# Industry-Funded Monitoring

An Omnibus Amendment to the
Fishery Management Plans
of the Mid-Atlantic and New England
Fishery Management Councils

**January 2015**

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

NEW ENGLAND FISHERY MANAGEMENT COUNCIL

**This page intentionally left blank.**

**Amendment X to the Atlantic Bluefish Fishery Management Plan (FMP);**
**Amendment 7 to the Atlantic Herring FMP;**
**Amendment X to the Atlantic Salmon FMP;**
**Amendment 17 to the Atlantic Sea Scallop FMP;**
**Amendment 5 to the Deep-Sea Red Crab FMP;**
**Amendment XX to the Mackerel, Squid, and Butterfish FMP;**
**Amendment 8 to the Monkfish FMP;**
**Amendment 22 to the Northeast Multispecies FMP;**
**Amendment 5 to the Northeast Skate Complex FMP;**
**Amendment X to the Spiny Dogfish FMP;**
**Amendment XX to the Summer Flounder, Scup, and Black Sea Bass FMP;**
**Amendment XX to the Surfclam and Ocean Quahog FMP; and**
**Amendment X to the Tilefish FMP**

**Including a**
**Draft Environmental Assessment,**
**a Regulatory Flexibility Act Assessment,**
**and a Regulatory Impact Review**

**January 2015**

Prepared by the

New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930

Mid-Atlantic Fishery Management Council
800 N. State Street, Suite 201
Dover, DE 19901
National Marine Fisheries Service
Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543

Draft EA Prepared:
Draft EA Adopted by MAFMC:
Draft EA Adopted by NEFMC:
Final EA Submitted to NMFS:

**This page intentionally left blank.**

## Executive Summary

The New England and Mid-Atlantic Fishery Management Councils are interested in increasing monitoring and/or other types of data collection in some fishery management plans to assess the amount and type of catch, to monitor annual catch limits, and/or provide other information for management. This increased monitoring would be above and beyond coverage required through the Standardized Bycatch Reporting Methodology (SBRM), the Endangered Species Act (ESA) or Marine Mammal Protection Act (MMPA). The amount of available Federal funding to support additional monitoring and legal constraints on the sharing of costs between the National Marine Fisheries Service (NMFS) and the fishing industry have recently prevented NMFS from approving proposals for industry-funded monitoring in some fisheries, specifically Atlantic Herring Amendment 5, Atlantic Mackerel, Squid, and Butterfish Amendment 14, and Northeast (NE) Multispecies Framework Adjustment 48.

### Omnibus Alternatives

The purpose of this action is to consider measures that would allow the Councils to implement industry-funded monitoring coverage in New England and Mid-Atlantic fishery management plans. This amendment would allow industry funding to be used in conjunction with available Federal funding to pay for additional monitoring to meet FMP-specific coverage targets. The concept of a monitoring *coverage target*, as opposed to a mandatory monitoring coverage level, allows NMFS to approve new monitoring programs without committing to support coverage levels above appropriated funding or before funding is determined to be available. The realized coverage in a given year would be determined by the amount of Federal funding available to cover NMFS cost responsibilities in a given year. Fishery management plans interested in coverage above SBRM would set coverage targets in an individual fishery management plan action (i.e., a framework adjustment or amendment). The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM and the specified coverage target.

To streamline the development and evaluation of future industry-funded monitoring programs, this amendment considers: (1) standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry, (2) a process for FMP-specific industry-funded monitoring to be implemented via a future framework adjustment action, (3) standard administrative requirements for industry-funded monitoring service providers, and (4) a process to prioritize available Federal funding for industry-funded monitoring across FMPs. The scope of the amendment is limited to those fisheries that are prosecuted in the Federal waters of the Greater Atlantic Region and managed through an FMP developed by either the Mid-Atlantic or New England Council. This amendment is being done as an omnibus to ensure consistency for industry-funded monitoring programs across New England and Mid-Atlantic FMPs. **No individual FMP would be subject to an industry-funded monitoring program as a result of implementation of the omnibus portions of this action.** Rather, any FMP that wishes to develop an industry-funded monitoring program would need to develop the program that meets the specifications of this action in a separate framework or amendment.

*Standardized cost responsibilities*. The action alternative would include standard cost responsibilities between NMFS and the industry for supporting monitoring programs targeting coverage above and beyond SBRM. Because there are legal requirements that dictate cost responsibilities, certain costs must be borne by NMFS. These cost responsibilities would be codified into regulation for industry-funded monitoring programs developed under New England and Mid-Atlantic fishery management plans. The proposed responsibilities are already in operation in the Atlantic Sea Scallop and NE Multispecies FMPs, although the cost responsibilities are not explicitly defined in those plans.

NMFS would be responsible for funding the costs to set standards for, monitor performance of, and support industry-funded monitoring programs. These program elements would include:

- The labor and facilities costs associated training and debriefing of monitors
- NFMS-issued gear (e.g., electronic reporting aids)
- Certification of monitoring providers and individual monitors; performance monitoring to maintain certificates
- Developing and executing vessel selection
- Data processing
- Costs associated with liaison activities between service providers, and NMFS, Coast Guard, Councils, sector managers and other partners

Based on fiscal year 2013 expenses, approximately $5 million of NMFS costs could support about 15,000 sea days per year. The currently leased facilities could accommodate additional personnel to support an additional 2,000 sea days. However, beyond that new facilities cost would have to be incurred. Facility costs cannot be obtained in small increments, so if sea days beyond 17,000 are considered, new facilities would have to be obtained so that there is sufficient capacity to cover the upper end of any anticipated increase.

The industry would be responsible for funding all other costs of the monitoring program. Based on at-sea monitoring costs from October 2012 through May 2014 averaged across the three service providers, the estimated industry cost per sea day is $818. The program elements and activities covered in this cost would include, but are not limited to:

- Costs to the provider for deployments and sampling (e.g., travel and salary for observer deployments and debriefing)
- Equipment, as specified by NMFS, to the extent not provided by NMFS
- Costs to the provider for observer time and travel to a scheduled deployment that doesn't sail and was not canceled by the vessel prior to the sail time.

- Provider overhead and project management costs (e.g., provider office space, administrative and management staff, recruitment costs, salary and per diem for trainees)
- Other costs of the provider to meet performance standards laid out by a fishery management plan

*Framework Adjustment Process*. The action alternative would include the ability for Councils to implement industry-funded monitoring programs, including at-sea monitoring, dockside monitoring, or electronic monitoring, through framework adjustments or amendments to the relevant fishery management plan. The details necessary for the consideration of these types of industry-funded monitoring program may include, but are not limited to: (1) Level and type of coverage target, (2) rationale for level and type of coverage, (3) minimum level of coverage necessary to meet coverage goals, (4) consideration of coverage waivers if coverage target cannot be met, (5) process for vessel notification and selection, (6) fee collection and administration, (7) standards for monitoring service providers, and (8) any other measures necessary to implement the industry-funded monitoring program. Additional National Environmental Policy Act (NEPA) analysis would be required for any action implementing and/or modifying industry-funded monitoring programs regardless if it required a framework adjustment or full amendment.

*Monitoring Service Providers*. The action alternative would include standard administrative requirements for industry-funded monitoring service providers, including at-sea monitoring and dockside monitoring. The SBRM Omnibus Amendment, if approved, would modify the scallop industry-funded observer service provider requirements (at 50 CFR 648.11(h) and (i)) to apply to all New England and Mid-Atlantic fishery management plans. However, the SBRM Amendment does not address service provider requirements for other types of industry-funded monitoring programs. The action alternative would modify the SBRM observer service provider approval and certification process to be a monitoring service provider approval and certification process that would apply to observer and dockside service providers for all New England and Mid-Atlantic FMPs. Because service provider standards for electronic monitoring are just starting to be considered across NMFS, it is likely premature to include service provider standards for electronic monitoring in this amendment. The action alternative allows the Councils to implement service provider standards for electronic monitoring through a future omnibus framework adjustment to New England and Mid-Atlantic fishery management plans.

*Prioritization Process.* The action alternative includes a prioritization process to allocate available Federal funding across FMPs to cover NMFS cost responsibilities for coverage targets above and beyond SBRM requirements. When industry-funded monitoring programs and coverage levels exist for multiple fishery management plans (e.g., if industry-funded monitoring programs are established in both the herring and mackerel plans), and when Federal funding is not sufficient to cover NMFS cost responsibilities to achieve coverage levels across the plans, the Councils and NMFS must decide how to allocate available Federal funding. Available Federal funding refers to any funds in excess of those allocated to meet SBRM or other existing monitoring requirements. The prioritization processes options outlined in the action alternative would guide the allocation of available Federal funding to cover NMFS cost responsibilities, and would determine which industry-funded monitoring programs would operate for a given year and which would not.

There are five options considered to prioritize available Federal funding across established industry-funded monitoring programs. Two of the alternatives (Omnibus Alternatives 2.1 and 2.2), termed the "discretionary alternatives," require NMFS or the Council to evaluate the design of the established industry-funded monitoring programs when deciding how to allocate funding. These prioritization processes provide the Councils and NMFS with more discretion to make trade-offs between industry-funded monitoring programs designed to meet different goals, but also require more recurring analysis and resources. The primary difference between these two alternatives is who (NMFS or Councils) would lead the prioritization process and analysis. Three of the alternatives (Omnibus Alternatives 2.3, 2.4, and 2.5), termed the "formulaic alternatives," use formulaic approaches, eliminating much of the discretion and analytical burden of the discretionary alternatives. However, the formulaic approaches may reduce the effectiveness of the resulting outcome.

### Summary of Omnibus Alternative Impacts

Under Omnibus Alternative 1 (No Action), there would be no standardized structure developed for Greater Atlantic Region industry-funded monitoring programs, meaning that there would be no standard definition of cost responsibilities for industry-funded monitoring in the New England and Mid-Atlantic fisheries, no standard administrative requirements for industry-funded monitoring service providers, no framework adjustment process to implement FMP-specific industry-funded monitoring, and no process to prioritize available Federal funding to meet Council desired monitoring coverage target above and beyond SBRM coverage. In contrast, Omnibus Alternative 2 would establish a standardized structure for industry-funded monitoring programs that would apply to all New England and Mid-Atlantic FMPs that choose to use industry funding to increase monitoring. This industry-funded monitoring program structure would include all of the components described above. Under Omnibus Alternative 2, if enough Federal funding available after SBRM coverage requirements were met to cover NMFS costs for all of the established industry-funded monitoring programs, they would all operate at the target coverage levels established through each individual FMP. If there is some Federal funding available after SBRM coverage requirements are met, but not enough to cover all of the industry-funded monitoring programs, one of the five possible prioritization processes would be used to decide how to allocate available Federal funding to the various industry-funded monitoring program. If no Federal funding were available after SBRM coverage requirements were met, then, similar to the No Action alternative, none of the established industry-funded monitoring programs would operate and there would be no additional observer coverage above SBRM levels.

*Impacts of Omnibus Alternatives on Biological Resources*. In general, there are no direct impacts on biological resources (target, non-target, and protected species) related to either

Omnibus Alternative 1 (No Action), or the various permutations of Omnibus Alternative 2. These alternatives are focused on the process of developing industry-funded monitoring programs, and thus do not directly affect the level of fishing activity, fishing operations, the species targeted, or areas fished in the Greater Atlantic Region.

Compared to the No action alternative, the establishment of standardized cost responsibilities and the framework adjustment process under Omnibus Alternative 2 has a negligible impact on biological resources when compared with the No Action alternative because these aspects of the alternative are process focused and do not impact fishing activity. There is a low positive indirect impact on biological resources related to establishment of standardized industry-funded monitoring service provider requirements. Standardized service provider requirements may lead to greater consistency in the information collected about biological resources through industry-funded monitoring programs, which may lead to better management of biological resources.

The magnitude of the potential indirect impacts of the range of prioritization processes on biological resources varies. The impacts discussed in this paragraph apply at times when there is some Federal funding available after SBRM coverage requirements are met, but not enough to cover all of the established industry-funded monitoring programs. Under the Omnibus Alternative 1 (No Action), the absence of a process to prioritize between established industry-funded monitoring programs means that Federal funding available after SBRM coverage requirements are met is allocated to industry-funded monitoring programs on a first-come, first-served basis, which has a potential low negative impact to biological resources if industry-funded monitoring programs necessary to gather important catch information go unfunded because they are developed after other programs. In general, the establishment of a prioritization process under Omnibus Alternative 2 provides a low positive impact on biological resources compared to the No Action alternative because all established industry-funded monitoring programs will be considered when deciding how to allocate available Federal funding.

The discretionary prioritization processes (Alternatives 2.1 and 2.2) have the greatest potential for positive impacts to biological resources compared to the No Action and formulaic alternatives (Alternatives 2.3-2.5) because they allow for the evaluation of program need and design when assigning priority. The formulaic prioritization alternatives (Alternative 2.3-2.5) all provide a low positive impact on biological resources compared to No action because they consider all established Greater Atlantic Region industry-funded monitoring programs when deciding how to allocate available Federal funds. In the case of the proportional prioritization process (Alternative 2.3), available Federal funding would be allocated proportionally to all established industry funded monitoring programs. The lowest coverage ratio based alternative (Alternative 2.4) would prioritize industry-funded monitoring programs associated with the most active fisheries. The highest coverage ratio based alternative (Alternative 2.5) would prioritize industry-funded monitoring programs associated with the least active fisheries. While both of these alternatives could result in certain industry-funded monitoring programs receiving no funding, there is still some benefit to biological resources that results from evaluating the allocation of available Federal funding across all Greater Atlantic Regional industry-funded monitoring programs in a structured way.

*Impacts of Omnibus Alternatives on the Physical Environment*. Because neither the No Action alternative (Omnibus Alternative 1) nor the other Omnibus Alternatives would directly impose or likely result in any changes in fishing effort or behavior, fishing gears used, or areas fished, there are no potential impacts to the physical environment (including EFH) associated with the Omnibus Alternatives under consideration for this item. There are also no differences among the various Omnibus Alternatives.

*Impacts of Omnibus Alternatives on Human Communities*. Overall, there will be negative economic impacts to fishing vessels as a result of selecting Omnibus Alternative 2 if both of the following occur: 1) There is an established industry-funded monitoring program for the FMP; and 2) There is Federal funding available to cover all, or a portion, of the costs of industry-funded monitoring programs after SBRM coverage requirements are met. The estimated vessel contribution, further described in section 2.0, is $818 per sea day. If no Federal funding were available after SBRM coverage requirements were met, then, similar to the No Action alternative, none of the established industry-funded monitoring programs would operate and there would be no additional observer coverage above SBRM levels. It is important to reiterate that the economic impacts associated with coverage targets for industry-funded monitoring programs must be evaluated on an FMP-by-FMP basis at the time each program is established (e.g., the economic analysis of coverage target impacts provided for the Atlantic herring and Atlantic mackerel fisheries in Sections 4.2 and 4.3). The indirect impacts of the various aspects of the Omnibus Alternatives on human communities is discussed below.

Compared to the No action alternative, the establishment of the framework adjustment process under Omnibus Alternative 2 has a negligible impact on human communities when compared with the No Action alternative because this aspect of the alternative is focused on a process and does not directly affect fishing vessels, fleets, or ports.

There is a potential low positive indirect impact on human communities associated with the establishment of standardized industry-funded monitoring service provider requirements if the standardized service provider requirements allow for efficiencies in the administration of industry-funded monitoring programs (e.g., initial applications to be approved as service providers, training for monitors, etc.), and ultimately reduce industry's contribution to monitoring costs. In addition, standardized service provider requirements could lead to greater consistency in the information collected about through industry-funded monitoring programs, provided that individual FMPs do not drastically alter the service provider requirements when establishing monitoring programs. Improved catch information that results from greater consistency in information collection may lead to better management of biological resources, which could eventually lead to greater fisheries yields.

The establishment of standardized cost responsibility definitions could have low positive impacts compared to No Action. While industry cost responsibilities are not codified in this action, the categorization and characterization of cost responsibilities in this action could provide industry members information necessary to negotiate contracts with industry-funded monitoring service providers, which may ultimately reduce industry cost responsibilities.

The magnitude of the potential indirect impacts of the prioritization process on human communities varies depending on the selected prioritization process. The impacts discussed in this paragraph apply at times when there is some Federal funding available after SBRM coverage requirements are met, but not enough to cover all of the established industry-funded monitoring programs. Under the Omnibus Alternative 1 (No Action), the absence of a process to prioritize between established industry-funded monitoring programs means that Federal funding available after SBRM coverage requirements are met is allocated to industry-funded monitoring programs on a first-come, first-served basis. There is a potential low negative impact to human communities under the No Action alternative if industry-funded monitoring programs necessary to gather important information catch information go unfunded because they are developed after other programs. In general, the establishment of a prioritization process under Omnibus Alternative 2 provides a low positive impact on human communities compared to the No Action alternative because all established industry-funded monitoring programs will be considered when deciding how to allocate available Federal funding.

The discretionary prioritization processes (Alternatives 2.1 and 2.2) both provide a low positive impact on human communities compared to No action because they consider all established Greater Atlantic Region industry-funded monitoring programs when deciding how to allocate available Federal funds, rather than considering funding allocation on a case-by-case basis under the No Action alternative. These alternatives have the greatest potential for positive impacts to human communities compared to the No Action and formulaic alternatives (Alternatives 2.3-2.5) because they allow for the evaluation of program need and design when assigning priority. Improved catch information that results from the opportunity to focus funding on the most important industry-funded monitoring programs may lead to better management of biological resources, which could eventually lead to greater fisheries yields.

The formulaic prioritization alternatives (Alternative 2.3-2.5) all provide a low positive impact on human communities compared to No action because they consider all established Greater Atlantic Region industry-funded monitoring programs when deciding how to allocate available Federal funds. In the case of the proportional prioritization process (Alternative 2.3), available Federal funding would be allocated proportionally to all established industry funded monitoring programs, rather than on a first-come, first-served basis under the No Action alternative. The lowest coverage ratio based alternative (Alternative 2.4) would prioritize industry-funded monitoring programs associated with the most active fisheries. The highest coverage ratio based alternative (Alternative 2.5) would prioritize industry-funded monitoring programs associated with the least active fisheries. While both of these alternatives could result in certain industry-funded monitoring programs receiving no funding, there is still some benefit to human communities that results from evaluating the allocation of available Federal funding across all Greater Atlantic Regional industry-funded monitoring programs in a structured way.

| Alternatives | Target Species<br>Non-Target Species<br>Protected Species | Human Communities |
|---|---|---|
| **Alternative 1: No Industry-Funded Monitoring Programs (No Action)** | Potential low positive impact related to allocating funding to industry-funded monitoring programs on a first come, first served basis | Potential low negative impact related to continued uncertainty about true discard rates (could exacerbate overly cautious management). |
| **Alternative 2: Industry-Funded Monitoring Programs (Action Alternative)** | Negligible impact related to standardized cost responsibilities and process for future industry-funded programs implemented via framework<br><br>Potential low positive impact related to standardized service provider requirements and process to prioritize additional monitoring | Potential low positive impact related to establishing standardized cost responsibilities, service provider requirements, and process to prioritize additional monitoring<br><br>Negligible impact related to standardized process for future industry-funded programs implemented via framework<br><br>Negative impact to industry related to new cost responsibilities |
| **Alternative 2.1: NMFS-Led Prioritization Process** | Potential low positive impact related to information collection because process considers all industry-funded programs, and allows an evaluation of program need/design when assigning priority | Potential low positive impact related to information collection because process considers all industry-funded programs, and allows an evaluation of program need/design when assigning priority |
| **Alternative 2.2: Council-Led Prioritization Process** | | |
| **Alternative 2.3: Proportional Prioritization Process** | Potential low positive impact related to information collection because process considers all industry-funded programs<br><br>Potential low negative impact (compared to discretionary alternatives) related to information collection because prioritization is formulaic, and does not allow for prioritization based on program need/design | Potential low positive impact related to information collection because process considers all industry-funded programs<br><br>Potential low negative (compared to discretionary alternatives) related to information collection because prioritization is formulaic, and does not allow for prioritization based on program need/design |
| **Alternative 2.4: Coverage Ratio-Based Prioritization Process** | | |
| **Impacts to physical environment were not discussed in this table because they are negligible. These alternatives will not alter fishing behavior, or directly impact fishing regulations (gears used or areas fished).** | | |

## Atlantic Herring and Atlantic Mackerel Coverage Target Alternatives

This amendment has a secondary purpose to consider monitoring coverage targets for the Atlantic Herring and Atlantic Mackerel, Squid, Butterfish Fishery Management Plans, which are anticipated to enhance the monitoring of at-sea catch of herring, mackerel, river herring, shad, haddock, and other species harvested in the herring and mackerel fisheries.

*Atlantic Herring Coverage Target Alternatives.* The New England Council is interested in improving catch and bycatch monitoring in the herring fishery consistent with recommendations in Amendment 5 to the Herring Fishery Management Plan. In Amendment 5, the Council recommended 100% observer coverage on vessels with the All Areas Limited Access Herring Permit (Category A) and the Areas 2/3 Limited Access Herring Permit (Category B). The Council believed these recommended coverage levels could enhance catch monitoring and achieve many of the goals and objectives of that amendment. This coverage level was disapproved by NMFS due to funding limitations. Amendment 5 to the Herring FMP also required 100% observer coverage on midwater trawl vessels fishing in the Groundfish Closed Areas. This requirement was approved and is currently in effect.

The New England Council also had previously established monitoring levels to assess haddock bycatch in the Atlantic Herring fishery. In past years, observer coverage for midwater trawl vessels fishing in the Closed Areas was allocated by the Northeast Fisheries Observer Program independent of the SBRM. The revised SBRM, if approved, would prohibit observer coverage being allocated to midwater trawl vessels fishing in the Closed Areas independent of the SBRM. In order to provide observer coverage for midwater trawl vessels fishing in the Closed Areas, coverage would need to be incorporated in an industry-funded monitoring program.

There are five alternatives under consideration for coverage targets to meet monitoring goals in the Atlantic Herring Fishery Management Plan, including:

- 100% Coverage Target on Herring Category A and B Vessels
    - No Waivers issued (Herring Alternative 2.1)
    - Waivers Issued (Herring Alternative 2.2)
- Percentage Coverage on Midwater Trawl Fleet to achieve a 30% CV on river herring and shad catch (2013 estimate is 51-61% coverage necessary)
    - No waivers issued (Herring Alternative 2.3)
    - Waivers Issued (Herring Alternative 2.4)
- 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas (Herring Alternative 2.5)

The major differences between the alternatives include how observer coverage is allocated (permit category vs fleet), the specified amount of observer coverage, and whether or not observer coverage is waived if an observer is not available. In addition, the action alternatives would specify that coverage targets are effective for 2 years, and would allow the Council the option to either allow the coverage to expire, or examine the results of the higher coverage levels to consider if adjustments are warranted.

Establishing monitoring coverage targets would allow NMFS to approve and implement new industry-funded monitoring programs, without committing to support coverage levels above appropriated funding or before funding is determined to be available. However, this amendment WOULD NOT automatically allow for higher coverage levels in the herring fishery. This amendment establishes tools that NMFS and the Councils could use to provide additional monitoring in the herring fishery when Federal funding is available. Therefore, during years when there is no additional funding to cover NMFS cost responsibilities above funding for SBRM, the tools developed in this amendment would not be used and there would be no additional monitoring coverage in the herring fishery, even if industry is able to fully fund their cost responsibilities.

## Summary of Herring Alternative Impacts

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Observer coverage for herring vessels would be allocated according to SBRM. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for the herring fishery would be evaluated on a case-by-case basis. Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring.

*Impacts of Herring Alternatives on Herring Resource*. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have a positive impact on the herring resource by increasing monitoring on the herring resource.

Under Herring Alternative 2, long-term benefits to biological resources could result from increased observer coverage, increased sampling, and a reduction in unobserved catch. The magnitude of positive impacts to the herring resource resources associated with additional catch information is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1

and 2.2 can be used for stock-wide ACL and sub-ACL monitoring but it is unlikely that those data will be used for the herring stock assessment and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was supported by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.3 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield in a given year is not harvested, there is the potential for a positive impact on the herring resource associated with Herring Alternatives 2.1 and 2.3. The positive impact would result from the increased reproductive potential of the individuals that are unharvested.

Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Grounfish Closed Area must carry an observer. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.3 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield in a given year is not harvested, there is the potential for a positive impact on the herring resource.

*Impacts of Herring Alternatives on Non-target species*. The non-target species of interest that are harvested by the herring fishery are haddock, river herring and shad (RH/S), and mackerel.

Under Herring Alternative 2, long-term benefits to non-target species could result from increased observer coverage, increased sampling, and a reduction in unobserved catch. As catch information improves, the uncertainty around catch and bycatch in the herring fishery may be reduced, potentially allowing for improved catch accounting of non-target species. Improved catch accounting of haddock and RH/S has the potential to reduce the uncertainty around catch estimates that are tracked against haddock and RH/S catch caps. The magnitude of positive impacts for non-target species associated with additional catch information is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on non-target species by increasing monitoring in the herring fishery. While the benefits to non-target species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1 and 2.2 can be used for monitoring catch against haddock and RH/S catch caps but it is unlikely that those data will be used for stock assessments and estimating total removals.

Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Grounfish Closed Area must carry an observer. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.3 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such the harvest of non-target species is reduced, there is the potential for a positive impact on non-target species.

*Impacts of Herring Alternatives on Human Communities*. The 100% coverage target for Category A and B vessels described in Herring Alternatives 2.1 and 2.2 was recommended by the Council under Amendment 5. If, under Herring Alternative 2.1, Federal funding is available to cover NMFS costs to observer 100% of Category A and B trips, or effort is reduced so that 100% of Category A and B trips are observed, net revenue is expected to be reduced anywhere from 5.3% to 18.5% per trip (depending on gear type used). If waivers are issued, the fleet level impact of paying for observer coverage would be less than if waivers are not issued (Herring Alternative 2.2).

The coverage target associated with a 30% CV on river herring and shad catch by the midwater fleet is described in Herring Alternatives 2.3 and 2.4. If, under Herring Alternative 2.3, Federal funding is available to cover NMFS costs to achieve a 30% CV on river herring and shad catch by the midwater trawl fleet, or effort is reduced such that a similar CV is achieved, net revenue is expected to be reduced anywhere from 11.0% to 16.7% per trip. If waivers are issued, the fleet level impact of paying for observer coverage would be less than if waivers are not issued (Herring Alternative 2.4).

Using the process established in this amendment, the realized coverage level for the Atlantic Herring Fishery Management Plan in a given year would be determined by the amount of Federal funding available to cover NMFS cost responsibilities a given year. The realized coverage level for the herring fishery in a given year (above and beyond SBRM) would fall anywhere between no additional coverage above SBRM and the specified coverage target.

Herring Alternative 2.5 was developed under the premise that available Federal funding to cover NMFS cost responsibilities may be limited, and that 100% at-sea observer coverage is required for vessels fishing with midwater trawl gear the Groundfish Closed Areas. If an observer was not available to cover a specific herring trip inside a Groundfish Closed Area (either due to logistics or a lack of funding), that vessel would be prohibited from fishing inside a Groundfish Closed Area on that trip. This alternative may reduce the ability of the midwater trawl fleet to participate in the herring fishery.

In 2014, midwater trawl vessels made 18 trips into Groundfish Closed Areas. Fishing on these trips occurred either in part or in total inside the Ground Closed Areas and the trips averaged 3 days in length. The average total revenue generated from these 18 trips was approximately $80,000 and was primarily from herring revenue (over 95%). If midwater trawl vessels were required to pay for an observer on these 18 trips, the average net revenue would likely be reduced, similar to revenue reductions shown in Table 13 that ranged from 11% to 16.7%. However, if a midwater trawl vessel chose not to fish in a Groundfish Closed Area and was not otherwise required to pay for an observer, its net revenues may not be reduced. However, a vessel's gross revenue may be reduced because, presumably, fishing in the Groundfish Closed Areas provides additional revenue generating opportunities that may not be available outside the Groundfish Closed Areas.

| Alternatives | Herring Resource | Non-Target Species | Protected Species | Physical Environment | Human Communities |
|---|---|---|---|---|---|
| Herring Alternative 1: No Coverage Target Specified For Industry-Funded Monitoring Programs (No Action) | Negligible to Negative | Negligible to Negative | Negligible to Negative | Negligible | Negligible to Negative |
| Herring Alternative 2: Coverage Target Specified For Industry-Funded Monitoring Programs | Negative to Positive | Negative to Positive | Negative to Positive | Negligible to Positive | Negative to Positive |
| Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers) | Low Positive | Low Positive to Positive | Low Positive to Positive | Negligible to Positive | Negative to Low Positive |
| Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers) | Low Positive | Low Positive to Positive | Low Positive | Negligible | Negative to Low Positive |
| Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers) | Positive | Positive | Positive | Negligible to Positive | Negative to Positive |
| Herring Alternative 2.4: Percent Coverage Target on Midwater Trawl Fleet (Waivers) | Positive | Positive | Positive | Negligible | Negative to Positive |
| Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas | Negligible to Positive | Negligible to Positive | Negligible to Positive | Negligible | Negative to Positive |

*Atlantic Mackerel Coverage Target Alternatives.*

[pending]

## List of Acronyms and Abbreviations

| | |
|---|---|
| ABC | Acceptable Biological Catch |
| ACCSP | Atlantic Coastal Cooperative Statistics Program |
| ACFCMA | Atlantic Coastal Fishery Cooperative Management Act |
| ACL | Annual Catch Limit |
| AM | Accountability Measure |
| APA | Administrative Procedure Act |
| APAIS | Access Point Angler Intercept Survey |
| ASMFC | Atlantic States Marine Fisheries Commission |
| CEQ | Council of Environmental Quality |
| CFDBS | Commercial Fisheries Database System |
| CV | Coefficient of Variation |
| CZMA | Coastal Zone Management Act |
| d/da | Discard-to-days-absent ratio |
| d/e | Discard-to-effort ratio |
| d/k | Discard-to-kept ratio |
| DAS | Days-at-sea |
| EA | Environmental Assessment |
| EEZ | Exclusive Economic Zone |
| EFH | Essential Fish Habitat |
| EO | Executive Order |
| ESA | Endangered Species Act |
| eVTR | Electronic Fishing Vessel Trip Report |
| FMP | Fishery Management Plan |
| FOIA | Freedom of Information Act |
| FONSI | Finding Of No Significant Impact |
| FVTR | Fishing Vessel Trip Report |
| GAM | Generalized Additive Model |
| GARFO | Greater Atlantic Regional Fisheries Office (formerly NERO) |
| GPS | Global Positioning System |
| IBS | Industry-Based Survey |
| ICNAF | International Commission for the Northwest Atlantic Fisheries |
| IFQ | Individual Fishing Quota |

| | |
|---|---|
| IQA | Information Quality Act (also known as the Data Quality Act or DQA) |
| IRFA | Initial Regulatory Flexibility Analysis |
| ITQ | Individual Transferable Quota |
| km | Kilometer |
| lb | Pounds |
| MA | Mid-Atlantic |
| MAFMC | Mid-Atlantic Fishery Management Council |
| MMPA | Marine Mammal Protection Act |
| MRIP | Marine Recreational Information Program |
| MRFSS | Marine Recreational Fisheries Statistics Survey |
| MSR | Master Site Register |
| NAFO | Northwest Atlantic Fisheries Organization |
| NASCO | North Atlantic Salmon Conservation Organization |
| NE | New England |
| NEAMAP | Northeast Area Monitoring and Assessment Program |
| NEFMC | New England Fishery Management Council |
| NEFOP | Northeast Fisheries Observer Program |
| NEFSC | Northeast Fisheries Science Center |
| NEPA | National Environmental Policy Act |
| NERO | Northeast Regional Office (renamed GARFO in 2014) |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NRC | National Research Council of the National Academies of Science |
| NWGB | National Working Group on Bycatch |
| OLE | NOAA Office of Law Enforcement |
| PRA | Paperwork Reduction Act |
| PREE | Preliminary Regulatory Economic Evaluation |
| PSP | Paralytic Shellfish Poisoning |
| QA/QC | Quality Assurance/Quality Control |
| RFA | Regulatory Flexibility Act |
| RIR | Regulatory Impact Review |
| SAFE | Stock Assessment and Fishery Evaluation |
| SAFIS | Standard Atlantic Fisheries Information System |

| | |
|---|---|
| SAP | Special Access Program |
| SAW/SARC | Stock Assessment Workshop/Stock Assessment Review Committee |
| SBRM | Standardized Bycatch Reporting Methodology |
| SFCPO | State-Federal Constituent Programs Office |
| SSC | Scientific and Statistical Committee |
| TAC | Total Allowable Catch |
| TAL | Total Allowable Landings |
| U.S. | United States |
| USFWS | United States Fish and Wildlife Service |
| VMS | Vessel Monitoring System |

# Table of Contents

# List of Tables

# List of Figures

# 1.0 INTRODUCTION AND BACKGROUND

The New England and Mid-Atlantic Councils are interested in increasing monitoring and/or other types of data collection in some fishery management plans (FMPs) to assess the amount and type of catch, to monitor annual catch limits, and/or provide other information for management. This increased monitoring would be above and beyond coverage required through the Standardized Bycatch Reporting Methodology (SBRM), the Endangered Species Act (ESA) or Marine Mammal Protection Act (MMPA). The amount of available Federal funding to support additional monitoring and legal constraints on the sharing of costs between the National Marine Fisheries Service (NMFS) and the fishing industry have recently prevented NMFS from approving proposals for industry-funded monitoring in some fisheries, specifically Atlantic Herring Amendment 5, Atlantic Mackerel, Squid and Butterfish Amendment 14, and Northeast (NE) Multispecies Framework Adjustment 48 (see Appendix A). The Councils initiated this omnibus amendment to consider remedies for the disapprovals of these actions and to reconsider new monitoring requirements for the Atlantic herring and Atlantic mackerel fisheries[1]. This amendment considers mechanisms that could facilitate the use of industry funding to increase monitoring, but it cannot resolve the underlying issue of limited Federal funding.

The Anti-Deficiency Act (ADA) prohibits augmenting or improperly shifting congressional appropriations, and a criminal prohibition restricts supplementing government employee salaries. These provisions tightly control government funding and services. The basic funding principle is that congressional appropriations establish a maximum authorized program level that cannot be exceeded without specific statutory authorization, and any monitoring or observer funding must comply with these restrictions. When Congress appropriates money for observer coverage, NMFS cannot obligate funding for a monitoring program if the total costs to fund that program and existing monitoring programs exceeds its appropriations for that purpose. Consequently, NMFS cannot approve monitoring levels that are insufficiently funded and cannot spend funds on contracts, beyond those provided for in its appropriations.

NMFS also cannot commit to pay for costs that do not fall under its legal obligations to pay for government services. NMFS has interpreted this to mean that it is only obligated to pay for its infrastructure costs to support industry-funded programs and is not obligated to pay for any costs generated from sampling activities for these programs. This standard was applied to the monitoring cost provisions recently proposed in the Herring, Mackerel, and NE Multispecies FMPs and resulted in the disapproval of those measures.

NMFS Greater Atlantic Regional Fisheries Office (GARFO) and Northeast Fisheries Science Center (NEFSC) receive funding amounts through specific budget line items to cover its

[1] Unless otherwise noted, “herring” refers to Atlantic herring and “mackerel” refers to Atlantic mackerel.

costs for monitoring programs. Within the set of funds to cover monitoring programs, the Standardized Bycatch Reporting Methodology (SBRM) Omnibus Amendment further identifies many of those line items (and the funding associated with it), to support infrastructure and sampling under the SBRM sampling protocols. This further restricts the monitoring line items available to fund non-SBRM programs such as those supporting monitoring in specific FMPs beyond the SBRM protocols. Thus, "available Federal funding" refers to any funds in excess of those allocated to meet SBRM, ESA, or MMPA requirements.

Monitoring levels for the NE Multispecies and Atlantic Sea Scallop FMPs are specified through existing processes. Monitoring in the groundfish sectors is required to meet a 30% coefficient of variation (CV) for the catch of groundfish stocks across sectors. While NMFS has paid sampling and infrastructure costs for groundfish sectors in past years, the groundfish sectors are required to cover the sampling costs if NMFS is not able to cover those costs. If funding is not sufficient to cover NMFS infrastructure costs, the FMP objective to meet a 30% CV for catch of groundfish stocks across sectors may not be met. Observer coverage in the scallop fishery is based on SBRM and ESA requirements and sampling costs are funded by a 1% harvest set-aside. Because coverage in the scallop fishery addresses SBRM requirements, SBRM funding is available to cover NMFS infrastructure costs associated with monitoring the scallop fishery. This amendment could apply to the groundfish sectors and scallop fisheries if in a future action the Council desires coverage above levels currently set by those FMPs and/or if the Council wants Federal funding prioritized for NMFS infrastructure costs associated with monitoring groundfish sectors.

The Miscellaneous Receipts Statute requires Federal employees to deposit any money received on behalf of the government into the general Treasury, unless otherwise directed by law. This means that if NMFS could accept funds from the industry, NMFS would be required to direct those funds to the Treasury and would not be able to reserve them to pay for monitoring in the Northeast. The Alaska Region has special authorization in the Magnuson-Stevens Act (MSA) to collect fees from the industry and to put these fees into a fund to be used to defray the costs of monitoring in that region (Section 313). The Greater Atlantic Region does not have such authority, except for cost recovery for Limited Access Privilege Programs (LAPPs). Currently, cost recovery is applicable only to the Atlantic sea scallop limited access general category and the golden tilefish individual fishing quota programs (both are forms of LAPPs). These fisheries, along with the surfclam and ocean quahog fisheries, are the only programs for the Greater Atlantic Region that carry the cost recovery requirement (although cost recovery for the Atlantic Surfclam and Ocean Quahog FMP has not been implemented yet).

Under the LAPP cost recovery authority (Sec 303A(e)) and the authority to establish fees (Sec 304(d)), the MSA requires NMFS to collect a fee to recover the actual costs directly related to the management, data collection, and enforcement of any LAPP and community development quota program that allocates a percentage of the total allowable catch of a fishery to such program. NMFS must collect a fee not to exceed 3 percent of the ex-vessel value of fish harvested under these programs. The fees are deposited into a unique fund that NMFS uses to directly pay for the management, data collection, and enforcement of the program. These costs that can be recovered are those costs that are unique to the operation of the LAPP, and are not costs that would exist under management of the fishery if the LAPP were not in effect. As noted, these requirements are not available for most fisheries because they are not LAPPs. A fishery would first need to be made an LAPP and the cost recovery program developed as part of that LAPP. To help pay for a portion of monitoring costs associated with at-sea, portside, or electronic monitoring, the need for the enhanced monitoring would have to be unique and directly tied to the implementation of the LAPP (and not for simply monitoring the fishery as NMFS would under the current management programs for each fishery). Finally, to add to the complexity of instituting a cost recovery program, LAPPs for the New England Council may not submit, and NMFS may not approve or implement, an FMP or amendment that creates an IFQ (a form of LAPP) unless the proposed program has been approved by more than two thirds of those voting in a referendum. Therefore, while possible to collect fees through cost recovery, the amount is limited, and the process for developing a program that requires cost recovery is complex.

Consistent with current law, there are two mechanisms by which the Greater Atlantic Region may accept outside resources for monitoring. Section 208 of the Magnuson-Stevens Act established a Fisheries Conservation and Management Fund, which may be funded through quota set-asides, appropriations, states or other public sources, and private or nonprofit organizations. This fund may be used to expand the use of electronic monitoring, and each region must be apportioned at least 5 percent of any money contributed to this fund. There have been inquiries about the fund over the years, but to date no contributions have been made. Additionally, Section 403(b) of the Magnuson-Stevens Act allows for NMFS to accept resources and facilities for observer training from state, university, and any appropriate private nonprofit organizations on a limited basis. This provision has not been previously implemented and may have limitations that might undermine its utility for this region's fisheries.

Department of Commerce General Counsel has advised NMFS that monitoring cost responsibilities may be allocated between industry and the government by delineating the at-sea and shoreside portions of the cost of monitoring. Industry would be responsible for costs directly attributable to the at-sea portion of observer coverage and the government would be responsible for costs directly attributable to the shoreside portion of observer coverage, such as observer training and data processing. Costs may be allocated by cost category (i.e., at-sea versus shoreside) but not by a dollar amount or percentage of total costs. When cost responsibility is divided by at-sea and shoreside costs, NMFS cannot be involved in collecting the at-sea portion of the costs, nor may an intermediary collect any shoreside costs on the agency's behalf.

Given these constraints, the joint New England and Mid-Atlantic Fishery Management Council Industry-Funded Monitoring Plan Development Team/Fishery Management Action Team (PDT/FMAT) has been tasked with developing alternatives for the omnibus amendment. However, the options described below would allow NMFS to approve the Councils' future proposals for new monitoring programs while meeting the legal requirements outlined above, and could lead to higher observer coverage levels depending on future funding.

The PDT/FMAT used the following criteria in developing the alternatives outlined in this document. The alternatives must allow NMFS to approve new monitoring programs **without**:

- Obligating itself to pay for any costs beyond its appropriations;
- Obligating itself to redirect appropriations designated for another purpose;
- Obligating itself to pay for costs it is not required to by law; and/or
- Requiring itself to accept funds from the fishing industry or other entity in order to meet its obligations.

Additionally, the PDT/FMAT developed the concept of monitoring *coverage targets*, rather than *mandatory coverage levels*, for industry-funded monitoring to achieve on an annual basis to meet certain FMP objectives above and beyond SBRM. The realized coverage in a given year would be determined by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM and the specified coverage target. Establishing monitoring coverage targets would allow NMFS to approve and implement new industry-funded monitoring programs, without committing to support coverage levels above appropriated funding or before funding is determined to be available.

However, this industry-funded omnibus amendment WOULD NOT automatically allow for higher coverage levels in Northeast fisheries. This amendment establishes tools that NMFS and the Councils could use to provide additional monitoring in Northeast fisheries when Federal funding is available. Therefore, during years when there is no additional funding to cover NMFS cost responsibilities above funding for SBRM, the tools developed in this amendment would not be used and there would be no additional monitoring coverage, even if industry is able to fully fund their cost responsibilities.

## 1.1 PURPOSE AND NEED FOR ACTION

The purpose of this action is to consider measures that would allow the Councils to implement industry-funded monitoring coverage in New England and Mid-Atlantic FMPs. This amendment would allow industry funding to be used in conjunction with available Federal funding to pay for additional monitoring to meet FMP-specific coverage targets. This amendment also considers (1) standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry, (2) a process for FMP-specific industry-funded monitoring to be implemented via a future framework adjustment action, (3) standard administrative requirements for industry-funded monitoring service providers, and (4) a process to prioritize available Federal funding for industry-funded monitoring across FMPs. This action is needed to allow Councils to implement industry-funded monitoring programs for Greater Atlantic Region, and prioritize the allocation of federal funding across those programs when available funding falls short of the total need. Additionally, this amendment has a second purpose, to consider monitoring coverage targets for the Atlantic Herring FMP and the Atlantic Mackerel, Squid, Butterfish (MSB) FMP, which are anticipated to enhance the monitoring of at-sea catch of herring, mackerel, river herring, shad, haddock, and other species harvested in the herring and mackerel fisheries. This action is needed to allow the Councils to monitor catch in these fisheries at their desired levels. This amendment is being done as an omnibus to ensure consistency for industry-funded monitoring programs across New England and Mid-Atlantic FMPs.

# 2.0 MANAGEMENT ALTERNATIVES

The PDT/FMAT for this amendment has developed a range of management alternatives for the Councils to consider. These alternatives include the following:

- Standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry;
- A process by which industry-funded monitoring programs (e.g., at-sea monitoring, dockside monitoring, electronic monitoring) can be implemented via framework adjustment in each FMP;
- Standards for industry-funded monitoring service providers (e.g., for dockside monitoring, at-sea monitoring);
- A process by which NMFS and/or the Councils would prioritize available Federal funding for industry-funded monitoring across FMPs, when Federal funding is not sufficient to meet all coverage targets; and
- Monitoring coverage targets or requirements for certain permit categories and/or gear types for the herring and mackerel fisheries.

## 2.1 OMNIBUS ALTERNATIVES

The following alternatives consider provisions that would apply to all New England and Mid-Atlantic FMPs, including (1) standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry, (2) process for FMP-specific industry-funded monitoring to be implemented via a future framework adjustment action, (3) standard administrative requirements for industry-funded monitoring service providers, and (4) process to prioritize available Federal funding for industry-funded monitoring across FMPs.

### 2.1.1 Omnibus Alternative 1: No Industry-funded Monitoring Programs (No Action)

Under Omnibus Alternative 1 (No Action), there would be no standardized structure developed for Greater Atlantic Region industry-funded monitoring programs. There would be no standard definition of costs and cost responsibility for industry-funded monitoring in the New England and Mid-Atlantic fisheries. Cost definitions and the determination of who pays for them would be considered individually by each FMP as industry-funded monitoring programs are developed. Under Omnibus Alternative 1, there would be no process to prioritize available Federal funding to meet Council desired monitoring coverage target above and beyond SBRM coverage and no standard administrative requirements for industry-funded monitoring service providers. The allocation of available Federal funding to increase monitoring to meet Council desired coverage levels and observer service provider requirements for industry-funded monitoring would be evaluated on an case-by-case, FMP-by-FMP basis. Additionally, under Omnibus Alternative 1, there would be no framework adjustment process to implement FMP-specific industry-funded monitoring. Rather, industry-funded monitoring programs would be developed and established in FMP-specific amendments.

### Timing for the Omnibus Alternative 1 (No Action)

The following table outlines the existing timeline for seaday allocation related to SBRM, Sector At-sea monitoring, and the scallop fishery (compensation rate determination). The SBRM year runs from April to March, the NE Multispecies fishing year runs from May to April, and the scallop fishing year runs from March to February. The schedule below would remain unchanged under the status quo alternative.

**TABLE 1. STATUS QUO TIMING OF GREATER ATLANTIC REGION SBRM, SECTOR AND SCALLOP MONITORING ALLOCATION AND ANALYSIS**

| Year | Month | SBRM schedule | Sector ASM Schedule | Scallop Compensation Rate Determination Schedule |
|---|---|---|---|---|
| **Year 1** | January to April | | | |
| | April/May | | | |
| | May to October | | | |
| | October | • Observer data July Year 0 – June Year 1 available<br>• Begin analysis for SBRM | Work on analysis for sector ASM using most recent complete fishing year (May Year 0 – April Year 1) | |
| | November | Work on discard estimation analysis for SBRM from November through early February | | |
| | December | | | |
| **Year 2** | January | Receive Year 2 budget | Sector ASM coverage rates published in proposed rule | Determine compensation rate |
| | February | | Collect public comment | |
| | March | If funding shortfall, run SBRM prioritization process | Sector ASM coverage rates published in final rule | Begin Year 2 |
| | April | Determine and begin Year 2 seaday schedule | Determine seaday schedule | Determine and begin seaday schedule |
| | May | | Begin Sector ASM Year 2 | |

## 2.1.2 Omnibus Alternative 2: Industry-funded Monitoring Programs

Under Omnibus Alternative 2, there would be an established, standardized structure for industry-funded monitoring programs that would apply to all New England and Mid-Atlantic FMPs that choose to use industry funding to increase monitoring. This industry-funded monitoring program structure would include the following components: (1) standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry, (2) process for FMP-specific industry-funded monitoring to be implemented via a future framework adjustment action, and (3) standard administrative requirements for industry-funded monitoring service providers. Additionally, Omnibus Alternative 2 would include a range of option for the process to prioritize available Federal funding for industry-funded monitoring across FMPs. No individual FMP would be subject to an industry-funded monitoring program as a result of implementation of this action. Rather, any FMP that wishes to develop an industry-funded monitoring program would need to develop the program that meets the specifications of this action in a separate framework or amendment.

### Standard Cost Responsibilities

Omnibus Alternative 2 would include standard cost responsibilities between NMFS and the industry for supporting monitoring programs targeting coverage above and beyond SBRM. Because there are legal requirements that dictate cost responsibilities, as described in the Introduction, certain costs must be borne by NMFS. These cost responsibilities would be codified into regulation for industry-funded monitoring in New England and Mid-Atlantic FMPs. If Omnibus Alternative 2 was not selected by the Councils, cost responsibilities for industry-funded monitoring would be codified on an FMP-by-FMP basis.

The cost responsibilities described below would be considered by the Councils when developing any industry-funded monitoring program for New England and Mid-Atlantic FMP in future actions. The cost responsibilities described below are already in operation in the Atlantic Sea Scallop and NE Multispecies FMPs, although the cost responsibilities are not explicitly defined in those FMPs. Selection of the Omnibus Alternative 2 would codify NMFS cost responsibilities for industry-funded monitoring into regulation for all New England and Mid-Atlantic FMPs, but it would not change industry-funded monitoring in the scallop or multispecies fisheries.

<u>NMFS Cost Responsibilities</u>
NMFS would be responsible for funding the costs to set standards for, monitor performance of, and support industry-funded monitoring programs. These program elements would include:

- The labor and facilities costs associated training and debriefing of monitors
- NFMS-issued gear (e.g., electronic reporting aids)

- Certification of monitoring providers and individual monitors; performance monitoring to maintain certificates
- Developing and executing vessel selection
- Data processing
- Costs associated with liaison activities between service providers, and NMFS, Coast Guard, Councils, sector managers and other partners

Based on fiscal year 2013 expenses, the following table shows the level of costs required to support the deployment of Northeast observers. These are presented as annual costs because while some components can be scaled up proportional to an increase in the total number of sea days, many cannot be scaled proportionally. For example, an increase in observer days would increase the number of hours needed to process data and that need could be met by hiring additional data processing personnel (proportional to the increased need). However, the facilities (particularly office space) needed to accommodate the additional data processing personnel is not proportionally scalable. The approximately $5 million of NMFS costs, detailed below, could support about 15,000 sea days per year. The currently leased facilities could accommodate additional personnel to support an additional 2,000 sea days. However, beyond that new facilities cost would have to be incurred. Facility costs cannot be obtained in small increments, so if sea days beyond 17,000 are considered, new facilities would have to be obtained so that there is sufficient capacity to cover the upper end of any anticipated increase.

The operational costs are presented as a single figure and are not broken out by each of the three components because there is some overlap, particularly when allocating employees' time over these activities.

### TABLE 2. NMFS COST RESPONSIBILITIES

| NMFS Cost Responsibilities | | Annual Cost (FY2013) for all Programs (NEFOP, ASM, and industry funded scallops) |
|---|---|---|
| **Training and Data Processing Costs** | The labor and facilities costs associated with training and debriefing of monitors | $805,700 |
| | Data processing | $2,057,100 |
| **Operational Costs** | Certification of monitoring providers and individual monitors; performance monitoring to maintain certifications | $2,244,700 |
| | Developing and executing vessel selection | |
| | Costs associated with liaison activities between service providers, NMFS, Councils, sectors and other partners | |
| **Total** | | $5,107,500 |

<u>Industry Cost Responsibilities</u>
The industry would be responsible for funding all other costs of the monitoring program. These program elements and activities would include, but are not limited to:

- Costs to the provider for deployments and sampling (e.g., travel and salary for observer deployments and debriefing)
- Equipment, as specified by NMFS, to the extent not provided by NMFS
- Costs to the provider for observer time and travel to a scheduled deployment that doesn't sail and was not canceled by the vessel prior to the sail time.
- Provider overhead and project management costs (e.g., provider office space, administrative and management staff, recruitment costs, salary and per diem for trainees)
- Other costs of the provider to meet performance standards laid out by a fishery management plan

NMFS costs to support industry-funded monitoring must be fully funded with Federal funds. The industry would be responsible for its cost responsibilities, unless it was determined that Federal funds were also available to offset industry cost responsibilities. The administrative mechanism by which industry cost responsibilities could be offset using available Federal funding is being developed by NMFS separately and can be used in conjunction with Omnibus Alternative 2.

The industry cost responsibilities are presented as costs per sea day because these costs are, for the most part, proportionally scalable to the number of sea days. These per day costs by cost component are shown in the table below. This per day cost estimate does not include "Other costs of the provider to meet performance standards laid out by a fishery management plan" because those costs will not be known until the details are made explicit in subsequent management plans. These costs are based on at-sea monitoring (ASM) costs from October 2012 through May 2014 and are averaged across the three service providers.

### TABLE 3. INDUSTRY COST RESPONSIBILITIES

| Industry Cost Responsibilities | Cost per observed sea day (FY2013) |
|---|---|
| Costs to the provider for deployments and sampling (e.g., travel and salary for observer deployments and debriefing) | Sea day charges paid to providers: $640/day<br>Travel: $71/day<br>Meals: $22/day<br>Other non-sea day charges: $12/day |
| Equipment, as specified by NMFS, to the extent not provided by NMFS | $11/day |
| Costs to the provider for observer time and travel to a scheduled deployment that doesn't sail and was not canceled by the vessel prior to the sail time. | $1/day |
| Provider overhead and project management costs not included in sea day charges above (e.g., per diem costs for trainees) ) | Training: $61/day |
| Other costs of the provider to meet performance standards laid out by a fishery management plan | TBD – won't know these costs until an industry funded observer coverage program is implemented in a fishery |
| Total (not including other costs) | $818/day |

Industry costs would be largely determined by the contracts with the service providers. For example, the $640/day paid to providers may cover such things as: Labor and overtime, data editing, project management and administration, benefits (vacation and sick leave), health insurance, and workers compensation. Additionally, service providers may have individual requirements for training and debriefing, such as annual observer training or semi-annual safety training.

Cost for industry-funded monitoring programs is a very important consideration. The requirement to pay for an observer increases operating costs for fishing vessels, which in turn reduces net revenues. While the total cost for each seaday described in the table above can vary between service providers, the individual components described in the table (i.e., costs for deployment and sampling, costs for equipment) are necessary to successfully execute a monitoring program. Because each of these components is essential, in most cases, it is not appropriate to reduce industry's cost responsibilities by removing or adjusting components of the seaday cost. Since vessels would be contracting directly with observer providers they may be able to negotiate somewhat lower prices, but due to the requirements for observers and observer providers, the ability to negotiate lower prices may be limited. Also, since vessels are contracting with the providers for much smaller amounts of observer coverage than NMFS does, project management costs for observer providers may increase, which would tend to increase the costs that providers charge for contracts directly with vessels.

There are two, more appropriate ways to limit the costs of an industry-funded monitoring program for industry. Both of these approaches limit the total cost of the observer program rather than adjusting the industry cost responsibilities. The first way to limit costs to industry is to set coverage levels at the lowest level necessary to gather information to meet program goals. For example, it may be possible to increase precision around discard estimates for a certain species by setting a coverage target of 50 percent, rather than a coverage target of 100 percent. The second way to limit costs to industry is to select the appropriate type of coverage to meet program goals. For example, it may be more cost effective to use electronic monitoring rather than at-sea observers to confirm compliance with slippage prohibitions on herring and mackerel vessels.

### Framework Adjustment Process

Omnibus Alternative 2 would include the ability for Councils to implement industry-funded monitoring programs, including at-sea monitoring, dockside monitoring, or electronic monitoring, through framework adjustments to the relevant FMP. Omnibus Alternative 2 would provide the option to implement new industry-funded monitoring programs via a framework adjustment, but it would not require new industry-funded monitoring programs to be implemented via a framework. Under Omnibus Alternative 2, Councils would retain the ability to implement new industry-funded monitoring program via the amendment process. If Omnibus Alternative 2 was not selected by the Councils, a full FMP amendment would be required to implement industry-funded monitoring programs for all New England and Mid-Atlantic fisheries, excluding existing industry funded monitoring programs in the Scallop and Multispecies FMP and any program developed in this action for the Herring or MSB FMPs.

Under Omnibus Alternative 2, the details of any industry-funded monitoring program, including at-sea, dockside, or electronic monitoring, would be specified and/or modified in a subsequent framework adjustment to the relevant FMP. These details may include, but are not limited to: (1) Level and type of coverage target, (2) rationale for level and type of coverage, (3) minimum level of coverage necessary to meet coverage goals, (4) consideration of coverage waivers if coverage target cannot be met, (5) process for vessel notification and selection, (6) fee collection and administration, (7) standards for monitoring service providers, and (8) any other measures necessary to implement the industry-funded monitoring program. Additional National Environmental Policy Act (NEPA) analysis would be required for any action implementing and/or modifying industry-funded monitoring programs regardless if it required a framework adjustment or full amendment.

Omnibus Alternative 2 contains a framework adjustment component for the known types of monitoring that are available for Northeast fisheries. Once a new industry-funded monitoring program is established through a framework adjustment, it would become subject to prioritization for funding under one of the alternatives for the prioritization process described later in this document. The existing types of monitoring programs include:

1. At-sea monitoring focuses data collection at sea, recording the type and quantity of retained and/or discarded catch.
2. Dockside monitoring focuses data collection at the dock, accounting for landings of target species and incidental catch. If all fish caught are retained and landed, dockside monitoring can also record type and quantity of total catch.
3. Electronic monitoring uses video cameras and other sensors to monitor discards at sea or to monitor compliance with full retention requirements or other at-sea requirements. The first Northeast FMP that develops an electronic monitoring program would also establish standard administrative requirements for electronic monitoring service providers for all FMPs.

Depending on the information needs for a given fishery, a dockside and/or electronic monitoring program could be used in addition to at-sea monitoring to provide more complete catch monitoring, or to reduce the overall monitoring costs for a given fishery (if dockside or electronic monitoring can be administered at a lower cost).

Cost for industry-funded monitoring programs is a very important consideration. The requirement to pay for an observer drastically increases operating costs for fishing vessels, which in turn reduces revenues. The best ways to limit the financial burden of an industry-funded monitoring program is to carefully design the program to minimize total program costs. As described in the cost responsibility discussion above, this can be accomplished by setting coverage levels at the lowest level necessary to gather information to meet program goals (i.e., not setting the coverage target at 100 percent if only 50 percent is necessary), or by selecting the appropriate type of coverage to meet program goals (i.e., choosing a less expensive type of monitoring, like dockside or electronic monitoring).

## Monitoring Service Providers

Omnibus Alternative 2 would include standard administrative requirements for industry-funded monitoring service providers, including at-sea monitoring and dockside monitoring. Because service provider standards for electronic monitoring are just starting to be considered across NMFS, it is likely premature to include service provider standards for electronic monitoring in this amendment. Omnibus Alternative 2 would include the ability for Councils to implement service provider standards for electronic monitoring through a future omnibus framework adjustment to New England and Mid-Atlantic FMPs. The first Northeast FMP that develops an electronic monitoring program would also establish standard administrative requirements for electronic monitoring service providers for all FMPs. If Omnibus Alternative 2 is not selected by the Councils, service provider requirements for industry-funded monitoring programs would be developed and implemented in individual FMPs.

The SBRM Omnibus Amendment, if approved, would modify the scallop industry-funded observer service provider requirements (at 50 CFR 648.11(h) and (i)) to apply to all New England and Mid-Atlantic FMPs as of April 2015. Specifically, the SBRM Amendment would authorize observer service provider approval and certification for all applicable fisheries, should a Council develop and implement a requirement or option for an industry-funded observer program in other fisheries beside scallops. However, the SBRM Amendment does not address service provider requirements for other types of industry-funded monitoring programs.

Omnibus Alternative 2 would modify the SBRM observer service provider approval and certification process to be a monitoring service provider approval and certification process that would apply to observer and dockside service providers for all New England and Mid-Atlantic FMPs. The selection of Omnibus Alternative 2 would not implement any new observer or dockside monitoring programs, but would only implement a process and standards to approve and certify monitoring service providers. In the future, if the Councils implement any industry-funded monitoring programs through a future action, the process to develop those monitoring programs would be streamlined.

The following section contains observer service provider regulations based on draft SBRM Amendment regulations. Omnibus Alternative 2 would revise these regulations so that they would apply to both at-sea and dockside observers. Additionally, regulations may be revised as part of this amendment to better address requirements associated with Omnibus Alternative 2. Suggested changes from draft SBRM regulations are highlighted.

**§ 648.11 At-sea sea sampler/observer (at-sea or dockside) coverage.**

(h) *Observer service provider approval and responsibilities* – (1) *General*. An entity seeking to provide observer services must apply for and obtain approval from NMFS following submission of a complete application. A list of approved observer service providers shall be distributed to vessel owners and shall be posted on the NMFS/NEFOP website at: www.nefsc.noaa.gov/femad/fsb/.

(2) [Reserved]

(3) *Contents of application*. An application to become an approved observer service provider shall contain the following:

(i) Identification of the management, organizational structure, and ownership structure of the applicant's business, including identification by name and general function of all controlling management interests in the company, including but not limited to owners, board members, officers, authorized agents, and staff. If the applicant is a corporation, the articles of incorporation must be provided. If the applicant is a partnership, the partnership agreement must be provided.

(ii) The permanent mailing address, phone and fax numbers where the owner(s) can be contacted for official correspondence, and the current physical location, business mailing address, business telephone and fax numbers, and business email address for each office.

(iii) A statement, signed under penalty of perjury, from each owner or owners, board members, and officers, if a corporation, that they are free from a conflict of interest as described under paragraph (h)(6) of this section.

(iv) A statement, signed under penalty of perjury, from each owner or owners, board members, and officers, if a corporation, describing any criminal conviction(s), Federal contract(s) they have had and the performance rating they received on the contracts, and previous decertification action(s) while working as an observer or observer service provider.

(v) A description of any prior experience the applicant may have in placing individuals in remote field and/or marine work environments. This includes, but is not limited to, recruiting, hiring, deployment, and personnel administration.

(vi) A description of the applicant's ability to carry out the responsibilities and duties of a fishery observer services provider as set out under paragraph (h)(5) of this section, and the arrangements to be used.

(vii) Evidence of holding adequate insurance to cover injury, liability, and accidental death for observers during their period of employment (including during training). Workers' Compensation and Maritime Employer's Liability insurance must be provided to cover the observer, vessel owner, and observer provider. The minimum coverage required is $5 million. Observer service providers shall provide copies of the insurance policies to observers to display to the vessel owner, operator, or vessel manager, when requested.

(viii) Proof that its observers, whether contracted or employed by the service provider, are compensated with salaries that meet or exceed the U.S. Department of Labor (DOL) guidelines for observers. Observers shall be compensated as Fair Labor Standards Act (FLSA) non-exempt employees. Observer providers shall provide any other benefits and personnel services in accordance with the terms of each observer’s contract or employment status.

(ix) The names of its fully equipped, NMFS/NEFOP certified, observers on staff or a list of its training candidates (with resumes) and a request for an appropriate NMFS/NEFOP Observer Training class. The NEFOP training has a minimum class size of eight individuals, which may be split among multiple vendors requesting training. Requests for training classes with fewer than eight individuals will be delayed until further requests make up the full training class size.

(x) An Emergency Action Plan (EAP) describing its response to an “at sea” emergency with an observer, including, but not limited to, personal injury, death, harassment, or intimidation.

(4) *Application evaluation*. (i) NMFS shall review and evaluate each application submitted under paragraph (h)(3) of this section. Issuance of approval as an observer provider shall be based on completeness of the application, and a determination by NMFS of the applicant's ability to perform the duties and responsibilities of a fishery observer service provider, as demonstrated in the application information. A decision to approve or deny an application shall be made by NMFS within 15 business days of receipt of the application by NMFS.

(ii) If NMFS approves the application, the observer service provider's name will be added to the list of approved observer service providers found on the NMFS/NEFOP website specified in paragraph (h)(1) of this section, and in any outreach information to the industry. Approved observer service providers shall be notified in writing and provided with any information pertinent to its participation in the fishery observer program.

(iii) An application shall be denied if NMFS determines that the information provided in the application is not complete or the evaluation criteria are not met. NMFS shall notify the applicant in writing of any deficiencies in the application or information submitted in support of the application. An applicant who receives a denial of his or her application may present additional information to rectify the deficiencies specified in the written denial, provided such information is submitted to NMFS within 30 days of the applicant's receipt of the denial notification from NMFS. In the absence of additional information, and after 30 days from an applicant's receipt of a denial, an observer provider is required to resubmit an application containing all of the information required under the application process specified in paragraph (h)(3) of this section to be re-considered for being added to the list of approved observer service providers.

(5) *Responsibilities observer service providers*. (i) An observer service provider must provide observers certified by NMFS/NEFOP pursuant to paragraph (i) of this section for deployment in a fishery when contacted and contracted by the owner, operator, or vessel manager of a fishing vessel, unless the observer provider refuses to deploy an observer on a requesting vessel for any of the reasons specified at paragraph (h)(5)(viii) of this section.

(ii) An observer service provider must provide to each of its observers:

(A) All necessary transportation, including arrangements and logistics, of observers to the initial location of deployment, to all subsequent vessel assignments, and to any debriefing locations, if necessary;

(B) Lodging, per diem, and any other services necessary for observers assigned to a fishing vessel or to attend an appropriate NMFS/NEFOP observer training class;

(C) The required observer equipment, in accordance with equipment requirements listed on the NMFS/NEFOP website specified in paragraph (h)(1) of this section, prior to any deployment and/or prior to NMFS observer certification training; and

(D) Individually assigned communication equipment, in working order, such as a mobile phone, for all necessary communication. An observer service provider may alternatively compensate observers for the use of the observer's personal mobile phone, or other device, for communications made in support of, or necessary for, the observer's duties.

(iii) *Observer deployment logistics*. Each approved observer service provider must assign an available certified observer to a vessel upon request. Each approved observer service provider must be accessible 24 hours per day, 7 days per week, to enable an owner, operator, or manager of a vessel to secure observer coverage when requested. The telephone system must be monitored a minimum of four times daily to ensure rapid response to industry requests. Observer service providers approved under paragraph (h) of this section are required to report observer deployments to NMFS daily for the purpose of determining whether the predetermined coverage levels are being achieved in the appropriate fishery.

(iv) *Observer deployment limitations*. (A) A candidate observer's first four deployments and the resulting data shall be immediately edited and approved after each trip by NMFS/NEFOP prior to any further deployments by that observer. If data quality is considered acceptable, the observer would be certified.

(B) Unless alternative arrangements are approved by NMFS, an observer provider must not deploy any observer on the same vessel for more than two consecutive multi-day trips, and not more than twice in any given month for multi-day deployments.

(v) *Communications with observers*. An observer service provider must have an employee responsible for observer activities on call 24 hours a day to handle emergencies involving observers or problems concerning observer logistics, whenever observers are at sea, stationed shoreside, in transit, or in port awaiting vessel assignment.

(vi) *Observer training requirements*. The following information must be submitted to NMFS/NEFOP at least 7 days prior to the beginning of the proposed training class: A list of observer candidates; observer candidate resumes; and a statement signed by the candidate, under penalty of perjury, that discloses the candidate's criminal convictions, if any. All observer trainees must complete a basic cardiopulmonary resuscitation/first aid course prior to the end of a NMFS/NEFOP Observer Training class. NMFS may reject a candidate for training if the candidate does not meet the minimum qualification requirements as outlined by NMFS/NEFOP minimum eligibility standards for observers as described on the NMFS/NEFOP website.

(vii) *Reports*. (A) *Observer deployment reports*. The observer service provider must report to NMFS/NEFOP when, where, to whom, and to what fishery ( including Open Area or Access Area for sea scallop trips) an observer has been deployed, within 24 hours of the observer's departure. The observer service provider must ensure that the observer reports back to NMFS its Observer Contract (OBSCON) data, as described in the certified observer training, within 24 hours of landing. OBSCON data are to be submitted electronically or by other means specified by NMFS. The observer service provider shall provide the raw (unedited) data collected by the observer to NMFS within 4 business days of the trip landing.

(B) *Safety refusals*. The observer service provider must report to NMFS any trip that has been refused due to safety issues, e.g., failure to hold a valid USCG Commercial Fishing Vessel Safety Examination Decal or to meet the safety requirements of the observer's pre-trip vessel safety checklist, within 24 hours of the refusal.

(C) *Biological samples*. The observer service provider must ensure that biological samples, including whole marine mammals, sea turtles, and sea birds, are stored/handled properly and transported to NMFS within 7 days of landing.

(D) *Observer debriefing*. The observer service provider must ensure that the observer remains available to NMFS, either in-person or via phone, at NMFS' discretion, including NMFS Office for Law Enforcement, for debriefing for at least 2 weeks following any observed trip. If requested by NMFS, an observer that is at sea during the 2-week period must contact NMFS upon his or her return.

(E) *Observer availability report*. The observer service provider must report to NMFS any occurrence of inability to respond to an industry request for observer coverage due to the lack of available observers by 5 p.m., Eastern Time, of any day on which the provider is unable to respond to an industry request for observer coverage.

(F) *Other reports*. The observer service provider must report possible observer harassment, discrimination, concerns about vessel safety or marine casualty, or observer illness or injury; and any information, allegations, or reports regarding observer conflict of interest or breach of the standards of behavior, to NMFS/NEFOP within 24 hours of the event or within 24 hours of learning of the event.

(G) *Observer status report*. The observer service provider must provide NMFS/NEFOP with an updated list of contact information for all observers that includes the observer identification number, observer's name, mailing address, email address, phone numbers, homeports or fisheries/trip types assigned, and must include whether or not the observer is "in service," indicating when the observer has requested leave and/or is not currently working for an industry funded program.

(H) *Vessel contract*. The observer service provider must submit to NMFS/NEFOP, if requested, a copy of each type of signed and valid contract (including all attachments, appendices, addendums, and exhibits incorporated into the contract) between the observer provider and those entities requiring observer services.

(I) *Observer contract.* The observer service provider must submit to NMFS/NEFOP, if requested, a copy of each type of signed and valid contract (including all attachments, appendices, addendums, and exhibits incorporated into the contract) between the observer provider and specific observers.

(J) *Additional information*. The observer service provider must submit to NMFS/NEFOP, if requested, copies of any information developed and/or used by the observer provider and distributed to vessels, such as informational pamphlets, payment notification, description of observer duties, etc.

(viii) *Refusal to deploy an observer*. (A) An observer service provider may refuse to deploy an observer on a requesting fishing vessel if the observer service provider does not have an available observer within 48 hours of receiving a request for an observer from a vessel.

(B) An observer service provider may refuse to deploy an observer on a requesting fishing vessel if the observer service provider has determined that the requesting vessel is inadequate or unsafe pursuant to the reasons described at §600.746.

(C) The observer service provider may refuse to deploy an observer on a fishing vessel that is otherwise eligible to carry an observer for any other reason, including failure to pay for previous observer deployments, provided the observer service provider has received prior written confirmation from NMFS authorizing such refusal.

(6) *Limitations on conflict of interest*. An observer service provider:

(i) Must not have a direct or indirect interest in a fishery managed under Federal regulations, including, but not limited to, a fishing vessel, fish dealer, fishery advocacy group, and/or fishery research;

(ii) Must assign observers without regard to any preference by representatives of vessels other than when an observer will be deployed; and

(iii) Must not solicit or accept, directly or indirectly, any gratuity, gift, favor, entertainment, loan, or anything of monetary value from anyone who conducts fishing or fishing related activities that are regulated by NMFS, or who has interests that may be substantially affected by the performance or nonperformance of the official duties of observer providers.

(7) *Removal of observer service provider from the list of approved observer service providers*. An observer service provider that fails to meet the requirements, conditions, and responsibilities specified in paragraphs (h)(5) and (h)(6) of this section shall be notified by NMFS, in writing, that it is subject to removal from the list of approved observer service providers. Such notification shall specify the reasons for the pending removal. An observer service provider that has received notification that it is subject to removal from the list of approved observer service providers may submit written information to rebut the reasons for removal from the list. Such rebuttal must be submitted within 30 days of notification received by the observer service provider that the observer service provider is subject to removal and must be accompanied by written evidence rebutting the basis for removal. NMFS shall review information rebutting the pending removal and shall notify the observer service provider within 15 days of receipt of the rebuttal whether or not the removal is warranted. If no response to a pending removal is received by NMFS, the observer service provider shall be automatically removed from the list of approved observer service providers. The decision to remove the observer service provider from the list, either after reviewing a rebuttal, or if no rebuttal is submitted, shall be the final decision of NMFS and the Department of Commerce. Removal from the list of approved observer service providers does not necessarily prevent such observer service provider from obtaining an approval in the future if a new application is submitted that demonstrates that the reasons for removal are remedied. Certified observers under contract with an observer service provider that has been removed from the list of approved service providers must complete their assigned duties for any fishing trips on which the observers are deployed at the time the observer service provider is removed from the list of approved observer service providers. An observer service provider removed from the list of approved observer service providers is responsible for providing NMFS with the information required in paragraph (h)(5)(vii) of this section following completion of the trip. NMFS may consider, but is not limited to, the following in determining if an observer service provider may remain on the list of approved observer service providers:

(i) Failure to meet the requirements, conditions, and responsibilities of observer service providers specified in paragraphs (h)(5) and (h)(6) of this section;

(ii) Evidence of conflict of interest as defined under paragraph (h)(6) of this section;

(iii) Evidence of criminal convictions related to:

(A) Embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; or

(B) The commission of any other crimes of dishonesty, as defined by state law or Federal law, that would seriously and directly affect the fitness of an applicant in providing observer services under this section;

(iv) Unsatisfactory performance ratings on any Federal contracts held by the applicant; and

(v) Evidence of any history of decertification as either an observer or observer provider.

(i) *Observer certification*.

(1) To be certified, employees or sub-contractors operating as observers for observer service providers approved under paragraph (h) of this section must meet NMFS National Minimum Eligibility Standards for observers. NMFS National Minimum Eligibility Standards are available at the National Observer Program website and include a requirement that observers have a college degree: www.nmfs.noaa.gov/op/pds/categories/science_and_technology.html.

(2) *Observer training*. In order to be deployed on any fishing vessel, a candidate observer must have passed an appropriate NMFS/NEFOP Observer Training course. If a candidate fails training, the candidate shall be notified in writing on or before the last day of training. The notification will indicate the reasons the candidate failed the training. Observer training shall include an observer training trip, as part of the observer's training, aboard a fishing vessel with a trainer. A candidate observer's first four deployments and the resulting data shall be immediately edited and approved after each trip by NMFS/NEFOP, prior to any further deployments by that observer. If data quality is considered acceptable, the observer would be certified.

(3) *Observer requirements*. All observers must:

(i) Have a valid NMFS/NEFOP fisheries observer certification pursuant to paragraph (i)(1) of this section;

(ii) Be physically and mentally capable of carrying out the responsibilities of an observer on board fishing vessels, pursuant to standards established by NMFS. Such standards are available from NMFS/NEFOP website specified in paragraph (h)(1) of this section and shall be provided to each approved observer service provider;

(iii) Have successfully completed all NMFS-required training and briefings for observers before deployment, pursuant to paragraph (i)(2) of this section; and

(iv) Hold a current Red Cross (or equivalence) CPR/First Aid certification.

(v) Accurately record their sampling data, write complete reports, and report accurately any observations relevant to conservation of marine resources or their environment.

(4) *Probation and decertification*. NMFS may review observer certifications and issue observer certification probation and/or decertification as described in NMFS policy found on the NMFS/NEFOP website specified in paragraph (h)(1) of this section.

(5) *Issuance of decertification*. Upon determination that decertification is warranted under paragraph (i)(4) of this section, NMFS shall issue a written decision to decertify the observer to the observer and approved observer service providers via certified mail at the observer's most

current address provided to NMFS. The decision shall identify whether a certification is revoked and shall identify the specific reasons for the action taken. Decertification is effective immediately as of the date of issuance, unless the decertification official notes a compelling reason for maintaining certification for a specified period and under specified conditions. Decertification is the final decision of NMFS and the Department of Commerce and may not be appealed.

The requirements for groundfish sector at-sea monitor service providers are identical to the service provider requirements described above, with a few exceptions. List exceptions… The service provider requirements for groundfish sector at-sea monitor service provider are located at 648.87 (b)(4) independent third-party monitoring provider standards and (b)(5) at-sea/electronic monitoring operational standards.

## Prioritization Process

Omnibus Alternative 2 includes a prioritization process to allocate available Federal funding across FMPs to cover NMFS cost responsibilities for coverage targets above and beyond SBRM and independent from ESA and MMPA requirements. Again, due to legal and budgetary constraints described in the Introduction, NMFS cannot approve and implement monitoring requirements for which it does not have the Federal funding to cover NMFS cost responsibilities. NMFS can, however, approve coverage targets associated with industry-funded monitoring programs for FMPs with the understanding that annual funding available to cover NMFS cost responsibilities will dictate realized coverage levels.

When industry-funded monitoring programs and coverage levels exist for multiple FMPs (e.g., the herring and mackerel FMPs), and when Federal funding is not sufficient to cover all associated NMFS cost responsibilities, the Councils and/or NMFS must decide how to allocate available Federal funding across the relevant FMPs. Available Federal funding refers to any funds in excess of those allocated to meet SBRM or other existing monitoring requirements. The prioritization processes outlined in Omnibus Alternative 2 would guide the allocation of available Federal funding to cover NMFS cost responsibilities, and would determine which industry-funded monitoring programs would operate for a given year and which would not.

Alternatives 2.1 and 2.2 provide the Councils and NMFS with more discretion to make trade-offs between FMPs, but also require more recurring analysis and resources. The primary difference between these two alternatives is who (NMFS or Councils) would lead the prioritization process and analysis. Alternatives 2.3, 2.4, and 2.5 use formulaic approaches, eliminating much of the discretion and analytical burden of Alternatives 2.1 and 2.2. However, the formulaic approaches in Alternatives 2.3, 2.4 and 2.5 may reduce the effectiveness of the resulting outcome. Under all of the options described below, the industry would be responsible for covering its cost responsibilities, unless it was determined that Federal funds were also available to be used to offset industry cost responsibilities. If Omnibus Alternative 2 was not selected by the Councils, available Federal funding would be allocated toward industry-funded monitoring on an FMP-by-FMP basis.

The following table helps better facilitate comparison of the discretionary prioritization alternatives and the formulaic prioritization alternatives.

**TABLE 4. PROS AND CONS OF DISCRETIONARY VERSUS FORMULAIC PRIORITIZATION ALTERNATIVES.**

| | Pros | Cons |
|---|---|---|
| **Discretionary Alternatives: Alternative 2.1 and 2.2** | More discretion over funding priorities | Complex, and requires additional workload to prioritize |
| | Takes objectives and context into account | Timeline > 1 year |
| | Could result in funding of most important programs first | Requires rulemaking |
| **Formulaic Alternatives: Alternatives 2.3, 2.4, and 2.5** | Shorter timeline | No discretion |
| | Adaptive to budget changes and timing | Blunt instrument |

#### 2.1.2.1 Omnibus Alternative 2.1: NMFS-led Prioritization Process for Industry-funded Monitoring Programs

Under Omnibus Alternative 2.1, the Regional Administrator and Science and Research Director would use the weighting approach below to determine, in consultation with the Councils, how to allocate NMFS available resources to support NMFS cost responsibilities required to achieve coverage targets for industry-funded monitoring coverage. After those costs are funded, NMFS would also determine, in consultation with the Councils, the allocation of any remaining funding available to offset industry costs established in this amendment for the Herring and MSB FMPs and other FMP actions. The costs would be defined as described by Omnibus Alternative 2. Funding for SBRM, ESA, and MMPA observer coverage would not be changed by this measure. Any funding for industry-funded monitoring programs would be allocated separately from any funding for SBRM or other statutory requirements and any coverage would be above and beyond coverage for SBRM or other statutory requirements.

The prioritization process would have the following steps:

1. NMFS would apply the weighting approach (described below) to develop a proposed allocation of Federal resources across FMPs with industry-funded monitoring programs. If available funding in a given year is sufficient, this distribution would be based on the allocation necessary to fully implement the industry-funded monitoring coverage targets specified in each FMP. If available

funding is not sufficient to fully fund all industry-funded monitoring programs, then NMFS would recommend an allocation of resources across FMPs that would include:

- The total amount of funding and seadays necessary to meet the coverage targets specified by each FMP if each FMP were fully funded, including each FMP's share of the total;
- The coverage level for each FMP if each FMP maintains its percentage share of the total funding (e.g., a fishery with a bigger proportion of the total funding would absorb a bigger proportion of the shortfall);
- The coverage levels that incorporate the weighting approach; and
- The rationale for the recommended prioritization.

2. At a joint New England/Mid-Atlantic committee or joint Council meeting, NMFS and the Councils would review NMFS's proposed allocation of funding and recommend any modifications to the prioritization.
3. NMFS would provide the Councils, at the earliest practicable opportunity: (1) The estimated industry-funded monitoring coverage levels that incorporate the recommended prioritization, based on available funding; and (2) the rationale for the recommended prioritization, including the reason for any deviation from the joint committee or joint Council's recommendations. The Councils may recommend revisions and additional considerations to be made by the Regional Administrator and Science and Research Director.

Step 3 allows the Councils and NMFS to discuss any final revisions to the distribution, which might be necessary if the final budget is not known at the time of initial prioritization and is less than expected.

Timing for this process is discussed below.

#### *2.1.2.2 Omnibus Alternative 2.2: Council-led Prioritization Process for Industry-funded Monitoring Programs*

Under Omnibus Alternative 2.2, the Regional Administrator and Science and Research Director would inform the Councils of NMFS's available funding to achieve coverage targets for industry-funded monitoring coverage, including supporting NMFS's infrastructure costs and/or any offset of industry costs established in this amendment for the Herring and MSB FMPs and other FMP actions. If available funding in a given year was sufficient, this distribution would be based on the allocation necessary to fully implement the industry-funded monitoring coverage targets specified in each FMP. If available funding was not sufficient, the Councils would apply the weighting approach below to determine the best allocation of available funding across FMPs with industry-funded monitoring programs to meet regional priorities and make recommendations to NMFS. NMFS and industry's costs would be defined as described by Omnibus Alternative 2. Funding for SBRM, ESA, and MMPA observer coverage would not be changed by this measure.

The prioritization process would have the following steps:

1. If available funding is not sufficient to fully fund all industry-funded monitoring programs, the Councils would apply a weighting approach (detailed below0 to develop a proposed allocation of resources across FMPs with industry-funded monitoring programs that would include:
    - The total amount of funding and seadays necessary to meet the coverage targets specified by each FMP if each FMP were fully funded, including each FMP's share of the total;
    - The coverage level for each FMP if each FMP maintains its percentage share of the total funding (e.g., e.g., a fishery with a bigger proportion of the total funding would absorb a bigger proportion of the shortfall);
    - The coverage levels that incorporate the weighting approach; and
    - The rationale for the recommended prioritization.

2. At a joint New England/Mid-Atlantic committee or joint Council meeting, NMFS and the Councils would review the results of the Councils' proposed allocation of funding for NMFS's infrastructure costs and offsets for industry costs. The joint committee or Councils would make any modifications and recommend a prioritization to NMFS. This would be the opportunity to resolve any differences in prioritization between the two Councils.

3. NMFS would provide the Councils, at the earliest practicable opportunity: (1) The estimated industry-funded monitoring coverage levels that incorporate the recommended prioritization, based on available funding; and (2) the rationale for the recommended prioritization, including the reason for any deviation from the Councils' recommendations. The Councils may recommend revisions and additional considerations to be made by the Regional Administrator and Science and Research Director.

Timing for this process is discussed below.

## Weighting Approach

The weighting approach is generally based on the draft processes developed by the Mid-Atlantic Fishery Management Council Scientific and Statistical Committee to prioritize research proposals. The weighting approach will give NMFS or the Council a transparent, deliberative framework to decide how to allocate NMFS's available resources to support NMFS cost responsibilities required to achieve coverage targets for industry-funded monitoring.

The proposed weighting approach has 2 steps outlined in more detail in the following pages:

**Step 1**

- Compare industry-funded monitoring criteria to each other to create a criteria weighting

**Step 2**

- Evaluate how each industry-funded monitoring program meets each criterion

### Step 1: Compare industry-funded monitoring criteria to each other to create a criteria weighting

The weighting approach first requires NMFS or the Councils to determine the relative importance of eight criteria that will be used to evaluate the industry-funded monitoring programs. The list of criteria proposed below would be used for the first prioritization cycle, and every cycle thereafter, unless the Councils change the criteria in a framework adjustment.

1. The industry-funded monitoring program relates to stocks that are overfished or subject to overfishing.

   Overfished stocks have biomass levels depleted to a degree that the stock's capacity to produce maximum sustainable yield (MSY) is jeopardized. Stocks subject to overfishing have a mortality rate that is higher than the rate that produces MSY. Under this criterion, preference would be given to stocks that are in poor condition because those stocks may benefit from additional monitoring support.

2. The species has high commercial or recreational value.

   This criterion prioritizes industry-funded monitoring programs related to species with high dollar value in the case of a commercial fishery, or a high number of annual landings or gross weight in the case of a recreational fishery.

3. The industry's daily revenue is high relative to the cost of industry costs for monitoring.

   This criterion evaluates industry's ability to fund its cost responsibilities related to industry-funded monitoring programs requirements established by the Councils. Preference will be given to industry-funded monitoring programs with high daily revenue relative to the daily costs of the industry funded monitoring.

4. The species has special importance to the ecosystem.

An industry-funded monitoring program may be important because of the biological relationship of the target species to the ecosystem. For example, the species could be a choke species, a forage fish, or have positive or negative impacts on other species. This criterion evaluates the need to prioritize industry-funded monitoring programs species with special ecosystem importance.

5. Industry-funded monitoring program has clear objectives, and a strong statistical basis for the FMP coverage target, including evaluation of the basis for the coverage target.

   Monitoring should have clear objectives and a statistical design for sampling that achieves those objectives. Monitoring programs should also have a clear link to current or future FMP needs. The basis for coverage rates, and/or target coefficient of variation (CV) or variance should be justified. As an example, an industry funded monitoring program with a 100 percent coverage target should have statistical analysis supporting this need (e.g., identification/quantification of significant bias).

6. Fleets monitored under the program are compatible with existing Standardized Bycatch Reporting Methodology (SBRM) fleet definitions.

   There are a number of reasons why it is beneficial to design monitoring programs to be compatible with SBRM fleet definitions.

   First, NMFS must be able to identify trips *a priori* in order to deploy coverage effectively. The SBRM fleet definitions (gear, mesh size, area) are robust to this requirement. Some other definitions (e.g., by target species or permit category) have proven difficult to implement coverage for, leading to inefficient use of resources. One example is the design of the coverage requirements for the longfin squid fishery related to the butterfish cap. Vessels intending to land over 2,500 lb longfin squid must notify the observer program 48 hours prior to departure in order to facilitate observer placement. Many vessels fishing with small mesh gear wished to have the option to land large quantities of longfin squid, should they encounter it. However, in that case, requiring vessels to notify the observer program about intent to target squid could lead to coverage on trips that do not ultimately target squid.

   Second, vessel trip reports typically include information on gear and statistical area associated with a trip, but do not include other identifiers to link the landed catch (e.g., several sector exempted fisheries). If a vessel trip report does not include details on a specific type of gear (e.g., Ruhle Trawl) or indicate that the trip is part of an exempted fishery or in an access area, then one cannot properly use the information to obtain expanded discard totals for the fleet.

   Finally, increasing coverage for a specific target species or certain permit types can bias discard estimates for a given SBRM fleet.

Overall, industry-funded monitoring programs designed to allocate observer coverage according to SBRM fleets should have priority over those that allocate observers using other criteria because monitors can be deployed effectively, and can provide information can be included in SBRM discard analyses, which makes them more cost-efficient.

7. Uncertainty surrounding catch estimates

This criterion prioritizes industry-funded monitoring programs related to target and non-target species with high uncertainty regarding catch estimates. This means that species with higher CVs related to discards or landings would be rated higher and receive higher priority for funding.

8. Risk to management based on fishery performance

A stock for which the quota is consistently under-harvested is unlikely to face the same management risk as one with a constraining quota. Industry-funded monitoring programs related to fisheries for stocks with constraining quotas should have priority over those for under-harvested stocks.

Some of the information above would be defined or analyzed in the original FMP action that created the industry-funded monitoring program. NMFS or the Council would first look to the original FMP action for information and update or supplement this information as necessary.

The eight criteria may not have equal importance, so NMFS or the Councils can assign weights to the relative importance of these criteria. The end result of this process is just a simple percentage weight for each criterion. For example, one criterion might count for 15% of the decision. The table method described below allows an explicit evaluation of each criterion against all the other criteria so that the final weights are consistent with the values decision makers actually place on the criteria. While it seems intricate, it is just a systematic way to arrive at weights for the criteria based on what decision makers really think is important.

- The comparison table is built by entering each criterion to be prioritized into a table, with criteria repeated along both the horizontal and vertical axis.
- The NMFS or the Councils would then compare the criterion to each other to determine importance. For example, First "stock status" is compared to "ecosystem importance", then "stock status" is compared to "SBRM compatibility," and so on, until all of the criteria have been compared to each other. Place an "x" in the boxes where the same two criteria are being compared.
- Each time a weight is recorded in a row cell, its reciprocal value must be recorded in the corresponding column.
- Comparison values:

  - 1 = criteria are equally important
  - 5 = criterion is more important
  - 10 = criterion is much more important
  - 0.2 = criterion is less important
  - 0.1 = criterion is much less important
- After completing the comparisons, total each horizontal row.
- The row totals should then be added to create a grand total.
- Then each row should be divided by the grand total to get a relative weighting value. This value is termed the “IFM Criterion Weighting.”

**TABLE 5. EXAMPLE IFM CRITERIA COMPARISON TABLE**

| IFM Evaluation Criteria | Stock status | Com/ Rec Value | Ability to pay | Ecosystem importance | Strong statistical basis | SBRM compatibility | Catch estimate uncertainty | Risk to management | Row total | IFM Criterion Weighting | Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stock status** | x | 10 | 0.1 | 5 | 1 | 10 | 1 | 0.2 | 27.3 | 0.15 | 15% |
| **Com/Rec Value** | 0.1 | x | 5 | 1 | 10 | 0.1 | 0.2 | 10 | 26.4 | 0.14 | 14% |
| **Ability to pay** | 10 | 0.2 | x | 1 | 5 | 0.2 | 10 | 5 | 31.4 | 0.17 | 17% |
| **Ecosystem importance** | 0.2 | 1 | 1 | x | 0.2 | 1 | 10 | 1 | 14.4 | 0.08 | 8% |
| **Strong statistical basis** | 1 | 0.1 | 0.2 | 5 | x | 0.2 | 0.1 | 0.1 | 6.7 | 0.04 | 4% |
| **SBRM compatibility** | 0.1 | 10 | 5 | 1 | 5 | x | 10 | 0.2 | 31.3 | 0.17 | 17% |
| **Catch estimate uncertainty** | 1 | 5 | 0.1 | 0.1 | 10 | 0.1 | x | 10 | 26.3 | 0.14 | 14% |
| **Risk to management** | 5 | 0.1 | 0.2 | 1 | 10 | 5 | 0.1 | x | 21.4 | 0.12 | 12% |
| | | | | | | | | Grand total | 185.2 | | |

In the above example, industry's ability to pay and SBRM compatibility are the most important criteria, and will each contribute 17% to the weight of the score of the industry-funded monitoring programs. The statistical basis for the program is the least important criterion, and will only contribute 4% to the weight of the score.

In practice, a very simple survey of Council members can be used to implement this exercise, and the New England Council's observer policy committee has already participated in a trial of such a survey.

Once the relative importance of each evaluation criteria is determined, the next step is to compare how the industry-funded monitoring programs measure up against the criteria.

### Step 2: Evaluate how each industry-funded monitoring program rates relative to each criterion

Rate each industry funded monitoring program:

- For criteria, reading across the vertical axis, assign a number based on how much each industry funded monitoring program meets the criterion. These are the ratings in the table below:
    - 0 = doesn't meet criterion at all
    - 1 = slightly meets criterion
    - 2 = somewhat meets criterion
    - 3 = mostly meets criterion
    - 4 = fully meets criterion
- After completing the comparisons, multiply the rating assigned to each criterion by the IFM Criterion Weighting in Step 1.
- Total the columns. Now the industry-funded monitoring programs can be ranked.

**TABLE 6. EXAMPLE FMP RANKING USING IFM EVALUATION CRITERIA**

| IFM Evaluation Criteria | IFM Criteria Weighting | FMP 1 Ranking | IFM Criteria Weighting x FMP 1 Ranking | FMP 2 Ranking | IFM Criteria Weighting x FMP 2 Ranking | FMP 2 Ranking | IFM Criteria Weighting x FMP 3 Ranking |
|---|---|---|---|---|---|---|---|
| **Stock status** | 0.15 | 4 | 0.59 | 0 | 0.00 | 2 | 0.00 |
| **Com/Rec Value** | 0.14 | 1 | 0.14 | 3 | 0.43 | 1 | 0.43 |
| **Ability to Pay** | 0.17 | 2 | 0.34 | 1 | 0.34 | 0 | 0.00 |
| **Ecosystem importance** | 0.08 | 0 | 0.00 | 2 | 0.00 | 4 | 0.00 |
| **Strong objective** | 0.04 | 3 | 0.11 | 3 | 0.33 | 1 | 0.33 |
| **SBRM compatibility** | 0.17 | 1 | 0.17 | 3 | 0.51 | 4 | 2.03 |
| **Catch estimate uncertainty** | 0.14 | 0 | 0.00 | 4 | 0.00 | 4 | 0.00 |
| **Risk to management** | 0.12 | 1 | 0.12 | 1 | 0.12 | 4 | 0.46 |
| **IFM Program Overall Ranking** | | | 1.46 | | 1.71 | | 3.24 |

In the example, FMP 3 ranks the highest, followed by FMP 1, then FMP 2.

After the process is complete, NMFS and the Councils may now use the rankings to prioritize the allocation of available funding to the FMPs to cover NMFS's costs. One possible way to do this would be to fully fund the highest ranked program, and then work through the ranking list sequentially until funding to cover NFMS's cost was completely allocated. Funding would not be allocated to a program if the available allocation would fund less than ¼ of the necessary funding.

### Timing for discretionary alternatives (Alternatives 2.1 and 2.2)

The discretionary prioritization alternatives (Alternatives 2.1 and 2.2) require a more time-intensive evaluation and ranking of industry funded monitoring programs, and would require rulemaking to solicit public comment on NMFS or the Council's recommended allocation of available funding. The status quo timing outlined under the status quo alternative would still apply, and this new process would apply alongside the existing timeline.

There are three options for to run this process so that it could be matched with annual funding levels and the SBRM cycle:

1. NMFS or the Council could revise the weighting approach every 3 years, and publish the proposed weighting to solicit public comment. This would mean that any new industry-funded monitoring programs, or any adjustments to existing industry funded monitoring programs, would need to be developed in time to be incorporated into the prioritization process every 3rd year. The process outlined in Year 2 would be repeated in Years 3 and 4.
2. Alternatively, the Council could choose to have the entire process occur on an as-needed basis (i.e., whenever new IFM programs are approved, or whenever existing IFM programs are adjusted or terminated), with the adjusted prioritization implemented in time for the next SBRM cycle. This path would mean that, once the prioritization was developed it could be in place indefinitely, until the next industry-funded monitoring program was finalized. Readjusting the weighting approach on an as-needed basis would mean that, after going through then entire timeline, the process outlined in Year 2 below repeat each year until new programs were added/old programs were adjusted or terminated, at which point the timeline would start over as outlined for Year 1.
3. Finally, the Councils could elect to do the process every 3 years unless new IFM programs are approved, or whenever existing IFM programs are adjusted or terminated.

### Table 7. Timing for discretionary alternatives (Alternatives 2.1 and 2.2)

<table>
<tr><th>Year</th><th>Month</th><th>SBRM/ASM/Scallop Schedule (status quo)</th><th>Alternatives 2.1 and 2.2</th></tr>
<tr><td rowspan="4">Year 1</td><td>January to April</td><td>SBRM analyses are completed late January/early February</td><td><ul><li>NMFS (2.1) prepares and analyze weighting approach for Year 2 – OR</li><li>Joint Committee or Council meeting to conduct weighting approach (2.2)</li></ul></td></tr>
<tr><td>April to May</td><td></td><td>Council and NFMS meet to review/finalize ranking of existing IFM programs (2.1 and 2.2)</td></tr>
<tr><td>May to October</td><td></td><td>NMFS conducts proposed and final rulemaking to finalize rankings for IFM programs for Years 2-4 (or for indefinite period).</td></tr>
<tr><td>October to December</td><td><ul><li>Observer data July Year 0 – June Year 1 available</li><li>Begin analysis for SBRM</li><li>Work on discard estimation analysis for SBRM from November through early February</li><li>Work on analysis for sector ASM using most recent complete fishing year (May Year 0 – April Year 1)</li></ul></td><td>Begin analysis to determine necessary IFM seadays</td></tr>
<tr><td rowspan="5">Year 2</td><td>January to February</td><td><ul><li>Receive Year 2 budget</li><li>Sector ASM coverage rates published in proposed rule/collect public comment</li><li>Determine scallop compensation rate</li></ul></td><td></td></tr>
<tr><td>March</td><td><ul><li>If funding shortfall, run SBRM prioritization process</li><li>Start of scallop Year 2</li></ul></td><td>If funding shortfall, issue funding based on finalized weighting approach</td></tr>
<tr><td>April</td><td><ul><li>Begin Year 2 seaday schedule</li><li>Sector ASM coverage rates published in final rule</li></ul></td><td>Implement Year 2 IFM coverage levels</td></tr>
<tr><td>May</td><td>Begin Sector ASM Year 2</td><td></td></tr>
<tr><td>June</td><td></td><td>NMFS briefs Councils on final year 2 IFM seaday allocation</td></tr>
</table>

### *2.1.2.3 Omnibus Alternative 2.3: Proportional Prioritization Process for Industry-funded Monitoring Programs*

Under Omnibus Alternative 2.3, the amount of Federal funding available to support industry-funded monitoring in each FMP would be reduced by the same percentage as the funding shortfall. If the available Federal funding falls short, the amount of the shortfall would be deducted from the total amount of funding to be allocated to each FMP, proportional to that FMP's share of the total funding need. For example, an FMP that represents 20% of the total funding need would absorb 20% of the total funding shortfall.

There could be a scenario where the available Federal funding for a given FMP would produce a coverage level below the coverage target defined by the FMP as providing sufficient information to meet an FMP's objectives for monitoring. For example, an additional 10 observed trips may provide additional data, but not sufficient data to provide a robust estimate of bycatch of the species of interest. In this case, that FMP would not receive additional coverage and the funding for that FMP would be re-allocated proportionally to other FMPs.

NMFS would determine and provide the Councils with: (1) The estimated industry-funded monitoring coverage levels that incorporates the proportional adjustments, based on available funding; and (2) the rationale for the recommended prioritization, including how it deviates from the fully funded coverage levels across all FMPs. This could be done on an annual basis or the allocation of resources could remain as specified unless revised.

Example FMP 1 needs $3 million, FMP 2 needs $5 million, and FMP 3 needs $2 million to fully implement their coverage targets. The total funding need is $10 million. If there is only $8 million in Federal funds for the coming year, then there is a $2 million shortfall, or a 20% shortfall. Using the proportional prioritization process, NMFS would allocate the $8 million such that each FMP has a 20% shortfall, i.e., they would all be funded at 80%. FMP 1 would get 80% of $3 million, or $2.4 million, FMP 2 would get 80% of $5 million, or $4 million, and FMP 3 would get 80% of $2 million, or $1.6 million. These would be the total funds available to the FMPs to fund NMFS's costs for coverage days above SBRM.

### *2.1.2.4 Omnibus Alternative 2.4: Lowest Coverage Ratio-based Prioritization Process for Industry-funded Monitoring Programs*

Under Omnibus Alternative 2.4, the amount of funding would be allocated to each FMP by prioritizing coverage in fisheries that have the lowest coverage needs (based on projections for the coming year) relative to effort (based on vessel trip reports from the previous year). In practice, this would mean that fisheries with the highest ratio of coverage to effort would be sequentially eliminated until the available Federal funding is sufficient to meet the coverage targets of the remaining FMPs. This alternative would eliminate coverage from fleets with low numbers of days absent from port, therefore preserve coverage for the most active FMPs with industry-funded monitoring programs.

NMFS would determine and provide the Councils with: (1) the estimated industry-funded monitoring coverage levels that incorporate the prioritization, based on available funding; and (2) the rationale for the recommended prioritization, including how it deviates from the fully funded coverage levels across all FMPs. This could be done on an annual basis or the allocation of resources could remain as specified unless revised.

Example FMP 1 needs $3 million, FMP 2 needs $5 million, and FMP 3 needs $2 million to fully implement their coverage targets. The total funding needed is $10 million, but there is only $8 million in Federal funds for the coming year, so there is a $2 million shortfall. Under the coverage ratio-based prioritization approach, NMFS would calculate the following ratio for each FMP:

$$\text{Coverage Ratio} = \frac{\text{Projected coverage days needed in the coming year}}{\text{Level of effort in the previous year}}$$

If FMP 1 had a ratio of 0.1, FMP 2 a ratio of 0.08, and FMP 3 a ratio of 0.2, FMP 3 would be eliminated from coverage first. Because the total funding need of the remaining programs, $8 million, can be met by the available Federal funding, $8 million, coverage for FMP 1 and FMP 2 would be fully funded. FMP 3 would receive no additional coverage in the coming year. The key here is that fewer needed coverage days and/or higher levels of effort in the previous year will both lead to a higher prioritization, and it is the interplay of these two factors that would determine the prioritization.

This alternative is based on an approach selected by the Councils in the SBRM amendment. SBRM sets "minimum pilot coverage" levels for each fishing mode to ensure that a fleet is not allocated too few observer sea days to generate meaningful discard estimations. If the total of agency funded sea days is greater than the total minimum pilot coverage, then the Penultimate Cell approach would be applied. If the funded days exactly equals the total minimum pilot coverage sea days then the sea days would be assigned to fishing modes according to the minimum pilot coverage. However, it is theoretically possible that the available funding for SBRM observers in a given year could be so restricted that the minimum pilot coverage for each fleet could not be achieved. In such a case, it would be necessary to determine which fleets would get enough observer coverage to reach the minimum pilot coverage and which would not. The Councils' preferred alternative for adjusting coverage levels below minimum pilot coverage would eliminate the funding shortfall by sequentially removing coverage in fleets that had the highest ratio of minimum pilot coverage to days absent from port based on FVTR reports in the previous year. Because the number of days absent from port is typically much larger than the minimum pilot coverage for a fishing mode, this alternative would maintain at-sea observer coverage on the most active fishing modes.

#### *2.1.2.5 Omnibus Alternative 2.5: Highest Coverage Ratio-based Prioritization Process for Industry-funded Monitoring Programs*

Under Omnibus Alternative 2.5, the amount of funding would be allocated to each FMP by prioritizing coverage in fisheries that have the highest coverage needs (based on projections for the coming year) relative to effort (based on vessel trip reports from the previous year). In practice, this would mean that fisheries with the lowest ratio of coverage to effort would be sequentially eliminated until the available Federal funding is sufficient to meet the coverage targets of the remaining FMPs. This alternative would eliminate coverage from fleets with high numbers of days absent from port, therefore preserve coverage for the least active FMPs with industry funded monitoring programs.

NMFS would determine and provide the Councils with: (1) the estimated industry-funded monitoring coverage levels that incorporate the prioritization, based on available funding; and (2) the rationale for the recommended prioritization, including how it deviates from the fully funded coverage levels across all FMPs. This could be done on an annual basis or the allocation of resources could remain as specified unless revised.

Example

FMP 1 needs $3 million, FMP 2 needs $5 million, and FMP 3 needs $2 million to fully implement their coverage targets. The total funding needed is $10 million, but there is only $8 million in Federal funds for the coming year, so there is a $2 million shortfall. Under the coverage ratio-based prioritization approach, NMFS would calculate the following ratio for each FMP:

$$\text{Coverage Ratio} = \frac{\text{Projected coverage days needed in the coming year}}{\text{Level of effort in the previous year}}$$

If FMP 1 had a ratio of 0.1, FMP 2 a ratio of 0.08, and FMP 3 a ratio of 0.2, FMP 2 would be eliminated from coverage first. Because the total funding need of the remaining programs, $5 million, can be met by the available Federal funding, $8 million, coverage for FMPs 1 and 3. FMP 2 would receive no additional coverage in the coming year. The key here is that greater needed coverage days and/or lower levels of effort in the previous year will both lead to a higher prioritization, and it is the interplay of these two factors that would determine the prioritization.

### Timing for formulaic alternatives (Alternatives 2.3, 2.4 and 2.5)

The formulaic alternatives (Alternatives 2.3, 2.4, and 2.5) could be implemented annually in concert with the existing SBRM cycle. Rulemaking would not be required, and the process outlined in Year 2 below would occur on an annual basis for all subsequent years.

**Table 8. Timing for discretionary alternatives (Alternatives 2.3, 2.4, and 2.5)**

| Year | Month | SBRM/ASM/Scallop Schedule (status quo) | Alternatives 2.3 and 2.4 |
|---|---|---|---|
| Year 1 | January to April | | |
| | April/May | | |
| | May to October | | |
| | October | • Observer data July Year 0 – June Year 1 available<br>• Begin analysis for SBRM<br>• Work on discard estimation analysis for SBRM from November through early February<br>• Work on analysis for sector ASM using most recent complete fishing year (May Year 0 – April Year 1) | Begin analysis for required IFM coverage rates |
| | November | | |
| | December | | |
| Year 2 | January | • Receive Year 2 budget<br>• Sector ASM coverage rates published in proposed rule/collect public comment<br>• Determine compensation rate | |
| | February | | |
| | March | • If funding shortfall, run SBRM prioritization process<br>• Start of scallop Year 2 | If funding shortfall exists, run IFM prioritization |
| | April | • Begin Year 2 seaday schedule<br>• Sector ASM coverage rates published in final rule | Implement Year 2 IFM coverage levels |
| | May | Begin Sector ASM Year 2 | |
| | June | | NMFS briefs Councils on final year 2 IFM seaday allocation |

### 2.1.3 Considered But Rejected Omnibus Alternatives

The January 2014 version of the Discussion Document contained a Vessel Cancellation Charge Option. That option included discussion of a fee to be paid by the vessel to the at-sea observer service provider when vessels are a "no show" or when they cancel trips less than 12 hours before the scheduled departure time. That option also discussed that payment of fees would be a vessel permit requirement and that outstanding fees would result in non-renewal of vessel permits.

As the PDT/FMAT further developed this option, the Department of Commerce Office of General Counsel advised that the government may not dictate the terms of a private transaction such as this fee. As a result, the Vessel Cancellation Charge Option is likely not legal because it involves the terms of a private business contract between a vessel and an observer service provider. While an observer service provider or a vessel could specify a cancellation fee as part of a contract, thereby eliminating the necessity of increasing the base rate that all vessels pay, it is unlikely that NMFS could legally require or specify the amount of such a fee.

The August 2014 version of the Discussion Document contained a Cost-based Prioritization Process for Industry-funded Monitoring Programs Option. Under that option, the Federal funding would be assigned to each FMP by sequentially eliminating coverage in FMPs that have the highest funding need until the available funding is sufficient to meet the funding needs of the FMPs remaining. That process would have prioritized fisheries with the least expensive programs first. NMFS would have determine and provided the Councils with: (1) The estimated industry-funded monitoring coverage levels that incorporates the prioritization, based on available funding; and (2) the rationale for the recommended prioritization, including how it deviates from the fully-funded coverage target across all FMPs. This option could be done on an annual basis or the allocation of resources could remain as specified unless revised.

At its August 19, 2014, meeting the New England's Observer Policy Committee recommended that this option be considered but rejected because cost-based prioritization option lacked rationale and eliminating FMPs with the highest funding needs would not likely meet the goals/objectives of the industry-funded monitoring programs established by the New England Council.

## 2.2 ATLANTIC HERRING MONITORING ALTERNATIVES

As described in the Introduction, the New England Council is interested in increasing monitoring in the Herring FMP to improve catch and bycatch monitoring in the herring fishery. This increased monitoring is above and beyond coverage required through the SBRM, the ESA, or MMPA. The amount of available Federal funding to support additional monitoring and legal constraints on the sharing of costs between NMFS and the fishing industry have recently prevented NMFS from approving proposals for industry-funded monitoring in some fisheries, specifically Atlantic Herring Amendment 5. This amendment is intended to remedy the industry-funded monitoring disapproval in Herring Amendment

5 by establishing (1) a process by which available Federal funding could be allocated to the Herring FMP and (2) a monitoring coverage target for the industry-funded monitoring to achieve on an annual basis to meet Herring FMP objectives.

Using the process established in this amendment, the realized coverage level for the Herring FMP in a given year would be determined by the amount of Federal funding available to cover NMFS cost responsibilities a given year. The realized coverage level for the Herring FMP in a given year (above and beyond SBRM) would fall anywhere between no additional coverage above SBRM and the specified coverage target. Establishing monitoring coverage targets would allow NMFS to approve and implement new industry-funded monitoring programs, without committing to support coverage levels above appropriated funding or before funding is determined to be available.

However, this amendment WOULD NOT automatically allow for higher coverage levels in the herring fishery. This amendment establishes tools that NMFS and the Councils could use to provide additional monitoring in the herring fishery when Federal funding is available. Therefore, during years when there is no additional funding to cover NMFS cost responsibilities above funding for SBRM, the tools developed in this amendment would not be used and there would be no additional monitoring coverage in the herring fishery, even if industry is able to fully fund their cost responsibilities.

### Amendment 5 to the Atlantic Herring FMP

The New England Council is interested in improving catch and bycatch monitoring in the herring fishery consistent with recommendations in Amendment 5 to the Herring FMP.

#### Table 9. Purpose and Need of Amendment 5 to Herring FMP

| Purpose | Need |
|---|---|
| **Address long term health of the herring resource, including how herring is harvested in order to sustain the important biologic role of herring as a forage fish in the Northeast Atlantic** | To improve long term catch monitoring and to ensure better compliance with the provisions of the MSA |
| **Improve how catch and bycatch from the herring fishery are accounted for** | Better monitor bycatch in the herring fishery, including specifically monitoring river herring bycatch, and to ensure that the FMP is consistent with the bycatch provisions of the MSA |

In Amendment 5 to the Herring FMP, the New England Council recommended 100% observer coverage on vessels with the All Areas Limited Access Herring Permit (Category

A) and the Areas 2/3 Limited Access Herring Permit (Category B). The Council believed that the provisions for observer coverage recommended in Amendment 5 could enhance catch monitoring and achieve many of the goals and objectives of that amendment. Support for 100% observer coverage on Category A and B herring vessels was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for the most active vessels to either confirm or disprove the claims that have been made by many regarding bycatch in the herring fishery.

The New England Council agreed with the need to increase observer coverage in the fishery to determine the true nature and extent of bycatch in the fishery, and to better address and manage bycatch issues in the future. The New England Council also believed that the requirement for 100% observer coverage should focus on the most active vessels in the herring fishery and vessels with Category A and B permits harvest greater than 98% of herring catch. Vessels with Limited Access Herring Incidental Catch Permits (Category C) harvest only a small percentage of the overall herring catch (0.6%). Because of the costs associated with industry-funded monitoring, Amendment 5 recommended limiting industry-funded observer coverage to vessels with Category A and B vessels. The New England Council believed that increasing coverage on just vessels with Category A and B permits would improve catch monitoring in the herring fishery while minimizing the negative economic impacts associated with industry-funded observer coverage on fishery-related businesses and communities.

Amendment 5 to the Herring FMP required 100% observer coverage on midwater trawl vessels fishing in the Groundfish Closed Areas. If the Groundfish Closed Areas are modified or eliminated in the future, coverage requirements for midwater trawl vessels will be reconsidered at that time. Analyses in Amendment 5 suggest that midwater trawl vessels are not catching significant amounts of groundfish either inside or outside the Closed Areas. Additionally, the majority of groundfish catch by midwater trawl vessels is haddock, and the catch of haddock by midwater trawl vessels is already managed through a haddock catch cap for the herring fishery. However, the New England Council believes it is important to determine the extent and nature of bycatch in the herring fishery. This measure still allows the herring midwater trawl fishery to operate in the Closed Areas, but it ensures that opportunities for sampling are maximized.

### Monitoring of the Herring Fishery

Standardized Bycatch Reporting Methodology

In recent years, observer coverage for the herring fishery has largely been allocated as part of the SBRM. The SBRM is the combination of sampling design, data collection procedures, and analyses used to estimate bycatch in multiple fisheries. The SBRM provides a structured approach for evaluating the effectiveness of the allocation of fisheries observer effort across multiple fisheries to monitor a large number of species. Although management measures are typically developed and implemented on an FMP-by-FMP basis, from the perspective of developing a bycatch reporting system, there is overlap among the FMPs and the fisheries that occur in New England and the Mid-Atlantic that could result in redundant and wasteful requirements if each FMP is addressed independently.

For example, New England vessels using extra-large mesh gillnets catch monkfish, skates, and Northeast multispecies, often on the same fishing trip, and, therefore, most participants in this fishery must operate according to the regulations implemented under three different FMPs. To distinguish between the management units identified in individual FMPs and the fisheries that operate under one or more FMPs, the SBRM is designed around “fishing modes” defined by the type of fishing gear used and the area from which the vessels depart.

There are 56 fishing modes defined in the SBRM, some of which further subdivide a fishery by the mesh size of the gear used (for gillnets and otter trawls), or by the type of permit and access area program (for sea scallop dredges). Although there are differences among the modes, the participants in these fishing modes fish throughout the Gulf of Maine, Georges Bank, and the Mid-Atlantic Bight, and land their catch across a large number of fishing ports from the Outer Banks of North Carolina to Downeast Maine. The SBRM is limited to those fisheries that are prosecuted in the Federal waters of the Greater Atlantic Region and managed through an FMP developed by either the Mid-Atlantic or New England Council. Current observer coverage allocated to the herring fishery through SBRM is described in Section 2.2.1 of this document.

<u>Observer Coverage on Midwater Trawl Vessels Fishing in Grounfish Closed Areas</u>

In past years, observer coverage for midwater trawl vessels fishing in the Closed Areas was allocated by the Northeast Fisheries Observer Program (NEFOP) independent of the SBRM. The revised SBRM, if approved, would prohibit observer coverage being allocated to midwater trawl vessels fishing in the Closed Areas independent of the SBRM. In order to provide observer coverage for midwater trawl vessels fishing in the Closed Areas, coverage would need to be incorporated in an industry-funded monitoring program.

In 2014, midwater trawl vessels made 18 trips into the Closed Areas and those trips averaged 3 days in length. The average total revenue from 2014 trips that fished in the Closed Areas (either the entire trip or just a portion of the trip) was approximately $80,000 with herring revenue comprising an average of 95% of that revenue.

### Table 10. Monitoring Needs of Herring Fishery

| Monitoring Needs | Vessels to be Monitored |
|---|---|
| **Sub-ACLs for Herring Management Areas** | All permits, gears, and areas |
| **Haddock catch caps** | Midwater trawl vessels fishing in Georges Bank and Gulf of Maine haddock stock areas |
| **100% Observer Coverage in Groundfish Closed Areas** | Midwater trawl vessels fishing in Groundfish Closed Areas |
| **River Herring and Shad Catch Caps** | Midwater trawl and small mesh bottom trawl vessels harvesting more 6,660 lb of herring from Gulf of Maine, Cape Cod, and Southern New England river herring and shad catch cap areas |

<u>Precision of Catch Estimates</u>

An important consideration regarding the alternatives to specify observer coverage targets for the herring fishery relates to understanding precision targets. Coefficients of Variation (CVs) provide a convenient way to compare the relative uncertainty of two estimates (lower is better), but they must be interpreted carefully. Assuming a normal distribution, doubling the CV produces the approximate 95% confidence interval. For example, a CV of 30% for a catch estimate means that if the catch were re-sampled, 95% of the time the new estimate would be within ± 60% of the original estimate (the other 5% of the time the new estimate would be more than 60% different). However, CVs do not account for certain sources of uncertainty (e.g., within-tow variability from basket sampling, fish stratification). Therefore, the true uncertainty is always higher than what is suggested by any given CV. Lower CVs mean that repeated sampling would generate similar estimates (this is the definition of precision). If there is minimal bias in the data collection and estimation, then an estimate with a low CV should be close to the actual amount being estimated.

There are costs associated with increasing the precision of catch estimates resulting from observer data. A more precise (lower CV) estimate generally requires increasing observer coverage on more sea days or trips. When observed catch events are infrequent yet highly variable, the additional sampling coverage required for higher precision may be substantial. This tradeoff between precise estimates and the cost of sampling coverage must be considered when specifying observer coverage targets and prioritizing available resources.

### River Herring and Shad Catch in the Atlantic Herring Fishery

In Amendment 5 to the Herring FMP, the New England Council recommended measures to improve the monitoring of river herring and shad catch (RH/S) in the herring fishery. These measures included: (1) Establishing river herring monitoring and avoidance areas,

(2) supporting and evaluation an ongoing river herring avoidance program, and (3) developing a process to establish river herring catch caps.

Once abundant along the East Coast, populations of river herring (alewife and blueback herring) and shad (American and hickory) have declined compared to historical levels due to various factors. Governmental agencies, non-profit organizations, tribal groups, academia, industry, and others are currently engaged in numerous efforts to further river herring and shad conservation.

Vessels fishing for Atlantic mackerel and herring can encounter RH/S. Both the Mid-Atlantic and New England Councils have recommended RH/S caps for the mackerel and herring fisheries beginning in 2014. Managers don't currently have enough data to determine biologically based RH/S catch caps or to assess the potential effects of such catch caps on RH/S populations coastwide. However, the Councils believe RH/S catch caps provide a strong incentive for the mackerel and herring fleets to continue avoiding RH/S. These catch caps are intended to allow for the full harvest of the mackerel and herring annual catch limits while reducing RH/S incidental catch.

At its June 2013 meeting, the Mid-Atlantic Council recommended establishing a RH/S catch cap of 236 mt for the 2014 mackerel fishery. The amount of the cap is the estimated median amount of RH/S that would have been caught if the commercial mackerel fishery had landed its current annual catch limit of 33,821 mt in recent years. RH/S caught on all trips landing 20,000 pounds or more of mackerel would count against the cap. If the directed mackerel fishery harvests 95% of its 236-mt RH/S cap, NMFS would implement a 20,000-pound mackerel possession limit, effectively closing the directed mackerel fishery.

At its September 2013 meeting, the New England Council recommended in Framework 3 to the Herring FMP to establish RH/S catch caps for midwater and bottom trawl gear in the herring fishery for 2014 and 2015. The amounts of the RH/S cap were based on the median of historical catch for the herring fishery specifically for midwater trawl gear in the Gulf of Maine (86 mt), midwater trawl gear in the Cape Cod area (13 mt), and bottom trawl gear (89 mt) and midwater trawl gear (124 mt) in Southern New England. RH/S caught on all trips that land 6,600 pounds or more of herring would count against the caps. If the directed herring fishery harvests the RH/S caps, NMFS would implement a 2,000-pound herring possession limit, effectively closing the directed herring fishery for that area and gear type.

Monitoring is critical to understanding the nature and extent of RH/S catch in the mackerel and herring fisheries. Because the seasonal and inter-annual distribution of RH/S are highly variable, the Councils believe that the most effective measures to address RH/S catch would be those that increase at-sea sampling, improve bycatch accounting of incidental catch, and promote cooperative efforts with the industry to minimize catch.

This action analyzed RH/S catch to develop a coverage target alternative to help improve monitoring of RH/S catch. The analysis estimated: (1) Total incidental catch for all RH/S species by fishing fleet (area fished, gear, mesh), (2) proportion of RH/S catch discarded by fishing fleet, and (3) percent at-sea coverage needed for a 30% CV for RH/S catch by fishing fleet. Details of the analysis are available in Appendix B.

The analysis of RH/S catch indicated that the fleets responsible for catching the majority of RH/S are the midwater trawl fleet (57%) followed by the small mesh bottom trawl fleet (33%). The analysis also indicated that the purse seine fleet is responsible for a negligible amount of RH/S catch (0.3%).

### Table 11. Fleets Responsible for RH/S Catch (Total catch from 2005-2013)

| Fishing Fleet | Percent of RH/S Catch |
|---|---|
| Midwater Trawl (Single and Paired) | 57% |
| Small Mesh Bottom Trawl | 33% |
| Large Mesh Gillnet | 7% |
| Purse Seine | 0.3% |

The analysis of RH/S catch also indicated that the at-sea discarding of RH/S is minimal by the midwater trawl fleet (5% or less) and substantial by the small mesh bottom trawl fleet (68%). Because the majority of midwater trawl catch is retained, the midwater trawl fleet may be a good candidate for portside sampling to monitoring catch. When considering types of monitoring for the herring fishery at its November 2014 meeting, the Herring Oversight Committee expressed support for electronic monitoring (to verify retention) and portside sampling to monitor catch by the midwater trawl fleet. Electronic monitoring and portside sampling are expected to meet the need for improved catch and bycatch monitoring in the herring fishery and are likely less expensive that at-sea observer coverage. Electronic monitoring and portside sampling are not currently considered as alternatives in this amendment. However, this amendment would allow an industry-funded electronic monitoring and portside sampling program to be developed and implemented via a framework adjustment to the Herring FMP.

### Table 12. Percentage of Discarded RH/S Catch

| Year | Small Mesh Bottom Trawl | Large Mesh Gillnet | Single Midwater Trawl | Paired Midwater Trawl |
|---|---|---|---|---|
| **2005** | 96% | 58% | 40% | 0% |
| **2006** | 60% | 25% | 0% | 0% |
| **2007** | 26% | 38% | 0% | 2% |
| **2008** | 93% | 100% | 0% | 0% |
| **2009** | 36% | 88% | 4% | 0% |
| **2010** | 86% | 88% | 0% | 0% |
| **2011** | 75% | 83% | 0% | 0% |
| **2012** | 85% | 95% | 0% | 0% |
| **2013** | 53% | 98% | 1% | 2% |
| **Mean** | 68% | 75% | 5% | 1% |

Lastly, the analysis estimated the percent coverage needed to achieve a 30% CV for RH/S catch by fishing fleet. As the midwater trawl fleet is responsible for the majority of RH/S catch, this action focuses on the percent coverage and number of sea days needed to achieve a 30% CV on RH/S catch by the midwater trawl fleet. Based on the 2013 catch (consistent with SBRM methodology), this analysis suggests that 61% coverage on the midwater trawl fleet would achieve a 30% CV on RH/S catch.

### Table 13. Observer Coverage Needed for 30% CV on RH/S Catch

| Year | NE Paired Midwater Trawl | | NE Single Midwater Trawl | | MA Paired Midwater Trawl | |
|---|---|---|---|---|---|---|
| | Percent Coverage | Sea Days | Percent Coverage | Sea Days | Percent Coverage | Sea Days |
| **2013** | 58% | 559 | 51% | 241 | 61% | 74 |

*NOTE: While there were MA single midwater trawl trips in previous years, there were no trips of this type in 2013.*

When considering focusing an alternative on RH/S catch by fishing fleet, the Herring Oversight Committee expressed concern at its November 2014 meeting. Specifically, the Herring Oversight Committee passed (4-1-1) the following motion: *That the RH/S CV-based coverage target alternatives related to RH/S catch not be included in the range of alternatives for the IFM amendment unless they can be expanded to include all Category A and B herring vessels and meet the goals/objectives of Amendment 5.*

The Industry-Funded Monitoring Omnibus Amendment Plan Development Team/Fishery Management Action Team (IFM PDT/FMAT) discussed the Herring Oversight Committee's concern, but still believes that an alternative focusing coverage on the midwater trawl fleet is consistent with the purpose and need of Amendment 5. Including an alternative that specified at-sea observer coverage on the midwater trawl fleet would focus coverage on the fleet that: (1) Harvests the majority of RH/S catch (57%), (2) harvests the majority of herring catch (73%), and harvests the majority of catch by vessels with Category A and B herring permits (83%).

Under SBRM, vessels are selected for observer coverage based on fishing fleet, not based on FMP, fishery or permit category. On a post-hoc basis, fleet-based catch estimates can be prorated by FMP using dealer or VTR landings of the fishery species as a proxy for directivity. More specifically, RH/S catch estimates specific to a particular FMP or fishery can be estimated by multiplying the total estimate of RH/S catch by the proportion of the fishery species (such as herring) in the total fleet's landings. The use of landings as a proxy ensures that all catch estimates are incorporated into FMP-specific estimates but are not double-counted. In contrast, the use of trip definitions (such as 6,600 lbs of herring or 20,000 lbs of mackerel) to identify trip directivity could result in the double-counting of RHS catches across FMPs because one trip could meet the landings requirements of two fishery species.

In contrast to proration of catch estimates by FMP, subsequent sample size (i.e., sea day) analyses must be done by fishing fleet and should not be prorated by FMP in order to remain consistent with SBRM's sampling design (i.e., how vessels are selected for observer coverage). Therefore, it is not possible to analyze the percent coverage needed to obtain a valid 30% CV for RH/S catch for vessels with Category A and B herring permits unless the sampling design is modified to ensure random selection of Category A and B vessels.

Valid estimates of catch or bycatch (and their variances) rely on formulas that are consistent with the underlying sampling design. Estimates that are inconsistent with the sampling design may be biased.

When at all possible (i.e., when the trips are identifiable in the database), observed trips that were selected for coverage based on fishery or permit category and not fleet are treated separately in catch and bycatch analyses. Ideally, these data should not be used for catch estimation because the vessel selection for observer coverage is no longer done in a random way that is consistent with SBRM's sampling design. Such data could be used in catch cap calculations that are specific to the permits or fishery that is being targeted for coverage (because the data collection and estimation method would match), but since they would not be used for estimates that enter stock assessments and coast-wide catch/bycatch estimates their usefulness would be limited.

To summarize, the decision to allocate observer coverage by FMP (i.e., permits) or fishing fleet depends on the objectives of the additional coverage and how the data will subsequently be used. If one of the objectives of additional coverage is to enhance the precision of catch estimates for use in stock assessments and not just solely for quota monitoring, then observer coverage should be allocated by fishing fleet and not FMP, fishery, or permit category.

### Table 14. Pros and cons of permit versus fleet-based coverage target alternatives

| | Pros | Cons |
|---|---|---|
| **Permit-Based Coverage Target Alternatives** | Councils manage fisheries by FMP and vessel permit | Not consistent with how SBRM allocates observers |
| | | Resulting data may be biased and not used for stock assessment and/or total removals |
| | Can be used to monitor FMP-specific quotas and catch caps | Difficult to design, deploy and analyze results because vessels typically don't structure trips by permit category |
| **Fleet-Based Coverage Target Alternatives** | Consistent with how SBRM allocates observers | Typically extends across FMPs |
| | Resulting data may be combined with SBRM data for stock assessments and/or total removals | Not consistent with how Councils manage fisheries by FMP and vessel permit |
| | Better way to design and deploy observer coverage and analyze results from that coverage | |

Cost for industry-funded monitoring programs is a very important consideration. The requirement to pay for observer coverage increases operating costs for fishing vessels, which in turn reduces revenues. While the total cost for each sea day described in the table above can vary between service providers, the individual components described in the table (i.e., costs for deployment and sampling, costs for equipment) are necessary to successfully execute a monitoring program. Because each of these components is essential, in most cases, it is not appropriate to reduce industry's cost responsibilities by removing or adjusting components of the sea day cost.

There are two, more appropriate ways to limit the costs of an industry-funded monitoring program for industry. Both of these approaches limit the total cost of the observer program rather than adjusting the industry cost responsibilities. The first way to limit costs to industry is to set coverage levels at the lowest level necessary to gather information to meet program goals. For example, it may be possible to increase precision around discard estimates for a certain species by setting a coverage target of 50%, rather than a coverage target of 100%. The second way to limit costs to industry is to select the appropriate type of coverage to meet program goals. For example, it may be more cost effective to use electronic monitoring rather than at-sea observers to confirm compliance with slippage prohibitions on herring and mackerel vessels.

Among some of the discussions about industry-funded monitoring has been the idea that analyses should be performed that would suggest what levels of observer coverage would be affordable to industry. While the economic impact analysis of the herring alternatives consider impacts to net revenues, these analyses do not address affordability. Affordability, particularly at the vessel level, is highly individualistic. Debt levels can be highly variable making prediction of affordability difficult. Even with perfect data on revenues and costs, making a determination of affordability can be subjective. For example, if a particular vessel has a profit margin of 10% and observer costs would reduce that margin by 3%, is that "affordable" because profit is still positive? How close to zero profit is "un-affordable"? At a fleet level, the problem is exacerbated by having a mix of different vessel types engaged in the herring fishery that also participate, at different scales, in other fisheries. Should affordability be specific to the fishery in question or in the context of all fisheries in which those vessels participate? Also, the random nature of vessel selection where coverage is less than 100% can result in differences in the degree to which fleet components share the cost burden. For these reasons, predictions about the affordability of observer coverage are not provided.

### 2.2.1 Herring Alternative 1: No Coverage Target Specified for Industry-funded Monitoring Programs (No Action)

Under Herring Alternative 1 (No Action), there would be no coverage target specified for an industry-funded monitoring program in the Herring FMP. Observer coverage for herring vessels would be allocated according to SBRM, and there would be no additional cost to the herring industry for observer coverage. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for the herring fishery would be evaluated on a case-by-case basis.

Under SBRM, the Atlantic herring fishery will receive at-sea observer coverage under the following 6 fleets: New England and Mid-Atlantic small mesh otter trawl; New England and Mid-Atlantic purse seine; and New England and Mid-Atlantic paired and single midwater trawl. The table below describes the sea days allocated for April 2014 through March 2015. The sea days listed below for small mesh otter trawl cover all FMPs that use this gear type, so only a portion would cover trips trips targeting herring. The purse seine and midwater trawl fleets are largely comprised of vessels targeting herring, so a majority of these sea days in these categories will be used to observe trips targeting herring.

**TABLE 15. THE PROPOSED OBSERVER SEA DAYS ALLOCATED FOR APRIL 2014 THROUGH MARCH 2015, AND OBSERVED SEA DAYS AND TRIPS FROM JULY 2012 THROUGH JUNE 2013, BY FLEETS THAT TARGET ATLANTIC HERRING.**

| Fleet | Region | Sea Days allocated for April 2014 to March 2015 | Observed sea days, July 2012 to June 2013 | VTR sea days, July 2012 to June 2013 | Observed trips, July 2012 to June 2013 | VTR trips, July 2012 to June 2013 |
|---|---|---|---|---|---|---|
| Small Mesh Bottom Trawl | MA | 1,289 | 631 | 7,003 | 263 | 3,569 |
| Small Mesh Bottom Trawl | NE | 1,604 | 463 | 7,315 | 171 | 3,315 |
| Purse seine | MA | 12 | 0 | 447 | 0 | 441 |
| Purse seine | NE | 20 | 71 | 699 | 31 | 319 |
| Midwater Trawl (Pair and Single) | MA | 0 | 7 | 72 | 1 | 10 |
| Midwater Trawl (Pair and Single) | NE | 45 | 638 | 1,389 | 146 | 394 |

Source: NEFOP/GARFO Proposed Seaday Allocation for 2014 (Appendix C); Wigley et al., 2014 (Appendix D).

### 2.2.2 Herring Alternative 2: Coverage Target Specified for Industry-funded Monitoring Program

Under Herring Alternative 2, the New England Council would specify the details of an industry-funded monitoring program, including at-sea, dockside, or electronic monitoring, for the Herring FMP. These details may include, but are not limited to: (1) Level and type of coverage target, (2) rationale for level and type of coverage, (3) minimum level of coverage necessary to meet coverage goals, (4) consideration of coverage waivers if coverage target cannot be met, (5) process for vessel notification and selection, (6) process for payment of industry cost responsibilities, (7) standards for monitoring service providers, and (8) any other measures necessary to implement the industry-funded monitoring program. Additional NEPA analysis would be required for any subsequent FMP framework adjustment action implementing and/or modifying the specified industry-funded monitoring programs.

The realized coverage level in a given year would be determined by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM and the specified coverage target.

Additionally, after the specified coverage targets are effective for 2 years, this amendment gives the New England Council the choice to either (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery, and consider if adjustments to the coverage targets are warranted. Depending on the results and desired actions, subsequent action to adjust the coverage targets could be accomplished via specifications, a framework adjustment, or an amendment to the Herring FMP, as appropriate.

## Service Providers

Omnibus Alternative 2 would include standard administrative requirements for industry-funded monitoring service providers, including at-sea monitoring and dockside monitoring. Because service provider standers for electronic monitoring are just starting to be considered across NMFS, it is likely premature to include service provider standards for electronic monitoring in this amendment. Omnibus Alternative 2 would include the ability for Councils to implement service provider standards for electronic monitoring through a future omnibus framework adjustment to New England and Mid-Atlantic FMPs. The first Northeast FMP that develops an electronic monitoring program would also establish standard administrative requirements for electronic monitoring service providers for all FMPs. If Omnibus Alternative 2 is not selected by the Councils, service provider requirements for industry-funded monitoring programs would be developed and implemented in individual FMPs.

The SBRM Omnibus Amendment, if approved, would modify the scallop industry-funded observer service provider requirements (at 50 CFR 648.11(h) and (i)) to apply to all New England and Mid-Atlantic FMPs as of April 2015. Specifically, the SBRM Amendment would authorize observer service provider approval and certification for all applicable fisheries, should a Council develop and implement a requirement or option for an industry-funded observer program in other fisheries beside scallops. However, the SBRM Amendment does not address service provider requirements for other types of industry-funded monitoring programs.

Omnibus Alternative 2 would modify the SBRM observer service provider approval and certification process to be a monitoring service provider approval and certification process that would apply to observer and dockside service providers for all New England and Mid-Atlantic FMPs.

An advanced High Volume Fishery (HVF) certification was developed in order to more effectively train certified NEFOP observers in high volume catch sampling and documentation. HVF certification allows observer to cover any of the fisheries that pump catch, typically the mid-water trawl and purse seine fleets. This certification was developed to prepare observers for changes in the regulations and new requirements that were under discussion (Amendment 5). The NEFOP determined that data quality was suboptimal when collected by observers without specialized training, potentially resulting in data loss. In addition, the high variety of deck configurations, fish handling practices and fast-paced operations proved more demanding for observers. Having an additional training to identify these practices allowed for improved decision-making while at sea, which, ultimately, improved data accuracy and maximized data collection.

In order to qualify for HVF training, NEFOP observers need to be certified and in a positive data quality standing with all trip data. Prior data and data quality history are critically examined in order to determine if an observer would be a good candidate for certification. The HVF training is conducted at the NEFOP training center in Falmouth, MA and is currently 1 day in duration. Training consists of species identification, sampling and subsampling methodologies, practice and documentation, gear identification and a review of the regulations. Regulations are discussed in order to educate observers in regard to Groundfish Closed Area coverage, haddock and river herring/shad catch accounting, slippage and operational discarding. Sampling and subsampling high volume catch is the main focus of training to ensure that observers understand the challenges that exist in trying to account for and accurately extrapolate catch on a haul by haul basis. Training on the use of a Marel scale is also conducted as most of the high volume vessels have volunteered to keep Marel scales onboard for the observers to utilize. An exam is administered at the end of training and if successfully completed an observer is certified to observe the high volume fisheries.

Under Herring Alternative 2, the process for SBRM observer service provider approval and certification would be adopted for industry-funded observer and dockside service providers for the Herring FMP. As described above, only NEFOP observers with special HVF training are used to cover the herring fishery. The process for vessel notification/selection and payment of industry cost responsibilities would be developed during the rulemaking and amendment approval process.

#### *2.2.2.1 Herring Alternative 2.1: Up to 100% Coverage on Category A and B Vessels (No Waivers Issued)*

Herring Alternative 2.1 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip.
Prior to any trip declared into the herring fishery, vessel owners, operators, and/or representatives for vessels with Category A and B herring permits would be required to provide notice to NMFS and request an observer through the pre-trip notification system. If an SBRM observer was not selected to cover that trip, NMFS would notify the vessel owner, operator, and/or representative of the vessel that observer coverage must be procured through an industry-funded at-sea observer service provider. The owner, operator, and/or representative of the vessel would then be required to contact an industry-funded at-sea observer service provider to obtain and pay for an at-sea observer to carry on its next fishing trip. The vessel would be prohibited from fishing for, taking, possessing, or landing any herring without carrying an observer for that trip.

The New England Council believed that the provisions for observer coverage recommended in Amendment 5 could enhance catch monitoring and achieve many of the goals and objectives of that amendment. Support for 100% observer coverage on Category A and B herring vessels was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was

necessary for the most active vessels to either confirm or disprove the claims that have been made by many regarding bycatch in the herring fishery.
The New England Council agreed with the need to increase observer coverage in the fishery to determine the true nature and extent of bycatch in the fishery, and to better address and manage bycatch issues in the future. The New England Council also believed that the requirement for 100% observer coverage should focus on the most active vessels in the herring fishery and vessels with Category A and B permits harvest greater than 98% of herring catch. Vessels with Limited Access Herring Incidental Catch Permits (Category C) harvest only a small percentage of the overall herring catch (0.6%). Because of the costs associated with industry-funded monitoring, the Amendment 5 recommended limiting industry-funded observer coverage to vessels with Category A and B vessels. The New England Council believed that increasing coverage just on vessels with Category A and B permits would improve catch monitoring in the herring fishery while minimizing the negative economic impacts associated with industry-funded observer coverage on fishery-related businesses and communities.

Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would require all vessels with Category A and B permits to carry an observer on every declared herring trip. If an observer was not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. This alternative would likely reduce the ability of vessels with Category A and B herring permits to participate in the herring fishery.

#### *2.2.2.2 Herring Alternative 2.2: 100% Coverage on Category A and B Vessels (Waivers Issued)*

Herring Alternative 2.2 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip unless the at-sea observer requirement was waived by NMFS.

Prior to any trip declared into the herring fishery, vessel owners, operators, and/or representatives for vessels with Category A and B herring permits would be required to provide notice to NMFS and request an observer through the pre-trip notification system. If an SBRM observer was not selected to cover that trip, NMFS would notify the vessel owner, operator, and/or representative of the vessel whether or not observer coverage must be procured through an industry-funded at-sea observer service provider. If NMFS informs the owner, operator, and/or representative of the vessel that they needed observer coverage, they would then be required to contact an industry-funded at-sea observer service provider to obtain and pay for an at-sea observer to carry on its next fishing trip. The vessel would be prohibited from fishing for, taking, possessing, or landing any herring without carrying an observer on its next trip. If NMFS informs the owner, operator, and/or representative of the vessel that observer coverage is not needed on its next trip, NMFS would issue the vessel an observer coverage waiver.

The realized observer coverage level for this alternative in a given year would be determined by the amount of Federal funding available to cover NMFS cost responsibilities. The realized observer coverage level would fall anywhere between SBRM coverage and 100% percent coverage on vessels with Category A and B herring permits.

As described above, the New England Council believed that the provisions for observer coverage recommended in Amendment 5 could enhance catch monitoring and achieve many of the goals and objectives of that amendment. Support for 100% observer coverage on Category A and B herring vessels was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for the most active vessels to either confirm or disprove the claims that have been made by many regarding bycatch in the herring fishery. The New England Council also believed that the requirement for 100% observer coverage should focus on the most active vessels in the herring fishery and vessels with Category A and B permits harvest greater than 98% of herring catch.

Recognizing that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would specify a 100% percent coverage target on vessels with Category A and B permits but would allow the requirement to carry an observer on every declared herring trip to be waived by NMFS if an observer is not available to cover a specific trip (either due to logistics or a lack of funding). This alternative would preserve the New England Council's intent to have 100% percent coverage on vessels with Category A and B permits, but would not prevent vessels from participating in the herring fishery if observers are not available.

#### *2.2.2.3 Herring Alternative 2.3: Up to Confidence Interval-based Coverage (No Waivers Issued)*

Herring Alternative 2.3 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage.

Prior to any trip declared into the herring fishery, vessel owners, operators, and/or representatives for vessels using midwater trawl gear would be required to provide notice to NMFS and request an observer through the pre-trip notification system. If an SBRM observer was not selected to cover that trip, NMFS would notify the vessel owner, operator, and/or representative of the vessel whether or not observer coverage must be procured through an industry-funded at-sea observer service provider. If NMFS informs the owner, operator, and/or representative of the vessel that they needed observer coverage, they would then be required to contact an industry-funded at-sea observer service provider to obtain and pay for an at-sea observer to carry on its next fishing trip. The vessel would be prohibited from fishing for, taking, possessing, or landing any herring without carrying an observer on its next trip. If NMFS informs the owner, operator, and/or representative of the vessel that observer coverage is not needed on its next trip, NMFS would issue the vessel an observer coverage waiver.

The monitoring of catch and bycatch of RH/S in the herring fishery was identified as an FMP need in Amendment 5. This alternative was developed from an analysis that evaluated catch of RH/S catch in the herring fishery and was designed to complement SBRM monitoring coverage. Specifically, it evaluated which fishing fleets were catching RH/S, which fleets were discarding RH/S at sea, and the percent coverage necessary to obtain a 30% CV on RH/S catch by fleet. This alternative would focus coverage on the midwater trawl fleet because that fleet catches the majority of RH/S (57%). Additionally, consistent with the need identified in Amendment 5 to monitor all catch in the herring fishery, this alternative would focus coverage on the fleet that catches the majority of the herring harvest (73%) and on the vessels with Category A and B permits that harvest the majority of the herring harvest (83%).

Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would require midwater trawl vessel to carry an at-sea observer on every herring trip selected by NMFS. If an observer was not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. This alternative may reduce the ability of the midwater trawl fleet to participate in the herring fishery.

#### *2.2.2.4 Herring Alternative 2.4: Confidence Interval-based Coverage (Waivers Issued)*

Herring Alternative 2.4 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage.

Prior to any trip declared into the herring fishery, vessel owners, operators, and/or representatives for vessels using midwater trawl gear would be required to provide notice to NMFS and request an observer through the pre-trip notification system. If an SBRM observer was not selected to cover that trip, NMFS would notify the vessel owner, operator, and/or representative of the vessel whether or not observer coverage must be procured through an industry-funded at-sea observer service provider. If NMFS informs the owner, operator, and/or representative of the vessel that they needed observer coverage, they would then be required to contact an industry-funded at-sea observer service provider to obtain and pay for an at-sea observer to carry on its next fishing trip. The vessel would be prohibited from fishing for, taking, possessing, or landing any herring without carrying an observer on its next trip. If NMFS informs the owner, operator, and/or representative of the vessel that observer coverage is not needed on its next trip, NMFS would issue the vessel an observer coverage waiver.

The realized observer coverage level for this alternative in a given year would be determined by the amount of Federal funding available to cover NMFS cost responsibilities. The realized observer coverage level would fall anywhere between SBRM coverage and the specified coverage target for the midwater trawl fleet.

As described previously, this alternative would focus coverage on the midwater trawl fleet because that fleet catches the majority of RH/S (57%) and the majority of the herring harvest (73%).

Recognizing that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would specify a percent coverage target needed to achieve a 30% CV on RH/S catch by the midwater trawl fleet but would allow the requirement to carry an observer on every selected herring trip to be waived by NMFS if an observer is not available to cover a specific trip (either due to logistics or a lack of funding). This alternative would preserve the intent to focus coverage on the midwater trawl fleet , but would not prevent vessels from participating in the herring fishery if observers are not available.

#### *2.2.2.5 Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas*

Herring Alternative 2.5 would require vessels fishing with midwater trawl gear in the Groundfish Closed Areas (year around closed areas only) to carry an at-sea observer.

Prior to any Groundfish Closed Area trip declared into the herring fishery, vessel owners, operators, and/or representatives for vessels with midwater trawl gear would be required to provide notice to NMFS and request an observer through the pre-trip notification system. If an SBRM observer was not selected to cover that trip, NMFS would notify the vessel owner, operator, and/or representative of the vessel that observer coverage must be procured through an industry-funded at-sea observer service provider. The owner, operator, and/or representative of the vessel would then be required to contact an industry-funded at-sea observer service provider to obtain and pay for an at-sea observer to carry on its next fishing trip within a Groundfish Closed Area. The vessel would be prohibited from fishing for, taking, possessing, or landing any herring on any trip within a Groundfish Closed Area without carrying an observer for that trip.

As described previously, analyses in Amendment 5 suggest that midwater trawl vessels are not catching significant amounts of groundfish either inside or outside the Closed Areas. Additionally, the majority of groundfish catch by midwater trawl vessels is haddock, and the catch of haddock by midwater trawl vessels is already managed through a haddock catch cap for the herring fishery. However, the New England Council believes it is important to determine the extent and nature of bycatch in the herring fishery. This alternative would still allow the herring midwater trawl fishery to operate in the Closed Areas, but it would ensure that opportunities for sampling are maximized.

Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would require vessels fishing with midwater trawl the Groundfish Closed Areas to carry an at-sea observer on every declared herring trip. If an observer was not available to cover a specific herring trip inside a Groundfish Closed Area (either due to logistics or a lack of funding), that vessel would be prohibited from fishing inside a Groundfish Closed Area on that trip. This alternative may reduce the ability of the midwater trawl fleet to participate in the herring fishery.

### 2.2.3 Considered But Rejected Herring Alternatives

[pending]

## 2.3 ATLANTIC MACKEREL MONITORING ALTERNATIVES

### 2.3.1 Mackerel Alternative 1: No Coverage Target Specified for Industry-funded Monitoring Programs (No Action)

### 2.3.2 Mackerel Alternative 2: Coverage Target Specified for Industry-funded Monitoring Program

#### *2.3.2.1 Mackerel Alternative 2.1: Up to 100% Coverage on Category A and B Vessels (Waivers Issued)*

#### *2.3.2.2 Mackerel Alternative 2.2: 100% Coverage on Category A and B Vessels (No Waivers Issued)*

#### *2.3.2.3 Mackerel Alternative 2.3: Up to Confidence Interval-based Coverage (Waivers Issued)*

#### *2.3.2.4 Mackerel Alternative 2.4: Confidence Interval-based Coverage (No Waivers Issued)*

### 2.3.3 Considered But Rejected Mackerel Alternatives

# 3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

## 3.1 INTRODUCTION

The purpose of this action is to consider measures that would allow the Councils to implement industry-funded monitoring coverage in New England and Mid-Atlantic FMPs. This amendment would allow industry funding to be used in conjunction with available Federal funding to pay for additional monitoring to meet FMP-specific coverage targets. This amendment also considers (1) standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry, (2) a process for FMP-specific industry-funded monitoring to be implemented via a future framework adjustment action, (3) standard administrative requirements for industry-funded monitoring service providers, and (4) a process to prioritize available Federal funding for industry-funded monitoring across FMPs. Additionally this amendment considers monitoring coverage targets for the Atlantic Herring FMP and the Atlantic Mackerel, Squid, Butterfish (MSB) FMP, which are anticipated to enhance the monitoring of at-sea catch of herring, mackerel, river herring, shad, haddock, and other species harvested in the herring and mackerel fisheries.

This section will provide specific information on the FMPs subject to this amendment and summarize the relevant environmental features at a broader scale that crosses all subject FMPs and their constituent fisheries.

Because the omnibus portion of this amendment are concerned with the process to create industry-funded monitoring programs and prioritize Federal funding across those programs, the scope of the “environment” affected by this amendment is atypical for an FMP amendment. As the focus of the omnibus portions of the process to creating and allocating Federal funds to industry-funded monitoring programs, the impacts of the omnibus alternatives are procedural in nature. Therefore, a detailed description of the environmental components including the biological resources, physical environment, and socio-economic structure that could be affected by the alternatives under consideration is not necessary. Instead, this section of the amendment will include a brief overview of the areas in which the fishing activities affected by the subject FMPs occur, a brief overview of the primary ports engaged in the subject fishing activities, and a brief overview of the fishery and non-fishery living marine resources most frequently encountered by the subject fishing activities. This section will also include references for more detailed information on these topics, should any reader wish to become more familiar with the features of the environment in which the subject fisheries occur.

The herring and mackerel specific alternatives in this amendment are consistent with typical FMP amendments. The potential increases in monitoring for the herring and mackerel fisheries may directly impact fishing vessel operations (by modifying where, when, and/or how fishing may take place), and the ways in which herring and mackerel fishing activities directly or indirectly interact with living marine resources, marine habitat, and the socio-economic constructs of the human environment. Thus, where necessary, as in the “Affected Environment” section for a standard FMP amendment, detailed information is included regarding the herring and mackerel resources, non-target and protected species encountered in these fisheries, the habitats of these species, and the fishing businesses and communities expected to be directly or indirectly affected by the proposed action.

## 3.1.1 TARGET SPECIES

The fishery resources of the Greater Atlantic Region include a variety of managed and non-managed species that are caught and landed by commercial and recreational fishermen operating in the region (see table below). These fishery resources include many species of both demersal and pelagic finfish, several species of crustaceans, mollusks, and other invertebrates. These species occupy broad ranges within the Greater Atlantic Region (see table below) and a wide variety of habitats from the pelagic waters of the open ocean to sand, mud, gravel, and rock beds in coastal waters.

In 2011, over 157 species were recorded in FVTRs as being landed. Of the 39 species that comprised the top 99 percent, by weight, of the reported landings, all but 4 are the subject of an FMP by the Mid-Atlantic Council, the New England Council, or the ASMFC. Of the four non-FMP species in this group, two are managed by at least one state (channeled whelk, and knobbed whelk), one is likely to be subject to a forthcoming Council FMP (Atlantic hagfish), and one may be considered for future Council FMPs (Jonah crabs).

The 40 species managed under the FMPs subject to this amendment comprised 81 percent, by weight, of the species reported as landed in the 2011 FVTR data. Additional information regarding these species, and the management programs established under the subject FMPs, is discussed below. An additional 17 percent, by weight, of all landed species incorporates the 15 species managed solely under ASMFC FMPs, and the federally managed Atlantic highly migratory species represent another 0.1 percent of total reported landings by vessels submitting FVTRs. In sum, 97.5 percent, by weight, of all reported landings in 2011 were comprised by species subject to either Federal or ASMFC FMPs.

All of the FMP summaries below incorporate data from the seafood dealer purchase report database, from 2009-2013, inclusive. For some FMPs, the fishing year is offset from the calendar year, and starts on March 1 (Sea Scallops and Deep-Sea Red Crab), May 1 (Northeast Multispecies, Spiny Dogfish, and Skates), or on November 1 (Tilefish). For ease of analysis and consistency of presentation, the landings data for these FMPs are summarized based on calendar year, not fishing year.

| Resource group | Species | Gulf of Maine | Georges Bank | Middle Atlantic Bight |
|---|---|---|---|---|
| Fishery Resources | American lobster | X | X | X |
| | American plaice | X | | |
| | Atlantic bluefish | X | | X |
| | Atlantic cod | X | X | |
| | Atlantic croaker | | | X |
| | Atlantic halibut | X | | |
| | Atlantic herring | X | X | X |
| | Atlantic mackerel | X | X | X |
| | Atlantic sea scallop | | X | X |
| | Atlantic surfclam | X | X | X |
| | Atlantic wolffish | X | X | |
| | Black sea bass | | X | X |
| | Blue crab | | | X |
| | Butterfish | | X | X |
| | Clearnose skate | | | X |
| | Deep-sea red crab | X | X | X |
| | Golden tilefish | | | X |
| | Haddock | X | X | |
| | Hagfish | X | X | X |
| | Horseshoe crab | X | X | X |
| | Jonah crab | X | X | |
| | King whiting | | | X |
| | Little skate | | X | X |
| | Longfin squid | | X | X |
| | Menhaden | X | X | X |
| | Monkfish | X | X | X |
| | Ocean pout | X | X | X |
| | Ocean quahog | X | X | X |
| | Offshore hake | | X | X |
| | Pandalid shrimp | X | | |
| | Pollock | X | X | |
| | Red hake | X | X | X |
| | Redfish | X | | |
| | Rock crab | X | X | X |
| | Rosette skate | | | X |
| | Scup | | | X |
| | Shortfin squid | X | X | X |
| | Silver hake | X | X | X |
| | Smooth dogfish | | X | X |
| | Spiny dogfish | X | X | X |
| | Spot | | | X |
| | Striped bass | X | X | X |
| | Summer flounder | | X | X |
| | Whelks | X | X | X |
| | White hake | X | X | X |
| | Windowpane | | X | X |
| | Winter flounder | X | X | X |
| | Winter skate | X | X | X |
| | Witch flounder | X | | |
| | Yellowtail flounder | X | X | X |

| Resource group | Species | Gulf of Maine | Georges Bank | Middle Atlantic Bight |
|---|---|---|---|---|
| Protected Resources | North Atlantic right whale | X | X | X |
| | Humpback whale | X | X | X |
| | Fin whale | X | X | X |
| | Blue whale[2] | | | |
| | Sei whale | X | X | |
| | Sperm whale | | X | X |
| | Minke whale | X | X | X |
| | Risso's dolphin | | X | X |
| | Short-finned pilot whale | | | X |
| | Long-finned pilot whale | X | X | X |
| | White sided dolphin | X | X | X |
| | Common dolphin | X | X | X |
| | Spotted dolphin | | X | X |
| | Bottlenose dolphin | | X | X |
| | Harbor seal | X | | X |
| | Gray seal | X | | |
| | Harp seal | X | | |
| | Hooded seal | X | | |
| | Leatherback sea turtle | X | X | X |
| | Kemp's ridley sea turtle | X | | X |
| | Green sea turtle | X | | X |
| | Loggerhead sea turtle | | X | X |
| | Atlantic sturgeon | X | X | X |
| | Atlantic salmon | X | | |
| | Cusk (candidate species) | X | X | X |
| Other Non-fishery Resources | Amphipods (spp.) | X | X | X |
| | Annelid worm (spp.) | X | X | X |
| | Barndoor skate | | X | |
| | Brittle star (spp.) | X | X | X |
| | Coral (spp.) | X | X | X |
| | Greater shearwater | X | | |
| | Grenadier (spp.) | X | X | X |
| | Hermit crab (spp.) | X | X | X |
| | Jellyfish (spp.) | X | X | X |
| | Kelp (spp.) | X | X | X |
| | Lumpfish | X | X | X |
| | Northern gannet | X | X | X |
| | Northern stone crab | X | X | X |
| | Sand dollar (spp.) | X | X | X |
| | Sand lance (spp.) | X | X | X |
| | Sculpin (spp.) | X | X | X |
| | Sea anemone (spp.) | X | X | X |
| | Sea cucumber (spp.) | X | | X |
| | Sea raven | X | X | X |
| | Sea robin (spp.) | X | X | X |
| | Sea squirt (spp.) | X | X | X |
| | Snail (spp.) | X | X | X |
| | Spider crab (spp.) | X | | X |
| | Sponge (spp.) | X | X | X |
| | Spotted hake | | X | X |
| | Starfish (spp.) | X | X | X |
| | Thorny skate | X | X | |
| | Zooplankton (spp.) | X | X | X |

**TABLE 16**. LIST OF EXAMPLE BIOLOGICAL RESOURCES AND THE GEOGRAPHIC REGIONS WHERE THE RESOURCES ARE MOST COMMONLY FOUND.

[2] Blue whales are considered only an occasional "visitor" to this region.

#### *3.1.1.1 Atlantic Bluefish FMP*

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

The Mid-Atlantic Council began developing the Atlantic Bluefish FMP in 1979 in response to a petition by concerned fishermen reacting to developments in international markets for bluefish. The final FMP was adopted as a joint plan between the Council and the ASMFC in 1989. The FMP was approved and implemented in 1990. Amendment 1 to the FMP was developed in response to the Sustainable Fisheries Act amendments to the Magnuson-Stevens Act and implemented in 2000. Amendment 2 to the FMP was the 2007 SBRM Omnibus Amendment. In order to come into compliance with the revised Magnuson-Stevens Act, the Mid-Atlantic Council developed an Annual Catch Limit (ACL) and Accountability Measure (AM) Omnibus Amendment for all of its FMPs. The ACL/AM Omnibus Amendment (Amendment 3 to Atlantic Bluefish FMP) implemented ACLs and AMs for this fishery.

The FMP established a state-by-state commercial quota system and a coastwide recreational harvest limit. The Council and the ASMFC decide annually on a total allowable landings (TAL) level, that is divided between the commercial and recreational sectors (the commercial quota is further allocated to the states from Maine through Florida based on percentage shares specified in the FMP). The FMP calls for 83 percent of the TAL to be allocated to the recreational sector and 17 percent allocated to the commercial sector, but provides for a transfer of quota to the commercial sector from the recreational sector within certain limits. The Bluefish FMP is the only Greater Atlantic Region FMP that allocates specific quota to the states of South Carolina, Georgia, and Florida.

Amendment 1 to the FMP established a plan to rebuild the stock within 9 years through a gradual reduction in fishing mortality rate. The bluefish stock was declared to be rebuilt in 2009. In recent years, commercial catch has ranged from 7.0 million lb in 2007 down to 5.1 million lb in 2011, and recreational catch has ranged from 21.7 million lb in 2007 down to 11.5 million lb in 2011 (see Table 17). The major ports associated with bluefish are listed in Table 18.

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

| | Commercial Landings | Recreational Landings |
|---|---|---|
| 2007 | 7,006,000 | 21,690,000 |
| 2008 | 5,718,000 | 19,672,000 |
| 2009 | 6,469,000 | 14,513,000 |
| 2010 | 6,968,000 | 16,194,000 |
| 2011 | 5,077,000 | 11,499,000 |

**TABLE 17. RECENT COMMERCIAL AND RECREATIONAL LANDINGS (LB) OF BLUEFISH.**

| Primary Ports | Commercial Landings | Ex-vessel Value of Landings |
|---|---|---|
| Wanchese, NC | 1,585,400 | $620,400 |
| Long Beach/Barnegat Light, NJ | 665,200 | $296,400 |
| Point Judith, RI | 290,600 | $118,600 |
| Hampton Bays, NY | 277,000 | $169,800 |
| Montauk, NY | 272,000 | $169,200 |
| Belford, NJ | * | $* |
| Hatteras, NC | 237,600 | $69,200 |

**TABLE 18. PRIMARY PORTS ASSOCIATED WITH THE BLUEFISH FISHERY (VALUES ARE AVERAGED FOR 2007-2011). *DATA EXCLUDED FOR CONFIDENTIALITY.**

#### *3.1.1.2 Atlantic Herring FMP*

Atlantic herring are distributed along the Atlantic coast from North Carolina to the Canadian Maritime provinces. Schooling, or the formation of large aggregations for feeding and migration, is characteristic of herring species. This behavior begins as early as the onset of metamorphosis during larval development. Although herring schools are sometimes visible at the water's surface during the day, they typically undertake diurnal vertical migrations, sinking to the seafloor during the day and rising to the surface after dusk. Schools of adult herring make extensive migrations to areas where they feed, spawn, and overwinter.

Atlantic sea herring stocks were first managed in 1972 through the International Commission for the Northwest Atlantic Fisheries (ICNAF),[3] which regulated the high-seas international fishery. Upon implementation of the original Magnuson Fishery Conservation and Management Act in 1976, the New England Council developed an FMP for herring. This FMP was implemented in late 1978; however, the FMP was withdrawn in 1982 due to concerns over the lack of enforcement of state waters quotas. In 1996, the Council began development of a new FMP for herring that was intended to closely coordinate Federal management with that of the ASMFC. This FMP was implemented in 2000.

The Atlantic Herring FMP established total allowable catches (TACs) for each of four management areas in the Gulf of Maine and Georges Bank. This FMP established requirements for vessel, dealer, and processor permits, as well as reporting requirements and restrictions on the size of vessels that can catch herring. Amendment 1 to the FMP was completed in 2006 and implemented a limited access qualification program, changes to management areas, and improved monitoring of catch. Amendment 2 to the FMP was part of the 2007 SBRM Omnibus Amendment. In 2011, Amendment 4 implemented a process for establishing ACLs and AMs in the herring fishery and brought the Herring FMP into compliance with the recently reauthorized Magnuson-Stevens Act.

Although some herring are caught incidentally in recreational fisheries for Atlantic mackerel and silver hake, this is limited to coastal New Jersey, and almost all herring are caught for commercial purposes. There are two primary uses of commercially-caught herring: As bait (in either the tuna fishery or the lobster fishery) or as a food fish. Other than tuna vessels catching their own herring to use as bait, almost all herring is caught with either mid-water trawls (single and paired) or purse seines. The majority of herring landings are made with mid-water trawls; purse seines accounted for approximately one-fifth of landings from 2000-2004.

While herring is caught over a wide range, there are seasonal patterns to the fishery. During the winter months (December-March), the fishery is most active in the coastal waters south of New England, as adult herring move into this area. The fishery generally moves offshore and into the Gulf of Maine as spring approaches, and by late summer or early fall, the fishery concentrates on the coastal waters of Maine, New Hampshire, and Massachusetts as herring move into these areas prior to spawning. The Georges Bank fishery is most active in summer and early fall. Table 19 lists recent landings, and Table 20 identifies the major herring ports.

[3] ICNAF formerly coordinated management of many fisheries off the east coast of North America. ICNAF lasted until 1979, when it was partly replaced by Northwest Atlantic Fisheries Organization (NAFO).

| | Commercial Landings | Recreational Landings |
|---|---|---|
| 2007 | 163,049,000 | 139,000 |
| 2008 | 174,400,000 | 113,000 |
| 2009 | 224,558,000 | 55,000 |
| 2010 | 144,915,000 | 46,000 |
| 2011 | 177,165,000 | 58,000 |

**Table 19. Recent commercial and recreational landings (lb) of herring.**

| Primary Ports | Commercial Landings | Ex-vessel Value of Landings |
|---|---|---|
| Gloucester, MA | 51,077,600 | $6,051,600 |
| New Bedford, MA | 34,077,600 | $2,671,400 |
| Portland, ME | 28,329,600 | $3,764,200 |
| Rockland, ME | 27,384,600 | $3,562,800 |
| Cape May, NJ | * | $* |
| Stonington, ME | 5,955,600 | $772,200 |
| Point Judith, RI | 4,160,000 | $424,800 |
| Prospect Harbor, ME | 3,179,200 | $388,400 |

**Table 20. Primary ports associated with the herring fishery (values are averaged for 2007-2011). *Data excluded for confidentiality.**

#### *3.1.1.3 Atlantic Salmon FMP*

Atlantic salmon are a migratory anadromous fish with a complex life history, going through several distinct phases marked by changes in physiology and behavior. Spawning and juvenile development of Atlantic salmon occur in fresh water New England streams, with adults undergoing a highly migratory life on the open ocean and returning to fresh water to reproduce. North American origin Atlantic salmon are either from migratory stocks, undergoing long ocean migrations, or resident stocks, with more limited ocean migrations. Northern Canadian stocks are residential, while New England stocks tend to be migratory, traveling vast distances across open ocean to feeding grounds off the coast of southwestern

Greenland and later returning to their New England spawning grounds. Although rivers from Maine to Connecticut once supported healthy populations of Atlantic salmon, native Atlantic salmon have since become extirpated in all but a portion of Maine supporting the remaining Gulf of Maine Distinct Population Segment.

The New England Council developed an FMP for Atlantic salmon that was implemented by NMFS in 1988. The FMP established explicit U.S. management authority over all Atlantic salmon of U.S. origin. The plan was intended to complement state management programs in coastal and inland waters and Federal management authority on the high seas (conferred to the U.S. as a signatory nation to the North Atlantic Salmon Conservation Organization).

The FMP prohibits possession of Atlantic salmon and any directed or incidental (bycatch) commercial fishery for Atlantic salmon in Federal waters. The Council's Atlantic salmon plan strengthens the efforts of local groups, such as the Connecticut River Atlantic Salmon Commission, that are working towards the restoration of salmon stocks in New England river systems. The first change to the Atlantic Salmon FMP, Amendment 1, was implemented in 1999 to designate essential fish habitat and provide for a framework adjustment mechanism related to aquaculture. Amendment 2 to this FMP was the 2007 SBRM Omnibus Amendment.

The Atlantic salmon fishery expanded during the late 1800s from a reported 183 weirs and nets capturing 7,320 salmon in 1867, to 230 weirs and 36 gillnets capturing over 10,016 salmon in 1880. The catch peaked in 1889 with over 17,000 salmon and began a steady decline during the 20th century, with landings falling to as low as 40 salmon in 1947 (Collette and Klein-MacPhee 2002). Because no reporting requirements were established for the fishery, landings data are incomplete. In 1989, all state and Federal commercial salmon fisheries in New England were closed by law. Recreational fishing for sea-run Atlantic salmon is currently prohibited in all New England States. A small local fishery is ongoing for captive reared domestic Atlantic salmon released into select rivers in Connecticut and New Hampshire, these fisheries are individually regulated by each State. In spite of the decline of wild salmon populations, Atlantic salmon remains an important fishery resource in New England through the development of fish farming efforts (aquaculture and mariculture). Salmon mariculture is especially important in Maine, where harvest of farmed Atlantic salmon typically averages between 10 to 12 million pounds and reached almost 25 million pounds in 2010.

#### *3.1.1.4 Atlantic Sea Scallop FMP*

The Atlantic sea scallop is a bivalve mollusk that is highly valued for the meat in the large adductor muscle that holds the top and bottom portions of the shell together. Sea scallops are semi-mobile, bottom dwelling organisms. They are most abundant on coarse sand, gravel, and cobble. Mature females are highly fecund and produce millions of eggs during the late summer and autumn months. The Atlantic sea scallop is managed as a single unit throughout its range in United States waters. Five stock components are recognized: The

Gulf of Maine; eastern Georges Bank; the Great South Channel; the New York Bight; and the waters adjacent to Delaware, Maryland, and Virginia.

The Atlantic Sea Scallop FMP, prepared by the New England Council, was implemented in 1982 to restore adult scallop stocks and reduce year-to-year fluctuations in stock abundance caused by variation in recruitment. Amendments 4 and 7 significantly reduced fishing effort by limiting access to the resource, instituting DAS allocations (limiting the number of days a vessel is allowed to fish for scallops each year), implementing gear restrictions to improve escapement of small scallops and finfish, and limiting crew size. Area closures in New England and the Mid-Atlantic and above-average recruitment have resulted in increased scallop biomass both within and outside of the groundfish closed areas.

One of the foundations of the Scallop FMP is its area rotational management programs, established in 2004 under Amendment 10. Under this program, areas are defined and closed and reopened to fishing on a rotational basis, depending on the condition and size of the scallop resource in the areas. As a result of Amendment 10, controls on scallop effort differ depending on whether a fishing trip occurs in an access area or in an open area. Vessels either fish in access areas under allocated trips, or in open areas under DAS. Amendment 12 was the 2007 SBRM Omnibus Amendment, and Amendment 13 permanently re-activated the industry funded observer program in the same year. Amendment 11, implemented in 2008, included measures to control capacity and mortality in the general category scallop fishery. Primary measures included a limited entry program for general category vessels, as well as other permit provisions including an individual fishing quota program (IFQ). The most recent amendment, Amendment 15, introduced annual catch limits and accountability measures to the Scallop FMP in 2011, as required by the Magnuson-Stevens Act. Various frameworks have set annual or biennial scallop specifications and have included a variety of other management measures aimed at improving the effectiveness of the various aspects of scallop fishery management.

Under current regulations, the scallop fleet can be differentiated by vessel permit category: Limited access vessels that are subject to area-specific DAS controls and trip allocations; and limited access general category vessels that are not subject to DAS controls, but are subject to a possession limit per fishing trip. There are three types of limited access general category permits: Individual fishing quota (IFQ) permits with a possession limit of 600 lb per trip; Northern Gulf of Maine permits with a possession limit of 200 lb per trip; and incidental permits with a possession limit of 40 lb. per trip. The limited access and limited access general category scallop fleets receives a total allocation of 94.5 percent and 5 percent, respectively, of the scallop fishery's ACL, with the remaining 0.5 percent allocated to IFQ permits on vessels that have both limited access general category IFQ and limited access scallop permits. There are no open access permits in this fishery.

Another unique aspect of the Scallop is its industry-funded observer program. Every year, 1 percent of the ACL allocated to the scallop fishery is set-aside to be used as compensation for limited access or limited access general category IFQ vessels that are assigned an observer in open or access areas. If a limited access vessel is assigned an observer while fishing on an open area DAS trip, it will accrue DAS at a reduced rate for the trip. For limited access vessels on access area trips, and IFQ vessels on any trip, vessels receive additional scallop catch above the possession limit on observed trips in order to pay for the observer. If the set-aside is exhausted in a given fishing year, vessel owners must continue to pay for observers assigned to their vessel without receiving any compensation. NMFS sets the compensation rates (i.e., the appropriate scallop lb/trip for each observed trip) at the start of each fishing year based on that year's observer set-aside allocation and closely monitors the set-aside usage each year to avoid fully harvesting it whenever possible.

Scallops are harvested primarily through the use of scallop dredges and trawls. In recent years (2007-2011), almost 98 percent of all scallop landings are by dredge vessels. During the 2007-2011 fishing years, trawl vessels landed another 1-2 percent, with other gear types contributing only trace amounts of scallop landings.

The Atlantic sea scallop fishery is rebuilt to sustainable levels, following declines in fishing mortality from effort reductions, gear restrictions, and closed areas, combined with above average recruitment in some areas and in multiple years since 1999. Revenues from commercial scallop landings for New England and Mid-Atlantic states in the year 2000 were estimated at $161 million. Increased landings since the early 2000's were made possible by an increase in scallop biomass and favorable recruitment. In recent years, total commercial landings have remained relatively constant while revenue has increased by over 50 percent (see Table 21). The majority of limited access vessels are based in Massachusetts, Virginia, New Jersey, and North Carolina, and the primary scallop ports are located in New Bedford, MA, Cape May, NJ, and Newport News, VA (see Table 22).

| | **Commercial Landings (lb)** | **Ex-vessel Value** |
|---|---|---|
| 2007 | 58,521,000 | $386,468,000 |
| 2008 | 53,388,000 | $370,117,000 |
| 2009 | 57,714,000 | $373,735,000 |
| 2010 | 57,058,000 | $450,808,000 |
| 2011 | 58,838,000 | $580,527,000 |

**TABLE 21. RECENT COMMERCIAL LANDINGS OF ATLANTIC SEA SCALLOPS.**

| Primary Ports | Commercial Landings (lb) | Ex-vessel Value of Landings |
|---|---|---|
| New Bedford, MA | 28,502,000 | $220,117,000 |
| Cape May, NJ | 8,081,400 | $59,567,000 |

| | | |
|---|---|---|
| Newport News, VA | 5,339,600 | $38,535,400 |
| Long Beach/Barnegat Light, NJ | 2,365,600 | $18,781,400 |
| Seaford, VA | * | $* |
| Hampton, VA | * | $* |

**Table 22. Primary ports associated with the sea scallop fishery (values are averaged for 2007-2011). *Data excluded for confidentiality.**

#### *3.1.1.5 Deep-Sea Red Crab FMP*

The deep-sea red crab is a deep-water brachyuran crab that occurs in a patchy distribution on the continental shelf and slope from Nova Scotia to Florida. Though the species is found primarily within a 200-1800 meter depth band along the continental shelf and slope, red crabs have also been located in some deep-water canyons along the coast and can also be found in the Gulf of Maine. Preferred depth depends, in part, on the characteristics of individual crabs. Young crabs dwell in considerably deeper water than adults and males are typically found deeper than females. The red crab is a slow-growing species that may not spawn annually. It is long-lived, with some individuals surviving for up to 15 years. These characteristics make it particularly susceptible to depletion by overfishing.

There has been a small directed fishery off the coast of New England and in the Mid-Atlantic for deep-sea red crab since the early 1970s. Though the size and intensity of this fishery has fluctuated, it has remained consistently small relative to more prominent New England fisheries such as groundfish, sea scallops, and lobster. Landings increased substantially after 1994, when implementation of Amendment 5 to the Northeast Multispecies FMP may have led some fishing effort to redirect onto “under-exploited” fishery resources such as red crab.

In 1999, at the request of members of the red crab fishing industry, the New England Council began development of an FMP to prevent overfishing of the red crab resource and address a threat of overcapitalization of the red crab fishery. A control date was established in 2000 to discourage "speculative entry," or rapid entry of new vessels into the fishery and, in 2001, NMFS implemented emergency regulations to prevent overfishing of the resource during the time the FMP was being developed. The FMP was implemented in 2002. The primary management control was to establish a limited access permit program for qualifying vessels with documented history in the fishery. Other measures implemented under the FMP included DAS limits, trip limits, gear restrictions, and limits on processing crabs at sea. Framework Adjustment 1 provided for a 3-year, rather than annual, specification-setting process. Amendment 3 was implemented in 2011 to bring the FMP into compliance with the revised Magnuson-Stevens Act by implementing annual catch limits and accountability measures. Amendment 3 also revised the management measures, by eliminating DAS and the vessel trip limit. The directed, limited access red crab fishery is a male-only fishery, that is currently managed with a "hard" quota (i.e., the fishery is closed when the quota is reached), gear restrictions, and limits on processing crabs at sea.

Although there is an open access permit category, the small possession limit of 500 lb per trip has kept this sector of the fishery very small. The directed red crab fishery is limited to using parlor-less crab pots, and is considered to have little, if any, incidental catch of other species. There is no known recreational fishery for deep-sea red crab. Landings of red crab varied somewhat before the implementation of the FMP, but have stabilized since (see Table 23). All vessels with limited access permits now fish out of Fall River, MA.

| | Commercial Landings (lb) | Ex-vessel Value |
|---|---|---|
| 2007 | 2,650,000 | $2,615,000 |
| 2008 | 2,744,000 | $3,153,000 |
| 2009 | 2,188,000 | $2,140,000 |
| 2010 | 3,124,000 | $3,060,000 |
| 2011 | 3,598,000 | $3,488,000 |

**TABLE 23. RECENT COMMERCIAL LANDINGS OF DEEP-SEA RED CRABS.**

#### *3.1.1.6 Mackerel, Squid, and Butterfish FMP*

Atlantic mackerel, *Illex* and longfin squid, and butterfish are all schooling pelagic species that range from at least the Gulf of St. Lawrence south to at least Cape Lookout, NC.[4] Butterfish and the two squids are fast-growing, short-lived species, while Atlantic mackerel grows more slowly and lives several years longer. All four species are most abundant from Georges Bank to Cape Hatteras, NC, and follow seasonal migration patterns based largely on water temperature. Longfin inshore squid was previously referred to as *Loligo* squid. Due to a recent change in the scientific name of longfin inshore squid from *Loligo pealeii* to *Doryteuthis (Amerigo) pealeii*, the common name ''longfin squid'' is now used in all official documents to avoid confusion.

The FMP was developed by the Mid-Atlantic Council and was implemented in 1983. Early amendments to the FMP changed permit and reporting requirements, the fishing year, quota adjustment mechanisms, foreign fishing and joint venture provisions, and

[4] Atlantic mackerel ranges from the Gulf of St. Lawrence to Cape Lookout, NC; *Loligo* squid ranges from Newfoundland to the Gulf of Venezuela; *Illex* squid ranges from the Labrador Sea to the Florida Straits; and butterfish range from the Gulf of St. Lawrence to the coast of Florida.

implemented limited access systems for butterfish and the two squid fisheries. In recent years, amendments have been implemented to rebuild the butterfish stock and address bycatch in the longfin squid fishery (Amendment 10, in 2010), limit access in the mackerel fishery (Amendment 11, in 2011), and establish ACLs and AMs for the mackerel and butterfish fisheries (Amendment 13, in 2012). Amendment 12 to this FMP was the 2007 SBRM Omnibus Amendment. Several amendments are currently under development to improve monitoring in the mackerel, squid, and butterfish fisheries and reduce river herring and shad bycatch (Amendment 14), consider adding river herrings and shads as stocks in the Mackerel, Squid, and Butterfish FMP (Amendment 15), and address interactions with deep-sea corals (Amendment 16).

The mackerel, squid, and butterfish fisheries are all managed by directly controlling harvest. The directed mackerel fishery can be closed when landings are projected to reach 95 percent of the total domestic harvest. The mackerel incidental catch fishery can be closed when landings are projected to reach 100 percent of the total domestic harvest. The directed longfin squid fishery is managed via trimester quota allocations and the directed fishery is closed when 90 percent of the trimester quota allocations or 95 percent of the total domestic harvest is projected to be landed. There is also a cap on butterfish discards in the longfin squid fishery that is allocated by trimester, and closes the longfin squid fishery to directed harvest once it has been exceeded. The directed *Illex* fishery closes when 95 percent of the total domestic harvest is projected to be landed. Finally, butterfish is managed using a phased system. The system triggers butterfish possession limit reductions at different points to ensure quota is available for directed harvest throughout the fishing year. During closures of the directed longfin squid, *Illex*, or butterfish fisheries, incidental catch fisheries for these species are permitted.

Although 1.5 percent of butterfish landed from 2007-2011 were reported as caught with gillnets, and trace amount of these species were reported as caught with a variety of fishing gears, more than 98 percent of reported landings of all four species during this period were caught with otter trawls (midwater and bottom). Management measures implemented under this FMP restrict only the commercial fishing sectors, although there is a recreational fishery for Atlantic mackerel.

Fishing for Atlantic mackerel occurs year-round, although most fishing activity occurs from January through April. The *Illex* squid fishery occurs largely from June through October, although this can vary somewhat from year to year. In some years, the longfin squid fishery remains relatively consistent throughout the year, but in most years, landings peak during October through April. Butterfish are landed year-round, with no apparent seasonal patterns. Table 24 lists the estimated recreational landings of Atlantic mackerel from 2007-2011. Table 25 and Table 26 identify the recent landings, ex-vessel value, and primary ports for these fisheries.

| | Recreational Landings (lb) |
|---|---|
| 2007 | 1,287,000 |
| 2008 | 1,726,000 |
| 2009 | 1,330,000 |
| 2010 | 1,672,000 |
| 2011 | 2,056,000 |

**Table 24. Recreational landings of Atlantic mackerel.**

| | Atlantic mackerel | | Butterfish | | Illex squid | | Loligo squid | |
|---|---|---|---|---|---|---|---|---|
| | Commercial Landings (1,000 lb) | Ex-vessel Value ($1,000) | Commercial Landings (1,000 lb) | Ex-vessel Value ($1,000) | Commercial Landings (1,000 lb) | Ex-vessel Value ($1,000) | Commercial Landings (1,000 lb) | Ex-vessel Value ($1,000) |
| 2007 | 56,321 | $6,603 | 1,496 | $1,088 | 19,890 | $3,863 | 27,236 | $23,240 |
| 2008 | 47,934 | $6,316 | 996 | $758 | 35,054 | $8,346 | 25,125 | $23,460 |
| 2009 | 49,900 | $7,978 | 958 | $611 | 40,606 | $9,667 | 20,517 | $18,313 |
| 2010 | 21,775 | $3,179 | 1,269 | $829 | 34,887 | $10,758 | 14,875 | $15,366 |
| 2011 | 1,170 | $356 | 1,463 | $1,124 | 41,440 | $18,832 | 21,046 | $24,131 |

**TABLE 25. RECENT COMMERCIAL LANDINGS IN THE ATLANTIC MACKEREL, BUTTERFISH, AND SQUID FISHERIES.**

| Atlantic mackerel | | Butterfish | | Illex squid | | Longfin squid | |
|---|---|---|---|---|---|---|---|
| Primary Ports | Ex-vessel Value | Primary Ports | Ex-vessel Value | Primary Ports | Ex-vessel Value | Primary Ports | Ex-vessel Value |
| North Kingstown, RI | $* | Point Judith, RI | $270,000 | Cape May, NJ | $5,013,000 | Point Judith, RI | $7,742,000 |
| Gloucester, MA | $1,200,400 | Montauk, NY | $211,400 | North Kingstown, RI | $* | Montauk, NY | $3,203,600 |
| New Bedford, MA | $1,163,200 | North Kingstown, RI | $54,600 | Hampton, VA | $* | North Kingstown, RI | $2,727,400 |
| Cape May, NJ | $743,800 | New Bedford, MA | $44,400 | Point Judith, RI | $129,600 | Cape May, NJ | $2,114,600 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Fall River, MA | $277,000 | Hampton Bays, NY | $35,400 | Wanchese, NC | $127,400 | Hampton Bays, NY | $1,430,800 |

**Table 26. Primary ports associated with the Atlantic mackerel, butterfish, and squid fisheries (values are averaged for 2007-2011). *Data excluded for confidentiality.**

### *3.1.1.7 Monkfish FMP*

The monkfish (also known as goosefish) is a member of the anglerfish family Lophiidae, fishes distinguished by an appendage on the head known as the illicium which has a fleshy end (esca) that acts as a lure to attract prey to within range of its large mouth. Monkfish have a large, bony head and are harvested for their livers and the tender meat in their tails. The species is distributed widely throughout the Northwest Atlantic, from the northern Gulf of St. Lawrence to Cape Hatteras, NC, and is known to inhabit waters from the tide-line to depths as great at 840 meters across a wide range of temperatures.

Adults have been found on a variety of substrate types including hard sand, gravel, broken shell, and soft mud. Spawning occurs in May and June from Cape Hatteras to southern New England. Mature females, which are slightly larger than males, produce a non-adhesive, mucoid egg raft or veil which can reach 20-40 feet in length and ½-5 feet in width. During spawning, this large mass of eggs can account for up to 50 percent of a female's body mass. Monkfish are managed as two stocks, a northern stock from Maine to Cape Cod, MA, and a southern stock from Cape Cod to North Carolina.

During the early 1990s, fishermen and dealers in the monkfish fishery addressed both the New England and Mid-Atlantic Councils with concerns about the increasing amount of small fish being landed, the increasing frequency of gear conflicts between monkfish vessels and those in other fisheries, and the expanding directed trawl fishery. In response, the Councils developed a joint FMP that was implemented in 1999. The FMP was designed to stop overfishing and rebuild the stocks through a number of measures, including: Limiting the number of vessels with access to the fishery and allocating DAS to those vessels; setting trip limits for vessels fishing for monkfish; minimum fish size limits; gear restrictions; mandatory time out of the fishery during the spawning season; and a framework adjustment process.

Reported landings of monkfish increased dramatically from the late 1970s until the mid-1990s and have remained high (see Table 27). Burgeoning markets for monkfish tails and livers in the 1980s allowed fishermen to fish profitably for monkfish, landing increasingly smaller monkfish as the stocks became depleted. Since the implementation of the FMP, however, vessels are more commonly landing large, whole monkfish for export to Asian markets. Revenues have generally increased since the mid-1980s and the relative value of monkfish is currently at its highest point since 1996 (see Table 27 and Table 28).

| | Commercial Landings (lb) | Ex-vessel Value |
|---|---|---|
| 2007 | 14,440,000 | $28,797,000 |
| 2008 | 13,013,000 | $27,195,000 |
| 2009 | 10,392,000 | $19,513,000 |
| 2010 | 8,790,000 | $18,985,000 |
| 2011 | 10,672,000 | $26,333,000 |

**Table 27. Recent commercial landings of monkfish.**

| Primary Ports | Commercial Landings | Ex-vessel Value of Landings |
|---|---|---|
| New Bedford, MA | 2,244,400 | $5,407,600 |
| Long Beach/Barnegat Light, NJ | 1,360,600 | $2,343,800 |
| Gloucester, MA | 1,205,000 | $3,569,000 |
| Point Judith, RI | 886,200 | $1,972,600 |
| Boston, MA | 603,400 | $1,777,800 |
| Chatham, MA | 580,200 | $908,400 |
| Montauk, NY | 501,800 | $801,000 |
| Little Compton, RI | 468,200 | $679,200 |
| Point Pleasant, NJ | 392,200 | $628,000 |

**Table 28. Primary ports associated with the monkfish fishery (values are averaged for 2007-2011).**

The majority of commercial landings are made using gillnets (67 percent) with another 26 percent landed by otter trawls (according to the fishing vessel trip report (FVTR) database, 2007-2011). Scallop dredges also catch monkfish, but in much smaller amounts (7 percent of reported landings, 2007-2011). No other gear types account for more than trace landings of monkfish. There is no recreational component to this fishery.

The Monkfish FMP has been modified by three amendments and 7 framework adjustment actions since 1999. Amendments have implemented more substantial changes to the FMP, while framework adjustments implement less substantive revisions to existing measures, or specify annual catch levels. Amendment 1 implemented the EFH provisions of the Magnuson-Stevens Act in 1999. Amendment 2, implemented in 2005, included restrictions on otter trawls in certain areas, made the minimum fish size consistent in all areas, closed two offshore canyons to monkfish fishing, created a monkfish research DAS set-aside program, and created new permit categories for fishing in designated areas, among other measures. Amendment 3 was the 2007 SBRM Omnibus Amendment. In 2011, Amendment 5 implemented a process to establish acceptable biological catch amounts and annual catch limits, along with accountability measures to prevent overfishing if such catch limits are exceeded, to bring the FMP into compliance with the Magnuson-Stevens Reauthorization Act. Framework adjustments have generally specified appropriate fishing measures (DAS and trip limits) for each management area to achieve, but not exceed annual catch targets.

#### *3.1.1.8 Northeast Multispecies FMP*

Sixteen species of groundfish are managed under this FMP (see **Error! Reference source not found.**). Thirteen species are managed as part of the large-mesh complex, based on fish size and type of gear used to harvest the fish, and three species are included in this FMP as the small-mesh complex but are managed under a separate small-mesh multispecies program. While these sixteen groundfish species exhibit unique body types, behaviors, and habitat preferences, all are demersal, living near the bottom and feeding on benthic organisms. Groundfish are found throughout New England waters, from the Gulf of Maine to southern New England.

In 1977, the New England Council's first groundfish FMP, including only cod, haddock, and yellowtail flounder, was implemented. This plan was primarily developed by NMFS and its individual species quotas were a continuation of the ICNAF quota-based management system. Although the quotas did reduce the catch of these species, the system had a number of serious flaws. Because there was no limit on the number of participants, the number of vessels increased dramatically as the stocks improved between 1977 and 1980. The increasing number of vessels caught the quota in less time causing the fishery to be closed more frequently and for longer periods of time. The quotas forced vessels to catch fish as fast as possible to get the largest possible share before the fishery was closed (known as a "derby" fishery). In 1977, the Gulf of Maine cod quota was taken in 5 months and the Georges Bank quota was caught in 6 months.

The Council implemented a system of individual vessel trip limits that helped to prevent long closures that disrupted market supplies. This action was also intended to mitigate the derby fishery, which caused safety concerns, and to give small boats a greater chance to catch a share of fish proportional to their traditional participation levels. Limits were set for each species and stock area for each of three vessel categories. Because of problems associated with data reliability, enforcement, and equity among the vessel sectors, the Council eliminated the quota-based management system when it adopted the Interim Groundfish FMP in 1982. This plan replaced the catch quotas with minimum fish size and codend mesh size regulations for Georges Bank and the Gulf of Maine. It also allowed small-mesh fishing to continue throughout the Gulf of Maine. Closed areas intended to protect spawning haddock were left in place.

What we now consider the Northeast Multispecies FMP was implemented in 1986. It was the first plan in the world to set biological targets in terms of maximum spawning potential. This mechanism allows the Council to meet its biological objectives either by increasing the age-at-first capture (size of fish caught) or by controlling fishing mortality. The plan also greatly expanded the number of species included in the management unit. In its first year, the plan set minimum fish sizes for some species and changed minimum fish sizes for others. The plan also enlarged one of the haddock spawning closed areas, Area I, and established a large closed area off of southern New England to protect spawning yellowtail and to help reduce fishing mortality. The Exempted Fisheries Program substantially reduced the area and time period available for small-mesh fishing in the Gulf of Maine.

In 1987, the Council adopted Amendment 1 to the FMP, which decreased the area for the silver hake exempted fishery, increased the large-mesh area to include some important yellowtail flounder grounds to the south, and tightened existing mesh size regulations and regulations for the southern New England yellowtail flounder area. Amendment 2 eliminated a scheduled increase in codend mesh size, and implemented the following measures: (1) Trip bycatch limits and stricter non-reporting penalties in the Exempted Fisheries Program; (2) increased some minimum fish sizes; (3) established a seasonal large-mesh area on Nantucket Shoals to protect cod; (4) applied mesh size regulations to the whole nets rather than only to the codend; (5) set all recreational minimum sizes to be consistent with commercial minimum sizes; and (6) excluded trawlers from Closed Area II during the closure to improve enforcement of the closure.

Amendment 3, implemented in 1989, established the Flexible Area Action System. Its purpose was to enable the Council and NMFS to respond quickly to protect large concentrations of juvenile, sub-legal (smaller than the minimum legal size) and spawning fish. Amendment 4 was implemented in 1991 and added more restrictions to the Exempted Fisheries Program; established a procedure for the Council to make recommendations for modifying northern shrimp gear to reduce the bycatch of groundfish; expanded the management unit to include silver hake, ocean pout, and red hake; established management measures for the Cultivator Shoals silver hake fishery; further tightened restrictions on the carrying of small mesh while fishing in the Regulated Mesh Area; and established a minimum mesh size in the southern New England yellowtail flounder area.

Amendment 5 was implemented in 1994 to address the overfishing of principal groundfish stocks that occurred in the late 1980s and early 1990s and reflected a significant turning point in the management of the Northeast multispecies fishery. Amendment 5 established a moratorium on new vessel permits during the rebuilding period (creating the current limited access permit system based on history in the fishery), implemented a DAS effort reduction program (the first of its kind), added additional mesh size restrictions, and also included interim gillnet regulations to reduce harbor porpoise bycatch, a mandatory vessel trip reporting system for landings, a prohibition on pair-trawling, a requirement for a finfish excluder device for shrimp fishery, changed some minimum fish sizes, and expanded the size of Closed Area II. Amendment 6 followed shortly after to implement additional haddock conservation measures.

Amendment 7, implemented in 1996, accelerated the DAS effort reduction program established in Amendment 5, eliminated significant exemptions from the current effort control program, provided incentives to fish exclusively with mesh larger than the minimum required, broadened the area closures to protect juvenile and spawning fish, and increased the haddock possession limit. It established a rebuilding program for Georges Bank and Southern New England yellowtail flounder, Georges Bank and Gulf of Maine cod, and Georges Bank haddock based primarily on DAS controls, area closures, and minimum mesh size. Additionally, the amendment changed existing permit categories and initiated several new ones, including an open access multispecies permit for limited access sea scallop vessels. Amendment 7 also created a program for reviewing the management measures annually and making changes to the regulations through the framework adjustment process to insure that plan goals would be met.

Amendment 8 was implemented to address gear conflict issues between the mobile gear participants of the groundfish and scallop fisheries and the fixed gear participants of the lobster fishery. Amendment 9 established new status determination criteria (overfishing definitions) and set optimum yield for twelve groundfish species to bring the plan into compliance with the Sustainable Fisheries Act. Amendment 9 also added Atlantic halibut to the FMP's management unit. Amendment 10, known as the "consistency amendment," was developed to make the vessel upgrading and replacement provisions consistent across all New England and Mid-Atlantic Council FMPs. Amendment 11 addressed the Sustainable Fisheries Act EFH requirements. Amendment 12 addressed the Sustainable Fisheries Act requirements for silver hake, red hake, and offshore hake through a separate small-mesh multispecies management program implemented in 2000.

In addition to the amendments implemented prior to Amendment 13, the FMP was modified through a number of framework adjustments designed to achieve the Amendment 7 fishing mortality targets or to fulfill the requirement for annual adjustments to management measures. Several joint frameworks with the Sea Scallop FMP were implemented to provide scallop vessels access to the groundfish closed areas. Frameworks 32, 35, 37, and 38 instituted additional changes to management of the small-mesh fishery, including several new small-mesh gear exemption areas and elimination of default rebuilding measures.

The Council began work in Amendment 13 in February 1999. The purpose for this amendment included a need to develop rebuilding programs to meet the Amendment 9 status determination criteria and to address problems identified with the effort control program (DAS). After this amendment was begun, the Council submitted Framework 33 to meet the Amendment 7 requirement for an annual adjustment to the FMP. This framework was implemented May 1, 2000. On May 19, 2000, a coalition of conservation organizations challenged Framework 33 alleging that it failed to implement programs necessary to rebuild groundfish stocks to the Amendment 9 targets and did not meet bycatch requirements of the Magnuson-Stevens Act (*Conservation Law Foundation et al*. v. *Evans et al*.). The Court found in favor of the plaintiffs on December 28, 2001. After a series of negotiations among various parties, interim measures were adopted by the Court in 2002 and NMFS was instructed to submit a management plan that complied with the Magnuson-Stevens Act. Amendment 13–already in development–was recognized as the most appropriate vehicle to meet the Court's requirement.

Amendment 13 was implemented in 2004, and included several new management features. The amendment classified multispecies DAS into three categories (unrestricted A DAS, restricted use B DAS, and C DAS, which cannot be used at this time); enables the Council to create/allow "special access programs" (SAPs)[5] for healthy stocks, such as Georges Bank haddock; allows sectors of the groundfish fishing industry to develop their own sector allocation plan; includes an adaptive approach for rebuilding groundfish stocks that requires biennial adjustments to management measures; and implements several provisions of the U.S./Canada Resource Sharing Understanding.[6] Since Amendment 13 was implemented, several framework adjustments have been developed to modify, fully implement, and/or comply with various provisions of Amendment 13. Several environmental groups challenged Amendment 13, claiming that the rebuilding programs did not comply with the Magnuson-Stevens Act, the management measures would be ineffective, an SBRM was not included, and the amendment did not consider a sufficiently broad range of alternatives. The Court upheld the amendment with the exception of the reference to the SBRM.

Amendment 16 was implemented May 1, 2010 and provided major changes in the realm of groundfish management. Notably, it greatly expanded the sector program and implemented Annual Catch Limits in compliance with 2006 revisions to the Magnuson-Stevens Act. As a result of this amendment, about 95 percent of the fishery chose to operate in a form of cooperative referred to as a sector, subject to strict limits on catch. These vessels are not subject to trip limit or days-at-sea controls. This management system drastically changed the way the fishery operates. At the time of its implementation, Amendment 16 was expected to reduce bycatch as it reduces regulatory discards. Possession of some species was prohibited to reduce catches (ocean pout, windowpane

---

[5] There are three SAPs currently in place: The Closed Area I Hook Gear Haddock SAP is open to NE multispecies DAS vessels fishing with hook gear in a portion of Closed Area I; the Eastern U.S./Canada Haddock SAP Pilot Program is open to NE multispecies DAS vessels using a haddock "separator" trawl in portions of the Eastern U.S./Canada Area and Closed Area II; and the Closed Area II Yellowtail Flounder SAP is open to NE multispecies DAS vessels fishing for yellowtail flounder in the southern portion of Closed Area II.

[6] The U.S./Canada Resource Sharing Understanding (Understanding) was reached between the United States and Canada regarding the management of Georges Bank cod, Georges Bank haddock, and Georges Bank yellowtail flounder resources found within the waters of both countries in an area known as the U.S./Canada Management Area. Amendment 13 implements certain measures consistent with the Understanding, including a requirement to use VMS, an area declaration requirement, and specific gear requirements (flatfish net or haddock separator trawl).

flounder, wolffish, SNE/MA winter flounder). The amendment also included a host of mortality reduction measures for “common pool” (i.e. non-sector) vessels and the recreational component of the fishery.

The New England Council developed Amendment 19 with the initial goal of bringing the small-mesh multispecies portion of the NE Multispecies FMP into compliance with the ACL and AM requirements of the reauthorized Magnuson-Stevens Act. However, development of Amendment 19 was delayed for several reasons, so NMFS implemented ACLs and AMs for the small-mesh multispecies in 2012 through a Secretarial Amendment. The Council continued development of Amendment 19 in order to adopt the ACL framework used by the Secretarial Amendment, as well as to modify other management measures for the small-mesh multispecies fishery. The management measures in the Secretarial Amendment and Amendment 19 include an incidental trip limit trigger to prevent the ACL from being exceeded, a year-round trip limit for red hake, and the potential to implement a quarterly quota system in the southern area, should landings increase rapidly. Because these species are caught incidentally in many fisheries, landings are never prohibited if a quota is projected to be reached, just reduced to an incidental limit to discourage directed fishing. In general, the small-mesh multispecies portion of the fishery is managed using mesh-size dependent trip limits for whiting (silver and offshore hake, combined), area restrictions on small-mesh, and a new year-round trip limit for red hake.

The NE Multispecies FMP has been modified through a number of framework adjustments designed to achieve fishing mortality targets or to fulfill the requirement for annual adjustments to management measures. Several joint frameworks with the Atlantic Scallop FMP were implemented to provide scallop vessels access to the groundfish closed areas. Frameworks 32, 35, 37, and 38 each instituted additional changes to management of the small-mesh fishery, including several new small-mesh gear exemption areas and elimination of default rebuilding measures.

There are a variety of fishing gears used in the commercial groundfish fishery. Otter trawls are the primary gear type used for all species in both the large-mesh and small-mesh complexes and flatfish and silver hake are caught almost exclusively with otter trawls. Based on FVTR data for 2007-2011, gillnets contribute substantial amounts of Atlantic cod, pollock, redfish, and white hake. Other gears identified in the FVTR data associated with landings of groundfish include handlines, longlines, and fish pots. Recreational fishing for groundfish is focused primarily Atlantic cod, pollock, haddock, red hake, and winter flounder. Recreational fishing is conducted by shore-based anglers and anglers with private boats, as well as by anglers aboard party/charter vessels. See below for recent commercial and recreational landings of large-mesh (Table 29) and small-mesh (Table 31) multispecies, aggregated across the complexes. Table 30 and Table 32 identify the primary ports associated with the large-mesh and small-mesh multispecies complexes, respectively, along with the average recent landings and ex-vessel values for each of the primary ports.

| | Commercial Landings | Recreational Landings[7] |
|---|---|---|
| 2007 | 57,403,000 | 5,407,000 |
| 2008 | 67,286,000 | 6,841,000 |
| 2009 | 62,854,000 | 5,900,000 |
| 2010 | 62,166,000 | 7,498,000 |
| 2011 | 63,164,000 | 8,044,000 |

**Table 29. Recent commercial and recreational landings (lb) of large-mesh multispecies (aggregated).**

| Primary Ports | Commercial Landings | Ex-vessel Value of Landings |
|---|---|---|
| Gloucester, MA | 21,434,000 | $27,510,000 |
| New Bedford, MA | 18,053,000 | $25,869,000 |
| Boston, MA | 7,631,000 | $9,290,000 |
| Portland, ME | 5,010,000 | $6,324,000 |
| Chatham, MA | 1,925,000 | $2,797,000 |

**Table 30. Primary ports associated with the large-mesh multispecies fishery (values are aggregated and averaged for 2007-2011).**

| | Commercial Landings | Recreational Landings |
|---|---|---|
| 2007 | 15,762,000 | 44,000 |
| 2008 | 15,026,000 | 188,000 |
| 2009 | 17,790,000 | 326,000 |
| 2010 | 19,017,000 | 237,000 |
| 2011 | 18,330,000 | 257,000 |

**Table 31. Recent commercial and recreational landings of small-mesh multispecies (aggregated).**

[7] There are no data currently available on the recreational landings of witch flounder.

| Primary Ports | Commercial Landings | Ex-vessel Value of Landings |
|---|---|---|
| New Bedford, MA | 4,594,000 | $2,596,000 |
| Point Judith, RI | 3,856,000 | $1,861,000 |
| Montauk, NY | 2,962,000 | $1,996,000 |
| New London, CT | 899,000 | $600,000 |
| Gloucester, MA | 657,000 | $418,000 |

**Table 32. Primary ports associated with the small-mesh multispecies fishery (values are aggregated and averaged for 2007-2011).**

#### *3.1.1.9 Northeast Skate FMP*

There are seven species included in the Northeast skate complex: Barndoor skate, clearnose skate, little skate, rosette skate, smooth skate, thorny skate, and winter skate. The Northeast skate complex is distributed along the coast of the northeastern United States from near the tide line to depths exceeding 700 meters. Within the complex, the ranges of the individual species vary. The center of distribution for little and winter skates is Georges Bank and southern New England. Barndoor skate is most common in the offshore Gulf of Maine, on Georges Bank, and in southern New England. Thorny and smooth skates are commonly found in the Gulf of Maine. Clearnose and rosette skates have a more southern distribution, and are found in southern New England and the Chesapeake Bight. Skates are not known to undertake large-scale migrations, but they do move seasonally in response to changes in water temperature, moving offshore in summer and early autumn and returning inshore during winter and spring.

A Northeast Skate Complex FMP was developed by the New England Council and was implemented in 2003. The regulations implementing the FMP require the Council to monitor the status of the subject skates and the fishery on an annual basis. The initial regulations under the FMP included the following: Permit requirements for vessels possessing skates and dealers purchasing skates; reporting requirements; a possession limit for skate wings; an exemption from the wing possession limit for vessels fishing only for skates for the bait market; and prohibitions on the possession of smooth skates from or in the Gulf of Maine, and barndoor and thorny skates throughout their range. The original FMP also incorporated a baseline of management measures implemented under other FMPs (Northeast Multispecies, Sea Scallops, and Monkfish) that directly or indirectly control fishing effort on skates. Any proposed changes to these FMPs that could result in an increase in fishing effort on skates were required to first undergo a “skate baseline review” to determine whether, and to what degree, the change may have an impact on skate conservation. The FMP was developed, in part, to collect more complete and accurate information on the catch and disposition of skates in Northeast fisheries, at the species level. Stock assessments and efforts to manage fishing mortality have been hampered by a lack of species-specific catch information. The first amendment to the Skate FMP was the 2007 SBRM Omnibus Amendment.

Amendment 3 to the Skate FMP was implemented in 2010, to establish ACLs and AMs for the skate complex as required by the re-authorized Magnuson-Stevens Act, and to implement measures to rebuild overfished skate stocks. Amendment 3 implemented a stock complex ACL for skates, but created separate landing quotas for the skate wing and bait fisheries, and reduced the skate wing and bait possession limits. The skate bait fishery annual total allowable landings were divided into three separate seasonal quotas to maintain year-round supply of bait. AMs would be triggered if the total allowable landings or ACL were exceeded. Amendment 3 also replaced the skate baseline review with annual review and specification procedures. Framework Adjustment 1 to the Skate FMP was subsequently implemented in 2011, to further reduce the skate wing possession limits, and adjust the in-season trigger of the incidental possession limit. Skates are harvested for two very different commercial markets—one market supplies whole skates to be used as bait in the lobster fishery, and one market supplies skate wings for human consumption. The skate bait fishery is a directed fishery and is more traditional, involving vessels primarily from southern New England ports that target a combination of little skates (>90 percent) and, to a much lesser extent, juvenile winter skates (<10 percent). The vessels supplying skates for the bait market tend to make dedicated trips targeting skates and land large quantities of skates per trip.

The skate wing fishery developed in the 1990s when skates were promoted as "underutilized species," and fishermen shifted effort from groundfish and other fisheries to skates and spiny dogfish. The wing fishery is largely an incidental catch fishery that involves vessels that also participate in the groundfish and/or monkfish fisheries. Although some vessels will make trips specifically targeting winter skates for the wing market, most skates caught for this market are retained by vessels engaged in other fisheries. Most skates are caught using an otter trawl (according to the FVTR) database for 2007-2011, almost 65 percent of landings were from an otter trawl), although gillnets are also used (the remaining 35 percent of 2007-2011 landings were from gillnets). Small amounts of landings are associated with hook and line gear and scallop dredges.

Even though skates are now managed under a Federal FMP, reported landings remain incomplete at the species level. Although some skates are caught by recreational fishermen, recreational landings of skates are negligible both in the context of all recreational fisheries and in the context of the overall skate fisheries. Thus, Table 33 reports recent commercial landings and the ex-vessel value of skates aggregated across all species. Table 34 identifies the primary ports associated with the skate fishery.

| | Commercial Landings (lb) | Ex-vessel Value |
|---|---|---|
| 2007 | 24,752,000 | $8,686,000 |
| 2008 | 24,945,000 | $7,224,000 |
| 2009 | 23,977,000 | $6,780,000 |
| 2010 | 23,583,000 | $7,508,000 |
| 2011 | 22,165,000 | $7,640,000 |

**Table 33. Recent commercial landings of skates (aggregated).**

| Primary Ports | Commercial Landings (lb) | Ex-vessel Value of Landings |
|---|---|---|
| New Bedford, MA | 6,691,000 | $2,952,000 |
| Point Judith, RI | 5,605,000 | $927,000 |
| Chatham, MA | 2,880,000 | $1,388,000 |
| Newport, RI | 2,098,000 | $344,000 |
| Fall River, MA | 1,070,000 | $121,000 |

**Table 34. Primary ports associated with the skate fishery (2007-2011 values are averaged).**

#### *3.1.1.10 Spiny Dogfish FMP*

Spiny dogfish are the most abundant sharks in the western North Atlantic, and range from Labrador to Florida, although they are most abundant from Nova Scotia to Cape Hatteras, North Carolina. Spiny dogfish are highly migratory, often traveling in large troops, and they move northward in the spring and summer and southward in the fall and winter. Spiny dogfish are known to be opportunistic predators, consuming whatever prey are readily abundant in their environment, including pelagic and benthic invertebrates and fishes. Although dogfish have a varied diet, most of what they eat are invertebrates (ctenophores in particular) and a recent study of 40,000 stomachs found that less than 1 percent of their diet was composed of principal groundfish species (Link et al. 2002).

In spite of their large numbers and opportunistic feeding, spiny dogfish, like many elasmobranches, suffer from several reproductive constraints. Females may take 7-12 years to reach maturity, growing more than one-third larger than their mature male counterparts before becoming sexually mature. Fertilization and egg development are internal, and gestation takes roughly 2 years, resulting in litters that usually average 6-7 dogfish "pups." As a result of these factors (long time to maturity, long gestation periods, and low fecundity), spiny dogfish are vulnerable to overfishing, particularly if fishing activities focus on the largest individuals, which are almost all mature females.

As a result of increased fishing pressure, spiny dogfish were classified as overfished in 1998. The Mid-Atlantic and New England Councils jointly developed an FMP for spiny dogfish. This plan was partially approved in 1999 and implemented in 2000 and the management measures included an overall commercial quota, allocated into two semiannual periods; restrictive trip limits; a prohibition on finning; an annual quota adjustment process; and permit and reporting requirements. The Atlantic States Marine Fisheries Commission implements complementary management measures for spiny dogfish in state waters. The most significant effect of the original FMP measures was the elimination of the directed dogfish fishery in Federal waters.[8] Framework Adjustment 1 to the FMP, implemented in 2006, provided for a multi-year, rather than annual, specification-setting process. Framework Adjustment 2, implemented in 2009, adjusted the FMP to allow for more efficient implementation of new scientific information on stock status and biological reference points. The spiny dogfish stock was officially declared to be rebuilt in 2010, and commercial quotas have been significantly increased in recent years. Amendment 1 to the Spiny Dogfish FMP was the 2007 SBRM Omnibus Amendment. Amendment 2 was implemented in 2011 to bring the FMP into compliance with the revised Magnuson-Stevens Act by implementing annual catch limits and accountability measures.

By far most spiny dogfish landings are the result of commercial fishing activities, as reported recreational landings comprise less than 2 percent of the total catch. Sink gillnets, bottom longlines, and bottom otter trawls are the primary commercial fishing gears that catch spiny dogfish and these three gear types accounted for 97 percent of all dogfish landed in 2007-2011. Over the last several years, commercial landings ranged from 6.6 million lb in 2007 up to as 20.9 million lb in 2011 (see Table 35). For fishing years 2007-2011 combined, the Massachusetts ports had the most commercial landings (42.5 percent), with another 19 percent made in Virginia, and 10 percent in New Hampshire. Table 36 identifies the primary ports of spiny dogfish landings from 2007 to 2011.

[8] Directed fishing for spiny dogfish continued in state waters until 2004, by which time the states had followed suit to implement restrictive trip limits and eliminate the directed dogfish fishery.

| | Commercial Landings (lb) | Ex-vessel Value |
|---|---|---|
| 2007 | 6,628,000 | $1,387,000 |
| 2008 | 9,051,000 | $2,242,000 |
| 2009 | 11,666,000 | $2,543,000 |
| 2010 | 12,139,000 | $2,478,000 |
| 2011 | 20,900,000 | $4,544,000 |

**Table 35. Recent commercial landings of spiny dogfish.**

| Primary Ports | Commercial Landings (lb) | Ex-vessel Value of Landings |
|---|---|---|
| Gloucester, MA | 1,904,200 | $418,800 |
| Chatham, MA | 1,465,400 | $298,600 |
| Virginia Beach, VA | * | $* |
| Hatteras, NC | 450,200 | $66,200 |
| Seabrook, NH | * | $* |
| Lynnhaven, VA | * | $* |
| Long Beach/Barnegat Light, NJ | 403,200 | $87,000 |
| New Bedford, MA | 391,800 | $111,200 |

**Table 36. Primary ports associated with the spiny dogfish fishery (values averaged for 2007-2011). *Data excluded for confidentiality.**

#### *3.1.1.11 Summer Flounder, Scup, and Black Sea Bass FMP*

Summer flounder, scup, and black sea bass are three demersal finfish species that occur primarily in the Middle Atlantic Bight from Cape Cod, MA, to Cape Hatteras, NC.[9] All three species exhibit seasonal movement or migration patterns. Summer flounder move inshore to shallow coastal and estuarine waters during warmer months and move offshore during colder months. Scup is a schooling species that undertakes extensive migrations between

[9] Summer flounder range from Nova Scotia to Florida; scup range from the Bay of Fundy to Florida; and black sea bass range from southern Nova Scotia to southern Florida and into the Gulf of Mexico.

the coastal waters in the summer and outer continental shelf waters in the winter. Black sea bass are most often found in association with structured habitats, and they migrate offshore and to the south as waters cool in the fall, returning north and inshore to coastal areas and bays as waters warm in the spring.

The FMP was developed by the Mid-Atlantic Council, initially just for summer flounder, and approved by the Secretary of Commerce in 1988. This original Summer Flounder FMP was based largely on the ASMFC plan. The first major amendment, Amendment 2, was implemented in 1993 and it established much of the current management regime, including a commercial quota allocated to the states, a recreational harvest limit, minimum size limits, gear restrictions, permit and reporting requirements, and an annual review process to establish specifications for the coming fishing year. Amendments 4 through 7 made relatively minor adjustments to the management program.

Although initially intended to be separate FMPs, work on the development of the Scup FMP and the Black Sea Bass FMP was folded into the Summer Flounder FMP, which was broadened to incorporate management measures for scup and black sea bass through Amendments 8 and 9, respectively. These amendments included management measures for scup and black sea bass such as commercial quotas and quota periods, commercial fishing gear requirements, minimum fish size limits, recreational harvest limits, and permit and reporting requirements. Both amendments were implemented in 1996. Amendments 10 and 11 made relatively minor changes to the management systems for these fisheries, including removing the sunset provisions related to the limited access (moratorium) permits, gear requirements, and to achieve consistency among all Mid-Atlantic and New England Council FMPs regarding vessel replacement and upgrade provisions.

Amendment 12 was developed to bring the FMP into compliance with the provisions of the Sustainable Fisheries Act. This amendment included revised overfishing definitions for all three species, established rebuilding programs, addressed bycatch and habitat issues, and established a framework adjustment procedure for the FMP to allow relatively minor changes to management measures to be implemented through a streamlined process. Amendment 12 was implemented in 1999, although not all of the elements of the amendment were approved by NMFS. In particular, the EFH provisions for all three species and the rebuilding program for scup were not approved.

Implemented in 2003, Amendment 13 focused primarily on the commercial black sea bass fishery, although it also served to bring the FMP into compliance with the Sustainable Fisheries Act regarding the EFH requirements for all three species. The most significant change to the commercial black sea bass fishery eliminated the quarterly quota system, replaced with an annual coastwide quota. This change provided a framework for the ASMFC to allocate the annual quota on a state-by-state basis.

Amendment 14 to the FMP, implemented in 2007, addressed the requirement to establish a rebuilding program for scup, which was declared in 2005 to be overfished. Scup was declared rebuilt as of 2009, and is no longer under a rebuilding plan. An upcoming amendment (Amendment 18) is planned to address a wide range of issues associated with the management of scup (including the commercial/recreational split and the allocation of commercial scup quota among the three quota periods, among other issues). Amendment 17 has been initiated, but not yet completed, to discuss the potential for the black sea bass recreational fishery to be managed using conservation equivalency

In order to come into compliance with the revised Magnuson-Stevens Act, the Mid-Atlantic Council developed an omnibus amendment for all of its FMPs. The ACL/AM Omnibus Amendment (Amendment 15 to the Summer Flounder, Scup, and Black Sea Bass FMP) implemented ACLs and AMs for these three fisheries. Amendment 16 to the FMP was the 2007 SBRM Omnibus Amendment.

For each of these three species, an annual acceptable biological catch (ABC) is established by the Council. The ABC is then divided, using percentages identified in the FMP[10], into a commercial ACL and a recreational ACL. The Council then sets corresponding annual catch targets (ACT) for each fishing sector. The commercial quota and recreational harvest limit are the amount of landings remaining after deducting discards from the respective ACTs. The commercial fisheries for all three species are managed through a combination of limited access (moratorium) fishing vessel permits, annual quotas that result in closures of the fisheries upon reaching the quota, gear restrictions, and minimum fish sizes. The summer flounder and black sea bass commercial quotas are managed on an annual basis, but the scup commercial quota is sub-divided into three quota periods (Winter I, Summer, and Winter II); although the black sea bass and scup quotas are managed on a coastwide basis, the summer flounder quota is managed on a state-by-state basis.[11] The annual specifications for these three fisheries may be set each year or for up to 3 years in advance.

The recreational fisheries are not subject to a "hard" quota, but instead are subject to a set of management measures designed to constrain catch to a target level. Management measures used include minimum fish sizes, bag (possession) limits, and fishing seasons. AMs for the recreational fisheries include a pound-for-pound payback of any overage of the ACL.[12] Party/charter vessels operating in Federal waters are required to obtain Federal permits. Coastwide management measures are established for the black sea bass and scup recreational fisheries operating in Federal waters, but for summer flounder, the states have the option to develop state-by-state measures that, in sum, would achieve the equivalent

---

[10] The summer flounder TAL is allocated 60 percent to the commercial fishery and 40 percent to the recreational. The scup TAL is allocated 78 percent to the commercial fishery, while 22 percent is allocated to the recreational fishery. The black sea bass TAL is allocated 49 percent to the commercial fishery, with 51 percent allocated to the recreational fishery.

[11] Similar to the percentage allocation of the TAL to the commercial and recreational fisheries, the FMP allocates the commercial summer flounder quota among the states from North Carolina to Maine according to specific percentage shares.

[12] An Omnibus Amendment (Amendment 19 to the Summer Flounder, Scup, and Black Sea Bass FMP) is under development that may revise the AMs for the Mid-Atlantic Council's recreational fisheries.

level of conservation as would the coastwide measures. All decisions regarding annual quotas and management measures for these commercial and recreational fisheries are made in conjunction with the ASMFC.

All three of these species support significant recreational as well as commercial fisheries. On average, commercial landings over the last several years accounted for slightly more than half to two-thirds of the total landings of summer flounder and scup, while black sea bass recreational landings typically exceed commercial landings (see Table 37). The primary gears used in the commercial fisheries for these species vary. Based on fishing vessel trip report data from 2007-2011, summer flounder are caught almost exclusively (95 percent) with bottom otter trawls; scup are caught primarily (92 percent) with bottom otter trawls, but handlines/rod and reel combined with pots, traps, and weirs accounted for another 6 percent; and black sea bass are caught in roughly equal amounts by bottom otter trawls (47 percent), and pots and traps (46 percent), and to a much lesser extent by handlines/rod and reel (5 percent), . Recreational fishing for these species is enjoyed by shore-based anglers, private recreational boat anglers, and anglers on party and charter vessels. Table 37 and Table 38 identify the recent commercial and recreational landings as well as the primary ports and ex-vessel value of the commercial fishery.

| | Summer Flounder | | Scup | | Black Sea Bass | |
|---|---|---|---|---|---|---|
| | **Commercial Landings** | **Recreational Landings** | **Commercial Landings** | **Recreational Landings** | **Commercial Landings** | **Recreational Landings** |
| 2007 | 10,037,000 | 9,257,000 | 9,284,000 | 4,594,000 | 2,286,157 | 2,641,000 |
| 2008 | 9,213,000 | 8,151,000 | 5,225,000 | 3,763,000 | 1,930,425 | 2,402,000 |
| 2009 | 11,052,000 | 6,023,000 | 8,204,000 | 3,221,000 | 1,168,873 | 2,781,000 |
| 2010 | 13,386,000 | 5,122,000 | 10,415,000 | 5,980,000 | 1,733,355 | 3,719,000 |
| 2011 | 16,569,000 | 5,963,000 | 15,032,000 | 3,663,000 | 1,688,820 | 1,544,000 |

**TABLE 37. RECENT COMMERCIAL AND RECREATIONAL LANDINGS IN THE SUMMER FLOUNDER, SCUP, AND BLACK SEA BASS FISHERIES.**

| Summer Flounder | | Scup | | Black Sea Bass | |
|---|---|---|---|---|---|
| Primary Ports | Ex-vessel Value | Primary Ports | Ex-vessel Value | Primary Ports | Ex-vessel Value |
| Point Judith, RI | $4,051,000 | Point Judith, RI | $1,764,000 | Point Judith, RI | $433,000 |
| Point Pleasant, NJ | $1,635,000 | Montauk, NY | $1,078,000 | Ocean City, MD | $417,000 |
| Wanchese, NC | $1,633,000 | Point Pleasant, NJ | $562,000 | Cape May, NJ | $403,000 |
| Newport News, VA | $1,544,000 | Little Compton, RI | $485,000 | Point Pleasant, NJ | $313,000 |
| Montauk, NY | $1,530,000 | New Bedford, MA | $437,000 | Montauk, NY | $295,000 |
| Hampton, VA | $1,469,000 | Hampton Bays, NY | $382,000 | New Bedford, MA | $233,000 |

**Table 38. Primary ports associated with the summer flounder, scup, and black sea bass commercial fisheries (values are averaged for 2007-2011).**

### *3.1.1.12 Surfclam and Ocean Quahog FMP*

The Atlantic surfclam and ocean quahog are both bivalve mollusks that are found in continental shelf waters from Cape Hatteras, NC, north to the Gulf of St. Lawrence/Newfoundland. Major concentrations of surfclams are found on Georges Bank, south of Cape Cod, off Long Island, southern New Jersey, and the Delmarva Peninsula. The greatest concentrations of ocean quahogs are fished in offshore waters south of Nantucket to the Delmarva Peninsula. In general, surfclams are found in water shallower than that in which ocean quahogs are found.

The Mid-Atlantic Council developed the FMP in the mid 1970's (it was the first FMP the Council developed) and the FMP was implemented in 1977. Initially, the FMP instituted a moratorium on participation in the surfclam fishery, while a more detailed limited entry system could be developed, and established quarterly quotas for surfclams and an annual quota for ocean quahogs. The first several amendments dealt mostly with the duration of the management measures and permit moratorium (made indefinite in Amendment 3), reporting requirements, management areas (Amendment 2 divided the surfclam portion of the management unit into the New England and Mid-Atlantic areas) minimum size limits, cage tags, and quota period issues.

Amendment 8 to the FMP, implemented in 1990, established an individual transferable quota (ITQ) system for the fisheries. The fishing vessel owners that received allocation under the ITQ system were those whose vessels had reported landings under the mandatory logbook requirement in place since 1978. The initial allocation was based on the vessel's average historical catch and vessel size, calculated as a percentage of historical quota allocations. Quota shareholders are allowed to purchase, sell, or lease quota to and from other shareholders. This amendment also merged the Mid-Atlantic and New England management areas back into a single management area.

Amendment 9 revised the overfishing definitions, and Amendment 10 incorporated management measures for the Maine "mahogany clam."[13] Amendment 11 represented the "consistency amendment" to bring all New England and Mid-Atlantic Council FMPs into consistency in regards to vessel replacement and upgrade provisions. Amendment 12 was intended to bring the FMP into compliance with the provisions of the Sustainable Fisheries Act, and included revisions to overfishing definitions, the designation of EFH, a provision allowing framework adjustments to the FMP, and a requirement for an operator permit. Amendment 13 rectified aspects of Amendment 12 that were not approved (surfclam overfishing definition and an analysis of the impacts of fishing on EFH), and included provision for multiple year quota setting. A framework adjustment in 2007 implemented a requirement to use VMS for all vessels participating in the surfclam or ocean quahog

[13] The Maine mahogany clam is the same species as the ocean quahog, but is found in the inshore waters of the State of Maine and supports a small artisanal fishery. This fishery had been operating on an experimental basis since 1990, but was beginning to move offshore into Federal waters.

fisheries. Amendment 14 to this FMP was the 2007 SBRM Omnibus Amendment, and Amendment 16 was the 2011 ACL/AM Omnibus Amendment.

Both species live in the sediment and are not vulnerable to most types of fishing gears. Almost 100 percent of landings are associated with the hydraulic clam dredge, although the relatively small Maine fishery uses the so-called “dry” dredge. Landings of surfclams and ocean quahogs from recreational fishing are negligible. Table 39 identifies the recent commercial landings and ex-vessel value of both species, and Table 40 identifies the primary ports of landings for both species.

Waters of the Gulf of Maine and Georges Bank are subject to intermittent harmful algal blooms, or “red tide,” caused by the dinoflagellate *Alexandrium fundyense*, which produces a toxin known to cause paralytic shellfish poisoning (PSP) in people consuming contaminated clams. Because of a history of harmful algal blooms and limited testing in the area, eastern Georges Bank has been closed to the harvest of clams since 1990. In 2013 a portion of Georges Bank was opened for the harvest of surfclams and ocean quahog by vessels using a new PSP testing protocol. Other areas in the Gulf of Maine and western Georges Bank have been closed since 2005 due to an outbreak of *A. fundyense* in these areas.

| | Atlantic Surfclam | | Ocean Quahog | |
|---|---|---|---|---|
| | Commercial Landings (lb) | Ex-vessel Value | Commercial Landings (lb) | Ex-vessel Value |
| 2007 | 66,152,000 | $41,032,000 | 34,688,000 | $20,607,000 |
| 2008 | 61,177,000 | $39,440,000 | 34,354,000 | $20,353,000 |
| 2009 | 50,644,000 | $34,050,000 | 34,909,000 | $21,919,000 |
| 2010 | 44,043,000 | $30,240,000 | 36,072,000 | $23,185,000 |
| 2011 | 43,888,000 | $29,732,000 | 31,771,000 | $22,095,000 |

**TABLE 39. RECENT COMMERCIAL LANDINGS AND EX-VESSEL VALUES IN THE SURFCLAM AND OCEAN QUAHOG FISHERIES.**

| Atlantic Surfclam | | | Ocean Quahog | | |
|---|---|---|---|---|---|
| Primary Ports | Landings (lb) | Ex-vessel Value | Primary Ports | Landings (lb) | Ex-vessel Value |
| Atlantic City, NJ | 28,600,000 | $18,184,000 | New Bedford, MA | * | $* |
| Ocean City, MD | 4,916,000 | $3,119,000 | Pt Pleasant, NJ | * | $* |
| New Bedford, MA | 3,454,000 | $2,786,000 | Atlantic City, NJ | 3,828,000 | $2,614,000 |
| Pt Pleasant, NJ | 5,081,000 | $2,568,000 | Jonesport, ME | 553,000 | $1,787,000 |
| Oceanside, NY | 2,201,000 | $1,603,000 | Ocean City, MD | 2,123,000 | $1,681,000 |

**TABLE 40. PRIMARY PORTS ASSOCIATED WITH THE SURFCLAM AND OCEAN QUAHOG COMMERCIAL FISHERIES (VALUES ARE AVERAGED FOR 2007-2011). *DATA EXCLUDED FOR CONFIDENTIALITY.**

#### *3.1.1.13 Tilefish FMP*

The golden tilefish is the largest and longest lived of all the tilefish species, and in U.S. waters ranges from Georges Bank to Key West, FL, and throughout the Gulf of Mexico. Golden tilefish occupy a fairly restrictive band along the outer continental shelf and are most abundant in depths of 100-240 meters. Temperature may also constrain their range, as they are most abundant near the 15° C isotherm. Although this species occupies a variety of habitats, it is somewhat unique in that they create and modify existing vertical burrows in the sediment as their dominant habitat in U.S. waters.

The Tilefish FMP was developed by the Mid-Atlantic Council to implement management measures for the tilefish fishery north of the Virginia/North Carolina border intended to address the overfished status of the species.[14] The FMP was implemented in 2001, and in the FMP's short existence it has been the subject of two legal challenges. *Natural Resources Defense Council* v. *Evans* (2001) challenged the essential fish habitat provisions of the FMP,

[14] The tilefish fishery south of the Virginia/North Carolina border is currently managed as part of the Snapper-Grouper Complex FMP developed by the South Atlantic Fishery Management Council.

and *Hadaja* v. *Evans* (2001) challenged the ban on trawl gear and the permit category designations. The latter temporarily voided the limited access permit categories in the FMP.

Amendment 1 to the Tilefish FMP, implemented in 2009, eliminated the limited access permit categories and adopted an IFQ program. Initially, thirteen allocation holders received quota share based primarily on historical participation in the fishery. Any vessel is required to have an open access permit in order to land tilefish. The open access permit alone authorizes a vessel to land tilefish under a 500 lb per trip incidental possession limit. If the vessel is authorized to land under tilefish an IFQ allocation permit, it is exempt from the possession limit. Each year, 95 percent of the total allowable landings are allocated to the IFQ fishery. The remaining 5 percent is allocated to the incidental fishery. If landings in the incidental fishery reach or exceed the amount allocated, the incidental fishery would be shut down for the remainder of the fishing year. Amendment 2 was the 2007 SBRM Omnibus Amendment, and Amendment 3 was the 2011 ACL/AM Omnibus Amendment.

The commercial tilefish fishery is relatively small, with only a dozen vessels participating in the IFQ fishery. Tilefish are primarily caught with bottom longlines (98 percent of landings reported in the fishing vessel trip report database from 2007-2011), and approximately 1.8 percent of landings are associated with bottom otter trawls. There is a minimal recreational fishery for this species, with less than 8,300 lb landed annually for the last 30 years and in only two years since 2000 does the MRIP database report trips with tilefish as the primary target species. Table 41 and Table 42 identify the recent commercial landings as well as the primary ports and ex-vessel value of the commercial fishery.

| | **Commercial Landings (lb)** | **Ex-vessel Value** |
|---|---|---|
| 2007 | 1,514,000 | $4,493,000 |
| 2008 | 1,491,000 | $4,279,000 |
| 2009 | 1,748,000 | $4,202,000 |
| 2010 | 1,865,000 | $5,183,000 |
| 2011 | 1,750,000 | $5,633,000 |

**TABLE 41. RECENT COMMERCIAL LANDINGS OF GOLDEN TILEFISH.**

| Primary Ports | Commercial Landings (lb) | Ex-vessel Value of Landings |
|---|---|---|
| Montauk, NY | 1,132,000 | $3,273,000 |
| Long Beach/Barnegat Light, NJ | 321,000 | $880,000 |
| Hampton Bays, NY | 170,000 | $505,000 |
| Point Judith, RI | 17,000 | $28,000 |
| Shinnecock, NY | 4,000 | $12,000 |

**TABLE 42. PRIMARY PORTS FOR THE GOLDEN TILEFISH FISHERY (VALUES ARE AVERAGED FOR 2007-2011).**

### 3.1.2 NON-TARGET AND BYCATCH SPECIES

River Herring

In the most recent Atlantic States Marine Fisheries Commission river herring stock assessment (ASMFC 2012), of the 24 river herring stocks for which sufficient data are available to make a conclusion, 23 were depleted relative to historic levels and one was increasing. The status of 28 additional stocks could not be determined because the time-series of available data was too short. Estimates of coastwide abundance and fishing mortality could not be developed because of the lack of adequate data. The "depleted" determination was used instead of "overfished" because of the many factors that have contributed to the declining abundance of river herring, which include not just directed and incidental fishing, but likely also habitat issues (including dam passage, water quality, and water quantity), predation, and climate change. There are no coastwide reference points.

As part of a recent river herring status review under the Endangered Species Act, NMFS completed an extinction risk analysis (http://www.nero.noaa.gov/prot_res/candidatespeciesprogram/RiverHerringSOC.htm). This analysis 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 (page 7 and Figures 8 and 9 of the referenced document). 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. The status review concluded that the species did not currently warrant listing under the ESA.

NMFS and the ASMFC are engaged in a proactive conservation strategy for river herring and the Council is also involved in the endeavor. This strategy is described at http://www.nero.noaa.gov/protected/riverherring/tewg/index.html, and will bring a variety of management partners and stakeholders together to address river herring threats and plan conservation and data gathering activities.

Shad

The most recent American shad stock assessment report (ASMFC 2007) identified that American shad stocks are highly depressed from historical levels. Of the 24 stocks of American shad for which sufficient information was available, 11 were depleted relative to historic levels, 2 were increasing, and 11 were stable (but still below historic levels). The status of 8 additional stocks could not be determined because the time-series of data was too short or analyses indicated conflicting trends. Taken in total, American shad stocks do not appear to be recovering. The assessment concluded that current restoration actions need to be reviewed and new ones need to be identified and applied. These include fishing rates, dam passage, stocking, and habitat restoration. There are no coastwide reference points for American shad. There is no stock assessment available for hickory shad.

### 3.1.3 PHYSICAL ENVIRONMENT

The fishing activities affected by the FMPs subject to this amendment occur off the Atlantic coast of the U.S., primarily from Cape Hatteras, NC, to the U.S./Canada border. This area of the Northwest Atlantic Ocean is also known as the Northeast U.S. Continental Shelf Large Marine Ecosystem (Sherman et al., 1996) and includes the subsystems known as the Gulf of Maine, Georges Bank, and the Mid-Atlantic Bight. For more information about the physical characteristics of the environment described below, reference NEFMC (2004a); NEFMC (2004b); Sherman et al. (1996); and Stevenson et al. (2004). See Figure 1 for a map of the Greater Atlantic Region with the three major subsystems identified.

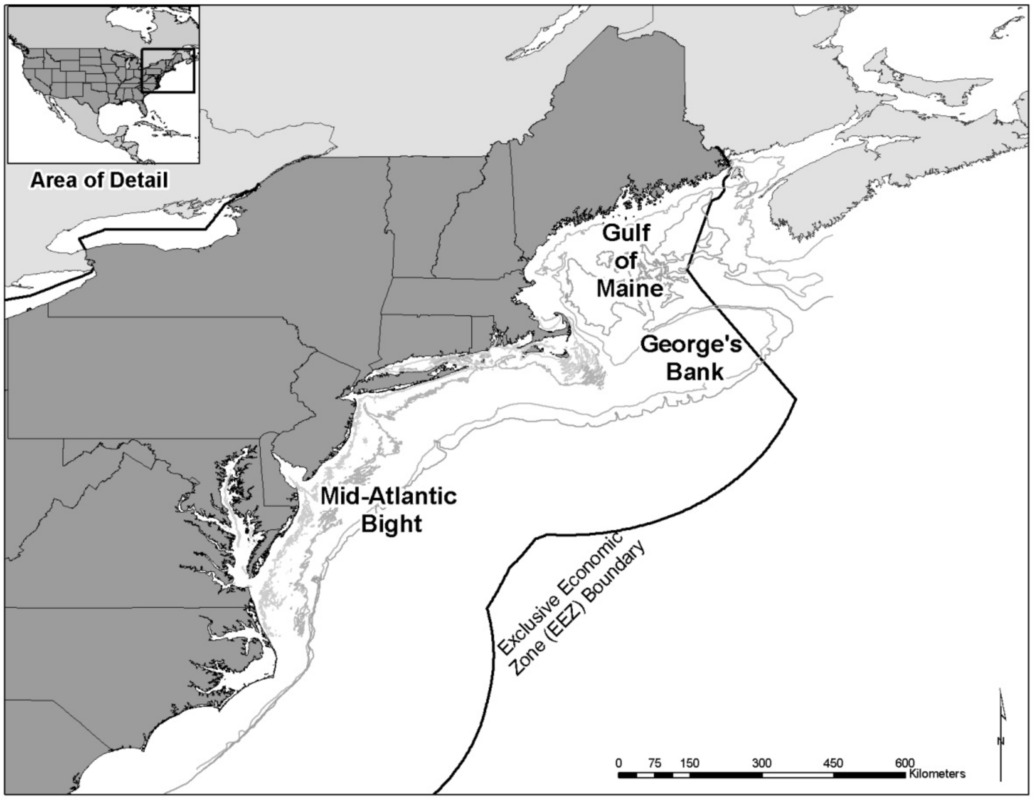



**FIGURE 1. MAP OF THE GULF OF MAINE, GEORGES BANK, AND MID-ATLANTIC BIGHT.**

## Gulf of Maine

The Gulf of Maine is an enclosed coastal sea characterized by relatively cold waters and deep basins. The Gulf of Maine is bounded on the east by Browns Bank, on the north by Maine and Nova Scotia, on the west by Maine, New Hampshire, and Massachusetts, and on the south by Cape Cod and Georges Bank. Retreating glaciers (18,000-14,000 years ago) formed a complex system of deep basins, moraines, and rocky protrusions, leaving behind a variety of sediment types including silt, sand, clay, gravel, and boulders. These sediments are patchily distributed throughout the Gulf of Maine, and are largely related to the topography of the bottom.

Water patterns in the Gulf of Maine exhibit a general counterclockwise current, influenced primarily by cold water masses moving in from the Scotian Shelf and offshore. Although large-scale water patterns are generally counterclockwise around the Gulf, many small gyres and minor currents do occur. Freshwater runoff from the many rivers along the coast of the Gulf of Maine influences coastal circulation, as well. These water movements feed into and affect the circulation patterns on Georges Bank and in Southern New England, both of which are discussed below.

## Georges Bank

Georges Bank is a shallow, elongate extension of the northeastern U.S. continental shelf, and it is characterized by a steep slope on its northern edge and a broad, flat, and gently sloping southern flank. The Gulf of Maine lies to the north of Georges Bank, the Northeast Channel (between Georges Bank and Browns Bank) is to the east, the continental slope lies to the south, and the Great South Channel separates Georges Bank and Southern New England to the west. Although the top of Georges Bank is predominantly sandy sediment, glacial retreat during the late Pleistocene era resulted in deposits of gravel along the northern edge of the Bank, and some patches of silt and clay can be found.

The most dominant oceanographic features of Georges Bank include a weak but persistent clockwise gyre that circulates over the whole of the Bank, strong tidal flows (predominantly northwest and southeast), and strong but intermittent storm-induced currents. The strong tidal currents result in waters over the Bank that are well-mixed vertically. The clockwise Georges Bank gyre is in part driven by the southwestern flow of shelf and slope water that forms a countervailing current to the Gulf Stream.

## Mid-Atlantic Bight and Southern New England

The Mid-Atlantic Bight includes the continental shelf and slope waters from Georges Bank to Cape Hatteras, North Carolina. Occasionally discussed separately, most texts consider Southern New England a subregion within the Mid-Atlantic Bight.[15] The basic morphology and sediments of the Mid-Atlantic Bight were shaped during the retreat of the last ice sheet. The continental shelf south of New England is broad and flat, dominated by fine grained sediments (sand and silt). Patches of gravel can be found in places, such as on the western flank of the Great South Channel.

The shelf slopes gently away from the shore out to 100-200 km offshore, where it transforms into the continental slope at the shelf break (at water depths of 100-200 m). Along the shelf break, numerous deep-water canyons incise the slope and into the shelf. The sediments and topography of the canyons are much more heterogeneous than the predominantly sandy top of the shelf, with steep walls and outcroppings of bedrock and deposits of clay.

The southwestern flow of cold shelf water feeding out of the Gulf of Maine and off Georges Bank dominates the circulatory patterns in this area. The countervailing Gulf Stream provides a source of warmer water along the coast as warm-core rings and meanders break off from the Gulf Stream and move shoreward, mixing with the colder shelf and slope

[15] Southern New England is generally considered to be the area of the continental shelf off the coasts of Massachusetts, Rhode Island, and Long Island, New York, from the Great South Channel to Hudson Canyon.

water. As the shelf plain narrows to the south (the extent of the continental shelf is narrowest at Cape Hatteras), the warmer Gulf Stream waters run closer to shore.

### 3.1.4 ENDANGERED AND OTHER PROTECTED SPECIES

There are many protected species inhabiting the Northeast Continental Shelf Large Marine Ecosystem. These include Atlantic salmon, two species of listed sturgeon, several species of endangered and threatened sea turtles, and several species of whales, small cetaceans, and pinnipeds. Although there may be many species that occur in this area, this section will focus on those protected species that may be caught in or otherwise interact with one or more of the fishing gears utilized in a fishery addressed in this amendment. For a complete list of protected species that occur in the Greater Atlantic Region, see Table 16. More detailed information on the range-wide status of marine mammal and sea turtle species that occur in the area can be found in a number of published documents. These include sea turtle status reviews and biological reports (Conant et al. 2009; NMFS and USFWS 1995, 2007a, 2007b, 2007c, 2007d; Hirth 1997; Turtle Expert Working Group (TEWG) 1998, 2000, 2007, 2009), recovery plans for Endangered Species Act-listed sea turtles and marine mammals (NMFS 1991; NMFS and USFWS 1991a, 1991b, 2008; NMFS et al. 2011; USFWS and NMFS 1992; NMFS 2005b), the marine mammal stock assessment reports (e.g., Waring et al. 2011), and other publications (e.g., Clapham et al. 1999; Perry et al. 1999; Wynne and Schwartz 1999; Best et al. 2001; Perrin et al. 2002). Additional background information on the Gulf of Maine Distinct Population Segment of Atlantic salmon and the five distinct population segments of Atlantic sturgeon can be found in the respective status reviews (Fay et al. 2006; ASSRT 2007) and listing determinations for Atlantic salmon (74 FR 29344; June 19, 2009) and Atlantic sturgeon (77 FR 5880 and 77 FR 5914; February 3, 2012)

The wild populations of Atlantic salmon whose freshwater range covers the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, including the Penobscot and Kennebec rivers, are listed as endangered under the Endangered Species Act (74 FR 29344, June 19, 2009). This status also applies wherever these fish occur in these rivers' estuaries and the marine environment. Atlantic salmon are highly migratory, undertaking long marine migrations from the mouths of U.S. rivers into the northwest Atlantic Ocean, where they are distributed seasonally over much of the region (Reddin 1985, Sheehan et al. 2012). Most of the salmon originating from the Gulf of Maine Distinct Population Segment spend two winters in the ocean before returning to streams for spawning (Fay et al. 2006).

Loggerhead, leatherback, Kemp's ridley, and green sea turtles occur seasonally in continental shelf waters north of Cape Hatteras. In general, turtles move up the coast from southern wintering areas as water temperatures warm in the spring (James et al. 2005; 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. 2005; 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 sea turtles are more commonly observed south of Cape Cod, but may occur in the Gulf of Maine. The more cold-tolerant leatherbacks range farther north than other sea turtles, feeding as far north as Canadian waters.

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, and low latitude winter calving grounds (Perry et al. 1999; Waring et al. 2011). 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. 2011). 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).

Waring et al. (2011) report that, in comparison to the baleen whales, sperm whale distribution occurs more on the continental shelf edge, over the continental slope, and into mid-ocean regions. However, sperm whales distribution in EEZ waters also occurs in a distinct seasonal cycle. Typically, sperm whale distribution is concentrated east-northeast of Cape Hatteras in winter and shifts northward in spring when whales are found throughout the Mid-Atlantic Bight. Distribution extends further northward to areas north of Georges Bank and the Northeast Channel region in summer and then south of New England in fall, back to the Mid-Atlantic Bight.

Numerous small cetacean species (dolphins, pilot whales, 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, bottlenose dolphin, harbor porpoise), while others are found primarily in continental shelf edge and slope waters (e.g., Risso's dolphin), and still others occupy all three habitats (e.g., common dolphin, pilot whale). Information on the western North Atlantic stocks of each species is summarized in Waring et al. (2005).

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). Gray seals are the second most common seal species in EEZ waters of the United States, occurring primarily in New England (Katona et al. 1993; Waring et al. 2011). Pupping colonies for both species are also present in New England, although the majority of pupping occurs in Canada. Harp and hooded seals are less commonly observed in EEZ waters. Both species form aggregations for pupping and breeding off of eastern Canada in the late winter/early spring, and then travel to more northern latitudes for molting and summer feeding (Waring et al. 2011). However, individuals of both species are also known to travel south into EEZ waters and sightings as well as strandings of each species have been recorded for both New England and Mid-Atlantic waters (Waring et al. 2011).

Atlantic sturgeons belonging to the five distinct population segments use different rivers for spawning and exhibit differences in certain characteristics (e.g., age at maturity and timing of spawning) (Scott and Crossman 1973; Murawski and Pacheco 1977; Smith et al. 1982; Smith 1985; Bain 1997; Smith and Clugston 1997; Young et al. 1998; Caron et al. 2002). However, once the young have become sufficiently salt tolerant, they leave the natal estuary and undertake a migratory existence, ranging from Hamilton Inlet, Labrador, Canada to Cape Canaveral, Florida, USA (Scott and Scott, 1988; ASSRT, 2007). Numerous publications support the conclusion that Atlantic sturgeon of all five distinct population segments occur primarily in marine waters less than 60m, aggregate in certain areas, and exhibit seasonal northerly and southerly coastal movement to and from coastal estuaries (Vladykov and Greeley 1963; Murawski and Pacheco 1977; Dovel and Berggren 1983; Smith 1985; Collins and Smith 1997; Welsh et al. 2002; Savoy and Pacileo 2003; Stein et al. 2004; USFWS 2004; Laney et al. 2007; Dunton et al. 2010; Erickson et al. 2011; Wirgin et al. 2012; Waldman et al. 2013). The final listing rules provide additional information on the distribution of Atlantic sturgeon (77 FR 5880 and 77 FR 5914; February 6, 2012).

Shortnose sturgeons are listed as endangered under the Endangered Species Act. The species is listed as one unit throughout its range, with populations occurring from the Saint John River, New Brunswick, Canada, to the St. Johns River, Florida. Coastal migrations of shortnose sturgeon do occur, particularly in the Gulf of Maine and Southeast where shortnose sturgeon operate as metapopulations (Shortnose Sturgeon Status Review Team 2010).

There are no seabird species in the Greater Atlantic Region that would be subject to interactions with fishing gear from one or more of the relevant fisheries listed as either endangered or threatened under the Endangered Species Act.

Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA. Candidate species also include those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register.

Candidate species receive no substantive or procedural protection under the ESA; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed project. NMFS has initiated review of recent stock assessments, bycatch information, and other information for these candidate/proposed species. The results of those efforts are needed to accurately characterize recent interactions between fisheries and the candidate/proposed species in the context of stock sizes. Any conservation measures deemed appropriate for these species will follow the information reviews. Please note that once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10).

Cusk (*Brosme brosme*) are NMFS "species of concern," as well as a "candidate species" under the ESA as NMFS is currently conducting a review of the species. NMFS initiated a status review due to concerns over the status of and threats to cusk, particularly bycatch. NMFS is involved in various proactive conservation initiatives to obtain more information on this data poor species to assess its status and further conservation efforts. These initiatives involve cooperative efforts with industry, scientists, and other partners to learn more about cusk. NMFS is especially interested in the investigation and identification of methods to reduce bycatch or discard mortality of cusk, and, in particular, studies of how to alleviate barotrauma effects in released cusk are of high interest. In the Northeastern U.S., cusk are predominantly caught in the Gulf of Maine in commercial bottom trawl, bottom longline, gillnet, lobster trap, and handline/rod and reel gears, as well recreational handline gear (O'Brien, 2010; GMRI, 2012). Additional information on cusk and some conservation efforts can be found at www.greateratlantic.fisheries.noaa.gov/protected/pcp/soc/cusk.html.

## 3.1.5 HUMAN COMMUNITIES

### *3.1.5.1 ATLANTIC HERRING FISHERY INFORMATION*

The following information is adapted from Framework Adjustment 4 to the Atlantic Herring FMP (NEFSC, 2014). Additional description of the herring fishery is included in section 3.1.1.2 of this document.

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) (see figure below).

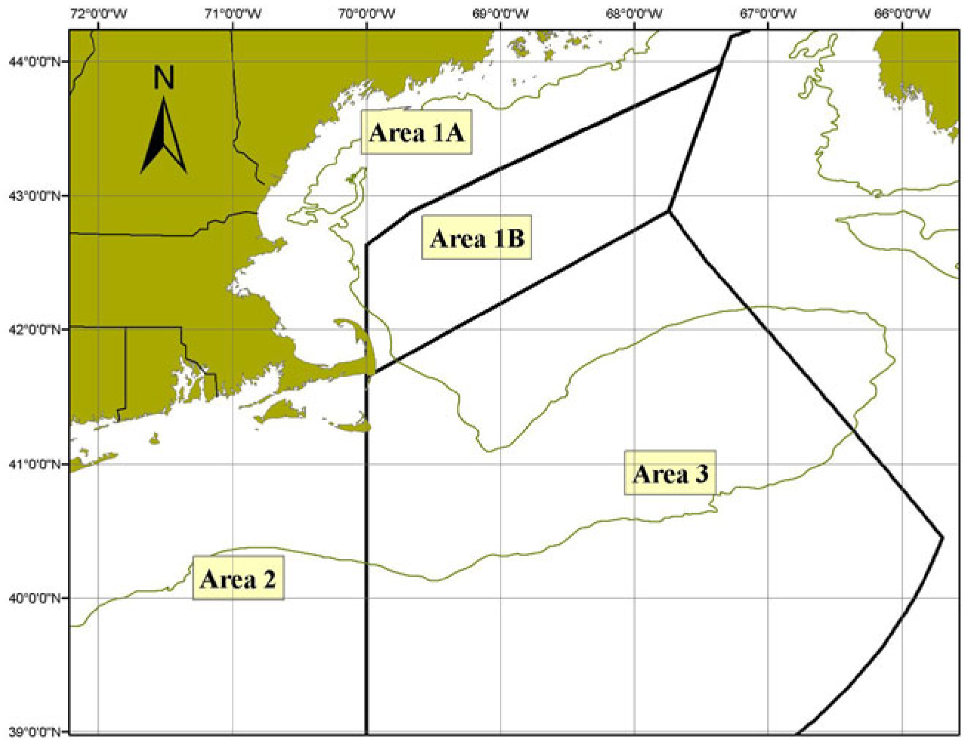



**FIGURE 2. ATLANTIC HERRING MANAGEMENT AREAS.**

The Atlantic 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.

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.

The 2013-2015 Atlantic herring fishery specifications were 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 13 are effective for the 2013-2015 fishing years (initial allocations, not including overage deductions, carryovers, or set-aside deductions).

### Table 43. 2013-2015 Atlantic Herring Fishery Specifications (Initial allocations)

| | 2013-2015 |
|---|---|
| **Overfishing Limit** | 169,000 – 2013<br>136,000 – 2014<br>114,000 – 2015 |
| **Acceptable Biological Catch (ABC)** | 114,000 |
| **Optimum Yield/ACL** | 107,800 |
| **Domestic Annual Harvest (DAH)** | 107,800 |
| **Border Transfer** | 4,000 |
| **Domestic Annual Processing (DAP)** | 103,800 |
| **U.S. At-Sea Processing (USAP)** | 0 |
| **Area 1A Sub-ACL** | 31,200 |
| **Area 1B Sub-ACL** | 4,600 |
| **Area 2 Sub-ACL** | 30,000 |
| **Area 3 Sub-ACL** | 42,000 |
| **Fixed Gear Set-Aside** | 295 |
| **Research Set-Aside** | 3 percent of each sub-ACL |

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

## Atlantic Herring Catch

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 VMS and weekly 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.

NMFS' catch estimation methods for the Atlantic herring fishery are described in detail in both Framework Adjustment 2 and Framework Adjustment 3 to the Atlantic Herring FMP (see Section 3.6.1 of Framework 3, NEFMC 2014).

The table below summarizes recent Atlantic herring catch estimates by year and management area from 2004-2013. The following bullets describe how these estimates were derived:

• 2004-2006 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.

• 2010-2013 Atlantic 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. The methodology for estimating catch is based on landings data obtained from dealer reports (Federal and State) supplemented with VTRs (Federal and State of Maine) with the addition of discard data from extrapolated observer data.

### Table 44. Atlantic Herring Catch by Year and Management Area, 2004-2013

| Year | Area (sub-ACL) | Catch (mt) | Quota (mt) | Percent of quota caught |
|---|---|---|---|---|
| **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% |
| **2013** | 1A | 29,820 | 29,775 | 100% |
| **2013** | 1B | 2,458 | 4,600 | 53% |
| **2013** | 2 | 27,569 | 30,000 | 92% |
| **2013** | 3 | 37,833 | 42,000 | 90% |

The table below summarizes total Atlantic herring catch as a percentage of the total available catch in each year from 2003-2013 based on NMFS catch estimation methods. Atlantic herring catch 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. The 2013-2015 Atlantic herring fishery specifications increased the stockwide Atlantic herring ACL available to the fishery by more than 15,000 mt; an additional 7,000 mt was caught under the higher quota in 2013, and overall, the fishery utilized 92% of the stockwide herring ACL.

### Table 45. Total annual Atlantic herring catch 2003-2013

| 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 | 96,166 | 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% |
| 2013 | 97,680 | 106,375 | 92% |

## Atlantic Herring Vessels

This section provides summary information regarding the vessels participating in the Atlantic herring fishery from 2008-2013. Additional information can be found in the FEIS for Amendment 5 to the Herring FMP. In this section, a herring trip is defined liberally as any trip in which at least one pound of Atlantic herring is retained.

## Atlantic Herring 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; Category D open access incidental catch of 3 mt per trip; and Category E limited access mackerel vessels that did not qualify for a limited access herring permit with 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 (limited access) vessels are also active in the Atlantic mackerel fishery (managed by the MAFMC). It is expected that only a few vessels will obtain a Category E permit.

Since 2008, the number of vessels with either a limited access or an open access Atlantic herring permit has decreased annually (see table below). 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 revenues.

**Table 46. Fishing Vessels with Federal Atlantic herring permits, 2011-2013**

| Permit Category | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | All | Active | All | Active | All | Active | All | Active | All | Active |
| **A** | 44 | 29 | 42 | 29 | 38 | 29 | 36 | 24 | 36 | pending |
| **B,C** | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | pending |
| **C** | 51 | 15 | 49 | 19 | 44 | 10 | 41 | 13 | 43 | pending |
| **Total LA** | 99 | 47 | 95 | 51 | 86 | 41 | 81 | 40 | 83 | pending |
| **D** | 2,373 | 78 | 2,277 | 99 | 1,991 | 84 | 1869 | 80 | 1,791 | pending |

*Source: NMFS Permit database 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 vessels landed the catch. Permit data for 2009-2011 are as of November 2012. Permit data for 2012-2013 are as of August 23, 2013.*

## Atlantic Herring 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 18). 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 18 and Table 19 show the distribution of Atlantic herring landings by gear type, permit category, and management area. The data indicate that the vast majority of midwater trawl vessels are Category A permit holders. All pair trawl vessels possess Category A permits, and a small number of single midwater trawl vessels have both Category B and C herring permits.

### Table 47. 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 |
|---|---|---|---|---|---|
| Midwater 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%) |
| Small Mesh Bottom Trawl | 639 (0.4%) | 2 (0.0%) | 18,768 (18.5%) | 121 (0.1%) | 19,530 (4.6%) |
| 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.

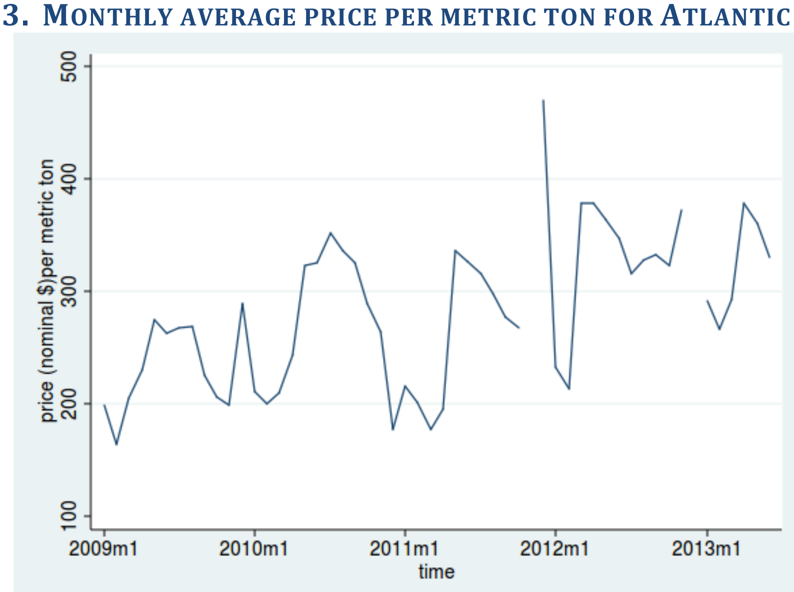
### TABLE 48. FISHING GEAR DISTRIBUTION OF HERRING LANDINGS (MT) BY PERMIT CATEGORY (2008-2011)

| Gear Type | Category A | Category B/C | Category C | Category D | Total |
|---|---|---|---|---|---|
| Midwater Trawl | 26,915 (8%) | 383 (9%) | 0 (0.0%) | 5 (0%) | 27,302 (8%) |
| Midwater Pair Trawl | 216,235 (66%) | 0 (0%) | 0 (0.0%) | 0 (0%) | 216,235 (65%) |
| Purse Seine | 73,261 (22%) | 0 (0%) | 1,350 (62%) | 514 (41%) | 74,991 (22%) |
| Small Mesh Bottom Trawl | 9,922 (3%) | 3,990 (91%) | 538 (25%) | 418 (34%) | 14,869 (4%) |
| Other | 249 (0%) | 0 (0%) | 278 (13%) | 307 (25%) | 834 (0%) |
| Total | 326,583 (100%) | 4,373 (100%) | 2,166 (100%) | 1,244 (100%) | 334,365 (100%) |

## Atlantic 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. The figure below 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 3. MONTHLY AVERAGE PRICE PER METRIC TON FOR ATLANTIC HERRING.



## Atlantic Herring 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.

## Atlantic Herring 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

## Atlantic Herring 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 (see table below). 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 49. Distribution of 2012 Atlantic Herring Permit Holders that 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 |

## Atlantic Herring 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 (see table below). 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 50. ATLANTIC HERRING LANDING DISTRIBUTION BY PORT AND MANAGEMENT AREA

| Landing Port | | Area 1A | Area 1B | Area 2 | Area 3 |
|---|---|---|---|---|---|
| **Maine** | Portland | 25% | 20% | 0% | 26% |
| | Rockland | 27% | 14% | 0% | 11% |
| | Stonington/Deer Isle | 8% | 12% | 0% | 0% |
| | Vinalhaven | 1.7% | 3.9% | 0% | 2.3% |
| | Lubec/Eastport | 0% | 0% | 0% | 0% |
| | Sebasco Estates | 0% | 0% | 0% | 0% |
| | Maine, other | 6.1% | 1.1% | 0% | 4% |
| **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% |
| **Rhode Island** | Southern | 0% | 0% | 22% | 0.1% |
| **New Jersey** | Cape May | 0% | 0% | 12% | 0% |
| | New Jersey, other | 0% | 0% | 0% | 0% |
| **Other States** | | 0% | 0% | 0.1% | 0% |
| Total | | 163,269 (100%) | 23,289 (100%) | 101,542 (100%) | 133,368 (100%) |

### Atlantic Herring 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.

#### *3.1.5.2 ATLANTIC MACKEREL FISHERY INFORMATION*

The following information is adapted from 2015-2017 Specifications and Management Measures for the Atlantic Mackerel, Squid, and Butterfish FMP (MAFMC, 2014). Additional description of the mackerel fishery is included in section 3.1.1.6 of this document.

### Historical Atlantic Mackerel Commercial Fishery

The modern northwest mackerel fishery began with the arrival of the European distant-water fleets in the early 1960's. Total international commercial landings (Northwest Atlantic Fisheries Organization Subareas 2-6,) peaked at 437,000 mt in 1973 and then declined sharply to 77,000 by 1977 (Overholtz 1989). The MSA established control of the portion of the mackerel fishery occurring in US waters (Northwest Atlantic Fisheries

Organization Subareas 5-6) under the auspices of the Council. Reported foreign landings in US waters declined from an unregulated level of 385,000 mt in 1972 to less than 400 mt from 1978-1980 under the MSA (the foreign mackerel fishery was restricted by NOAA Foreign Fishing regulations to certain areas or "windows." Under the MSB FMP foreign mackerel catches were permitted to increase gradually to 15,000 mt in 1984 and then to a peak of almost 43,000 mt in 1988 before being phased out again.

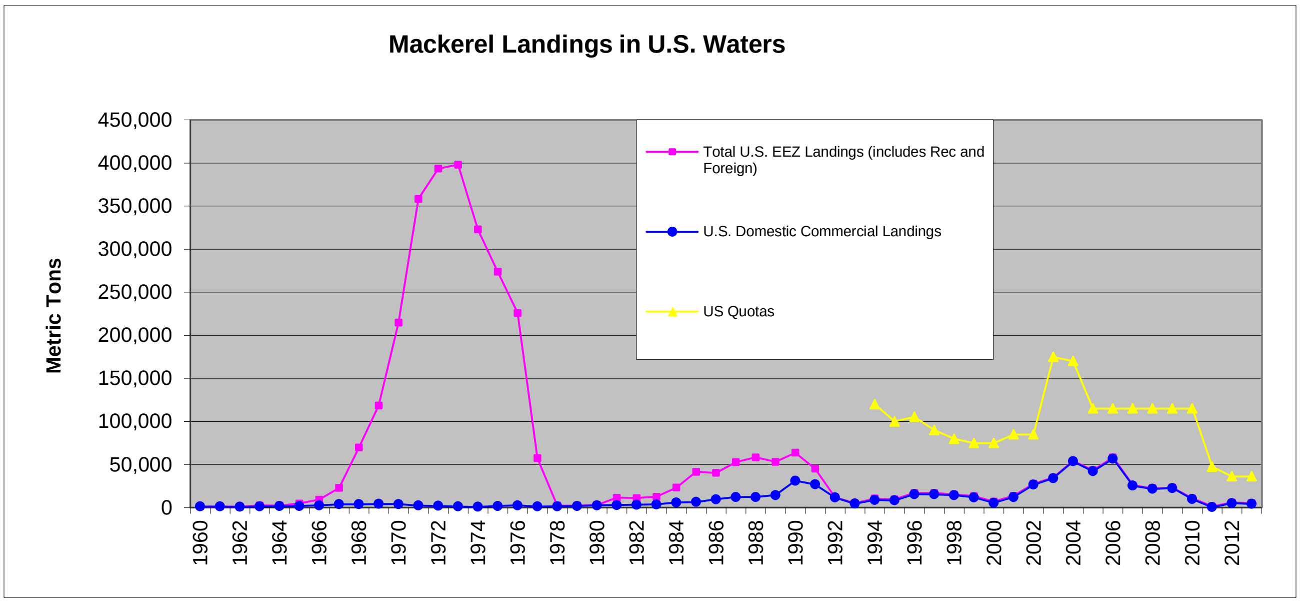



**FIGURE 4.** HISTORICAL ATLANTIC MACKEREL LANDINGS IN THE U.S. EEZ.

US commercial landings of mackerel increased steadily from roughly 3000 mt in the early 1980s to greater than 31,000 mt by 1990. US mackerel landings declined to relatively low levels 1992-2000 before increasing in the early 2000's. The most recent years have seen a significant drop-off in harvest. The mackerel fishery usually catches 95% of its mackerel by May 1 so while incomplete, available 2014 data suggests that around 3,500-4,500 mt will be landed in 2014.

Nominally ex-vessel price has generally varied between about $200-$700 per mt but when inflation is taken into account there was erosion in the ex-vessel per-pound value of mackerel from 1982-2010. 2011 and 2012 prices increased substantially (near $700/mt), which is likely at least partially related to the low levels of mackerel landed. 2013 ex-vessel prices were about $436/mt. Total ex-vessel value tracks both price and the quantity of fish landed (see Fishery Information Document at http://www.mafmc.org/ssc-meetings/2013/april-may for details). 2013 landings totaled 4,372 mt and generated $1.9 million in ex-vessel revenues.

## Atlantic Mackerel Fishery Performance

Weekly dealer data triggers in-season management actions that institute relatively low trip limits when 90% of the commercial DAH is landed. The table below lists the performance of the mackerel fishery (commercial and recreational together) compared to the effective quota for the last 10 years. There have been no quota overages over this period, but the fisheries have not approached the quotas. Since 2012 any ABC overages must be repaid pound for pound. Discard information is not available since 2011, but it does not appear that mackerel would have approached anywhere near its ABC since discards are usually quite low according to the most recent assessment (TRAC 2010). The 2013 ABC was 43,781 mt, which is also the ABC for 2014.

### TABLE 51. ATLANTIC MACKEREL QUOTA PERFORMANCE (MT)

| Year | Harvest (mt) (Commercial and Recreational) | Quota (mt) (Rec+Com) | Percent of Quota Landed |
|---|---|---|---|
| 2004 | 54,298 | 170,000 | 32% |
| 2005 | 43,275 | 115,000 | 38% |
| 2006 | 58,352 | 115,000 | 51% |
| 2007 | 26,142 | 115,000 | 23% |
| 2008 | 22,498 | 115,000 | 20% |
| 2009 | 23,235 | 115,000 | 20% |
| 2010 | 10,739 | 115,000 | 9% |
| 2011 | 1,478 | 47,395 | 3% |
| 2012 | 6,015 | 36,264 | 17% |
| 2013 | 5,261 | 36,264 | 15% |

*Source: Unpublished NMFS dealer reports and MRIP data*

Participation in the fishery was low in 2013 related to the low availability of mackerel. The tables and figures below and on the following pages describe vessel participation, vessel dependency, distribution of landings by state/month/gear/port, dealer participation, and the general at-sea location of recent mackerel landings/catches.

### TABLE 52. 2013 DATA FOR PERMITTED AND ACTIVE ATLANTIC HERRING VESSELS

| Principal Port State (from permit data) | 1,000,000 or more pounds | 100,000-1,000,000 pounds | 50,000-100,000 pounds | 10,000-50,000 pounds |
|---|---|---|---|---|
| All States | 4 | 3 | 3 | 13 |

*Source: Unpublished NMFS dealer reports and permit data. Data confidentiality rules do not allow state by state breakdowns.*

The mackerel fishery became a limited access fishery in 2013 except for open-access incidental catch permits. The current numbers of permits are 32 Tier 1 permits, 24 Tier 2 permits, and 90 Tier 3 permits. When the directed fishery is open, there are no trip limits for Tier 1, Tier 2 has a 135,000 pound trip limit and Tier 3 has a 100,000 pound trip limit. Tier 3's trip limit is reduced to 20,000 pounds if it catches 7% of the commercial quota. Open access incidental permits have a 20,000 pound per trip limit. Only a few vessels accounted for most mackerel landings in 2013 (see table above).

### Table 53. 2013 Vessel Dependence on Mackerel (revenue-based)

*Source: Unpublished NMFS dealer reports – not at state level due to data confidentiality issues*

| Dependence on Mackerel | Number of Vessels in Each Dependency Category |
|---|---|
| 1%-5% | 23 |
| 5%-25% | 13 |
| 25%-50% | 4 |
| More than 50% | 5 |

### Table 54. Recent Landings by State (MT)

*Source: Unpublished NMFS dealer reports*

| YEAR | CT | MA | MD | ME | NA | NC | NH | NJ | NY | RI |
|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | 17 | 234 | 0 | 90 | 5 | 3 | 0 | 48 | 60 | 73 |
| 2012 | 4 | 1,874 | 0 | 19 | 1 | 1 | 0 | 915 | 25 | 2,493 |
| 2013 | 9 | 3,302 | 0 | 465 | 2 | 0 | 3 | 21 | 9 | 562 |

### Table 55. Recent Landings by Month (MT)

| YEAR | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | 22 | 91 | 131 | 113 | 35 | 13 | 56 | 1 | 14 | 4 | 18 | 33 |
| 2012 | 668 | 3,576 | 948 | 19 | 48 | 4 | 5 | 1 | 35 | 18 | 5 | 4 |
| 2013 | 109 | 2,075 | 1,149 | 148 | 26 | 9 | 29 | 28 | 21 | 23 | 33 | 723 |

*Source: Unpublished NMFS dealer reports*

### TABLE 56. RECENT LANDINGS BY GEAR (MT)

| YEAR | Gill Nets | Bottom Trawl | Single Mid-Water Trawl | Pair Mid-Water Trawl | Trap/Pots/Pound Nets/Weir | Other/ Unknown |
|---|---|---|---|---|---|---|
| 2011 | 27 | 327 | 69 | 72 | 5 | 30 |
| 2012 | 4 | 3,059 | 576 | 1,488 | 24 | 181 |
| 2013 | 6 | 965 | 166 | 2,338 | 15 | 883 |

*Source: Unpublished NMFS dealer reports*

Because of data confidentiality issues, details for port revenues from mackerel cannot be provided. Ports that had at least $100,000 in ex-vessel revenues from mackerel over 2011-2013 (combined) included (from more mackerel dollars to less): North Kingstown, RI; Gloucester, MA; New Bedford, MA; Cape May, NJ; Portland, ME, and Point Judith, RI. (*Source: Unpublished NMFS dealer reports.*). *Descriptions of these communities are provided* in Section 3.1.5.1.

### TABLE 57. KEPT CATCH (MT) IN STATISTICAL AREAS WITH AT LEAST 1,000 MT OF MACKEREL CAUGHT IN AT LEAST ONE RECENT YEAR

| YEAR | _612 | _521 | _616 | _522 |
|---|---|---|---|---|
| 2011 | 4 | . | 100 | 13 |
| 2012 | 2,393 | 38 | 1,527 | 45 |
| 2013 | 15 | 2,010 | . | 1,511 |

*Source: Unpublished NMFS vessel trip reports*

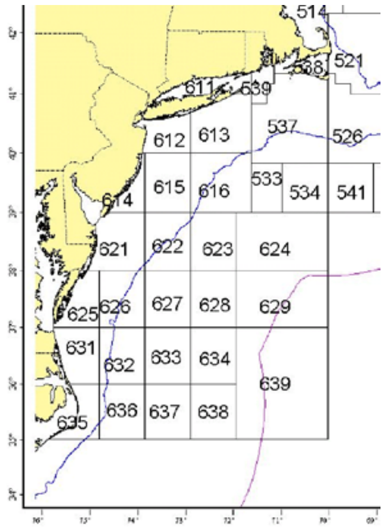



**FIGURE 5. NMFS STATISTICAL AREAS**

## Current Market Overview for Mackerel and World Production (Required by FMP)

U.S. mackerel (western Atlantic) are a substitute for European mackerel (eastern Atlantic), which are caught in much larger quantities. It is unclear how demand for U.S. mackerel may be impacted by European catches, but the MSB advisory panel has indicated that the demand for mackerel is high enough to support catches near the quotas if the product is of high quality.

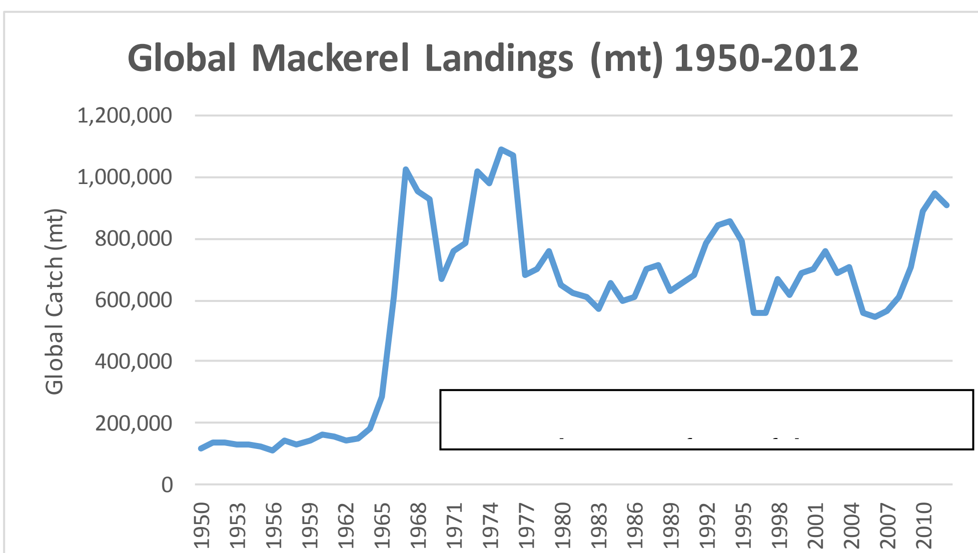



**FIGURE 6. WORLD PRODUCTION OF MACKEREL, 1950-2011.**

### Recreational Atlantic Mackerel Fishery

Mackerel can be seasonally important to the recreational fisheries of the Mid-Atlantic and New England regions. They may be available to recreational anglers in the Mid-Atlantic primarily during the winter and spring, depending on annual conditions. Mackerel are caught in New England in the summer and fall and are often targeted for purposes of collecting live bait, especially for large striped bass. 2004-2013 recreational landings of mackerel, as estimated from the Marine Recreational Information Program ("MRIP"), are given in the table below. Most mackerel are caught in the private/rental mode but some are caught in the party/charter and shore modes as well. Approximately 10% of all mackerel caught (by number) are released. Compared to other recreationally-important species, estimates for mackerel recreational harvest have low precisions due to low encounter rates. Earlier years (1980s-1991) had higher catches (consistently in the 1,000-4,000 mt range) but most recent years have been below 1,000 mt.

**Table 58. Recreational Harvest (rounded to nearest mt) of Mackerel, 2004-2013.**

| Year | Harvest (MT) |
|---|---|
| 2004 | 465 |
| 2005 | 1,005 |
| 2006 | 1,491 |
| 2007 | 596 |
| 2008 | 755 |
| 2009 | 600 |
| 2010 | 845 |
| 2011 | 947 |
| 2012 | 683 |
| 2013 | 895 |

*Source: Personal communication from NMFS, Fisheries Statistics Division.*

# 4.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

The National Environmental Policy Act requires that an EA briefly describe the probable environmental impacts of the proposed action and alternatives to the proposed action considered by the action agency (NEPA, section 102(2)(E)). The following sections address the reasonably foreseeable direct, indirect, and cumulative effects of the alternatives being considered under the industry-funded monitoring amendment.

### General discussion of Omnibus alternative impacts

As noted above in the introduction to the affected environment (section 3.1), the omnibus alternatives (Omnibus Alternatives 1, 2, and 2.1-2.5) in this amendment are procedural in nature—focused on the definition of cost responsibilities between NMFS and industry, the process that will be used to prioritize the allocation funding for NMFS cost responsibilities related to industry-funded monitoring programs established for Greater Atlantic Region fisheries, industry-funded monitoring program service provider standards, and the establishment of future industry-funded monitoring programs. Subsequently, there are no expected direct physical or biological impacts associated with the alternatives under consideration for the omnibus portions of the action. Due to the nature of the omnibus alternatives evaluated in this amendment, there very few functional differences (as far as environmental effects generally considered in an EA are concerned) between the status quo alternatives and the other alternatives under consideration.

The expected direct effects are generally well-defined for most fishery management actions, but indirect effects are often less so. While NEPA requires consideration of "reasonably foreseeable effects," it does not require consideration of remote and speculative impacts; these effects remain outside the scope of a NEPA analysis (Bass et al. 2001). During the development of this amendment, there have been occasions when discussions began to diverge from how bycatch data may best be collected into discussions about the likely management implications of an "improved" data collection program. These discussions generally focused on the potential for improvements in stock assessments and on the types of management measures that may be necessary to address bycatch concerns where they may exist.

There are three reasons why these types of potential downstream effects (e.g., subsequent management measures to address bycatch issues) of this action are considered too remote and speculative to be appropriate for consideration in this amendment. First, while this amendment is focused on potentially expanding observer coverage above the level required under SBRM, implementation of this amendment does not, by itself, automatically allow for higher observer coverage in Greater Atlantic Region fisheries or coverage above status quo. While increases in target observer coverage levels for some fisheries may be expected to improve data quality, realization of an improvement in data quality is contingent upon sufficient funding to expand coverage beyond SBRM.

The second reason these types of potential effects are too remote and speculative to be appropriate for consideration in this amendment is that there is no way to predict the effect that an improvement in data quality would have for managing the affected fisheries. Improvements in data quality would give assessment scientists and fishery managers more confidence in the data. However, there is no way to predict the type of new information that would arise from future catch estimations (e.g., higher or lower discard estimates). Because any change in direction of catch estimation cannot be predicted at this time, there is no way to predict whether changes in management would be required to address any potential issues that may arise.

The third reason is that the management measures that might be implemented, should action be determined to be necessary to address a bycatch concern, also cannot be predicted. Depending on the specific fishery, resource species, time, area, and manner of interaction leading to the concern, different types of management measures would be appropriate. Some types of concerns may best be addressed with a bycatch quota, others may best be addressed with an area or seasonal closure, and yet others may best be addressed through changes to the fishing gear used. As the actual environmental impacts of these potential management changes would vary with and depend upon the type of measure proposed, the management system to be changed, and the time, area, and species fished, there is no way to speculate as to what the most likely environmental impacts may be.

Therefore, because these types of potential management actions, which may eventually stem from implementation of the industry-funded monitoring amendment, are too remote and speculative to be adequately or meaningfully addressed in this amendment, this NEPA analysis focuses solely on the potential direct, indirect, and cumulative effects expected to be immediately associated with the proposed action and primary alternatives. Any future management actions that may result from the information collected through industry-funded monitoring programs would be subject to all the requirements of NEPA at the appropriate time.

The discussion of environmental effects that follows is organized to present the relevant biological, physical, and socio-economic considerations for each of the omnibus alternatives. Thus, the effects on biological resources of the each of the omnibus alternatives are discussed, followed by the effects on the physical environment (habitat) of each of the omnibus alternatives, and finally followed by the socio-economic effects of each of the omnibus alternatives. In this way, the effects of each of the alternatives on each portion of the affected environment can be appropriately compared.

Due to the administrative nature of much of this action (i.e., the action is focused on establishing a process) in many cases there are no environmental impacts associated with the omnibus alternative under consideration. In these cases, an explanation for this conclusion is presented, but no separate discussion of the alternatives is provided. Separate discussion of the likely impacts of alternatives is only provided where there are measurable differences in impacts between the alternatives.

### General discussion of herring and mackerel coverage target alternative impacts

In contrast with the omnibus alternatives, the impacts of each of the coverage target alternatives for the Atlantic herring and Atlantic mackerel fisheries are more reflective of a typical FMP action. Thus, the impacts associated with the coverage target alternatives for the Atlantic herring and Atlantic mackerel fisheries will be discussed for the target and non-target species, protected resources, the physical environment and human communities. This discussion is presented separately from the impacts of the omnibus alternatives.

## 4.1 OMNIBUS ALTERATIVE IMPACTS

This section considers the potential impacts of omnibus alternatives considered by the NEFMC and MAFMC to establish a common structure for industry-funded monitoring programs that would apply to all Greater Atlantic Region FMPs.

Alternatives under consideration include the following:

- Alternative 1: Case-by-case Industry-Funded Monitoring Programs (No Action); and
- Alternative 2: Standardized Industry-Funded Monitoring Programs.

The standardized industry-funded monitoring program under consideration includes (1) standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry, (2) a process for FMP-specific industry-funded monitoring to be implemented via a future framework adjustment action, (3) standard administrative requirements for industry-funded monitoring service providers, and (4) a process to prioritize available Federal funding for industry-funded monitoring across FMPs.

There are five alternative processes for prioritizing available Federal funding for industry-funded monitoring programs across FMP, including:

- Alternative 2.1: NMFS-led prioritization process;
- Alternative 2.2: Council-led prioritization process;
- Alternative 2.3: Proportional prioritization process;
- Alternative 2.4: Lowest coverage ratio prioritization process; and
- Alternative 2.5: Highest coverage ratio prioritization process.

### 4.1.1 OMNIBUS ALTERNATIVE IMPACTS TO BIOLOGICAL RESOUCES

Under Omnibus Alternative 1 (No Action), there would be no standardized structure developed for Greater Atlantic Region industry-funded monitoring programs, meaning that there would be no standard definition of cost responsibilities for industry-funded monitoring in the New England and Mid-Atlantic fisheries, no standard administrative requirements for industry-funded monitoring service providers, no framework adjustment process to implement FMP-specific industry-funded monitoring, and no process to prioritize available Federal funding to meet Council desired monitoring coverage target above and beyond SBRM coverage. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for Greater Atlantic Region FMPs would be evaluated on a case-by-case basis. If no Federal funding were available after SBRM coverage requirements were met, then none of the established industry-funded monitoring programs would operate and there would be no additional observer coverage above SBRM levels.

In contrast, Omnibus Alternative 2 would establish a standardized structure for industry-funded monitoring programs that would apply to all New England and Mid-Atlantic FMPs that choose to use industry funding to increase monitoring. This industry-funded monitoring program structure would include the following components: (1) standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry, (2) process for FMP-specific industry-funded monitoring to be implemented via a future framework adjustment action, and (3) standard administrative requirements for industry-funded monitoring service providers. Under Omnibus Alternative 2, if enough Federal funding available after SBRM coverage requirements were met to cover NMFS costs for all of the established industry-funded monitoring programs, they would all operate at the target coverage levels established through each individual FMP. If there is some Federal funding available after SBRM coverage requirements are met, but not enough to cover all of the industry-funded monitoring programs, one of five possible prioritization processes would be used to decide how to allocate available Federal funding to the various industry-funded monitoring program. If no Federal funding were available after SBRM coverage requirements were met, then, similar to the No Action alternative, none of the established industry-funded monitoring programs would operate and there would be no additional observer coverage above SBRM levels.

In general, there are no direct impacts on biological resources (target, non-target, and protected species) related to either Omnibus Alternative 1 (No Action), or the various permutations of Omnibus Alternative 2. Again, these alternatives are entirely focused on the process of developing industry-funded monitoring programs, and thus do not directly affect the level of fishing activity, fishing operations, the species targeted, or areas fished in the Greater Atlantic Region. The indirect impacts of the various aspects of the Omnibus Alternatives on biological resources is discussed below.

Compared to the No action alternative, the establishment of standardized cost responsibilities and the framework adjustment process to allow for the future establishment of industry-funded monitoring programs in individual FMPs under Omnibus Alternative 2 has a negligible impact on biological resources when compared with the No Action alternative. These aspects of Omnibus Alternative 2 are entirely focused on the process of developing industry-funded monitoring programs, and thus do not directly affect the level of fishing activity, fishing operations, the species targeted, or areas fished in the Greater Atlantic Region. As there are no biological impacts associated with the cost responsibility and framework adjustment aspects of the Omnibus Alternative 2 and the No action alternative, there are no differences among them.

There is a low positive indirect impact on biological resources related to establishment of standardized industry-funded monitoring service provider requirements. Standardized service provider requirements may lead to greater consistency in the information collected about target, non-target, and protected species through industry-funded monitoring programs, provided that individual FMPs do not drastically alter the service provider requirements when establishing monitoring programs. Improved catch information that results from greater consistency in information collection may lead to better management of biological resources. In contrast, under the No Action alternative, industry-funded monitoring service provider requirements would need to be established separately for each FMP.

The magnitude of the potential indirect impacts of the prioritization process on biological resources varies depending on the selected prioritization process. The impacts discussed in this paragraph apply at times when there is some Federal funding available after SBRM coverage requirements are met, but not enough to cover all of the established industry-funded monitoring programs. Under the Omnibus Alternative 1 (No Action), the absence of a process to prioritize between established industry-funded monitoring programs means that Federal funding available after SBRM coverage requirements are met is allocated to industry-funded monitoring programs on a first-come, first-served basis. There is a potential low negative impact to biological resources under the No Action alternative if industry-funded monitoring programs necessary to gather important catch information go unfunded because they are developed after other programs. In general, the establishment of a prioritization process under Omnibus Alternative 2 provides a low positive impact on biological resources compared to the No Action alternative because all established industry-funded monitoring programs will be considered when deciding how to allocate available Federal funding, and funding will either be allocated proportionally to all industry-funded monitoring programs (under Alternative 2.3), or will be distributed among industry-funded programs based on a method selected by the Councils (under Alternatives 2.1, 2.2, 2.4, and 2.5).

The discretionary prioritization processes (Alternatives 2.1 and 2.2) have the greatest potential for positive impacts to biological resources compared to the no action and formulaic alternatives (Alternatives 2.3-2.5) because they allow for the evaluation of program need and design when assigning priority. This means that, in years where there is Federal funding available to prioritize, the discretionary prioritization alternatives allow the potential to direct funding towards monitoring programs that improve information about specific target, non-target, and protected species.

The formulaic prioritization alternatives (Alternative 2.3-2.5) all provide a low positive impact on biological resources compared to No action because they consider all established Greater Atlantic Region industry-funded monitoring programs when deciding how to allocate available Federal funds, rather than considering funding allocation on a case-by-case basis under the No Action alternative. In the case of the proportional prioritization process (Alternative 2.3), available Federal funding would be allocated proportionally to all established industry funded monitoring programs, rather than on a first-come, first-served basis under the No Action alternative. This means that, in years where there is Federal funding available to prioritize, all industry-funded monitoring programs would result in some additional monitoring, which may have low positive impacts on biological resources in terms of information collection. The lowest coverage ratio based alternative (Alternative 2.4) would prioritize industry-funded monitoring programs associated with the most active fisheries. The highest coverage ratio based alternative (Alternative 2.5) would prioritize industry-funded monitoring programs associated with the to either the least active fisheries. While both of these alternatives could result in certain industry-funded monitoring programs receiving no funding, there is still some benefit to biological resources that results from evaluating the allocation of available Federal funding across all Greater Atlantic Regional industry-funded monitoring programs in a structured way, rather than on a case-by-case basis.

### 4.1.2 OMNIBUS ALTERNATIVE IMPACTS TO PHYSICAL ENVIRONMENT

Because neither the status quo omnibus alternative nor the other omnibus alternatives would directly impose or likely result in any changes in fishing effort or behavior, fishing gears used, or areas fished, there are no potential impacts to the physical environment (including EFH) associated with the omnibus alternatives under consideration for this item. There are also no differences among the various omnibus alternatives.

### 4.1.3 OMNIBUS ALTERNATIVE IMPACTS TO HUMAN COMMUNITIES

Under Omnibus Alternative 1 (No Action), there would be no standardized structure developed for Greater Atlantic Region industry-funded monitoring programs, meaning that there would be no standard definition of cost responsibilities for industry-funded monitoring in the New England and Mid-Atlantic fisheries, no standard administrative requirements for industry-funded monitoring service providers, no framework adjustment process to implement FMP-specific industry-funded monitoring, and no process to prioritize available Federal funding to meet Council desired monitoring coverage target above and beyond SBRM coverage. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for Greater Atlantic Region FMPs would be evaluated on a case-by-case basis. If no Federal funding were available after SBRM coverage requirements were met, then none of the established industry-funded monitoring programs would operate and there would be no additional observer coverage above SBRM levels.

In contrast, Omnibus Alternative 2 would establish a standardized structure for industry-funded monitoring programs that would apply to all New England and Mid-Atlantic FMPs that choose to use industry funding to increase monitoring. This industry-funded monitoring program structure would include the following components: (1) standard cost responsibilities associated with industry-funded monitoring for NMFS and the fishing industry, (2) process for FMP-specific industry-funded monitoring to be implemented via a future framework adjustment action, and (3) standard administrative requirements for industry-funded monitoring service providers. Under Omnibus Alternative 2, if enough

Federal funding available after SBRM coverage requirements were met to cover NMFS costs for all of the established industry-funded monitoring programs, they would all operate at the target coverage levels established through each individual FMP. If there is some Federal funding available after SBRM coverage requirements are met, but not enough to cover all of the industry-funded monitoring programs, one of five possible prioritization processes would be used to decide how to allocate available Federal funding to the various industry-funded monitoring program. If no Federal funding were available after SBRM coverage requirements were met, then, similar to the No Action alternative, none of the established industry-funded monitoring programs would operate and there would be no additional observer coverage above SBRM levels. No individual FMP would be subject to an industry-funded monitoring program as a result of implementation of this action. Rather, any FMP that wishes to develop an industry-funded monitoring program would need to develop the program that meets the specifications of this action in a separate framework or amendment.

Overall, there will be negative economic impacts to fishing vessels as a result of selecting Omnibus Alternative 2 if both of the following occur: 1) There is an established industry-funded monitoring program for the FMP; and 2) There is Federal funding available to cover all, or a portion, of the costs of industry-funded monitoring programs after SBRM coverage requirements are met. The estimated vessel contribution, further described in section 2.0, is $818 per sea day. If no Federal funding were available after SBRM coverage requirements were met, then, similar to the No Action alternative, none of the established industry-funded monitoring programs would operate and there would be no additional observer coverage above SBRM levels. It is important to reiterate that the economic impacts associated with coverage targets for industry-funded monitoring programs must be evaluated on an FMP-by-FMP basis at the time each program is established (e.g., the economic analysis of coverage target impacts provided for the Atlantic herring and Atlantic mackerel fisheries in Sections 4.2 and 4.3). The indirect impacts of the various aspects of the Omnibus Alternatives on human communities are discussed below.

Compared to the No action alternative, the establishment of the framework adjustment process to allow for the future establishment of industry-funded monitoring programs in individual FMPs under Omnibus Alternative 2 has a negligible impact on human communities when compared with the No Action alternative. This aspects of Omnibus Alternative 2 is entirely focused on the process of developing industry-funded monitoring programs, and thus does not directly affect fishing vessels, fleets, or ports. As there is no direct impact to human communities associated with the framework adjustment aspects of the Omnibus Alternative 2 and the No action alternative, there are no differences between the alternatives.

There is a potential low positive indirect impact on human communities associated with the establishment of standardized industry-funded monitoring service provider requirements. The service provider requirements match the existing service provider requirements codified for other industry-funded monitoring programs in the Greater

Atlantic Region. Standardized service provider requirements may allow for efficiencies in the administration of industry-funded monitoring programs (e.g., initial applications to be approved as service providers, training for monitors, etc.) compared to the No Action alternative, which could ultimately reduce industry's contribution to monitoring costs. In addition, standardized service provider requirements could lead to greater consistency in the information collected about through industry-funded monitoring programs, provided that individual FMPs do not drastically alter the service provider requirements when establishing monitoring programs. Improved catch information that results from greater consistency in information collection may lead to better management of biological resources, which could eventually lead to greater fisheries yields. In contrast, under the No Action alternative, industry-funded monitoring service provider requirements would need to be established separately for each FMP.

The establishment of standardized cost responsibility definitions could have low positive impacts compared to No Action. While industry cost responsibilities are not codified in this action, the categorization and characterization of cost responsibilities in this action could provide industry members information necessary to negotiate contracts with industry-funded monitoring service providers, which may ultimately reduce industry cost responsibilities.

The magnitude of the potential indirect impacts of the prioritization process on human communities varies depending on the selected prioritization process. The impacts discussed in this paragraph apply at times when there is some Federal funding available after SBRM coverage requirements are met, but not enough to cover all of the established industry-funded monitoring programs. Under the Omnibus Alternative 1 (No Action), the absence of a process to prioritize between established industry-funded monitoring programs means that Federal funding available after SBRM coverage requirements are met is allocated to industry-funded monitoring programs on a first-come, first-served basis. There is a potential low negative impact to human communities under the No Action alternative if industry-funded monitoring programs necessary to gather important information catch information go unfunded because they are developed after other programs. In general, the establishment of a prioritization process under Omnibus Alternative 2 provides a low positive impact on human communities compared to the No Action alternative because all established industry-funded monitoring programs will be considered when deciding how to allocate available Federal funding, and funding will either be allocated proportionally to all industry-funded monitoring programs (under Alternative 2.3), or will be distributed among industry-funded programs based on a method selected by the Councils (under Alternatives 2.1, 2.2, 2.4, and 2.5).
The discretionary prioritization processes (Alternatives 2.1 and 2.2) both provide a low positive impact on human communities compared to No action because they consider all established Greater Atlantic Region industry-funded monitoring programs when deciding how to allocate available Federal funds, rather than considering funding allocation on a case-by-case basis under the No Action alternative. These alternatives have the greatest potential for positive impacts to human communities compared to the No Action and

formulaic alternatives (Alternatives 2.3-2.5) because they allow for the evaluation of program need and design when assigning priority. This means that, in years where there is Federal funding available to prioritize, the discretionary prioritization alternatives allow the potential to direct funding towards monitoring programs with specific characteristics. These alternatives could allow the Council or NMFS to preferentially support industry-funded monitoring programs for species with economic value, programs where industry is most able to bear the cost of additional monitoring, or programs that gather information about species with special ecosystem importance (e.g., choke species or forage species). Improved catch information that results from the opportunity to focus funding on the most important industry-funded monitoring programs may lead to better management of biological resources, which could eventually lead to greater fisheries yields.

The formulaic prioritization alternatives (Alternative 2.3-2.5) all provide a low positive impact on human communities compared to No action because they consider all established Greater Atlantic Region industry-funded monitoring programs when deciding how to allocate available Federal funds, rather than considering funding allocation on a case-by-case basis under the No Action alternative. In the case of the proportional prioritization process (Alternative 2.3), available Federal funding would be allocated proportionally to all established industry funded monitoring programs, rather than on a first-come, first-served basis under the No Action alternative. This means that, in years where there is Federal funding available to prioritize, all industry-funded monitoring programs would result in some additional monitoring, which may have low positive impacts on human communities in terms of information collection. The lowest coverage ratio based alternative (Alternative 2.4) would prioritize industry-funded monitoring programs associated with the most active fisheries. The highest coverage ratio based alternative (Alternative 2.5) would prioritize industry-funded monitoring programs associated with the least active fisheries. While both of these alternatives could result in certain industry-funded monitoring programs receiving no funding, there is still some benefit to human communities that results from evaluating the allocation of available Federal funding across all Greater Atlantic Regional industry-funded monitoring programs in a structured way, rather than on a case-by-case basis.

### 4.1.4 OMNIBUS ALTERNATIVE IMPACTS SUMMARY

## 4.2 ATLANTIC HERRING ALTERNATIVE IMPACTS

This section considers the potential impacts of alternatives considered by the New England Council to allocate at-sea observer coverage to the herring fishery.

Alternatives under consideration include the following:

- Herring Alternative 1: No Coverage Target Specified for Industry-Funded Monitoring Programs (No Action) and
- Herring Alternative 2: Coverage Target Specified For Industry-Funded Monitoring Programs.

The alternatives under consideration to specify coverage targets for an industry-funded monitoring program include the following:

- Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers Issued);
- Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers Issued);
- Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers Issued);
- Herring Alternative 2.4: Percent Coverage Target on Midwater Trawl Fleet (Waivers Issued); and
- Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas.

## 4.2.1 ATLANTIC HERRING ALTERNATIVE IMPACTS ON TARGET SPECIES

### *4.2.1.1 Impacts of Herring Alternative 1: No Coverage Target Specified for Industry-Funded Monitoring Programs (No Action)*

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Observer coverage for herring vessels would be allocated according to SBRM. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for the herring fishery would be evaluated on a case-by-case basis.

In recent years, observer coverage for the herring fishery has largely been allocated as part of the SBRM. The SBRM is the combination of sampling design, data collection procedures, and analyses used to estimate bycatch in multiple fisheries. The SBRM provides a structured approach for evaluating the effectiveness of the allocation of fisheries observer effort across multiple fisheries to monitor a large number of species. Although management measures are typically developed and implemented on an FMP-by-FMP basis, from the perspective of developing a bycatch reporting system, there is overlap among the FMPs and the fisheries that occur in New England and the Mid-Atlantic that could result in redundant and wasteful requirements if each FMP is addressed independently.

For example, New England vessels using extra-large mesh gillnets catch monkfish, skates, and Northeast multispecies, often on the same fishing trip, and, therefore, most participants in this fishery must operate according to the regulations implemented under three different FMPs. To distinguish between the management units identified in individual FMPs and the fisheries that operate under one or more FMPs, the SBRM is designed around “fishing modes” defined by the type of fishing gear used and the area from which the vessels depart.

There are 56 fishing modes defined in the SBRM, some of which further subdivide a fishery by the mesh size of the gear used (for gillnets and otter trawls), or by the type of permit and access area program (for sea scallop dredges). Although there are differences among the modes, the participants in these fishing modes fish throughout the Gulf of Maine, Georges Bank, and the Mid-Atlantic Bight, and land their catch across a large number of fishing ports from the Outer Banks of North Carolina to Downeast Maine. The SBRM is limited to those fisheries that are prosecuted in the Federal waters of the Greater Atlantic Region and managed through an FMP developed by either the Mid-Atlantic or New England Council. Current observer coverage allocated to the herring fishery through SBRM is described in Section 2.2.1 of this document.

Under SBRM, the herring fishery will receive at-sea observer coverage under the following 6 fleets: New England and Mid-Atlantic small mesh otter trawl; New England and Mid-Atlantic purse seine; and New England and Mid-Atlantic paired and single midwater trawl. The table below describes the sea days allocated for April 2014 through March 2015. The sea days listed below for small mesh otter trawl cover all FMPs that use this gear type, so only a portion would cover trips targeting herring. The purse seine and midwater trawl fleets are largely comprised of vessels targeting herring, so a majority of these sea days in these categories will be used to observe trips targeting herring.

**TABLE 59. THE PROPOSED OBSERVER SEA DAYS ALLOCATED FOR FISHING FLEETS THAT HARVEST HERRING FOR APRIL 2014 THROUGH MARCH 2015.**

| Fleet | Region | Sea Days allocated for April 2014 to March 2015 | Observed sea days, July 2012 to June 2013 | VTR sea days, July 2012 – June 2013 | Observed trips, July 2012 to June 2013 | VTR trips, July 2012 to June 2013 |
|---|---|---|---|---|---|---|
| Small Mesh Bottom Trawl | MA | 1,289 | 631 | 7,003 | 263 | 3,569 |
| Small Mesh Bottom Trawl | NE | 1,604 | 463 | 7,315 | 171 | 3,315 |
| Purse seine | MA | 12 | 0 | 447 | 0 | 441 |
| Purse seine | NE | 20 | 71 | 699 | 31 | 319 |
| Midwater Trawl (Pair and Single) | MA | 0 | 7 | 72 | 1 | 10 |
| Midwater Trawl (Pair and Single) | NE | 45 | 638 | 1,389 | 146 | 394 |

Source: NEFOP/GARFO Proposed Seaday Allocation for 2014; Wigley et al., 2014.

The herring fishery is managed through a stock-wide annual catch limit (ACL) (reduced from the overfishing limit and acceptable biological catch to address scientific uncertainty and management uncertainty) and sub-ACLs (allocated by herring management area) that are designed to prevent overfishing on individual stock components. Currently, the herring resource is not overfished, and overfishing is not occurring. Additionally, in recent years, the fleet has had the ability to fully harvest the stock-wide ACL and the sub-ACLs. Selection of Herring Alternative 1 will not likely affect the setting of herring harvest specifications nor will it likely affect the ability of the herring fleet to fully harvest the stock-wide ACL or the sub-ACLs.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have a positive impact on the herring resource by increasing monitoring in the herring fishery. While the benefits to the herring resource may be difficult to quantify under Herring Alternative 2, they would likely not be realized under Herring Alternative 1.

Under Herring Alternative 2, long-term benefits to the herring resource could result from increased observer coverage, increased sampling, and a reduction in unobserved catch. As catch information improves, the uncertainty around catch and bycatch in the herring fishery may be reduced, potentially allowing for discard estimates to be incorporated into future herring stock assessments. Increased catch information has the potential to reduce scientific uncertain associated with the stock assessment and reduce management uncertainty associated with catch and bycatch estimates, ultimately helping inform the setting of herring harvest specifications. The magnitude of positive impacts to the herring resource associated with additional catch information is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive impacts to the herring resource associated with additional catch monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

### *4.2.1.2 Impacts of Herring Alternative 2: Coverage Target Specified for Industry-Funded Monitoring Programs*

Herring Alternative 2 would specify the details of an industry-funded monitoring program. Details may include, but are not limited to: (1) Level and type of coverage target, (2) rationale for level and type of coverage, (3) minimum level of coverage necessary to meet coverage goals, (4) consideration of coverage waivers if coverage target cannot be met, (5) process for vessel notification and selection, (6) process for payment of industry cost responsibilities, (7) standards for monitoring service providers, and (8) any other measures necessary to implement the industry-funded monitoring program. T
Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. Depending on the results and desired actions, subsequent action to adjust the coverage targets could be accomplished via specifications, a framework adjustment, or an amendment to the Herring FMP, as appropriate.

Under Herring Alternative 2, the process for SBRM observer service provider approval and certification would be adopted for industry-funded observer and dockside service providers for the Herring FMP. As described previously, only NEFOP observers with special HVF training are used to cover the herring fishery. Maintaining SBRM observer service provider approval and certification would help ensure that the current level of HVF observer training and data quality requirements would continue under an industry-funded monitoring program. The process for vessel notification/selection and payment of industry cost responsibilities would be developed during the rulemaking and amendment approval process.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have a positive impact on the herring resource by increasing monitoring in the herring fishery. While the benefits to the herring resource may be difficult to quantify under Herring Alternative 2, they would likely not be realized under Herring Alternative 1.

Under Herring Alternative 2, long-term benefits to the herring resource could result from increased observer coverage, increased sampling, and a reduction in unobserved catch. As catch information improves, the uncertainty around catch and bycatch in the herring fishery may be reduced, potentially allowing for discard estimates to be incorporated into future herring stock assessments. Increased catch information has the potential to reduce scientific uncertain associated with the stock assessment and reduce management uncertainty associated with catch and bycatch estimates, ultimately helping inform the setting of herring harvest specifications. The magnitude of positive impacts to the herring resource associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive impacts to the herring resource associated with additional catch monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

#### 4.2.1.2.1 Impacts of Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers Issued)

Herring Alternative 2.1 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip. If an observer was not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on the herring resource by increasing monitoring in the herring fishery. While the benefits to the herring resource may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of positive impacts to the herring resource associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1 and 2.2 can be used for stock-wide ACL and sub-ACL monitoring but it is unlikely that those data will be used for the herring stock assessment and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

Herring Alternative 2.1 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.3 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield in a given year is not harvested, there is the potential for a positive impact on the herring resource associated with Herring Alternatives 2.1 and 2.3. The positive impact would result from the increased reproductive potential of the individuals that are unharvested.

##### 4.2.1.2.2 Impacts of Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers Issued)

Herring Alternative 2.2 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip unless the at-sea observer requirement was waived by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on the herring resource by increasing monitoring in the herring fishery. While the benefits to the herring resource may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of positive impacts to the herring resource associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1 and 2.2 can be used for stock-wide ACL and sub-ACL monitoring but it is unlikely that those data will be used for the herring stock assessment and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

Herring Alternative 2.2 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), observer coverage may be waived by NMFS. The ability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.4 but less restrictive than Herring Alternatives 2.1, 2.3, and 2.5 that do not allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield in a given year is not harvested, there is the potential for a positive impact on the herring resource. The positive impact would result from the increased reproductive potential of the individuals that are unharvested. Because Herring Alternative 2.2 allows observer coverage to be waived, it is unlikely that observer availability will limit herring harvest under Herring Alternative 2.2. Therefore, any positive impact to the herring resource under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.2.

#### 4.2.1.2.3 Impacts of Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers Issued)

Herring Alternative 2.3 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on the herring resource by increasing monitoring in the herring fishery. While the benefits to the herring resource may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of positive impacts to the herring resource associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for the herring stock assessment and to estimate total removals as well as stock-wide ACL and sub-ACL monitoring.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-

Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage.

Herring Alternative 2.3 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield in a given year is not harvested, there is the potential for a positive impact on the herring resource associated with Herring Alternatives 2.1 and 2.3. The positive impact would result from the increased reproductive potential of the individuals that are unharvested.

#### 4.2.1.2.4 Impacts of Herring Alternative 2.4: Percent Coverage Target on the Midwater Trawl Fleet (Waivers)

Herring Alternative 2.4 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on the herring resource by increasing monitoring in the herring fishery. While the benefits to the herring resource may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of positive impacts to the herring resource associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for the herring stock assessment and to estimate total removals as well as stock-wide ACL and sub-ACL monitoring.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage.

Herring Alternative 2.4 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), observer coverage may be waived by NMFS. The ability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.2 but less restrictive than Herring Alternatives 2.1, 2.3, and 2.5 that do not allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield in a given year is not harvested, there is the potential for a positive impact on the herring resource. The positive impact would result from the increased reproductive potential of the individuals that are unharvested. Because Herring Alternative 2.4 allows observer coverage to be waived, it is unlikely that observer availability will limit herring harvest under Herring Alternative 2.4. Therefore, any positive impact to the herring resource under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.4.

##### 4.2.1.2.5 Impacts of Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas

Herring Alternative 2.5 would require vessels fishing with midwater trawl gear in the Groundfish Closed Areas (year around closed areas only) to carry an at-sea observer.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on the herring resource by increasing monitoring in the herring fishery. While the benefits to the herring resource may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of positive impacts to the herring resource associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for the herring stock assessment and to estimate total removals as well as stock-wide ACL and sub-ACL monitoring.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Specifying 100% coverage midwater trawl vessel fishing in Grounfish Closed Areas (Herring Alternatives 2.5) was recommended in Amendment 5. The New England Council believed it was important to determine the extent and nature of bycatch in the herring fishery. This alternative would still allow the herring midwater trawl fishery to operate in the Closed Areas, but it would ensure that opportunities for sampling are maximized.

Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Grounfish Closed Area must carry an observer. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.3 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield in a given year is not harvested, there is the potential for a positive impact on the herring resource. Even though Herring Alternative 2.5 does not allow observer coverage to be waived for a trip inside the Groundfish Closed Areas, it is unlikely that observer availability would reduce fishing effort such that the herring optimum yield is not able to be harvested. Therefore, any positive impact to the herring resource under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.5.

## Table 60. Impacts of Coverage Target Alternatives on Herring Resource

| Alternatives | Impacts on Herring Resource |
| --- | --- |
| Herring Alternative 1: No Coverage Target Specified For Industry-Funded Monitoring Programs (No Action) | • Negligible impact associated with observer coverage allocated by SBRM<br>• Negative impact associated with no additional monitoring to reduce uncertainty around catch and bycatch estimates |
| Herring Alternative 2: Coverage Target Specified For Industry-Funded Monitoring Programs | • Positive impact associated with additional monitoring to reduce uncertainty benefits around catch and bycatch estimates<br>• Negative impact associated with no additional monitoring unless available Federal funding can cover NMFS cost responsibilities<br>• Magnitude of impacts associated with additional monitoring would be dependent on the type of coverage and the amount of available Federal funding |
| Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers) | • Low positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by Category A and B vessels<br>• Low positive impact associated with additional information to track catch against herring ACL/sub-ACLs but potentially not suitable for use in the herring stock assessment or estimating total removals<br>• Positive impact if fishing effort is limited by observer availability and herring OY is not harvested |
| Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers) | • Low positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by Category A and B vessels<br>• Low positive impact associated with additional information to track catch against herring ACL/sub-ACLs but potentially not suitable for use in the herring stock assessment or estimating total removals |
| Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers) | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information to track catch against herring ACL /sub-ACLs, estimate total removals, and for the herring stock assessment<br>• Positive impact if fishing effort is limited by observer availability and herring OY is not harvested |
| Herring Alternative 2.4: Percent Coverage Target on Midwater Trawl Fleet (Waivers) | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information to track catch against herring ACL /sub-ACLs, estimate total removals, and for the herring stock assessment |
| Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information to track catch against herring ACL /sub-ACLs, estimate total removals, and for the herring stock assessment<br>• Negligible impact associated with changes in fishing effort |

### 4.2.2 ATLANTIC HERRING ALTERNATIVE IMPACTS ON NON-TARGET SPECIES

The non-target species of interest that are harvested by the herring fishery are haddock, river herring and shad (RH/S), and mackerel.

#### *4.2.2.1 Impacts of Herring Alternative 1: No Coverage Target Specified for Industry-Funded Monitoring Programs (No Action)*

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Observer coverage for herring vessels would be allocated according to SBRM. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for the herring fishery would be evaluated on a case-by-case basis.

Under SBRM, the herring fishery will receive at-sea observer coverage under the following 6 fleets: New England and Mid-Atlantic small mesh otter trawl; New England and Mid-Atlantic purse seine; and New England and Mid-Atlantic paired and single midwater trawl. The table below describes the sea days allocated for April 2014 through March 2015. The sea days listed below for small mesh otter trawl cover all FMPs that use this gear type, so only a portion would cover trips targeting herring. The purse seine and midwater trawl fleets are largely comprised of vessels targeting herring, so a majority of these sea days in these categories will be used to observe trips targeting herring.

**TABLE 61. THE PROPOSED OBSERVER SEA DAYS ALLOCATED FOR FISHING FLEETS THAT HARVEST HERRING FOR APRIL 2014 THROUGH MARCH 2015.**

| Fleet | Region | Sea Days allocated for April 2014 to March 2015 | Observed sea days, July 2012 to June 2013 | VTR sea days, July 2012 – June 2013 | Observed trips, July 2012 to June 2013 | VTR trips, July 2012 to June 2013 |
|---|---|---|---|---|---|---|
| Small Mesh Bottom Trawl | MA | 1,289 | 631 | 7,003 | 263 | 3,569 |
| Small Mesh Bottom Trawl | NE | 1,604 | 463 | 7,315 | 171 | 3,315 |
| Purse seine | MA | 12 | 0 | 447 | 0 | 441 |
| Purse seine | NE | 20 | 71 | 699 | 31 | 319 |
| Midwater Trawl (Pair and Single) | MA | 0 | 7 | 72 | 1 | 10 |
| Midwater Trawl (Pair and Single) | NE | 45 | 638 | 1,389 | 146 | 394 |

Source: NEFOP/GARFO Proposed Seaday Allocation for 2014; Wigley et al., 2014.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have a positive impact on non-target species by increasing monitoring in the herring fishery. While the benefits to non-target species may be difficult to quantify under Herring Alternative 2, they would likely not be realized under Herring Alternative 1.

Under Herring Alternative 2, long-term benefits to non-target species could result from increased observer coverage, increased sampling, and a reduction in unobserved catch. As catch information improves, the uncertainty around catch and bycatch in the herring fishery may be reduced, potentially allowing for improved catch accounting of non-target species. Improved catch accounting of haddock and RH/S has the potential to reduce the uncertainty around catch estimates that are tracked against haddock and RH/S catch caps. The magnitude of positive impacts for non-target species associated with additional catch information is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive impacts to non-target species associated with additional catch monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

#### *4.2.2.2 Impacts of Herring Alternative 2: Coverage Target Specified for Industry-Funded Monitoring Programs*

Herring Alternative 2 would specify the details of an industry-funded monitoring program. Details may include, but are not limited to: (1) Level and type of coverage target, (2) rationale for level and type of coverage, (3) minimum level of coverage necessary to meet coverage goals, (4) consideration of coverage waivers if coverage target cannot be met, (5) process for vessel notification and selection, (6) process for payment of industry cost responsibilities, (7) standards for monitoring service providers, and (8) any other measures necessary to implement the industry-funded monitoring program.

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. Depending on the results and desired actions, subsequent action to adjust the coverage targets could be accomplished via specifications, a framework adjustment, or an amendment to the Herring FMP, as appropriate.

Under Herring Alternative 2, the process for SBRM observer service provider approval and certification would be adopted for industry-funded observer and dockside service providers for the Herring FMP. As described previously, only NEFOP observers with special HVF training are used to cover the herring fishery. Maintaining SBRM observer service provider approval and certification would help ensure that the current level of HVF observer training and data quality requirements would continue under an industry-funded monitoring program. The process for vessel notification/selection and payment of industry cost responsibilities would be developed during the rulemaking and amendment approval process.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have a positive impact on non-target species by increasing monitoring in the herring fishery. While the benefits to non-target species may be difficult to quantify under Herring Alternative 2, they would likely not be realized under Herring Alternative 1.

Under Herring Alternative 2, long-term benefits to non-target species could result from increased observer coverage, increased sampling, and a reduction in unobserved catch. As catch information improves, the uncertainty around catch and bycatch in the herring fishery may be reduced, potentially allowing for improved catch accounting of non-target species. Improved catch accounting of haddock and RH/S has the potential to reduce the uncertainty around catch estimates that are tracked against haddock and RH/S catch caps. The magnitude of positive impacts for non-target species associated with additional catch information is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive impacts to non-target species associated with additional catch monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

#### 4.2.2.2.1 Impacts of Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers Issued)

Herring Alternative 2.1 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip. If an observer was not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip.
Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on non-target species by increasing monitoring in the herring fishery. While the benefits to non-target species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.
The magnitude of positive impacts to non-target species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).
Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1 and 2.2 can be used for monitoring catch against haddock and RH/S catch caps but it is unlikely that those data will be used for stock assessments and estimating total removals. The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

Herring Alternative 2.1 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.3 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the harvest of non-target species is reduced, there is the potential for a positive impact on non-target species associated with Herring Alternatives 2.1 and 2.3. The positive impact would result from the increased reproductive potential of the individuals that are unharvested.

#### 4.2.2.2.2 Impacts of Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers Issued)

Herring Alternative 2.2 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip unless the at-sea observer requirement was waived by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on non-target species by increasing monitoring in the herring fishery. While the benefits to non-target species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.
The magnitude of positive impacts to non-target species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).
Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1

and 2.2 can be used for monitoring catch against haddock and RH/S catch caps but it is unlikely that those data will be used for stock assessments and estimating total removals. The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

Herring Alternative 2.2 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), observer coverage may be waived by NMFS. The ability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.4 but less restrictive than Herring Alternatives 2.1, 2.3, and 2.5 that do not allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer such that the harvest of non-target species is reduced, there is the potential for a positive impact on non-target species. The positive impact would result from the increased reproductive potential of the individuals that are unharvested. Because Herring Alternative 2.2 allows observer coverage to be waived, it is unlikely that observer availability will limit the harvest of non-target species under Herring Alternative 2.2. Therefore, any positive impact to non-target species under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.2.

#### 4.2.2.2.3 Impacts of Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers Issued)

Herring Alternative 2.3 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on non-target species by increasing monitoring in the herring fishery. While the benefits to non-target species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.
The magnitude of positive impacts to non-target species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given

year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5). Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for monitoring catch against haddock and RH/S catch caps as well as stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage. Herring Alternative 2.3 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the harvest of non-target species is reduced, there is the potential for a positive impact on non-target species associated with Herring Alternatives 2.1 and 2.3. The positive impact would result from the increased reproductive potential of the individuals that are unharvested.

#### 4.2.2.2.4 Impacts of Herring Alternative 2.4: Percent Coverage Target on the Midwater Trawl Fleet (Waivers)

Herring Alternative 2.4 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on non-target species by increasing monitoring in the herring fishery. While the benefits to non-target species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1. The magnitude of positive impacts to non-target species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5). Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for monitoring catch against haddock and RH/S catch caps as well as stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage. Herring Alternative 2.4 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), observer coverage may be waived by NMFS. The ability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.2 but less restrictive than Herring Alternatives 2.1, 2.3, and 2.5 that do not allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the harvest of non-target species is reduced, there is the potential for a positive impact on non-target species. The positive impact would result from the increased reproductive potential of the individuals that are unharvested. Because Herring Alternative 2.4 allows observer coverage to be waived, it is unlikely that observer availability will limit the harvest of non-target species under Herring Alternative 2.4. Therefore, any positive impact to non-target species under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.4.

#### 4.2.2.2.5 Impacts of Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas

Herring Alternative 2.5 would require vessels fishing with midwater trawl gear in the Groundfish Closed Areas (year around closed areas only) to carry an at-sea observer.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on non-target species by increasing monitoring in the herring fishery. While the benefits to non-target species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.
The magnitude of positive impacts to non-target species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).
Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for monitoring catch against haddock and RH/S catch caps as well as stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Specifying 100% coverage midwater trawl vessel fishing in Grounfish Closed Areas (Herring Alternatives 2.5) was recommended in Amendment 5. The New England Council believed it was important to determine the extent and nature of bycatch in the herring fishery. This alternative would still allow the herring midwater trawl fishery to operate in the Closed Areas, but it would ensure that opportunities for sampling are maximized.
Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Grounfish Closed Area must carry an observer. The inability to waive observer coverage on a specific

trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.3 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such the harvest of non-target species is reduced, there is the potential for a positive impact on non-target species. Even though Herring Alternative 2.5 does not allow observer coverage to be waived for a trip inside the Groundfish Closed Areas, it is unlikely that observer availability would reduce fishing effort such that the harvest of non-target species would be reduced. Therefore, any positive impact to non-target species under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.5.

### TABLE 62. IMPACTS OF COVERAGE TARGET ALTERNATIVES ON NON-TARGET SPECIES

| Alternatives | Impacts on Non-Target Species (Haddock, RH/S, Mackerel) |
|---|---|
| Herring Alternative 1: No Coverage Target Specified For Industry-Funded Monitoring Programs (No Action) | • Negligible impact associated with observer coverage allocated by SBRM<br>• Negative impact associated with no additional monitoring to reduce uncertainty around catch and bycatch estimates |
| Herring Alternative 2: Coverage Target Specified For Industry-Funded Monitoring Programs | • Positive impact associated with additional monitoring to reduce uncertainty benefits around catch and bycatch estimates<br>• Negative impact associated with no additional monitoring unless available Federal funding can cover NMFS cost responsibilities<br>• Magnitude of impacts associated with additional monitoring would be dependent on the type of coverage and the amount of available Federal funding |
| Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers) | • Low positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by Category A and B vessels<br>• Low positive impact associated with additional information from Category A and B vessels to track catch against haddock and RH/S catch caps but potentially not suitable for use in stock assessments or estimating total removals<br>• Positive impact if fishing effort is limited by observer availability |
| Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers) | • Low positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by Category A and B vessels<br>• Low positive impact associated with additional information from Category A and B vessels to track catch against haddock and RH/S catch caps but potentially not suitable for use in stock assessments or estimating total removals |
| Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers) | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information from midwater trawl fleet to track catch against haddock and RH/S catch caps, estimate total removals, and for stock assessments<br>• Positive impact if fishing effort is limited by observer availability |
| Herring Alternative 2.4: Percent Coverage Target on Midwater Trawl Fleet (Waivers) | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information from midwater trawl fleet to track catch against haddock and RH/S catch caps, estimate total removals, and for stock assessments |
| Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information from midwater trawl fleet to track catch against haddock and RH/S catch caps, estimate total removals, and for stock assessments<br>• Negligible impact associated with changes in fishing effort |

## 4.2.3 ATLANTIC HERRING ALTERNATIVE IMPACTS ON PROTECTED RESOURCES

Protected species include fish, turtle, and marine mammals listed under the Endangered Species Act and marine mammals protected under the Marine Mammal Protection Act.

### *4.2.3.1 Impacts of Herring Alternative 1: No Coverage Target Specified for Industry-Funded Monitoring Programs (No Action)*

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Observer coverage for herring vessels would be allocated according to SBRM. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for the herring fishery would be evaluated on a case-by-case basis.

Under SBRM, the herring fishery will receive at-sea observer coverage under the following 6 fleets: New England and Mid-Atlantic small mesh otter trawl; New England and Mid-Atlantic purse seine; and New England and Mid-Atlantic paired and single midwater trawl. The table below describes the sea days allocated for April 2014 through March 2015. The sea days listed below for small mesh otter trawl cover all FMPs that use this gear type, so only a portion would cover trips targeting herring. The purse seine and midwater trawl fleets are largely comprised of vessels targeting herring, so a majority of these sea days in these categories will be used to observe trips targeting herring.

**TABLE 63. THE PROPOSED OBSERVER SEA DAYS ALLOCATED FOR FISHING FLEETS THAT HARVEST HERRING FOR APRIL 2014 THROUGH MARCH 2015.**

| Fleet | Region | Sea Days allocated for April 2014 to March 2015 | Observed sea days, July 2012 to June 2013 | VTR sea days, July 2012 – June 2013 | Observed trips, July 2012 to June 2013 | VTR trips, July 2012 to June 2013 |
|---|---|---|---|---|---|---|
| Small Mesh Bottom Trawl | MA | 1,289 | 631 | 7,003 | 263 | 3,569 |
| Small Mesh Bottom Trawl | NE | 1,604 | 463 | 7,315 | 171 | 3,315 |
| Purse seine | MA | 12 | 0 | 447 | 0 | 441 |
| Purse seine | NE | 20 | 71 | 699 | 31 | 319 |
| Midwater Trawl (Pair and Single) | MA | 0 | 7 | 72 | 1 | 10 |
| Midwater Trawl (Pair and Single) | NE | 45 | 638 | 1,389 | 146 | 394 |

Source: NEFOP/GARFO Proposed Seaday Allocation for 2014; Wigley et al., 2014.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have a positive impact on protected species by increasing monitoring in the herring fishery. While the benefits to protected species may be difficult to quantify under Herring Alternative 2, they would likely not be realized under Herring Alternative 1.

Under Herring Alternative 2, long-term benefits to protected species could result from increased observer coverage, increased sampling, and a reduction in unobserved catch. As catch information improves, the uncertainty around catch and bycatch in the herring fishery may be reduced, potentially allowing for improved catch accounting of protected species.

The magnitude of positive impacts for protected species associated with additional catch information is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive impacts to protected species associated with additional catch monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

#### *4.2.3.2 Impacts of Herring Alternative 2: Coverage Target Specified for Industry-Funded Monitoring Programs*

Herring Alternative 2 would specify the details of an industry-funded monitoring program. Details may include, but are not limited to: (1) Level and type of coverage target, (2) rationale for level and type of coverage, (3) minimum level of coverage necessary to meet coverage goals, (4) consideration of coverage waivers if coverage target cannot be met, (5) process for vessel notification and selection, (6) process for payment of industry cost responsibilities, (7) standards for monitoring service providers, and (8) any other measures necessary to implement the industry-funded monitoring program.

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. Depending on the results and desired actions, subsequent action to adjust the coverage targets could be accomplished via specifications, a framework adjustment, or an amendment to the Herring FMP, as appropriate.

Under Herring Alternative 2, the process for SBRM observer service provider approval and certification would be adopted for industry-funded observer and dockside service providers for the Herring FMP. As described previously, only NEFOP observers with special HVF training are used to cover the herring fishery. Maintaining SBRM observer service provider approval and certification would help ensure that the current level of HVF observer training and data quality requirements would continue under an industry-funded monitoring program. The process for vessel notification/selection and payment of industry cost responsibilities would be developed during the rulemaking and amendment approval process.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have a positive impact on protected species by increasing monitoring in the herring fishery. While the benefits to protected species may be difficult to quantify under Herring Alternative 2, they would likely not be realized under Herring Alternative 1.

Under Herring Alternative 2, long-term benefits to protected species could result from increased observer coverage, increased sampling, and a reduction in unobserved catch. As catch information improves, the uncertainty around catch and bycatch in the herring fishery may be reduced, potentially allowing for improved catch accounting of protected species.

The magnitude of positive impacts for protected species associated with additional catch information is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive impacts to protected species associated with additional catch monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

4.2.3.2.1 Impacts of Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers Issued)

Herring Alternative 2.1 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip. If an observer was not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on protected species by increasing monitoring in the herring fishery. While the benefits to protected species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1. The magnitude of positive impacts to protected species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5). Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. It is unlikely that the additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1 and 2.2 can be used for stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

Herring Alternative 2.1 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.3 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the harvest of protected species is reduced, there is the potential for a positive impact on protected species associated with Herring Alternatives 2.1 and 2.3. The positive impact would result from the increased reproductive potential of the individuals that are unharvested.

#### 4.2.3.2.2 Impacts of Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers Issued)

Herring Alternative 2.2 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip unless the at-sea observer requirement was waived by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on protected species by increasing monitoring in the herring fishery. While the benefits to protected species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.
The magnitude of positive impacts to protected species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).
Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. It is unlikely that the additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1 and 2.2 can be used for stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

Herring Alternative 2.2 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), observer coverage may be waived by NMFS. The ability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.4 but less restrictive than Herring Alternatives 2.1, 2.3, and 2.5 that do not allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer such that the harvest of protected species is reduced, there is the potential for a positive impact on protected species. The positive impact would result from the increased reproductive potential of the individuals that are unharvested. Because Herring Alternative 2.2 allows observer coverage to be waived, it is unlikely that observer availability will limit the harvest of protected species under Herring Alternative 2.2. Therefore, any positive impact to protected species under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.2.

#### 4.2.3.2.3 Impacts of Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers Issued)

Herring Alternative 2.3 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on protected species by increasing monitoring in the herring fishery. While the benefits to protected species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.
The magnitude of positive impacts to protected species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage

level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5). Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage. Herring Alternative 2.3 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the harvest of protected species is reduced, there is the potential for a positive impact on protected species associated with Herring Alternatives 2.1 and 2.3. The positive impact would result from the increased reproductive potential of the individuals that are unharvested.

#### 4.2.3.2.4 Impacts of Herring Alternative 2.4: Percent Coverage Target on the Midwater Trawl Fleet (Waivers)

Herring Alternative 2.4 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated

with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on protected species by increasing monitoring in the herring fishery. While the benefits to protected species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.
The magnitude of positive impacts to protected species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).
Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage. Herring Alternative 2.4 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), observer coverage may be waived by NMFS. The ability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.2 but less restrictive than Herring Alternatives 2.1, 2.3, and 2.5 that do not allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the harvest of protected species is reduced, there is the potential for a positive impact on protected species. The positive impact would result from the increased reproductive potential of the individuals that are unharvested. Because Herring Alternative 2.4 allows observer coverage to be waived, it is unlikely that observer availability will limit the harvest of protected species under Herring Alternative 2.4. Therefore, any positive impact to protected species under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.4.

#### 4.2.3.2.5 Impacts of Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas

Herring Alternative 2.5 would require vessels fishing with midwater trawl gear in the Groundfish Closed Areas (year around closed areas only) to carry an at-sea observer.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have a positive impact on protected species by increasing monitoring in the herring fishery. While the benefits to protected species may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1. The magnitude of positive impacts to protected species associated with additional catch information is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5). Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Specifying 100% coverage midwater trawl vessel fishing in Grounfish Closed Areas (Herring Alternatives 2.5) was recommended in Amendment 5. The New England Council believed it was important to determine the extent and nature of bycatch in the herring fishery. This alternative would still allow the herring midwater trawl fishery to operate in the Closed Areas, but it would ensure that opportunities for sampling are maximized.

Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Grounfish Closed Area must carry an observer. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.3 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such the harvest of protected species is reduced, there is the potential for a positive impact on protected species. Even though Herring Alternative 2.5 does not allow observer coverage to be waived for a trip inside the Groundfish Closed Areas, it is unlikely that observer availability would reduce fishing effort such that the harvest of protected species would be reduced. Therefore, any positive impact to protected species under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.5.

### Table 64. Impacts of Coverage Target Alternatives on Protected Species

| Alternatives | Impacts on Protected Species |
|---|---|
| Herring Alternative 1: No Coverage Target Specified For Industry-Funded Monitoring Programs (No Action) | • Negligible impact associated with observer coverage allocated by SBRM<br>• Negative impact associated with no additional monitoring to reduce uncertainty around catch and bycatch estimates |
| Herring Alternative 2: Coverage Target Specified For Industry-Funded Monitoring Programs | • Positive impact associated with additional monitoring to reduce uncertainty benefits around catch and bycatch estimates<br>• Negative impact associated with no additional monitoring unless available Federal funding can cover NMFS cost responsibilities<br>• Magnitude of impacts associated with additional monitoring would be dependent on the type of coverage and the amount of available Federal funding |
| Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers) | • Low positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by Category A and B vessels<br>• Low positive impact associated with additional information on catch in the herring fishery, but it may not be suitable for estimating total removals<br>• Positive impact if fishing effort is limited by observer availability |
| Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers) | • Low positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by Category A and B vessels<br>• Low positive impact associated with additional information on catch in the herring fishery, but it may not be suitable for estimating total removals |
| Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers) | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information on catch in the herring fishery to estimate total removals<br>• Positive impact if fishing effort is limited by observer availability |
| Herring Alternative 2.4: Percent Coverage Target on Midwater Trawl Fleet (Waivers) | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information on catch in the herring fishery to estimate total removals |
| Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Positive impact associated with additional information on catch in the herring fishery to estimate total removals<br>• Negligible impact associated with changes in fishing effort |

## 4.2.4 ATLANTIC HERRING ALTERNATIVE IMPACTS ON THE PHYSICAL ENVIRONMENT

### *4.2.4.1 Impacts of Herring Alternative 1: No Coverage Target Specified for Industry-Funded Monitoring Programs (No Action)*

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Observer coverage for herring vessels would be allocated according to SBRM. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for the herring fishery would be evaluated on a case-by-case basis.

Under SBRM, the herring fishery will receive at-sea observer coverage under the following 6 fleets: New England and Mid-Atlantic small mesh otter trawl; New England and Mid-Atlantic purse seine; and New England and Mid-Atlantic paired and single midwater trawl. The table below describes the sea days allocated for April 2014 through March 2015. The sea days listed below for small mesh otter trawl cover all FMPs that use this gear type, so only a portion would cover trips targeting herring. The purse seine and midwater trawl fleets are largely comprised of vessels targeting herring, so a majority of these sea days in these categories will be used to observe trips targeting herring.

**TABLE 65. THE PROPOSED OBSERVER SEA DAYS ALLOCATED FOR FISHING FLEETS THAT HARVEST HERRING FOR APRIL 2014 THROUGH MARCH 2015.**

| Fleet | Region | Sea Days allocated for April 2014 to March 2015 | Observed sea days, July 2012 to June 2013 | VTR sea days, July 2012 – June 2013 | Observed trips, July 2012 to June 2013 | VTR trips, July 2012 to June 2013 |
|---|---|---|---|---|---|---|
| Small Mesh Bottom Trawl | MA | 1,289 | 631 | 7,003 | 263 | 3,569 |
| Small Mesh Bottom Trawl | NE | 1,604 | 463 | 7,315 | 171 | 3,315 |
| Purse seine | MA | 12 | 0 | 447 | 0 | 441 |
| Purse seine | NE | 20 | 71 | 699 | 31 | 319 |
| Midwater Trawl (Pair and Single) | MA | 0 | 7 | 72 | 1 | 10 |
| Midwater Trawl (Pair and Single) | NE | 45 | 638 | 1,389 | 146 | 394 |

Source: NEFOP/GARFO Proposed Seaday Allocation for 2014; Wigley et al., 2014.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may increase monitoring in the herring fishery. The impact of the herring fishery on the physical environment is thought to be minimal and temporary. Therefore, the expected impact on the physical environment of increased monitoring in the herring fishery is expected to be negligible under Herring Alternatives 1 and 2.

Under Herring Alternative 2, the realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, the impact on the physical environment is expected to be negligible compared to Herring Alternative 1.

#### *4.2.4.2 Impacts of Herring Alternative 2: Coverage Target Specified for Industry-Funded Monitoring Programs*

Herring Alternative 2 would specify the details of an industry-funded monitoring program. Details may include, but are not limited to: (1) Level and type of coverage target, (2) rationale for level and type of coverage, (3) minimum level of coverage necessary to meet coverage goals, (4) consideration of coverage waivers if coverage target cannot be met, (5) process for vessel notification and selection, (6) process for payment of industry cost responsibilities, (7) standards for monitoring service providers, and (8) any other measures necessary to implement the industry-funded monitoring program.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may increase monitoring in the herring fishery. The impact of the herring fishery on the physical environment is thought to be minimal and temporary. Therefore, the expected impact on the physical environment of increased monitoring in the herring fishery is expected to be negligible under Herring Alternatives 1 and 2.

Under Herring Alternative 2, the realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, the impact on the physical environment is expected to be negligible compared to Herring Alternative 1.

Under Herring Alternative 2, the magnitude of positive and negative impacts on herring vessels associated with additional industry-funded monitoring is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

If fishing effort is limited under Herring Alternatives 2.1-2.5, there is the potential for a positive impact on the physical environment. However, the magnitude of any potential positive impact is low because the herring fishery has only minimal and temporary impacts on the environment. Vessels using midwater trawl gear may switch gear modes (to either purse seine or small mesh bottom trawl) to minimize economic impacts associated with observer coverage requirements for vessels using midwater trawl gear. However, changes to gear modes associated with Herring Alternatives 2.3-2.5 are not expected to affect the overall impact of the herring fishery on the physical environment. Therefore, impacts on the physical environment are expected to be similar under Herring Alternatives 1 and 2.

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive or negative impact to herring vessels associated with additional industry-funded monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

### Table 66. Impacts of Coverage Target Alternatives on Physical Environment

| Alternatives | Impacts on Physical Environment |
|---|---|
| Herring Alternative 1: No Coverage Target Specified For Industry-Funded Monitoring Programs (No Action) | Negligible impact associated with minimal and temporary effects on the environment from herring fishery |
| Herring Alternative 2: Coverage Target Specified For Industry-Funded Monitoring Programs | • Negligible impact associated with minimal and temporary effects on the environment from herring fishery<br>• Positive impact if fishing effort is limited by observer availability<br>• Negligible impact associated with switching from midwater trawl to another gear type (i.e., small mesh bottom trawl or purse seine) |

## 4.2.5 ATLANTIC HERRING ALTERNATIVE IMPACTS ON HUMAN COMMUNITIES

The economic analysis of the industry-funded monitoring herring coverage target alternatives compares industry cost responsibilities (approximately $800 per sea day) to average net revenues of vessels that fished in 2013. Net revenues are determined from gross revenue from the sale of fish minus the variable costs of fishing (i.e., trip costs) and crew pay. NEFOP data were used to calculate the average trip costs of vessels with Category A and B herring permits and the midwater trawl fleet. Components of trip costs include, fuel, oil, ice, food, water, supplies, and damage to gear, equipment, and the vessel. There may be additional trip costs incurred by these vessels but data on those costs are not collected by observers. Crew pay is assumed to equal one-half of gross revenue less trip costs. Revenue and other information about the vessel and trip were obtained from Northeast dealer and logbook data. Fixed costs, such as boat payments and insurance, are not included.

The population of trips and vessels that would be affected, if these industry-funded monitoring coverage targets were in place in 2013, is described at the fleet and vessel level. At the vessel level, average per trip revenue, average net revenues, and average net revenues reduced by observer costs are used to calculate percent reductions in net revenue associated with paying for an observer on a given trip. At the fleet level, total revenues, net revenues, net revenues reduced by observer costs, number of trips, number of days, and number of vessels are provided.

### Vessels with Category A and B Herring Permits

In 2013, there were 7 single midwater trawl vessels, 11 paired midwater trawl vessels, 5 purse seine vessels, and 7 small mesh bottom trawl vessels with Category A and B herring permits that took trips landing 1 lb or more of herring.

Had these vessels been required to carry observers on herring trips in 2013, their average net revenue per trip would have been reduced by 10.6%, 11.6%, 5.3%, and 18.5%, respectively. Observer costs per trip would have been approximately $2,400 for single midwater trawl vessels, approximately $2,500 for paired midwater trawl vessels, approximately $700 for purse seine vessels, and approximately $1,600 for small mesh bottom trawl vessels (Table 67. Herring Alternative 2.1 -- Per Trip Average Revenues and Net Revenues for Population of Trips (standard deviations in parentheses)(Table 67). If less than 100% coverage is required for Category A and B vessels, the fleet costs are lower (detailed below), but the costs on each trip would be the same as those described in this paragraph.

Assuming 100% observer coverage on Category A and B vessels in 2013, approximately $180,000 in observer costs would have been incurred by the single midwater trawl fleet, approximately $655,000 would have been incurred by the paired midwater trawl fleet, approximately $188,000 would have been incurred by the purse seine fleet, and approximately $156,000 would have been incurred by the small mesh bottom trawl fleet (Table 68).

Since this action also considers a 100% coverage target that allows for coverage to be waived on a specific trip, the reduction of net revenues due to observer costs are also analyzed for observer coverage rates of 75%, 50%, and 25%. The reduction in net revenues to the entire fleet from 75% of the days being observed (25% unobserved) is shown in Table 69 along with the impact from the 50% and 25% coverage rates.

### TABLE 67. HERRING ALTERNATIVE 2.1 -- PER TRIP AVERAGE REVENUES AND NET REVENUES FOR POPULATION OF TRIPS (STANDARD DEVIATIONS IN PARENTHESES)

| | Average Value all Species | Average Net Revenue | Average Net Revenue With Observer Costs | Percent Reduction in Net Revenue | Average Vessel Length |
|---|---|---|---|---|---|
| **A/B Single Midwater Trawl** | $59,411 | $22,252 | $19,887 | 10.6% | 128’ |
| | ($39,328) | ($21,050) | ($21,866) | | |
| **A/B Paired Midwater Trawl** | $54,938 | $21,164 | $18,710 | 11.6% | 122’ |
| | ($40,364) | ($20,182) | ($20,182) | | |
| **A/B Purse Seine** | $27,620 | $13,136 | $12,434 | 5.3% | 69’ |
| | ($16,714) | ($8,654) | ($8,983) | | |
| **A/B Small Mesh Bottom Trawl** | $21,236 | $8,608 | $7,016 | 18.5% | 104’ |
| | ($42,283) | ($18,236) | ($16,324) | | |

### Table 68. Herring Alternative 2.1 -- Fleet Level Revenues/Net Revenues for Population of Trips

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Number of Trips | Number of Days | Number of Vessels |
|---|---|---|---|---|---|---|
| **A/B Single Midwater Trawl** | $4,515,239 | $1,691,163 | $1,511,392 | 76 | 220 | 7 |
| **A/B Paired Midwater Trawl** | $14,668,363 | $5,650,880 | $4,995,662 | 267 | 801 | 11 |
| **A/B Purse Seine** | $7,402,107 | $3,520,319 | $3,332,226 | 268 | 230 | 5 |
| **A/B Small Mesh Bottom Trawl** | $2,081,125 | $843,536 | $687,587 | 98 | 191 | 7 |

### Table 69. Herring Alternatives 2.1 and 2.2 -- Fleet Level Percent Reductions in Total Net Revenue

| Vessels | Percent Reduction in Total Net Revenue with 100% Coverage | Percent Reduction in Total Net Revenue with 75% Coverage | Percent Reduction in Total Net Revenue with 50% Coverage | Percent Reduction in Total Net Revenue with 25% Coverage |
|---|---|---|---|---|
| **A/B Single Midwater Trawl** | 10.6% | 7.8% | 5.3% | 2.2% |
| **A/B Paired Midwater Trawl** | 11.6% | 8.6% | 5.8% | 2.8% |
| **A/B Purse Seine** | 5.3% | 4.0% | 2.6% | 1.4% |
| **A/B Small Mesh Bottom Trawl** | 18.5% | 14.1% | 9.3% | 4.7% |

### Midwater Trawl Fleet

In 2013, there were 11 New England midwater trawl vessels, 10 New England paired midwater trawl vessels, and 8 Mid-Atlantic paired midwater trawl vessels that took trips landing 1 lb or more of herring.

Had these vessels been required to carry observers on herring trips in 2013, their average net revenues per trip would have been reduced by 12.7%, 11.0%, and 16.7%, respectively. Observer costs per trip would have been approximately $1,300 for New England single midwater trawl vessels and approximately $2,500 for New England and Mid-Atlantic paired midwater trawl vessels (Table 70). If observer coverage is waived for a specific trip, the fleet costs are lower (detailed below), but the costs on each trip would be the same as those described in this paragraph.

Assuming a coverage level necessary to achieve a 30% CV on river herring and shad catch on the midwater trawl fleet in 2013, approximately $117,000 in observer costs would have been incurred by the New England single midwater trawl fleet, approximately $333,000 would have been incurred by the New England paired midwater trawl fleet, and approximately $51,500 by the Mid-Atlantic paired midwater trawl fleet (Table 72).

Since this action also considers a 30% CV coverage target that allows for coverage to be waived on a specific trip, the reduction of net revenues due to observer costs are also analyzed for observer coverage rates of 40% and 20%. The reduction in net revenues to the entire fleet from 40% of the days being observed (60% unobserved) is shown in Table 73 along with the impact from the maximum coverage rates and a 20% coverage rate.

**TABLE 70. MIDWATER TRAWL ALTERNATIVE 2.3 -- PER TRIP AVERAGE REVENUES AND NET REVENUES FOR POPULATION OF TRIPS (STANDARD DEVIATIONS IN PARENTHESES)**

| | Average Total Value all Species | Average Net Revenue | Average Net Revenue With Observer Costs | Percent Reduction in Net Revenue | Average Vessel Length |
|---|---|---|---|---|---|
| **New England Single Midwater Trawl** | $26,242 | $10,171 | $8,880 | 12.7% | 105’ |
| | ($36,710) | ($16,344) | ($16,156) | | |
| **New England Paired Midwater Trawl** | $57,148 | $22,270 | $19,816 | 11.0% | 119’ |
| | ($41,984) | ($20,992) | ($20,992) | | |
| **Mid-Atlantic Paired Midwater Trawl** | $42,004<br>($25,741) | $14,697<br>($12,870) | $12,243<br>($12,870) | 16.7% | 126’ |

### Table 71. Midwater Trawl Alternative 2.3 -- Fleet Level Revenues/Net Revenues for Population of Trips

| | Total Value all Species | Total Net Revenue | Number of Trips | Number of Days | Number of Vessels |
|---|---|---|---|---|---|
| **New England Single Midwater Trawl** | $4,775,961 | $3,702,175 | 182 | 287 | 11 |
| **New England Paired Midwater Trawl** | $13,372,659 | $5,211,077 | 234 | 702 | 10 |
| **Mid-Atlantic Paired Midwater Trawl** | $1,428,119 | $499,707 | 34 | 102 | 8 |

### Table 72. Midwater Trawl Alternative 2.3 -- Affected Fleet Level Revenues/Net Revenues for Maximum Coverage Rates. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses)

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **New England Single Midwater Trawl** (50.73% Coverage) | $2,392,257 | $929,842 | $812,907 | 143 |
| | ($247,488) | ($108,105) | ($106,257) | (12.3) |
| **New England Paired Midwater Trawl** (58.14% Coverage) | $7,780,381 | $3,032,778 | $2,699,034 | 408 |
| | ($315,463) | ($157,731) | ($157,731) | (0) |
| **Mid-Atlantic Paired Midwater Trawl** (60.5% Coverage) | $881,992 | $308,602 | $257,068 | 63 |
| | ($76,462) | ($38,231) | ($38,231) | (0) |

### Table 73. Midwater Trawl Alternatives 2.3 and 2.4 -- Fleet Level Percent Reductions in Total Net Revenue

| Vessels | Percent Reduction in Total Net Revenue with 30% CV Coverage* | Percent Reduction in Total Net Revenue with 40% Coverage | Percent Reduction in Total Net Revenue with 20% Coverage |
|---|---|---|---|
| **New England Single Midwater Trawl** | 6.8% | 4.9% | 2.4% |
| **New England Paired Midwater Trawl** | 6.3% | 4.2% | 2.2% |
| **Mid-Atlantic Paired Midwater Trawl** | 9.1% | 6.0% | 2.7% |

* Coverage equals: 50.73% for New England Single Midwater Trawl, 58.14% for New England Paired Midwater Trawl, and 60.5% for Mid-Atlantic Paired Midwater Trawl.

#### 4.2.5.1 *Impacts of Herring Alternative 1: No Coverage Target Specified for Industry-Funded Monitoring Programs (No Action)*

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Observer coverage for herring vessels would be allocated according to SBRM. If there was Federal funding available after SBRM coverage requirements were met, additional monitoring for the herring fishery would be evaluated on a case-by-case basis. Under Herring Alternative 1, additional costs to vessels participating in the herring associated with observer coverage, if there were any, would be evaluated on a case-by-case basis.

Under SBRM, the herring fishery will receive at-sea observer coverage under the following 6 fleets: New England and Mid-Atlantic small mesh bottom trawl; New England and Mid-Atlantic purse seine; and New England and Mid-Atlantic paired and single midwater trawl. The table below describes the sea days allocated for April 2014 through March 2015. The sea days listed below for small mesh bottom trawl cover all FMPs that use this gear type, so only a portion would cover trips targeting herring. The purse seine and midwater trawl fleets are largely comprised of vessels targeting herring, so a majority of these sea days in these categories will be used to observe trips targeting herring.

**TABLE 74. THE PROPOSED OBSERVER SEA DAYS ALLOCATED FOR FISHING FLEETS THAT HARVEST HERRING FOR APRIL 2014 THROUGH MARCH 2015.**

| Fleet | Region | Sea Days allocated for April 2014 to March 2015 | Observed sea days, July 2012 to June 2013 | VTR sea days, July 2012 – June 2013 | Observed trips, July 2012 to June 2013 | VTR trips, July 2012 to June 2013 |
|---|---|---|---|---|---|---|
| Small Mesh Bottom Trawl | MA | 1,289 | 631 | 7,003 | 263 | 3,569 |
| Small Mesh Bottom Trawl | NE | 1,604 | 463 | 7,315 | 171 | 3,315 |
| Purse seine | MA | 12 | 0 | 447 | 0 | 441 |
| Purse seine | NE | 20 | 71 | 699 | 31 | 319 |
| Midwater Trawl (Pair and Single) | MA | 0 | 7 | 72 | 1 | 10 |
| Midwater Trawl (Pair and Single) | NE | 45 | 638 | 1,389 | 146 | 394 |

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have both a positive and negative impact on vessels participating in the herring fishery.

Positive impacts on herring vessels may result from increased monitoring in the herring fishery reducing uncertainty around catch and bycatch estimates leading to additional harvesting opportunities. Negative impacts on herring vessels would likely result from reduced net revenues associated with paying for an observer. If the higher observer coverage leads to information that is used to further restrict the fishery then that could also be a negative impact, but this outcome is not expected. While the full extent of positive and negative impacts to herring vessels may be difficult to quantify under Herring Alternative 2, they would likely not be realized under Herring Alternative 1.

Under Herring Alternative 2, the magnitude of positive and negative impacts on herring vessels associated with additional industry-funded monitoring is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive or negative impact to herring vessels associated with additional industry-funded monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

#### *4.2.5.2 Impacts of Herring Alternative 2: Coverage Target Specified for Industry-Funded Monitoring Programs*

Herring Alternative 2 would specify the details of an industry-funded monitoring program. Details may include, but are not limited to: (1) Level and type of coverage target, (2) rationale for level and type of coverage, (3) minimum level of coverage necessary to meet coverage goals, (4) consideration of coverage waivers if coverage target cannot be met, (5) process for vessel notification and selection, (6) process for payment of industry cost responsibilities, (7) standards for monitoring service providers, and (8) any other measures necessary to implement the industry-funded monitoring program.

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. Depending on the results and desired actions, subsequent action to adjust the coverage targets could be accomplished via specifications, a framework adjustment, or an amendment to the Herring FMP, as appropriate.

Under Herring Alternative 2, the process for SBRM observer service provider approval and certification would be adopted for industry-funded observer and dockside service providers for the Herring FMP. As described previously, only NEFOP observers with special HVF training are used to cover the herring fishery. Maintaining SBRM observer service provider approval and certification would help ensure that the current level of High Volume Fisheries (HVF) observer training and data quality requirements would continue under an industry-funded monitoring program. The process for vessel notification/selection and payment of industry cost responsibilities would be developed during the rulemaking and amendment approval process.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternative 2 may have both a positive and negative impact on vessels participating in the herring fishery.

Positive impacts on herring vessels may result from increased monitoring in the herring fishery reducing uncertainty around catch and bycatch estimates leading to additional harvesting opportunities. Negative impacts on herring vessels would likely result from reduced net revenues associated with paying for an observer. If the higher observer coverage leads to information that is used to further restrict the fishery then that could also be a negative impact, but this outcome is not expected. While the full extent of positive and negative impacts to herring vessels may be difficult to quantify under Herring Alternative 2, they would likely not be realized under Herring Alternative 1.

Under Herring Alternative 2, the magnitude of positive and negative impacts on herring vessels associated with additional industry-funded monitoring is expected to vary with the type of coverage target specified and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternative 2 would specify that coverage targets are effective for 2 years, this amendment gives the New England Council the choice to (1) require that coverage targets expire or (2) examine the results of any higher coverage in herring fishery and consider if adjustments to the coverage targets are warranted. If increased monitoring associated with Herring Alternative 2 expires after 2 years or coverage targets are reduced, any positive or negative impact to herring vessels associated with additional industry-funded monitoring may be reduced and/or similar to impacts under Herring Alternative 1.

#### 4.2.5.2.1 Impacts of Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers Issued)

Herring Alternative 2.1 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip. If an observer was not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-2.5 may have positive and negative impacts on herring vessels. While the positive and negative impacts may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of impacts to herring vessels associated with industry-funded monitoring is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1 and 2.2 can be used for monitoring catch against quotas and catch caps but it is unlikely that those data will be used for stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

Under Herring Alternatives 2.1 and 2.2, the average net revenue per trip would have been reduced by 10.6% (for single midwater trawl vessels), 11.6% (for paired midwater trawl), 5.3% (for purse seine vessels), and 18.5% (for small mesh bottom trawl vessels) based on 2013 revenues and estimated observer costs. When compared to the other coverage target alternatives, the potential reduction in average net revenues per trip is highest under Herring Alternatives 2.1 and 2.2.

Herring Alternative 2.1 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.3 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield is not harvested, there is the potential for an additional negative economic impact on herring vessels associated with a reduced herring harvest under Herring Alternatives 2.1 and 2.3. Without waivers, potentially most of the herring quota could remain uncaught. In 2013, herring landings generated approximately $30 million in revenue.

#### 4.2.5.2.2 Impacts of Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers Issued)

Herring Alternative 2.2 would require vessels with Category A and B herring permits to carry an at-sea observer on every declared herring trip unless the at-sea observer requirement was waived by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have positive and negative impacts on herring vessels. While the positive and negative impacts may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of impacts to herring vessels associated with industry-funded monitoring is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1 and 2.2 can be used for monitoring catch against quotas and catch caps but it is unlikely that those data will be used for stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.1 and 2.2 is higher than coverage levels specified under Herring Alternatives 2.3 and 2.4 and equal to the coverage level specified under Herring Alternative 2.5. Specifying 100% coverage on vessels with Category A and B herring permits (Herring Alternatives 2.1 and 2.2) was recommended in Amendment 5 and was driven by a majority of stakeholders. Those stakeholders, as well as some members of the herring industry, believed that 100% observer coverage was necessary for those vessels that catch the majority of the herring harvest to either confirm or disprove the claims that have been made by many regarding unaccounted for bycatch in the herring fishery.

Under Herring Alternatives 2.1 and 2.2, the average net revenue per trip would have been reduced by 10.6% (for single midwater trawl vessels), 11.6% (for paired midwater trawl), 5.3% (for purse seine vessels), and 18.5% (for small mesh bottom trawl vessels) based on 2013 revenues and estimated observer costs. When compared to the other coverage target alternatives, the potential reduction in average net revenues per trip is highest under Herring Alternatives 2.1 and 2.2.

Herring Alternative 2.2 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), observer coverage may be waived by NMFS. The ability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.4 but less restrictive than Herring Alternatives 2.1, 2.3, and 2.5 that do not allow observer coverage to be waived for a specific trip. The ability to waiver observer coverage makes it less likely that fishing effort may be limited by observer availability such that the herring optimum yield is not harvested. Therefore, it is less likely that Herring Alternatives 2.2 and 2.4 would result in a reduced herring harvest than Herring Alternatives 2.1 and 2.3.

Waiving the requirement for a vessel with a Category A and B permit to carry an observer on a specific trip will likely result in less coverage than the specified coverage target. Having less coverage in the herring fishery may reduce the positive impacts associated with additional monitoring on herring vessels but it is also expected to reduce the negative impacts associated with paying for an observer. The impacts associated with the ability to waive observer coverage are possible under Herring Alternatives 2.2 and 2.3, but are less likely to be realized under Herring Alternatives 2.1, 2.4, and 2.5.

#### 4.2.5.2.3 Impacts of Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers Issued)

Herring Alternative 2.3 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have positive and negative impacts on herring vessels. While the positive and negative impacts may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of impacts to herring vessels associated with industry-funded monitoring is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for monitoring catch against quotas and catch caps as well as stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-

Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage.

Under Herring Alternatives 2.3 and 2.4, the average net revenue per trip would have been reduced by 12.7% for New England singe midwater trawl vessels, 11.0% for New England paired midwater trawl vessels, and 16.7% for Mid-Atlantic paired midwater trawl vessels based on 2013 revenues and estimated observer costs. When compared to the other coverage target alternatives, the potential reduction in average net revenues per trip under Herring Alternatives 2.3 and 2.4 is less than under Herring Alternatives 2.1 and 2.2.

Herring Alternative 2.3 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), that vessel would be prohibited from participating in the herring fishery on that trip. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.5 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield is not harvested, there is the potential for an additional negative economic impact on herring vessels associated with a reduced herring harvest under Herring Alternatives 2.1 and 2.3. Without waivers, potentially much of the herring quota could remain uncaught. In 2013, herring landings generated approximately $30 million in revenue and midwater trawl vessels generated approximately half of that revenue.

#### 4.2.5.2.4 Impacts of Herring Alternative 2.4: Percent Coverage Target on the Midwater Trawl Fleet (Waivers)

Herring Alternative 2.4 would require midwater trawl vessels to carry an at-sea observer on every herring trip selected by NMFS.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have positive and negative impacts on herring vessels. While the positive and negative impacts may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of impacts to herring vessels associated with industry-funded monitoring is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for monitoring catch against quotas and catch caps as well as stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Trips would be selected by NMFS to achieve a 30% CV on RH/S catch by the midwater trawl fleet. The percent coverage would fluctuate each year to for the midwater trawl fleet (both Mid-Atlantic and New England paired and single midwater trawl) to meet at 30% CV. Based on 2013, the percent coverage to achieve a 30% CV would have been up to 61% coverage.

Under Herring Alternatives 2.3 and 2.4, the average net revenue per trip would have been reduced by 12.7% for New England singe midwater trawl vessels, 11.0% for New England paired midwater trawl vessels, and 16.7% for Mid-Atlantic paired midwater trawl vessels based on 2013 revenues and estimated observer costs. When compared to the other coverage target alternatives, the potential reduction in average net revenues per trip under Herring Alternatives 2.3 and 2.4 is less than under Herring Alternatives 2.1 and 2.2.

Herring Alternative 2.4 specifies that if an observer is not available to cover a specific herring trip (either due to logistics or a lack of funding), observer coverage may be waived by NMFS. The ability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.2 but less restrictive than Herring Alternatives 2.1, 2.3, and 2.5 that do not allow observer coverage to be waived for a specific trip. The ability to waiver observer coverage makes it less likely that fishing effort may be limited by observer availability such that the herring optimum yield is not harvested. Therefore, it is less likely that Herring Alternatives 2.2 and 2.4 would result in a reduced herring harvest than Herring Alternatives 2.1 and 2.3.

Waiving the requirement for a midwater trawl vessel to carry an observer on a specific trip will likely result in less coverage than the specified coverage target. Having less coverage in the herring fishery may reduce the positive impacts associated with additional monitoring on herring vessels but it is also expected to reduce the negative impacts associated with paying for an observer. The impacts associated with the ability to waive observer coverage are possible under Herring Alternatives 2.2 and 2.3, but are less likely to be realized under Herring Alternatives 2.1, 2.4, and 2.5.

#### 4.2.5.2.5 Impacts of Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas

Herring Alternative 2.5 would require vessels fishing with midwater trawl gear in the Groundfish Closed Areas (year around closed areas only) to carry an at-sea observer.

Herring Alternatives 2.1-2.5 are intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM, for industry-funded monitoring. If Federal funding is available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, Herring Alternatives 2.2-25 may have positive and negative impacts on herring vessels. While the positive and negative impacts may be difficult to quantify under Herring Alternatives 2.1-2.5, they would likely not be realized under Herring Alternative 1.

The magnitude of impacts to herring vessels associated with industry-funded monitoring is expected to vary with the type of coverage target specified (Herring Alternatives 2.1-2.5) and the realized coverage level in a given year. The realized coverage level in a given year would be largely driven by the amount of funding available to cover NMFS cost responsibilities in a given year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.5).

Herring Alternatives 2.1-2.5 differ by (1) how coverage is allocated, (2) the specified amount of coverage, and (3) whether or not waivers are issued if an observer is not available (either due to logistics or a lack of funding).

Herring Alternatives 2.1 and 2.2 would allocate observer coverage by vessel permit category while Herring Alternatives 2.3-2.5 would allocate observer coverage by fishing fleet. The extent to which coverage is allocated consistent with SBRM fishing fleet will determine how the resulting data can be used. Unless vessel permit category is equivalent to fishing fleet, the resulting information from Herring Alternatives 2.1 and 2.2 will have limited utility when compared to Herring Alternatives 2.3-2.5. Because Herring Alternatives 2.3-2.5 allocate observer coverage by fishing fleet, the additional information on catch and bycatch estimates in herring fishery can likely be used for monitoring catch against quotas and catch caps as well as stock assessments and estimating total removals.

The specified amount of coverage under Herring Alternatives 2.3 and 2.4 is lower than coverage levels specified under Herring Alternatives 2.1, 2.2, and 2.5. Specifying 100% coverage midwater trawl vessel fishing in Grounfish Closed Areas (Herring Alternatives 2.5) was recommended in Amendment 5. The New England Council believed it was important to determine the extent and nature of bycatch in the herring fishery. This alternative would still allow the herring midwater trawl fishery to operate in the Groundfish Closed Areas, but it would ensure that opportunities for sampling are maximized.

In 2014, midwater trawl vessels made 18 trips into Groundfish Closed Areas. Fishing on these trips occurred either in part or in total inside the Ground Closed Areas and the trips averaged 3 days in length.

The average total revenue generated from these 18 trips was approximately $80,000 and was primarily from herring revenue (over 95%). If midwater trawl vessels were required to pay for an observer on these 18 trips, the average net revenue would likely be reduced, similar to revenue reductions shown in Table 70 that ranged from 11% to 16.7%.

However, if a midwater trawl vessel chose not to fish in a Groundfish Closed Area and was not otherwise required to pay for an observer, its net revenues may not be reduced. However, a vessel's gross revenue may be reduced because, presumably, fishing in the Groundfish Closed Areas provides additional revenue generating opportunities that may not be available outside the Groundfish Closed Areas.

Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Groundfish Closed Area must carry an observer. The inability to waive observer coverage on a specific trip is consistent with requirements in Herring Alternative 2.1 and 2.3 but more restrictive than Herring Alternatives 2.2 and 2.4 that allow observer coverage to be waived for a specific trip. If fishing effort is limited by observer availability such that the herring optimum yield is not harvested, there is the potential for an additional negative economic impact on herring vessels associated with a reduced herring harvest under Herring Alternatives 2.1 and 2.3. Even though Herring Alternative 2.5 does not allow observer coverage to be waived for a trip inside the Groundfish Closed Areas, it is unlikely that observer availability would reduce fishing effort such that the herring optimum yield would not be harvested. Therefore, any potential for an additional negative economic impact on herring vessels associated with a reduced herring harvest under Herring Alternatives 2.1 and 2.3 would likely not be realized under Herring Alternative 2.5.

### TABLE 75. IMPACTS OF COVERAGE TARGET ALTERNATIVES ON FISHERY-RELATED BUSINESS

| Alternatives | Impacts on Fishery-Related Business |
|---|---|
| Herring Alternative 1: No Coverage Target Specified For Industry-Funded Monitoring Programs (No Action) | • Negligible impact associated with observer coverage allocated by SBRM<br>• Negative impact associated with no additional monitoring to reduce uncertainty around catch and bycatch estimates |
| Herring Alternative 2: Coverage Target Specified For Industry-Funded Monitoring Programs | • Positive impact associated with additional monitoring to reduce uncertainty around catch and bycatch estimates<br>• Negative impact associated with no additional monitoring unless available Federal funding can cover NMFS cost responsibilities<br>• Magnitude of impacts associated with additional monitoring would be dependent on the type of coverage and the amount of available Federal funding |
| Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers) | • Low positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by Category A and B vessels<br>• Negative impact if fishing effort is limited by observer availability and herring OY cannot be harvested<br>• Negative impact associated with up to 18.5% reduction in net revenues |
| Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers) | • Low positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by Category A and B vessels<br>• Negative impact associated with up to 18.5% reduction in net revenues |
| Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers) | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Negative impact if fishing effort is limited by observer availability and herring OY cannot be harvested<br>• Negative impact associated with up to 16.7% reduction in net revenues |

| | |
|---|---|
| Herring Alternative 2.4: Percent Coverage Target on Midwater Trawl Fleet (Waivers) | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Negative impact associated with up to 16.7% reduction in net revenues |
| Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas | • Positive impact associated with additional information to reduce uncertainty around catch/bycatch harvested by midwater trawl fleet<br>• Negative impact of a reduction in revenue with observer coverage requirement in Groundfish Closed Areas<br>• Negligible impact on revenue associated with changes in fishing effort |

## 4.2.6 SUMMARY OF IMPACTS OF ATLANTIC HERRING ALTERNATIVES

### TABLE 76. PRELIMINARY CONSIDERATION OF OVERALL IMPACTS ASSOCIATED WITH HERRING COVERAGE TARGET ALTERNATIVES

| Alternatives | Herring Resource | Non-Target Species | Protected Species | Physical Environment | Human Communities |
|---|---|---|---|---|---|
| Herring Alternative 1: No Coverage Target Specified For Industry-Funded Monitoring Programs (No Action) | Negligible to Negative | Negligible to Negative | Negligible to Negative | Negligible | Negligible to Negative |
| Herring Alternative 2: Coverage Target Specified For Industry-Funded Monitoring Programs | Negative to Positive | Negative to Positive | Negative to Positive | Negligible to Positive | Negative to Positive |
| Herring Alternative 2.1: 100% Coverage Target on Herring Category A and B Vessels (No Waivers) | Low Positive | Low Positive to Positive | Low Positive to Positive | Negligible to Positive | Negative to Low Positive |
| Herring Alternative 2.2: 100% Coverage Target on Herring Category A and B Vessels (Waivers) | Low Positive | Low Positive to Positive | Low Positive | Negligible | Negative to Low Positive |
| Herring Alternative 2.3: Percent Coverage Target on Midwater Trawl Fleet (No Waivers) | Positive | Positive | Positive | Negligible to Positive | Negative to Positive |
| Herring Alternative 2.4: Percent Coverage Target on Midwater Trawl Fleet (Waivers) | Positive | Positive | Positive | Negligible | Negative to Positive |
| Herring Alternative 2.5: 100% Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas | Negligible to Positive | Negligible to Positive | Negligible to Positive | Negligible | Negative to Positive |

## 4.3 ATLANTIC MACKEREL ALTERNATIVE IMPACTS

### 4.3.1 ATLANTIC MACKEREL ALTERNATIVE IMPACTS ON TARGET SPECIES

### 4.3.2 ATLANTIC MACKEREL ALTERNATIVE IMPACTS ON NON-TARGET SPECIES

### 4.3.3 ATLANTIC MACKEREL ALTERNATIVE IMPACTS ON PROTECTED RESOURCES

### 4.3.4 ATLANTIC MACKEREL ALTERNATIVE IMPACTS ON THE PHYSICAL ENVIRONMENT

### 4.3.5 ATLANTIC MACKEREL ALTERNATIVE IMPACTS ON HUMAN COMMUNITIES

# 5.0 CUMULATIVE EFFECTS ANALYSIS

[Not developed until complete draft]

## 5.1 TARGET SPECIES

[Not developed until complete draft]

## 5.2 NON-TARGET AND BYCATCH SPECIES

[Not developed until complete draft]

## 5.3 PHYSICAL ENVIRONMENT AND EFH

[Not developed until complete draft]

## 5.4 ENDANGERED AND PROTECTED SPECIES

[Not developed until complete draft]

## 5.5 HUMAN COMMUNITIES

[Not developed until complete draft]

## 5.6 NON-FISHING ACTIVITIES

[Not developed until complete draft]

# 6.0 OTHER APPLICABLE LAWS

## 6.1 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

[Not developed until complete draft]

## 6.2 NATIONAL ENVIRONMENTAL POLICY ACT

[Not developed until complete draft]

### 6.2.1 FINDING OF NO SIGNIFICANT IMPACT

[Not developed until complete draft]

## 6.3 MARINE MAMMAL PROTECTION ACT

The impacts of the preferred alternatives on protected species are considered in sections 4.1.1, 4.2.3, and 4.3.3, and, based on the procedural nature of the action, the Councils have concluded preliminarily that there would be no direct or indirect impacts on marine mammals, that the preferred alternatives appear consistent with the provisions of the MMPA, and that the preferred alternatives would not alter existing measures to protect the species likely to inhabit the management units of the subject fisheries.

## 6.4 ENDANGERED SPECIES ACT

Section 7 of the ESA 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. The impacts of the proposed alternatives on protected species are considered in chapter 5, section 5.4, and, based on the procedural nature of the action, the Councils have determined preliminarily that there would be no direct or indirect impacts on protected resources, including endangered or threatened species or their habitat.

## 6.5 PAPERWORK REDUCTION ACT

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 preferred alternatives currently associated with this action do not propose to modify any existing collections, or to add any new collections; therefore, no review under the PRA is necessary.

## 6.6 INFORMATION QUALITY ACT

[Not developed until complete draft]

## 6.7 IMPACTS OF FEDERALISM/EXECTIVE ORDER 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. However, no federalism issues or implications have been identified relative to the measures under consideration in the Industry-funded Monitoring Omnibus Amendment. 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 Councils (all affected states are represented as voting members of at least one Regional

Fishery Management Council). Thus far, no comments were received from any state officials relative to any federalism implications that may be associated with this action.

## 6.8 ADMINISTRATIVE PROCEDURES ACT

Section 553 of the APA 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 Councils are not requesting any abridgement of the rulemaking process for this action.

## 6.9 COASTAL ZONE MANAGEMENT ACT

[Not developed until complete draft]

## 6.10 REGULATORY FLEXIBILITY ACT/EXECUTIVE ORDER 12866

[Not developed until complete draft]

### 6.10.1 Regulatory Impact Review and Initial Regulatory Flexibility Analysis

### 6.10.2 Description of Management Objectives

### 6.10.3 Description of the Fishery

### 6.10.4 Statement of the Problem

### 6.10.5 Description of the Alternatives

### 6.10.6 Economic Analysis

### 6.10.7 Determination of Significance Under E.O. 12866

### 6.10.8 Initial Regulatory Flexibility Analysis

#### *6.10.8.1 Reasons for Considering the Action*

#### *6.10.8.2 Objectives and Legal Basis for the Action*

#### *6.10.8.3 Description and Number of Small Entities to Which the Rule Applies*

#### *6.10.8.4 Recordkeeping and Reporting Requirements*

#### *6.10.8.5 Duplication, Overlap, or Conflict with Other Federal Rules*

#### *6.10.8.6 Economic Impacts on Small Entities Resulting from the Proposed Action*

# 7.0 LITERATURE CITED

[Not developed until complete draft]

# 8.0 LIST OF PREPARERS

[Not developed until complete draft]

# 9.0 AGENCIES CONSULTED

[Not developed until complete draft]

# 10.0 GLOSSARY OF TERMS

**Accuracy.** The closeness of a measured or estimated value (e.g., population parameter) to its true value. Accuracy should not be confused with precision, which relates to the variability of the measured or estimated value (i.e., the closeness of repeated measurements of the same quantity).

**Allocation.** The practice of apportioning resources among various entities. Under the SBRM, allocation often regards the assignment of observer effort across the various sampling strata; i.e., geographical region (by port of departure), fishing modes (gear type and mesh size), access area, and trip category.

**Bias.** A systematic difference between the expected value of a statistical estimate and the quantity it estimates. Absent bias, precision will lead to accuracy; thus, bias and accuracy are used interchangeably, but bias is generally associated with the design of sampling program. Eliminating potential sources of bias improves the accuracy of the results.

**Biomass (B**). (1) The total weight of a group (or stock) of living organisms (e.g., fish, plankton) or of some defined fraction of it (e.g., spawners) in an area, at a particular time. (2) Measure of the quantity, usually by weight in pounds or metric tons (2,205 lb or 1 metric ton), of a stock at a given time.

**Bycatch.** According to the Magnuson-Stevens Act, bycatch includes all fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Fish released alive under a recreational catch and release fishery management program are not considered bycatch. The words bycatch and discard are used interchangeably in SBRM documents.

**Catch.** (1) To undertake any activity that results in taking fish out of its environment dead or alive. To bring fish on board a vessel dead or alive. (2) The total number (or weight) of fish caught by fishing operations, including retained catch (landings) and discarded catch (bycatch). (3) The component of fish encountering fishing gear that is retained by the gear.

**Coefficient of variation (CV**). A standard measure of precision, calculated as the ratio of the square root of the variance of the bycatch estimate (i.e., the standard error) to the bycatch estimate itself. The higher the CV, the larger the standard error is relative to the estimate. A lower CV reflects a smaller standard error relative to the estimate. A 0-percent CV means there is no variance in the sampling distribution. Alternatively, CVs of 100 percent or higher indicate that there is considerable variance in the estimate.

**Discard.** To release or return fish to the sea, dead or alive, whether or not such fish are brought fully on board a fishing vessel. Fish (or parts of fish) can be discarded for a variety of reasons such as having physical damage, being a non-target species for the trip, and compliance with management regulations such as minimum size limits or quotas. The terms discard and bycatch are used interchangeably in SBRM documents.

**Effort.** The amount of time and fishing power used to harvest fish; includes gear size, boat size, and horsepower.

**Environmental assessment (EA).** As part of the National Environmental Policy Act (NEPA) process, an EA is a concise public document that provides evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI).

**Finding of no significant impact (FONSI).** As part of the National Environment Policy Act (NEPA) process, a FONSI is a document that explains why an action that is not otherwise excluded from the NEPA process, and for which an environmental impact statement (EIS) will not be prepared, will not have a significant effect on the human environment.

**Fish.** Means finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds.

**Fishing mode.** A way of grouping fishing activities according to the fishing gears used, port of departure, mesh size, and, in some cases, regulatory fishing program, rather than by FMP or species of fish landed. There are 56 fishing modes defined in the Greater Atlantic Region for the purpose of the SBRM Omnibus Amendment.

**Fishing vessel trip report (FVTR)** or **Logbook.** A detailed, usually official, record of a vessel's fishing activity registered systematically onboard the fishing vessel, usually including information on catch and its species composition, the corresponding fishing effort, and location. Some form of trip report must be completed and submitted by every holder of a Federal fishing permit in the Greater Atlantic Region, except those who hold a Federal permit only for lobster.

**Marine Recreational Fisheries Statistical Survey (MRFSS).** An annual national survey conducted by NMFS, in cooperation with the coastal states, to estimate the number, catch, and effort of recreational fishermen. MRFSS was phased out and replaced by MRIP in 2011.

**Marine Recreational Information Program (MRIP).** An annual national survey conducted by NMFS, in cooperation with the coastal states, along with the supporting statistical methods, that are used to estimate the number, catch, and effort of recreational fishermen.

**National Standard 9.** A provision in the Magnuson-Stevens Act that requires that "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." NMFS has defined the term "to the extent practicable" to include a consideration of the effects of reducing bycatch and bycatch mortality on the overall benefit to the Nation.

**Observer.** At-sea fishery observers are generally biologists trained to collect information on board fishing vessels. They may be deployed for various reasons including monitoring interactions with protected species, measuring catch composition and disposition (including discards), validating or adjusting self-reported data, tracking in-season quotas (including bycatch quotas), or a variety of other reasons. The regional observer program is administered by the Northeast Fisheries Science Center.

**Precision.** The degree of agreement of repeated measurements of the same quantity or object.

**Sampling design.** The sampling design of a scientific survey refers to the statistical techniques and methods adopted for selecting a sample and obtaining estimates of the survey variables from the selected sample.

**Standardized bycatch reporting methodology (SBRM).** The combination of sampling design, data collection procedures, and analyses used to estimate bycatch in fisheries. An SBRM is required to be implemented for each fishery under section 303(a)(11) of the Magnuson-Stevens Act.

**Stock assessment.** The process of collecting and analyzing biological and statistical information to determine the changes in the abundance of fishery stocks in response to fishing, and, to the extent possible, to predict future trends of stock abundance. Stock assessments are based on resource surveys; knowledge of the habitat requirements, life history, and behavior of the species; the use of environmental indices to determine impacts on stocks; and catch statistics. Stock assessments are used as a basis to assess and specify the present and probable future condition of a fishery.

**Stock Assessment and Fishery Evaluation (SAFE) report.** A report that provides a summary of the most recent biological condition of a stock of fish and the economic and social condition of the recreational fishermen, commercial fishermen, and seafood processors who use the fish. The report provides information to the fishery management councils for determining harvest levels.

**Total allowable catch (TAC).** The annual recommended or specified regulated catch for a species or species group. The regional fishery management council sets the TAC from the range of acceptable biological catch (ABC).

# Appendixes

# Appendix A

### Text from Greater Atlantic Region disapprovals regarding industry-funded monitoring

**Excerpt from the Final Rule for Framework Adjustment 48 to the Northeast Multispecies FMP (78 FR 26118; May 3, 2013)**

2. At-Sea Monitoring Cost-Sharing

To serve as a more long-term solution to the cost burden of at-sea monitoring to sectors, Framework 48 proposed a mechanism for sharing of at-sea monitoring costs between sectors and NMFS. Framework 48 proposed that the industry would only ever be responsible for paying the direct costs of at-sea monitoring, specifically the daily salary of the at-sea monitor. All other programmatic costs would be the responsibility of NMFS, including, but not limited to: Briefing, debriefing, training and certification costs (salary and non-salary); sampling design development; data storage, management and security; data quality assurance and control; administrative costs; maintenance of monitoring equipment; at-sea monitor recruitment, benefits, insurance and taxes; logistical costs associated with deployment; and at-sea monitor travel and lodging. This measure was intended to reduce the cost burden of at-sea monitoring to sectors and thereby increase their profitability.

NMFS has disapproved this cost-sharing measure because it is not consistent with other applicable laws as developed. Specifically, the Anti-Deficiency Act and other appropriations law prohibits Federal agencies from obligating the Federal government except through appropriations and from sharing the payment of government obligations with private entities. Framework 48 proposed to require NMFS to pay for some portion of the costs of at-sea activities, such as logistical costs generated by deployment, which are outside its statutory obligations under the Magnuson-Stevens Act. As written, this measure would also have required NMFS and sectors to share payment of obligations defined as belonging to one or the other. For example, Framework 48 proposed to require NMFS to pay some costs related to at-sea activities, such as benefits and insurance for at-sea monitors, while sectors would pay other portions of at-sea costs, like the salary for at-sea monitors. Because such action would be prohibited under the law, NMFS has disapproved this measure in Framework 48.

Although this measure was not approvable as developed, NMFS shares the Council and industry's concern about the ability of sectors to bear the full costs of monitoring in future fishing years. NMFS believes this approach to cost sharing, which defines the items that NMFS versus sectors should be responsible for, could be viable if restructured and may be worth pursuing in a future action. NMFS is already working with the New England and Mid-Atlantic Councils' joint Herring/Mackerel Plan Development Team (PDT)/Fishery Management Action Team (FMAT) to pursue cost-sharing options such as this one for those fisheries for FY 2014. The Council could consider including the NE Multispecies FMP in this joint effort to develop a workable and consistent cost-sharing mechanism for the Northeast region.

**Excerpt from the Final Rule for Amendment 5 to the Atlantic Herring FMP**

1. Increased Observer Coverage Requirements

As described previously, the NEFSC determines observer coverage levels in the herring fishery based on the SBRM. Observer coverage in the herring fishery is currently fully funded by NMFS. Amendment 5 proposed increasing observer coverage in the herring fishery by requiring 100-percent observer coverage on Category A and B vessels. Many stakeholders believe this measure is necessary to accurately determine the extent of bycatch and incidental catch in the herring fishery. The Council recommended this measure to gather more information on the herring fishery so that it may better evaluate and, if necessary, implement additional measures to address issues involving catch and discards. The 100-percent observer requirement is coupled with a target maximum industry contribution of $325 per day. There are two types of costs associated with observer coverage: (1) Observer monitoring costs, such as observer salary and travel costs, and (2) NMFS support and infrastructure costs, such as observer training and data processing. The monitoring costs associated with an observer in the herring fishery are higher than $325 per day. Cost-sharing of monitoring costs between NMFS and the industry would violate the Anti-Deficiency Act. Therefore, there is no current legal mechanism to allow cost-sharing of monitoring costs between NMFS and the industry.

Throughout the development of Amendment 5, NMFS advised the Council that Amendment 5 must identify a funding source for increased observer coverage because NMFS's annual appropriations for observer coverage are not guaranteed. Some commenters claim that the $325 per day industry contribution was not a limit, but a target, and that the Council intended the industry to pay whatever was necessary to ensure 100-percent observer coverage. NMFS disagrees, and does not believe the amendment specifies that the industry would pay all the monitoring costs associated with 100-percent observer coverage, nor does it analyze the economic impacts of the industry paying all the monitoring costs. The FEIS for Amendment 5 analyzed alternatives with the industry paying $325 per day or $1,200 per day (estimated sum of observer monitoring costs and NMFS support and infrastructure costs), but it did not analyze a range of alternatives that would approximate total monitoring costs. Budget uncertainties prevent NMFS from being able to commit to paying for increased observer coverage in the herring fishery. Requiring NMFS to pay for 100-percent observer coverage would amount to an unfunded mandate. Because Amendment 5 did not identify a funding source to cover the costs of increased observer coverage, the measure is not sufficiently developed to approve at this time. Therefore, NMFS had to disapprove the 100-percent observer coverage requirement. With the disapproval of this measure, this action maintains the existing SBRM observer coverage levels and Federal observer funding for the herring fishery.

Recognizing funding challenges, Amendment 5 specified status quo observer coverage levels and funding for up to 1 year following the implementation of Amendment 5, with the 100-percent observer coverage and partial industry funding requirement to become effective 1 year after the implementation of Amendment 5. During that year, the Council and NMFS, in cooperation with the industry, were to attempt to develop a way to fund 100-percent observer coverage.

During 2013, a working group was formed to identify a workable, legal mechanism to allow for industry-funded observer coverage in the herring fishery; the group includes staff from the New England and

Mid-Atlantic Councils and NMFS. To further explore the legal issues surrounding industry-funded observer coverage, NMFS formed a working group of Northeast Regional Office, NEFSC, General Counsel, and Headquarters staff. The NMFS working group identified an administrative mechanism to allow for industry funding of observer monitoring costs in Northeast Region fisheries, as well as a potential way to help offset funding costs that would be borne by the industry, subject to available funding. This administrative mechanism would be an option to fund observer coverage targets that are higher than SBRM coverage levels. The mechanism to allow for industry-funded observer coverage is a potential tool for all Northeast Region FMPs, but it would need to be added to each FMP through an omnibus amendment to make it an available tool, should the Council want to use it. Additionally, this omnibus amendment could establish the observer coverage targets for Category A and B herring vessels.

In a September 20, 2013, letter to the Council, NMFS offered to be the technical lead on an omnibus amendment to establish the administrative mechanism to allow for industry-funded observer coverage in New England and Mid-Atlantic FMPs. At its September 2013 meeting, the Council considered NMFS's offer and encouraged NMFS to begin development of the omnibus amendment. At this time, NMFS expects to present a preliminary range of alternatives for the omnibus amendment to the New England and Mid-Atlantic Councils in early 2014.

Additionally, other Amendment 5 measures implemented in this action help improve monitoring in the herring fishery. These measures include the requirement for vessels to contact NMFS at least 48 hr in advance of a fishing trip to facilitate the placement of observers, observer sample station and reasonable assistance requirements to improve an observer's ability collect quality data in a safe and efficient manner, and the slippage prohibition and the sampling requirements for midwater trawl vessels fishing in groundfish closed areas to minimize the discarding of unsampled catch.

The same measure that would have required 100-percent observer coverage, coupled with a $325 contribution by the industry, would have also required that: (1) The 100-percent coverage requirement be re-evaluated by the Council 2 years after implementation; (2) the 100-percent coverage requirement be waived if no observers were available, but not waived for trips that enter the River Herring Monitoring/Avoidance Areas; (3) observer service provider requirements for the Atlantic sea scallop fishery apply to observer service providers for the herring fishery; and (4) states be authorized as observer service providers. NMFS believes these additional measures are inseparable from the 100-percent observer coverage requirement; therefore, NMFS had to disapprove these measures too. With the disapproval of these measures, the existing waiver and observer service provider requirements remain in effect.

**Excerpt from Amendment 14 to the Atlantic Mackerel, Squid, and Butterfish FMP (79 FR 10029; February 24, 2014)**

1. Increased Observer Coverage Requirements

Currently, the NMFS Northeast Fisheries Science Center (NEFSC) determines observer coverage levels in the mackerel fishery based on the standardized bycatch reporting methodology (SBRM) and after consultations with the Council. Observer coverage in the mackerel fishery is currently fully funded by

NMFS. In Amendment 14, the Council recommended increases in the observer coverage in the mackerel fishery, specifically 100-percent observer coverage on all limited access mackerel vessels using midwater trawl (i.e., Tiers 1, 2 and 3) and Tier 1 mackerel vessels using small-mesh bottom trawl, 50-percent coverage on Tier 2 mackerel vessels using small-mesh bottom trawl, and 25-percent on Tier 3 mackerel vessels using small-mesh bottom trawl. Many stakeholders believe this measure is necessary to accurately determine the extent of bycatch and incidental catch in the mackerel fishery. The Council recommended this measure to gather more information on the mackerel fishery so that it may better evaluate and, if necessary, implement additional measures to address catch and discards of river herring and shad. The increased observer coverage level recommendations were coupled with a target maximum industry contribution of $325 per day. There are two types of costs associated with observer coverage: Observer monitoring costs, such as observer salary and travel costs; and NMFS support and infrastructure costs, such as observer training, data processing, and infrastructure. The monitoring costs associated with an observer in the mackerel fishery are higher than $325 per day. Upon legal analysis of this measure, the cost-sharing of monitoring costs between NMFS and the industry would violate the Anti-Deficiency Act. Therefore, based on this analysis, there is no current legal mechanism to allow cost-sharing of monitoring costs between NMFS and the industry.

Throughout the development of Amendment 14, NMFS advised the Council that Amendment 14 must identify a funding source for increased observer coverage because NMFS's annual appropriations for observer coverage are not guaranteed. Some commenters asserted that the $325 per day industry contribution was not a limit, but a target, and that the Council intended the industry to pay whatever is necessary to ensure 100-percent observer coverage. NMFS disagrees, and does not believe the amendment specifies that the industry would pay all the monitoring costs associated with 100-percent observer coverage, nor does the amendment analyze the economic impacts of the industry paying all the monitoring costs. The FEIS for Amendment 14 analyzes the industry paying $325 per day, and the DEIS analyzes the cost of vessels paying $800 per day (estimated sum of observer monitoring costs), but it does not analyze a range of that would approximate total monitoring costs. Budget uncertainties prevent NMFS from being able to commit to paying for increased observer coverage in the mackerel fishery. Requiring NMFS to pay for 100-percent observer coverage would amount to an unfunded mandate. Because Amendment 14 does not identify a funding source to cover the costs of increased observer coverage, the measure is not sufficiently developed to approve at this time. Therefore, NMFS had to disapprove the 100-percent observer coverage requirement. With the disapproval of this measure, this action maintains the existing observer coverage levels and full Federal funding for observer coverage the mackerel fishery.

In 2013, a working group was formed to identify a workable, legal mechanism to allow for industry-funded observer coverage in the herring fishery, including staff from the New England and Mid-Atlantic Councils and NMFS. To further explore the legal issues surrounding industry-funded observer coverage, NMFS formed a working group of Greater Atlantic Regional Fisheries Office, NEFSC, General Counsel, and Headquarters staff. The NMFS working group is currently exploring possibilities.

In the November 7, 2013, partial approval letter to the Council, NMFS offered to be the technical lead on an omnibus amendment to establish an administrative mechanism to allow for industry-funded observer coverage in New England and Mid-Atlantic FMPs. At its October 2013 meeting, the Council considered NMFS's offer and encouraged NMFS to begin development of the omnibus amendment. NMFS expects to present a preliminary range of alternatives for the omnibus amendment to the New England and Mid-Atlantic Councils in early 2014.

Additionally, other measures implemented in this action help improve monitoring in the mackerel fishery. These measures include the requirement for vessels to contact NMFS at least 48 hr in advance of a fishing trip to facilitate the placement of observers, observer sample station and reasonable assistance requirements to improve an observer's ability collect quality data in a safe and efficient manner, and the slippage prohibition and the sampling requirements for midwater trawl vessels fishing in groundfish closed areas to minimize the discarding of unsampled catch.

The same measure that would have required increased observer coverage, coupled with a $325 contribution by the industry, would have also required that: (1) The Council would re-evaluate the increased observer coverage level 2 yr after implementation; and (2) observer service provider requirements for the Atlantic sea scallop fishery would apply to observer service providers for the mackerel fishery. NMFS believes these additional measures are inseparable from the 100-percent observer coverage requirement; therefore, NMFS also disapproved these measures. With the disapproval of these measures, this action maintains the existing SBRM-based observer coverage provisions for the mackerel fishery.

# Appendix B

## River Herring and Shad Incidental Catch and Sample Size Analysis

**Northeast Fisheries Science Center**

**January 2015**

*Estimation of total incidental catch*

Total incidental catch of the river herring and shad (RHS) species group, which includes alewife, blueback herring, hickory shad and American shad, was quantified by fleet. Fleets included in the analyses were those sampled by the Northeast Fisheries Observer Program (NEFOP) and were stratified by region fished (Mid-Atlantic versus New England), time (year and quarter), gear group, and mesh size.

Region fished was defined using statistical areas for reporting commercial fishery data (Figure 1). The Mid-Atlantic region included statistical areas greater than 600, and New England included statistical areas 464 through 599. Gear groups included in the analyses were: bottom trawls, paired midwater trawls, single midwater trawls, gillnets, dredges, handlines, haul seines, longlines, pots/traps, purse seines, scallop trawl/dredge, seines and shrimp trawls. Bottom trawls and gillnets were further stratified into the following mesh categories:

| Mesh category | Bottom Trawl | Gillnet |
|---|---|---|
| small | mesh ≤ 3.5 | mesh < 5.5 |
| medium | 3.5 < mesh < 5.5 | --- |
| large | mesh ≥ 5.5 | 5.5 ≤ mesh < 8 |
| x-large | --- | mesh ≥ 8 |

Single and paired midwater trawls were split into separate fleets because the total catch-to-kept ratios varied between midwater trawl types and previous analyses for 2005-2010 indicated that the majority of both mackerel and herring landings were from paired midwater trawls (MAFMC 2013).

The combined ratio method (Wigley et al. 2007) is the standard discard estimation method implemented in NEFSC stock assessments. We used this method to quantify and estimate the precision (CV) of RHS total incidental catch for 1989 – 2013 across all fleets. Incidental catch estimates for the midwater trawl (MWT) and purse seine fleets are only provided for 2005-2013 because these estimates are most accurate as a result of improved sampling methodologies. Marked improvements to NEFOP sampling methodologies occurred in the high-volume MWT and purse seine fisheries beginning in 2005, limiting the interpretability of estimates from these fleets in prior years. The NEFOP currently deploys specially-certified observers on midwater trawl vessels and purse seine vessels. NEFOP coverage of these high-volume fisheries that pump catch began in 2003 but the sampling focused on marine mammal interactions. In 2005, the focus of the sampling changed and the priorities became quantification of groundfish bycatch. At this time, the NEFOP implemented the catch composition log and observers began sampling the catches using a basket subsampling methodology in order to more accurately estimate catch weights over the course of pumping operations. At the same time, NEFOP protocols also required a more accurate quantification of the catches culled by the crew.

Therefore, incidental catch estimates are provided beginning in 2005 because they are considered more accurate.

The NEFOP data used in this analysis were aggregated at the trip level. The sampling unit for the NEFOP database is a trip (Wigley et al. 2007) and observer sea days are allocated at the trip and fleet level, in contrast to the haul of FMP level. The numbers of trips included in the analyses, for the Mid-Atlantic and New England regions, are presented in Tables 1 and 2, respectively.

For each trip, NEFOP data were used to calculate a total catch to kept (t/k) ratio, where t represents the total (retained+discarded) catch of the RHS species group and k is the kept weight of all species. Annual estimates of total incidental catch were derived by quarter. Imputations were used for quarters with one or less observed trips.

The t/k ratios were expanded using a raising factor to quantify total incidental catch. With the exception of the midwater trawl fleets, total landed weight of all species (from the dealer database) was used as the raising factor. Total landings from the dealer database are considered to be more accurate than those of the VTR database because VTR landings represent a captain's hail estimate. However, for the MWT fleets, we were unable to use the dealer data to estimate the kept weight of all species when stratifying by fishing area. When the area allocation (AA) tables were developed, MWT was not included in effort calculations because of difficulties determining effort for paired MWTs. Only those gears with effort information could be assigned to a Statistical Area. Given these limitations, VTR data were used as the expansion factor for the MWT fleet.

When quantifying incidental catch across multiple fleets, total kept weight of all species is an appropriate surrogate for effective fishing power because it is likely that all trips will not exhibit the same attributes (Wigley et al 2007). The use of effort without standardization makes the implicit assumption that effort is constant across all vessels, thereby resulting in a biased effort metric.

*Sample size (sea day) estimation*

A sample size analysis was completed to estimate the number of trips and sea days needed to monitor the RHS species in each fleet. Following Wigley et al. 2007, the number of trips needed to achieve a particular level of precision (i.e. a particular CV) was based on the variance of the total incidental catch estimate for the RHS species group. The number of needed trips was then converted to sea days using the weighted mean trip length, where the weighting factor was the number of dealer or VTR trips (depending on fleet) that occurred in the fleet. The number of needed trips was also converted to percent coverage using the number of VTR or dealer trips that occurred in the fleet. Sample size estimates were derived for a range of CV values from 0 through 2.0.

Sample size estimates were derived for each fleet at a quarterly level from 2010-2013. For fleets, years and quarters without a corresponding sample size estimate, RHS were not caught in that category. Consequently, sample size requirements for these quarters could not be estimated. Annual sample sizes were calculated by summing quarterly estimates. For fleets and years where only percent coverage is depicted, fishing activity occurred in quarters that were not sampled by observers. Therefore, annual trip and sea day estimates would be underestimated because they would only represent quarters with observer coverage. For fleets and years without a corresponding figure, RHS were not caught in that fleet and year. Therefore, sample size requirements for these fleets and years could not be estimated.

*Fleet versus FMP-based alternatives and the proposed alternative of 30%CV of RHS catch for Atlantic herring A and B vessels*

Following the standardized bycatch reporting methodology (SBRM), vessels are selected for observer coverage based on fishing fleet, not based on FMP, fishery or permit category. On a post-hoc basis, fleet-based incidental catch estimates can be prorated by FMP using dealer or VTR landings of the fishery species as a proxy for directivity. More specifically, RHS catch estimates specific to a particular FMP or fishery can be estimated by multiplying the total estimate of RHS catch by the proportion of the fishery species (such as Atlantic herring) in the total fleet's landings. The use of landings as a proxy ensures that all incidental catch estimates are incorporated into FMP-specific estimates but are not double-counted. In contrast, the use of trip definitions (such as 2,000 lbs of Atlantic herring or 10,000 lbs of Atlantic mackerel) to identify trip directivity could result in the double-counting of RHS catches across FMPs because one trip could meet the landings requirements of two fishery species.

In contrast to incidental catch analyses, subsequent sample size (i.e. sea day) analyses must be done by fishing fleet and should not be subsetted by FMP in order to remain consistent with SBRM's sampling design (i.e. how vessels are selected for observer coverage). Therefore, it is not possible to analyze the percent coverage needed to obtain a valid 30% CV for RHS catch for Atlantic herring category A and B vessels unless the sampling design is modified to ensure random selection of vessels in categories A and B.

If observer coverage is allocated to specific fisheries, the resulting data are best only used for particular objectives. Strictly speaking, valid estimates of incidental catch or discards and their variances rely on estimators that are consistent with the underlying sampling design; estimates that are inconsistent with the sampling design may be biased. When at all possible (i.e. when the trips are identifiable in the database), observed trips that were selected for coverage based on fishery or permit category and not fleet are treated separately in bycatch or incidental catch analyses. Ideally, these data should not be used for catch estimation because the vessel selection for observer coverage is no longer done in a random way that is consistent with SBRM's sampling design. Therefore, the decision of whether to select vessels for observer coverage based on fishing fleet or FMP depends on the objectives of the additional coverage and how the data will subsequently be used. If stakeholders would like the data to be used to enhance the precision of catch estimates and not just solely quota monitoring, vessels should be selected for observer coverage based on fishing fleet and not FMP, fishery or permit category.

*References*

MAFMC (Mid Atlantic Fishery Management Council) 2013. Amendment 14 to the Atlantic mackerel, squid and butterfish (MSB) fishery management plan (FMP) Final Environmental Impact Statement; 526 p.

Wigley, S.E., P.J. Rago, K.A. Sosebee and D.L. Palka. 2007. The analytic component to the Standardized Bycatch Reporting Methodology Omnibus Amendment: sampling design and estimation of precision and accuracy (2nd edition). U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 07-09; 156 p.

Table 1: Total number of trips recorded for each fleet in the observer, dealer and VTR databases for the Mid-Atlantic. Landings from the VTR database were used as the raising factor to estimate catch in the midwater trawl fleets. For all other fleets, the dealer database was used.

| | Number of trips | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Bottom trawl | | | | | | Midwater trawl | | | |
| | Small mesh | | Medium mesh | | Large mesh | | Single | | Paired | |
| Year | Observer | Dealer | Observer | Dealer | Observer | Dealer | Observer | VTR | Observer | VTR |
| 1989 | 29 | 4,180 | 7 | 412 | 4 | 2,627 | | | | |
| 1990 | 31 | 3,745 | 19 | 386 | 0 | 2,864 | | | 0 | 0 |
| 1991 | 61 | 3,994 | 20 | 361 | 4 | 3,699 | 5 | 0 | 0 | 0 |
| 1992 | 39 | 3,080 | 12 | 283 | 14 | 4,719 | | | 9 | 0 |
| 1993 | 9 | 2,965 | 7 | 103 | 12 | 5,904 | | | 14 | 0 |
| 1994 | 8 | 3,857 | 8 | 156 | 21 | 4,865 | 1 | 64 | 30 | 44 |
| 1995 | 60 | 4,731 | 3 | 330 | 55 | 6,745 | 0 | 120 | 33 | 50 |
| 1996 | 70 | 4,699 | 10 | 652 | 18 | 6,500 | 0 | 264 | 0 | 14 |
| 1997 | 41 | 5,174 | 10 | 692 | 9 | 6,554 | 0 | 210 | 0 | 6 |
| 1998 | 29 | 5,269 | 4 | 784 | 13 | 6,866 | 0 | 239 | 0 | 34 |
| 1999 | 28 | 4,655 | 9 | 777 | 8 | 6,712 | 0 | 205 | 0 | 26 |
| 2000 | 28 | 4,575 | 12 | 806 | 26 | 5,938 | 5 | 194 | 1 | 74 |
| 2001 | 42 | 3,783 | 13 | 879 | 50 | 6,493 | 0 | 170 | 0 | 56 |
| 2002 | 15 | 3,475 | 18 | 998 | 39 | 6,958 | 0 | 72 | 1 | 107 |
| 2003 | 21 | 2,168 | 53 | 795 | 16 | 7,107 | 0 | 115 | 5 | 195 |
| 2004 | 111 | 2,408 | 156 | 692 | 109 | 6,796 | 2 | 99 | 8 | 250 |
| 2005 | 74 | 1,422 | 109 | 466 | 93 | 8,441 | 4 | 81 | 11 | 222 |
| 2006 | 101 | 2,349 | 54 | 736 | 71 | 6,938 | 8 | 74 | 6 | 184 |
| 2007 | 86 | 2,196 | 139 | 714 | 160 | 5,976 | 1 | 86 | 2 | 83 |
| 2008 | 68 | 2,253 | 86 | 701 | 132 | 6,159 | 8 | 17 | 8 | 144 |
| 2009 | 169 | 2,504 | 126 | 661 | 167 | 6,945 | 5 | 27 | 20 | 162 |
| 2010 | 183 | 2,305 | 193 | 420 | 276 | 5,555 | 4 | 15 | 13 | 84 |
| 2011 | 235 | 2,283 | 155 | 585 | 254 | 6,297 | 4 | 3 | 22 | 44 |
| 2012 | 133 | 2,415 | 111 | 684 | 169 | 4,716 | 4 | 35 | 7 | 40 |
| 2013 | 219 | 2,228 | 195 | 951 | 251 | 4,644 | 1 | 45 | 2 | 34 |

Table 1, contd.

| Year | Number of trips | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gillnet | | | | | | Purse Seine | | Other | |
| | Small mesh | | Large mesh | | X-large mesh | | | | | |
| | Observer | Dealer | Observer | Dealer | Observer | Dealer | Observer | Dealer | Observer | Dealer |
| 1989 | 0 | 67 | 0 | 1,643 | | | 0 | 102 | 0 | 15,392 |
| 1990 | 0 | 137 | 0 | 2479 | 0 | 3 | 0 | 190 | 1 | 16,443 |
| 1991 | 0 | 121 | 0 | 3356 | | | 0 | 345 | 8 | 17,603 |
| 1992 | 0 | 100 | 0 | 2617 | | | 0 | 479 | 15 | 16,563 |
| 1993 | 0 | 80 | 0 | 2856 | | | 0 | 433 | 42 | 17,034 |
| 1994 | 83 | 85 | 58 | 2839 | 20 | 24 | 0 | 460 | 42 | 14,626 |
| 1995 | 137 | 185 | 207 | 4028 | 73 | 294 | 0 | 335 | 44 | 13,105 |
| 1996 | 146 | 343 | 174 | 5073 | 65 | 638 | 0 | 306 | 24 | 13,803 |
| 1997 | 106 | 422 | 136 | 10132 | 111 | 1,021 | 0 | 327 | 27 | 18,214 |
| 1998 | 104 | 699 | 132 | 5750 | 73 | 1,403 | 0 | 257 | 36 | 16,121 |
| 1999 | 44 | 848 | 23 | 5402 | 19 | 1,443 | 0 | 229 | 57 | 15,195 |
| 2000 | 49 | 1,110 | 18 | 4972 | 18 | 1,954 | 0 | 250 | 72 | 15,058 |
| 2001 | 54 | 1,280 | 17 | 3834 | 17 | 2,193 | 0 | 221 | 97 | 15,526 |
| 2002 | 34 | 1,267 | 10 | 3701 | 11 | 2,139 | 0 | 152 | 96 | 16,501 |
| 2003 | 25 | 750 | 4 | 3835 | 13 | 2,104 | 0 | 147 | 115 | 17,851 |
| 2004 | 12 | 1,303 | 6 | 3292 | 38 | 1,409 | 0 | 171 | 330 | 16,721 |
| 2005 | 19 | 1,270 | 4 | 4122 | 82 | 1,739 | 0 | 134 | 408 | 23,052 |
| 2006 | 20 | 1,160 | 7 | 3511 | 32 | 1,470 | 0 | 112 | 144 | 25,010 |
| 2007 | 19 | 1,231 | 13 | 5575 | 32 | 2,045 | 1 | 231 | 244 | 27,404 |
| 2008 | 7 | 905 | 2 | 4357 | 44 | 2,029 | 0 | 160 | 505 | 25,799 |
| 2009 | 9 | 1,252 | 8 | 6904 | 43 | 1,693 | 7 | 134 | 426 | 25,653 |
| 2010 | 12 | 851 | 52 | 3596 | 91 | 1,455 | 8 | 239 | 274 | 16,299 |
| 2011 | 11 | 1,529 | 24 | 5591 | 62 | 2,275 | 0 | 249 | 261 | 21,787 |
| 2012 | 0 | 1,114 | 3 | 4389 | 68 | 2,034 | 3 | 346 | 222 | 19,609 |
| 2013 | 8 | 955 | 10 | 6208 | 29 | 1,789 | 0 | 122 | 202 | 20,347 |

Table 2: Total number of trips recorded for each fleet in the observer, dealer and VTR databases for New England. Landings from the VTR database were used as the raising factor to estimate catch in the midwater trawl fleets. For all other fleets, the dealer database was used.

| | **Number of trips** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Bottom trawl** | | | | | | **Midwater trawl** | | | |
| | **Small mesh** | | **Medium mesh** | | **Large mesh** | | **Single** | | **Paired** | |
| **Year** | **Observer** | **Dealer** | **Observer** | **Dealer** | **Observer** | **Dealer** | **Observer** | **VTR** | **Observer** | **VTR** |
| 1989 | 72 | 5,060 | 15 | 528 | 57 | 21,439 | | | 0 | 0 |
| 1990 | 33 | 4,850 | 4 | 355 | 54 | 21,518 | | | 0 | 0 |
| 1991 | 84 | 4,372 | 13 | 156 | 78 | 22,429 | 2 | 0 | 0 | 0 |
| 1992 | 56 | 4,157 | 1 | 120 | 68 | 22,518 | 0 | 0 | 0 | 0 |
| 1993 | 21 | 5,054 | 10 | 153 | 44 | 21,468 | 0 | 0 | 7 | 0 |
| 1994 | 13 | 5,522 | 5 | 239 | 36 | 21,084 | 0 | 306 | 4 | 53 |
| 1995 | 37 | 4,217 | 3 | 154 | 68 | 20,376 | 4 | 785 | 2 | 11 |
| 1996 | 48 | 3,893 | 2 | 52 | 44 | 19,750 | 0 | 902 | 0 | 18 |
| 1997 | 19 | 3,788 | 4 | 100 | 29 | 17,417 | 0 | 705 | 0 | 93 |
| 1998 | 5 | 4,198 | 1 | 94 | 13 | 18,156 | 0 | 508 | 0 | 170 |
| 1999 | 19 | 3,915 | 0 | 214 | 41 | 16,345 | 1 | 519 | 2 | 165 |
| 2000 | 8 | 3,338 | 9 | 124 | 103 | 17,473 | 7 | 463 | 0 | 367 |
| 2001 | 8 | 2,834 | 11 | 173 | 157 | 17,372 | 1 | 336 | 0 | 631 |
| 2002 | 35 | 2,184 | 30 | 221 | 220 | 17,480 | 0 | 371 | 0 | 651 |
| 2003 | 46 | 2,226 | 27 | 184 | 387 | 16,813 | 2 | 251 | 18 | 614 |
| 2004 | 88 | 1,822 | 85 | 152 | 531 | 13,384 | 23 | 254 | 60 | 581 |
| 2005 | 84 | 1,507 | 173 | 131 | 1350 | 11,902 | 43 | 265 | 91 | 463 |
| 2006 | 49 | 1,939 | 37 | 299 | 619 | 10,612 | 10 | 194 | 21 | 487 |
| 2007 | 58 | 2,145 | 18 | 213 | 621 | 10,760 | 10 | 87 | 11 | 235 |
| 2008 | 46 | 2,381 | 16 | 175 | 753 | 11,013 | 11 | 34 | 36 | 185 |
| 2009 | 195 | 2,296 | 26 | 270 | 879 | 10,936 | 10 | 48 | 67 | 223 |
| 2010 | 206 | 2,601 | 55 | 251 | 1054 | 9,423 | 29 | 57 | 106 | 215 |
| 2011 | 164 | 1,854 | 31 | 246 | 1597 | 8,351 | 24 | 59 | 89 | 252 |
| 2012 | 138 | 2,227 | 30 | 390 | 1551 | 7,535 | 30 | 122 | 131 | 246 |
| 2013 | 191 | 1,856 | 56 | 510 | 1095 | 7,368 | 27 | 181 | 69 | 234 |

Table 2, contd.

| | Number of trips | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gillnet | | | | | | Purse Seine | | Other | |
| | Small mesh | | Large mesh | | X-large mesh | | | | | |
| Year | Observer | Dealer | Observer | Dealer | Observer | Dealer | Observer | Dealer | Observer | Dealer |
| 1989 | 0 | 10 | 0 | 12,682 | 0 | 1 | 0 | 1,082 | 40 | 27,465 |
| 1990 | 0 | 10 | 0 | 13196 | | | 0 | 1,205 | 32 | 29,436 |
| 1991 | 0 | 50 | 0 | 13315 | 0 | 2 | 0 | 1,046 | 79 | 31,973 |
| 1992 | | | 0 | 13340 | 0 | 47 | 0 | 1,198 | 144 | 32,377 |
| 1993 | | | 0 | 13172 | 0 | 81 | 0 | 481 | 118 | 33,223 |
| 1994 | 0 | 3 | 61 | 13504 | 40 | 934 | 0 | 94 | 107 | 28,496 |
| 1995 | 0 | 8 | 105 | 12798 | 46 | 2,030 | 0 | 73 | 101 | 31,877 |
| 1996 | 0 | 21 | 55 | 10957 | 23 | 1,533 | 0 | 115 | 62 | 35,277 |
| 1997 | 0 | 12 | 51 | 9487 | 19 | 1,214 | 0 | 654 | 32 | 34,773 |
| 1998 | 3 | 14 | 115 | 9579 | 15 | 1,061 | 0 | 41 | 15 | 32,135 |
| 1999 | 1 | 7 | 98 | 7122 | 21 | 1,352 | 0 | 67 | 74 | 24,965 |
| 2000 | 0 | 17 | 107 | 7547 | 50 | 1,881 | 2 | 26 | 229 | 21,371 |
| 2001 | 1 | 17 | 69 | 7085 | 33 | 2,530 | 1 | 15 | 27 | 22,559 |
| 2002 | 0 | 14 | 91 | 7095 | 41 | 2,827 | 0 | 16 | 30 | 23,224 |
| 2003 | 0 | 20 | 326 | 7857 | 190 | 2,990 | 1 | 25 | 71 | 20,552 |
| 2004 | 1 | 16 | 699 | 5922 | 536 | 2,973 | 21 | 113 | 219 | 16,593 |
| 2005 | 0 | 39 | 587 | 5833 | 459 | 2,958 | 26 | 141 | 463 | 39,240 |
| 2006 | 0 | 67 | 142 | 6683 | 79 | 2,421 | 0 | 113 | 262 | 46,999 |
| 2007 | 2 | 78 | 132 | 7905 | 164 | 2,102 | 10 | 197 | 309 | 43,381 |
| 2008 | 3 | 27 | 170 | 9453 | 112 | 2,274 | 23 | 183 | 345 | 55,559 |
| 2009 | 2 | 12 | 313 | 10014 | 76 | 1,989 | 33 | 187 | 210 | 66,183 |
| 2010 | 0 | 22 | 1267 | 7837 | 771 | 2,653 | 20 | 160 | 364 | 150,199 |
| 2011 | 0 | 9 | 1589 | 6512 | 715 | 2,847 | 48 | 144 | 327 | 160,899 |
| 2012 | 0 | 5 | 1379 | 5389 | 454 | 2,246 | 35 | 122 | 576 | 147,335 |
| 2013 | 0 | 4 | 620 | 3427 | 323 | 2,272 | 32 | 166 | 400 | 168,109 |

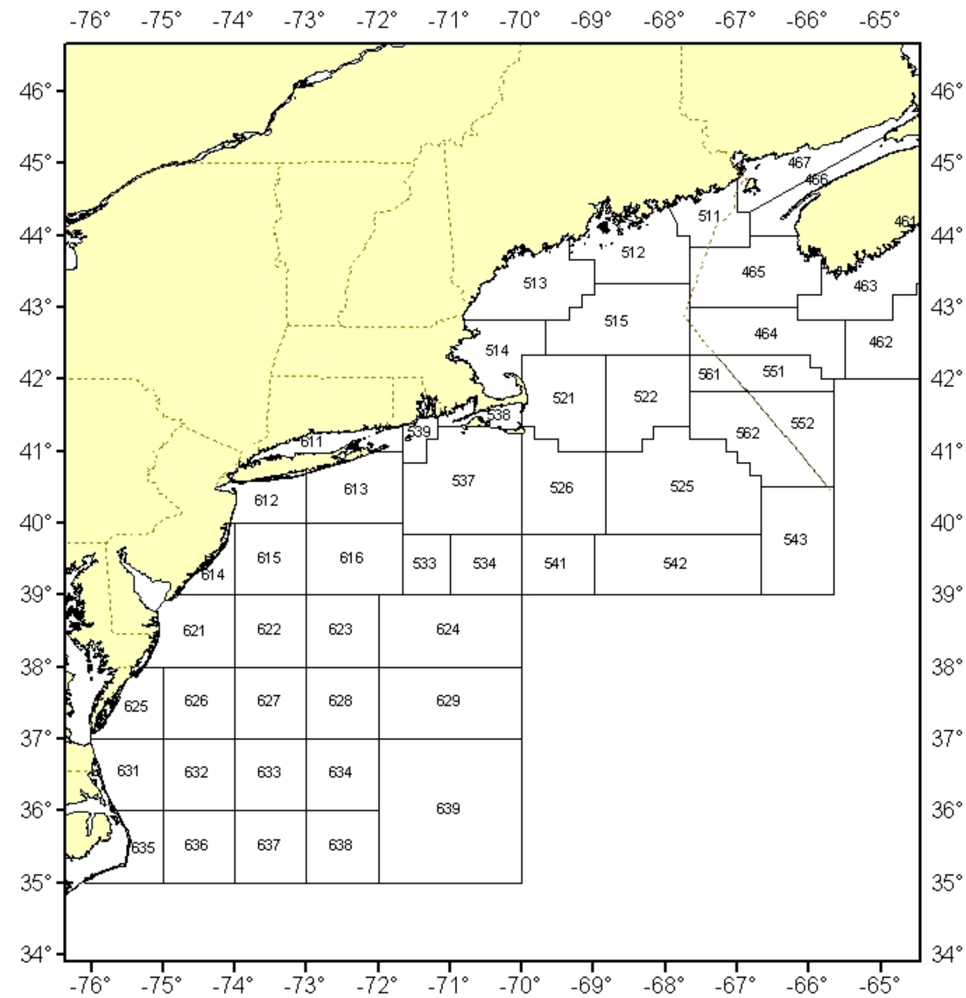



Figure 1: Statistical Areas used to define the fishing regions used in the incidental catch analysis. The Mid-Atlantic region included Statistical Areas greater than 600. The New England region included Statistical Areas 464 through 599.

**Proposed 2014 Observer Sea Day Allocation**

**by**

**Northeast Fisheries Science Center**
**NOAA Fisheries**
**166 Water Street**
**Woods Hole, MA 02543**

**and**

**Greater Atlantic Regional Fisheries Office**
**NOAA Fisheries**
**55 Great Republic Drive**
**Gloucester, MA 01930**

**May 22, 2014**

## *Introduction*

The Standardized Bycatch Reporting Methodology (SBRM) Omnibus Amendment was implemented on 27 February 2008 (NMFS 2008, NEFMC 2007) and subsequently vacated by the US District Court for the District of Columbia and remanded back to National Marine Fisheries Service (NMFS) on 15 September 2011. On 29 December 2011, NMFS removed the regulations implementing the SBRM (NMFS 2011). Nevertheless, the need remains to annually allocate observer coverage among fisheries prosecuted in the waters off the northeastern US. The numbers of sea days needed to monitor 14 federally managed fish/invertebrate species groups and one species of sea turtles have been estimated by the Northeast Fisheries Science Center (NEFSC). Based upon the funding available for observer coverage, the numbers of sea days have been allocated by fleet for the April 2014 through March 2015 period.

## *Number of Sea Days Needed*

Sample size analyses were conducted to estimate the numbers of sea days needed to monitor 14 federally managed fish/invertebrate species groups and one sea turtle species (Table 1). For fish/invertebrate species groups, the numbers of sea days needed to achieve a 30% coefficient of variation (CV) of total discards for each species group were derived for 56 fleets by using data collected during July 2012 through June 2013 and employing the estimation methods described in Wigley et al. (in press). Fleet abbreviations used in this report are described in Appendix Table 1. Based on the 2014 sample size analysis in Wigley et al. (in press), a total of 14,529 sea days is needed for the 14 fish and invertebrate species groups (Table 2). However, these results required further refinements.

The use of pilot coverage in the sample size analysis may result in too much coverage in cases where little or no observer coverage may actually be needed, when effort changed sharply between years, or when the fleet effort comprises only a few trips. For example, there are ten fleets for which there were fewer than 3 Vessel Trip Report (VTR) trips per quarter for at least one quarter (Rows 9, 10, 13-16, 25, 42, 44, and 56; Appendix Table 2). To allocate sea days based on pilot coverage to these fleets for these quarters would result in coverage rates exceeding 100%. Additionally, there are several fleets for which activity is greater than 3 VTR trips per quarter, but overall trip activity is low (e.g., Rows 39, 45, and 46; Appendix Table 2). To allocate sea days based on pilot coverage to these fleets would result in coverage rates that exceed those derived from observer data. For fleets with low trip activity, there are two scenarios: (1) fleets for which significant activity occurs in other quarters (e.g., Rows 42 and 44; Appendix Table 2); and (2) fleets for which overall activity is low (e.g., Rows 9, 10, 13-16, 25, 39, 45, 46, and 56; Appendix Table 2). In the first scenario, the use of pilot coverage is warranted for these fleets. In the second scenario, pilot coverage is not warranted.

A refinement to the sample size analysis was developed to address the potential for excessive observer coverage created by using a pilot coverage policy for fleets with overall low activity. Pilot coverage had been designed to provide minimum number of trips sufficient to compute the variance of discard estimates and subsequently the derivation of sea days needed. The number of sea days per quarter could not be reduced further without omitting the fleet from the sample size analysis. A standardized approach, similar to the two filters used in the importance filter (Wigley et al. 2007), was employed to remove fleets with overall low trip activity. This approach hereafter is referred to as the trip filter. In the trip filter, the percentage of VTR trips for a fleet was derived by dividing the number of VTR trips in a fleet by the total number of VTR trips across all fleets. The fleets were then ranked (smallest to largest) by the percentage of trips in a fleet and the cumulative percentage for each fleet was then derived. A cut point of 1% was selected to remove fleets that contained the lowest cumulative 1% of the total trips. Thus the trip filter excludes those fleets, which in aggregate, constitute less than 1% of all commercial fishing activity. Fleets which constitute the upper cumulative 99% of all trips remain in the analysis. When the trip filter was applied, 22 of the 56 fleets were removed (Rows 9, 10, 12-17, 20, 21, 25, 30, 31, 38, 39, 45, 46, 49-52, and 56; Appendix Table 2; Table 3, Step 2). For the remaining 34 fleets, a total of 13,690 sea days is needed for the 14 fish/invertebrate species groups (Table 3; Step 2). Implications of the trip filter are discussed later.

For loggerhead turtles, the numbers of sea days needed to achieve a 30% CV of turtle discards were estimated by fishery, defined as a managed fish or invertebrate species landed on vessels using bottom otter trawl, sink gillnet, or scallop dredge gear in the Mid-Atlantic region (see Murray 2012, and Murray 2013). The maximum amount of projected coverage across all the fisheries was considered the desired level of sampling to monitor turtle discards for that gear type. Roughly 4,800 days are needed across bottom trawl fisheries (Murray 2012), roughly 2,600 days are needed across sink gillnet fisheries (based on CVs in Murray, 2013 and sea day estimation methods in Murray 2012), and approximately 1,300 days are needed in the scallop dredge fishery, based on loggerhead bycatch precision levels after chain mats were implemented in the fishery (Murray 2012). Estimates of sea day needs for turtles are revised when new bycatch estimates are published for a particular gear type (approximately every five years). Sea day requirements for non-loggerhead turtle species (i.e., greens, Kemp's ridleys, and leatherbacks) are not currently estimated because too few have been observed to estimate total bycatch and CVs for these species (Murray 2012). Because observers document all protected species interactions on trips, monitoring of other turtles species will still occur via days intended to monitor fish or loggerheads.

The numbers of sea days needed to achieve a 30% CV associated with the Mid-Atlantic[1] turtle gear types and fish/invertebrate fleets are given below and in Table 3, Steps 2 and 3.

| | Sea Days | |
|---|---|---|
| **Turtle Gear Types and Fish Fleets** | **Loggerhead Turtles** | **Fish/Invertebrates Species Groups** |
| MA Otter Trawl and Scallop Trawl<br>Rows 5, 6, 9, 10, 11, and 12 | 4,838 | 2,320 |
| MA Gillnet<br>Rows 22, 23, and 24 | 2,593 | 101 |
| MA Scallop Dredge<br>Rows 30, 32, 34, and 36 | 1,293 | 261 |

The numbers of sea days needed for the combined fish/invertebrates and turtle species groups were derived as followed:

- If the sum of the sea days needed for fish/invertebrates species groups of the corresponding fish fleets exceeded the sea days needed for the turtle gear type, then the sea days needed for fish/invertebrate sea day was used.

- If the number of sea days needed for turtles for the gear type exceeded the sum of the sea days needed for fish/invertebrates of the corresponding fish fleets, then the sea days needed for turtles were distributed according to the proportion of sea days needed for fish/invertebrates of the corresponding fish fleets (Table 3; Step 4a and 4b).

A total of 19,732 sea days is needed for fish/invertebrates and loggerhead turtles (COMBINED; Table 3; Step 5) during the April 2014 through March 2015 period. Of the 19,732 sea days, 17,299 sea days are needed for agency-funded fleets and 2,433 sea days are needed for industry-funded fleets (Table 3, Step 6).

### *Funding available for the April 2014 through March 2015 period*

The funds available to the NEFSC's Northeast Fisheries Observer Program (NEFOP) in fiscal year 2014 are estimated to provide support for 13,799 days[2]. Based upon an observer set-aside

---

[1] In the sea turtle sample size analysis, Mid-Atlantic refers to areas fished west of 70$^{o}$W. In the fish/invertebrate sample size analysis, Mid-Atlantic refers to region based on port of departure from Connecticut and southward. Although it is recognized that port of departure may differ from the area fished, an odds ratio analysis conducted to evaluate broad-scale spatial coherence indicated a strong relationship between area fished (statistical area) and port of departure (region). Based upon this analysis, the "Mid-Atlantic" stratifications used in two analyses were considered similar.

[2] In addition to the 13,799 agency-funded sea days described in this report, there are also 300 days associated with the National Observer Program that are available in the 2014 budget to fund At-Sea Monitoring in April 2015. Since April 2015 is beyond the time period summarized in this report, the 300 days are not included in this report.

compensation rate analysis, there is industry funding for 2,703 days. Hence, 16,502 days (13,799 + 2,703) are available for observer coverage during April 2014 through March 2015.

Below is a summary of the two funding source categories: agency-funded and industry-funded. Within the agency-funded category, there are six sub-categories: Atlantic Coast, National Catch Share Program, National Observer Program, Northeast Observer Program, Marine Mammal Protection Act, and Reducing Bycatch.

- **Agency-funded**: The funding sources for the 13,799 agency-funded sea days include: Atlantic Coast (1,164 days) and Northeast Observer Program (4,837 sea days) that collectively fund the sea days for prioritization (6,001 days; Table 3, Step 7); National Catch Share Program (475 days) and National Observer Program (6,111 days) that collectively fund At-Sea Monitoring (ASM; 6,586 days; Table 3, Step 7); Northeast Observer Program (579 days) and Reducing Bycatch (67 days) that collectively fund the sea days to support herring management (646 days; Table 3, Step 7); and Marine Mammal Protection Act (MMPA; 566 days; Table 3, Step 7) that fund the sea days to monitor protected species.

  - 566 agency-funded days are applicable to protected species[3] only.

    The 566 MMPA days are associated with trips having sampling protocols that are specific to protected species (marine mammals, sea turtles, Endangered Species Act [ESA] listed fish species) and are not applicable for non-ESA listed fish and invertebrates. Owing to the extra demands of monitoring protected species, information on finfish and shellfish is not collected on these trips. However, these days will provide observer coverage for sea turtles and ESA-listed fish species above that which is allocated.

  - 13,233 agency-funded days (13,799 - 566) are applicable for all species.

    - 6,001 days are subject to the prioritization process across all fleets. The prioritization approach is described in the next section and given in Table 4.

    - 6,586 days are associated with At-Sea Monitoring and have been provisionally allocated among fleets associated with New England groundfish based on last year industry activity. Actual allocation will be based on industry activity during April 2014 through March 2015.

    - 646 days are associated with herring management. To support the management expectation of 100% coverage of herring trips in the access areas, 500 of the 646 sea days were re-directed from the pool of sea days subject to the prioritization process across all fleets. The 500 days are based on the anticipated number of access area herring trips and are similar in magnitude to the numbers of days redirected in recent past years to meet the management

[3] In this document, protected species refers to marine mammals, sea turtles, and ESA-listed fish.

expectation. Under SBRM, the re-direction of sea days from the prioritized days will not be possible.

        - No sea days have been set aside to support the training of new observers or as discovery days to address emerging questions of scientific and management interest as the year progresses.

    - Projected costs (i.e., an estimated rate that includes fixed and variable costs for operations, training, and data processing infrastructure and at-sea costs): $1200/day for NEFOP and ASM days.

- **Industry-funded**: The number of industry-funded sea days available for scallop fleets depends upon the total expected budget from the Research Set Aside (RSA) program and the increase in landings allowed for vessels carrying observers (i.e., the compensation rate). The sale of the additional scallops allocated to each boat supplies the funding for the at-sea costs of observer coverage. Based upon projected landings and expected prices, the RSA program generates funds in support of discard monitoring of the scallop fleets. A compensation rate analysis was undertaken to support observer coverage of the 13 industry-funded scallop fleets (Rows 9-13 and 30-37; Table 3).

    - Based upon the compensation rate analysis, a total of 2,703 sea days can be funded: 2,093 days for Open areas, 215 days for Delmarva Access Area (DMV), 136 days for Closed Area II (CAII), and 80 days in the Nantucket Lightship Access Area (NLAA).

        - The industry-funded schedule runs March 1 through February, a 12-month period that is shifted one month from the NEFOP sea day schedule of April to March.

        - Bulletins describing the 2014 set-aside compensation rate calculations and scallop management measures are available at:
          http://www.nero.noaa.gov/nr/2014/February/14scalobsercomaratephl.pdf
          http://www.nero.noaa.gov/mediacenter/2014/scallop2014measures.pdf

    - Of the 2,093 days for the Open areas, there are 248 days for Limited Access General Category fleets (Rows 11, 34, and 35; Table 5) and 1,845 days for Limited Access fleets (Rows 12, 36, and 37; Table 5).

    - Coverage of the 13 fleets depends on industry activity among these fleets during April 2014 through March 2015; the sea days represent the maximum coverage (i.e., caps).

    - Projected costs: the cost to industry for at-sea portion is $675/day for industry-funded fleets. Additional agency funds are needed for training and certification of observers and data processing.

Below is a summary of sea days based on the agency budget and the compensate rate analysis, by funding source for April 2014 through March 2015.

| **Funding Source** | **Sea Days** |
|---|---|
| Agency-funded Total | **13,799** |
| Agency-funded applicable to all species | 13,233 |
| Agency-funded applicable to protected species only | 566 |
| Industry-funded Total applicable to all species | **2,703** |
| **Total** | **16,502** |

***Prioritization Trigger and Allocation of Sea Days by Fleet***

Within the agency-funded fleets and prioritization-applicable funding, a funding shortfall of 11,298 days (17,299 – 6,001 days; Table 3) is expected.

At the April 2014 meetings, the New England and Mid-Atlantic Fishery Management Councils passed a motion to adopt the SBRM Omnibus Amendment. The amendment had been revised to address the deficiencies found by the Court in the prioritization process. The SBRM Omnibus Amendment now includes descriptions of the SBRM funding trigger and the prioritization approach. The 2014 funding shortfall would have triggered the SBRM prioritization approach; the prioritization approach is utilized with a portion of the agency funds.

The following describes the steps taken to allocate the 16,502 funded sea days to fleets (Tables 3, 4 and 5).

Step 1. Derive the number of sea days needed for the 14 fish and invertebrate species groups (see Wigley et al. in press, same method as Wigley et al. 2013; Table 3).

Step 2. Apply the trip filter and remove sea days from fleets that comprise 1% or less of the cumulative percentage of trips across all fleets. A total of 13,690 sea days is needed across 34 fleets; Table 3).

Step 3. Derive the number of sea days needed for sea turtles (see Murray 2012, 2013; Table 3).

Step 4. To support the penultimate prioritization approach, derive the number of sea days needed for loggerhead turtles for each of the fish fleets associated with the turtle gear type group (Table 3).

a. Derive the percentage of days for each fish fleet within a turtle gear type group. For each fleet associated with a turtle gear type, divide the sea days needed for fish by the sum of the sea days needed for the gear type group.

b. Derive the number of sea days needed for loggerhead turtles by fish fleet. Multiply the number of turtle sea days needed for the gear type by the percentage of days needed for each fish fleet.

Step 5. Derive the number of sea days needed for fish and turtles COMBINED; select the largest of the two sea days (i.e., sea days needed for the 14 fish species groups with the trip filter applied [Step 2] and sea days needed for loggerhead turtles [Step 4b]) within the fleet.

A total of 19,732 days are needed to achieve a 30% CV on the discards of the 15 species groups in 2014; Table 3).

Step 6. Partition fleets into funding source categories and sum the number of sea days needed, by funding source.

There were 17,299 days and 2,433 days needed to achieve a 30% CV for the 15 species groups for agency-funded and industry-funded fleets, respectively (Table 3).

Step 7. Obtain funded sea days, by funding source category. For agency-funded sea days, calculate the number of sea days applicable to the prioritization process (prioritized versus non-prioritized days).

There are 6,001 agency-funded days applicable to the prioritization process (Table 3).

Step 8. Evaluate needed sea days versus funded sea days for each funding category and calculate shortfall or surplus sea days associated with the prioritization process.

A shortfall of 11,298 days is expected for agency-funded fleets (Table 3).

Step 9. Apply the penultimate approach algorithm to allocate sea days to fleets for agency-funded days that are applicable to prioritization process.

As described in the draft SBRM Amendment[4], the number of agency-funded sea days applicable to the prioritization process is assigned to each fleet (fishing mode) after sequentially removing the sea days needed for the species group/fleet with the highest sea day difference between adjacent species groups within a fleet until the sea day shortfall is removed.

The following describes the steps taken to assign the agency-funded sea days applicable to the prioritization process using the penultimate approach (Table 4).

Step 9.1. For each agency-funded fleet, list the sea days needed for the 15 species groups (fish/invertebrates Table 2; loggerhead turtle Table 3) in descending order within a fleet. Use the minimum pilot days (Table 2) as the minimum sea days needed for the fleet for fleets that are not filtered out via the trip filter.

---

[4] Information relating to the draft SBRM Omnibus Amendment is available at: http://www.nero.noaa.gov/mediacenter/2013/09/draftsbrmamendment.html .

Step 9.2. Calculate the differences in sea days between adjacent species groups within each agency-funded fleet.

Step 9.3. Within the resulting matrix of differences (Step 9.2), identify the largest difference and remove the sea days associated with the species group accounting for this difference.

Repeat this process for the next largest difference, with the constraint that the differences are taken in penultimate order (from left to right in the matrix) within a fleet, until the cumulative reduction of sea days equals the sea day shortfall (Step 8). If the reduction in sea days using the next largest (penultimate) value is greater than the shortfall, reduce the number of sea days only enough to remove the shortfall.

The 2014 sea day shortfall is 11,298 days. The 7,262 sea days (RCRAB in Row 8) associated with the largest sea day difference (6,100 days) between adjacent species groups is removed first (Table 4). The penultimate value in Row 8 is associated with GFS (1,162 days). Given the penultimate fleet constraint (i.e., cannot remove the sea days of a species group unless all species groups with greater numbers of sea days have been removed within the fleet), the 2,688 sea days (TURS in Row 5) associated with the next largest sea day difference (1,399) between adjacent species groups is removed next. The penultimate value in Row 5 is associated with FSB (1,289 days). The 1,258 sea days (TURS in Row 23) associated with the next largest sea day difference (1,209) is removed next. The penultimate value in Row 23 is associated with PILOT (38 days). The 2,100 days (TURS in Row 6) with the next largest sea day difference (1,093) is removed next. The penultimate value in Row 6 is associated with MONK (1,007 days). The 976 days (TURS in Row 22) with the next largest sea day difference (938) is removed next. The penultimate value in Row 22 is associated with PILOT (49 days). The 679 sea day difference associated with the last species group (328 days for DOG in Row 6) would have removed more sea days than needed to reach the shortfall amount of 11,298 day (Table 4). Thus, only 559 of the 679 sea day difference between adjacent species groups (1,007 days for MONK and 328 days for DOG) is used (Table 4). The prioritized sea days for Row 6 (448 days) represent the difference between 1,007 days and 559 days.

Step 9.4. After the removal of sea days within a fleet (Step 9.3), the remaining highest sea days (i.e., the penultimate or the left-hand-most value in Step 9.1) becomes the "PRIORITIZED" sea days required for that fleet.

The 6,001 prioritized sea days provide observer coverage to all 34 fleets. There are 29 fleets for which no reduction in sea days occurred and there are five fleets (Rows 5, 6, 8, 22, and 23) for which the numbers of sea days allocated are less than the days needed to achieve a 30% CV. In these five fleets, there are three species groups (RCRAB, TURS, and MONK) in six species group/fleet combinations for which the expected CV will exceed 30%. All other species groups within these fleets have an expected CV of 30% or less.

Step 9.5. Identify fleets that cannot be covered by NEFOP this year.

By using the prioritization process, more fleets have allocated observer coverage than in past years. There are practical limitations of the NEFOP to expand observer coverage to all fleets that have not had observer coverage before or in recent years. While the NEFOP can accommodate most of the fleets previously not assigned coverage, the NEFOP will not have trained certified observers available for ocean quahog and surfclam dredge fleets this year (Rows 54 and 55; Table 4). The NEFOP expects to be able to cover these fleets next year. Thus, the 139 prioritized days associated with Rows 54 and 55 (76 days and 63 days, respectively) have been re-allocated to Row 6, the last fleet impacted by the prioritization process. Row 6 has 587 prioritized sea days (448 days + 139 days) and Rows 54 and 55 have zero days.

Step 10. Allocate agency-funded non-prioritized sea days: ASM, herring management, and MMPA days.

There are 7,798 agency-funded days that are not applicable to the prioritization process (non-prioritized days: 6,586 ASM days, 566 MMPA days, and 646 herring management days; Table 3).

The 6,586 ASM sea days will be assigned to trips via the Pre-Trip Notification System (PTNS). This means that the observer coverage within each of these fleets will depend upon industry activity during the April 2014 through March 2015 period. The ASM sea days have been proportionally allocated based on the previous year's industry activity, and thus the allocation presented in this report should be considered provisional (Table 5).

The 566 MMPA sea days, all assumed to have limited sampling protocols, are allocated to a row designated as "MMPA coverage" and will be associated with the NE and MA gillnet fleets (Rows 22-27; Table 5).

The 646 herring management days are allocated to a row designated as "herring management coverage" and will be associated with the NE midwater trawl fleet (Row 40; Table 5).

Step 11. Allocate industry-funded days. The sea days for the industry-funded fleets are assigned to trips via the call-in system[5]. Similar to the ASM non-prioritized sea days, the sea day coverage for industry-funded fleets will depend on industry activity during the April 2014 through March 2015 period and will be capped as described above. The 2,703 industry-funded sea days have not been allocated to individual fish fleets, but rather to groups of fish

[5] For more information on the call-in system for the industry-funded scallop program, see http://www.nero.noaa.gov/mediacenter/2014/scallop2014measures.pdf

fleets that correspond to the stratification used in compensation rate analysis: Mid-Atlantic access area fleets (Rows 9, 10, 30, and 32; Table 5); Open areas fleets (Rows 12, 36, and 37; Table 5); and New England access area fleets (Rows 31 and 33; Table 5). The allocated sea days represent the maximum coverage (i.e., caps).

Step 12. The sea days allocated for the April 2014 – March 2015 (TOTAL) is the sum of the prioritized days (Step 9.5), non-prioritized days (Step 10), and industry-funded days (Step 11). A total of 16,502 days is allocated across 40 fleets (Table 5).

The agency-funded fleets with an * or ** (Table 5) indicate that some or all of the observer coverage will be assigned via the Pre-Trip Notification System (PTNS; see Palmer et al. 2013) or the scallop call-in program. This means that some or all of the observer coverage within each of these fleets will depend upon industry activity during the April 2014 through March 2015 period. The sea days for agency-funded fleets have been proportionally allocated based on the previous year's activity, and thus should be considered provisional. All other fleets will have sea days assigned to trips via the NEFOP sea day schedule.

The Joint Working Group on Observer Sea Day Prioritization[6] met via conference call on May 15, 2014 and agreed to continue to use the PTNS to select directed longfin squid trips for observer coverage during the April 2014 through March 2015 period despite selection issues between the PTNS and the NEFOP sea day schedule. The number of sea days allocated to the directed longfin squid fishery were derived by using the proportion of directed longfin squid trips to total trips within each in the Mid-Atlantic and New England small mesh otter trawl fleets (Rows 5 and 7); 161 sea days (12.5% of 1,289 sea days in Row 5, Table 5) and 147 sea days (9.5% of the 1,548 days in Row 7, Table 5) will be assigned to trips via the PTNS for monitor butterfish on directed longfin squid fishery in the Mid-Atlantic and small mesh otter trawl fleets, respectively. The NEFOP staff and others will work toward reducing or eliminating the issues resulting from two concurrent selection systems. Sub-setting the observer coverage associated with the Mid-Atlantic and New England small mesh otter trawl fleets (Rows 5 and 7) for directed longfin squid trips is not expected to continue.

Although the trip filter removes the fleets with overall low activity from the sample size analysis, some of these fleets may have observer coverage assigned via the PTNS or the call-in program. For example, 6 of the 22 fleets that are removed by the trip filter are scallop fleets (Rows 9, 10, 12, 13, 30, and 31) that have a call-in program such that coverage could be assigned based on industry activity. Similarly, those fleets associated with the groundfish (e.g., Rows 16 and 17) could be assigned observer coverage via the Pre-Trip Notification System (PTNS), depending upon industry activity. Because the sea days needed for these fleets have been excluded, the needed sea days may be slightly underestimated. However, it is important to note that these fleets have very low trip activity and the activity is expected to remain low. As a practical matter, fleets with low trip activity within a quarter or overall are very difficult to "find" unless they are part of PTNS or a call-

[6] The Joint Working Group on Observer Sea Day Prioritization is a newly formed working group consisting of staff from the Northeast Fisheries Science Center and Greater Atlantic Regional Fisheries Office.

in program. Attempts to assign observers can be inefficient since the probability of randomly finding such trips at a specific port or time period will be very low. Such fleets fall below practical detection limits.

The sample size analysis conducted by Wigley et al. (in press) derived the expected precision (CV) of the discard estimates for various species groups over a range of sample sizes for each of the species groups that were not filtered out by the importance filter (Table 7 and Figure 3 in Wigley et al. in press). Deriving the expected CV assumes the variance of the discard estimate is constant over a range of sample sizes (number of trips). The analysis was based upon the observed trips in the NEFOP database during the July 2012 through June 2013 time period (Table 2 in Wigley et al. in press). For fish, the following two examples illustrate that although the sea days needed may be greater than the total allocated sea days, this does not imply that the expected precision for *all* fish species groups will exceed 30% CV. In the Mid-Atlantic large mesh otter trawl fleet, a total of 638 days (Table 5, Step 12, Row 6) has been allocated for which 1,007 days (Table 2, Row 6) are needed for a 30% CV for the 14 fish/invertebrate species groups. The expected CV for MONK is approximately 38% and all other fish/invertebrate species groups have an expected CV less than 30% with 638 days allocated to this fleet (Figure 1). In the NE large mesh otter fleet, a total of 4,178 days (Table 5, Step 12, Row 8) has been allocated for which 7,262 days (Table 2, Row 8) are needed for a 30% CV for the 14 fish/invertebrate species groups. The expected CV for RCRAB is approximately 44% and all other fish/invertebrate species groups have an expected CV of 30% or less with 4,178 days allocated to this fleet (Figure 1). For loggerhead turtles, 4,838 days are needed in Mid-Atlantic otter trawl fleets, and 2,593 days in Mid-Atlantic gillnet fleets, for a 30% CV. With 1,927 days allocated to Mid-Atlantic otter trawl fleets (Table 5, Step 12, Rows 5 and 6), the expected CV increases to roughly 48%. With 446 days allocated to Mid-Atlantic gillnet fleets (Table 5, Rows 22-24), the expected CV increases to roughly 70% (Figure 2). As MMPA days will provide additional coverage for turtles, the expected CVs may be slightly lower.

The NY Department of Environmental Conservation has secured funding through the Atlantic Coast Cooperative Statistical Program (ACCSP) to support observer coverage (approximately 880 days) the next several years for otter trawl, gillnet, and pot/trap fleets in the Mid-Atlantic region. These sea days will provide observer coverage for all species above that allocated in this report.

### *References*

Murray, KT. 2013. Estimated Loggerhead and Unidentified Hard-shelled Turtle Interactions in Mid-Atlantic Gillnet Gear, 2007-2011. NOAA Tech Memo NMFS-NE-225. 20p. Available online at: http://www.nefsc.noaa.gov/publications/tm/tm225/

Murray KT. 2012. Estimating observer sea day requirements in the Mid-Atlantic region to monitor loggerhead sea turtle (*Caretta caretta*) interactions. US Dept Commer, Northeast Fish Sci Cent Ref Doc 12-26; 10 p. Available online at: http://www.nefsc.noaa.gov/publications/crd/crd1226/

National Marine Fisheries Service (NMFS). 2011. Fisheries of the Northeastern United States; Removal of Standardized Bycatch Reporting Methodology Regulations. Federal Register, Vol. 76, No. 250, Thursday, December 29, 2011. p. 81844 – 81850. http://www.gpo.gov/fdsys/pkg/FR-2011-12-29/pdf/2011-33302.pdf

National Marine Fisheries Service (NMFS). 2008. Magnuson-Stevens Fishery Conservation and Management Act Provisions; Fisheries of the Northeastern United States; Northeast Region Standardized Bycatch Reporting Methodology Omnibus Amendment. Federal Register, Vol. 73, No. 18, Monday, January 28, 2008. p. 4736-4758. Available on-line at: http://www.gpoaccess.gov/fr/retrieve.html

New England Fishery Management Council (NEFMC), Mid-Atlantic Fishery Management Council and National Marine Fisheries Service. 2007. Northeast Region Standardized Bycatch Reporting Methodology: An Omnibus Amendment to the Fishery Management Plans of the New England and Mid-Atlantic Fishery Management Councils. June 2007. 642 p. Available on-line at: http://www.nefmc.org/issues/sbrm/index.html

Palmer, MC, Hersey P, Marotta H, Shield G, Cierpich, SB. 2013. The design, implementation and performance of an observer pre-trip notification system (PTNS) for the northeast United States groundfish fishery. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 82 p. Available online at: http://www.nefsc.noaa.gov/publications/crd/crd1321/

Wigley SE, Blaylock J, Rago PJ, Shield G. 2013. 2013 discard estimation, precision, and sample size analyses for 14 federally managed species in the northeast region. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 150 p. Available online at: http://www.nefsc.noaa.gov/publications/crd/crd1315/

Wigley SE, Blaylock J, Rago PJ, Shield G. (in press). 2014 discard estimation, precision, and sample size analyses for 14 federally managed species in the northeast region. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 158 p. Will be available online at: http://www.nefsc.noaa.gov/publications/crd/

Wigley SE, Rago PJ, Sosebee KA, Palka DL. 2007. The Analytic Component to the Standardized Bycatch Reporting Methodology Omnibus Amendment: Sampling Design, and Estimation of Precision and Accuracy (2nd Edition). US Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 07-09; 156 p. Available online at: http://www.nefsc.noaa.gov/publications/crd/crd0709/

Table 1. A list of the 14 fish and invertebrate species groups and one species of sea turtles (in bold), with species group abbreviations in parentheses and scientific names in italics, and the species that compose these groups, corresponding to the 13 federal fishery management plans implements in the waters off the northeastern United States.

| | |
|---|---|
| **ATLANTIC SALMON (SAL)** | *Salmo salar* |
| **BLUEFISH (BLUE)** | *Pomatomus saltatrix* |
| **FLUKE - SCUP - BLACK SEA BASS (FSB)** | |
| Black sea bass | *Centropristis striata* |
| Fluke | *Paralichthys dentatus* |
| Scup | *Stenotomus chrysops* |
| **HERRING, ATLANTIC (HERR)** | *Clupea harengus* |
| **LARGE MESH GROUNDFISH (GFL)** | |
| American plaice | *Hippoglossoides platessoides* |
| Atlantic cod | *Gadus morhua* |
| Atlantic halibut | *Hippoglossus hippoglossus* |
| Atlantic wolffish | *Anarhichas lupus* |
| Haddock | *Melanogrammus aeglefinus* |
| Ocean pout | *Zoarces americanus* |
| Pollock | *Pollachius virens* |
| Redfish | *Sebastes fasciatus* |
| White hake | *Urophycis tenuis* |
| Windowpane flounder | *Scophthalmus aquosus* |
| Winter flounder | *Pseudopleuronectes americanus* |
| Witch flounder | *Glyptocephalus cynoglossus* |
| Yellowtail flounder | *Limanda ferruginea* |
| **MONKFISH (MONK)** | *Lophius americanus* |
| **RED CRAB (RCRAB)** | *Chaceon quinquedens* |
| **SEA SCALLOP (SCAL)** | *Placopecten magellanicus* |
| **SKATE COMPLEX (SKATE)**[7] | *Rajidae* |
| Barndoor skate | *Dipturus laevis* |
| Clearnose skate | *Raja eglanteria* |
| Little skate | *Leucoraja erinacea* |
| Rosette skate | *Leucoraja garmani* |
| Smooth skate | *Malacoraja senta* |
| Thorny skate | *Amblyraja radiata* |
| Winter skate | *Leucoraja ocellata* |
| **SMALL MESH GROUNDFISH (GFS)** | |
| Offshore hake | *Merluccius albidus* |
| Red hake | *Urophycis chuss* |
| Silver hake | *Merluccius bilinearis* |
| **SPINY DOGFISH (DOG)** | *Squalus acanthias* |
| **SQUID[8] - BUTTERFISH - MACKEREL (SBM)** | |
| Atlantic mackerel | *Scomber scombrus* |
| Butterfish | *Peprilus triacanthus* |
| Northern shortfin squid | *Illex illecebrosus* |
| Longfin inshore squid | *Doryteuthis (Amerigo) pealeii* |
| **SURFCLAM - OCEAN QUAHOG (SCOQ)** | |
| Surfclam | *Spisula solidissima* |
| Ocean quahog | *Artica islandica* |
| **TILEFISH (TILE)** | *Lopholatilus chamaeleonticeps* |
| **LOGGERHEAD TURTLE (TURS)** | *Caretta caretta* |

7 Skate complex is composed of seven species as well as skate, unknown.
8 Squid, unclassified is included in this species group. In this document, longfin inshore squid is referred to as longfin squid. Longfin inshore squid and northern shortfin squid are also known as Loligo squid and Illex squid, respectively.

Table 2. The number of sea days needed to achieve a 30% coefficient of variation of the discard estimate for each of the 14 fish and invertebrate species groups, the number of pilot sea days, the number of minimum pilot sea days, and the maximum number of sea days needed for each fleet (2014 Sea Days Needed) for fish and invertebrate species groups based on July 2012 through June 2013 data. Bold red font indicates basis for fleet sea days. "P" indicates fleets with "pilot" designation. Species group abbreviations are given in Table 1. *Taken from Table 6 in Wigley et al. (in press).*

| Row | Gear Type | Access Area | Trip Category | Region | Mesh Group | BLUE | HERR | SAL | RCRAB | SCAL | SBM | MONK | GFL | GFS | SKATE | DOG | FSB | SCOQ | TILE | Pilot Days | Min Pilot Days | 2014 Sea Days Needed | Pilot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Longline | OPEN | all | MA | all | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | **85** | 85 | 85 | P |
| 2 | Longline | OPEN | all | NE | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | **12** | 12 | |
| 3 | Hand Line | OPEN | all | MA | all | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | **74** | 13 | 74 | P |
| 4 | Hand Line | OPEN | all | NE | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | **14** | 14 | |
| 5 | Otter Trawl | OPEN | all | MA | sm | 0 | 0 | 0 | 1,147 | 0 | 827 | 223 | 562 | **1,289** | 517 | 135 | 169 | 0 | 0 | 140 | 27 | 1,289 | |
| 6 | Otter Trawl | OPEN | all | MA | lg | 0 | 0 | 0 | 0 | 0 | 0 | **1,007** | 114 | 0 | 83 | 328 | 265 | 0 | 0 | 225 | 31 | 1,007 | |
| 7 | Otter Trawl | OPEN | all | NE | sm | 0 | 0 | 0 | 0 | 0 | 722 | 0 | 0 | 854 | 0 | **1,601** | 1,035 | 0 | 0 | 146 | 28 | 1,601 | |
| 8 | Otter Trawl | OPEN | all | NE | lg | 0 | 0 | 0 | **7,262** | 0 | 0 | 159 | 160 | 525 | 307 | 240 | 1,162 | 0 | 0 | 433 | 33 | 7,262 | |
| 9 | Scallop Trawl | AA | GEN | MA | all | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | **6** | 6 | 6 | P |
| 10 | Scallop Trawl | AA | LIM | MA | all | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | **85** | 85 | 85 | P |
| 11 | Scallop Trawl | OPEN | GEN | MA | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | **24** | 24 | |
| 12 | Scallop Trawl | OPEN | LIM | MA | all | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | **58** | 58 | 58 | P |
| 13 | Scallop Trawl | OPEN | LIM | NE | all | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | **51** | 51 | 51 | P |
| 14 | Otter Trawl, Ruhle | OPEN | all | MA | lg | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | **60** | 60 | 60 | P |
| 15 | Otter Trawl, Ruhle | OPEN | all | NE | sm | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | **26** | 26 | 26 | P |
| 16 | Otter Trawl, Ruhle | OPEN | all | NE | lg | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | **54** | 54 | 54 | P |
| 17 | Otter Trawl, Haddock Separator | OPEN | all | NE | lg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 111 | **111** | 111 | |
| 18 | Shrimp Trawl | OPEN | all | MA | all | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | **57** | 45 | 57 | P |
| 19 | Shrimp Trawl | OPEN | all | NE | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **21** | 0 | 0 | 0 | 0 | 0 | 18 | 12 | 21 | |
| 20 | Floating Trap | OPEN | all | MA | all | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | **9** | 9 | 9 | P |
| 21 | Floating Trap | OPEN | all | NE | all | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | **6** | 6 | 6 | P |
| 22 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | sm | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | **38** | 13 | 38 | P |
| 23 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | lg | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | **49** | 13 | 49 | P |
| 24 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | xlg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | **14** | 14 | |
| 25 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | sm | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | **8** | 8 | 8 | P |
| 26 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | lg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **94** | 0 | 0 | 0 | 152 | 17 | 94 | |
| 27 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | xlg | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 0 | 0 | 134 | **148** | 0 | 0 | 0 | 76 | 19 | 148 | |
| 28 | Purse Seine | OPEN | all | MA | all | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | **12** | 9 | 12 | P |
| 29 | Purse Seine | OPEN | all | NE | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | **20** | 20 | |
| 30 | Scallop Dredge | AA | GEN | MA | all | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | **31** | 31 | 31 | P |
| 31 | Scallop Dredge | AA | GEN | NE | all | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | **30** | 30 | 30 | P |
| 32 | Scallop Dredge | AA | LIM | MA | all | 0 | 0 | 0 | 0 | 0 | 0 | **101** | 0 | 0 | 85 | 0 | 0 | 0 | 0 | 104 | 104 | 101 | |
| 33 | Scallop Dredge | AA | LIM | NE | all | 0 | 0 | 0 | 0 | 0 | 0 | 192 | **254** | 0 | 101 | 0 | 0 | 0 | 0 | 137 | 104 | 254 | |
| 34 | Scallop Dredge | OPEN | GEN | MA | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **42** | 0 | 0 | 0 | 0 | 79 | 19 | 42 | |
| 35 | Scallop Dredge | OPEN | GEN | NE | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 94 | **15** | 15 | |
| 36 | Scallop Dredge | OPEN | LIM | MA | all | 0 | 0 | 0 | 0 | 0 | 0 | **118** | 0 | 0 | 117 | 0 | 0 | 0 | 0 | 106 | 106 | 118 | |
| 37 | Scallop Dredge | OPEN | LIM | NE | all | 0 | 0 | 0 | 0 | 398 | 0 | **821** | 120 | 0 | 302 | 0 | 0 | 0 | 0 | 224 | 105 | 821 | |
| 38 | Danish Seine | OPEN | all | MA | all | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | **9** | 9 | 9 | P |
| 39 | Mid-water Paired & Single Trawl | OPEN | all | MA | all | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | **43** | 43 | 43 | P |
| 40 | Mid-water Paired & Single Trawl | OPEN | all | NE | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | **45** | 45 | |
| 41 | Pots and Traps, Fish | OPEN | all | MA | all | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | **19** | 12 | 19 | P |
| 42 | Pots and Traps, Fish | OPEN | all | NE | all | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | **24** | 17 | 24 | P |

Table 2 continued. The number of sea days needed to achieve a 30% coefficient of variation of the discard estimate for each of the 14 fish and invertebrate species groups, the number of pilot sea days, the number of minimum pilot sea days, and the maximum number of sea days needed for each fleet (2014 Sea Days Needed) for fish and invertebrate species groups based on July 2012 through June 2013 data. Bold red font indicates basis for fleet sea days. "P" indicates fleets with "pilot" designation. Species group abbreviations are given in Table 1. *Taken from Table 6 in Wigley et al. (in press).*

| Row | Gear Type | Access Area | Trip Category | Region | Mesh Group | BLUE | HERR | SAL | RCRAB | SCAL | SBM | MONK | GFL | GFS | SKATE | DOG | FSB | SCOQ | TILE | Pilot Days | Min Pilot Days | 2014 Sea Days Needed | Pilot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | Pots and Traps, Conch | OPEN | all | MA | all | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | **30** | 14 | 30 | P |
| 44 | Pots and Traps, Conch | OPEN | all | NE | all | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | **26** | 12 | 26 | P |
| 45 | Pots and Traps, Hagfish | OPEN | all | NE | all | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | **73** | 73 | 73 | P |
| 46 | Pots and Traps, Shrimp | OPEN | all | NE | all | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | **3** | 3 | 3 | P |
| 47 | Pots and Traps, Lobster | OPEN | all | MA | all | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | **51** | 17 | 51 | P |
| 48 | Pots and Traps, Lobster | OPEN | all | NE | all | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **165** | 0 | 0 | 0 | 0 | 0 | 0 | 444 | 17 | 165 | |
| 49 | Pots and Traps, Crab | OPEN | all | MA | all | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | **15** | 15 | 15 | P |
| 50 | Pots and Traps, Crab | OPEN | all | NE | all | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 | **97** | 97 | 97 | P |
| 51 | Beam Trawl | OPEN | all | MA | all | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | **25** | 25 | 25 | P |
| 52 | Beam Trawl | OPEN | all | NE | all | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | **11** | 11 | 11 | P |
| 53 | Dredge, Other | OPEN | all | MA | all | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | **19** | 19 | 19 | P |
| 54 | Ocean Quahog/Surfclam Dredge | OPEN | all | MA | all | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | **76** | 25 | 76 | P |
| 55 | Ocean Quahog/Surfclam Dredge | OPEN | all | NE | all | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | **63** | 14 | 63 | P |
| 56+ | Otter Trawl | OPEN | all | NE | smR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | **28** | 28 | |
| | | | | | **Totals** | **1,323** | **1,323** | **1,323** | **9,732** | **1,721** | **2,872** | **4,065** | **2,698** | **4,012** | **3,011** | **3,869** | **3,954** | **1,323** | **1,323** | **4,055** | **1,913** | **14,529** | |

Table 3. The number of sea days needed to monitor fish/invertebrates (FISH), loggerhead turtles (TURS), combined species groups (COMBINED) by fleet (Steps 1 through 5), and the number of funded sea days for April 2014 through March 2015 (Steps 6 though 8). "+" indicates new fleets in 2014.

| | | | | | | Step 1 | Step 2 | Step 3 | Step 4a | Step 4b | Step 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | Gear Type | Access Area | Trip Cat. | Region | Mesh | 2014 Sea Days Needed FISH | 2014 Sea Days Needed FISH **FILTERED** | 2012, 2013, 2014 Sea Days Needed for TURS | % by FISH fleet | TURS Sea Days by FISH fleet | 2014 Sea Days Needed COMBINED |
| 1 | Longline | OPEN | all | MA | all | 85 | 85 | | | | 85 |
| 2 | Longline | OPEN | all | NE | all | 12 | 12 | | | | 12 |
| 3 | Hand Line | OPEN | all | MA | all | 74 | 74 | | | | 74 |
| 4 | Hand Line | OPEN | all | NE | all | 14 | 14 | | | | 14 |
| 5 | Otter Trawl | OPEN | all | MA | sm | 1,289 | 1,289 | 4,838 | 0.556 | **2,688** | 2,688 |
| 6 | Otter Trawl | OPEN | all | MA | lg | 1,007 | 1,007 | | 0.434 | **2,100** | 2,100 |
| 7 | Otter Trawl | OPEN | all | NE | sm | 1,601 | 1,601 | | | | 1,601 |
| 8 | Otter Trawl | OPEN | all | NE | lg | 7,262 | 7,262 | | | | 7,262 |
| 9 | Scallop Trawl | AA | GEN | MA | all | 6 | 0 | | 0.000 | **0** | 0 |
| 10 | Scallop Trawl | AA | LIM | MA | all | 85 | 0 | | 0.000 | **0** | 0 |
| 11 | Scallop Trawl | OPEN | GEN | MA | all | 24 | 24 | | 0.010 | **50** | 50 |
| 12 | Scallop Trawl | OPEN | LIM | MA | all | 58 | 0 | | 0.000 | **0** | 0 |
| 13+ | Scallop Trawl | OPEN | LIM | NE | all | 51 | 0 | | | | 0 |
| 14 | Otter Trawl, Ruhle | OPEN | all | MA | lg | 60 | 0 | | | | 0 |
| 15 | Otter Trawl, Ruhle | OPEN | all | NE | sm | 26 | 0 | | | | 0 |
| 16 | Otter Trawl, Ruhle | OPEN | all | NE | lg | 54 | 0 | | | | 0 |
| 17 | Otter Trawl, Haddock Separator | OPEN | all | NE | lg | 111 | 0 | | | | 0 |
| 18 | Shrimp Trawl | OPEN | all | MA | all | 57 | 57 | | | | 57 |
| 19 | Shrimp Trawl | OPEN | all | NE | all | 21 | 21 | | | | 21 |
| 20 | Floating Trap | OPEN | all | MA | all | 9 | 0 | | | | 0 |
| 21 | Floating Trap | OPEN | all | NE | all | 6 | 0 | | | | 0 |
| 22 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | sm | 38 | 38 | | 0.376 | **976** | 976 |
| 23 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | lg | 49 | 49 | 2,593 | 0.485 | **1,258** | 1,258 |
| 24 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | xlg | 14 | 14 | | 0.139 | **359** | 359 |
| 25 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | sm | 8 | 0 | | | | 0 |
| 26 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | lg | 94 | 94 | | | | 94 |
| 27 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | xlg | 148 | 148 | | | | 148 |
| 28 | Purse Seine | OPEN | all | MA | all | 12 | 12 | | | | 12 |
| 29 | Purse Seine | OPEN | all | NE | all | 20 | 20 | | | | 20 |
| 30 | Scallop Dredge | AA | GEN | MA | all | 31 | 0 | | 0.000 | **0** | 0 |
| 31 | Scallop Dredge | AA | GEN | NE | all | 30 | 0 | | | | 0 |
| 32 | Scallop Dredge | AA | LIM | MA | all | 101 | 101 | 1,293 | 0.387 | **500** | 500 |
| 33 | Scallop Dredge | AA | LIM | NE | all | 254 | 254 | | | | 254 |
| 34 | Scallop Dredge | OPEN | GEN | MA | all | 42 | 42 | | 0.161 | **208** | 208 |
| 35 | Scallop Dredge | OPEN | GEN | NE | all | 15 | 15 | | | | 15 |
| 36 | Scallop Dredge | OPEN | LIM | MA | all | 118 | 118 | | 0.452 | **585** | 585 |
| 37 | Scallop Dredge | OPEN | LIM | NE | all | 821 | 821 | | | | 821 |
| 38 | Danish Seine | OPEN | all | MA | all | 9 | 0 | | | | 0 |
| 39 | Mid-water Paired & Single Trawl | OPEN | all | MA | all | 43 | 0 | | | | 0 |
| 40 | Mid-water Paired & Single Trawl | OPEN | all | NE | all | 45 | 45 | | | | 45 |
| 41 | Pots and Traps, Fish | OPEN | all | MA | all | 19 | 19 | | | | 19 |
| 42 | Pots and Traps, Fish | OPEN | all | NE | all | 24 | 24 | | | | 24 |
| 43 | Pots and Traps, Conch | OPEN | all | MA | all | 30 | 30 | | | | 30 |
| 44 | Pots and Traps, Conch | OPEN | all | NE | all | 26 | 26 | | | | 26 |
| 45 | Pots and Traps, Hagfish | OPEN | all | NE | all | 73 | 0 | | | | 0 |
| 46 | Pots and Traps, Shrimp | OPEN | all | NE | all | 3 | 0 | | | | 0 |
| 47 | Pots and Traps, Lobster | OPEN | all | MA | all | 51 | 51 | | | | 51 |
| 48 | Pots and Traps, Lobster | OPEN | all | NE | all | 165 | 165 | | | | 165 |
| 49 | Pots and Traps, Crab | OPEN | all | MA | all | 15 | 0 | | | | 0 |
| 50 | Pots and Traps, Crab | OPEN | all | NE | all | 97 | 0 | | | | 0 |
| 51 | Beam Trawl | OPEN | all | MA | all | 25 | 0 | | | | 0 |
| 52 | Beam Trawl | OPEN | all | NE | all | 11 | 0 | | | | 0 |
| 53 | Dredge, Other | OPEN | all | MA | all | 19 | 19 | | | | 19 |
| 54 | Ocean Quahog/Surfclam Dredge | OPEN | all | MA | all | 76 | 76 | | | | 76 |
| 55 | Ocean Quahog/Surfclam Dredge | OPEN | all | NE | all | 63 | 63 | | | | 63 |
| 56+ | Otter Trawl | OPEN | all | NE | smR | 28 | 0 | | | | 0 |
| | | | | | **Total** | **14,529** | **13,690** | **8,724** | | | **19,732** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Step 6** | Agency Fleets (Sea Days Needed) | **12,893** | **12,315** | | | **17,299** |
| | Industry Fleets (Sea Days Needed) | **1,636** | **1,375** | | | **2,433** |
| **Step 7** | Agency Fleets (Sea Days Funded) | | | Prioritized | | **6,001** |
| | Agency Fleets (Sea Days Funded) | | | Non-prioritized (ASM) | | **6,586** |
| | Agency Fleets (Sea Days Funded) | | | Non-prioritized (MMPA) | | **566** |
| | Agency Fleets (Sea Days Funded) | | | Non-prioritized (Herring Management) | | **646** |
| | Industry Fleets (Sea Days Funded) | | | | | **2,703** |
| **Step 8** | Agency Fleet Difference | | | SHORTFALL | | **-11,298** |
| | Industry Fleet Difference | | | SURPLUS | | **270** |

| | | | | | |
|---|---|---|---|---|---|
| Turtle Gear Types | MA Trawl | **2,469** | **2,320** | 4,838 | 4,838 |
| | MA Gillnet | 101 | 101 | **2,593** | 2,593 |
| | MA Dredge | 292 | 261 | **1,293** | 1,293 |

| | |
|---|---|
| **KEY:** AF = Agency funded fleets | IF = Industry funded fleets |
| Steps independent of prioritization approach | |

Table 4. The 2014 sea days needed (COMBINED; Step 5) and the information used in the penultimate approach to prioritize sea days to fleets for agency-funded days that are applicable to the prioritization process (Steps 9.1 through 9.5). "+" indicates new fleets in 2014.

| | | | | | | Step 5 | Step 9.1 | | | | | | | | Step 9.2 | | | | | | | | Step 9.3 | | Step 9.4 | Step 9.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | Gear Type | Access Area | Trip Cat. | Region | Mesh | 2014 Sea Days Needed COMBINED | Penultimate sea days needed for the 15 species groups, in descending order with MPC as minimum for fleet | | | | | | | | Sea day differences between adjacent species groups within a row (red font indicated values used in Step 9.3) | | | | | | | | Sea day differences, in descending order with fleet constraint | Cumulative reduction of sea days | 2014 Sea Days PRIORITIZED (Penultimate) | 2014 Sea Days PRIORITIZED (Penultimate) **Adjusted** |
| 1 | Longline | OPEN | all | MA | all | 85 | | | | | | | | | | | | | | | | | 6,100 | 6,100 | 85 | 85 |
| 2 | Longline | OPEN | all | NE | all | 12 | 12 | | | | | | | | 0 | | | | | | | | 1,399 | 7,499 | 12 | 12 |
| 3 | Hand Line | OPEN | all | MA | all | 74 | 13 | | | | | | | | 61 | | | | | | | | 1,209 | 8,708 | 74 | 74 |
| 4 | Hand Line | OPEN | all | NE | all | 14 | 14 | | | | | | | | 0 | | | | | | | | 1,093 | 9,801 | 14 | 14 |
| 5 | Otter Trawl | OPEN | all | MA | sm | 2,688 | 1,289 | 1,147 | 827 | 562 | 517 | 223 | 169 | 135 | 1,399 | 142 | 320 | 265 | 45 | 294 | 54 | 34 | 938 | 10,739 | 1,289 | 1,289 |
| 6 | Otter Trawl | OPEN | all | MA | lg | 2,100 | 1,007 | 328 | 265 | 114 | 83 | 31 | | | 1,093 | 679 | 63 | 151 | 31 | 52 | | | 559 of 679 | 11,298 | 448 | 587 |
| 7 | Otter Trawl | OPEN | all | NE | sm | 1,601 | 1,035 | 854 | 722 | 28 | | | | | 566 | 181 | 132 | 694 | | | | | | | 1,601 | 1,601 |
| 8 | Otter Trawl | OPEN | all | NE | lg | 7,262 | 1,162 | 525 | 307 | 240 | 160 | 159 | 33 | | 6,100 | 637 | 218 | 67 | 80 | 1 | 126 | | | | 1,162 | 1,162 |
| 9 | Scallop Trawl | AA | GEN | MA | all | 0 | | | | | | | | | | | | | | | | | | | | |
| 10 | Scallop Trawl | AA | LIM | MA | all | 0 | | | | | | | | | | | | | | | | | | | | |
| 11 | Scallop Trawl | OPEN | GEN | MA | all | 50 | | | | | | | | | | | | | | | | | | | | |
| 12 | Scallop Trawl | OPEN | LIM | MA | all | 0 | | | | | | | | | | | | | | | | | | | | |
| 13+ | Scallop Trawl | OPEN | LIM | NE | all | 0 | | | | | | | | | | | | | | | | | | | | |
| 14 | Otter Trawl, Ruhle | OPEN | all | MA | lg | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 15 | Otter Trawl, Ruhle | OPEN | all | NE | sm | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 16 | Otter Trawl, Ruhle | OPEN | all | NE | lg | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 17 | Otter Trawl, Haddock Separator | OPEN | all | NE | lg | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 18 | Shrimp Trawl | OPEN | all | MA | all | 57 | 45 | | | | | | | | 12 | | | | | | | | | | 57 | 57 |
| 19 | Shrimp Trawl | OPEN | all | NE | all | 21 | 12 | | | | | | | | 9 | | | | | | | | | | 21 | 21 |
| 20 | Floating Trap | OPEN | all | MA | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 21 | Floating Trap | OPEN | all | NE | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 22 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | sm | 976 | 38 | 13 | | | | | | | 938 | 25 | | | | | | | | | 38 | 38 |
| 23 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | lg | 1,258 | 49 | 13 | | | | | | | 1,209 | 36 | | | | | | | | | 49 | 49 |
| 24 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | xlg | 359 | 14 | | | | | | | | 345 | | | | | | | | | | 359 | 359 |
| 25 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | sm | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 26 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | lg | 94 | 17 | | | | | | | | 77 | | | | | | | | | | 94 | 94 |
| 27 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | xlg | 148 | 134 | 121 | 19 | | | | | | 14 | 13 | 102 | | | | | | | | 148 | 148 |
| 28 | Purse Seine | OPEN | all | MA | all | 12 | 9 | | | | | | | | 3 | | | | | | | | | | 12 | 12 |
| 29 | Purse Seine | OPEN | all | NE | all | 20 | 20 | | | | | | | | 0 | | | | | | | | | | 20 | 20 |
| 30 | Scallop Dredge | AA | GEN | MA | all | 0 | | | | | | | | | | | | | | | | | | | | |
| 31 | Scallop Dredge | AA | GEN | NE | all | 0 | | | | | | | | | | | | | | | | | | | | |
| 32 | Scallop Dredge | AA | LIM | MA | all | 500 | | | | | | | | | | | | | | | | | | | | |
| 33 | Scallop Dredge | AA | LIM | NE | all | 254 | | | | | | | | | | | | | | | | | | | | |
| 34 | Scallop Dredge | OPEN | GEN | MA | all | 208 | | | | | | | | | | | | | | | | | | | | |
| 35 | Scallop Dredge | OPEN | GEN | NE | all | 15 | | | | | | | | | | | | | | | | | | | | |
| 36 | Scallop Dredge | OPEN | LIM | MA | all | 585 | | | | | | | | | | | | | | | | | | | | |
| 37 | Scallop Dredge | OPEN | LIM | NE | all | 821 | | | | | | | | | | | | | | | | | | | | |
| 38 | Danish Seine | OPEN | all | MA | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 39 | Mid-water Paired & Single Trawl | OPEN | all | MA | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 40 | Mid-water Paired & Single Trawl | OPEN | all | NE | all | 45 | 45 | | | | | | | | 0 | | | | | | | | | | 45 | 45 |
| 41 | Pots and Traps, Fish | OPEN | all | MA | all | 19 | 12 | | | | | | | | 7 | | | | | | | | | | 19 | 19 |
| 42 | Pots and Traps, Fish | OPEN | all | NE | all | 24 | 17 | | | | | | | | 7 | | | | | | | | | | 24 | 24 |
| 43 | Pots and Traps, Conch | OPEN | all | MA | all | 30 | 14 | | | | | | | | 16 | | | | | | | | | | 30 | 30 |
| 44 | Pots and Traps, Conch | OPEN | all | NE | all | 26 | 12 | | | | | | | | 14 | | | | | | | | | | 26 | 26 |
| 45 | Pots and Traps, Hagfish | OPEN | all | NE | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 46 | Pots and Traps, Shrimp | OPEN | all | NE | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 47 | Pots and Traps, Lobster | OPEN | all | MA | all | 51 | 17 | | | | | | | | 34 | | | | | | | | | | 51 | 51 |
| 48 | Pots and Traps, Lobster | OPEN | all | NE | all | 165 | 17 | | | | | | | | 148 | | | | | | | | | | 165 | 165 |
| 49 | Pots and Traps, Crab | OPEN | all | MA | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 50 | Pots and Traps, Crab | OPEN | all | NE | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 51 | Beam Trawl | OPEN | all | MA | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 52 | Beam Trawl | OPEN | all | NE | all | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| 53 | Dredge, Other | OPEN | all | MA | all | 19 | 19 | | | | | | | | 0 | | | | | | | | | | 19 | 19 |
| 54 | Ocean Quahog/Surfclam Dredge | OPEN | all | MA | all | 76 | 25 | | | | | | | | 51 | | | | | | | | | | 76 | 0 |
| 55 | Ocean Quahog/Surfclam Dredge | OPEN | all | NE | all | 63 | 14 | | | | | | | | 49 | | | | | | | | | | 63 | 0 |
| 56+ | Otter Trawl | OPEN | all | NE | smR | 0 | | | | | | | | | | | | | | | | | | | 0 | 0 |
| | | | | | **Total** | **19,732** | | | | | | | | | | | | | | | | | | | **6,001** | **6,001** |

| | | | |
|---|---|---|---|
| **Step 6** | Agency Fleets (Sea Days Needed) | **17,299** | |
| | Industry Fleets (Sea Days Needed) | **2,433** | |
| **Step 7** | Agency Fleets (Sea Days Funded) | **6,001** | **Prioritized days** |
| | Agency Fleets (Sea Days Funded) | **6,586** | **Non-prioritized days (ASM)** |
| | Agency Fleets (Sea Days Funded) | **566** | **Non-prioritized days (MMPA)** |
| | Agency Fleets (Sea Days Funded) | **646** | **Non-prioritized days (Herring Management)** |
| | Industry Fleets (Sea Days Funded) | **2,703** | **Industy-funded scallop days** |
| **Step 8** | Agency Fleet Difference | **-11,298** | |
| | Industry Fleet Difference | **270** | |
| Turtle Gear Types | MA Trawl | 4,838 | |
| | MA Gillnet | 2,593 | |
| | MA Dredge | 1,293 | |

| | |
|---|---|
| **KEY:** AF = Agency funded fleets | IF = Industry funded fleets |
| Steps independent of prioritization approach | |
| Prioritization Steps | Fleets with reduction in sea days |

Table 5. The number of sea days needed to monitor the combined species groups (COMBINED; Step 5), prioritized days (Step 9.5), non-prioritized days (Step 10), industry-funded days (Step 11), and the 2014 proposed observer sea days allocated for April 2014 through March 2015, by fleet. Note: * indicates all coverage is dependent on industry activity; ** indicates some coverage is dependent on industry activity; *** indicates coverage for protected species bycatch (not applicable to non-ESA listed fish and invertebrates); + indicates new fleets in 2014.

| | | | | | | Step 5 | Step 9.5 | Step 10 | Step 11 | Step 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | Gear Type | Access Area | Trip Cat. | Region | Mesh | 2014 Sea Days Needed COMBINED | 2014 Sea Days PRIORITIZED (Penultimate) **Adjusted** | 2014 Sea Days non-prioritized (ASM, MMPA, herring) | 2014 Industry-funded Sea Days | Sea Days Allocated for April 2014 - March 2015 (TOTAL) | Comments |
| 1 | Longline | OPEN | all | MA | all | 85 | 85 | 0 | | 85 | Fish stock assessment support |
| 2 | Longline | OPEN | all | NE | all | 12 | 12 | 252 | | 264 | Fish stock assessment support * |
| 3 | Hand Line | OPEN | all | MA | all | 74 | 74 | 6 | | 80 | Fish stock assessment support ** |
| 4 | Hand Line | OPEN | all | NE | all | 14 | 14 | 123 | | 137 | Fish stock assessment support ** |
| 5 | Otter Trawl | OPEN | all | MA | sm | 2,688 | 1,289 | 0 | | 1,289 | Fish stock assessment and turtle bycatch support ** |
| 6 | Otter Trawl | OPEN | all | MA | lg | 2,100 | 587 | 51 | | 638 | Fish stock assessment and turtle bycatch support ** |
| 7 | Otter Trawl | OPEN | all | NE | sm | 1,601 | 1,601 | 3 | | 1,604 | Fish stock assessment support ** |
| 8 | Otter Trawl | OPEN | all | NE | lg | 7,262 | 1,162 | 3,016 | | 4,178 | *Fish stock assessment support ** |
| 9 | Scallop Trawl | AA | GEN | MA | all | 0 | | | | | Industry funded* (see Row 32) |
| 10 | Scallop Trawl | AA | LIM | MA | all | 0 | | | | | Industry funded * (see Row 32) |
| 11 | Scallop Trawl | OPEN | GEN | MA | all | 50 | | | | | Industry funded * (see Row 35) |
| 12 | Scallop Trawl | OPEN | LIM | MA | all | 0 | | | | | Industry funded * (see Row 37) |
| 13+ | Scallop Trawl | OPEN | LIM | NE | all | 0 | | | | | Industry funded * (see Row 35) |
| 14 | Otter Trawl, Ruhle | OPEN | all | MA | lg | 0 | 0 | 0 | | 0 | |
| 15 | Otter Trawl, Ruhle | OPEN | all | NE | sm | 0 | 0 | 0 | | 0 | |
| 16 | Otter Trawl, Ruhle | OPEN | all | NE | lg | 0 | 0 | 13 | | 13 | Fish stock assessment support * |
| 17 | Otter Trawl, Haddock Separator | OPEN | all | NE | lg | 0 | 0 | 154 | | 154 | Fish stock assessment support * |
| 18 | Shrimp Trawl | OPEN | all | MA | all | 57 | 57 | 0 | | 57 | Fish stock assessment support |
| 19 | Shrimp Trawl | OPEN | all | NE | all | 21 | 21 | 0 | | 21 | Fish stock assessment support |
| 20 | Floating Trap | OPEN | all | MA | all | 0 | 0 | 0 | | 0 | |
| 21 | Floating Trap | OPEN | all | NE | all | 0 | 0 | 0 | | 0 | |
| 22 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | sm | 976 | 38 | 0 | | 38 | Fish stock assessment and turtle bycatch support ** |
| 23 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | lg | 1,258 | 49 | 0 | | 49 | Fish stock assessment and turtle bycatch support ** |
| 24 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | xlg | 359 | 359 | 0 | | 359 | Fish stock assessment and turtle bycatch support ** |
| 25 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | sm | 0 | 0 | 0 | | 0 | Fish stock assessment support ** |
| 26 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | lg | 94 | 94 | 1,582 | | 1,676 | Fish stock assessment support ** |
| 27 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | xlg | 148 | 148 | 728 | | 876 | Fish stock assessment support ** |
| 28 | Purse Seine | OPEN | all | MA | all | 12 | 12 | 0 | | 12 | Fish stock assessment support |
| 29 | Purse Seine | OPEN | all | NE | all | 20 | 20 | 0 | | 20 | Fish stock assessment support |
| 30 | Scallop Dredge | AA | GEN | MA | all | 0 | | | | | Industry funded * (see Row 32) |
| 31 | Scallop Dredge | AA | GEN | NE | all | 0 | | | | | Industry funded * (see Row 33) |
| 32 | Scallop Dredge | AA | LIM | MA | all | 500 | | | 246 | 246 | Industry funded * (Rows 9, 10, 30, & 32) |
| 33 | Scallop Dredge | AA | LIM | NE | all | 254 | | | 364 | 364 | Industry funded * (Rows 31 & 33) |
| 34 | Scallop Dredge | OPEN | GEN | MA | all | 208 | | | | | Industry funded * (see Row 35) |
| 35 | Scallop Dredge | OPEN | GEN | NE | all | 15 | | | 248 | 248 | Industry funded * (Rows 11, 13, 34, & 35) |
| 36 | Scallop Dredge | OPEN | LIM | MA | all | 585 | | | | | Industry funded * (see Rows 37) |
| 37 | Scallop Dredge | OPEN | LIM | NE | all | 821 | | | 1,845 | 1,845 | Industry funded * (Rows 12, 36, & 37) |
| 38 | Danish Seine | OPEN | all | MA | all | 0 | 0 | 0 | | 0 | |
| 39 | Mid-water Paired & Single Trawl | OPEN | all | MA | all | 0 | 0 | 0 | | 0 | |
| 40 | Mid-water Paired & Single Trawl | OPEN | all | NE | all | 45 | 45 | 0 | | 45 | Fish stock assessment support |
| 41 | Pots and Traps, Fish | OPEN | all | MA | all | 19 | 19 | 0 | | 19 | Fish stock assessment support |
| 42 | Pots and Traps, Fish | OPEN | all | NE | all | 24 | 24 | 0 | | 24 | Fish stock assessment support |
| 43 | Pots and Traps, Conch | OPEN | all | MA | all | 30 | 30 | 0 | | 30 | Fish stock assessment support |
| 44 | Pots and Traps, Conch | OPEN | all | NE | all | 26 | 26 | 0 | | 26 | Fish stock assessment support |
| 45 | Pots and Traps, Hagfish | OPEN | all | NE | all | 0 | 0 | 0 | | 0 | |
| 46 | Pots and Traps, Shrimp | OPEN | all | NE | all | 0 | 0 | 0 | | 0 | |
| 47 | Pots and Traps, Lobster | OPEN | all | MA | all | 51 | 51 | 0 | | 51 | Fish stock assessment support |
| 48 | Pots and Traps, Lobster | OPEN | all | NE | all | 165 | 165 | 0 | | 165 | Fish stock assessment support |
| 49 | Pots and Traps, Crab | OPEN | all | MA | all | 0 | 0 | 0 | | 0 | |
| 50 | Pots and Traps, Crab | OPEN | all | NE | all | 0 | 0 | 0 | | 0 | |
| 51 | Beam Trawl | OPEN | all | MA | all | 0 | 0 | 0 | | 0 | |
| 52 | Beam Trawl | OPEN | all | NE | all | 0 | 0 | 0 | | 0 | |
| 53 | Dredge, Other | OPEN | all | MA | all | 19 | 19 | 0 | | 19 | Fish stock assessment support |
| 54 | Ocean Quahog/Surfclam Dredge | OPEN | all | MA | all | 76 | 0 | 0 | | 0 | |
| 55 | Ocean Quahog/Surfclam Dredge | OPEN | all | NE | all | 63 | 0 | 0 | | 0 | |
| 56+ | Otter Trawl | OPEN | all | NE | smR | 0 | 0 | 0 | | 0 | |
| | Herring management coverage | | | | | | | 646 | | 646 | Coverage associated with Row 40* |
| | MMPA coverage | | | | | | | 566 | | 566 | Coverage associated with Rows 22-27 *** |
| | Additional coverage beyond 26% ASM requirement | | | | | | | 658 | | 658 | Coverage assoicated with ASM groundfish fleets* |
| | | | | | **Total** | **19,732** | **6,001** | **7,798** | **2,703** | **16,502** | |

| | | | |
|---|---|---|---|
| **Step 6** | Agency Fleets (Sea Days Needed) | **17,299** | |
| | Industry Fleets (Sea Days Needed) | **2,433** | |
| **Step 7** | Agency Fleets (Sea Days Funded) | **6,001** | **Prioritized days** |
| | Agency Fleets (Sea Days Funded) | **6,586** | **Non-prioritized days (ASM)** |
| | Agency Fleets (Sea Days Funded) | **566** | **Non-prioritized days (MMPA)** |
| | Agency Fleets (Sea Days Funded) | **646** | **Non-prioritized days (Herring Management)** |
| | Industry Fleets (Sea Days Funded) | **2,703** | **Industy-funded scallop days** |
| **Step 8** | Agency Fleet Difference | **-11,298** | |
| | Industry Fleet Difference | **270** | |

| | | |
|---|---|---|
| Turtle Gear Types | MA Trawl | 4,838 |
| | MA Gillnet | 2,593 |
| | MA Dredge | 1,293 |

| | |
|---|---|
| **KEY:** AF = Agency funded fleets | IF = Industry funded fleets |
| Steps independent of prioritization approach | |
| Prioritization Steps | Fleets with reduction in sea days |

Appendix Table 1.  Stratification abbreviations used for 2014 fleets.

| Abbreviation | Definition |
|---|---|
| MA | Mid-Atlantic ports (CT and southward) |
| NE | New England ports (RI and northward) |
| sm | Small mesh (less than 5.5 in) |
| smR | Small mesh (4.5 in) |
| lg | Large mesh (5.5 to 7.99 in for gillnet; 5.5 in and greater for otter trawl) |
| xlg | Extra-large mesh (8 in and greater) |
| LIM | Limited access category |
| GEN | General category |
| OPEN | Non-access area |
| AA | Access area |

Appendix Table 2. The number of Vessel Trip Reports (VTR) trips, by fleet and calendar quarter (Q) during July 2012 through June 2013. “P” indicates fleets with “pilot” designation. The percentage and cumulative percentage for each fleet, when fleets are ranked from smallest to largest, is also presented. The shaded cells represent the fleets containing the lowest cumulative 1% of all trips.

| | | | | | | VTR TRIPS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Row** | **Gear Type** | **Access Area** | **Trip Category** | **Region** | **Mesh Group** | Q3 | Q4 | Q1 | Q2 | TOTAL | Pilot |
| 1 | Longline | OPEN | all | MA | all | 59 | 24 | 20 | 56 | **159** | P |
| 2 | Longline | OPEN | all | NE | all | 742 | 184 | 136 | 58 | **1,120** | |
| 3 | Hand Line | OPEN | all | MA | all | 1,702 | 756 | 131 | 796 | **3,385** | P |
| 4 | Hand Line | OPEN | all | NE | all | 1,391 | 207 | 35 | 407 | **2,040** | |
| 5 | Otter Trawl | OPEN | all | MA | sm | 1,624 | 750 | 393 | 802 | **3,569** | |
| 6 | Otter Trawl | OPEN | all | MA | lg | 1,595 | 907 | 939 | 1,382 | **4,823** | |
| 7 | Otter Trawl | OPEN | all | NE | sm | 1,298 | 728 | 444 | 845 | **3,315** | |
| 8 | Otter Trawl | OPEN | all | NE | lg | 2,287 | 1,979 | 1,848 | 1,787 | **7,901** | |
| 9 | Scallop Trawl | AA | GEN | MA | all | 1 | | | | **1** | P |
| 10 | Scallop Trawl | AA | LIM | MA | all | 4 | 1 | | 1 | **6** | P |
| 11 | Scallop Trawl | OPEN | GEN | MA | all | 105 | 23 | 52 | 149 | **329** | |
| 12 | Scallop Trawl | OPEN | LIM | MA | all | 5 | 3 | 9 | 11 | **28** | P |
| 13+ | Scallop Trawl | OPEN | LIM | NE | all | 1 | 4 | 1 | | **6** | P |
| 14 | Otter Trawl, Ruhle | OPEN | all | MA | lg | 2 | 4 | 1 | | **7** | P |
| 15 | Otter Trawl, Ruhle | OPEN | all | NE | sm | 1 | | 16 | 1 | **18** | P |
| 16 | Otter Trawl, Ruhle | OPEN | all | NE | lg | | 2 | | 4 | **6** | P |
| 17 | Otter Trawl, Haddock Separator | OPEN | all | NE | lg | 15 | 22 | 16 | 18 | **71** | |
| 18 | Shrimp Trawl | OPEN | all | MA | all | 256 | 64 | | 3 | **323** | P |
| 19 | Shrimp Trawl | OPEN | all | NE | all | 87 | 13 | 443 | 30 | **573** | |
| 20 | Floating Trap | OPEN | all | MA | all | 35 | 3 | | 33 | **71** | P |
| 21 | Floating Trap | OPEN | all | NE | all | 13 | | | 12 | **25** | P |
| 22 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | sm | 675 | 480 | 343 | 308 | **1,806** | P |
| 23 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | lg | 371 | 1,095 | 497 | 371 | **2,334** | P |
| 24 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | xlg | 71 | 464 | 381 | 1,061 | **1,977** | |
| 25 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | sm | 2 | 1 | | | **3** | P |
| 26 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | lg | 3,446 | 1,441 | 320 | 807 | **6,014** | |
| 27 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | xlg | 965 | 441 | 297 | 810 | **2,513** | |
| 28 | Purse Seine | OPEN | all | MA | all | 299 | 38 | | 104 | **441** | P |
| 29 | Purse Seine | OPEN | all | NE | all | 230 | 29 | | 60 | **319** | |
| 30 | Scallop Dredge | AA | GEN | MA | all | 7 | 7 | 7 | 6 | **27** | P |
| 31 | Scallop Dredge | AA | GEN | NE | all | 29 | 10 | 3 | 19 | **61** | P |
| 32 | Scallop Dredge | AA | LIM | MA | all | 130 | 38 | 61 | 108 | **337** | |
| 33 | Scallop Dredge | AA | LIM | NE | all | 240 | 199 | 75 | 198 | **712** | |
| 34 | Scallop Dredge | OPEN | GEN | MA | all | 823 | 465 | 534 | 710 | **2,532** | |
| 35 | Scallop Dredge | OPEN | GEN | NE | all | 882 | 770 | 970 | 1,251 | **3,873** | |
| 36 | Scallop Dredge | OPEN | LIM | MA | all | 125 | 65 | 64 | 121 | **375** | |
| 37 | Scallop Dredge | OPEN | LIM | NE | all | 368 | 200 | 179 | 502 | **1,249** | |
| 38 | Danish Seine | OPEN | all | MA | all | 93 | 7 | | 55 | **155** | P |
| 39 | Mid-water Paired & Single Trawl | OPEN | all | MA | all | | | 5 | 5 | **10** | P |
| 40 | Mid-water Paired & Single Trawl | OPEN | all | NE | all | 137 | 34 | 168 | 55 | **394** | |
| 41 | Pots and Traps, Fish | OPEN | all | MA | all | 299 | 173 | 75 | 293 | **840** | P |
| 42 | Pots and Traps, Fish | OPEN | all | NE | all | 511 | 40 | 2 | 150 | **703** | P |
| 43 | Pots and Traps, Conch | OPEN | all | MA | all | 60 | 527 | 206 | 369 | **1,162** | P |
| 44 | Pots and Traps, Conch | OPEN | all | NE | all | 380 | 450 | 1 | 339 | **1,170** | P |
| 45 | Pots and Traps, Hagfish | OPEN | all | NE | all | 7 | 3 | 6 | 11 | **27** | P |
| 46 | Pots and Traps, Shrimp | OPEN | all | NE | all | | | 21 | | **21** | P |
| 47 | Pots and Traps, Lobster | OPEN | all | MA | all | 920 | 382 | 136 | 450 | **1,888** | P |
| 48 | Pots and Traps, Lobster | OPEN | all | NE | all | 11,849 | 8,182 | 1,847 | 4,635 | **26,513** | |
| 49 | Pots and Traps, Crab | OPEN | all | MA | all | 34 | 11 | | 27 | **72** | P |
| 50 | Pots and Traps, Crab | OPEN | all | NE | all | 26 | 19 | 25 | 6 | **76** | P |
| 51 | Beam Trawl | OPEN | all | MA | all | 37 | 21 | 9 | 3 | **70** | P |
| 52 | Beam Trawl | OPEN | all | NE | all | 26 | 9 | | 18 | **53** | P |
| 53 | Dredge, Other | OPEN | all | MA | all | 5 | 74 | 83 | 50 | **212** | P |
| 54 | Ocean Quahog/Surfclam Dredge | OPEN | all | MA | all | 506 | 426 | 451 | 429 | **1812** | P |
| 55 | Ocean Quahog/Surfclam Dredge | OPEN | all | NE | all | 840 | 569 | 591 | 708 | **2,708** | P |
| 56+ | Otter Trawl | OPEN | all | NE | smR | | | 2 | 10 | **12** | |
| **Total** | | | | | | **35,616** | **22,344** | **11,843** | **20,444** | **90,247** | |

| Row | VTR TRIPS | % of Trips | VTR TRIPS Cum % |
|---|---|---|---|
| 9 | 1 | <0.1% | 0.00% |
| 25 | 3 | <0.1% | 0.00% |
| 10 | 6 | <0.1% | 0.01% |
| 13 | 6 | <0.1% | 0.02% |
| 16 | 6 | <0.1% | 0.02% |
| 14 | 7 | <0.1% | 0.03% |
| 39 | 10 | <0.1% | 0.04% |
| 56 | 12 | <0.1% | 0.06% |
| 15 | 18 | <0.1% | 0.08% |
| 46 | 21 | <0.1% | 0.10% |
| 21 | 25 | <0.1% | 0.13% |
| 30 | 27 | <0.1% | 0.16% |
| 45 | 27 | <0.1% | 0.19% |
| 12 | 28 | <0.1% | 0.22% |
| 52 | 53 | 0.1% | 0.28% |
| 31 | 61 | 0.1% | 0.34% |
| 51 | 70 | 0.1% | 0.42% |
| 17 | 71 | 0.1% | 0.50% |
| 20 | 71 | 0.1% | 0.58% |
| 49 | 72 | 0.1% | 0.66% |
| 50 | 76 | 0.1% | 0.74% |
| 38 | 155 | 0.2% | 0.92% |
| 1 | 159 | 0.2% | 1.09% |
| 53 | 212 | 0.2% | 1.33% |
| 29 | 319 | 0.4% | 1.68% |
| 18 | 323 | 0.4% | 2.04% |
| 11 | 329 | 0.4% | 2.40% |
| 32 | 337 | 0.4% | 2.78% |
| 36 | 375 | 0.4% | 3.19% |
| 40 | 394 | 0.4% | 3.63% |
| 28 | 441 | 0.5% | 4.12% |
| 19 | 573 | 0.6% | 4.75% |
| 42 | 703 | 0.8% | 5.53% |
| 33 | 712 | 0.8% | 6.32% |
| 41 | 840 | 0.9% | 7.25% |
| 2 | 1,120 | 1.2% | 8.49% |
| 43 | 1,162 | 1.3% | 9.78% |
| 44 | 1,170 | 1.3% | 11.08% |
| 37 | 1,249 | 1.4% | 12.46% |
| 22 | 1,806 | 2.0% | 14.46% |
| 54 | 1,812 | 2.0% | 16.47% |
| 47 | 1,888 | 2.1% | 18.56% |
| 24 | 1,977 | 2.2% | 20.75% |
| 4 | 2,040 | 2.3% | 23.01% |
| 23 | 2,334 | 2.6% | 25.60% |
| 27 | 2,513 | 2.8% | 28.38% |
| 34 | 2,532 | 2.8% | 31.19% |
| 55 | 2,708 | 3.0% | 34.19% |
| 7 | 3,315 | 3.7% | 37.86% |
| 3 | 3,385 | 3.8% | 41.61% |
| 5 | 3,569 | 4.0% | 45.57% |
| 35 | 3,873 | 4.3% | 49.86% |
| 6 | 4,823 | 5.3% | 55.20% |
| 26 | 6,014 | 6.7% | 61.87% |
| 8 | 7,901 | 8.8% | 70.62% |
| 48 | 26,513 | 29.4% | 100.00% |
| | 90,247 | | |

| Row | VTR TRIPS Cum % |
|---|---|
| 1 | 1.09% |
| 2 | 8.49% |
| 3 | 41.61% |
| 4 | 23.01% |
| 5 | 45.57% |
| 6 | 55.20% |
| 7 | 37.86% |
| 8 | 70.62% |
| 9 | 0.00% |
| 10 | 0.01% |
| 11 | 2.40% |
| 12 | 0.22% |
| 13 | 0.02% |
| 14 | 0.03% |
| 15 | 0.08% |
| 16 | 0.02% |
| 17 | 0.50% |
| 18 | 2.04% |
| 19 | 4.75% |
| 20 | 0.58% |
| 21 | 0.13% |
| 22 | 14.46% |
| 23 | 25.60% |
| 24 | 20.75% |
| 25 | 0.00% |
| 26 | 61.87% |
| 27 | 28.38% |
| 28 | 4.12% |
| 29 | 1.68% |
| 30 | 0.16% |
| 31 | 0.34% |
| 32 | 2.78% |
| 33 | 6.32% |
| 34 | 31.19% |
| 35 | 49.86% |
| 36 | 3.19% |
| 37 | 12.46% |
| 38 | 0.92% |
| 39 | 0.04% |
| 40 | 3.63% |
| 41 | 7.25% |
| 42 | 5.53% |
| 43 | 9.78% |
| 44 | 11.08% |
| 45 | 0.19% |
| 46 | 0.10% |
| 47 | 18.56% |
| 48 | 100.00% |
| 49 | 0.66% |
| 50 | 0.74% |
| 51 | 0.42% |
| 52 | 0.28% |
| 53 | 1.33% |
| 54 | 16.47% |
| 55 | 34.19% |
| 56 | 0.06% |

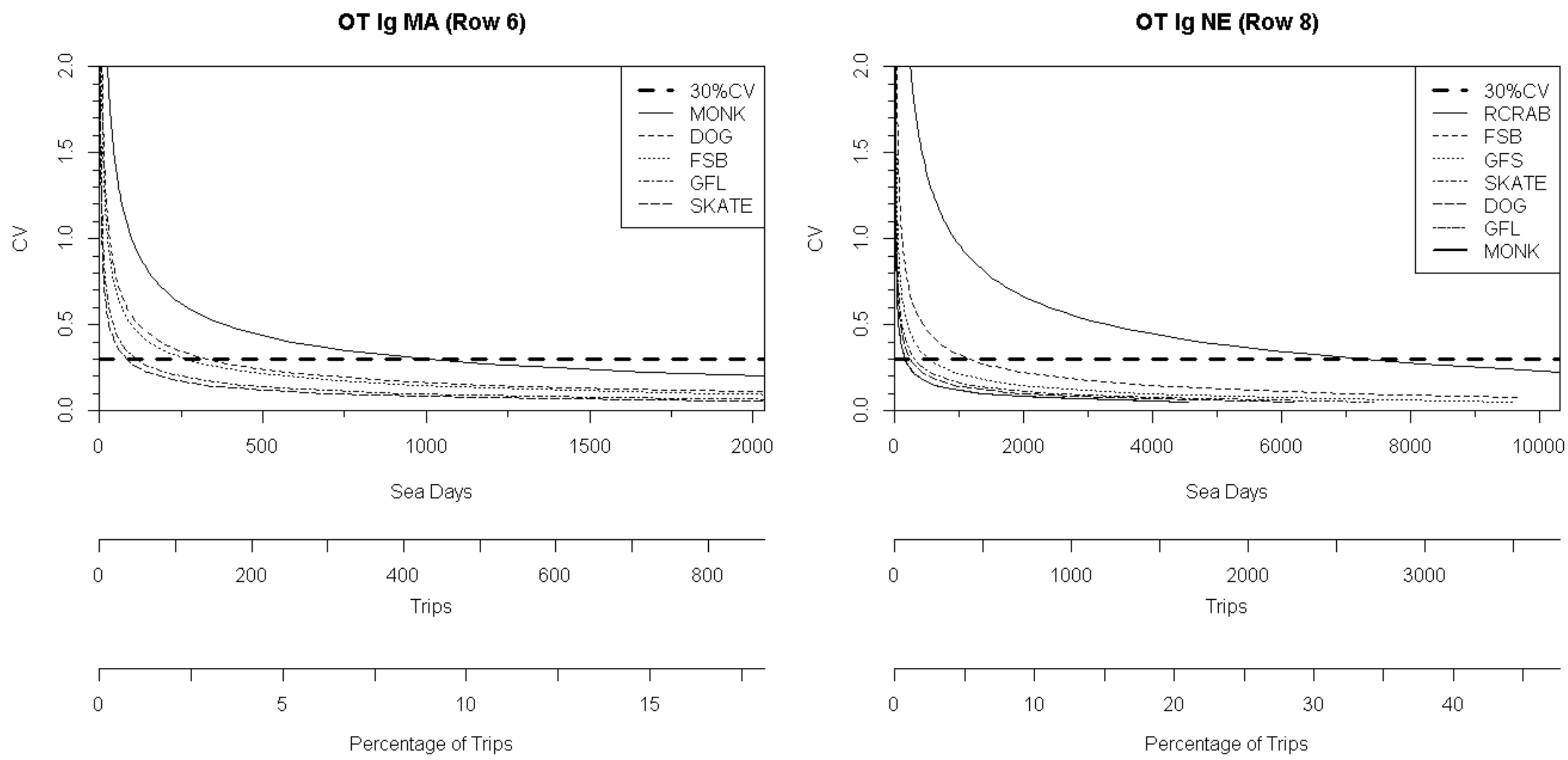



Figure 1. Results from the 2014 sample size analysis conducted for Mid-Atlantic large mesh otter fleet (Row 6) and the New England large mesh otter fleet (Row 8). The curves represent the relationship between the coefficient of variance (CV) and the sample size (sea days, trips and percent of trips) for each of the species groups that were not filtered out. The dash line is the 30% CV. For species group abbreviations, see Table 1.
*Taken from Figure 3 in Wigley et al. (in press).*

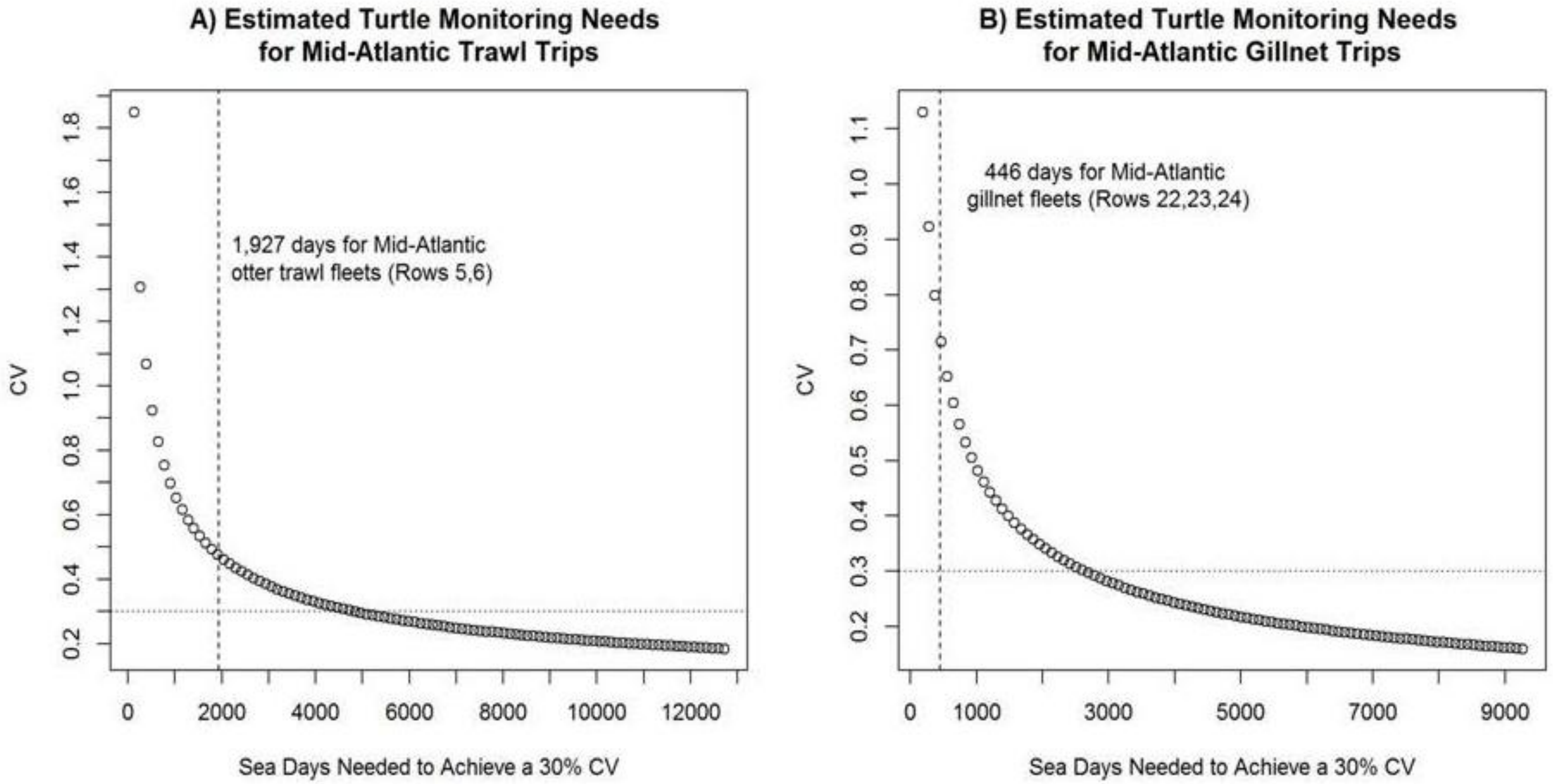



Figure 2. Expected CVs for estimates of turtle interactions in Mid-Atlantic otter trawl fleets (A) and Mid-Atlantic gillnet fleets (B), under the proposed observer sea day allocation for 2014. Vertical dashed lines indicate the number of sea day needs for fish and turtles combined.

Northeast Fisheries Science Center Reference Document 14-05

# 2014 Discard Estimation, Precision, and Sample Size Analyses for 14 Federally Managed Species Groups in the Waters off the Northeastern United States

by SE Wigley, J Blaylock, PJ Rago, and G Shield

**Northeast Fisheries Science Center Reference Document 14-05**

# 2014 Discard Estimation, Precision, and Sample Size Analyses for 14 Federally Managed Species Groups in the Waters off the Northeastern United States

by SE Wigley[1], J Blaylock[2], PJ Rago[1], and G Shield[1]

[1]NOAA Fisheries, Northeast Fisheries Science Center, 166 Water Street, Woods Hole, MA 02543
[2]Integrated Statistics, Inc., 172 Shearwater Way, Falmouth, MA 02540

**U.S. DEPARTMENT OF COMMERCE**
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts
April 2014

This document may be cited as:

Wigley SE, Blaylock J, Rago PJ, Shield G. 2014. 2014 Discard estimation, precision, and sample size analyses for 14 federally managed species groups in the waters off the northeastern United States. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 14-05; 157 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

# TABLE OF CONTENTS



# LIST OF TABLES

## LIST OF FIGURES



## LIST OF APPENDIX TABLES

# LIST OF ACRONYMS AND ABBREVIATIONS

AA = Access area
ASM = At-Sea Monitoring Program
ASMFC = Atlantic States Marine Fisheries Commission
CV = coefficient of variation
d/k = discard/kept
FED = finfish excluder device
FMP = fishery management plan
GEN = General category
lg = large mesh
LIM = Limited access category
MA = Mid-Atlantic
MPC = minimum pilot coverage
MRFSS = Marine Recreational Fisheries Statistical Survey
MRIP = Marine Recreational Information Program
NE = New England
NEFOP = Northeast Fisheries Observer Program
NEFSC = Northeast Fisheries Science Center
NMFS = National Marine Fisheries Service
OPEN = Non-access area
SBRM = Standardized Bycatch Reporting Methodology
SE = standard error of the estimate
sm = small mesh
smR = small mesh redfish exemption
VTR = Vessel Trip Report
xlg = extra large mesh

# EXECUTIVE SUMMARY

This report describes the analysis of the expected coverage needed by at-sea observers for northeastern US fisheries for the April 2014 through March 2015 period using the Standardized Bycatch Reporting Methodology. The sea days needed to achieve a precision-based performance standard (30% coefficient of variation of the discard estimate) were updated by using July 2012 through June 2013 data.

To monitor 14 federally managed fish and invertebrate species groups across 56 fleets, a total of 14,529 sea days are needed. Analyses also revealed that observer coverage within a fleet corresponded with the spatial and temporal patterns of fishing activity, in terms of kept weight of all species, for fleets with observer coverage. Based upon this analysis, an estimated 65,054 mt (143,419,913 lb) of federally regulated species were discarded during the July 2012 through June 2013 time period. The predominant species groups discarded are skates (Rajidae), spiny dogfish (*Squalus acanthias*), and sea scallops (*Placopecten magellanicus*). Across all species groups examined, "No Market" is the reason reported for the majority of discards. The discards reported in this document may not necessarily correspond directly with the discard estimates derived for individual stock assessments because of differences in stratification and data. Hence, the discard estimates are not definitive, but indicative of where discarding is occurring among commercial fleets and for which species groups.

# BACKGROUND

The Standardized Bycatch Reporting Methodology (SBRM) Omnibus Amendment (NEFMC 2007; NMFS 2008) was vacated by the US District Court of the District of Columbia on 15 September 2011, and the regulations implementing the SBRM were removed by the National Marine Fisheries Service (NMFS) on 29 December 2011 (NMFS 2011). While an SBRM is not currently required, the need to allocate observer sea days to monitor fisheries prosecuted off the northeast coast of the United States remains, and thus an analysis to estimate the number of sea days needed by each fleet was conducted.

The SBRM discard estimation methods described in Wigley et al. 2007 are still applicable. Refinements to the procedure for filtering the needed sea days have been made based on analyses conducted for the 2011 SBRM 3-year Review Report (Wigley et al. 2012a). The analyses conducted for 2014 are similar to those conducted in 2013 (Wigley et al. 2013).

This document presents the estimated discards and associated precision as well as the number of sea days needed to obtain a 30% coefficient of variation (CV) on the discard estimates for the 14 species groups associated with federal fishery management plans (FMPs) in northeastern US fleets[1]. Additionally, discard reasons associated with the discarded species are summarized. This document and Wigley et al. (2013, 2012b) differ from previous SBRM documents in that they do not include a sea day prioritization[2] and focus on fish and invertebrate species groups; they do not include sea turtles.

---

[1] "Fleet" is synonymous with "fishing mode."

[2] The Proposed 2013 Observer Sea Day Allocation (March 23, 2012) document is available on-line at: http://www.nefsc.noaa.gov/femad/fsb/SBRM/2012/Proposed_2012_Observer_Sea_Day_Allocation_3-23-2012_v3.pdf. When available, the Proposed 2014 Observer Sea Day Allocation document will be posted on the SBRM website under Additional Documents.

# METHODS

## Data Sources

The data sets used include July 2012 through June 2013 data from the Northeast Fisheries Observer Program[3] (NEFOP) database, the Vessel Trip Report (VTR; including logbooks from the surfclam [*Spisula solidissima*] and ocean quahog [*Artica islandica*] fishery) database, the Northeast Fisheries Science Center (NEFSC) commercial landings database, and the NOAA Marine Recreational Information Program[4] (MRIP) database.

The NEFOP is a comprehensive, multipurpose program that collects a broad range of data including information on all species, by disposition (retained and discarded), that are encountered during a fishing trip as well as gear characteristics data, economic information, and biological samples (NEFOP 2010, 2013). The NEFOP employs trained sea-going observers and monitors to collect these data. Fish and invertebrate species are recorded in weight. Conversion factors were applied to convert any dressed weight data to live weight equivalents.

For this analysis, only observed hauls from NEFOP trips with a "complete" sampling protocol were used. A "complete" sampling protocol includes obtaining species weights for both kept and discarded portions of all species in the catch. NEFOP training trips have been included in the analysis. Aborted trips and "set only" trips were excluded from this analysis along with 1 trip fishing in a statistical area associated with the Southeast Region (statistical area "702"), 1 trip landing outside the Greater Atlantic Region[5] (formerly Northeast Region), and 12 "carrier" trips (*fleet type* = "050"; no fishing effort occurred on these trips). Additionally, hauls with no catch report and species hail weight with discard reason "039" ("previously discarded") were excluded.

The same broad stratification scheme used in SBRM analyses was employed in this analysis, in which trips were partitioned into fleets by using 6 classification variables: calendar quarter, geographic region, gear type, mesh, access area, and trip category. Calendar quarter was based on landed date and used to capture seasonal variations in fishing activity and discard rates. Two broad geographical regions were defined: New England (NE) and Mid-Atlantic (MA) based on port of departure[6]; ports from Maine to Rhode Island constituted the NE region, and ports in states from Connecticut southward constituted the MA region. Gear type was based on Northeast gear codes (*negear)*. Some gear codes were combined: sink, anchored, and drift gillnets, and single and paired midwater trawls. Trips for which gear was unknown were excluded. Mesh size groups were formed for otter trawl and gillnet gear types. For otter trawls, 2 mesh groups were

[3] There were 1,844 At-Sea Monitoring Program (ASM) trips associated with NE hand line, longline, otter trawl, and gillnet fleets in the July 2012 through June 2013 data. A comparison of discard rates derived from observer and at-sea monitor data in 2010, 2011, and 2012 revealed there were generally similar discard rates between the 2 data collection programs for the 18 fish species for 4 gear types (longline, large mesh otter trawl, large mesh gillnet, and extra large mesh gillnet) where at-sea monitor data exist, hence NEFOP and ASM data were pooled. See Northeast Fisheries Observer Program (2011, 2013) for more information on ASM. The Atlantic States Marine Fisheries Commission (ASMFC) funded 157 otter trawl trips in the July 2012 through June 2013 data. A comparison of discard rates derived from NEFOP-allocated and ASMFC-allocated trips reveals there were generally similar discard rates for the 2 fleets where ASMFC-allocated trips exist (MA small mesh otter trawl fleet and NE small mesh otter trawl fleet); hence, these data have been pooled.

[4] Marine Recreational Information Program (MRIP) was implemented in 2012 and supersedes the NOAA Marine Recreational Fisheries Statistics Survey (MRFSS).

[5] For more information, see http://www.nero.noaa.gov/stories/2014/07_nero_name_change.html

[6] Wigley et al. (2007) found that the majority (over 93%) of 2004 observed trips both originated and fished in the same region and exhibited the same general pattern as in the VTR data. An updated analysis using July 2007 through June 2011 data found similar results (Wigley et al. 2012a).

formed: small (mesh less than 5.5 in) and large (5.5 in mesh and greater). For gillnets, 3 mesh groups were formed: small (mesh less than 5.5 in), large (mesh between 5.5 and 7.99 in), and extra large (mesh 8 in and greater). Two access area categories were formed: access area (AA) and open (OPEN). The sea scallop fishery was divided into General (GEN) and Limited (LIM) category trips. All other fisheries were combined into a category called "all." In the data set analyzed, there were also trips associated with a small mesh redfish exempted fishery where 100% observer coverage was required for trips using otter trawl with 4.5 in mesh. These exempted trips have been grouped together into a mesh group labeled "smR." For more information on the small mesh redfish exemption, see http://www.gpo.gov/fdsys/pkg/FR-2013-03-05/html/2013-05044.htm.

Stratification abbreviations used are given below.

| Abbreviation | Definition |
|---|---|
| MA | Mid-Atlantic ports (CT and southward) |
| NE | New England ports (RI and northward) |
| sm | Small mesh (less than 5.5 in) |
| smR | Small mesh redfish exemption (4.5 in) |
| lg | Large mesh (5.5 to 7.99 in for gillnet; 5.5 in and greater for otter trawl) |
| xlg | Extra large mesh (8 in and greater) |
| LIM | Limited access category |
| GEN | General category |
| OPEN | Nonaccess area |
| AA | Access area |

The VTR data are used as a basis for defining the sampling frame, since all federally permitted vessels are required to file a VTR for each fishing trip (See NMFS-Greater Atlantic Regional Fisheries Office [formerly Northeast Regional Office] http://www.nero.noaa.gov/ro/fso/vtr_inst.pdf ). These self-reported data[7] constitute the basis of the fishing activity of the commercial fleets. Because dealer data do not contain mesh size and area fished information, the dealer data could not be used to expand discard ratios by fleet for the annual analyses. The VTR data were used as a surrogate for dealer data and were used to expand the NEFOP discard ratios to total discards. For this analysis, the commercial VTR trips (excluding NY state [nonfederal] vessels) were used. Conversion factors were applied to convert various units of measure to pounds and all weight to live weight. VTR trip data were grouped into fleets as defined above. Trips participating in the US/Canada access area and other special access programs could not be identified in the VTR data. These trips have been grouped by the other stratification variables and have not been partitioned separately.

The clam fishery has a logbook system separate from the VTR logbook. The commercial clam logbook data were used to augment the VTR data for the clam dredge fishery. The commercial and recreational landings (in live weight) for the federally managed species were used only in sample size analysis.

A list of the 14 federally managed fish and invertebrate species groups analyzed and the individual species that compose each species group is given in Table 1. Summaries of the data

[7] See Wigley et al. 2007 for more details on self-reported VTR data.

used, in terms of number of trips and number of sea days, by fleet, calendar quarter, and data source (NEFOP and VTR), are given in Tables 2 and 3, respectively.

The spatial and temporal patterns of observer coverage within a fleet were evaluated. Rather than using number of trips (a trip-based metric), the kept weight of all species reported in the VTR was used. The "kept weight with observer coverage" was derived as the kept weight of all species reported in the VTR summed by fleet, statistical area, and quarter where at least 1 observed trip occurred in the fleet-quarter-statistical area cell and at least 3 observed trips[8] occurred in the fleet-quarter stratum. The "kept weight" was derived as the kept weight of all species reported in the VTR summed over all statistical areas and quarters within a fleet. The percentages of "kept weight with observer coverage" were calculated by dividing the "kept weight with observer coverage" by the "kept weight." These percentages were derived for the 56 fleets (reported as 48 individual fleets and 7 confidential fleets combined into "Confidential fleets"), "Other minor fleets" (that also include 1 confidential fleet and 6 observed twin trawl trips), and all fleets combined. Additionally, as a relative measure of fleet activity among all fleets, the percentage of "kept weight" was derived by dividing the "kept weight" by the sum of the "kept weight" across all fleets.

## Discard Estimation

Total discards of each of the 14 federally managed species groups were estimated for the July 2012 through June 2013 time period by using a combined discard/kept ($d/k$) ratio estimator (Cochran 1963), where $d$ = discarded pounds of a given species group, and $k$ = the kept pounds of all species. Total discards (in weight) were derived by multiplying the estimated discard rate of each fleet by the corresponding fleet landings in the VTR database and then summing over fleets.

Simple imputation methods were used to fill quarterly cells for which there were 1 or no observed trips. Data from adjoining strata were pooled to impute estimates for cells with zero or one trip. In this imputation only the temporal stratification (calendar quarter) was relaxed to an annual aggregation even though seasonal variation can occur for some species. This simple imputation could not be applied to fleets where observer coverage was low or missing throughout the year (i.e., too few data to support the simple imputation approach). In these cases, imputed values were not used, and the fleet was designated as a fleet in need of pilot coverage[9]. If some data were available, then discard estimates were derived, but these results were not used in sample size analyses.

The variances and standard errors (SE) of the discard estimates were also derived. In this document, CV is defined as the ratio of the standard error of the total discards divided by the total discards. The appendix presents the equations used in the analysis.

For each species/species group and fleet, the landings from the VTR and clam logbook are presented to provide perspective for the discard estimates.

## Discard Reasons

For each species group and fleet, the fish dispositions associated with discarding (as reported by the at-sea observer) have been grouped into the following 6 discard reason

[8] The 3 trips for fleet-quarter correspond with a minimum threshold for allocating observer coverage.

[9] Pilot coverage is defined as a minimum level of observer coverage necessary to acquire bycatch information with which to calculate variance estimates that can then be used to further define the level of sampling needed (NMFS 2004).

categories: no market, regulation (size), regulation (quota), regulation (other), poor quality, and other. The discard reason categories and the associated fish dispositions are summarized in Appendix Table 2. The discard reasons “No Market” and “Poor Quality” would be considered economic discards and not regulatory discards.

The observed (nonextrapolated) discards associated with each of the 6 discard reason categories were summed for each species group/species for the fleets where discards could be estimated. For individual fleets, the percentage of observed discards by discard reason category was derived by dividing the sum of the observed discards for each discard reason category by the sum of the total observed discards for each species group/species and fleet. The discard reason category percentages were taken from the observed discard reason category percentages. For each fleet included in “Other fleets filtered out” (an aggregated group that represents fleets where the variance of the discard estimate was not used in the annual sample size analysis), the observed discard reason category percentages were then multiplied by the total estimated (extrapolated) discards for each species group/species to derive the estimated discards by discard reason category. For each fleet included in “Other fleets filtered out,” the total estimated discards by discard reason category were summed over the fleets that compose the fleet aggregation for each species group/species. The estimated discard reason category percentage was derived by dividing the estimated discards for each discard reason category by the sum of the total estimated discards for each species group/species and fleet. In other words, the “Other fleets filtered out” represents the weighted percentage where the weighting factor was the fleet extrapolated discards.

## Sample Size Analysis

The sample size analysis (also referred to as sea day analysis) was conducted to estimate the number of baseline trips and sea days needed to monitor the 14 federally managed species groups in each fleet. As described in Wigley et al. 2007 (and given in the appendix), the number of trips and sea days needed to achieve a given precision level was based on the variance of the total discard estimate for a species group. Sample size (trips and sea days) associated with the precision standard for discard estimates (30% CV) were derived. The sample size analysis was performed by using trips as the sampling unit, and then converting the number of trips to sea days by multiplying by the weighted mean trip length, where the weighting factor was the quarterly number of VTR trips. The percentage of trips was derived by dividing the number of trips needed by the number of VTR trips that occurred in the fleet.

When total discards could not be estimated because of little or no observer coverage (no data), or when total discards were zero (no variance), the sample size (number of trips) was determined by using a pilot coverage level set to 2% of the quarterly VTR trips for a fleet, with a minimum of 3 trips per quarter (12 trips per year) and a maximum of 100 trips per quarter (400 trips per year). The 2% pilot coverage was the same as was used in the 2013 and 2012 sea day analyses (Wigley et al. 2012b, 2013) and the SBRM analyses (Wigley et al. 2007, 2011). The quarterly trips were then multiplied by the quarterly mean VTR trip length to derive quarterly sea days. The quarterly trips and quarterly sea days were then summed for annual number of trips and sea days. It is recognized that pilot coverage may result in too much coverage in cases where little or no observer coverage may actually be needed, when effort changes sharply between years, or when the fleet comprises only a few trips.

Some fleet/species combinations contribute very little to the total mortality or discard of the species but may require significant resources to characterize the precision of the estimate. For example, a high variance estimate for a rare event within a fleet would require high levels of sampling, even though the total discard in that fleet was unimportant with respect to either the total discard or total mortality of the resource. To address this, a modification of the filtering approach developed for SBRM was employed. Similar to the SBRM analyses (Wigley et al. 2007), importance filters were used to provide a standardized protocol to further refine the number of baseline sea days based on: (a) the importance of the discarded species relative to the total amount of discards by a fleet and (b) the total fishing mortality due to discards. In the SBRM analyses, the importance filter comprised 3 filters (i.e., unlikely cell filter, fraction of discard filter, and fraction of total mortality due to discards filter) that were applied simultaneously. However, based on an evaluation of the use of the unlikely filter over a 3-year period, it was found that no substantive changes in the determination of sea days would have resulted had the unlikely filter been removed from the importance filter (Wigley et al. 2012a). Thus, in this analysis, all cells in the unlikely filter were set to 1 (all cells are likely; this is equivalent to removing the unlikely filter from the importance filter).

The 2014 baseline sea days were filtered by using a 95% cut-point in the discard filter, and a 98% cut-point for the total mortality filter due to discards. In other words, estimates of sea day coverage for a given species or species group were derived for those fleets where discards constituted 95% of the discard mortality and catch constituted 98% of the total mortality.

To determine the number of sea days (referred to as the “2014 sea days needed”) and trips needed to achieve a 30% CV on the estimates of discards for each of the 14 species groups within a fleet, the maximum number of sea days for the 14 species groups (i.e., the maximum number of sea days in a row) was used. This approach ensures that all species groups will have a 30% CV or less. In the event that sea days for each species group within a fleet were filtered out, then the number of sea days for the fleet was based on minimum pilot days to maintain monitoring coverage for that fleet. Minimum pilot coverage represents a minimum threshold for the allocation of sea days and is defined as 3 trips per quarter for each quarter with industry activity. The quarterly number of trips is multiplied by the quarterly mean VTR trip length and then summed over quarters to derive the annual minimum pilot days for the fleet. If the fleet was designated as a pilot fleet, then pilot sea days were used. These fleets are indicated with a “P.” The fleets with sufficient data to estimate sample size are referred to as nonpilot fleets.

# RESULTS

There were 56 fleets uniquely identified in the July 2012 through June 2013 data (Tables 2 and 3; Appendix Table 1). Based upon the industry activity during this time period, the NE LIM OPEN scallop trawl (Row 13) and the NE otter trawl small mesh exempted redfish fleet (Row 56) were added to the collection of fleets analyzed (fleets that have not been included in previous analyses are indicated with a “+” in Tables 2 and 3). Compared to the 2013 sea day analysis, there were 2 fleets (MA large mesh haddock separator trawl and MA hagfish pots and traps) that were not included in this analysis because of no industry activity. The other minor fleets not uniquely identified in this analysis have been aggregated into a single fleet labeled “Other minor fleets.” Because of confidentially rules, the landings associated with 7 unique fleets (MA GEN Access area scallop trawl [Row 9], MA LIM Access area scallop trawl [Row 10], NE small mesh Ruhle trawl [Row 15], NE large mesh Ruhle trawl [Row 16], MA floating trap [Row 20], MA Danish seine [Row 38], and NE beam trawl [Row 52]) in Tables 2 and 3 have been aggregated into a single fleet labeled “Confidential fleets” for reporting purposes in Tables 4 and 5. An additional confidential fleet, NE LIM OPEN scallop trawl (Row 13; Tables 2 and 3), was not aggregated with the other confidential fleets because this fleet was the only confidential fleet with some NEFOP data (confidential data would be exposed); this fleet was aggregated into “Other minor fleets” in Tables 4 and 5. Hence, the fleet row numbers within Tables 2, 3, and 6 are sequential, while the fleet row numbers in Tables 4, 5, and 7 are ordered but there are gaps in the row numbers.

Of the 56 fleets examined, 34 fleets had little or no observer data: 6 fleets had sparse observer data across all quarters, while 28 fleets were missing observer data in all quarterly cells. The fleets with no observer coverage were primarily pot and trap fisheries targeting particular species (e.g., red crab [*Chaceon quinquedens*], conch [*Busycon carica*, *Busyotypus canaliculatus*], shrimp [*Pandalus borealis*], and hagfish [Myxinidae]). No discard estimation was performed for the 28 fleets with no observer coverage, and they were designated as fleets in need of pilot coverage (Tables 2 and 3; Appendix Table 1). The 6 fleets with sparse observer coverage were also designated as fleets in need of pilot coverage for the sample size analysis; however, discard estimation was performed with the sparse observer data. For the 22 remaining fleets (designated as nonpilot fleets), estimates of discards and their associated variance were derived and used to determine the sample sizes needed for a 30% CV. Of the 22 fleets, there were 5 fleets (Rows 4, 11, 17, 19, and 24) where the simple imputation was applied (Tables 2 and 3).

Thus, for the discard estimation and precision analysis, 34 fleets had no discard estimation, and 22 fleets had discards estimated. For the sample size analysis, 22 fleets had sample sizes derived from the discard variances, and 34 fleets had sample sizes based upon pilot coverage.

A total of 3,869 trips (11,083 days) was observed during the July 2012 through July 2013 period. When these trips were stratified, some trips were partitioned between strata resulting in 4,174 trips (11,658 days; Tables 2 and 3) in the NEFOP data set. The total number of trips and days do not include 6 observed twin trawl trips in the MA and NE twin trawl fleets because there were no reported VTR trips for these fleets. The information for these 2 fleets has been aggregated into “Other minor fleets.” Information regarding twin trawl gear code and apparent misreporting of some gear types are further described in the discussion section of this report.

In terms of number of trips, the percentages of observed trips varied by fleet and calendar quarter. On an annual basis, for the 28 fleets with some observer coverage, the percentage of observed trips by fleet ranged between 0.03% (MA Hand Line, Row 3; Table 2) to 108% (NE small mesh redfish exempted Otter Trawl fleet, Row 56; Table 2). It is unexpected to have coverage percentages exceed 100%; in this case, the NEFOP reported subtrips on a VTR trip that did not report subtrips, hence more observed trips than VTR trips appeared in the data sets. For the 22 nonpilot fleets (excluding the NE Otter Trawl small mesh redfish exempted fleet [Row 56] that required 100% observer coverage), the percentage of observed trips ranged between 0.09% (NE Lobster Pot, Row 48) and 37% (NE mid-water trawl fleet, Row 40). Over all fleets, the percentage of observed trips was 4.6% (Table 2).

In terms of kept weight of all species, the percentage of observer coverage over all fleets was 52% (Table 4). For the 22 nonpilot fleets, the percentage of observer coverage ranged between 38% and 98% with an average of 79% (Table 4). Nineteen of the 22 fleets had a percentage greater than or equal to 68% with an average of 86%. This finding indicates that the majority of kept weight within the fleet was associated with statistical areas and quarters with observer coverage. Additionally, these 19 fleets composed 56% of the total kept weight across all fleets. The kept weight of all species was considered a surrogate for fishing effort; hence, observer coverage spatially and temporally occurred where the majority of fishing effort occurred.

The landings associated with the combined fleet “Other minor fleets” contributed 0.1% of the total landings across all fleets (Table 4); thus, the 56 uniquely identified fleets account for almost all of the total VTR landings.

Annual VTR landings for all fleets and estimated discards (live pounds) with associated precision (CV and SE) for 27 individual fleets (Rows 2-8, 11, 17, 19, 23, 24, 26, 27, 29-37, 39, 40, 48, and 56) are summarized for each of the 14 species groups, the individual species that composed those species groups, and the 14 species groups combined (Tables 5A, 5B, and 5C; Figures 1A and 1B). There were 21 fleets (Rows 1, 12, 14, 18, 21, 22, 25, 28, 41-47, 49-51, 53-55) with no discard estimation because of the lack of NEFOP coverage; 2 combined fleets (“Confidential fleets,” and “Other minor fleets”) also have landings only. Fleets with no discard estimation have dark shade in Tables 5A and 5B. In Table 5A, the CVs associated with the cells (species group and fleet) that were not used in the sample size analysis (i.e., cells filtered out via the importance filter) are indicated in light shading. Precision of discards of individual species (Table 5B) and 14 species group combined (Table 5C) were not used in the sample size analysis.

Based upon this analysis, 65,054 mt (143,419,914 lb; live weight) of discards for the 14 species groups occurred during the July 2012 through June 2013 period (Table 5C). The majority (81%) of the discards comprises 3 species groups: skates (Rajidae; 55%), spiny dogfish (*Squalus acanthias*; 13%), and sea scallops (*Placopecten magellanicus*; 13%); the remaining species groups each accounted for less than or equal to 6% (Table 5A).

The percentage of discards to total catch varied among the 14 species groups (Table 5A; Figure 1A) and individual species (Table 5B; Figure 1B). There were 3 species groups (SCOQ, HERR, and TILE) where discards were less than 1% total catch; 3 species groups (SBM, SCAL, and BLUE) where percentages of discards ranged between 1% and 10% of total catch; 4 species groups (FSB, GFL, RCRAB, and GFS) where discards ranged between 11% and 25% of total catch; and 4 species groups (MONK, DOG, SKATE, and SAL) where discards were greater than 26% of total catch. The species groups with the highest percentage of total discards relative to total catch were: Atlantic salmon (*Salmo salar*;100%), skates (74%), spiny dogfish (50%), and monkfish (*Lophius americanus*; 31%; Figure 1A). Because of the no possession regulation for Atlantic salmon, it is not surprising to have a discard percentage equal to 100%. For individual species (Table 5B; Figure 1B), most notable are the high percentages of discards to total catch for Atlantic wolffish *(Anarhichas lupus*; 100%), ocean pout (*Zoarces americanus*; >99%), and windowpane flounder (*Scophthalmus aquosus*; >99%) because of the no possession regulations for these 3 individual species. The New England large mesh otter trawl fleet (Row 8) had the highest estimated discards (Table 5C).

The reasons for discarding varied among the 14 species groups (Appendix Table 3A) and individual species (Appendix Table 3B). Overall, for the 14 species groups, the majority (75%) of discards occurred were due to “No Market.” “Regulation” (size, quota, and other), “Poor Quality,” and “Other” contributed 19%, 3%, and 3%, respectively (Appendix Table 3A).

The percentages of discard to total catch were also summarized by fleet for the 22 nonpilot fleets (Figure 2). Discards of 1 or more of the 14 species groups that were filtered out via the importance filter have been aggregated into a species group labeled “Other FMP.” Discards of nonfederally managed species have been aggregated into a species group labeled “Non-FMP.” The percentages of discard to total catch varied by fleet (Figure 2). There were 2 fleets (Rows 29 and 40) where discards were less than 1% of the total catch in the fleet; 4 fleets (Rows 2, 4, 35, and 56) where the percentages of discards ranged between 1% and 10%; 8 fleets (Rows 7, 19, 24, 27, 32, 33, 36, and 37) where the percentages of discards ranged between 11% and 25% of total catch; 7 fleets (Rows 5, 8, 11, 17, 26, 34, and 48) where the percentages of discards ranged between 26% and 50% of the total catch; and 1 fleet (Row 6) where discards were greater than 50% of the total catch (Figure 2).

The number of species groups discarded within a fleet also varied among fleets. The majority of fleets (13 of the 22 fleets) comprised 2 or 3 discarded species groups. For 7 of these fleets (Rows 2, 4, 11, 17, 24, 35, and 56), the "Other FMP" species group comprised the majority of the discards. This finding indicates that the majority of discards were filtered out via the importance filter. There were 3 fleets (Rows 29, 40, and 48) for which the "Non-FMP" species group comprised the majority of the discards. There were another 3 fleets where 2 of the 3 discarded species groups were "Other FMP" and "Non-FMP," and the third represented at least 45% of the discards: Row 19 (small mesh groundfish), Row 26 (spiny dogfish), and Row 34 (skate; Figure 2).

The remaining fleets (9 of the 22 fleets) had between 4 and 10 discarded species groups. The skate species group dominated the discards in 5 of these fleets (Rows 5, 6, 8, 27, and 33) while "Non-FMP" dominated the discards in 2 fleets (Rows 7 and 36), SCAL was the dominant discarded species group in 1 fleet (Row 37), and "Other FMP" was the dominant discarded group in 1 fleet (Row 32). The dominant "Non-FMP" species in the scallop dredge fleets (Rows 32, 33, 34, 35, 36, and 37) were: sand dollar (Clypeasteroida), sponge (Porifera), and starfish (Asteroidea). "Fish, not known" was the dominant "Non-FMP" species in the NE purse seine fleet and the NE mid-water trawl fleet (Rows 29 and 40). American lobsters (*Homarus americanus*) and jonah crab (*Cancer borealis*) were the dominant "Non-FMP" species in NE lobster pot fleet (Row 48; Figure 2).

The precision of the discard estimates varied by species group and fleet (Table 5A). Of the 14 species groups, 8 species groups (FSB, GFL, MONK, SCAL, SKATE, GFS, DOG, and SBM) had an overall CV that was less than 30%, and 6 species groups (SAL, BLUE, HERR, RCRAB, SCOQ, and TILE) had an overall CV that was greater than 30%. The discards of 5 species groups (SAL, BLUE, HERR, SCOQ, and TILE) were filtered out in all fleets; this finding indicates that the discards of these species groups were a minor component of the total catch of these species (Table 5A; Figure 1A). The precision of the discard estimates for individual species are given in Table 5B; these precision estimates were not used in the sample size analysis.

The numbers of sea days needed for each species group and fleet, as well of the number of pilot coverage days, minimum pilot coverage days, and the sea days needed for the fleet (referred to as "2014 Sea Days Needed"), are summarized in Table 6. A total of 14,529 days are needed for the 56 fleets. As mentioned previously, 34 fleets had insufficient observer information to estimate discards and the sea days for these fleets were based on pilot coverage days. The number of sea days needed for fleets with the pilot coverage designation was 1,323 days (9% of 14,529; Table 6). There are 8 fleets for which the sea days for all species groups were filtered out via the importance filter, and minimum pilot coverage days were used to maintain some coverage (Rows 2, 4, 11, 17, 24, 29, 35, and 40; Table 6). There were 255 sea days associated with these fleets with minimum pilot coverage (2% of 14,529; Table 6). The sea days needed for the remaining 14 fleets (12,951 days, representing 89% of the total sea days needed) were derived by using the variance of the discard estimate (Tables 6). Of the 12,951 days, 7,262 days (56%) were associated with 1 fleet (Row 8; Table 6).

The sample size (in terms of number of sea days, number of trips, and percentage of trips based on the July 2012 through June 2013 VTR trips) needed to achieve a 30% CV of the discard estimate in 13 fleets is given in Table 7. The relationship between sample size and precision, over a range of sample sizes, is shown in Figure 3 for species groups and fleets. If the precision standard (30% CV) was relaxed for the red crab species group in 1 fleet (Row 8), resulting in the penultimate (next largest) value being used in the fleet (e.g., 1,162 days rather than 7,262 days for Row 8), then the total number of sea days needed across the 56 fleets would be 8,429 days (a 42% decrease from the 14,529 days). When the penultimate value is used, the expected achieved precision of red crab discards in Row 8 would be 89% CV.

# DISCUSSION

A broad stratification was used to support the deployment of observers on commercial fishing trips among various fleets by using attributes known prior to the trip departure. As discussed in previous discard estimation analyses (Wigley et al. 2007, 2011), species-specific stock assessment discard estimation may differ from this report because of differences in stratification and data used (calendar year versus 12-month [July through June] time period; area fished versus region [port of departure]; and VTR landings versus dealer landings). Region, based on port of departure, was used for the deployment observers. It is recognized that area fished would provide a better stratification for discard estimation. It is expected, however, that estimates would be in the same order of magnitude. The discard estimates presented here are not definitive estimates but rather are indicative of where discarding occurred among the commercial fleets for the 14 federally managed species groups.

We have assumed 100% discard mortality; i.e., we do not account for potential survival of organisms returned to the water. When comparing discard estimates from this study with those from stock assessments, it is useful to note that survival ratios are applied in stock assessments for Georges Bank and Gulf of Maine stocks of cod (*Gadus morhua*), Atlantic sea scallop, spiny dogfish, summer flounder (*Paralichthys dentatus*), southern New England and Gulf of Maine stocks of winter flounder (*Pseudopleuronectes americanus*), and southern New England yellowtail flounder (*Limanda ferruginea*).

Atlantic salmon are rarely encountered on observed trips (Wigley et al. 2011). In this analysis, 49 lb of Atlantic salmon discards were estimated, the first instance in which an estimate was greater than zero.

These analyses have used VTR data. Dealer (*CFDERSyyyy*) data do not contain mesh or area fished information until the trip-based allocation is performed (Wigley et al. 2008). The trip-based allocation of dealer (*CFDETT/SyyyyAA*) data is conducted annually and was not available when this analysis was initiated. Given that the VTR landings estimates are usually less (VTR reports the good faith hails) than the dealer records for a given fleet, the corresponding estimates of discards will also be underestimated. The magnitude of the underestimation will vary by fleet and year.

During the data preparation for these analyses, some possible misreported gear types were encountered. Some of the possible misreporting was associated with the seasonal switch between fishing for groundfish and shrimp. For example, captains reported using a shrimp trawl (“OTS”) with 6.5 in mesh catching groundfish (in these cases, one would expect “OTF,” otter trawl fish). Conversely, captains reported “OTF” with 1 7/8 in mesh catching shrimp (in these cases, one would expect “OTS”). Generally, there are only a few trips with these possible reporting errors.

There also appeared to be some confusion in the proper use of the VTR gear code “OTS” (shrimp trawl), “OTC” (scallop trawl), and “OTF” (otter trawl). Some of the “OTS” trips have either squid or scallops (species that start with the letter “S”) as the predominant species reported (no shrimp reported), and it is not certain whether or not these trips used a shrimp trawl, scallop trawl, otter trawl, or twin trawl. Regarding the twin trawl trips, there were no VTR trips that reported using twin trawl (VTR gear code "OTT") in the VTR database at the time of this analysis, yet there were 6 observed twin trawl trips in the NEFOP database that occurred during the July 2012 through June 2013 period. When these 6 observed trips were mapped back to the VTR data, it was found that the VTR database had "OTF" (otter trawl, bottom, fish) as the gear and gear quantity was 2 nets. Because of this data irregularity of twin trawl gear type, the twin trawl fleet could not be included in this analysis (observed trips were greater than VTR trips, and no VTR trips existed in the database[10]). Caution should be used when interpreting results associated with these otter trawl gear types as the implications of changed and/or misreported gear types are variable among fleets, and the true magnitude is unknown. Continued outreach and education to industry members emphasizing proper reporting of gear types is a critical need as well as improved VTR database management.

Since the northern shrimp fishery is closed during the calendar quarter 3, the VTR trips associated with NE shrimp trawl fleet (Row 19, Qtr 3; Tables 2 and 3) were investigated in the 2013 analysis. These trips used 2 in mesh, and most trips reported catching herring while a few trips reported catching squid. The captains of these vessels indicated that a finfish excluder device (FED) was not used. The northern shrimp fishery requires a FED; however, other small mesh exempted fisheries do not require a FED. Currently, there is no data element within the VTR database that indicates whether or not a FED or other bycatch reduction device was used. Because of this limitation, the trips within the NE shrimp trawl fleet (Row 19) represent trips using shrimp trawl with and without a FED (Tables 2 through 7; Figures 2 and 3). An additional data element within the VTR database would be needed to partition these trips into separate fleets.

The analysis conducted for the spatial and temporal observer coverage used live weight. As a result, fleets using scallop dredge and clam dredge targeting species with shells have higher kept weight percentage than other fleets because of the use of "live" weight rather than "landed meat" weight. However, the use of live weight does not distort the observed percentage (spatial or temporal pattern) within a fleet. It is important to remember that percent observer coverage is an indicator of where observed kept weight (or trips) occurred relative to unobserved kept weight (or trips). The percentage observed should not be confused with the precision of the discard estimate which is the metric used to describe discard variability and to determine the sample size needed for monitoring purposes.

The use of minimum pilot coverage represents a refinement over the 2012 (and prior) analyses when pilot coverage was used. As depicted in Figure 4 of Wigley et al. 2012a, there were 2 cases in which pilot coverage had been invoked in the sample size analysis: (1) insufficient or no NEFOP data (no discard information is available) and (2) when all sea days were filtered out (discard information is available and discards found to be low relative to other fleets). By utilizing the minimum pilot coverage, the numbers of trips needed to monitor the fleet in the upcoming year are based upon the information obtained via the data analysis. It is important to note that in many cases, there are only minor differences in the number of the pilot days versus the minimum pilot days because of the low number of industry trips in the fleets where all species are filtered out. Thus, the use of minimum pilot coverage represents only a minor refinement in the sea day analysis.

The use of pilot coverage may result in designating more observed trips than the number of trips that occurred in a fleet; therefore, pilot coverage may need further refinement in the

[10] In June 2013, the twin trawl gear code was removed from the VTR database, and data with twin trawl gear codes were changed from twin trawls to otter trawls. In February 2014, after this analysis was completed, the VTR data are to be changed back to what was originally reported.

future. For example, there are 10 fleets for which there were less than 3 trips per quarter for at least 1 quarter (Rows 9, 10, 13-16, 25, 42, 44, and 56; Table 2). To assign pilot coverage to these fleets for these quarters would results in coverage rates exceeding 100%. Additionally, there are several fleets for which activity is greater than 3 trips per quarter; however, overall activity is low (e.g., Rows 39, 45, and 46; Table 2). To assign pilot coverage to these fleets would result in coverage rates that exceed those derived from observer data. For fleets with low activity, there are 2 scenarios: (1) fleets for which significant activity occurs in other quarters (e.g., Rows 42 and 44; Table 2); and (2) fleets for which overall activity is low (e.g., Rows 9, 10, 13-16, 25, 39, 45, 46, and 56; Table 2). In the first scenario, the use of pilot coverage is warranted for these fleets. In the second scenario, pilot coverage is not warranted. A future refinement might be to exclude fleets in the second scenario by using a standardize protocol either at the beginning of the sample size analysis or when the sea day allocation is performed.

There are several fleets with high sea day requirements (>1,000 sea days). The NEFOP data associated with the trips within these fleets were reviewed to rule out any data "irregularities." The high monitoring coverage for New England large mesh and MA small mesh otter trawl fleets (Rows 5 and 8; Table 6) was due to high variability of red crab discards. In this analysis, as well as in previous analyses (NEFSC 2011a, 2011b; Wigley et al. 2011, 2012b, 2013), the high variability arose from observing some trips that were fishing in deep-water portions of statistical areas as well as observing other trips that were fishing in shallower portions of the same statistical areas. Red crabs were encountered during trips fishing in deep water. Although the discard reason reported for 3 fleets was "No Market" (Appendix Table 3A), these vessels do not generally have permits to land red crabs, thus the red crabs must be discarded. Currently, the analysis does not stratify these fleets further to account for depth because statistical area is the finest spatial resolution that defines a subtrip within the Vessel Trip Report (a subtrip within the VTR is a unique gear, mesh, and statistical area). While depth is a data element in the VTR, depth is not always reported, and there are few quality checks on this data element.

Fish may be discarded for economic reasons (e.g., "No Market" or "Poor Quality") or for regulatory reasons (size, quota, or other). When considering mechanisms to reduce discards, it may be useful to know why discarding is occurring. It is important to note that large discard percentages may be associated with a small quantity of discards. Additionally, it is important to note that for many species, the discards are associated with fleets that have been filtered out by the importance filter. Observers classify the discards by fish disposition based upon the NEFOP protocol (NEFOP 2010, 2011) in which the observer asks the captain/crew why species are being discarded. Thus, these data should be considered a form of self-reported data, and as such, these data are difficult to verify and should be interpreted cautiously.

This analysis does not address the coverage needed for individual sectors or multiple stock components of a species. The analytical basis for the allocation of future sea day coverage in this analysis is a specified level of precision (i.e., 30% CV) and an expectation that the pattern of fishing activity observed in the prior year will be similar to that in the upcoming year.

## ACKNOWLEDGEMENTS

We thank all the NEFOP observers and at-sea monitors for their diligent efforts to collect the data used in this report. We thank our reviewers for their helpful comments on this report.

# REFERENCES CITED

Cochran WL. 1963. Sampling Techniques. J. Wiley and Sons. New York.

National Marine Fisheries Service (NMFS). 2004. Evaluating bycatch: a national approach to standardized bycatch monitoring programs. US Dep. Comm., NOAA Tech. Memo. NMFS-F/SPO-66, 108 p. On-line version, http://www.nmfs.noaa.gov/by_catch/SPO_final_rev_12204.pdf

National Marine Fisheries Service (NMFS). 2008. Magnuson-Stevens Fishery Conservation and Management Act Provisions; Fisheries of the Northeastern United States; Northeast Region Standardized Bycatch Reporting Methodology Omnibus Amendment. Federal Register, Vol. 73, No. 18, Monday, January 28, 2008. p. 4736-4758. Available on-line at: http://www.gpoaccess.gov/fr/retrieve.html

National Marine Fisheries Service (NMFS). 2011. Fisheries of the Northeastern United States; Removal of Standardized Bycatch Reporting Methodology Regulations. Federal Register, Vol. 76, No. 250, Thursday, December 29, 2011. p. 81844 – 81850. http://www.gpo.gov/fdsys/pkg/FR-2011-12-29/pdf/2011-33302.pdf

New England Fishery Management Council (NEFMC), Mid-Atlantic Fishery Management Council and National Marine Fisheries Service. 2007. Northeast Region Standardized Bycatch Reporting Methodology: An Omnibus Amendment to the Fishery Management Plans of the New England and Mid-Atlantic Fishery Management Councils. June 2007. 642 p. Available on-line at: http://www.nefmc.org/issues/sbrm/index.html

Northeast Fisheries Science Center (NEFSC). 2011a. Standardized Bycatch Report Methodology Annual Discard Report 2011 (Section 1 and 2). Internal document presented to the NEFMC and MAFMC. 1135 p. Available on-line at: http://www.nefsc.noaa.gov/fsb/SBRM/

Northeast Fisheries Science Center (NEFSC). 2011b. Standardized Bycatch Report Methodology Sea Day Analysis and Prioritization 2011. Internal document presented to the NEFMC and MAFMC on January 25, 2011. 25 p. Available on-line at: http://www.nefsc.noaa.gov/fsb/SBRM/2011/2011-SBRM-Sea-Day-Analysis-Prioritization.pdf

Northeast Fisheries Observer Program (NEFOP). 2010. Fisheries Observer Program Manual 2010. Northeast Fisheries Science Center, Woods Hole, MA 02543. 442 p. Available on-line at: http://www.nefsc.noaa.gov/fsb/manuals/2010/NEFOPM_010110_Bookmarks_Compressed.pdf

Northeast Fisheries Observer Program (NEFOP). 2011. At-Sea Monitoring Program Manual. Northeast Fisheries Science Center, Woods Hole, MA 02543. 502 p. Available on-line at: http://www.nefsc.noaa.gov/fsb/manuals/2011/ASM_program_manual_0611.pdf

Northeast Fisheries Observer Program (NEFOP). 2013. Fisheries Observer Program Manual 2013. Northeast Fisheries Science Center, Woods Hole, MA 02543. 426 p. Available on-line at: http://www.nefsc.noaa.gov/fsb/manuals/2013/NEFSC_Observer_Program_Manual.pdf

Wigley SE, Blaylock J, Rago PJ, Murray KT, Nies TA, Seagraves RJ, Potts D, and Drew K. 2012a. Standardized Bycatch Reporting Methodology 3-year Review Report 2011- Part 2. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-27; 226 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026 or http://www.nefsc.noaa.gov/publications/crd/crd1227/

Wigley SE, Blaylock J, Rago PJ, Shield G. 2012b. 2012 Discard estimation, precision, and sample size analyses for 14 federally managed species groups in the northeast region. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-17; 146 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026 or http://www.nefsc.noaa.gov/publications/crd/crd1217/

Wigley SE, Blaylock J, Rago PJ, Shield G. 2013. 2013 Discard estimation, precision, and sample size analyses for 14 federally managed species groups in the northeast region. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-15; 150 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026 or http://www.nefsc.noaa.gov/publications/crd/crd1315/

Wigley SE, Blaylock J, Rago PJ, Tang J, Haas HL, Shield G. 2011. Standardized Bycatch Reporting Methodology 3-year Review Report 2011- Part 1. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 11-09; 285 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026 or http://www.nefsc.noaa.gov/publications/crd/crd1109/

Wigley SE, Hersey P, Palmer JE. 2008. A description of the allocation procedure applied to the 1994 to 2007 commercial landings data. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 08-18; 61 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or http://www.nefsc.noaa.gov/publications/crd/crd0818/crd0818.pdf

Wigley SE, PJ Rago, KA Sosebee, DL Palka. 2007. The analytic component to the Standardized Bycatch Reporting Methodology Omnibus Amendment: sampling design and estimation of precision and accuracy (2nd edition). U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 07-09; 156 p. Available on-line: http://www.nefsc.noaa.gov/publications/crd/crd0709/index.htm

**Table 1. List of the 14 fish and invertebrate species groups (in bold), with species group abbreviations in parentheses and scientific names in italics, and the species that compose these groups, corresponding to the 13 federal fishery management plans implemented in the waters off the northeastern United States.**

| | |
|---|---|
| **ATLANTIC SALMON (SAL)** | *Salmo salar* |
| **BLUEFISH (BLUE)** | *Pomatomus saltatrix* |
| **FLUKE - SCUP - BLACK SEA BASS (FSB)** | |
| Black sea bass | *Centropristis striata* |
| Fluke | *Paralichthys dentatus* |
| Scup | *Stenotomus chrysops* |
| **HERRING, ATLANTIC (HERR)** | *Clupea harengus* |
| **LARGE MESH GROUNDFISH (GFL)** | |
| American plaice | *Hippoglossoides platessoides* |
| Atlantic cod | *Gadus morhua* |
| Atlantic halibut | *Hippoglossus hippoglossus* |
| Atlantic wolffish | *Anarhichas lupus* |
| Haddock | *Melanogrammus aeglefinus* |
| Ocean pout | *Zoarces americanus* |
| Pollock | *Pollachius virens* |
| Redfish | *Sebastes fasciatus* |
| White hake | *Urophycis tenuis* |
| Windowpane flounder | *Scophthalmus aquosus* |
| Winter flounder | *Pseudopleuronectes americanus* |
| Witch flounder | *Glyptocephalus cynoglossus* |
| Yellowtail flounder | *Limanda ferruginea* |
| **MONKFISH (MONK)** | *Lophius americanus* |
| **RED CRAB (RCRAB)** | *Chaceon quinquedens* |
| **SEA SCALLOP (SCAL)** | *Placopecten magellanicus* |
| **SKATE COMPLEX[11] (SKATE)** | Rajidae |
| Barndoor skate | *Dipturus laevis* |
| Clearnose skate | *Raja eglanteria* |
| Little skate | *Leucoraja erinacea* |
| Rosette skate | *Leucoraja garmani* |
| Smooth skate | *Malacoraja senta* |
| Thorny skate | *Amblyraja radiata* |
| Winter skate | *Leucoraja ocellata* |
| **SMALL MESH GROUNDFISH (GFS)** | |
| Offshore hake | *Merluccius albidus* |
| Red hake | *Urophycis chuss* |
| Silver hake | *Merluccius bilinearis* |
| **SPINY DOGFISH (DOG)** | *Squalus acanthias* |
| **SQUID[12] - BUTTERFISH - MACKEREL (SBM)** | |
| Atlantic mackerel | *Scomber scombrus* |
| Butterfish | *Peprilus triacanthus* |
| Northern shortfin squid | *Illex illecebrosus* |
| Longfin inshore squid | *Doryteuthis (Amerigo) pealeii* |
| **SURFCLAM - OCEAN QUAHOG (SCOQ)[13]** | |
| Surfclam | *Spisula solidissima* |
| Ocean quahog | *Artica islandica* |
| **TILEFISH (TILE)** | *Lopholatilus chamaeleonticeps* |

[11] Skate complex is comprises seven species as well as skate, unknown. Individual species are not summarized separately.
[12] Squid, unclassified is included in this species group. Longfin inshore squid and northern shortfin squid are also known as Loligo squid and Illex squid, respectively.
[13] In this analysis, surfclams and ocean quahogs compose the species group and are not reported separately.

**Table 2. Number of Northeast Fisheries Observer Program (NEFOP) and Vessel Trip Report (VTR) trips, by fleet and calendar quarter (Q), based on July 2012 through June 2013 data. "P" indicates fleets with "pilot" designation.**

| | | | | | | NEFOP | | | | | VTR | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | Gear Type | Access Area | Trip Category | Region | Mesh Group | Q3 | Q4 | Q1 | Q2 | TOTAL | Q3 | Q4 | Q1 | Q2 | TOTAL | Pilot |
| 1 | Longline | OPEN | all | MA | all | . | . | . | . | . | 59 | 24 | 20 | 56 | 159 | P |
| 2 | Longline | OPEN | all | NE | all | 91 | 21 | 27 | 5 | 144 | 742 | 184 | 136 | 58 | 1,120 | |
| 3 | Hand Line | OPEN | all | MA | all | 1 | . | . | . | 1 | 1,702 | 756 | 131 | 796 | 3,385 | P |
| 4 | Hand Line | OPEN | all | NE | all | 68 | 6 | . | 2 | 76 | 1,391 | 207 | 35 | 407 | 2,040 | |
| 5 | Otter Trawl | OPEN | all | MA | sm | 45 | 65 | 56 | 97 | 263 | 1,624 | 750 | 393 | 802 | 3,569 | |
| 6 | Otter Trawl | OPEN | all | MA | lg | 35 | 34 | 58 | 70 | 197 | 1,595 | 907 | 939 | 1,382 | 4,823 | |
| 7 | Otter Trawl | OPEN | all | NE | sm | 47 | 40 | 23 | 61 | 171 | 1,298 | 728 | 444 | 845 | 3,315 | |
| 8 | Otter Trawl | OPEN | all | NE | lg | 257 | 400 | 342 | 279 | 1,278 | 2,287 | 1,979 | 1,848 | 1,787 | 7,901 | |
| 9 | Scallop Trawl | AA | GEN | MA | all | . | . | . | . | . | 1 | . | . | . | 1 | P |
| 10 | Scallop Trawl | AA | LIM | MA | all | . | . | . | . | . | 4 | 1 | . | 1 | 6 | P |
| 11 | Scallop Trawl | OPEN | GEN | MA | all | 3 | 6 | 1 | 8 | 18 | 105 | 23 | 52 | 149 | 329 | |
| 12 | Scallop Trawl | OPEN | LIM | MA | all | . | . | . | . | . | 5 | 3 | 9 | 11 | 28 | P |
| 13+ | Scallop Trawl | OPEN | LIM | NE | all | 1 | . | . | . | 1 | 1 | 4 | 1 | . | 6 | P |
| 14 | Otter Trawl, Ruhle | OPEN | all | MA | lg | . | . | . | . | . | 2 | 4 | 1 | . | 7 | P |
| 15 | Otter Trawl, Ruhle | OPEN | all | NE | sm | . | . | . | . | . | 1 | . | 16 | 1 | 18 | P |
| 16 | Otter Trawl, Ruhle | OPEN | all | NE | lg | . | . | . | . | . | . | 2 | . | 4 | 6 | P |
| 17 | Otter Trawl, Haddock Separator | OPEN | all | NE | lg | 6 | 5 | 1 | 4 | 16 | 15 | 22 | 16 | 18 | 71 | |
| 18 | Shrimp Trawl | OPEN | all | MA | all | . | . | . | . | . | 256 | 64 | . | 3 | 323 | P |
| 19 | Shrimp Trawl | OPEN | all | NE | all | . | . | 24 | . | 24 | 87 | 13 | 443 | 30 | 573 | |
| 20 | Floating Trap | OPEN | all | MA | all | . | . | . | . | . | 35 | 3 | . | 33 | 71 | P |
| 21 | Floating Trap | OPEN | all | NE | all | . | . | . | . | . | 13 | . | . | 12 | 25 | P |
| 22 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | sm | . | . | . | . | . | 675 | 480 | 343 | 308 | 1,806 | P |
| 23 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | lg | . | . | 4 | . | 4 | 371 | 1,095 | 497 | 371 | 2,334 | P |
| 24 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | xlg | . | 5 | 5 | 16 | 26 | 71 | 464 | 381 | 1,061 | 1,977 | |
| 25 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | sm | . | . | . | . | . | 2 | 1 | . | . | 3 | P |
| 26 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | lg | 543 | 316 | 28 | 139 | 1,026 | 3,446 | 1,441 | 320 | 807 | 6,014 | |
| 27 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | xlg | 177 | 43 | 15 | 49 | 284 | 965 | 441 | 297 | 810 | 2,513 | |
| 28 | Purse Seine | OPEN | all | MA | all | . | . | . | . | . | 299 | 38 | . | 104 | 441 | P |
| 29 | Purse Seine | OPEN | all | NE | all | 24 | 4 | . | 3 | 31 | 230 | 29 | . | 60 | 319 | |
| 30 | Scallop Dredge | AA | GEN | MA | all | . | 1 | 1 | 1 | 3 | 7 | 7 | 7 | 6 | 27 | P |
| 31 | Scallop Dredge | AA | GEN | NE | all | 1 | 2 | . | 2 | 5 | 29 | 10 | 3 | 19 | 61 | P |
| 32 | Scallop Dredge | AA | LIM | MA | all | 23 | 3 | 7 | 12 | 45 | 130 | 38 | 61 | 108 | 337 | |
| 33 | Scallop Dredge | AA | LIM | NE | all | 44 | 35 | 11 | 30 | 120 | 240 | 199 | 75 | 198 | 712 | |

*Note: The MA and NE twin trawl fleets are not reported in this table. Based on July 2012 through June 2013 data, there were 3 MA twin trawl trips and 3 NE twin trawl trips observed with no corresponding VTR trips for these 2 fleets.*

See text for fleet abbreviations; "+" = new fleets in 2014.

**Table 2, continued. Number of Northeast Fisheries Observer Program (NEFOP) and Vessel Trip Report (VTR) trips, by fleet and calendar quarter (Q), based on July 2012 through June 2013 data. "P" indicates fleets with "pilot" designation.**

| | | | | | | NEFOP | | | | | VTR | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | Gear Type | Access Area | Trip Category | Region | Mesh Group | Q3 | Q4 | Q1 | Q2 | TOTAL | Q3 | Q4 | Q1 | Q2 | TOTAL | Pilot |
| 34 | Scallop Dredge | OPEN | GEN | MA | all | 8 | 5 | 14 | 15 | 42 | 823 | 465 | 534 | 710 | 2,532 | |
| 35 | Scallop Dredge | OPEN | GEN | NE | all | 8 | 11 | 10 | 31 | 60 | 882 | 770 | 970 | 1,251 | 3,873 | |
| 36 | Scallop Dredge | OPEN | LIM | MA | all | 8 | 3 | 4 | 13 | 28 | 125 | 65 | 64 | 121 | 375 | |
| 37 | Scallop Dredge | OPEN | LIM | NE | all | 25 | 9 | 20 | 73 | 127 | 368 | 200 | 179 | 502 | 1,249 | |
| 38 | Danish Seine | OPEN | all | MA | all | . | . | . | . | . | 93 | 7 | . | 55 | 155 | P |
| 39 | Mid-water Paired & Single Trawl | OPEN | all | MA | all | . | . | 1 | . | 1 | . | . | 5 | 5 | 10 | P |
| 40 | Mid-water Paired & Single Trawl | OPEN | all | NE | all | 90 | 17 | 18 | 21 | 146 | 137 | 34 | 168 | 55 | 394 | |
| 41 | Pots and Traps, Fish | OPEN | all | MA | all | . | . | . | . | . | 299 | 173 | 75 | 293 | 840 | P |
| 42 | Pots and Traps, Fish | OPEN | all | NE | all | . | . | . | . | . | 511 | 40 | 2 | 150 | 703 | P |
| 43 | Pots and Traps, Conch | OPEN | all | MA | all | . | . | . | . | . | 60 | 527 | 206 | 369 | 1,162 | P |
| 44 | Pots and Traps, Conch | OPEN | all | NE | all | . | . | . | . | . | 380 | 450 | 1 | 339 | 1,170 | P |
| 45 | Pots and Traps, Hagfish | OPEN | all | NE | all | . | . | . | . | . | 7 | 3 | 6 | 11 | 27 | P |
| 46 | Pots and Traps, Shrimp | OPEN | all | NE | all | . | . | . | . | . | . | . | 21 | . | 21 | P |
| 47 | Pots and Traps, Lobster | OPEN | all | MA | all | . | . | . | . | . | 920 | 382 | 136 | 450 | 1,888 | P |
| 48 | Pots and Traps, Lobster | OPEN | all | NE | all | 5 | 8 | 6 | 5 | 24 | 11,849 | 8,182 | 1,847 | 4,635 | 26,513 | |
| 49 | Pots and Traps, Crab | OPEN | all | MA | all | . | . | . | . | . | 34 | 11 | . | 27 | 72 | P |
| 50 | Pots and Traps, Crab | OPEN | all | NE | all | . | . | . | . | . | 26 | 19 | 25 | 6 | 76 | P |
| 51 | Beam Trawl | OPEN | all | MA | all | . | . | . | . | . | 37 | 21 | 9 | 3 | 70 | P |
| 52 | Beam Trawl | OPEN | all | NE | all | . | . | . | . | . | 26 | 9 | . | 18 | 53 | P |
| 53 | Dredge, Other | OPEN | all | MA | all | . | . | . | . | . | 5 | 74 | 83 | 50 | 212 | P |
| 54 | Ocean Quahog/Surfclam Dredge | OPEN | all | MA | all | . | . | . | . | . | 506 | 426 | 451 | 429 | 1,812 | P |
| 55 | Ocean Quahog/Surfclam Dredge | OPEN | all | NE | all | . | . | . | . | . | 840 | 569 | 591 | 708 | 2,708 | P |
| 56+ | Otter Trawl | OPEN | all | NE | smR | . | . | 2 | 11 | 13 | . | . | 2 | 10 | 12 | |
| | | | | | **Total** | **1,510** | **1,039** | **678** | **947** | **4,174** | **35,616** | **22,344** | **11,843** | **20,444** | **90,247** | |

*Note: The MA and NE twin trawl fleets are not reported in this table. Based on July 2012 through June 2013 data, there were 3 MA twin trawl trips and 3 NE twin trawl trips observed with no corresponding VTR trips for these 2 fleets.*

See text for fleet abbreviations; "+" = new fleets in 2014.

**Table 3. Number of Northeast Fisheries Observer Program (NEFOP) and Vessel Trip Report (VTR) sea days, by fleet and calendar quarter (Q), based on July 2012 through June 2013 data. "P" indicates fleets with "pilot" designation.**

| | | | | | | NEFOP | | | | | VTR | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | Gear Type | Access Area | Trip Category | Region | Mesh Group | Q3 | Q4 | Q1 | Q2 | TOTAL | Q3 | Q4 | Q1 | Q2 | TOTAL | Pilot |
| 1 | Longline | OPEN | all | MA | all | . | . | . | . | . | 289 | 199 | 183 | 333 | 1,004 | P |
| 2 | Longline | OPEN | all | NE | all | 91 | 21 | 27 | 5 | 144 | 746 | 190 | 145 | 60 | 1,141 | |
| 3 | Hand Line | OPEN | all | MA | all | 1 | . | . | . | 1 | 1,905 | 806 | 141 | 812 | 3,664 | P |
| 4 | Hand Line | OPEN | all | NE | all | 69 | 6 | . | 2 | 77 | 1,604 | 327 | 35 | 429 | 2,395 | |
| 5 | Otter Trawl | OPEN | all | MA | sm | 61 | 125 | 271 | 174 | 631 | 2,644 | 1,545 | 1,444 | 1,370 | 7,003 | |
| 6 | Otter Trawl | OPEN | all | MA | lg | 56 | 90 | 174 | 97 | 417 | 2,405 | 2,517 | 3,943 | 2,364 | 11,229 | |
| 7 | Otter Trawl | OPEN | all | NE | sm | 120 | 102 | 102 | 139 | 463 | 2,598 | 1,767 | 1,297 | 1,653 | 7,315 | |
| 8 | Otter Trawl | OPEN | all | NE | lg | 848 | 1,245 | 1,035 | 944 | 4,072 | 5,194 | 5,418 | 5,613 | 5,417 | 21,642 | |
| 9 | Scallop Trawl | AA | GEN | MA | all | . | . | . | . | . | 2 | . | . | . | 2 | P |
| 10 | Scallop Trawl | AA | LIM | MA | all | . | . | . | . | . | 29 | 6 | . | 15 | 50 | P |
| 11 | Scallop Trawl | OPEN | GEN | MA | all | 3 | 6 | 2 | 14 | 25 | 206 | 41 | 110 | 303 | 660 | |
| 12 | Scallop Trawl | OPEN | LIM | MA | all | . | . | . | . | . | 21 | 13 | 55 | 53 | 142 | P |
| 13+ | Scallop Trawl | OPEN | LIM | NE | all | 15 | . | . | . | 15 | 4 | 32 | 5 | . | 41 | P |
| 14 | Otter Trawl, Ruhle | OPEN | all | MA | lg | . | . | . | . | . | 5 | 30 | 10 | . | 45 | P |
| 15 | Otter Trawl, Ruhle | OPEN | all | NE | sm | . | . | . | . | . | 3 | . | 40 | 3 | 46 | P |
| 16 | Otter Trawl, Ruhle | OPEN | all | NE | lg | . | . | . | . | . | . | 17 | . | 38 | 55 | P |
| 17 | Otter Trawl, Haddock Separator | OPEN | all | NE | lg | 50 | 49 | 11 | 35 | 145 | 138 | 217 | 144 | 161 | 660 | |
| 18 | Shrimp Trawl | OPEN | all | MA | all | . | . | . | . | . | 1,346 | 354 | . | 13 | 1,713 | P |
| 19 | Shrimp Trawl | OPEN | all | NE | all | . | . | 24 | . | 24 | 87 | 13 | 443 | 30 | 573 | |
| 20 | Floating Trap | OPEN | all | MA | all | . | . | . | . | . | 35 | 3 | . | 33 | 71 | P |
| 21 | Floating Trap | OPEN | all | NE | all | . | . | . | . | . | 13 | . | . | 12 | 25 | P |
| 22 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | sm | . | . | . | . | . | 718 | 495 | 352 | 326 | 1,891 | P |
| 23 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | lg | . | . | 4 | . | 4 | 398 | 1,124 | 518 | 392 | 2,432 | P |
| 24 | Sink, Anchor, Drift Gillnet | OPEN | all | MA | xlg | . | 8 | 6 | 19 | 33 | 74 | 540 | 449 | 1,215 | 2,278 | |
| 25 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | sm | . | . | . | . | . | 3 | 1 | . | . | 4 | P |
| 26 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | lg | 592 | 368 | 72 | 203 | 1,235 | 3,949 | 1,832 | 598 | 1,215 | 7,594 | |
| 27 | Sink, Anchor, Drift Gillnet | OPEN | all | NE | xlg | 196 | 55 | 40 | 88 | 379 | 1,144 | 545 | 611 | 1,516 | 3,816 | |
| 28 | Purse Seine | OPEN | all | MA | all | . | . | . | . | . | 299 | 38 | . | 110 | 447 | P |
| 29 | Purse Seine | OPEN | all | NE | all | 53 | 9 | . | 9 | 71 | 496 | 60 | . | 143 | 699 | |
| 30 | Scallop Dredge | AA | GEN | MA | all | . | 3 | 3 | 3 | 9 | 17 | 19 | 18 | 16 | 70 | P |
| 31 | Scallop Dredge | AA | GEN | NE | all | 3 | 5 | . | 4 | 12 | 72 | 24 | 9 | 41 | 146 | P |
| 32 | Scallop Dredge | AA | LIM | MA | all | 225 | 31 | 62 | 123 | 441 | 1,174 | 323 | 483 | 995 | 2,975 | |
| 33 | Scallop Dredge | AA | LIM | NE | all | 377 | 336 | 92 | 235 | 1,040 | 2,043 | 1,756 | 648 | 1,741 | 6,188 | |

*Note: The MA and NE twin trawl fleets are not reported in this table. Based on July 2012 through June 2013 data, there were 11 MA twin trawl sea days and 15 NE twin trawl sea days observed with no corresponding VTR sea days for these 2 fleets.*

See text for fleet abbreviations; "+" = new fleets in 2014.

**Table 3, continued. Number of Northeast Fisheries Observer Program (NEFOP) and Vessel Trip Report (VTR) sea days, by fleet and calendar quarter (Q), based on July 2012 through June 2013 data. "P" indicates fleets with "pilot" designation.**

| | | | | | | NEFOP | | | | | VTR | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row | Gear Type | Access Area | Trip Category | Region | Mesh Group | Q3 | Q4 | Q1 | Q2 | TOTAL | Q3 | Q4 | Q1 | Q2 | TOTAL | Pilot |
| 34 | Scallop Dredge | OPEN | GEN | MA | all | 12 | 8 | 24 | 22 | 66 | 1,253 | 751 | 839 | 1,117 | 3,960 | |
| 35 | Scallop Dredge | OPEN | GEN | NE | all | 10 | 15 | 10 | 41 | 76 | 1,060 | 965 | 1,142 | 1,513 | 4,680 | |
| 36 | Scallop Dredge | OPEN | LIM | MA | all | 71 | 28 | 47 | 128 | 274 | 1,180 | 565 | 530 | 1,097 | 3,372 | |
| 37 | Scallop Dredge | OPEN | LIM | NE | all | 257 | 76 | 156 | 700 | 1,189 | 3,486 | 1,678 | 1,376 | 4,678 | 11,218 | |
| 38 | Danish Seine | OPEN | all | MA | all | . | . | . | . | . | 94 | 7 | . | 55 | 156 | P |
| 39 | Mid-water Paired & Single Trawl | OPEN | all | MA | all | . | . | 7 | . | 7 | . | . | 30 | 42 | 72 | P |
| 40 | Mid-water Paired & Single Trawl | OPEN | all | NE | all | 389 | 75 | 76 | 98 | 638 | 598 | 123 | 428 | 240 | 1,389 | |
| 41 | Pots and Traps, Fish | OPEN | all | MA | all | . | . | . | . | . | 308 | 174 | 81 | 302 | 865 | P |
| 42 | Pots and Traps, Fish | OPEN | all | NE | all | . | . | . | . | . | 511 | 40 | 5 | 150 | 706 | P |
| 43 | Pots and Traps, Conch | OPEN | all | MA | all | . | . | . | . | . | 61 | 534 | 286 | 512 | 1,393 | P |
| 44 | Pots and Traps, Conch | OPEN | all | NE | all | . | . | . | . | . | 381 | 450 | 1 | 340 | 1,172 | P |
| 45 | Pots and Traps, Hagfish | OPEN | all | NE | all | . | . | . | . | . | 52 | 16 | 27 | 78 | 173 | P |
| 46 | Pots and Traps, Shrimp | OPEN | all | NE | all | . | . | . | . | . | . | . | 21 | . | 21 | P |
| 47 | Pots and Traps, Lobster | OPEN | all | MA | all | . | . | . | . | . | 1,208 | 527 | 215 | 564 | 2,514 | P |
| 48 | Pots and Traps, Lobster | OPEN | all | NE | all | 11 | 31 | 23 | 23 | 88 | 14,106 | 10,298 | 3,523 | 6,414 | 34,341 | |
| 49 | Pots and Traps, Crab | OPEN | all | MA | all | . | . | . | . | . | 34 | 22 | . | 54 | 110 | P |
| 50 | Pots and Traps, Crab | OPEN | all | NE | all | . | . | . | . | . | 234 | 206 | 153 | 39 | 632 | P |
| 51 | Beam Trawl | OPEN | all | MA | all | . | . | . | . | . | 76 | 31 | 15 | 9 | 131 | P |
| 52 | Beam Trawl | OPEN | all | NE | all | . | . | . | . | . | 34 | 11 | . | 19 | 64 | P |
| 53 | Dredge, Other | OPEN | all | MA | all | . | . | . | . | . | 10 | 95 | 89 | 96 | 290 | P |
| 54 | Ocean Quahog/Surfclam Dredge | OPEN | all | MA | all | . | . | . | . | . | 969 | 870 | 977 | 964 | 3,780 | P |
| 55 | Ocean Quahog/Surfclam Dredge | OPEN | all | NE | all | . | . | . | . | . | 904 | 714 | 723 | 789 | 3,129 | P |
| 56+ | Otter Trawl | OPEN | all | NE | smR | . | . | 6 | 76 | 82 | . | . | 5 | 69 | 74 | |
| | | | | | **Total** | **3,510** | **2,692** | **2,274** | **3,182** | **11,658** | **56,220** | **38,329** | **27,760** | **39,950** | **162,258** | |

*Note: The MA and NE twin trawl fleets are not reported in this table. Based on July 2012 through June 2013 data, there were 11 MA twin trawl sea days and 15 NE twin trawl sea days observed with no corresponding VTR sea days for these 2 fleets.*

See text for fleet abbreviations; "+" = new fleets in 2014.

# Appendix E
# Economic Impact Analysis of Herring and Mackerel Alternatives

Northeast Fisheries Science Center

January 2015

Economic impacts of the herring and mackerel monitoring alternatives are measured in terms of what the industry funded portion of the additional observer coverage ($818 per day at sea) represents in relation to typical net revenues of vessels that fished in 2013. For this analysis it is assumed that the NMFS annual infrastructure costs (approximately $5 million) would not change since the additional days required are less than 2,000 and so could be absorbed by the current program.

Net revenues are the gross receipts from the sale of fish less the variable costs of fishing (trip costs) and crew pay. Northeast observer data were used to calculate the average trip costs of the different vessel types that will be affected. The components of trip costs include, fuel, oil, ice, food, water, supplies, and damage. There may be other trip costs incurred by these vessels but these are not collected by observers. Crew pay is assumed to equal one-half of gross receipts less trip costs. Revenue and other information about the vessel and trip were obtained from Northeast dealer and logbook data.

For each alternative the population of trips and vessels that would be affected, if these regulations were in place in 2013, are described at the fleet and vessel levels. At the vessel level, average per trip revenue, net revenues, and then net revenues after observer costs are deducted are described. With that information average percent reductions in net revenue by vessel type are provided. At the fleet level, total revenues, net revenues, net revenues reduced by observer costs, number of trips, number of days, and number of vessels are provided.

For alternatives where less than 100% coverage are proposed, trips are randomly selected (without replacement) from the population of 2013 trips. This process is repeated 1,000 times for each analysis so that a range of average revenues, and net revenues with and without observer costs, can be provided. This is achieved by providing standard deviations around each of the reported means. Some of the proposed coverage targets cover a variety of vessel types so each random draw results in a different mix of vessel types and trips that would be required to carry an observer. For proposed coverage targets that are specific to a vessel type, then each random draw results in a different mix of trips.

## Mackerel Alternative 2.1.A (up to 100% coverage on limited access MWT & Tier 1 SMBT vessels for trips with >= 20,000 lbs landed mackerel)

In 2013 there were three limited access mid-water trawl vessels, seven limited access paired mid-water trawl vessels, and two tier 1 small mesh bottom trawl vessels with trips that landed 20,000 lbs or more of mackerel. Had these vessels been required to carry observers on these 20,000+ lb mackerel trips in 2013, on average their net revenues per trip would have been reduced by observer costs by 6.5%, 7.0%, and 8.9%, respectively. For the mid-water trawl vessels the additional observer costs are about $2,000 per trip. For the paired mid-water trawl vessels the additional observer costs are about $2,500 per trip (Table 1). Since there were less than three tier 1 small mesh bottom trawl vessels, their revenues and net revenues cannot be reported.

At the fleet level with 100% observer coverage, the mid-water trawl vessels would have had additional observer costs of about $14,000 and paired mid-water trawl vessels would have had costs of about $46,600 (Table 2).

Since this alternative considers coverage “up to” 100%, coverage rates of 75%, 50%, and 25% are also analyzed. The impacts on the fleet of impacted vessels (vessels or trips not selected for coverage would not result in a reduction in net revenue) are shown in Tables 3 through 5.

## Mackerel Alternative 2.1.B (up to 50% coverage on Tier 2 SMBT vessels for trips with >= 20,000 lbs landed mackerel)

In 2013 there was only one trip taken by a tier 2 small mesh bottom trawl vessels that landed 20,000 lbs or more of mackerel. Had observer coverage been required for this trip, net revenues would have been reduced by 7.9% (Table 6). For data confidentiality reasons and because there was only one trip to draw from for coverage rate analyses, no further information can be provided.

## Mackerel Alternative 2.1.C (up to 25% coverage on Tier 3 SMBT vessels for trips with >= 20,000 lbs landed mackerel)

There were no trips with 20,000 lbs of mackerel landed by tier 3 small mesh bottom trawl vessels in 2013 (or in 2011 or 2012).

## Mackerel Alternative 2.2.A (100% coverage on limited access MWT & Tier 1 SMBT vessels for trips with >= 20,000 lbs landed mackerel)

See mackerel alternative 2.1.A -- 100% observer coverage analyses (Tables 1 and 2).

## Mackerel Alternative 2.2.B (50% coverage on Tier 2 SMBT vessels for trips with >= 20,000 lbs landed mackerel)

See mackerel alternative 2.1.B -- 50% observer coverage analysis (Table 6).

## Mackerel Alternative 2.2.C (25% coverage on Tier 3 SMBT vessels for trips with >= 20,000 lbs landed mackerel)

See mackerel alternative 2.1.C.

## Herring Alternative 2.1 (up to 100% coverage on category A & B vessels on declared herring trips)

In 2013 there were seven limited access mid-water trawl vessels, 11 limited access paired mid-water trawl vessels, five purse seine vessels, and seven small mesh bottom trawl vessels with trips that landed 1 lb or more of herring. Had these vessels been required to carry observers on these herring trips in 2013, on average their net revenues per trip would have been reduced by observer costs by 10.6%, 11.6%, 5.3%, and 18.5%, respectively. For the mid-water trawl vessels the additional observer costs are about $2,400 per trip. For the paired mid-water trawl vessels the additional observer costs are about $2,500 per trip. For the purse seine vessels the additional observer costs are about $700 per trip, and for the small mesh bottom trawls vessels, about $1,600 per trip (Table 7).

At the fleet level with 100% observer coverage, the mid-water trawl vessels would have had additional observer costs of about $180,000, paired mid-water trawl vessels about $655,000, purse seine vessels about $188,000, and small mesh bottom trawl vessels about $156,000 (Table 8).

Since this alternative considers coverage "up to" 100%, coverage rates of 75%, 50%, and 25% are also analyzed. The impacts on the fleet of impacted vessels (vessels or trips not selected for coverage would not result in a reduction in net revenue) are shown in Tables 9 through 11.

## Herring Alternative 2.2 (100% coverage on category A & B vessels on declared herring trips)

See herring alternative 2.1 -- 100% observer coverage analyses (Tables 7 and 8).

## Mid-Water Trawl Alternative 2.3 (up to 50.73%, 58.14%, and 60.5% coverage on New England Single MWT, New England Paired MWT, and Mid-Atlantic Paired MWT, respectively)

In 2013 there were 11 New England mid-water trawl vessels, 10 New England paired mid-water trawl vessels, and 8 Mid-Atlantic paired mid-water trawl vessels. Had these vessels been required to carry observers on these herring trips in 2013, on average their net revenues per trip would have been reduced by observer costs by 12.7%, 11.0%, and 16.7%, respectively. For the New England mid-water trawl vessels the additional observer costs are about $1,300 per trip. For the New England and Mid-Atlantic paired mid-water trawl vessels the additional observer costs are about $2,500 per trip (Table 12). Total net revenue for the fleet and information on trips, days, and number of vessels is shown in Table 13.

At the fleet level at the maximum coverage rates, the New England mid-water trawl vessels would have had additional observer costs of about $117,000, New England paired mid-water trawl vessels about $333,000, and Mid-Atlantic paired mid-water trawl vessels about $51,500 (Table 14).

Since this alternative considers coverage "up to" the maximum rates, coverage rates of 40% and 20% are also analyzed. The impacts on the fleet of impacted vessels (vessels or trips not selected for coverage would not result in a reduction in net revenue) are shown in Tables 15 and 16.

## Additional Fishing Vessel Cost Information

To provide context for evaluating the impacts to net revenues, information about the annual fixed cost for fishing vessels (such as insurance and repair and maintenance costs) is given. The cost data is from surveys conducted by the Social Sciences Branch of the Northeast Fisheries Science Center (see http://www.nefsc.noaa.gov/read/socialsci/fixedCostSurvey2012.html). Since very few observations on mid-water trawl vessels are available, information about the fixed costs for large (> 80') trawl vessels are given (Table 17). This information can be used to evaluate both mid-water trawl and small mesh bottom trawl vessel types. Cost information for purse seine vessels is provided separately (Table 17).

The following example will help to illustrate how these annual fixed costs can be used to provide context:  the mean fixed costs for purse seine vessels are $137,343 (Table 17). Table 7 shows that purse seine vessel net revenues per trip are $13,136 and when observer costs are included they are $12,434. In order for net revenues to just cover fixed costs, 10.5 trips per year are needed (this only considers trips of this type, not other trips that don't meet the criteria described in the alternative under evaluation). This represents the break-even number of trips needed before any profit is earned. If observers were required on all purse seine trips the break-even point increases to 11 trips. So, on average, one-half of an additional trip per year would be required to cover the additional cost of carrying an observer.

Table 1. Mackerel Alternative 2.1.A -- per trip Average Revenues and Net Revenues for Population of Trips (standard deviations in parentheses)

| | Average Total Value all Species | Average Net Revenue | Average Net Revenue With Observer Costs | Percent Reduction in Net Revenue | Average Vessel Length |
|---|---|---|---|---|---|
| **Limited Access Mid-Water Trawl** | $75,282 ($45,898) | $31,215 ($18,775) | $29,175 ($17,784) | 6.5% | 122’ |
| **Limited Access Paired Mid-Water Trawl** | $82,297 ($37,082) | $34,844 ($18,541) | $32,390 ($18,541) | 7.0% | 122’ |
| **Tier 1 Small Mesh Bottom Trawl** | conf | conf | conf | 8.9% | 133’ |

Table 2. Mackerel Alternative 2.1.A -- Fleet Level Revenues/Net Revenues for Population of Trips

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Number of Trips | Number of Days | Number of Vessels |
|---|---|---|---|---|---|---|
| **Limited Access Mid-Water Trawl** | $526,977 | $218,503 | $204,226 | 7 | 17 | 3 |
| **Limited Access Paired Mid-Water Trawl** | $1,563,652 | $662,041 | $615,415 | 19 | 57 | 7 |
| **Tier 1 Small Mesh Bottom Trawl** | conf | conf | conf | 6 | 62 | 2 |

Table 3. Mackerel 2.1.A – Affected Fleet Level Revenues/Net Revenues for a 75% Coverage Rate. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **Limited Access Mid-Water Trawl** | $392,214<br>($94,097) | $162,943<br>($38,700) | $152,418<br>($36,233) | 13<br>(3.9) |
| **Limited Access Paired Mid-Water Trawl** | $1,177,240<br>($123,209) | $498,478<br>($55,438) | $463,391<br>($53,148) | 43<br>(3.7) |
| **Tier 1 Small Mesh Bottom Trawl** | conf | conf | conf | 46<br>(10.5) |

Table 4. Mackerel 2.1.A -- Affected Fleet Level Revenues/Net Revenues for a 50% Coverage Rate. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **Limited Access Mid-Water Trawl** | $263,884<br>($105,788) | $109,702<br>($43,760) | $102,643<br>($41,076) | 9<br>(4.3) |
| **Limited Access Paired Mid-Water Trawl** | $778,304<br>($146,571) | $329,373<br>($65,787) | $306,104<br>($62,988) | 28<br>(4.4) |
| **Tier 1 Small Mesh Bottom Trawl** | conf | conf | conf | 32<br>(11.9) |

Table 5. Mackerel 2.1.A -- Affected Fleet Level Revenues/Net Revenues for a 25% Coverage Rate. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **Limited Access Mid-Water Trawl** | $148,562<br>($85,600) | $61,789<br>($35,206) | $57,825<br>($33,032) | 5<br>(3.8) |
| **Limited Access Paired Mid-Water Trawl** | $388,492<br>($125,397) | $164,331<br>($56,533) | $152,687<br>($54,233) | 14<br>(3.6) |
| **Tier 1 Small Mesh Bottom Trawl** | conf | conf | conf | 18<br>(8.5) |

Table 6. Mackerel Alternative 2.1.B -- Fleet Level Revenues/Net Revenues for Population of Trips

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Percent Reduction in Net Revenue | Number of Trips | Number of Vessels |
|---|---|---|---|---|---|---|
| **Tier 2 Small Mesh Bottom Trawl** | conf | conf | conf | 7.9% | 1 | 1 |

Table 7. Herring Alternative 2.1 -- per trip Average Revenues and Net Revenues for Population of Trips (standard deviations in parentheses)

| | Average Total Value all Species | Average Net Revenue | Average Net Revenue With Observer Costs | Percent Reduction in Net Revenue | Average Vessel Length |
|---|---|---|---|---|---|
| **Category A&B Mid-Water Trawl** | $59,411 ($39,328) | $22,252 ($21,050) | $19,887 ($21,866) | 10.6% | 128’ |
| **Category A&B Paired Mid-Water Trawl** | $54,938 ($40,364) | $21,164 ($20,182) | $18,710 ($20,182) | 11.6% | 122’ |
| **Category A&B Purse Seine** | $27,620 ($16,714) | $13,136 ($8,654) | $12,434 ($8,983) | 5.3% | 69’ |
| **Category A&B Small Mesh Bottom Trawl** | $21,236 ($42,283) | $8,608 ($18,236) | $7,016 ($16,324) | 18.5% | 104’ |

Table 8. Herring Alternative 2.1 -- Fleet Level Revenues/Net Revenues for Population of Trips

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Number of Trips | Number of Days | Number of Vessels |
|---|---|---|---|---|---|---|
| **Category A&B Mid-Water Trawl** | $4,515,239 | $1,691,163 | $1,511,392 | 76 | 220 | 7 |
| **Category A&B Paired Mid-Water Trawl** | $14,668,363 | $5,650,880 | $4,995,662 | 267 | 801 | 11 |
| **Category A&B Purse Seine** | $7,402,107 | $3,520,319 | $3,332,226 | 268 | 230 | 5 |
| **Category A&B Small Mesh Bottom Trawl** | $2,081,125 | $843,536 | $687,587 | 98 | 191 | 7 |

Table 9. Herring Alternative 2.1 -- Affected Fleet Level Revenues/Net Revenues for a 75% Coverage Rate. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **Category A&B Mid-Water Trawl** | $3,393,293<br>($272,138) | $1,271,478<br>($118,195) | $1,136,546<br>($114,373) | 165<br>(14.1) |
| **Category A&B Paired Mid-Water Trawl** | $11,011,379<br>($419,358) | $4,243,093<br>($184,804) | $3,751,633<br>($176,191) | 600<br>(17.2) |
| **Category A&B Purse Seine** | $5,554,568<br>($199,712) | $2,641,664<br>($98,004) | $2,500,523<br>($96,355) | 173<br>(6.8) |
| **Category A&B Small Mesh Bottom Trawl** | $1,556,419<br>($196,473) | $630,799<br>($83,795) | $514,088<br>($73,930) | 143<br>(14.3) |

Table 10. Herring Alternative 2.1 -- Affected Fleet Level Revenues/Net Revenues for a 50% Coverage Rate. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **Category A&B Mid-Water Trawl** | $2,255,018<br>($307,296) | $844,935<br>($133,110) | $755,257<br>($128,739) | 110<br>(16.1) |
| **Category A&B Paired Mid-Water Trawl** | $7,336,176<br>($500,629) | $2,825,321<br>($218,875) | $2,497,278<br>($207,851) | 401<br>(20.8) |
| **Category A&B Purse Seine** | $3,702,121<br>($234,480) | $1,760,934<br>($115,063) | $1,667,138<br>($113,099) | 115<br>(7.7) |
| **Category A&B Small Mesh Bottom Trawl** | $1,041,327<br>($235,729) | $421,804<br>($100,396) | $343,557<br>($88,382) | 96<br>(17.2) |

Table 11. Herring Alternative 2.1 -- Affected Fleet Level Revenues/Net Revenues for a 25% Coverage Rate. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **Category A&B Mid-Water Trawl** | $1,149,595<br>($272,905) | $431,711<br>($116,550) | $386,300<br>($112,119) | 55<br>(14.5) |
| **Category A&B Paired Mid-Water Trawl** | $3,675,702<br>($441,920) | $1,417,663<br>($194,478) | $1,254,106<br>($185,159) | 200<br>(17.7) |
| **Category A&B Purse Seine** | $1,843,424<br>($200,132) | $876,636<br>($98,100) | $829,726<br>($96,302) | 57<br>(6.5) |
| **Category A&B Small Mesh Bottom Trawl** | $519,176<br>($201,788) | $210,377<br>($86,143) | $171,402<br>($76,022) | 48<br>(14.6) |

Table 12. Mid-Water Trawl Alternative 2.3 -- per trip Average Revenues and Net Revenues for Population of Trips (standard deviations in parentheses)

| | Average Total Value all Species | Average Net Revenue | Average Net Revenue With Observer Costs | Percent Reduction in Net Revenue | Average Vessel Length |
|---|---|---|---|---|---|
| **New England Mid-Water Trawl** | $26,242 ($36,710) | $10,171 ($16,344) | $8,880 ($16,156) | 12.7% | 105’ |
| **New England Paired Mid-Water Trawl** | $57,148 ($41,984) | $22,270 ($20,992) | $19,816 ($20,992) | 11.0% | 119’ |
| **Mid-Atlantic Paired Mid-Water Trawl** | $42,004 ($25,741) | $14,697 ($12,870) | $12,243 ($12,870) | 16.7% | 126’ |

Table 13. Mid-Water Trawl Alternative 2.3 -- Fleet Level Revenues/Net Revenues for Population of Trips

| | Total Value all Species | Total Net Revenue | Number of Trips | Number of Days | Number of Vessels |
|---|---|---|---|---|---|
| **New England Mid-Water Trawl** | $4,775,961 | $1,851,087 | 182 | 287 | 11 |
| **New England Paired Mid-Water Trawl** | $13,372,659 | $5,211,077 | 234 | 702 | 10 |
| **Mid-Atlantic Paired Mid-Water Trawl** | $1,428,119 | $499,707 | 34 | 102 | 8 |

Table 14. Mid-Water Trawl Alternative 2.3 -- Affected Fleet Level Revenues/Net Revenues for Maximum Coverage Rates. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **New England Mid-Water Trawl (Max Cov 50.73%)** | $2,392,257 ($247,488) | $929,842 ($108,105) | $812,907 ($106,257) | 143 (12.3) |
| **New England Paired Mid-Water Trawl (Max Cov 58.14%)** | $7,780,381 ($315,463) | $3,032,778 ($157,731) | $2,699,034 ($157,731) | 408 (0) |
| **Mid-Atlantic Paired Mid-Water Trawl (Max Cov 60.5%)** | $881,992 ($76,462) | $308,602 ($38,231) | $257,068 ($38,231) | 63 (0) |

Table 15. Mid-Water Trawl Alternative 2.3 -- Affected Fleet Level Revenues/Net Revenues for a 40% Coverage Rate. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **New England Mid-Water Trawl** | $1,920,004 ($247,225) | $744,395 ($109,514) | $650,099 ($108,045) | 115 (11.9) |
| **New England Paired Mid-Water Trawl** | $5,373,794 ($319,450) | $2,094,274 ($159,725) | $1,863,598 ($159,725) | 282 (0) |
| **Mid-Atlantic Paired Mid-Water Trawl** | $585,240 ($72,292) | $204,357 ($36,146) | $170,001 ($36,146) | 42 (0) |

Table 16. Mid-Water Trawl Alternative 2.3 -- Affected Fleet Level Revenues/Net Revenues for a 20% Coverage Rate. Values are based on 1,000 Random Draws across all Fleet Types (standard deviations in parentheses).

| | Total Value all Species | Total Net Revenue | Total Net Revenue With Observer Costs | Days |
|---|---|---|---|---|
| **New England Mid-Water Trawl** | $966,700<br>($197,409) | $373,367<br>($87,921) | $325,340<br>($87,081) | 59<br>(10) |
| **New England Paired Mid-Water Trawl** | $2,674,401<br>($252,579) | $1,040,889<br>($126,290) | $925,551<br>($126,290) | 141<br>(0) |
| **Mid-Atlantic Paired Mid-Water Trawl** | $295,712<br>($61,076) | $103,724<br>($30,538) | $86,546<br>($30,538) | 21<br>(0) |

Table 17. Average Annual Fixed Costs

| | Observations | Mean | Standard Deviation |
|---|---|---|---|
| **Large (>80') Trawl Vessels** | 12 | $330,193 | $608,124 |
| **Purse Seine Vessels** | 6 | $137,343 | $211,725 |