEFMC for its entire managed species, is provided in Section 3.4 of this document. The EFH Omnibus Amendment was approved for Atlantic herring by the Secretary of Commerce on October 27, 1999. The final rule implementing the Atlantic Herring FMP to allow for the development of a sustainable Atlantic herring fishery was published on December 11, 2000 (65 FR 77450).

Because the gears used in the Atlantic herring fishery have only occasional bottom contact with the primary substrates used by herring for egg deposition, and because the noises produced by herring fishing operations only temporarily disperse schools of juvenile and adult herring, EFH impacts assessments for the fishery have concluded that it does not have an adverse effect on herring EFH. In addition, these assessments have concluded that the herring fishery does not have an adverse impact on EFH designated for non-herring species.

Various measures have been implemented in the Northeast Region to protect the EFH of NEFMC-managed species. In particular, all bottom-tending mobile gear is prohibited from the level 3 Habitat Closed Areas (HCAs) established in 2004 under Amendment 13 to the Northeast Multispecies FMP and Amendment 10 to the Atlantic Sea Scallop FMP. In large part, these HCAs overlap with areas established in 1994 and 1998 to protect overfished stocks of cod, haddock and other groundfish species. As mobile bottom-tending gear is largely prohibited from the groundfish closures, they have incidental EFH protection benefits. Other measures to protect EFH include spatially-specific roller gear restrictions in the Multispecies and Monkfish fisheries.

Reasonably Foreseeable Future Actions: Reasonably foreseeable future actions that will likely affect habitat include the Omnibus EFH Amendment, currently under development. This action reviews and updates EFH designations, identifies Habitat Areas of Particular Concerns (HAPCs), reviews prey information for all managed species, reviews non-fishery impacts to EFH, and reviews the current science on fishing impacts to habitat. It will also include coordinated and integrated measures intended to minimize the adverse impact of NEFMC-managed fishing on EFH. The net effect of new EFH and HAPC designations and more targeted habitat management measures should be positive for EFH.

The Strategy for Sea Turtle Conservation and Recovery in Relation to Atlantic Ocean and Gulf of Mexico ("Strategy") is a gear-based approach to addressing sea turtle bycatch. NMFS is currently considering proposing changes to the regulatory requirements for trawl fisheries to protect sea turtles. As described in a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for Sea Turtle Conservation and Recovery in Relation to the Atlantic Ocean and Gulf of Mexico Trawl Fisheries (74 FR 88 May 8, 2009), NMFS is considering expanding the use of TEDs in trawl fisheries and modifying the geographic scope of the TED requirements.

Since TED requirements may decrease the catch retention of some target species, vessels may tow longer to offset this loss of catch, likely resulting in negative impacts to habitat and EFH.

4.7.4.5 Protected Resources

Past and Present Actions: A general description of protected species that may be affected by the proposed action is provided in Section 3.5 of this document and in more detail in Amendment 1 and Amendment 5 to the Herring FMP.

Large whales may be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries. Ship strikes and fishing gear entanglement continue to be the most likely sources of human-related injury or mortality for right, humpback, fin and minke whales. Sei, blue and sperm whales are also vulnerable, but fewer ship strikes or entanglements have been recorded. Mobile bottom trawls, as well as midwater trawl gear, appear to be less of a concern for the large whale species. Other marine mammals, however, such as harbor porpoise, dolphins and to a greater degree seals, are vulnerable to entanglement in net gear, including midwater trawl gear and purse seines.

In addition to these actions, NMFS has implemented specific regulatory actions to reduce injuries and mortalities from gear interactions. The ALWTRP, implemented in 1999 with subsequent rule modifications, restrictions, and extensions, includes time and area closures for trap/pot fisheries (e.g., lobster and black sea bass) and gillnet fisheries (e.g., anchored gillnet and shark gillnet fisheries); gear requirements, including a general prohibition on having line floating at the surface in these fisheries; a prohibition on storing inactive gear at sea; and restrictions on setting shark gillnets off the coasts of Georgia and Florida and drift gillnets in the Mid-Atlantic. This plan also contains non-regulatory aspects, including gear research, public outreach, scientific research, a network to inform mariners when right whales are in an area, and increasing efforts to disentangle whales caught in fishing gear. The intent of the ALWTRP is to positively affect large whales by reducing injuries and deaths of large whales (North-Atlantic right, humpback, and fin) in waters off the United States East Coast due to incidental entanglement in fishing gear.

Turtles in general have documented entanglements in shrimp trawls, pound nets, bottom trawls and sink gillnets. Shrimp trawls are required to use turtle excluder devices (TEDs). The diversity of the sea turtle life history also leaves them susceptible to many other human impacts, including impacts on land, in the benthic environment, and in the pelagic environment. Anthropogenic factors that impact the success of nesting and hatching include: beach erosion, beach armoring and nourishment; artificial lighting; beach cleaning; increased human presence; recreational beach equipment; beach driving; coastal construction and fishing piers; exotic dune and beach vegetation; and poaching. An increased human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants, and an increased presence of native species (e.g., raccoons, armadillos, and opossums) which raid and feed on turtle eggs. Entanglement(s) in debris or ingestion of marine debris are also seen as possible threats.

Reasonably Foreseeable Future Actions: The final submission for Amendment 5 to the Atlantic Herring FMP was presented to NMFS on Dec 21, 2012 and approved by NEFMC in June 2012. Measures that were approved in Amendment 5 just recently became effective on March 17, 2014. The focus of Amendment 5 is to establish a comprehensive catch monitoring program for the limited access herring fishery, address river herring bycatch, establish criteria for midwater trawl vessel access to groundfish closed areas, and adjust other aspects of the fishery management program to keep the Herring FMP in compliance with the MSA.

The likely impacts of the Omnibus EFH Amendment on protected resources cannot be determined at this time. The Harbor Porpoise Take Reduction Plan for the GOM and Mid-Atlantic Coasts was originally implemented in 1998, and NMFS published a proposed rule in July 2009 indicating additional management restrictions for gillnetters. Future measures of this plan may be implemented if take reduction goals are not met, which could further reduce fishing effort and may have a positive effect on the population of this species.

The sea turtle Strategy is a gear-based approach to addressing sea turtle bycatch. Under the Strategy, NMFS has identified trawl gear as a priority for reducing sea turtle bycatch and is considering proposing changes to the TED requirements in the trawl fisheries. TED requirements are designed to have a positive effect on protected resources, specifically turtles by allowing for most turtles caught in trawl nets to escape. NMFS is working to develop and implement bycatch reduction measures in all trawl fisheries in the Atlantic and Gulf of Mexico when and where sea turtle takes have occurred or where gear, time, location, fishing method, and other similarities exist between a particular trawl fishery and sea turtle takes have occurred by trawls (72 FR 7382, February 15, 2007). On February 15, 2007, NMFS issued an advance notice of proposed rulemaking to announce that it is considering amendments to the regulatory requirements for TEDs (72 FR 7382). On May 8, 2009, NMFS issued a NOI to prepare an EIS (74 FR 88 May 8, 2009), and held public scoping meetings throughout the East coast.

4.7.4.6 Fishery-Related Businesses and Communities

Past and Present Actions: A general description of fishery-related businesses and communities that may be affected by the proposed action is provided in Section 3.6 of this document and in more detail in Amendment 5 to the Herring FMP. Past and present actions described in Section 4.7.4.1 affecting the Atlantic herring resource have also affected fishery-related businesses and communities.

In 2010, the ASMFC adopted an Addendum which modified Amendment 1 and Amendment 2 to the Interstate Fisheries Management Plan for Atlantic Sea Herring by changing the specification setting process and associated definitions. Based on the difficulty of having two sets of acronyms, one for the NEFMC plan and one for the ASMFC plan, for one cooperatively managed species the addendum was developed to establish an identical set of definitions and acronyms as those that the NEFMC is required to use under MSA. The addendum also established a new specification setting process that is more in line with the ASMFC Sea Herring

Section's usual process for setting specifications while taking into account the new process that was enacted by the NEFMC in Amendment 4 to the Atlantic Herring FMP.

Amendment 4 to the Atlantic Herring FMP, as enacted by the NEFMC in 2010, primarily responded to the requirements of the MSA and NEPA. The amendment established provisions for ACLs by first defining terms to bring the FMP into compliance with the new requirements of the MSA, setting an interim ABC control rule, eliminating JVP, IWP, TALFF and reserve specifications, establishing provisions for sub-ACLs, and modifying the specifications process to utilize these elements. Three Accountability Measures (AMs) were also established in Amendment 4: an in-season AM that closes the directed herring fishery in a management area when there is a projection that 95% of the sub-ACL is reached, an AM for overage deductions, which subtracts the amount of an ACL or sub-ACL overage from subsequent ACLs/sub-ACLs, and another AM which established provisions for closing the directed herring fishery if the haddock catch cap (Framework 43 and 46 to the Multispecies FMP, see below) is reached. Currently, Amendment 4 is under court order and pending further action as of August 2012.

In 2006, Framework 43 to the Northeast Multispecies FMP was enacted, which modified the restrictions for herring vessels so that herring fishing could continue on Georges Bank, but prohibited certain herring vessels from discarding haddock and limited possession of other groundfish to small amounts. It also adopted a cap on the amount of haddock that could be caught by certain herring vessels. In 2011, Framework 46 changed these catch cap provisions so that they would apply only to midwater trawl vessels with a herring permit, because these vessels caught nearly all of the haddock caught by the herring fishery. Catches of haddock by midwater trawl vessels fishing in Herring Management Areas 1A, 1B, and 3 that are documented by at-sea observers are now extrapolated to an estimate of the total catch of haddock. Individual estimates are then developed for each haddock stock (GOM and GB haddock). The cap is then applied based on the multispecies fishing year (May 1 through April 30), and is 1 percent of the Acceptable Biological Catch (ABC) of each stock. If the haddock catch estimate extrapolated from observer reports exceeds a stock-specific cap, midwater trawl vessels are limited to catching 2,000 pounds of Atlantic herring in a relevant area. If there is an overage of the cap, the cap for the following year is reduced by the amount of the overage. In order to monitor the cap, midwater trawl vessels fishing in Herring Management Areas 1A, 1B, and 3 are also required to report total kept catch by haddock stock area and gear used.

Framework 2 to the Atlantic Herring FMP was implemented by NMFS concurrently with the 2013-2015 Atlantic herring fishery specifications on September 30, 2013. Framework 2 authorizes the Council to split sub-ACLs in all herring management areas seasonally (by month) during the specifications process. It also establishes a general policy for authorizing annual carryover of unutilized sub-ACL (up to 10%) under specific conditions. Seasonal (monthly) splits of sub-ACLs in Areas 1A and 1B are effective for the 2014 and 2015 fishing years, and carryover provisions apply as well. The 2013-2015 Atlantic herring fishery specifications are summarized in Table 26 on p. 84 of this document.

The Council also implemented additional accountability measures for the herring fishery in the 2013-2015 specifications package; the AMs will remain effective beyond the 2015 fishing year. Under the new AMs (effective September 30, 2013), the trigger for closing the directed herring fishery in a management area is reduced to 92% of the sub-ACL (not including RSAs). When 92% of a management area sub-ACL is projected to be reached, the directed herring fishery in that area will close, and all herring permit holders will be limited to 2,000 pounds of herring per trip in that area for the remainder of the fishing year. In addition, the new AMs establish a trigger for closing the directed herring fishery in all management areas. The trigger for closing the directed herring fishery in all management areas will be 95% of the stockwide Atlantic herring ACL. When 95% of the stockwide ACL for herring is projected to be reached, the directed herring fishery in all management areas would close, and all herring permit holders would be limited to 2,000 pounds of herring per trip for the remainder of the fishing year. These AMs were adopted by the Council to further prevent the stockwide Atlantic herring ACL and management area sub-ACLs from being exceeded during the fishing year, as well as improve the likelihood that the total ACL (OY) can be caught on a continuing basis while preventing overfishing.

Reasonably Foreseeable Future Actions: Amendment 5 to the Atlantic Herring FMP was approved by NEFMC in June 2012. After review and revision, the final submission for Amendment 5 was presented to NMFS on March 25, 2013, and measures approved in Amendment 5 just recently became effective (March 17, 2014). The focus of Amendment 5 is to establish a comprehensive catch monitoring program for the Atlantic herring fishery, address river herring bycatch, establish criteria for midwater trawl vessel access to groundfish closed areas, and adjust other aspects of the fishery management program to keep the Herring FMP in compliance with the MSA. The amendment also establishes a long-term strategy for river herring bycatch avoidance/minimization through industry-based avoidance and, presumably, a catch cap for river herring. Provisions are included in the amendment to allow for the implementation of a RH/S catch cap through this framework adjustment.

Amendment 14 to the Mackerel Squid Butterfish (MSB) FMP was developed concurrently to Amendment 5 by the Mid-Atlantic Fishery Management Council. Many of the actions contained with both Amendments have been developed to compliment and/or replicate each other so as to avoid conflicting overlaps of restrictions on vessels that participate in both fisheries. In some cases, however, the actions contained in both Amendments present some conflict with each other. Actions proposed in Amendment 14 include: vessel reporting measures, dealer reporting measures, at-sea observation optimization measures, other sampling and monitoring measures such as port-side monitoring, at-sea observer coverage requirements, mortality caps on river herring, restrictions in areas of high river herring catch, mesh requirements, and the potential addition of river herring as a stock in the fishery. The ways in which these actions overlap can be seen in Table 196 of the Amendment 5 FEIS. Similarly, the timelines for Amendment 5 and Amendment 14 were designed to complement each other and allow public comment sessions to occur simultaneously.

In November 2013, the NEFMC voted to initiate Framework 4 to the Atlantic Herring FMP, which will address disapproved elements of Amendment 5 relating to dealer weighing requirements and measures to address net slippage. The first Framework 4 meeting will occur at the January 2014 NEFMC meeting. This action will move forward as soon as possible. The NEFMC and MAFMC are also working with NMFS to develop an omnibus amendment to implement provisions for industry-funded monitoring across all fisheries. This amendment will also include provisions for observer coverage in the Atlantic herring and mackerel fisheries. The target implementation date for the omnibus amendment is the 2015 fishing year. The NEFMC also agreed, as part of its management priorities for 2014, to continue to explore issues related to adding RH/S as stocks in the Atlantic herring fishery, and to participate in coordinated RH/S conservation efforts with NMFS and the Mid-Atlantic Council.

Implementation of the Omnibus EFH Amendment may result in additional habitat protections, which may or may not affect fishery-related businesses and communities depending on what the protection does to vessel effort. Similarly, if revisions are made to the Harbor Porpoise Take Reduction Plan, vessels could face additional restrictions, possibly resulting in positive impacts to bycatch through effort reductions.

NMFS is currently considering proposing changes to the regulatory requirements for trawl fisheries to protect sea turtles. As described in a NOI to prepare an EIS (74 FR 88 May 8, 2009), NMFS is considering expanding the use of TEDs to other trawl fisheries and modifying the geographic scope of the TED requirements. TED requirements may have a negative effect on fishery-related businesses and communities, as they may increase the cost of fishing, however the extent of the measures is unknown at this time.

During 2015, Atlantic herring stock information will be reviewed, and the Council will develop the Atlantic herring fishery specifications for the 2016-2018 fishing years. The 2016-2018 fishery specifications package will include the specification of ACLs and sub-ACLs for the Atlantic herring fishery, as well as RH/S catch caps for 2016-2018 if the action proposed in this framework adjustment is approved/implemented.

Table 51 Summary of Effects of Past, Present, and Reasonably Foreseeable Future Actions on the VECs Identified for Framework 3

VEC	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Atlantic Herring	**Positive** Combined effects of past actions have controlled effort and provided a sustainable fishery with a rebuilt resource	**Positive** Current regulations continue to manage for a sustainable stock	**Positive** Future actions are anticipated to strive to maintain a sustainable stock	**Positive** Stock are being managed for sustainability
River Herring/Shad	**Mixed** Combined effects of past actions have depleted stocks, but many have started to see recovery	**Likely Positive** Current regulations continue to decrease catch/bycatch and related mortality	**Likely Positive** Future regulations are being developed to improve monitoring and further address bycatch issues	**Positive** Conservation efforts continue,; RH/S catch addressed in the herring fishery
Other Non-Target Species	**Positive** Combined effects of past actions have decreased effort and reduced bycatch	**Positive** Current regulations continue to decrease effort and reduced bycatch	**Positive** Future regulations are being developed to improve monitoring and further address bycatch issues	**Low Positive** Decreased effort and reduced bycatch continue
Physical Environment and Essential Fish Habitat (EFH)	**Positive** Combined effects of past actions have decreased effort and improved habitat protection	**Positive** Effort reductions and better control of non-fishing activities have been positive but fishing activities and non-fishing activities continue to reduce habitat quality	**Positive** Future actions are anticipated to continue rebuilding a healthy environment and increase habitat quality	**Positive** Continued management of Physical environment and EFH for an increased quality of habitat
Protected Resources	**Positive** Combined effects of past fishery actions have reduced effort and thus interactions with protected resources	**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	**Positive** Continued effort controls along with past regulations will likely help stabilize protected species interactions
Fishery-Related Businesses and Communities	**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 fishing industry and thus businesses	**Mixed** Current regulations continue to manage for a sustainable stock, thus controlling effort on the herring resource provides additional yield for fishery and non-fishery activities	**Mixed** Future regulations will likely control effort and but as stocks improve, effort will likely increase for fishery and non-fishing activities	**Mixed** Continued fisheries management will likely control effort for a sustainable fishery and thus fishery and non-fishery related activities will continue

4.7.5 Baseline Conditions

For the purposes of a cumulative effects assessment, the baseline conditions for resources and human communities are considered the present condition of the VECs plus the combined effects of the past, present, and reasonably foreseeable future actions. Table 52 summarizes the added effects of the condition of the VECs (i.e., status/trends from Section 3.0) and the sum effect of the past, present and reasonably foreseeable future actions (from Section 4.7.4 above). The resulting CEA baseline for each VEC is exhibited in the last column (shaded). In general, straightforward quantitative metrics of the baseline conditions are only available for the managed resources, non-target species, and protected resources. The conditions of the habitat and human communities VECS are complex and varied. As such, the reader should refer to the characterizations provided in Section 3.0 of this document (Affected Environment).

Table 52 Cumulative Effects Assessment Baseline Conditions of the VECs

VEC	Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 51)	Combined CEA Baseline Conditions
Atlantic Herring Resource	Not overfished and overfishing is not occurring.	**Positive -** Stocks are being managed to meet sustainable fishing levels	**Positive -** Stocks are being managed to meet sustainable fishing levels
River Herring/Shad	Many stocks depleted in 2012 ASMFC assessment	**Positive –** Restoration efforts continue/increase; some stocks are seeing recovery	**Positive –** Restoration efforts continue, catch/bycatch addressed
Other Non-Target Species	*Mixed* Status of other non-target species varies	**Low Positive –** combined effect of reduced effort and measures to address bycatch	**Low Positive –** combined effects of FMP management reduced effort and reduced bycatch
Habitat and EFH	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.	**Mixed** - reduced habitat disturbance by fishing gear but impacts from non-fishing actions, such as global warming, could increase and have a negative impact.

Table 52 continued. **Cumulative Effects Assessment Baseline Conditions of the VECs**

Protected Resources	**Sea Turtles**	Leatherback, Kemp's ridley and green sea turtles are classified as endangered under the ESA and NWA DPS loggerhead sea turtles are classified as threatened.	**Positive** – reduced gear encounters through effort reductions and management actions taken under the ESA and MMPA have had a positive impact	**Positive** – reduced gear encounters through effort reductions and additional management actions taken under the ESA and MMPA.
	Large Cetaceans	Of the baleen whales (right, humpback, fin, blue, sei and minke whales) and sperm whales, all are protected under the MMPA and with the exception of minke whales, all are listed as endangered under the ESA.		
	Small Cetaceans	Pilot whales, dolphins and harbor porpoise are all protected under the MMPA. The most recent stock assessment for harbor porpoise shows that takes are increasing and nearing PBR.		
	Pinnipeds	Harbor, Grey, Harp and Hooded seals are all protected under the MMPA.		
Human Communities		Complex and variable. In general, herring catch for New England states since 1996 has declined, but catch year to year has been variable. Revenues have also generally been variable.	**Negative** – Although future sustainable resources should support viable communities and economies, continued effort reductions over the past few 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

4.7.6 Summary of Framework 3 Impacts

The impacts of the Framework 3 measures relative to the no action alternative are summarized below and in Table 53.

Impacts on Atlantic Herring Resource (Section 4.1, p. 124)

Relative to the no action alternative, the RH/S catch cap process and provisions established through this framework adjustment (Alternative 2, ***Preferred Alternative***) are not expected to substantially impact the Atlantic herring resource because they are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the fishery specifications process. In the future, the RH/S catch caps established through this action may result in the closure of one or more RH/S Catch Cap Areas, but the impacts of future RH/S catch caps will be analyzed when the catch caps are specified by the Council. Generally, if Atlantic herring catch is less than expected, there could be a positive impact on the Atlantic herring resource. However, the provisions proposed for specifying RH/S catch caps (by gear and area) under the ***Preferred Alternative*** are intended to provide opportunity for the directed herring fleet to utilize the total ACL for Atlantic herring (OY) if it can continue to avoid RH/S.

While there are no measurable impacts on the Atlantic herring resource expected from establishing the RH/S catch cap process and provisions in this framework adjustment, the potential to reduce total Atlantic herring catch in a fishing year could be *low positive*. There may be long-term benefits if the RH/S catch cap process and related provisions improve catch monitoring and promotes sustainable management of the Atlantic herring resource and herring fishery. Because the Atlantic herring resource is considered to be rebuilt and catch will remain within the bounds of the 2013-2015 Atlantic herring fishery specifications, the impacts of the *Preferred Options* for specifying 2014 and 2015 RH/S catch caps on the Atlantic herring resource are expected to be *neutral*.

Impacts on RH/S (Section 4.2, p. 127)

Relative to the no action alternative, the impacts of Alternative 2 (***Preferred Alternative***) are expected to be *likely positive* for the RH/S species. The measures proposed in this framework adjustment establish a mechanism to control/limit RH/S catch in the Atlantic herring fishery. They also provide incentives for the industry to continue to reduce bycatch and avoid RH/S interactions to the extent possible. Specific biological impacts will be influenced by changes in herring fleet behavior and shifts in the distribution/aggregation of stocks/sub-stocks from changes in fishing activity, environmental factors, climate change, restoration efforts, and other factors. Overall, though, the long-term impact on RH/S are likely to be positive. In contrast, selecting the no action alternative would likely be negative for the RH/S stocks because the expected benefits of catch limitations under Alternative 2 would not be realized. The no action alternative is also not consistent with the goals/objectives of Amendment 5 to the Herring FMP.

By encouraging the Atlantic herring fleet to avoid RH/S, the proposed catch caps should produce a positive impact to RH/S stocks in 2014 and 2015, but the extent is unknown because there are no absolute abundance estimates for RH/S stocks, and there is no way to link the catch cap amount (or catch under a cap) to RH/S fishing mortality. In general, the lower the catch cap is, the less RH/S will be caught by the herring fishery in 2014/2015, and presumably the higher the benefit, but the degree to which this may occur is unknown. Thus, all of the options considered by the Council for specifying catch caps would likely benefit RH/S more than taking no action or not setting a catch cap in these areas. The impacts of the proposed 2014-2015 RH/S catch caps on RH/S, therefore, are *unknown but likely positive.*

Impacts on Other Non-Target Species (Section 4.3, p. 133)

Relative to the no action alternative, the RH/S catch cap process proposed in Alternative 2 (***Preferred Alternative***) is not expected to impact other non-target species because it is administrative in nature and is not expected to directly affect the amount of Atlantic herring available for harvest, herring fishing effort, or herring fishing behavior. The resulting impacts on other non-target species, therefore, are *negligible.* The impacts of the proposed 2014/2015 RH/S catch caps on other non-target species will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the ABC specified for these fishing years. For these reasons, the impacts of these cap specifications on other non-target species are *unknown but likely neutral*.

Impacts on the Physical Environment and EFH (Section 4.4, p. 136)

Given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery (see Amendment 5), establishing a process for RH/S catch caps is not expected to have a measurable influence on the total magnitude of adverse effects across the fishery. Thus, as far as EFH impacts are concerned, there is no measureable difference between any of the alternatives/options considered by the Council in this framework adjustment. Thus, the proposed action would not have any adverse effects on EFH as compared to the no action alternative. Impacts on the Physical Environment and EFH are determined to be *negligible*.

Impacts on Protected Resources (Section 4.5, p. 139)

Relative to the no action alternative, the RH/S catch cap process proposed in Alternative 2 (***Preferred Alternative***) is not expected to impact protected resources because it is administrative in nature and is not expected to directly affect the amount of Atlantic herring available for harvest, herring fishing effort, or herring fishing behavior. The resulting impacts on protected resources, therefore, are *negligible.* The impacts of the proposed 2014/2015 RH/S catch caps on protected resources will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the ABC specified for these fishing years. For these reasons, the impacts of these cap specifications on protected resources are *unknown but likely neutral*.

Impacts on Fishery-Related Businesses and Communities (Section 4.6, p. 142)

Relative to the no action alternative, the long-term impact of the catch cap process/provisions established Alternative 2 (***Preferred Alternative***) on fishery-related businesses and communities is *low positive*. This alternative enhances industry-based bycatch reduction initiatives and builds on the approach adopted by the Council in Amendment 5 to the Herring FMP. It reduces the likelihood that more restrictive limits will be imposed in the future if the industry can continue to reduce and avoid RH/S interactions. The gear-specific and area-specific allocations of RH/S catch cap minimize negative impacts for those herring vessels with fewer observed encounters with RH/S. The RH/S catch caps proposed for the 2014 and 2015 fishing years are expected to have a *low negative* impact on fishery-related businesses and communities, but the catch caps are not likely to preclude directed Atlantic herring fishing in all areas and provide midwater trawl vessels an opportunity to fish in Area 3 (Georges Bank) without a RH/S catch cap, thereby potentially mitigating some of the negative impacts.

Table 53 Summary of Impacts of Framework 3 Alternatives on VECs

VEC →	Atlantic Herring Resource	River Herring/Shad	Other Non-Target Species	Physical Environment/EFH	Protected Resources	Fishery-Related Businesses and Communities
Alternative 1 (No Action)	*Negligible* Status quo fishing under 2013-2015 herring fishery specifications	*Unknown but Likely Negative* No limits on RH/S catch in herring fishery	*Negligible* Status quo fishing under 2013-2015 herring fishery specifications and provisions in other FMPs	*Negligible* Minimal/temporary nature of adverse effects on EFH in the herring fishery (see Am 5)	*Negligible* Status quo fishing under 2013-2015 herring fishery specifications and provisions in other FMPs	*Neutral* Status quo fishing under 2013-2015 herring fishery specifications; impacts may be positive and/or negative
Alternative 2 (*Preferred Alternative*)						
Alternative 2 Process/Provisions	*Low Positive* Long-term benefits from improved catch monitoring and promoting sustainable management	*Likely Positive* Implements mechanism to limit/manage catch in herring fishery and promotes bycatch avoidance/reduction	*Negligible* Provisions for RH/S catch management do not affect other non-target species	*Negligible* Provisions for RH/S catch management do not affect EFH	*Negligible* Provisions for RH/S catch management do not affect protected resources	*Low Positive* Promotes industry-based bycatch reduction and long-term sustainable management; supports Am 5 objectives; encourages coordination with MAFMC to address overlap with mackerel fishery
2014/2015 RH/S Catch Caps	*Neutral* Catch may be affected but will remain within bounds of 2013-2015 herring fishery specifications	*Unknown but Likely Positive* Cannot be quantified but limits RH/S catch and may reduce it from recent levels; provides incentive to reduce/avoid interactions with RH/S	*Unknown but Likely Neutral* Specific impacts will depend on changes in herring fishing effort; overall catch will remain within bounds of 2013-2015 herring specifications	*Negligible* Minimal/temporary nature of adverse effects on EFH in the herring fishery (see Am 5)	*Unknown but Likely Neutral* Specific impacts will depend on changes in herring fishing effort; overall catch will remain within bounds of 2013-2015 herring specifications	*Low Negative* May preclude fishing in some areas; no cap on GB and smaller closure area in SNE/MA may mitigate some negative impacts

4.7.7 Cumulative Effects Summary

The table above provides a summary of likely impacts found in the management alternatives contained in Framework Adjustment 3. Impacts are listed as no impact/neutral, positive, negative, or unknown. Impacts listed as no impact/neutral include those alternatives that have no impact or have a neutral impact (neither positive nor negative). Impacts listed as mixed contain both positive and negative impacts. The cumulative effect is the sum of: the CEA baseline, as described in Table 52, which represents the sum of the past, present, and reasonably foreseeable future (identified hereafter as "other") actions and present conditions of each VEC, plus the impacts from the Proposed Action. When an alternative has a positive effect on a 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 the "other" actions that were also designed to increase stock size. In contrast, when an alternative has a negative effect 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.

Atlantic Herring Resource

Section 4.1 of this document address the impacts of the measures proposed in Framework 3 on the Atlantic herring resource. Analysis of the measures proposed in Framework 3 considered the potential impacts of the proposed action and other alternatives on the Atlantic herring resource, in combination with relevant past, present, and reasonably foreseeable future actions as well as applicable non-fishing impacts. The incremental benefits from the proposed action are not likely to result in significant cumulative effects on the Atlantic herring resource. The significance criteria that applies to the herring resource requires the consideration of whether or not the proposed action is reasonably expected to jeopardize the sustainability of any target species (herring) and whether or not the proposed action is expected to result in cumulative adverse impacts with a substantial effect on Atlantic erring.

The biological analyses provided in this document suggest that the impacts of the proposed action on the Atlantic herring resource will be negligible. Overall, past and present impacts, combined with the impacts of the ***Preferred Alternative*** and future actions on the Atlantic herring resource should yield a positive impact.

River Herring/Shad

Section 4.2 of this document address the impacts of the measures proposed in Framework 3 on river herring and shad. Overall, past and present impacts, combined with the impacts of the ***Preferred Alternative*** and future actions on river herring and shad should yield a positive impact.

Other Non-Target Species

Section 4.3 of this document address the impacts of the measures proposed in Framework 3 on non-target species. The impacts on other non-target species are likely to be negligible. Overall, past and present impacts, combined with the ***Preferred Alternative*** and future actions, are expected to continue reducing bycatch and striving to maintain sustainable stocks, should yield positive impacts on other non-target species.

Physical Environment and EFH

Section 4.4 of this document address the impacts of the measures proposed in Framework 3 on habitat and EFH. Because fishing with midwater trawls and purse seines, the gears used in the directed herring fishery, does not impact EFH in a manner that is more than minimal or more than temporary in nature, the impacts to EFH of these alternatives are negligible, regardless of how much fishing takes place in any particular area. It is likely that fishing and non-fishing activities will continue to degrade habitat quality. Overall, the ***Preferred Alternative*** would not have any adverse effects on EFH as compared to the no action alternatives. The combination of past, present, and future actions is expected to reduce fishing effort and hence reduce damage to habitat and have a positive impact on habitat and EFH**.**

Protected Resources

Section 4.5 of this document address the impacts of the measures proposed in Framework 3 on protected species and supports the conclusion that the impacts on protected species are expected to be negligible. Overall, past and present impacts, combined with the impacts of the ***Preferred Alternative*** and future actions on protected resources should yield a positive impact.

Fishery-Related Businesses and Communities

Section 4.6 of this document address the impacts of the measures proposed in Framework 3 on fishery-related businesses and communities. Relative to the no action alternative, the long-term impact of the catch cap process/provisions established Alternative 2 (***Preferred Alternative***) on fishery-related businesses and communities is *low positive*. The RH/S catch caps proposed for the 2014 and 2015 fishing years are expected to have a *low negative* impact, but the catch caps are not likely to preclude herring fishing in all areas and provide midwater trawl vessels an opportunity to fish in Area 3 (Georges Bank) without a RH/S catch cap, thereby potentially mitigating some of the negative impacts. Overall, the combination of past, present, and future actions, including the proposed action, is expected to enable a sustainable harvest of herring, and should lead to positive impacts on fishery-related businesses and communities.

5.0 RELATIONSHIP TO APPLICABLE LAW

5.1 CONSISTENCY WITH THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (MSFCMA)

5.1.1 National Standards

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act requires that fishery management plans (FMPs) contain conservation and management measures that are consistent with ten National Standards:

In General. – Any fishery management plan prepared, and any regulation promulgated to implement any such plan, pursuant to this title shall be consistent with the…national standards for fishery conservation and management.

(1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The 2013-2015 Atlantic herring fishery specifications (see Table 26 on p. 84) established annual Atlantic herring harvest levels for each of four management areas (Figure 17, p. 83), established a 95% total herring ACL trigger, and modified the suite of existing AMs to reduce the sub-ACL trigger to 92%. Framework 2 to the Atlantic Herring FMP was implemented concurrently with the 2013-2015 fishery specifications and modifies the specifications process to allow for seasonal sub-ACL splitting (by month) and un-utilized sub-ACL carryovers (up to 10% per management area). The AMs were adopted by the Council to further prevent the stockwide Atlantic herring ACL and management area sub-ACLs from being exceeded during the fishing year, as well as improve the likelihood that the total ACL (OY) can be caught on a continuing basis while preventing overfishing.

Information about recent catch in the Atlantic herring fishery is provided in Section 3.6.1 of this document, and impacts on fishery-related businesses and communities are discussed in Section 4.6 and in Appendix III. The conservation and management measures proposed in Framework 3 are intended to allow the Atlantic herring fishery to continue to achieve OY on a continuing basis if it can continue to minimize its catch of RH/S to the extent practicable. The proposed action therefore reduces the likelihood that more restrictive limits will be imposed in the future if the industry can continue to reduce and avoid RH/S interactions. The provisions proposed for specifying RH/S catch caps (by gear and area) under the ***Preferred Alternative*** are intended to provide opportunity for the directed herring fleet to utilize the total annual ACL for Atlantic herring (OY) if it can avoid RH/S. The proposed RH/S Catch Cap Areas (Figure 1) and related closure areas (Figure 2) are different than the herring management areas (Figure 17); this area-based approach reduces the likelihood that reaching one or more RH/S catch caps in a fishing year would result in closure of the directed herring fishery in all management areas. Additionally, gear-specific allocations of RH/S catch caps minimize negative impacts for those herring vessels with fewer observed encounters with RH/S and ensure that the opportunities to catch herring remain available for gear sectors that effectively avoid encounters.

(2) Conservation and management measures shall be based upon the best scientific information available.

The analyses provided in this document are based primarily on landings, revenue, and effort information collected through the NMFS data collection systems used for the Atlantic herring fishery. Although there are some limitations to the data used in the analyses, these data have been thoroughly reviewed and are considered to be the best available. Information about catch/bycatch is based on reports collected by the NEFSC Sea Sampling (Observer) Branch and incorporated into the NOAA Fisheries observer database. The observer data are collected using an approved, scientifically-valid sampling process. To develop the 2014-2015 RH/S catch cap options, the Herring PDT created a master dataset that includes observed RH/S catch cap trips from 2008-2012 from the NEFOP, ME DMR, or MA DMF databases. The analyses that were prepared by and reviewed by the Council's Herring Plan Development Team comply with the Information Quality Act (IQA, see Section 5.6 for more information about the IQA).

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The Atlantic Herring FMP and all related management actions address the long-term management of the Atlantic herring fishery throughout the range of the Atlantic herring resource in U.S. waters, in accordance with the jurisdiction of U.S. law. While most Atlantic herring are landed in Maine, Massachusetts, and Rhode Island, herring landings have been reported in every state from Maine through Virginia. Most Atlantic herring are caught in the Exclusive Economic Zone (EEZ). In order to address the portion of the resource that is harvested in State waters, the FMP and other related actions were developed in close coordination with the Atlantic States Marine Fisheries Commission. The development of Framework 3 was closely coordinated with the Mid-Atlantic Fishery Management Council, due to the overlap and interaction between the herring and mackerel fisheries.

(4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

Fishery-related businesses and communities that participate in/depend on the Atlantic herring fishery are described in detail in Section 3.6 of this document. The management measures proposed in Framework Adjustment 3 do not discriminate between residents of different States. This action does not allocate or assign fishing privileges among various fishermen. While the measures do not discriminate between permit holders from different States, they may result in variable impacts across permit holders/fishery participants. The impacts of the proposed Framework 3 measures on fishing-related businesses and communities are discussed in various sections throughout Section 4.6 of this document; differential impacts are identified and evaluated to the extent possible in the analyses.

(5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

The management measures proposed in this document should promote efficiency in the utilization of fishery resources through appropriate conservation action intended to minimize non-targeted RH/S catch to the extent practicable. Economic allocation is not the purpose of Framework Adjustment 3. The goals and objectives of the conservation and management measures proposed in Framework 3 are identified in Section 1.2 of this document (p. 6). The ***Preferred Alternative*** is intended to allow the directed Atlantic herring fleet to fully utilize the yield available to the fishery if the fleet can continue to avoid RH/S.

(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Changes in fisheries occur continuously, both as the result of human activity (for example, new technologies or shifting market demand) and natural variation (for example, oceanographic perturbations). There are a number of factors which could introduce variations into the Atlantic herring fishery; these are discussed in the Herring FMP and recent amendments/framework adjustments.

The conservation and management measures proposed in Framework 3 account for variations among and contingencies in the Atlantic herring fishery, the Atlantic herring resource, RH/S resources, and related catches by establishing a process that allows for the specification of RH/S catch caps by gear type and area and builds flexibility into the Atlantic herring fishery specifications process. The proposed RH/S catch caps are intended to provide opportunity for the directed herring fleet to utilize the total ACL for Atlantic herring (OY) if it can continue to avoid RH/S to the extent practicable. The RH/S Catch Cap Areas (Figure 1) and related closure areas (Figure 2) are different than the herring management areas (Figure 17); this area-based approach reduces the likelihood that reaching one or more RH/S catch caps in a fishing year would result in closure of the directed herring fishery in all management areas. In the future, the Council can modify the RH/S catch caps and related provisions through the Atlantic herring fishery specifications process (every three years) based on the best available information. The proposed action also provides flexibility for the Council to work cooperatively with the Mid-Atlantic Council in the future so that RH/S catch caps in the overlapping area(s) can be developed jointly between the two Councils, or at least with enhanced coordination.

When selecting the final measures for Framework 3 at its September 2013 meeting, the Council passed a motion to request NMFS recognize the high variability of river herring/shad catch rates, particularly in the Cape Cod and southern New England areas, by carefully extrapolating and expanding RH/S catch from individual vessels to all vessels' catches in those areas when monitoring the RH/S catch caps. The approach applied by NMFS to estimate RH/S catch across the fishery will play a critical role in both ensuring the effectiveness of the catch caps and minimizing negative impacts on the Atlantic herring fleet. The Council has highlighted this as an important variation/contingency to consider during the implementation of Framework 3.

NMFS should review and evaluate the methodology will be utilized to estimate RH/S catch and monitor the catch caps, with particular attention to the concerns identified by the Council.

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The measures proposed in Framework Adjustment 3 are intended to minimize costs and avoid unnecessary duplication, to the extent possible. As always, the Council considered the costs and benefits when developing the proposed action. Any costs incurred as a result of the measures proposed in this action are deemed to be necessary in order to achieve the goals and objectives of the herring management program and are viewed to be outweighed by the benefits of taking the management action.

The management measures proposed in this document are not duplicative and were developed in close coordination with NMFS, the MAFMC, and other interested entities and agencies to minimize duplicity. The reporting provisions proposed in this action should streamline the administrative burden of reporting (a transactions cost) for fishermen under multiple catch caps. The proposed action also provides flexibility for the Council to work cooperatively with the MAFMC in the future so that RH/S catch caps in the overlapping area(s) can be developed jointly between the two Councils. This should help to minimize costs and avoid unnecessary duplication.

(8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Summary information about fishery-related businesses and communities is provided in Section 3.6 of this document, detailed information can be found in the FEIS for Amendment 5 to the Atlantic Herring FMP. Impacts of the management measures proposed in Framework 3 on fishery-related businesses and communities are thoroughly considered in Section 4.6 of this document, as well as in Appendix III.

The conservation and management measures proposed in Framework Adjustment 3 enhance industry-based bycatch reduction initiatives and build on the approach adopted by the Council in Amendment 5 to the Atlantic Herring FMP. The proposed action reduces the likelihood that more restrictive limits will be imposed in the future if the industry can continue to reduce and avoid RH/S interactions. The gear-specific and area-specific allocations of RH/S catch cap minimize negative impacts for those herring vessels with fewer observed encounters with RH/S. The RH/S catch caps proposed for the 2014 and 2015 fishing years are expected to have a *low negative* impact on fishery-related businesses and communities, but the catch caps are not likely to preclude directed Atlantic herring fishing in all areas and provide midwater trawl vessels an opportunity to fish in Area 3 (Georges Bank) without a RH/S catch cap, thereby potentially mitigating some of the negative impacts.

(9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

The MSA defines "bycatch" as fish that are harvested in a fishery, but are not retained (sold, transferred, or kept for personal use), including economic discards and regulatory discards. The MSA mandates the reduction of "bycatch," as defined, to the extent practicable. Incidental catch, on the other hand, is typically considered to be non-targeted species that are harvested while fishing for a target species and is retained and/or sold. In contrast to bycatch, there is no statutory mandate to reduce incidental catch. When non-target species are encountered in the Atlantic herring fishery, they are either discarded (bycatch) or they are retained and sold as part of the catch (incidental catch). The majority of catch by herring vessels on directed trips is Atlantic herring, with extremely low percentages of bycatch (discards).

The National Standard Guidelines for National Standard 9 (NS9) state that, to the extent practicable, the priority under National Standard 9 is to avoid catching bycatch species or to return unavoidable bycatch to the sea alive. The NS9 Guidelines advise taking into account the net benefits to the nation of any proposed conservation and management measure, including negative impacts on affected stocks; incomes to fishery participants in directed fisheries; incomes accruing to those targeting the bycatch species; environmental consequences; non-market values of bycatch species (e.g., recreational values); and impacts on other marine organisms. The Guidelines recognize the need for improvement of data collection methods for each fishery to allow the Councils and NMFS to determine the amount, type, disposition, and characteristics of bycatch and bycatch mortality in order to weigh the benefits of bycatch minimizing measures against the costs. In selecting conservation and management measures, the Councils and NMFS are guided to consider biological, protected species, social, and economic impacts. The Council may propose conservation and management measures that do not give priority to avoiding bycatch, but any such measures must be supported by appropriate analyses.

River herring and shad are caught incidentally in the Atlantic herring fishery. Due to the high-volume nature of the Atlantic herring fishery, non-target species, including river herring (blueback herring and alewives), shad (hickory and American), and some groundfish, are generally retained once the fish are brought on board. This is particularly true with species like river herring and shad, which are other pelagic fish that look very similar to Atlantic herring and can be sold along with herring. Even the rate of incidental catch of river herring and shad is relatively low. Available information and analysis have not shown a strong connection between the effects of bycatch – either in the Atlantic herring fishery or in other fisheries subject to federal management – and the stocks of these species.

River herring and shad are forage species that play an important role in the ecosystem, providing a benefit to recreational fishermen, and are of great interest to numerous stakeholders. They are anadromous species that spawn and grow in state waters, including inland waterways connected to the ocean by rivers and streams and in ocean waters inshore of Federal waters, where they are subject to fishing. Consequently, they have been managed primarily by states. While they do occur in Federal waters and are encountered in the Atlantic herring fishery, river herring and shad are not target species in the fishery, and their rate of bycatch is very low overall.

Most conservation and management measures can affect bycatch and bycatch mortality and whether further reductions in bycatch are practicable. Because discarding of river herring, shad, and other species does not generally occur after the fish is brought on board a vessel, the Atlantic Herring FMP and related measures in the Northeast Multispecies FMP use measures aimed at directly avoiding incidental catch of these species, thereby avoiding any possibility of bycatch or bycatch mortality. The Atlantic Herring FMP also seeks to gather further information that may help design future avoidance measures while taking into account the net benefits to the nation of the Atlantic herring fishery and its effect on other species, as instructed in the National Standard Guidelines.

A catch cap falls under the concept of reducing bycatch to the extent practicable by providing an incentive to avoid the incidental catch of river herring and shad by allowing an opportunity to achieve Optimum Yield while maintaining a trigger that implements a low Atlantic herring possession limit (area closure) that is expected to further limit bycatch once the cap is reached. Amendment 1 to the Atlantic Herring FMP identified bycatch measures as management measures that could be implemented via a framework or the specifications process, with a focus on a haddock catch cap for the Atlantic herring fishery. Amendment 5 contains a specific alternative that considers implementing a river herring catch cap through a framework or the specifications process. Based on the Atlantic States Marine Fisheries Commission's recent river herring and shad assessments, data are not robust enough to determine a biologically-based river herring/shad catch cap and/or the potential effects of such a catch cap on river herring/shad populations on a coast-wide scale. However, catch caps will provide a strong incentive for the Atlantic herring industry to continue avoiding river herring and shad catch and bycatch while still allowing an opportunity to utilize their full ACL.

The catch cap measures in Framework 3 use a catch threshold based on the median catch and differentiate by gear type and area. The threshold is designed to provide an incentive to the industry to continue avoiding river herring and shad catch. It represents the median levels of river herring catch in a period during which the industry's avoidance efforts resulted in a reduction of observed river herring and shad catch. The catch cap is further refined by gear and area, which provides a further balancing of opportunities to fish against measures that curtail specific gears in areas with higher incidence of bycatch. Instead of one catch cap for the entire fishery, or shutting down the entire fishery once that cap is reached, applying the caps to gears and areas allow portions of the fishery that do not encounter river herring and shad to continue harvesting herring. Once caps are reached in certain areas by gear types, those vessels may fish in other areas where the incidence of bycatch is under the caps or expected to be substantially lower. Therefore, by taking into account the impacts of these catch caps on the target and non-target fishery resource as well as the fishing industry, these measures minimize bycatch and bycatch mortality to the extent practicable.

(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Fishing is a dangerous occupation; participants must constantly balance the risks imposed by weather against the economic benefits. A management plan should be designed so that it does not encourage dangerous behavior by the participants. According to the National Standard guidelines, the safety of the fishing vessel and the protection from injury of persons aboard the vessel are considered the same as *safety of human life at sea*. This National Standard does not replace the judgment or relieve the responsibility of the vessel master related to vessel safety. None of the management measures proposed in this framework adjustment are expected to negatively affect the safety of human life at sea.

5.1.2 Other Required Provisions of MSFCMA

Section 303(a) of the Magnuson-Stevens Fishery Conservation and Management Act contains 15 additional required provisions for Fishery Management Plans. Such provisions are detailed in the Environmental Impact Statement for Amendment 5 to the Atlantic Herring FMP, which is available at: http://www.nero.noaa.gov/regs/. In general, these provisions detail the measures and monitoring required for federally-managed species in order to ensure successful conservation. Given the scope of the action proposed in this framework adjustment, impacts related to such requirements are not expected.

5.1.3 Discretionary Provisions of MSFCMA

Section 303b of the Magnuson-Stevens Act contains 14 additional discretionary provisions for FMPs. They are found on pp. 59-60 of NMFS' redline version of the Magnuson-Stevens Fishery Conservation and Management Act at:
http://www.nmfs.noaa.gov/msa2007/MSA_Amended%20by%20Magnuson-Stevens%20Reauthorization%20Act%20%281-31-07%20draft%29.pdf.
Given the limited scope of this action, there are no significant impacts related to the discretionary provisions except provision 12: "*include management measures in the plan to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations*." The action proposed in this framework adjustment to establish RH/S catch caps is rooted in the mandate to reduce bycatch (National Standard 9) as well as this discretionary provision since river herring and shad are not targeted species in the Atlantic herring fishery.

5.2 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

NEPA provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document is designed to meet the requirements of both the MSA and NEPA. The Council on Environmental Quality (CEQ) has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508). All of those requirements are addressed in this document, as referenced below. This integrated document also contains the elements required under NEPA for Framework Adjustment 3 to the Herring FMP.

To prepare the Draft Framework Adjustment 3, the Council held meetings of its Herring Plan Development Team, Herring Oversight Committee, and Herring Advisory Panel, in addition to Council meetings. All of these meetings were open to the public. Final selection of management alternatives for inclusion in this document occurred at the September 2013 New England Fishery Management Council meeting.

5.2.1 Environmental Assessment

The required elements of an Environmental Assessment (EA) are specified in 40 CFR 1508.9(b). They are included in this document, in addition to other relevant sections, as follows:

- An Executive Summary (beginning of the document);
- A Table of Contents (beginning of the document);
- The need for this action is described in Section 1.1;
- The alternatives that were considered are described in Section 2.0;
- A description of the Affected Environment is found in Section 3.0;
- The environmental impacts of the Proposed Action are described in Section 4.0;
- Cumulative impacts of the Proposed Action are discussed in Section 4.7;
- A finding of no significant impact is provided in Section 5.2.2 (below);
- The list of preparers and agencies consulted on this action is provided in Section 7.0.

5.2.2 Finding of No Significant Impact (FONSI)

National Oceanic and Atmospheric Administration Order (NAO) 216-6 (revised May 20, 1999) provides sixteen criteria for determining the significance of the impacts of a final fishery management action. These criteria are discussed below:

1. Can the Proposed Action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?

Response: The proposed action is not expected to jeopardize the sustainability of the target species affected by this action – Atlantic herring (see Section 3.1 of this document for a description of the Atlantic herring resource). The impacts of the proposed action on the Atlantic herring resource are discussed in detail in Section 4.1 of this document (p. 124). Relative to the no action alternative, the RH/S catch cap process and provisions established through this framework adjustment (Alternative 2, ***Preferred Alternative***) are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified based on Atlantic herring stock status and analyzed through the fishery specifications process. The spatial distribution of (1) the proposed RH/S catch caps, (2) the Atlantic herring ACL, and (3) fishing effort in the direct herring fishery suggests that there may be potential to reduce Atlantic herring catch during the fishing year under this alternative. In the future, the RH/S catch caps established through this action may result in the closure of one or more RH/S Catch Cap Areas, but the impacts of future RH/S catch caps will be analyzed when the catch caps are specified by the Council. While there are no measurable impacts on the Atlantic herring resource expected from establishing the RH/S catch cap process and provisions under the ***Preferred Alternative***, the potential to reduce total Atlantic herring catch in a fishing year could be positive. Moreover, there may be long-term benefits if the RH/S catch cap process improves catch monitoring and promotes sustainable management of the Atlantic herring resource and herring fishery. The impacts of the process are therefore expected to be *low positive*.

In general, the *Preferred Options* for specifying RH/S catch caps in 2014 and 2015 will likely result in aggregate catch that is less than (or equal to) the status quo. According to the analysis, Atlantic herring catch could decline by 9% in 2014 and 2015 under the *Preferred Options* for specifying RH/S catch caps if the fleet does not avoid catching RH/S. A specific change in Atlantic herring catch resulting from the 2014-2015 RH/S catch caps is difficult to predict, however. Changes in herring catch, and therefore impacts, will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the herring fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the herring ABC specified for these fishing years and evaluated in the 2013-2015 specifications package. Because the Atlantic herring resource is considered to be rebuilt and catch will remain within the bounds of the 2013-2015 Atlantic herring fishery specifications, the impacts of the *Preferred Options* for specifying 2014 and 2015 RH/S catch caps on the Atlantic herring resource are expected to be *neutral*. Any resulting impacts under any of the options considered

by the Council are not expected to change or jeopardize the status of the Atlantic herring resource.

2. Can the Proposed Action reasonably be expected to jeopardize the sustainability of any non-target species?

Response: The action proposed in Framework Adjustment 3 is not expected to jeopardize the sustainability of any non- target species affected by this action. In contrast, it is intended to promote conservation and enhance rebuilding efforts for river herring and shad, two non-target species of particular concern (see Section 3.2 of this document for a description of RH/S). Reducing non-targeted catch of RH/S in the directed Atlantic herring fishery is the primary focus of the action proposed in this framework adjustment. Impacts of the proposed action on the RH/S stocks are discussed in Section 4.2 of this document (p. 127).

As discussed in the impact analysis, the impacts of Alternative 2 (***Preferred Alternative***) are *likely positive* for the RH/S species. However, specific biological impacts on RH/S stocks cannot be quantified at this time due to a lack of information; the biological impacts will be influenced by changes in directed Atlantic herring fleet behavior and shifts in the distribution/aggregation of stocks/sub-stocks from changes in fishing activity, environmental factors, climate change, restoration efforts, and other factors. Setting a cap on the catch of these species in the Atlantic herring fishery is a proactive action intended to manage and minimize catch to the extent practicable while allowing the Atlantic herring fishery to continue to operate and fully utilize OY in the upcoming fishing years if RH/S can be avoided. The catch of RH/S in the directed Atlantic herring fishery would likely be less under the proposed action when compared to the no action alternative because it would be capped, and there would be a regulatory incentive for the fleet to continue to avoid RH/S. Generally, lower catches should result in positive impacts on the stock(s). Moreover, taking action under this alternative will provide the Council with the ability to link RH/S catch in the Atlantic herring fishery to RH/S stock status and fishing mortality as better scientific information becomes available in the future.

The *Preferred Options* for setting catch caps in 2014 and 2015 limit RH/S catch in 2014/2015 in all sectors of the directed herring fishery (gears/areas) that have the most significant interaction with RH/S; these options therefore have the greatest potential to benefit the RH/S stocks. Comparatively, the lower the RH/S catch cap is, the less RH/S will be caught by the Atlantic herring fishery in 2014/2015, and presumably the higher the benefit to RH/S stocks, but the degree to which this may occur is unknown. All of the options considered by the Council for specifying RH/S catch caps in 2014 and 2015 would likely benefit RH/S more than taking no action or not setting a catch cap in these areas. The impacts of the proposed 2014-2015 RH/S catch caps on RH/S, therefore, are *unknown but likely positive.*

Other non-target species are described in Section 3.3 of this document (p. 57), and impacts on other non-target species are addressed in Section 4.3 (p. 133). Overall, the RH/S catch cap process and provisions established under the ***Preferred Alternative*** are not likely to cause substantial changes in the catch of other non-target species in the directed herring fishery and therefore would not influence the biological status of other non-target species. If fishing patterns change substantially as a result of the proposed action, there may be some change to the catch of

other non-target species by the Atlantic herring fleet, but this cannot be predicted. Other non-target species catch may increase or decrease depending on when and how directed herring fishing effort changes as a result of the proposed action. In the future, the impacts of specific RH/S catch caps on other non-target species will be evaluated in the action that specifies the caps (this action specifies RH/S catch caps for 2014/2015). The ongoing management of other non-target species catch in the Atlantic herring fishery (for example, the haddock catch cap and groundfish possession restrictions), as well as the management of other non-target species through Federal and Interstate FMPs (Multispecies FMP, MSB FMP, etc.), will continue to address fishing mortality and the biological status of other non-target species. The resulting impacts of the proposed action on other non-target species, therefore, are likely *negligible*.

According to the analysis presented in Section 4.1, the proposed RH/S catch caps in 2014 and 2015 will likely result in aggregate Atlantic herring catch that is less than (or equal to) the status quo. A specific decline in catch is difficult to predict, and any resulting impact on other non-target species is even more difficult to predict and cannot be quantified. Impacts on other non-target species, will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the ABC specified for these fishing years. For this reason, the expected impacts of the proposed 2014-2015 RH/S catch caps on other non-target species are *unknown but likely neutral*. Because Atlantic herring catch will remain within the bounds of the 2013-2015 Atlantic herring fishery specifications, impacts from the proposed RH/S catch caps for 2014-2015 are not expected to change or jeopardize the status of other non-target species.

3. Can the Proposed Action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

Response: The physical environment and EFH are described in Section 3.4 of this document (p. 60). The action proposed in Framework Adjustment 3 is not expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs. Given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery (see Amendment 5), establishing a process for RH/S catch caps is not expected to have a measurable influence on the total magnitude of adverse effects across the fishery. Thus, the proposed action would not have any adverse effects on EFH as compared to the no action alternative. Impacts of the proposed action on the Physical Environment and EFH are determined to be *negligible*.

4. Can the Proposed Action be reasonably expected to have a substantial adverse impact on public health or safety?

Response: The action proposed in Framework Adjustment 3 is not expected to cause substantial adverse impact on public health or safety. When developing management measures, the Council usually receives extensive comments from affected members of the public regarding the safety implications of measures under consideration. No such comments were received regarding the measures proposed in this framework adjustment. The safety of human life at sea is discussed further in Section 5.1.1 of this document (National Standard 10).

5. Can the Proposed Action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Response: Protected resources affected by the proposed action are described in Section 3.5 of this document. The action proposed in Framework Adjustment 3 is not expected to cause substantial adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species. Relative to the no action alternative, the RH/S catch cap process proposed in Alternative 2 (***Preferred Alternative***) is not expected to impact protected resources because it is administrative in nature and is not expected to directly affect the amount of Atlantic herring available for harvest, herring fishing effort, or herring fishing behavior. The resulting impacts on protected resources, therefore, are *negligible.* The impacts of the proposed 2014/2015 RH/S catch caps on protected resources will depend, in part, on if/when/where fishing effort is redirected due to closure of a RH/S Catch Cap Area and whether or not the total herring ACL available to the fishery in 2014 and 2015 is fully utilized. Regardless of any changes in catch resulting from the action proposed in this framework adjustment, however, Atlantic herring catch during 2014 and 2015 will remain at or less than the ABC specified for these fishing years.

6. Can the Proposed Action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: The action proposed in Framework Adjustment 3 is not expected to cause substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.). While Atlantic herring is recognized as one of many important forage fish for marine mammals, other fish, and birds throughout the region, the resource appears to be large enough at this time to accommodate all predators including Atlantic bluefish, Atlantic striped bass, and several other pelagic species such as shark and tuna. The Atlantic herring itself is not known to prey on other species of fish but prefers chaetognaths and euphausiids. Consumption of Atlantic herring by predator species was factored into the most recent benchmark stock assessment (SAW 54, July 2012) and affects current biological reference points including MSY, as well as yield that may be available to the fishery. The management program adopted in Amendment 5 and the 2013-2015 Atlantic herring fishery specifications account for these important issues. The proposed action is intended to continue to ensure biodiversity and ecosystem stability over the upcoming fishing years and should produce long-term positive impacts for some stocks that are not targeted in the Atlantic herring fishery (RH/S).

7. Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: The action proposed in Framework Adjustment 3 is not expected to result in significant social or economic impacts that are interrelated with natural or physical environmental effects. A complete discussion of the potential impacts of the proposed action is provided in Section 4.0 of this document. The environmental assessment concludes that no significant natural or physical effects will result from the implementation of the management measures proposed in Framework 3. The proposed action is designed to reduce bycatch to the extent practicable and promote long-term sustainable management of the Atlantic herring resource and fishery. Moreover, the proposed action cannot be reasonably expected to have a substantial impact on habitat or protected species, as the impacts are expected to fall within the range of those resulting from previous actions addressing the management of this fishery.

NMFS has determined that despite the potential socio-economic impacts resulting from this action, there is no need to prepare an EIS. The purpose of NEPA is to protect the environment by requiring Federal agencies to consider the impacts of their proposed actions on the human environment, defined as "the natural and physical environment and the relationship of the people with that environment." The EA for Framework Adjustment 3 describes and analyzes the proposed measures and alternatives and concludes there will be no significant impacts to the natural and physical environment. While some fishermen, shore-side businesses and others may experience impacts to their livelihood, these impacts in and of themselves do not require the preparation of an EIS, as supported by NEPA's implementing regulations at 40 C.F.R. 1508.14. Most of the impacts are expected to be positive over the long-term, and they are not anticipated to be significant. Consequently, because the EA demonstrates that the action's potential natural and physical impacts are not significant, the execution of a FONSI remains appropriate under criteria 7.

8. Are the effects on the quality of the human environment likely to be highly controversial?

Response: The action proposed in Framework Adjustment 3 is not expected to result in significant effects on the quality of the human environment that are likely to be highly controversial. The need to maintain a sustainable Atlantic herring resource is grounded in Federal fisheries law and forms the basis of the goals and objectives of the herring management program, as described in the Herring FMP. The RH/S catch caps proposed in this framework adjustment were considered by the Council during the development of Amendment 5 to the Herring FMP (2008-2012). Extensive comment was received regarding concerns about the status of river herring and shad stocks and the need to address non-targeted catch of these species in Federal fisheries, particularly the Atlantic herring fishery. The Council expressed intent to develop the action proposed in this framework adjustment when it selected the final management measures for Amendment 5 in June 2012 and voted to initiate this framework adjustment in January 2013.

Impacts of the proposed action on fishery-related businesses and communities are discussed in Section 4.6 of this document. The proposed action enhances industry-based bycatch reduction initiatives and builds on the approach adopted by the Council in Amendment 5 to the Herring FMP. The gear-specific and area-specific allocations of RH/S catch cap minimize negative impacts for those herring vessels with fewer observed encounters with RH/S. Establishing a process for setting RH/S catch caps provides an incentive for participants in the directed herring fishery to find innovative, low-cost solutions to avoid river herring and shad, such as the SMAST/SFC/MA DMF River Herring Bycatch Avoidance Project (Section 3.6.4). This collaboration allows herring fishery participants to collaborate in observations and facilitate monitoring/sampling that will lead to the development of avoidance strategies. Social science research has documented improved effectiveness of regulations developed with a participatory and/or collaborative approach (Johnson & van Denson 2007). Providing the industry with an opportunity to develop a communication network and bycatch avoidance strategy could ultimately reduce costs associated with bycatch avoidance, because the industry would likely prioritize cost-effectiveness when developing strategies. Moreover, communication networks developed for river herring avoidance might be used for other reasons, for example, safety-related circumstances that arise suddenly or other fisheries or fishing-related problems.

The RH/S catch caps proposed for the 2014 and 2015 fishing years are expected to have a *low negative* impact, but the catch caps are not likely to preclude herring fishing in all areas and provide midwater trawl vessels an opportunity to fish in Area 3 (Georges Bank) without a RH/S catch cap, thereby potentially mitigating some of the negative impacts. While there remains some differing perspectives regarding approaches for managing the fishery, the Council developed the proposed action while considering the needs of herring fishery participants, other fishery-related interests, the long-term health of the Atlantic herring resource, and the health of non-target species affected by the fishery.

9. Can the Proposed Action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

Response: The action proposed in Framework Adjustment 3 is not expected to have substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas. The proposed action affects fishing for Atlantic herring in the U.S. Exclusive Economic Zone and is not expected to have any impacts on shoreside historical and/or cultural resources. In addition, the proposed action is not expected to substantially affect fishing and other vessel operations around the unique historical and cultural resources encompassed by the Stellwagen Bank National Marine Sanctuary. Other types of commercial fishing already occur in the area affected by the proposed action, and although it is possible that historic or cultural resources such as shipwrecks could be present, vessels try to avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear.

10. Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: The action proposed in Framework Adjustment 3 is not expected to have substantial impacts on the human environment that are highly uncertain or involve unique or unknown risks. Impacts of the proposed action on the human environment (fishery-related businesses and communities) are discussed in Section 4.6 of this document. While it is difficult to specifically quantify impacts on the human environment, the impacts are not largely unique or unknown; the Council has determined that the long-term positive impacts of the proposed action on fishery-related businesses and communities will outweigh any short-term negative impacts. The proposed action enhances industry-based bycatch reduction initiatives and builds on the approach adopted by the Council in Amendment 5 to the Herring FMP. The gear-specific and area-specific allocations of RH/S catch cap minimize negative impacts for those herring vessels with fewer observed encounters with RH/S.

While there is always a degree of uncertainty in the year to year performance of the relevant fisheries, the proposed actions are not expected to substantially increase effort or to substantially alter fishing methods and activities. The overall impacts of the proposed action are expected to fall within the range of impacts expected under the 2013-2015 Atlantic herring fishery specifications.

11. Is the Proposed Action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: The action proposed in Framework Adjustment 3 is not related to other actions with individually insignificant, but cumulatively significant impacts. The cumulative effects assessment for the proposed action can be found in Section 4.7 of this document (p. 160). This assessment considers the impacts of the proposed action in combination with relevant past, present, and reasonably foreseeable future actions and concludes that no significant cumulative impacts are expected from the measures proposed in Framework 3.

12. Is the Proposed Action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: The action proposed in Framework Adjustment 3 will not likely adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources. The proposed action is specific to activities in the directed Atlantic herring fishery, which occurs almost exclusively in the U.S. EEZ.

13. Can the Proposed Action reasonably be expected to result in the introduction or spread of a non-indigenous species?

Response: The action proposed in Framework Adjustment 3 will not likely be expected to result in the introduction or spread of a non-indigenous species because it is a resource that is removed and likely utilized as bait thus limiting the spread of possible non-indigenous species. The proposed action relates specifically to fishing for Atlantic herring in the Northeast Region using traditional fishing practices. Vessels affected by the proposed action are those currently engaged in the Atlantic herring fishery. The fishing-related activity of these vessels is anticipated to occur solely within the Northeast Region and should not result in the introduction or spread of non-indigenous species.

14. Is the Proposed Action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: The action proposed in Framework Adjustment 3 will not likely establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration. This action is consistent with the management program for the Atlantic herring fishery, and the measures were developed and adopted by the Council through a standard public process for framework adjustments. Future actions and decisions for modifying the Atlantic herring management program in the future are expected to occur through a similar process. The intent of the RH/S catch cap process is to allow for future RH/S catch caps to be established through the herring fishery specifications process every three years, as new information becomes available. The impacts of future catch caps and any adjustments to the catch cap provisions will be evaluated by the Council through an informed, public decision-making process. The proposed management measures are designed to specifically address current stock and fishery conditions and are not intended to represent a decision about future management actions that may include other measures.

15. Can the Proposed Action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: The action proposed in Framework Adjustment 3 will not be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment. The relationship of the proposed action to other applicable law is discussed in Section 5.0 of this document (starting on p. 187). NMFS will determine whether this action is consistent with the Coastal Zone Management Act (CZMA) requirements of the affected States.

16. Can the Proposed Action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: The action proposed in Framework Adjustment 3 is not be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species. In fact, the proposed action is intended to promote conservation and enhance rebuilding efforts specifically for river herring and shad species (see Section 3.2 of this document for a description of RH/S). The cumulative effects assessment for the proposed action can be found in Section 4.7 of this document (p. 160). This assessment considers the impacts of the proposed action in combination with relevant past, present, and reasonably foreseeable future actions and concludes that no significant cumulative impacts are expected from the measures proposed in Framework 3.

In view of the analysis presented in this document, the establishment of the measures proposed in Framework Adjustment 3 to the Atlantic Herring FMP will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the Proposed Action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not required.

for JOHN BOLLARD — 11/6/2014

Regional Administrator, NOAA *Date*

5.3 MARINE MAMMAL PROTECTION ACT (MMPA)

The New England Fishery Management Council has reviewed the impacts of the measures proposed in Framework 3 on marine mammals and has concluded that the management actions proposed are consistent with the provisions of the MMPA. Although they are likely to affect species inhabiting the management unit, the measures will not alter the effectiveness of existing MMPA measures, such as take reduction plans, to protect those species based on overall reductions in fishing effort that have been implemented through the FMP.

5.4 ENDANGERED SPECIES ACT (ESA)

Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. A description of the protected resources potentially affected by the action proposed in this framework adjustment is provided in Section 3.5of this document. For further information on the potential impacts of the fishery as well as the ***Preferred Alternative*** and other alternatives considered by the Council on listed species, see Section 4.5 of this document.

5.5 PAPERWORK REDUCTION ACT (PRA)

The purpose of the PRA is to control and, to the extent possible, minimize the paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by or for the Federal Government. The authority to manage information and recordkeeping requirements is vested with the Director of the Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

The measures proposed in Framework Adjustment 3 to the Herring FMP may contain new or additional collection-of-information requirements, which will be evaluated through a PRA analysis by NMFS as part of the review and implementation of this action.

5.6 INFORMATION QUALITY ACT (IQA)

Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554, also known as the Data Quality Act or Information Quality Act) directed the Office of Management and Budget (OMB) to issue government-wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by federal agencies." OMB directed each federal agency to issue its own guidelines, establish administrative mechanisms allowing affected persons to seek and obtain correction of information that does not comply with the OMB guidelines, and report periodically to OMB on the number and nature of complaints. The NOAA Section 515 Information Quality Guidelines require a series of actions for each new information product subject to the Data Quality Act. Information must meet standards of utility, integrity and objectivity. This section provides information required to address these requirements.

Utility of Information Product

Framework Adjustment 3 includes: a description of the management issues to be addressed, statement of goals and objectives, a description of the proposed action and other alternatives considered, analyses of the impacts of the proposed measures and other alternatives on the affected environment, and the reasons for selecting the preferred management measures. These proposed modifications implement the FMP's conservation and management goals consistent with the Magnuson-Stevens Fishery Conservation and Management Act as well as all other existing applicable laws.

Utility means that disseminated information is useful to its intended users. "Useful" means that the content of the information is helpful, beneficial, or serviceable to its intended users, or that the information supports the usefulness of other disseminated information by making it more accessible or easier to read, see, understand, obtain or use. The information presented in this document is helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the proposed action, the measures proposed, and the impacts of those measures. A discussion of the reasons for selecting the proposed action is included so that intended users may have a full understanding of the proposed action and its implications. The intended users of the information contained in this document are participants in the Atlantic herring fishery and other interested parties and members of the general public. The information contained in this document may be useful to owners of vessels holding an Atlantic herring permit as well as Atlantic herring dealers and processors since it serves to notify these individuals of any potential changes to management measures for the fishery. This information will enable these individuals to adjust their fishing practices and make appropriate business decisions based on the new management measures and corresponding regulations.

The information being provided in the Framework Adjustment 3 concerning the status of the Atlantic herring fishery is updated based on landings and effort information through the 2012 fishing year, and 2013 if possible. Information presented in this document is intended to support the proposed process for setting/modifying RH/S catch caps in the Atlantic herring fishery, the provisions for which have been developed through a multi-stage process involving all interested members of the public. Consequently, the information pertaining to management measures contained in this document has been improved based on comments from the public, fishing industry, members of the Council, and NOAA Fisheries.

The media being used in the dissemination of the information contained in this document will be contained in a *Federal Register* notice announcing the Proposed and Final Rules for this action. This information will be made available through printed publication and on the Internet website for the Northeast Regional Office (NERO) of NOAA Fisheries. In addition, the final Framework Adjustment 3 document will be available on the Council's website (www.nefmc.org) in standard PDF format. Copies will be available for anyone in the public on CD ROM and paper from the Council's office.

Integrity of Information Product

Integrity refers to security – the protection of information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification. Prior to dissemination, NOAA information, independent of the intended mechanism for distribution, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information. All electronic information disseminated by NOAA adheres to the standards set out in Appendix III, "Security of Automated Information Resources," OMB Circular A-130; the Computer Security Act; and the Government Information Security Reform Act. If information is confidential, it is safeguarded pursuant to the Privacy Act and Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business and financial information).

Objectivity of Information Product

Objective information is presented in an accurate, clear, complete, and unbiased manner, and in proper context. The substance of the information is accurate, reliable, and unbiased; in the scientific, financial, or statistical context, original and supporting data are generated and the analytical results are developed using sound, commonly-accepted scientific and research methods. "Accurate" means that information is within an acceptable degree of imprecision or error appropriate to the particular kind of information at issue and otherwise meets commonly accepted scientific, financial, and statistical standards.

For purposes of the Pre-Dissemination Review, this document is considered to be a "Natural Resource Plan." Accordingly, the document adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, Fishery Management Plan Process; the Essential Fish Habitat Guidelines; the National Standard Guidelines; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act. Several sources of data were used in the development of this document, including the analysis of potential impacts. These data sources include, but are not limited to: landings data from vessel trip reports, landings data from individual voice reports, information from

resource trawl surveys, data from the dealer weighout purchase reports, descriptive information provided (on a voluntary basis) by processors and dealers of Atlantic herring, and ex-vessel price information. Although there are some limitations to the data used in the analysis of impacts of management measures and in the description of the affected environment, these data are considered to be the best available.

This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Stock status (including estimates of biomass and fishing mortality) reported in this document are based on either assessments subject to peer-review through the Stock Assessment Review Committee (SARC) or on updates of those assessments. Landings and revenue information is based on information collected daily VMS catch reports and VTR reports, and supplemented with state/federal dealer data. Information on catch composition and bycatch is based on reports collected by the NOAA Fisheries Service observer program and incorporated into the sea sampling or observer database systems. These reports are developed using an approved, scientifically valid sampling process. In addition to these sources, additional information is presented that has been accepted and published in peer-reviewed journals or by scientific organizations. Original analyses in this document were prepared using data from accepted sources, and the analyses have been reviewed by members of the Herring Plan Development Team.

The policy choices (i.e., management measures) proposed in this Framework 3 are supported by the best available scientific information. All supporting materials, information, data, and analyses within this document have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency. Qualitative discussion is provided in cases where quantitative information was unavailable, utilizing appropriate references as necessary.

The review process for any action under an FMP involves the Northeast Regional Office (NERO) of NOAA Fisheries, the Northeast Fisheries Science Center (Center), and NOAA Fisheries Headquarters (Headquarters). The Council review process involves public meetings at which affected stakeholders have the opportunity to provide comments on the proposed changes to the FMP. Reviews by staff at NERO are conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. The Center's technical review is conducted by senior-level scientists with specialties in population dynamics, stock assessment methodology, fishery resources, population biology, and the social sciences.

Final approval of this Framework Adjustment 3 and clearance of the Proposed and Final Rules is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget. This review process is standard for any action under an FMP, and provides input from individuals having various expertise who may not have been directly involved in the development of the proposed actions. Thus, the review process for any FMP modification, including Framework 3, is performed by technically-qualified individuals to ensure the action is valid, complete, unbiased, objective, and relevant.

5.7 IMPACTS ON FEDERALISM/E.O. 13132

This E.O. established nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. The E.O. also lists a series of policy making criteria to which Federal agencies must adhere when formulating and implementing policies that have federalism implications. This action does not contain policies with federalism implications sufficient to warrant preparation of an assessment under E.O. 13132. The affected States have been closely involved in the development of the proposed management measures through their representation on the Council (all affected states are represented as voting members of at least one Regional Fishery Management Council) and coordination with the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council.

5.8 ADMINISTRATIVE PROCEDURES ACT (APA)

This action was developed in compliance with the requirements of the Administrative Procedures Act, and these requirements will continue to be followed when the proposed regulation is published. Section 553 of the Administrative Procedure Act establishes 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 adequate notice and opportunity for comment. At this time, the Council is not requesting any abridgement of the rulemaking process for this action.

5.9 COASTAL ZONE MANAGEMENT ACT (CZMA)

Section 307(c)(1) of the Federal CZMA of 1972 requires that all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. Pursuant to the CZMA regulations at 15 CFR 930.35, a negative determination may be made if there are no coastal effects and the subject action: (1) Is identified by a state agency on its list, as described in § 930.34(b), or through case-by-case monitoring of unlisted activities; or (2) which is the same as or is similar to activities for which consistency determinations have been prepared in the past; or (3) for which the Federal agency undertook a thorough consistency assessment and developed initial findings on the coastal effects of the activity. The Council has determined that this action is consistent with the coastal zone management plan and policies of the coastal states in this region. NMFS will formally request consistency reviews by CZM state agencies following Council submission of Framework Adjustment 3.

5.10 REGULATORY FLEXIBILITY ACT (RFA)/E.O. 12866 (REGULATORY PLANNING AND REVIEW)

5.10.1 Regulatory Flexibility Act – Initial Regulatory Flexibility Analysis (IRFA)

The purpose of the RFA is to reduce the impacts of burdensome regulations and recordkeeping requirements on small businesses. To achieve this goal, the RFA requires Federal agencies to describe and analyze the effects of proposed regulations, and possible alternatives, on small business entities. To this end, this document contains an Initial Regulatory Flexibility Analysis (IRFA), found below, which includes an assessment of the effects that the Proposed Action and other alternatives are expected to have on small entities.

Under section 603(b) of the RFA, an IRFA must describe the impact of the proposed rule on small entities and contain the following information:

1. A description of the reasons why the action by the agency is being considered.
2. A succinct statement of the objectives of, and legal basis for, the proposed rule.
3. A description—and, where feasible, an estimate of the number—of small entities to which the proposed rule will apply.
4. A description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the types of professional skills necessary for preparation of the report or record.
5. An identification, to the extent practicable, of all relevant federal rules that may duplicate, overlap, or conflict with the proposed rule.

5.10.1.1 Reasons for Considering the Action

The statement of the problem(s) that this document addresses can be found in the Purpose and Need for Action section (Section 1.1, p. 6) and should be referenced for additional information. The goals and objectives of Framework 3 are discussed in Section 1.2.

5.10.1.2 Objectives and Legal Basis for the Action

The objective of the Proposed Action is to implement Framework Adjustment 3 to the Atlantic Herring FMP. The background and legal basis for this action is discussed in Section 1.0 of this document (p. 1).

5.10.1.3 Description and Number of Small Entities to Which the Rule Applies

The RFA recognizes three kinds of small entities: small businesses, small organizations, and small governmental jurisdictions. The size standard for finfish fishing is $19.0 million of gross revenue and the size standard for shellfish fishing is $5.0 million of gross revenues. A firm is classified as a finfish firms if more than half of the firm's gross receipts are derived from finfish. It is classified as a shellfish firm if more than half of the firm's gross receipts are derived from shellfish.

Regulated Commercial Harvesting Entities

The proposed action would affect limited-access herring vessels; therefore, the regulated entity is the business that owns at least one herring category A, B, or C permit. In 2012, there were 94 fishing vessels that help a limited access herring permit. Vessels and/or permits may be owned by entities affiliated by stock ownership, common management, identity of interest, contractual relationships, or economic dependency. For the purposes of this analysis, ownership entities are defined by those entities with common ownership personnel as listed on permit application documentation. Only permits with identical ownership personnel are categorized as an ownership entity. For example, if five permits have the same seven personnel listed as co-owners on their application paperwork, those seven personnel form one ownership entity, covering those five permits. If one or several of the seven owners also own additional vessels, with sub-sets of the original seven personnel or with new co-owners, those ownership arrangements are deemed to be separate ownership entities for the purpose of this analysis.

Based on this ownership criterion, NMFS dealer reported landings data for the last three years, and the size standards for finfish and shellfish firms, there are **72 directly regulated small entities** and six (6) large entities. Not all of these permitted firms are active: only 25 directly regulated small entities and four (4) large entities were actively fishing for Atlantic herring during the last three years.

5.10.1.4 Record Keeping and Reporting Requirements

Under the proposed action, all firms will be required to report total catch (kept and discarded) by statistical area so that the appropriate expansions can be made from the observed catch in those areas to monitor all applicable catch caps (see Section 2.3 of this document for a description of the proposed reporting requirements). The adjustments to the reporting requirements proposed in Framework 3 are generally similar to current reporting requirements, and no additional professional skills are expected to be required.

5.10.1.5 Duplication, Overlap, or Conflict with Other Federal Rules

The proposed action does not duplicate, overlap or conflict with any other Federal rules.

5.10.1.6 Impacts of Proposed Action on Small Entities

Under the proposed action, small entities are expected to experience slight declines in both gross revenues and revenues from Atlantic herring. Table 54 summarizes the number of small entities by revenue classifications, status-quo gross receipts from all fishing activities, status-quo revenues from Atlantic herring, and estimated gross receipts and herring revenues under the Council ***Preferred Alternative***. Across the categories, revenues are projected to fall slightly under the ***Preferred Alternative***.

Table 54 Summary of Small Entities by Revenue Classification

Revenues	# Small Entities	Gross Receipts (Status Quo)	Revenues from Herring (Status Quo)	Gross Receipts *(Preferred Alt)*	Revenues from Herring *(Preferred Alt)*
<$0.5M	27	$189,032	$36,013	$187,419	$34,399
$0.5M – $1M	14	$708,420	$110,255	$701,855	$103,689
$1M – $2M	18	$1,392,647	$233,413	$1,387,951	$228,717
$2M – $5M	12	$3,131,449	$450,579	$3,112,890	$432,020
$5+M	1	C	C	C	C
Grand Total	**72**				

**"C" denotes "cannot report" for confidentiality reasons.*

Table 55 summarizes the **active** small entities by revenue classifications, status-quo gross receipts from all fishing activities, status-quo revenues from Atlantic herring, and estimated gross receipts and herring revenue under the Council ***Preferred Alternative***. Across the categories, revenues are projected to fall slightly under the ***Preferred Alternative***.

Table 55 Summary of Active Small Entities by Revenue Classification

Revenues	# Small Entities	Gross Receipts (Status Quo)	Revenues from Herring (Status Quo)	Gross Receipts *(Preferred Alt)*	Revenues from Herring *(Preferred Alt)*
<$0.5M	11	$260,055	$88,394	$256,094	$84,434
$0.5M – $1M	5	$690,146	$308,714	$671,763	$290,330
$1M – $2M	4	$1,326,401	$1,050,358	$1,305,269	$1,029,226
$2M – $5M	4	$2,958,159	$1,351,738	$2,902,481	$1,296,060
$5+M	1	C	C	C	C
Grand Total	**25**				

**"C" denotes "cannot report" for confidentiality reasons.*

5.10.2 E.O. 12866 (Regulatory Planning and Review)

The purpose of E.O 12866 is to enhance planning and coordination with respect to new and existing regulations. This E.O. requires the Office of Management and Budget (OMB) to review regulatory programs that are considered to be "significant." E.O. 12866 requires a review of proposed regulations to determine whether or not the expected effects would be significant, where a significant action is any regulatory action that may:

- Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, of the principles set forth in the Executive Order.

In deciding how whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, include the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider.

The RIR contains:

- A statement of the problem;
- A description of the management goals and objectives;
- A description of the fishery and/or other affected entities;
- A description of each selected alternative, including the no-action alternative;
- An economic analysis of the expected effects of each selected alternative relative to the baseline.

5.10.2.1 Statement of the Problem/Management Goals and Objectives

The statement of the problem(s) that this document addresses can be found in the Purpose and Need for Action section (Section 1.1, p. 6) and should be referenced for additional information. The goals and objectives of Framework 3 are discussed in Section 1.2.

5.10.2.2 Description of the Fishery

Information about fishery-related businesses and communities potentially affected by the measures proposed in Framework Adjustment 3 is presented in detail in Section 3.6 of this document (p. 82).

5.10.2.3 Management Alternatives and Rationale

The proposed management action is identified as the Council's ***Preferred Alternative*** and represented by Alternative 2 (Section 2.3, p.10 of this document). This alternative establishes a process for implementing RH/S catch caps. It defines four areas; when the catch of RH/S in an area reaches the RH/S catch cap fishing vessels are restricted to 2,000 pound possession limit. This alternative also establishes pre-trip notification requirements for vessels in this fishery, modifies VMS reporting requirements, describes monitoring and implementation of the RH/S catch cap. Finally, the ***Preferred Alternative*** specifies the RH/S catch caps for each of the four areas for 2014 and 2015. The Council's rationale for selecting the ***Preferred Alternative*** is discussed in this section, as well as in related sections of the FEIS for Amendment 5 to the Atlantic Herring FMP.

The *No Action alternative* was also considered. This will be considered the *status quo* or baseline against which the costs and benefits of the ***Preferred Alternative*** will be evaluated.

Management measures that the Council considered but rejected during the development of this framework adjustment are discussed in Section 2.4 of this document.

5.10.2.4 Economic Analysis of Expected Effects

The expected effects of the alternatives/options considered by the Council in Framework 3 relative to the status quo on the fishery-related businesses and communities are discussed in detail throughout Section 4.6 of this document (p. 142), and additional analysis is provided in Appendix III.

The components of the ***Preferred Alternative*** that establish a process for implementing RH/S catch caps, defines four areas, establishes pre-trip notification requirements, describes monitoring and implementation of the RH/S catch cap, and modifies the VMS reporting requirements are expected to have minimal costs. Therefore, this section primarily focuses on the effects of the RH/S catch cap combined with the management measures that are triggered once an RH/S catch cap is reached in a particular area.

The RH/S catch cap can impose economics costs by triggering a closure of the directed herring fishery in the four monitoring areas. These are evaluated relative to the status-quo in which catch of river herring are does not result in any management measures. The simulation model described in Appendix III is used to construct landings in the status quo and ***Preferred Alternative.*** This is multiplied by the average price of herring to construct fleet level revenues. The number of trips in both status quo and ***Preferred Alternative*** scenarios is also constructed from the simulation model. The number of trips taken is multiplied by predicted trips costs (Das, 2014). The difference between revenues and variable costs are the net operating revenues. Under the s*tatus quo*, average net operating revenues are predicted to be $21.9M per year. Under the ***Preferred Alternative***, net operating revenues are projected to fall to $20.1M per year. Therefore, the costs of the ***Preferred Alternative*** relative to the status quo are approximately $1.8M per year (9%).

The simulation model indicates that the ***Preferred Alternative*** is likely to increase the variability of net operating revenues in this fishery. This will occur if there are closures of the directed herring fishery as a result of the river herring catch cap being reached. Table 56 illustrates this result. Under the status quo, the operating revenues have little variability. However, under the ***Preferred Alternative***, there is more variability in operating revenues.

Table 56 Selected Percentiles of Net Operating Revenues for Status Quo (No Action) and *Preferred Alternative*

	Status Quo/No Action ($Million)	***Preferred Alternative* ($Million)**
95th Percentile	23.3	22.4
90th Percentile	23	21.8
75th Percentile	22.5	21
50th percentile	21.9	20.1
25th percentile	21.2	19
10th percentile	20.7	18.1
5th percentile	20.4	17.7

There are three reasons for which the model simulation results are likely to overestimate the true costs of the ***Preferred Alternative.*** The simulation model does not:

- Account for switching of areas. The simulation model assumes that if an area is closed, a trip that would otherwise occur in that closed area does not occur. To some extent, fishing vessels should reallocate effort from closed areas into open areas.
- Account for averting behavior. Because the closure of fishing areas imposes costs on the fishing industry, there is a small to moderate incentive for fishing vessels to avoid RH/S. However, because the benefits are shared by the other members of the group, this incentive is weakened.
- Account for price changes. A model of *ex-vessel* prices is not available for herring. It is reasonable to believe that herring prices would increase when quantity supplied decreases. However, menhaden may be a substitute for herring in the bait market. In 2012, approximately 640,000 mt of menhaden were landed at an *ex-vessel* price of $168/mt. Current herring prices are approximately $300/mt. The availability of menhaden at a relatively low price may limit any increases in the price of herring.

5.10.2.5 Determination of Significance

Based on the analyses provided in this document, Framework Adjustment 3 to the Atlantic Herring FMP is not expected to constitute a "significant regulatory action." This action is not expected to have an impact of $100M or more on the economy, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities. They are not expected to raise novel legal and policy issues. The proposed action also does not interfere with an action taken or planned by another agency. It does not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients.

5.11 E.O. 13158 (MARINE PROTECTED AREAS)

The Executive Order on Marine Protected Areas requires each federal agency whose actions affect the natural or cultural resources that are protected by an MPA to identify such actions, and, to the extent permitted by law and to the extent practicable, avoid harm to the natural and cultural resources that are protected by an MPA. The E.O. defines a Marine Protected Area as "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." The E.O. requires that the Departments of Commerce and the Interior jointly publish and maintain such a list of MPAs. The Tilefish Gear Restricted Areas in Oceanographer, Lydonia, Veatch, and Norfolk canyons are included in the National System of Marine Protected Areas (MPAs). This action under the Herring FMP is not expected to occur within any of these MPAs. No further guidance related to this Executive Order is available at this time.

5.12 E.O. 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). These 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 the Atlantic herring specifications may affect communities with environmental justice concerns, the actions in this document should not have disproportionately high effects on low income or minority populations. The proposed measures would apply to all participants in the affected area, regardless of minority status or income level.

The existing demographic data on participants in the Atlantic herring fishery (i.e. vessel owners, crew, dealers, processors, employees of supporting industries) do not allow identification of those who live below the poverty level or are racial or ethnic minorities. Thus, it is not possible to fully determine how the actions within this specification document may impact these population segments. The public comment processes is an opportunity to identify issues that may be related to environmental justice, but none have been raised relative this proposed action. The public has never requested translations of documents pertinent to the herring fishery.

For the Atlantic herring *Communities of Interest* (Section 3.6.5.3), poverty and minority rate data at the state and county levels are provided in Table 57. In terms of poverty, Washington County is the only county that is more than 1% higher than its state average (Maine). Washington and Cumberland Counties are the only counties with a minority rate more than 1% higher than their state average (Maine). Minority populations in Southern New England have historically participated in the fishing industry. For the Atlantic herring fishery, evidence suggests that minority participation is focused within the processing sector. For a New Bedford-based herring processor, 90-95% of its employees are of Central American decent (see Amendment 5 FEIS). For a New Jersey-based processor, its minority employees are Hispanic and the rate is close to the county rate (Lund's, personal communication, 2012).

With respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. NERO tracks these issues, but there are no federally recognized tribal agreements for subsistence fishing in New England federal waters.

Table 57 Demographic Data for Atlantic Herring Fishing Communities of Interest

State/County	Minority Rate a	Poverty Rate b
Maine	**5.7%**	**12.6%**
Cumberland	8.3%	10.5%
Knox	3.7%	12.5%
Hancock	4.0%	11.5%
Washington	9.0%	19.8%
Sagadahoc	4.6%	8.8%
New Hampshire	**7.8%**	**7.8%**
Rockingham	6.0%	4.7%
Massachusetts	**23.6%**	**10.5%**
Essex	24.3%	10.1%
Bristol	13.5%	11.3%
Rhode Island	**23.5%**	**12.2%**
Newport	12.2%	7.3%
Washington	7.9%	7.4%
New Jersey	**41.1%**	**9.1%**
Cape May	13.4%	9.2%

Source: U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states.html
[a] *Persons other than those who report as White persons not Hispanic.*
[b] *Persons below poverty level, 2006-2010.*

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