

# **Industry-Funded Monitoring Omnibus Amendment Discussion Document**

## ***Herring Alternatives***

**New England Fishery Management Council  
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**Prepared by NOAA's National Marine Fisheries Service**

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## 1.1 INTRODUCTION

The New England Fishery Management Council (NEFMC) is interested in increasing catch monitoring in the Atlantic Herring Fishery Management Plan (Herring FMP). 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). Limited Federal funding and legal constraints on the sharing of costs between NOAA's National Marine Fisheries Service (NMFS) and the fishing industry have recently prevented NMFS from approving new industry-funded monitoring programs. Examples of new industry-funded monitoring programs that were not approved include Amendment 5 to the Herring FMP, Amendment 14 to the Atlantic Mackerel, Squid, and Butterfish (MSB) FMP, and Framework Adjustment 48 to the Northeast Multispecies FMP. This amendment is intended to remedy the industry-funded monitoring program disapproval in Herring Amendment 5 by establishing (1) a process by which available Federal funding could be allocated to the Herring FMP to support industry-funded monitoring and (2) an industry-funded monitoring coverage target to meet Herring FMP objectives.

Establishing monitoring coverage targets would allow NMFS to approve and implement new industry-funded monitoring programs, without committing to support industry-funded monitoring coverage targets above appropriated funding or before funding is determined to be available.

Although this action may select desired coverage targets beyond SBRM requirements, the availability of Federal funds to support industry-funded monitoring may impact the realized coverage level in any given year. The realized coverage level for the Herring FMP in a given year may be constrained if available Federal funding falls short of NMFS cost responsibilities for administering new industry-funded monitoring programs. During years when there is no additional funding to cover NMFS cost responsibilities above SBRM requirements, there would be no additional monitoring coverage in the herring fishery, even if industry is able to fully fund their cost responsibilities. However, if Federal funding is available to allow NMFS to meet its administrative responsibilities for new industry-funded monitoring programs, the specified coverage target levels would likely be met. Therefore, over time, the realized coverage level for the Herring FMP would fall between SBRM requirements and the industry-funded monitoring coverage target.

The omnibus alternatives in this amendment would apply to both NEFMC and Mid-Atlantic Fishery Management Council (MAFMC) FMPs and consider a standardized process to develop

new industry-funded monitoring programs to target coverage levels above SBRM requirements and prioritize available Federal funding across new industry-funded monitoring programs funding falls short of NMFS cost responsibilities for administering new industry-funded monitoring programs.

The omnibus alternatives include (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, (4) a process to prioritize available Federal funding for industry-funded monitoring across FMPs, and (5) a process for monitoring set-aside programs to be implemented via a future framework adjustment action. Both Councils reviewed and selected preliminary preferred omnibus alternatives in early 2016.

The coverage target alternatives in this amendment would apply to the Herring and MSB FMPs and consider coverage targets to increase monitoring in these FMPs, but this document only discusses the herring coverage target alternatives. The NEFMC recommended increased monitoring in the herring fishery to address the following goals: 1) Accurate estimates of catch (retained and discarded), 2) accurate catch estimates for incidental species for which catch caps apply, and 3) affordable monitoring for the herring fishery.

In 2016, NMFS was awarded NMFS National Observer Program/Fishery Information System money to test electronic monitoring aboard midwater trawl vessels and build an interface to receive state portside sampling data. NMFS will be evaluating how to use electronic monitoring to verify catch retention aboard midwater trawl vessels and how to use portside sampling data to monitor catch in the herring fishery.

## **1.2 PURPOSE AND NEED**

The purpose of this action is to consider measures that would allow the NEFMC and MAFMC to develop new industry-funded monitoring programs using a standardized approach. These programs 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 action is needed to allow the Councils to recommend increased monitoring above SBRM coverage levels in specific fisheries and prioritize Federal funding across new industry-funded monitoring programs when funding falls short of Federal cost responsibilities for administering new industry-funded monitoring programs.

### **1.3 UPDATE ON OMNIBUS ALTERNATIVES**

Both the NEFMC and the MAFMC have identified a Council-led prioritization process (Omnibus Alternative 2.2) as their preliminary preferred alternative to prioritize Federal funding across new industry-funded monitoring programs when funding falls short of Federal cost responsibilities for administering new industry-funded monitoring programs.

This action may establish industry-funded monitoring coverage targets for the herring and/or mackerel fisheries. The Council-led prioritization process would apply to those industry-funded monitoring programs, if there is a funding shortfall to support NMFS administrative cost responsibilities. The Councils could identify a weighting approach to prioritize funding under the Council-led prioritization process alternative in this action. Industry-funded monitoring programs for the herring and mackerel fisheries would both aim to address the following goals: 1) Accurate estimates of catch (retained and discarded), 2) accurate catch estimates for incidental species for which catch caps apply, and 3) affordable monitoring. The Councils may want to consider specifying an equal weighting approach in this action, acknowledging that a more complex weighing approach could be developed in the future. An example of an equal weighting approach would be funding both industry-funded monitoring programs at 70%, if only 70% of the Federal funding needed to administer both programs was available.

Revising the prioritization process (e.g., change from Council-led to NMFS-led) would be done in a future framework action. But the Councils could change the weighting approach for the Council-led prioritization process by considering a new weighting approach at a public meeting, where public comment is taken, and asking NMFS to publish a notice or rulemaking modifying the weighting approach. Both Councils would have to agree to any weighting approach, and an equal weighting approach specified in this action would ensure that the management objectives of both Councils are initially given equal weight.

### **1.4 DESCRIPTION OF HERRING COVERAGE TARGET ALTERNATIVES**

The industry-funded monitoring coverage target alternatives for the herring fishery provide a range of data collections and monitoring costs. This document evaluates how different coverage target alternatives meet specific monitoring goals identified by the NEFMC while comparing the costs of the monitoring programs, particularly costs that would be borne by the fishing industry.

Under any of the herring coverage target action alternatives, existing industry reporting requirements and observer coverage to meet MSA, ESA, and MMPA requirements under the no action alternative would continue. Any information collected under the herring coverage target action alternatives would be in addition to existing reporting and monitoring.

**TABLE 1. RANGE OF INDUSTRY-FUNDED MONITORING HERRING COVERAGE TARGET ALTERNATIVES**

<b>Gear Type</b>	<b>Purse Seine</b>	<b>MWT</b>	<b>Bottom Trawl</b>
<b>Herring Alternative 1:</b> No Coverage Target for IFM Program (No Action)	SBRM	SBRM	SBRM
<b>Herring Alternative 2:</b> Coverage Target for IFM Program	Includes Sub-Options: Waiver Allowed, Wing Vessel Exemption, 2 Year Sunset, 2 Year Re-evaluation, and 25 mt Threshold		
<b>Herring Alternative 2.1:</b> 100% NEFOP-Level Coverage on Category A and B Vessels	100% NEFOP-Level Observer	100% NEFOP-Level Observer	100% NEFOP-Level Observer
<b>Herring Alternative 2.2:</b> ASM Coverage on Category A and B Vessels	[25,50,75,100%] ASM	[25,50,75,100%] ASM	[25,50,75,100%] ASM
<b>Herring Alternative 2.3:</b> Combination Coverage on Category A and B Vessels and MWT Fleet	[25,50,75,100%] ASM	[50,100%] EM/Portside	[25,50,75,100%] ASM
<b>Herring Alternative 2.4:</b> EM and Portside Coverage on MWT Fleet	SBRM	[50,100%] EM/Portside	SBRM
<b>Herring Alternative 2.5:</b> 100% NEFOP-Level Coverage on MWT Fleet in Groundfish Closed Areas*	SBRM	100% NEFOP-Level Observer	SBRM
<b>Herring Alternative 2.6:</b> Combination Coverage on MWT Fleet in Groundfish Closed Areas	SBRM	Coverage would match selected alternatives 2.1-2.4	SBRM
* Sub-Options do not apply to Herring Alternative 2.5.			

### 1.4.1 Herring Alternative 1: No Coverage Target for Industry-Funded Monitoring Program

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 monitoring 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 receives Northeast Fisheries Observer Program (NEFOP) at-sea observer coverage under the following six 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 2015 through March 2016. 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 2. PROPOSED AND OBSERVED SEA DAYS FOR FLEETS THAT TARGET HERRING**

Fleet	Region	Sea Days allocated for April 2015 to March 2016	Observed sea days, July 2013 to June 2014	VTR sea days, July 2013 to June 2014	Observed trips, July 2013 to June 2014	VTR trips, July 2013 to June 2014
Small Mesh Bottom Trawl	MA	1,340	993	8,824	357	3,839
Small Mesh Bottom Trawl	NE	1,312	735	9,318	279	3,588
Purse seine	MA	6	0	231	0	229
Purse seine	NE	31	73	618	34	296
Midwater Trawl (Pair and Single)	MA	0	9	51	2	13
Midwater Trawl (Pair and Single)	NE	39	455	1,426	105	439

*Sources: 2015 SBRM Annual Discard Report with Observer Sea day Allocation; Wigley et al., 2015.*

Under SBRM, NEFOP observers collect the following information on declared herring trips:

- Fishing gear information (i.e., size of nets and dredges, mesh sizes, and gear configurations);
- Tow-specific information (i.e., depth, water temperature, wave height, and location and time when fishing begins and ends);
- All retained and discarded catch (fish, sharks, crustaceans, invertebrates, and debris) on observed hauls (species, weight, and disposition);
- Retained catch on unobserved hauls (species, weight, and disposition);
- Actual catch weights whenever possible, or alternatively, weight estimates derived by sub-sampling;
- Whole specimens, photos, and biological samples (i.e., scales, otoliths, and/or vertebrae from fish, invertebrates, and incidental takes);
- Information on interactions with protected species, such as sea turtles, marine mammals, and birds; and
- Vessel trip costs (i.e., operational costs for trip including food, fuel, oil, and ice).

Currently, NEFOP observers are required to possess a High Volume Fisheries (HVF) certification in order to observe the herring fishery. The HVF certification was developed in order to more effectively train certified NEFOP observers in high volume catch sampling and documentation. HVF certification allows observers 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 consideration in Herring Amendment 5.

NEFOP determined that data quality was sub-optimal 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 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.

Currently, the HVF training is conducted at the NEFOP training center in Falmouth, MA and is one 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.

#### **1.4.2 Herring Alternative 2: Coverage Target Specified for Industry-Funded Monitoring Program**

Under Herring Alternative 2, the NEFMC would specify the details of an industry-funded monitoring program 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.

Herring Alternative 2 would allow several sub-options to apply to the herring coverage target alternatives. Sub-options could apply to any of the alternatives except Herring Alternative 2.5.

- Sub-Option 1 would allow vessels to be issued waivers to exempt them from industry-funded monitoring requirements, for either a trip or the fishing year, if coverage was unavailable due to funding or logistics. Selection of this sub-option preserves the NEFMC's intent for additional monitoring in the herring fishery, but would not prevent vessels from participating in the herring fishery if monitoring coverage was not available. Should the NEFMC not select Sub-Option 1, then fishing effort would be reduced to match the available level of monitoring (i.e., the fleet would not fish if NMFS does not have funding for the program).
- Sub-Option 2 would exempt a wing vessel pair trawling with another vessel from industry-funded monitoring requirements, provided the vessel does not carry any fish.

- Sub-Option 3 would require that industry-funded monitoring requirements expire two years after implementation.
- Sub-Option 4 would require the NEFMC to examine the results of any increased coverage in the herring fishery two years after implementation, 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 a framework adjustment or an amendment to the Herring FMP, as appropriate.
- Sub-Option 5 would exempt trips that land less than 25 mt of herring from industry-funded monitoring requirements.

Omnibus Alternative 2 would include standard monitoring and service provider requirements for industry-funded monitoring, including NEFOP-level observers, at-sea monitors, electronic monitoring, and portside samplers. (*See Appendix 1 – Monitoring and Service Provider Requirements for the details of the standard requirements.*) 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.

A monitoring and service provider provision previously only considered under Herring Alternative 2 was recommended by the NEFMC in January 2016 to be included in the standard monitoring and service provider requirements in Omnibus Alternative 2. That provision would allow NEFOP-level observers and at-sea monitors to be deployed on the same vessel for more than two consecutive multi-day trips or more than twice in a given month.

In addition to the standard monitoring and service provider requirements specified in Omnibus Alternative 2, Herring Alternative 2 would specify that industry-funded observer requirements include a HVF certification for the herring fishery

Under Herring Alternative 2, the process for vessel notification and selection and payment of industry cost responsibilities would be developed during the rulemaking and amendment approval process.

#### **1.4.2.1 Herring Alternative 2.1: 100% NEFOP-Level Observer Coverage on Category A and B Vessels**

Herring Alternative 2.1 would require vessels with All Areas (Category A) and Areas 2/3 (Category B) Limited Access Herring Permits to carry a NEFOP-level observer on every declared herring trip.

NEFOP-level observers would be required to possess a NEFOP certification, including a HVF certification, and they would collect comprehensive catch data consistent with NEFOP protocols for observer data collected under the SBRM.

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

NEFOP-level observers would collect the following information on herring trips:

- Fishing gear information (i.e., size of nets and dredges, mesh sizes, and gear configurations);
- Tow-specific information (i.e., depth, water temperature, wave height, and location and time when fishing begins and ends);
- All retained and discarded catch (fish, sharks, crustaceans, invertebrates, and debris) on observed hauls (species, weight, and disposition);
- Retained catch on unobserved hauls (species, weight, and disposition);
- Actual catch weights whenever possible, or alternatively, weight estimates derived by sub-sampling;
- Whole specimens, photos, and biological samples (i.e., scales, otoliths, and/or vertebrae from fish, invertebrates, and incidental takes);
- Information on interactions with protected species, such as sea turtles, marine mammals, and birds; and
- Vessel trip costs (i.e., operational costs for trip including food, fuel, oil, and ice).

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% NEFOP-level coverage on vessels with Category A and B herring permits.

Herring Alternative 2.1 would require all vessels with Category A and B permits to carry a NEFOP-level observer on every declared herring trip. If a NEFOP-level 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. Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would likely reduce the ability of vessels with Category A and B herring permits to participate in the herring fishery, unless Sub-Option 1 was selected.

**Rationale:** Amendment 5 recommended 100% NEFOP-level observer coverage on vessels with Category A and B herring permits. The increased observer coverage recommended in Amendment 5 was intended to help determine the true nature and extent of bycatch in the fishery and better address and manage bycatch issues in the future. The requirement for 100% NEFOP-level observer coverage was recommended to apply to the most active vessels in the herring fishery. Vessels with Category A and B herring permits harvest greater than 98% of herring catch while 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, Herring Amendment 5 recommended limiting industry-funded observer coverage to vessels with Category A and B permits. The recommendation to increase coverage just on vessels with Category A and B permits was intended to 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.

Support for 100% NEFOP-level observer coverage on Category A and B herring vessels in Amendment 5 was driven by a majority of fishing industry stakeholders (e.g., groundfish fishing industry, recreational fishery participants, environmental advocates). Those stakeholders, as well as some members of the herring industry, believed that 100% NEFOP-level observer coverage on the most active vessels was important to either confirm or disprove the claims that have been made by many regarding bycatch in the herring fishery.

#### ***1.4.2.2 Herring Alternative 2.2: At-Sea Monitor Coverage on Category A and B Vessels***

Herring Alternative 2.2 would require vessels with Category A and B herring permits to carry an at-sea monitor on every declared herring trip selected for coverage by NMFS. Vessels would be selected to carry an at-sea monitor by NMFS to meet the at-sea monitor coverage target (25%, 50%, 75%, or 100%) specified in this action.

Prior to any trip declared into the herring fishery, representatives for vessels with Category A and B herring permits would be required to provide notice to NMFS and request an at-sea monitor through the pre-trip notification system. If an SBRM observer was not selected to

cover that trip, NMFS would notify the vessel representative whether or not an at-sea monitor must be procured through an industry-funded monitoring service provider. If NMFS informs the vessel representative at-sea monitoring coverage is necessary, they would then be required to contact an industry-funded monitoring service provider to obtain and pay for an at-sea monitor to carry on its next fishing trip. The vessel would be prohibited from fishing for, taking, possessing, or landing any herring without carrying an at-sea monitor on its next trip. If NMFS informs the vessel representative that at-sea monitoring coverage is not necessary on its next trip, NMFS would issue the vessel an at-sea monitoring coverage waiver.

At-sea monitors would collect the following information on herring trips:

- Fishing gear information (i.e., size of nets and dredges, mesh sizes, and gear configurations);
- Tow-specific information (i.e., depth, water temperature, wave height, and location and time when fishing begins and ends);
- All discarded catch (fish, sharks, crustaceans, invertebrates, and debris) on observed hauls (species, weight, and disposition);
- Actual catch weights whenever possible, or alternatively, weight estimates derived by sub-sampling;
- Biological samples (i.e., scales, otoliths, and/or vertebrae from fish, invertebrates, and incidental takes) on discarded catch; and
- Vessel trip costs (i.e., operational costs for trip including food, fuel, oil, and ice).

Currently, there are slippage restrictions and reporting requirements when an observer is aboard vessels with limited access herring permits. Slippage restrictions and reporting requirements could be extended to vessels with at-sea monitors aboard.

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 at-sea monitoring coverage level on vessels with Category A and B herring permits.

Herring Alternative 2.2 would require all vessels with Category A and B permits to carry an at-sea monitor on every declared herring trip selected for coverage by NMFS. If an at-sea monitor 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. Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would likely reduce the ability of vessels with Category A and B herring permits to participate in the herring fishery, unless Sub-Option 1 was selected.

**Rationale:** In contrast to NEFOP-level observers, at-sea monitors would only collect species composition on discarded catch, or catch that is not retained on board the vessel for any reason, including slippage events, operational discards, and catch that is sorted on board the vessel and then discarded. The NEFMC recommended that at-sea monitors collect only a limited data set compared to NEFOP-level observers to allow for any possible cost saving associated with reducing training time, gear requirements, and internal support resources necessary to administer an at-sea monitoring program for the herring fishery. (See *Appendix 5 – Analysis of ASM Costs for additional details.*)

#### **1.4.2.3 Herring Alternative 2.3: Combination Coverage on Category A and B Vessels and Midwater Trawl Fleet**

##### **Category A and B Vessels**

Herring Alternative 2.3 would require vessels with Category A and B herring permits using purse seine and small mesh bottom trawl gear to carry an at-sea monitor on every declared herring trip selected for coverage by NMFS. Vessels would be selected to carry an at-sea monitor by NMFS to meet the at-sea monitor coverage target (25%, 50%, 75%, or 100%) specified in this action.

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

At-sea monitors would collect the following information on herring trips:

- Fishing gear information (i.e., size of nets and dredges, mesh sizes, and gear configurations);

- Tow-specific information (i.e., depth, water temperature, wave height, and location and time when fishing begins and ends);
- All discarded catch (fish, sharks, crustaceans, invertebrates, and debris) on observed hauls (species, weight, and disposition);
- Actual catch weights whenever possible, or alternatively, weight estimates derived by sub-sampling;
- Biological samples (i.e., scales, otoliths, and/or vertebrae from fish, invertebrates, and incidental takes) on discarded catch; and
- Vessel trip costs (i.e., operational costs for trip including food, fuel, oil, and ice).

Currently, there are slippage restrictions and reporting requirements when an observer is aboard vessels with limited access herring permits. Slippage restrictions and reporting requirements could be extended to vessels with at-sea monitors aboard.

Herring Alternative 2.3 would require all vessels with Category A and B permits using purse seine or small mesh bottom trawl gear to carry an at-sea monitor on every declared herring trip selected for coverage by NMFS. If an at-sea monitor 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. Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would likely reduce the ability of vessels to participate in the herring fishery, unless Sub-Option 1 was selected.

**Rationale:** In contrast to NEFOP-level observers, at-sea monitors would only collect species composition on discarded catch, or catch that is not retained on board the vessel for any reason, including slippage events, operational discards, and catch that is sorted on board the vessel and then discarded. The NEFMC recommended that at-sea monitors collect only a limited data set compared to NEFOP-level observers to allow for any possible cost saving associated with reducing training time, gear requirements, and internal support resources necessary to administer an at-sea monitoring program for the herring fishery. (*See Appendix 5 – Analysis of ASM Costs for additional details.*)

### **Midwater Trawl Fleet**

Herring Alternative 2.3 would also require midwater trawl vessels to carry an operating electronic monitoring (EM) system on every trip declared into the herring fishery and portside sampling of catch on declared herring trips selected for coverage by NMFS. The intention of the NEFMC would be that some percentage of all declared herring trips by midwater trawl vessels would be sampled portside (50% or 100%). However, factors such as where catch is

landed, ability to access the offload, and infrastructure limitations at certain landing ports, may prevent the program from achieving 100% coverage, even if funding is not an issue.

Prior to any trip declared into the herring fishery, representatives for vessels using midwater trawl gear would be required to have an operational EM system installed aboard their vessel and provide notice to NMFS and request a portside sampler through the pre-trip notification system. NMFS would notify the vessel representative whether or not portside sampling coverage must be procured through an industry-funded monitoring service provider. If NMFS informs the vessel representative that they needed portside sampling coverage, they would then be required to contact an industry-funded monitoring service provider to obtain and pay for a portside sampler for its next fishing trip. The vessel would be prohibited from fishing for, taking, possessing, or landing any herring without portside sampling of its offload on its next trip. If NMFS informs the vessel representative that portside sampling coverage is not needed on its next trip, NMFS would issue the vessel a portside sampling coverage waiver.

### *Electronic Monitoring*

Under Herring Alternative 2.3, owners or operators of vessels issued a herring permit and using midwater trawl gear would be required to install EM equipment and maintain the equipment on board for the duration of the fishing year. Though the system would have to be installed for the duration of the fishing year, it would only need to be turned on during declared herring trips using midwater trawl gear.

Video footage would be used to confirm retention on midwater trawl trips to ensure that all catch is available to be sampled portside for a given trip. Video footage would be recorded either throughout the duration of the trip or just around haulback. For analysis purposes, haulback would be defined as the time gear sensors document the start of gear deployment to some set amount of time after the time gear sensors sense the end of deployment, in order to ensure that all catch has been transferred into the hold. In addition, one wide angle camera may remain on for the duration of the trip to monitor for discard compliance.

While video footage would initially only be used to verify retention of catch for portside sampling, EM would also be evaluated for its ability to verify compliance with slippage restrictions and reporting requirements, as well as slippage consequence measures (i.e., requirements to move 15 nautical miles or terminate a fishing trip following a slippage event). Footage would not initially be used to identify species, nor estimate the amount of catch released if a haul were slipped. The Councils or NMFS may expand the uses of video footage to include species identification or quantification of released catch in the future if video footage



proves useful for these purposes. Such an expansion would be done via a framework adjustment or amendment, as appropriate.

### Equipment

The EM system, installed by a NMFS-approved contractor, would be comprised of video camera(s), recording equipment, and other related equipment with the following components and capabilities:

- Video cameras. Video cameras would need to be mounted so to provide a clear, unobstructed, and well illuminated views of the area(s) where the midwater trawl gear is retrieved prior to catch being placed in the hold. There would need to be a sufficient number of cameras with sufficient resolution for NMFS, the US Coast Guard, and other authorized officers/designees to determine that all catch was brought aboard the vessel during haulback. The EM system must be capable of initiating video recording at the time gear retrieval starts, and record all periods of time when the gear is being retrieved and until catch is placed in the hold or discarded.
- Global Positioning System (GPS) receiver. A GPS receiver would be required to document coordinates, velocity, and heading data.
- Hydraulic and drum rotation sensors. Hydraulic sensors would be required to continuously monitor the hydraulic pressure. Drum rotation sensor would be required to continuously monitor drum rotations.
- EM control box. The system would need to include a control box that receives and stores the raw data provided by the sensors and cameras. The control box would need to contain removable hard drives and sufficient storage system capability to record data for the full duration of a trip (i.e., the longest expected trip length for the vessel).
- EM systems monitor. A wheelhouse monitor would be necessary to provide a graphical user interface for the vessel operator to monitor: 1) The state and performance of the control box, 2) information on the current date and time synchronized via GPS, 3) GPS coordinates, 4) current hydraulic pressure reading, 5) presence of a data disk, 6) percentage used of the data disk, 7) and video recording status.

NMFS would announce specifics about this equipment list, as well as any additional design requirements for the EM system, during the rulemaking and implementation process. Industry will be responsible for contracting with a NMFS-approved provider for technical and maintenance services.

### Data Transfer

After completing a fishing trip, a vessel representative would be required to mail or transmit the removable EM system hard drive(s) containing all data to NMFS or a NMFS-approved contractor, according to instructions provided by NMFS. The method of transfer that would be allowed under the EM program would be developed during implementation. Prior to departing on a subsequent trip, a vessel representative would be required to install a replacement EM system hard drive(s) to enable data collection and video recording. A vessel representative would be responsible for contacting NMFS or a NMFS-approved contractor if they have requested but not received a replacement hard drive(s) and for informing NMFS or NMFS-approved contractor of any lapse in the hard drive management procedures described in the vessel monitoring plan.

### Retention Requirements

Initially, Herring Alternative 2.3 would maintain the existing retention requirements for the midwater trawl fleet. Vessels would continue to operate under the regulations and possession limits for any fisheries for which they possess permits. Currently, there are slippage restrictions and reporting requirements when an observer is aboard vessels with limited access herring permits. Slippage restrictions and reporting requirements could be extended to vessels with EM on trips that are selected for portside sampling. There are also some statutory measures under the ESA and MMPA that may dictate retention of protected species.

### Review of EM Video Footage

Video footage would be subsampled at a predetermined percent of review (50% or 100%) and then compared to released catch affidavits, VMS reports describing slippage events, and/or observer data on slippage. Relatively high rates of review may be required to confirm discarding is not happening because discard events are relatively rare. The rate of review may be adjusted by NMFS during implementation, in cooperation with Council staff, to use the optimum and most cost effective rate to achieve management goals.

### Compliance Measures

Rates of video collection and/or subsampling could be increased if there is evidence of non-compliance. For example, if a vessel is found to have undocumented discarding events on more than a specified number of trips during a fishing year, then the vessel could be subject to increased rates of video collection and/or review for all subsequent fishing trips at the vessel

owner's expense for the remainder of the season and the next season, or until NMFS has determined that review levels can return to the original specified level.

### Vessel Monitoring Plans (VMPs)

Individual Vessel Monitoring Plans (VMPs) would serve as a clear plan for discard documentation, installation and maintenance, protocols for data storage and transfer, and other important information regarding a vessel's EM system. Each vessel operator or owner would be responsible for working with NMFS or a NMFS-approved contractor to develop a VMP, and would be required to keep the VMP aboard the vessel at all times. NMFS would specify VMP requirements in the regulations. VMPs may include, but are not limited to, information on the locations of EM system components, contact information for technical support, instructions on how to conduct a pre-trip system test, instructions on how to verify proper system functions, location(s) on deck where fish retrieval should occur to remain in view of the cameras, procedures for how to manage EM system hard drives, catch handling procedures, periodic checks of the monitor during the retrieval of gear to verify proper functioning, and reporting procedures. The VMP should minimize, as much as possible, any impact on the current operating procedures of the vessel, and should help ensure the safety of the crew. NMFS or a NMFS-approved contractor would review VMPs biennially prior to the start of the upcoming fishing year.

### *Portside Sampling*

Under Herring Alternative 2.3, vessels with herring permits using midwater trawl gear would be subject to portside sampling requirements for declared herring trips selected for coverage by NMFS. Portside sampling would be used to verify the amount and species composition of catch in the herring fishery and help track catch against catch caps for haddock and river herring and shad. Portside samplers would also collect biological information (i.e., age and length data).

### Sampling Design

The sampling design for portside sampling alternatives would be based on the existing portside sampling programs for the herring fishery, administered by the states of Massachusetts Division of Marine Fisheries and Maine Department of Marine Resources, and consistent with NEFOP sampling methodology. Midwater trawl vessels returning from a declared herring trip would be sampled portside during the offload. Initially, the level of sampling for midwater trawl trips would be approximately 50% or 100%. However, the sampling rate may be adjusted by NMFS during implementation, in cooperation with Council staff, to use the optimum and most cost

effective rate to achieve management goals. Such factors such as where catch is landed, ability to access the offload, and infrastructure limitations at certain landing ports, may prevent the program from achieving 100% coverage, even if funding is not limiting.

Basket samples would be collected from the vessel's dewatering box at specified intervals throughout the duration of the offload. Basket samples would be sorted and weighed by species and extrapolated based on vessel hail weight to represent the total trip. Actual weights could be verified using the vessel trip report and/or dealer data. Age and length data would be collected consistent with NEFOP sampling methodology.

### Landing Ports

Midwater trawl vessels returning from declared herring trips would be required to land catch in specific ports. In past years, the midwater trawl fleet has landed catch in Maine (Portland, Rockland, Vinalhaven, Prospect Harbor, Jonesport, Milbridge), New Hampshire (Newington), Massachusetts (Boston, Gloucester, New Bedford), Rhode Island (Point Judith, North Kingston), and New Jersey (Cape May). The list of specific landing ports and the details of offloading requirements in those ports would be developed as part of this amendment. Alternatives that include portside sampling are not intended to restrict the landing and offloading behavior of midwater trawl vessels. However, if certain ports are not suitable for portside sampling, then vessels may not be able to land in those ports on trips that are selected for portside sampling. If portside sampling is selected as a preliminary preferred alternative for the herring fishery, then NMFS would further evaluate how to enable portside sampling in all midwater trawl landing ports.

### Vessel Responsibilities

Midwater trawl vessels would be responsible for offloading catch consistent with offloading requirements and contacting a service provider to arrange a portside sampler to sample catch from declared herring trips.

Herring Alternative 2.3 would require midwater trawl vessels to carry an operating EM system on every trip declared into the herring fishery and portside sampling of catch on every declared herring trip selected for coverage by NMFS. If an operating EM system or portside sampler 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. Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this

alternative would likely reduce the ability of vessels to participate in the herring fishery, unless Sub-Option 1 was selected.

As recommended by the NEFMC, Herring Alternative 2.3 would have a pre-implementation plan to help the industry understand any new EM and portside monitoring requirements and become compliant with sampling equipment, notification, sampling, and reporting requirements.

**Rationale:** Because the midwater trawl fleet discards only a small percentage of its catch at sea, EM and portside sampling have the potential to be a cost effective way to address monitoring goals for the midwater trawl fleet harvesting herring. EM would be used to verify retention of catch on the midwater trawl fleet and portside sampling would be used to verify amount and species composition of landed catch.

The implementation of EM in the herring fishery would be based on the ongoing EM exempted fishing permit program for the West Coast whiting fishery that is expected to be transitioned into regulation by 2017. The implementation of portside sampling in the herring fishery would be based on the existing portside sampling program for the midwater trawl fleet operated by the Massachusetts Division of Marine Fisheries and Maine Department of Marine Resources.

#### ***1.4.2.4 Herring Alternative 2.4: Electronic Monitoring and Portside Sampling on the Midwater Trawl Fleet***

Herring Alternative 2.4 would require midwater trawl vessels to carry an operating EM system on every trip declared into the herring fishery and portside sampling of their catch on declared herring trips selected for coverage by NMFS. The intention of the NEFMC would be that some percentage of all declared herring trips by midwater trawl vessels would be sampled portside (approximately 50% or 100%). However, the sampling rate may be adjusted by NMFS during implementation, in cooperation with Council staff, to use the optimum and most cost effective rate to achieve management goals. Such factors as where catch is landed, ability to access the offload, and infrastructure limitations at certain landing ports, may prevent the program from achieving 100% coverage, even if funding is not an issue. For complete details of EM and portside sampling, see the description of Herring Alternative 2.3.

Herring Alternative 2.4, similar to Herring Alternative 2.3, would require midwater trawl vessels to carry an operating EM system on every trip declared into the herring fishery and portside sampling of their catch on every declared herring trip selected for coverage by NMFS. If an operating EM system or portside sampler 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. Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would likely reduce the ability of vessels to participate in the herring fishery, unless Sub-Option 1 was selected.

As recommended by the NEFMC, Herring Alternative 2.4 would have a pre-implementation plan to help the industry understand any new EM and portside monitoring requirements and become compliant with sampling equipment, notification, sampling, and reporting requirements.

**Rationale:** Because the midwater trawl fleet discards only a small percentage of its catch at sea, EM and portside sampling have the potential to be a cost effective way to address monitoring goals for the midwater trawl fleet harvesting herring. EM would be used to verify retention of catch on the midwater trawl fleet and portside sampling would be used to verify amount and species composition of landed catch.

The implementation of EM in the herring fishery would be based on the ongoing EM exempted fishing permit program for the West Coast whiting fishery that is expected to be transitioned into regulation by 2017. The implementation of portside sampling in the herring fishery would be based on the existing portside sampling program for the midwater trawl fleet operated by the Massachusetts Division of Marine Fisheries and Maine Department of Marine Resources.

#### ***1.4.2.5 Herring Alternative 2.5: 100% NEFOP-Level 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 to carry a NEFOP-level observer. The sub-options (i.e., waiver allowed, wing vessel exemption, 2 year sunset, 2 year evaluation, and 25 mt threshold) described under Herring Alternative 2 would not apply to Herring Alternative 2.5.

The Groundfish Closed Areas include: Closed Area I, Closed Area II, Nantucket Lightship Closed Area, Cashes Ledge Closure Area, and Western Gulf of Maine Closure Area.

Prior to any Groundfish Closed Area trip declared into the herring fishery, representatives for vessels with midwater trawl gear would be required to provide notice to NMFS and request a NEFOP-level observer through the pre-trip notification system. If an SBRM observer was not selected to cover that trip, NMFS would notify the vessel representative that NEFOP-level observer coverage must be procured through an industry-funded at-sea monitoring service provider. The vessel representative would then be required to contact an industry-funded monitoring service provider to obtain and pay for a NEFOP-level 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 a NEFOP-level observer for that trip.

NEFOP-level observers would collect the following information on herring trips in Groundfish Closed Areas:

- Fishing gear information (i.e., size of nets and dredges, mesh sizes, and gear configurations);
- Tow-specific information (i.e., depth, water temperature, wave height, and location and time when fishing begins and ends);
- All retained and discarded catch (fish, sharks, crustaceans, invertebrates, and debris) on observed hauls (species, weight, and disposition);
- Retained catch on unobserved hauls (species, weight, and disposition);
- Actual catch weights whenever possible, or alternatively, weight estimates derived by sub-sampling;
- Whole specimens, photos, and biological samples (i.e., scales, otoliths, and/or vertebrae from fish, invertebrates, and incidental takes);
- Information on interactions with protected species, such as sea turtles, marine mammals, and birds; and
- Vessel trip costs (i.e., operational costs for trip including food, fuel, oil, and ice).

Herring Alternative 2.5 would require vessels fishing with midwater trawl gear in the Groundfish Closed Areas to carry a NEFOP-level observer. If a NEFOP-level 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. Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would likely reduce the ability of the midwater trawl fleet to participate in the herring fishery inside the Groundfish Closed Areas.

**Rationale:** The requirement that midwater trawl vessels fishing in the Groundfish Closed Areas carry a NEFOP-level observer was established in Herring Amendment 5. Analyses in Amendment 5 suggest that midwater trawl vessels are not catching significant amounts of groundfish either inside or outside the Groundfish 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 rationale in Amendment 5 described the importance of determining 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.

Revisions to the SBRM in April 2015 affected how funding is used to allocate observer coverage, such that SBRM funding must first be used to provide SBRM coverage. SBRM coverage is used to estimate amount of fish discarded at sea. Since midwater trawl vessels generally discard only a small percentage of catch at sea, SBRM coverage allocated to midwater trawl vessels is relatively low compared to coverage allocated to other gear types that have higher discard rates. Thus, the realized coverage level of midwater trawl vessel fishing in Groundfish Closed Areas will only be equivalent to SBRM coverage aboard midwater trawl vessels and much less than 100% observer coverage. This alternative was added to this amendment as a way to increase observer coverage on midwater trawl vessels fishing in Groundfish Closed Areas.

#### ***1.4.2.6 Herring Alternative 2.6: Combination Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas***

Herring Alternative 2.6 would require vessels fishing with midwater trawl gear in the Groundfish Closed Areas to comply with any at-sea monitoring or EM and portside monitoring requirements specified for the herring fishery in this amendment.

Prior to any Groundfish Closed Area trip declared into the herring fishery, representatives for vessels with midwater trawl gear would be required to provide notice to NMFS and request the appropriate type of industry-funded monitoring coverage through the pre-trip notification system. If an SBRM observer was not selected to cover that trip, NMFS would notify the vessel representative that industry-funded monitoring coverage must be procured through an industry-funded at-sea monitoring service provider. The vessel representative would then be required to contact an industry-funded monitoring service provider to obtain and pay the appropriate type of industry-funded monitoring coverage 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 the appropriate type of monitoring coverage for that trip.

Herring Alternative 2.6 would require vessels fishing with midwater trawl gear in the Groundfish Closed Areas to comply with any as-sea monitoring or EM and portside monitoring requirements specified for the herring fishery in this amendment. If the appropriate type of monitoring coverage 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. Acknowledging that available Federal funding to cover NMFS cost responsibilities may be limited, this alternative would likely reduce



the ability of the midwater trawl fleet to participate in the herring fishery inside the Groundfish Closed Areas, unless Sub-Option 1 was selected.

**Rationale:** This alternative was recommended by the NEFMC to balance stakeholder interest in additional catch monitoring on midwater trawl vessels with the ability of the herring fishery to operate within the Groundfish Closed Areas and the economic impacts of paying for monitoring on trips within the Groundfish Closed Areas.

#### **1.4.3 Considered But Rejected Herring Coverage Target Alternatives**

The alternative specifying NEFOP-level observer coverage on the midwater trawl fleet to obtain a 30% coefficient of variation (CV) on river herring and shad catch was considered but rejected by the NEFMC.

The monitoring of river herring and shad catch in the herring fishery was identified as a Herring FMP need in Amendment 5. This alternative was developed from an analysis that evaluated catch of river herring and shad in the herring and mackerel fisheries and was designed to complement SBRM coverage.

This alternative would have focused observer coverage on the midwater trawl fleet because that fleet catches the majority of river herring and shad (57%). Additionally, consistent with the need identified in Amendment 5 to monitor all catch in the herring fishery, this alternative would have focused 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%). Based on 2013 data, the percent coverage to achieve a 30% CV on river herring and shad catch by the midwater trawl fleet would have been up to 61%.

The NEFMC recommended this alternative be considered but rejected because it was not considered consistent with the goals of Herring Amendment 5 and it could not be revised to apply only to vessels with Category A and B herring permits.

### **1.5 IMPACTS OF HERRING COVERAGE TARGET ALTERNATIVES**

This section considers the potential impacts of alternatives considered by the NEFMC to specify industry-funded monitoring coverage targets for the herring fishery on valued ecosystem components (VEC), including target species, non-target species, protected species, physical environment, and human communities.

For each VEC, the impacts associated with Herring Alternatives 1 and 2 will be discussed, followed by a discussion of impacts associated with Herring Alternatives 2.1-2.6.

### **1.5.1 IMPACTS OF HERRING COVERAGE TARGET ALTERNATIVES ON BIOLOGICAL RESOURCES**

When evaluating industry-funded monitoring for the herring fishery, one major consideration is whether a monitoring alternative provides the type and quality of data necessary to meet the Council's information collection goals for the herring fishery.

#### **Allocation of Monitoring Coverage**

The allocation of monitoring, or the basis of selecting a vessel for monitoring coverage, affects how the resulting data can be used for management.

Under SBRM, vessels are selected for observer coverage by fishing fleet (based on gear, mesh and area), not based on FMP or permit category. 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, which may impact the utility of the data.

Observed trips that were selected for coverage based on permit category, and not fleet, may be treated separately by the Northeast Fisheries Science Center in catch and bycatch analyses. These data may not be used in stock assessments or total catch estimation because the vessel selection for observer coverage is no longer done in a randomized way and is inconsistent with SBRM's sampling design. Data collected by permit category could be used to track catch against annual catch limits (ACLs) or fishery catch caps that are specific to the permits that are being targeted for coverage because the data collection and catch estimation method would match. However, the utility of data collected by permit category would likely be limited as compared to data that were collected by fishing fleet because the catch estimate method does not match SBRM's sampling design.

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 improve catch estimates for use in stock assessments, and not just solely for monitoring harvest, then monitoring coverage should be allocated by fishing fleet and not FMP, fishery, or permit category.

**Table 3. PROS AND CONS OF ALLOCATING MONITORING COVERAGE BY PERMIT VERSUS FLEET**

	<b>Pros</b>	<b>Cons</b>
<b>Permit-Based Coverage Target Alternatives</b>	Councils manage fisheries by FMP and vessel permit	Not consistent with how SBRM allocates observers
	Can be used to monitor FMP-specific quotas and catch caps	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
<b>Fleet-Based Coverage Target Alternatives</b>	Consistent with how SBRM allocates observer coverage	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

### Type of Information Collected

Different types of monitoring can provide different kinds of information with varying levels of verification (Table 4.)

Currently, vessel trip reports (VTRs) provide information on fishing effort, retained catch, and discarded catch. Dealer reports provide information on retained catch and vessel monitoring systems (VMS) provided information on fishing location and behavior. Affidavits of slippage events and discard reports can provide details of why slippage and/or discard events occur.

Under the industry-funded herring coverage target alternatives, NEFOP-level observers and at-sea monitors would both provide information on fishing effort. NEFOP-level observers and portside samplers would be collecting species composition and biological information on retained catch, while at-sea monitors would be collecting species and biological information on discarded catch. EM would be used to confirm retention of catch.

**TABLE 4. COMPARISON OF INFORMATION COLLECTED ACROSS HERRING COVERAGE TARGET ALTERNATIVES**

Herring Data Interests	Current Information Collections That Would Continue Under Any Alternative	HER Alt 1	HER Alt 2.1	HER Alt 2.2	HER Alt 2.3	HER Alt 2.4	HER Alt 2.5
		Ability to meet data interest: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> N/A					
		No Action (NEFOP coverage for SBRM only)	100% NEFOP on Category A and B Vessels	ASM (25, 50, 75, or 100%) on Category A and B Vessels	EM/Portside on MWT Vessels  ASM (25, 50, 75, or 100%) on other Category A and B vessels	EM/Portside on MWT vessels	100% NEFOP On MWT Vessels Fishing in Groundfish Closed Areas
Retained Catch	<ul style="list-style-type: none"> <li>Vessel trip reports</li> <li>Dealer reports</li> <li>VMS catch reports</li> </ul>	Information on effort, area, gear, and economics  Species composition data	Information on effort, area, gear, and economics  Species composition data	Information on effort, area, gear, and economics  Confirm retention	ASM - Information on effort, area, gear, economics; confirms retention  EM/Portside - Confirms retention; species composition data	Confirms retention  Species composition data	Information on effort, area, gear, and economics  Species composition data
Discarded Catch	<ul style="list-style-type: none"> <li>Vessel trip reports</li> <li>VMS catch reports</li> </ul>	Discard estimate  Species composition of discarded catch	Discard estimate  Species composition of discarded catch	Discard estimate  Species composition of discarded catch	ASM - Discard estimate; species composition data on discarded catch  EM - Flags discarding	Flags discarding	Discard estimate  Species composition of discarded catch
Haddock Catch Cap Monitoring	<ul style="list-style-type: none"> <li>Vessel trip reports</li> <li>Dealer reports</li> <li>VMS catch reports</li> <li>Affidavits</li> </ul>	Species composition of retained catch	Species composition of retained catch	Discard estimate  Species composition of discarded catch	ASM - Discard estimate; species composition data on discarded catch  EM/Portside - Confirms retention; species composition data on retained catch	Confirms retention  Species composition of retained catch	Species composition of retained catch  Species composition of discarded catch
River Herring and Shad Catch Cap Monitoring	<ul style="list-style-type: none"> <li>Vessel trip reports</li> <li>Dealer reports</li> <li>VMS catch reports</li> <li>Affidavits</li> </ul>	Species composition of discarded catch	Species composition of discarded catch	Species composition of discarded catch	EM/Portside - Confirms retention; species composition data on retained catch	Species composition of retained catch	Species composition of discarded catch
Stock Assessments	<ul style="list-style-type: none"> <li>Vessel trip reports</li> </ul>	Age and length data on catch	Age and length data on catch	Age and length data on discarded catch	ASM - Age and length data on discarded catch  EM/Portside - Age and length data on retained catch	Age and length data on retained catch	Age and length data on catch
Data collected under HER Alt 2.6 would be consistent with the data collected by ASM (25, 50, 75, 100%) or EM/PRT on MWT vessels fishing in Groundfish Closed Areas.							

## Tracking Catch Against Herring Fishery Catch Caps

Herring Alternatives 2.1-2.4 were evaluated with regard to their impact on monitoring catch caps (haddock and river herring and shad) in the herring fishery. The intent of this analysis is to provide a general characterization of how different alternatives would affect the precision of catch estimates tracked against catch caps. Fishing year (FY) 2015 data were used because haddock and river herring/shad catch caps were in effect for the herring fishery in 2015 and 2015 is the most recent available data. River herring/ shad catch data were from January 1 to December 31, 2015, while haddock data were from May 1, 2015 to March 2, 2016. Due to restrictions placed on the Georges Bank Haddock Accountability Measure Area in October 2015 and the low probability of midwater trawl fishing in the Gulf of Maine, catch tracked against the catch caps is unlikely to change between March 2, 2016, and April 30, 2016. The FY2015 catch data are not finalized and should be considered preliminary.

Estimates of catch tracked against herring fishery catch caps are comprised of both retained and discarded components. In FY2015, incidental retained catch accounted for greater than 99% of the total catch tracked against all catch caps, except for river herring/shad small mesh bottom trawl cap in Southern New England where retained catch accounted for 87% of total catch (Table 1).

**TABLE 5. SUMMARY OF PRELIMINARY FY2015 CATCH TRACKED AGAINST CATCH CAPS**

Catch Cap Fishery	Catch Cap (mt)	Discard (mt)	Incidental Kept (mt)	Catch (mt)
Haddock: Gulf of Maine Midwater Trawl	14	0.0	0.0	0.0
Haddock: Georges Bank Midwater Trawl	227	0.6	235.0	235.5
Herring-River Herring/Shad: Gulf of Maine Midwater Trawl	86	0.0	11.1	11.1
Herring-River Herring/Shad: Cape Cod Midwater Trawl	13	0.0	0.7	0.7
Herring-River Herring/Shad: Southern New England Bottom Trawl	89	13.1	87.6	100.7
Herring-River Herring/Shad: Southern New England Midwater Trawl	124	0.1	63.9	64.0

Source: GARFO Quota Monitoring Database Archives

Because of the relatively minor influence discards have on total catch tracked against catch caps, catch estimate precision will be sensitive to the type of coverage (NEFOP-level observer, at-sea monitor, or EM and portside) specified in each alternative. Alternatives that increase at-sea monitoring coverage are likely to produce minimal precision improvements, compared to those focusing on NEFOP-level observer coverage or EM/portside sampling coverage. This is because at-sea monitors will only quantify discard catch composition, not retained catch composition, which would be collected by NEFOP-level observers and portside samplers.

The coefficient of variation (CV) is defined for this analysis as the ratio of the standard error of total catch (incidental retained and discards) to estimated total catch is commonly used to quantify the precision of the estimated catch. The CV is sensitive to sample size. In a finite population the CV will converge to zero as the sample size approaches the population size. The total fishing trips within a stratum is considered finite, therefore as sampling coverage approaches 100%, the CV will converge to zero for that stratum. However, it is important to understand that this dynamic only holds for sampling regimes that capture both retained and discarded catch composition. Sampling regimes that only capture one of these components (retained or discarded) will only improve that component's precision, while leaving the precision of the other component unchanged.

For the purpose of this discussion, it was assumed that at-sea monitors would collect data on discarded catch similar to NEFOP-level observers and the vessel estimate would be used for retained catch information for each haul. An EM and portside sampling program does not currently exist for the herring fishery, therefore, its performance is unknown. For the purpose of this discussion, it was assumed that EM and portside sampling would collect data on retained and discarded catch similar to NEFOP-level observers. Thus, for Alternatives 2.3 and 2.4, 100% NEFOP-level observer coverage is used as a proxy for 100% EM and portside sampling coverage.

#### *Herring Alternative 2.1: 100% NEFOP-Level Coverage on Category A and B Vessels*

Herring Alternative 2.1 would likely produce CVs of zero for FY2015 haddock and midwater trawl river herring/shad catch caps. All of the FY2015 trips subject to these catch caps were by Category A and B vessels, therefore, under 100% NEFOP-level observer coverage, the CV will converge to zero. The river herring/shad bottom trawl cap for Southern New England was the only catch cap with catch by vessels other than Category A and B vessels, therefore, not all trips that would count against catch caps would be covered by Herring Alternative 2.1. This causes the CV for bottom trawl catch cap estimates to decline, but not converge to zero.

Catch caps apply to trips landing more than 6,600 lb of herring or, in general, to trips by vessels with limited access herring permits (Category A- C). One hundred percent sampling of Category A and B vessels may bias the catch estimate tracked against catch caps by over sampling Category A and B vessels (100% coverage) relative to Category C vessels (SBRM coverage).

#### *Herring Alternative 2.2: 25%-100% ASM Coverage on Category A and B Vessels*

Herring Alternative 2.2 will likely have a negligible impact on CVs for catch estimates tracked against catch caps for all proposed coverage targets (25%-100) because FY2015 discards

comprise less than 1% of total catch for most catch caps. The river herring/shad bottom trawl cap in Southern New England is the only catch cap with a substantial discard component; therefore, the impact on the CV for the catch estimate tracked against this cap may be low positive. Furthermore, the sampling bias (described above) towards Category A and B vessels may have more impact on catch estimation than any improvement in CV from increased sampling of the discarded portion of the catch.

*Herring Alternative 2.3: Combination Coverage on Category A and B Vessels and Midwater Trawl Fleet*

Assuming EM and portside sampling is analogous to NEFOP-level observer coverage, Herring Alternative 2.3 would likely produce CVs of zero for haddock and midwater trawl river herring/shad catch caps covered by 100% EM and portside sampling. The river herring/shad bottom trawl cap in Southern New England is the only catch cap that would not be covered by 100% EM and portside sampling. The impact on the CV for the catch estimate tracked against the river herring/shad bottom trawl cap in Southern New England will be similar to Herring Alternative 2.2 at low positive.

*Herring Alternative 2.4: EM and Portside Coverage on Midwater Trawl Fleet*

Assuming EM and portside sampling is analogous to NEFOP-level observer coverage, Herring Alternative 2.4 would likely produce CVs of zero for haddock and midwater trawl river herring/shad catch caps covered by 100% EM and portside sampling. The CV for catch estimates tracked against the river herring/shad bottom trawl cap in Southern New England would not be affected by this alternative because EM and portside sampling would not apply to bottom trawl gear.

**TABLE 6. SUMMARY OF BIOLOGICAL IMPACTS OF HERRING COVERAGE TARGET ALTERNATIVES**

<b>Alternatives</b>	<b>Impacts on Herring Resource, Non-Target Species, and Protected Species</b>
Herring Alternative 1: No Coverage Target Specified For IFM Programs (No Action)	<ul style="list-style-type: none"> <li>• Low positive impact associated with observer coverage allocated by SBRM</li> <li>• Low negative impact associated with no additional monitoring to reduce uncertainty around catch estimates</li> </ul>
Herring Alternative 2: Coverage Target Specified For IFM Programs	<ul style="list-style-type: none"> <li>• Positive impact associated with additional monitoring to reduce uncertainty around catch estimates</li> <li>• Low negative impact associated with no additional monitoring unless available Federal funding can cover NMFS cost responsibilities</li> <li>• Magnitude of impacts associated with additional monitoring would be primarily dependent on the type of information collected, amount of coverage, and amount of available Federal funding</li> <li>• Positive impact associated with Sub-Option 1 not being selected if fishing effort is limited and reproductive potential of herring, non-target species, and protected species is increased</li> <li>• Negative impact associated with Sub-Option 5 if it biases data used to track catch against catch caps</li> </ul>
Herring Alternative 2.1: 100% NEFOP-Level Coverage on Category A and B Vessels	<ul style="list-style-type: none"> <li>• Low positive impact associated with additional information to reduce uncertainty of catch estimates for Category A and B vessels and to track catch against catch caps</li> <li>• Positive impact if fishing effort is limited and reproductive potential of herring, non-target, and protected species is increased</li> </ul>
Herring Alternative 2.2: ASM Coverage on Category A and B Vessels	<ul style="list-style-type: none"> <li>• Negligible impact associated with additional information to reduce uncertainty of discard estimates associated with Category A and B vessels and to track discards against catch caps</li> <li>• Positive impact if fishing effort is limited and reproductive potential of herring, non-target, and protected species is increased</li> </ul>
Herring Alternative 2.3: Combination Coverage on Category A and B Vessels and Midwater Trawl Fleet	<ul style="list-style-type: none"> <li>• Positive impact associated with additional information to reduce uncertainty around catch estimates associated with the midwater trawl fleet and to track catch against catch caps</li> <li>• Negligible impact associated with additional information to reduce uncertainty of discard estimates associated with Category A and B vessels and to track discards against catch caps</li> <li>• Positive impact if fishing effort is limited and reproductive potential of herring, non-target, and protected species is increased</li> </ul>
Herring Alternative 2.4: EM and Portside Sampling on Midwater Trawl Fleet	<ul style="list-style-type: none"> <li>• Positive impact associated with additional information to reduce uncertainty around catch estimates associated with the midwater trawl fleet and to track catch against catch caps</li> <li>• Positive impact if fishing effort is limited and reproductive potential of herring, non-target, and protected species is increased</li> </ul>
Herring Alternative 2.5: 100% NEFOP-Level Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas	<ul style="list-style-type: none"> <li>• Low positive impact associated with additional information to reduce uncertainty around catch estimates associated with the midwater trawl fleet and to track catch against catch caps</li> <li>• Negligible impact associated with changes in fishing effort</li> </ul>
Herring Alternative 2.6: Combination Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas	<ul style="list-style-type: none"> <li>• Low positive impact associated with additional information to reduce uncertainty around catch estimates associated with the midwater trawl fleet and to track catch against catch caps</li> <li>• Negligible impact associated with changes in fishing effort</li> </ul>



### ***1.5.1.1 Impacts of Herring Alternatives 1 and 2 on Biological Resources***

For the purposes of this discussion, biological resources include the herring resource, non-target species, and protected species. The non-target species of interest that are harvested by the herring fishery are haddock, river herring and shad, and mackerel. Protected species include fish, turtles, and marine mammals listed under the ESA and marine mammals protected under the MMPA.

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Monitoring 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-specific 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 a FMP developed by either the MAFMC or NEFMC. Current observer coverage allocated to the herring fishery through SBRM is described in Table 2.

The herring fishery is managed through a stock-wide 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, but it may affect the ability of the herring fishery to fully harvest the ACLs if less monitoring (when compared to Herring Alternative 2) results in catch caps for haddock and river herring/shad limiting effort in the herring fishery.

The catch of mackerel in the herring fishery is managed by the MAFMC in the mackerel fishery specifications and the catch of haddock in the herring fishery is managed by the NEFMC in the Northeast multispecies specifications. The catch of haddock, river herring, and shad in the herring fishery is managed by fishery specific catch caps established by the NEFMC. Selection of Herring Alternative 1 will not likely affect the setting of harvest specifications for mackerel or haddock, but less monitoring (when compared to Herring Alternative 2) may affect the ability to track catch against fishery specific catch caps.

Under Herring Alternative 2, the NEFMC would specify the details of an industry-funded monitoring program 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.

Herring Alternative 2 is intended to allow for additional monitoring in the herring fishery by specifying coverage targets, above SBRM (Herring Alternative 1), for industry-funded monitoring. The realized coverage level in a given year would be determined by the amount of funding available to cover NMFS cost responsibilities in that 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. 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 biological resources by increasing monitoring in the herring fishery. While the benefits to the biological resources may be difficult to quantify under Herring Alternative 2, they may not be realized under Herring Alternative 1.

Under Herring Alternative 2, long-term benefits to the biological resources would vary with the type and amount of monitoring coverage target specified for the herring fishery but could result from increased monitoring to verify catch and bycatch. As catch information increases, the uncertainty around catch and bycatch in the herring fishery may be reduced, potentially improving the tracking of harvest against ACLs and catch caps and allowing for discard estimates to be incorporated into future stock assessments. The magnitude of positive impacts to the biological 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 2.1-2.6).

Similar to Herring Alternative 1, the selection of Herring Alternative 2 will not likely affect the setting of herring harvest specifications. However, similar to Herring Alternative 1, the selection of Herring Alternative 2 may affect the ability of the herring fishery to fully harvest ACLs. Under Herring Alternative 2, if fishing effort is limited by the availability of monitoring coverage or increased monitoring results in catch caps for haddock and river herring/shad limiting effort in the herring fishery, then the herring fishery may not be able to fully harvest the ACLs.

Herring Alternative 2 would allow several sub-options to apply to the industry-funded monitoring alternatives. Sub-Option 1 would allow vessels to be issued waivers to exempt them from industry-funded monitoring requirements, for either a trip or the fishing year, if coverage was unavailable due to funding or logistics. Selection of this sub-option preserves the NEFMC's intent to increase monitoring in the herring fishery, but would not prevent vessels from participating in the herring fishery if monitoring coverage was not available. Should the NEFMC not select Sub-Option 1, then any industry-funded monitoring requirements established in this amendment would have the potential to reduce effort in the herring fishery. Sub-Option 2 would exempt a wing vessel pair trawling with another vessel from industry-funded monitoring requirements, provided the vessel does not carry any fish. Sub-Option 3 would require that industry-funded monitoring requirements expire two years after implementation. Sub-Option 4 would require the NEFMC to examine the results of any increased coverage in the herring fishery two years after implementation, 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. Lastly, Sub-Option 5 would exempt trips that land less than 25 mt of herring from industry-funded monitoring requirements.

If the increased monitoring associated with Herring Alternative 2 is reduced or minimized by selection of any of the sub-options, the benefits of additional monitoring to the herring resource may be reduced and/or be similar to impacts under Herring Alternative 1.

Additionally, under Herring Alternative 2, because the 25 mt threshold differs from the triggers used to determine which trips count against catch caps for haddock (1 lb of herring) and river herring and shad (6,600 lb of herring) the data generated by selecting Sub-Option 5 may bias (either higher or lower) the catch tracked against catch caps when compared to not selecting Sub-Option 5. Therefore, the selection of Sub-Option 5 may reduce any benefits associated with Herring Alternative 2.

### **Coverage Target Alternatives**

Herring Alternative 2 would specify a level and type of industry-funded monitoring for the herring fishery. The types of industry-funded monitoring considered by the NEFMC for the herring fishery include: NEFOP-level observers, at-sea monitors, and electronic monitoring and portside sampling. Monitoring alternatives allocate coverage by fleet or permit category. Monitoring requirements could apply across all herring management areas or to just midwater trawl vessels fishing in the Groundfish Closed Areas.

Under Herring Alternative 2, the amount and quality of information collected as part of an industry-funded monitoring would vary with the type of coverage target alternative specified for the herring fishery. Impacts on the herring resource associated with specific coverage target alternatives (Herring Alternatives 2.1-2.6) are discussed in the following section.

### **Monitoring and Service Provider Requirements**

Herring Alternative 2 would specify that industry-funded observer requirements include a HVF certification for the herring fishery. The 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 midwater trawl and purse seine fleets. This certification was developed to prepare observers for changes in the regulations and new requirements that were under consideration in Herring Amendment 5.

NEFOP determined that data quality was sub-optimal 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.

Observers in the herring fishery are currently required to possess a HVF certification under Herring Alternative 1 and would be required to possess a HVF certification under Herring Alternative 2. Therefore, the impacts of a HVF certification requirement under Herring Alternative 2 on the herring resource would be similar to the impacts under Herring Alternative 1.

Under Herring Alternative 2, the process for vessel notification and selection and payment of industry cost responsibilities would be developed during the rulemaking and amendment approval process.

To the extent that increased information on herring catch benefits the biological resources under Herring Alternative 2, those benefits may not be realized under Herring Alternative 1.

#### ***1.5.1.2 Impacts of Herring Coverage Target Alternatives 2.1- 2.6 on the Biological Resources***

Herring Alternatives 2.1-2.6 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 2.1-2.6 may have a positive impact on the biological resources by increasing monitoring in the herring fishery. While the benefits to the biological resources may be difficult to quantify under Herring Alternatives 2.1-2.6, they may not be realized under Herring Alternative 1.

The magnitude of positive impacts to the biological resources associated with additional catch information is expected to vary with the monitoring coverage target specified and the realized coverage level in that 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 monitoring coverage target (Herring Alternatives 2.1-2.6).

Herring Alternatives 2.1-2.6 differ by (1) the type of information collected, (2) the specified amount of coverage, and (3) how coverage is allocated.

Currently, vessel and dealer data are used to track retained herring catch and SBRM observer data are used to track discarded herring catch. Vessel and dealer data are used to track retained catch of mackerel and SBRM observer data are used to track retained and discarded catch of haddock, river herring, and shad, as well as the discarded catch of mackerel. SBRM observer data are used to track catch of protected species. Additionally, vessel and SBRM observer data are used for stock assessments and to estimate total removals.

Herring Alternatives 2.1 would specify NEFOP-level observer coverage, Herring Alternatives 2.2 would specify at-sea monitor coverage, Herring Alternative 2.3 would specify at-sea monitor coverage as well as EM and portside sampling coverage, and Herring Alternative 2.4 would specify EM and portside sampling coverage. NEFOP-level observer coverage provides species composition data on both retained and discarded catch, while at-sea monitor coverage would provide species composition data on discarded catch and portside sampling coverage would provide species composition data on retained catch. NEFOP-level observer coverage and at-sea monitors can estimate amounts of discarded catch while EM cannot estimate the amount of discarded catch, but it can verify retention of catch. In the herring fishery, discards are a small percentage of total catch. Because alternatives with NEFOP-level observer coverage and EM and portside sampling coverage have the potential to collect information on a greater percentage of catch than at-sea monitoring coverage, Herring Alternatives 2.1, 2.3, and 2.4 have the potential to benefit the biological resources more than Herring Alternative 2.2.

Herring Alternatives 2.1, 2.3, 2.4, and 2.5 specify some aspect of monitoring coverage at 100% while Herring Alternatives 2.2, 2.3, and 2.4 allow some aspect of monitoring coverage to range between 25% and 100%. The monitoring objectives for the herring coverage targets are accurate estimates of herring catch and the catch of haddock and river herring/shad to track against catch caps. While high levels of monitoring are not always necessary to address a monitoring goal, more monitoring could be more effective to meet monitoring goals than less monitoring. Therefore, Herring Alternatives 2.1, 2.3, 2.4, and 2.5 have the potential to benefit the biological resources more than Herring Alternative 2.2.

Herring Alternatives primarily 2.1 and 2.2 would allocate monitoring coverage by vessel permit category (i.e., Category A and B herring permits), Herring Alternative 2.4 would allocate monitoring coverage by fishing fleet (i.e., midwater trawl fleet), and Herring Alternative 2.3 would allocate monitoring coverage by permit category and 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 and 2.4. The additional information on catch and bycatch estimates in the herring fishery obtained via Herring Alternatives 2.1, 2.2, and 2.3 (at-sea monitoring data) can be used for tracking catch against ACLs and catch caps but it is unlikely that those data will be used for stock assessments and estimating total removals. Additional data on catch and bycatch estimates in herring fishery obtained via Herring Alternatives 2.3 (EM and portside sampling data) and 2.4 could be used for catch monitoring as well as stock assessments and estimating total removals. Because the midwater trawl fleet harvests the majority of herring catch (over 70%), alternatives that focus coverage on the midwater trawl fleet (Herring Alternatives 2.3 and 2.4) would increase monitoring on vessels that harvest the majority of catch in the herring fishery.

Current management of the herring fishery specifies gear and area specific catch caps for non-target species of interest harvested in the herring fishery. River herring and shad catch caps for vessels using midwater trawl gear exist for the Gulf of Maine, Cape Cod, and Southern New England. River herring and shad catch caps for vessels using small mesh bottom trawl gear exist for Southern New England. The haddock catch cap in the herring fishery applies to vessels using midwater trawl gear in the Gulf of Maine and Georges Bank. The midwater trawl fleet harvests the majority of haddock and river herring and shad, so alternatives that increase coverage on the midwater trawl fleet (Herring Alternatives 2.3 and 2.4) have the potential to benefit non-target species more than alternatives that increase coverage on Category A and B vessels (Herring Alternatives 2.1 and 2.2).

The realized coverage level in a given year would be determined by the amount of funding available to cover NMFS cost responsibilities in that year. If coverage is not available (either due to logistics or a lack of funding) for a specific trip, Herring Alternatives 2.1-2.4 specify that the vessel would be prohibited from participating in the herring fishery on that trip. The selection of Herring Alternative 2 - Sub-Option 1 would enable coverage requirements to be waived on a specific trip to allow vessels to continue participating in the herring fishery, even if monitoring coverage is not available. Should fishing effort be limited by the availability of monitoring coverage, such that herring ACLs in a given year are not harvested, there is the potential for a positive impact on biological resources associated with Herring Alternatives 2.1-2.4. The positive impact would result from the increased reproductive potential of the individuals that are unharvested. However, larger numbers of spawning fish do not guarantee increased recruitment and high densities of fish may result in slow growth and poor condition. The selection of Herring Alternative 2 - Sub-Option 1 would enable monitoring coverage

requirements to be waived on a specific trip, allowing a vessel to continue participating in the herring fishery, even if monitoring coverage is not available. For this reason, any benefits to the biological resources under Herring Alternatives 2.1-2.4 may not be realized under Herring Alternative 2 – Sub-Option 1.

Alternatives that increase the amount of information on retained catch (Herring Alternatives 2.1, 2.3, and 2.4) may have an increased likelihood of affecting the data tracked against catch caps than alternatives that increase the amount of information on just discarded catch (Herring Alternative 2.2). Increased monitoring of haddock and river herring and shad catch may help reduce variability in estimates of catch that is tracked against catch caps, when that variability may have otherwise led to effort restrictions in the herring fishery. Conversely, additional monitoring may illustrate higher than expected catch of haddock and river herring and shad, resulting in catch caps that are fully harvested earlier than expected and reduced opportunities to harvest herring. Increased information to help track catch against catch caps may help allow the herring fishery to fully harvest the ACLs or it may curtail the harvest of herring by the herring fishery.

Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Groundfish Closed Areas must carry a NEFOP-level observer while Herring Alternative 2.6 would specify that coverage for midwater trawl vessels fishing in Groundfish Closed Areas would match the coverage targets recommended by the NEFMC for the rest of the fishery. The Herring Alternative 2 Sub-Options would apply to Herring Alternative 2.6 but not to Herring Alternative 2.5. Even though Herring Alternative 2.5 would not allow coverage requirements to be waived for a trip inside the Groundfish Closed Areas, it is unlikely that monitoring availability would reduce fishing effort such that the herring ACLs are not able to be harvested. During 2005-2010, prior to any observer coverage requirements for midwater trawl vessels fishing in Groundfish Closed Areas, less than 12% of total catch by the midwater trawl fleet came from inside the Groundfish Closed Areas. Because a relatively small percentage of the midwater trawl fishery's herring harvest comes from inside Groundfish Closed Areas, any positive impact to the biological resources associated with additional catch and bycatch information under Herring Alternatives 2.5 and 2.6 would be similar, but likely reduced, to impacts under Herring Alternatives 2.1-2.4.

In general, the benefits of these herring alternatives to the biological resources are indirect because they affect levels of monitoring rather than harvest specifications. Indirect benefits to the herring resource are possible if increased monitoring can reduce uncertainty of catch and bycatch tracked against ACLs and generate more information to estimate total removals and for stock assessments. Indirect benefits to non-target species are possible if increased monitoring



can reduce uncertainty of catch and bycatch tracked against catch caps and, possibly, better inform the setting of fishery catch caps. Indirect benefits to protected species are possible if increased monitoring of the herring fishery generates additional information on protected species to estimate total removals and for stock assessments. However, these alternatives may lead to direct positive impacts on the biological resources if fishing effort is limited, either through monitoring availability or catch caps, leading to increased reproductive potential of the biological resources. The impacts of these herring alternatives on the herring resource or non-target species are not significant because they would not cause the herring resource or non-target species to become overfished and would not result in overfishing. The impacts of these herring alternatives on protected species are not significant because they would not cause a change in population status.

### 1.5.2 IMPACTS OF HERRING COVERAGE TARGET ALTERNATIVES ON THE PHYSICAL ENVIRONMENT

**TABLE 7. SUMMARY OF PHYSICAL ENVIRONMENT IMPACTS OF HERRING COVERAGE TARGET ALTERNATIVES**

<b>Alternatives</b>	<b>Impacts on Physical Environment</b>
Herring Alternative 1: No Coverage Target Specified For IFM Programs (No Action)	<ul style="list-style-type: none"> <li>Negligible impact associated with minimal and temporary effects on the environment from herring fishery</li> </ul>
Herring Alternative 2: Coverage Target Specified For IFM Programs	<ul style="list-style-type: none"> <li>Negligible impact associated with minimal and temporary effects on the environment from herring fishery</li> <li>Low positive impact if fishing effort is limited by monitoring availability</li> <li>Negligible impact associated with switching gear modes</li> </ul>

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Monitoring 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 2, the NEFMC would specify the details of an industry-funded monitoring program 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.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM (Herring Alternative 1), for industry-funded monitoring. The realized coverage level in a given year would be determined by the amount of funding available to cover NMFS cost responsibilities in that year. The realized coverage for the fishery in a given year would fall somewhere between no additional coverage above SBRM requirements (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.6).

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 both Herring Alternatives 1 and 2.

Herring Alternative 2 would specify a level and type of industry-funded monitoring for the herring fishery. The monitoring levels under consideration by the NEFMC range from 25% to 100%. The types of monitoring under consideration include: NEFOP-level observers, at-sea monitors, and electronic monitoring and portside sampling. Monitoring alternatives allocate coverage by fleet or permit category. Monitoring requirements could apply across all herring management areas or to just midwater trawl vessels fishing in the Groundfish Closed Areas. The amount and quality of information collected as part of an industry-funded monitoring would vary with the type of coverage target alternative (Herring Alternatives 2.1-2.6) specified for the herring fishery.

The realized coverage level would be determined by the amount of funding available to cover NMFS cost responsibilities in a given year. If coverage is not available (either due to logistics or a lack of funding) for a specific trip, Herring Alternatives 2.1-2.6 specify that the vessel would be prohibited from participating in the herring fishery on that trip. The selection of Herring Alternative 2 - Sub-Option 1 would enable coverage requirements to be waived on a specific trip to allow vessels to continue participating in the herring fishery, even if monitoring coverage is not available. Additionally, the amount and quality of information collected under Herring Alternatives 2.1-2.4 has the potential to affect the amount of effort in the herring fishery.

Should fishing effort be limited by the availability of monitoring coverage or additional data collected, 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. Additionally, vessels may switch gear modes to minimize economic impacts associated with gear-specific requirements. However changes to gear modes associated with Herring Alternatives 2.1-2.6 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.

### **1.5.3 IMPACTS OF HERRING COVERAGE TARGET ALTERNATIVES ON HUMAN COMMUNITIES**

Another major consideration when evaluating an industry-funded monitoring program is the cost of the monitoring program. The requirement to pay for monitoring coverage increases operating costs for fishing vessels, which in turn reduces vessel revenues.

There are two primary approaches for minimizing the cost of monitoring paid by industry. The first approach is to select the most cost effective 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 retention of catch on herring vessels.

The second approach 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 data precision around discard estimates for a certain species by setting a coverage target of 50%, rather than a coverage target of 100%.

Table 8 shows the range of costs associated with the different types of monitoring being considered for the herring fishery. A detailed description of industry cost responsibilities associated with each of these types of monitoring can be found in Appendix 2 – Monitoring Cost Estimates.

**TABLE 8. MONITORING COST ESTIMATES FOR THE HERRING FISHERY**

Types of Monitoring	NMFS Cost	Vessel Cost
NEFOP-Level Observer	\$479 per sea day	\$818 per sea day
At-Sea Monitor	\$530 per sea day	\$710 per sea day
Electronic Monitoring	Year 1: \$36,000 startup plus \$97 per sea day  Year 2: \$97 per sea day	Year 1: \$15,000 startup plus \$325 <sup>1</sup> or \$187 <sup>2</sup> per sea day  Year 2: \$325 <sup>1</sup> or \$187 <sup>2</sup> per sea day
Portside Sampling	\$479-\$530 per sea day	\$5.12 <sup>1</sup> or \$3.84 <sup>2</sup> per mt
<p>1 – Initial cost assumptions: EM on every vessel, video collected throughout the duration of a trip, 100% video review, and targeting 100% of all trip sampled portside. Additionally, this portside cost estimate includes portside administration costs.</p> <p>2 – Revised cost assumptions: EM on every vessel, video collected only around haulback, 50% video review, and targeting 50% of all trips sampled portside. Additionally, this portside cost estimate no longer include portside administration costs.</p>		

### **Assumptions used to generate estimates of industry cost responsibilities**

While the cost of a sea day can vary between service providers, the individual components of a sea day cost 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.

#### **NEFOP-Level Observer Cost Estimate**

The \$818 per sea day industry cost responsibility related to NEFOP-level observer coverage is based on sampling costs from October 2012 through May 2014 averaged across 3 service providers. 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, costs to the provider for observer time and travel to a scheduled deployment that does not sail and was not canceled by the vessel prior to the sail time, and provider overhead.

#### **At-Sea Monitor Cost Estimate**

The \$710 per sea day industry cost responsibility related to a herring at-sea monitoring program is based on the current sea day rate for the groundfish at-sea monitoring program.

However, herring at-sea monitors would be collecting data on discards only. This may reduce training time, gear requirements, and internal support resources necessary to administer an at-sea monitoring program for the herring fishery resulting in a lower sea day rate than the groundfish at-sea monitoring program rate. (*See Appendix 5 – Analysis of ASM Costs for additional information.*) In the absence of an estimate specific to the herring at-sea monitoring program, the PDT/FMAT determined that using the groundfish at-sea monitoring sea day rate was appropriate, but the actual cost of a herring at-sea monitor may be less.

**TABLE 9. INDUSTRY COST RESPONSIBILITIES FOR NEFOP-LEVEL OBSERVERS AND AT-SEA MONITORS**

Industry Cost Responsibilities	NEFOP-level observer cost per sea day	At-sea monitoring cost per sea day
Provider costs for deployments and sampling (e.g., travel and salary for observer deployments and debriefing)	Sea day charges paid to providers: \$640 Travel: \$71 Meals: \$22 Other non-sea day charges: \$12	Sea day charge paid to providers: \$561 Travel: \$67 Meals: \$18 Other non-sea day charges: \$14
Equipment, as specified by NMFS, to the extent not provided by NMFS	\$11	
Provider costs 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	
Provider overhead and project management costs not included in sea day charges above (e.g., per diem costs for trainees)	Training: \$61	Training: \$50
Provider costs 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	TBD – won't know these costs until an industry funded observer coverage program is implemented in a fishery
Total (not including other costs)	\$818	\$710

### Midwater Trawl Electronic Monitoring Cost Estimate

Because no Federal electronic monitoring program exists for the midwater trawl fleet, industry cost responsibilities associated with an electronic monitoring program for the midwater trawl fleet were difficult to estimate. Electronic monitoring cost estimates include a one-time implementation cost, as well as ongoing annual operational program costs. Cost components include equipment, field services, data services, and program management. The implementation costs associated with EM are summarized in Table 10 and the ongoing costs associated with EM are summarized in Table 11. Additional details on monitoring costs are available in Appendix 2 – Monitoring Cost Estimates.

**TABLE 10. INDUSTRY COST RESPONSIBILITIES FOR ELECTRONIC MONITORING IMPLEMENTATION**

Industry Cost Responsibilities	Electronic Monitoring Implementation Costs Per Vessel
Equipment, including initial purchase and installation of the cameras, associated sensors, integrated GPS, control box, and hard drives	\$9,018
Field Services, including technician's labor and travel associated with the installation of equipment	\$2,952
Program Management, including one-time labor, equipment, facilities, and administrative costs associated with getting the new EM program operational	\$3,493
Total	\$15,463

Initially, the sea day cost for EM was estimated at \$325. In September 2015, the NEFMC requested the PDT/FMAT revise the \$325 per sea day industry cost estimate associated with electronic monitoring. The \$325 cost estimate was likely high because it assumed video was collected for the duration of a trip and 100% of the video was reviewed. The revised cost estimate of \$187 per sea day assumes video collected around haulback only and 50% video review. This revised estimate may be closer to the actual industry cost responsibilities associated with electronic monitoring of midwater trawl trips. The breakdown of these costs is shown in Table 11.

**TABLE 11. INDUSTRY COST RESPONSIBILITIES FOR ONGOING ELECTRONIC MONITORING COSTS**

<b>Industry Cost Responsibilities</b>	<b>Initial Ongoing Electronic Monitoring Costs Per Vessel Per Sea Day <sup>1</sup></b>	<b>Revised Ongoing Electronic Monitoring Costs Per Vessel Per Sea Day<sup>2</sup></b>
Equipment, including annual equipment costs estimated here include spare parts to replace broken or aging equipment, as well as licenses for the use of proprietary software	\$11	\$11
Field Services, including labor, travel, and other costs associated with repairs, technical support, and retrieving hard drives from the vessels and shipping them to the service provider for analysis	\$78	\$47
Data Services, including the costs associated with review and analysis of the video, reporting to NMFS, and archiving of the data	\$160	\$52
Program Management, including costs of the day-to-day operations of the service provider for running the EM program	\$77	\$77
<b>Total</b>	<b>\$325</b>	<b>\$187</b>
1 - Initial cost assumptions based on video collected for the duration of a trip and 100% video review.		
2 - Revised cost assumptions based on video collected only around haulback and 50% video review.		

### Midwater Trawl Portside Sampling Cost Estimate

The analysis assumes the cost per amount of fish landed is the most accurate way to represent the potential industry costs for monitoring. Because no Federal portside sampling program exists for the midwater trawl fleet, industry cost responsibilities associated with a portside sampling program for the midwater trawl fleet were difficult to estimate.

The average cost per pound of groundfish landed for the Northeast Multispecies dockside monitoring program ranged from \$0.01 - \$0.12 per pound for all sectors. The average cost per pound landed per trip is inversely related to the average pounds landed – that is, trips that land larger amounts are less expensive to monitor than trips that land smaller amounts. Larger trips are less expensive to monitor because they typically land in principle ports with a dedicated monitor, therefore, there are no additional costs for monitors to travel to offload locations.

Using cost estimates from the Massachusetts Division of Marine Fisheries portside sampling program for the herring fishery, the industry cost responsibility associated with portside sampling may be as much as \$5.12 per mt. This cost estimate is likely high as it includes program administration costs as well as sampling costs and was intended to apply to all midwater trawl trips for a target sampling rate of 100%.

In September 2015, the NEFMC requested the PDT/FMAT revise the estimate of the industry cost responsibility associated with portside sampling. The revised cost estimate eliminates portside administration costs and is estimated at \$3.84 per mt. This cost estimate may be closer to the actual industry cost responsibilities associated with portside sampling and is intended to apply to 50% of all midwater trawl trips for target sampling rate of 50%.

**TABLE 12. SUMMARY OF ECONOMIC IMPACTS OF HERRING COVERAGE TARGET ALTERNATIVES**

<b>Alternatives</b>	<b>Impacts on Fishery Related-Businesses</b>
Herring Alternative 1: No Coverage Target Specified For IFM Programs (No Action)	<ul style="list-style-type: none"> <li>• Low positive impact associated with observer coverage allocated by SBRM</li> <li>• Low negative impact associated with no additional monitoring to reduce uncertainty around catch estimates</li> </ul>
Herring Alternative 2: Coverage Target Specified For IFM Programs	<ul style="list-style-type: none"> <li>• Negative impact associated with potential reduction in return to owner (RTO)</li> <li>• Negative impact if fishing effort is limited by monitoring availability and herring ACLs are not harvested</li> <li>• Low positive impact associated with additional monitoring to reduce uncertainty around catch estimates in the herring fishery</li> <li>• Low negative impact associated with no additional monitoring unless available Federal funding can cover NMFS cost responsibilities</li> <li>• Magnitude of impacts associated with additional monitoring would be dependent on the type of information collected, amount of coverage, how coverage is allocated, and amount of available Federal funding</li> <li>• Magnitude of impacts associated with selection of Sub-Options</li> </ul>
Herring Alternative 2.1: 100% NEFOP-Level Coverage on Category A and B Vessels	<ul style="list-style-type: none"> <li>• Negative impact associated with potential 44.7%-11.5% reduction in RTO</li> <li>• Negative impact associated with potential 42.2%-5.8% reduction in RTO with 25 mt threshold</li> <li>• Negative impact if fishing effort is limited by monitoring availability and herring ACLs are not harvested</li> <li>• Low positive impact associated with additional information to reduce uncertainty of catch estimates in the herring fishery</li> </ul>



Herring Alternative 2.2: ASM Coverage on Category A and B Vessels	<ul style="list-style-type: none"> <li>• Negative impact associated with potential 38.9%-3.0% reduction in RTO</li> <li>• Negative impact associated with potential 36.7%-1.4% reduction in RTO with 25 mt threshold</li> <li>• Negative impact if fishing effort is limited by monitoring availability and herring ACLs are not harvested</li> <li>• Negligible impact associated with additional information to reduce uncertainty of discard estimates in the herring fishery</li> </ul>
Herring Alternative 2.3: Combination Coverage on Category A and B Vessels and Midwater Trawl Fleet	<ul style="list-style-type: none"> <li>• Negative impact associated with potential 38.5%-3.0% reduction in RTO</li> <li>• Negative impact associated with potential 36.7%-1.4% reduction in RTO with 25 mt threshold</li> <li>• Negative impact if fishing effort is limited by monitoring availability and herring ACLs are not harvested</li> <li>• Low positive impact associated with additional information to reduce uncertainty of catch estimates in the herring fishery</li> </ul>
Herring Alternative 2.4: EM and Portside Sampling on Midwater Trawl Fleet	<ul style="list-style-type: none"> <li>• Negative impact associated with potential 29.1%*-6.9% reduction in RTO</li> <li>• Negative impact associated with potential 27.5%*-2.4% reduction in RTO with 25 mt threshold</li> <li>• Negative impact if fishing effort is limited by monitoring availability and herring ACLs are not harvested</li> <li>• Low positive impact associated with additional information to reduce uncertainty around catch estimates in the herring fishery</li> </ul>
Herring Alternative 2.5: 100% NEFOP-Level Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas	<ul style="list-style-type: none"> <li>• Negative impact associated with potential 5.4%-1.0% reduction in RTO</li> <li>• Low positive impact associated with additional information to reduce uncertainty around catch estimates in the herring fishery</li> <li>• Negligible impact associated with changes in fishing effort</li> </ul>
Herring Alternative 2.6: Combination Coverage on Midwater Trawl Fleet Fishing in Groundfish Closed Areas	<ul style="list-style-type: none"> <li>• Negative impact associated with potential reduction in RTO</li> <li>• Low positive impact associated with additional information to reduce uncertainty around catch estimates associated with the midwater trawl fleet</li> <li>• Negligible impact associated with changes in fishing effort</li> </ul>
* Reflects RTO from Year 2 of Herring Alternative 2.4	

Analysis of the economic impact of industry-funded monitoring herring coverage target alternatives on fishery-related businesses compared industry cost responsibilities to 2014 herring vessel returns-to owner (RTO). RTO is calculated by subtracting fixed and operational costs from gross revenue and was used rather than net revenues to more accurately reflect income from fishing trips.

The previous analysis of economic impacts of herring coverage target alternatives on the herring industry was based on trip cost data collected by NEFOP and showed the economic impact of the alternatives on partial vessel net revenues (gross revenues less certain trip costs). Because NEFOP only collects a limited amount of cost data, industry participants expressed concern that an analysis of net revenues underestimated vessel costs. In response, Jason

Didden, staff of the MAFMC, offered to coordinate a survey of herring and mackerel vessels to collect more detailed cost information.

The survey requested information from vessel owners on total trip costs in 2014. The cost survey collected information on variable costs; payments to crew; the cost of repairs, maintenance, upgrades; and fixed costs. These data were used to update the impact analyses. To profile vessels, data were averaged across vessel types, by vessel characteristics, and by primary species caught. The cost profiles of vessels, as adjusted by the estimated industry cost responsibilities of each herring coverage target alternative, were used to describe the economic impact on herring vessels. Economic impacts are described at an annual level. Surveys were sent to approximately 18 vessel owners (representing about 26 vessels) in the herring and/or mackerel fisheries. Surveys were sent in May 2015 and information was submitted for 16 of the 26 vessels. A copy of the survey is included in Appendix 3.

**TABLE 13. SUMMARY OF TOTAL TRIP COSTS FOR HERRING AND MACKEREL VESSELS IN 2014.**

<b>Cost Category</b>	<b>Description</b>	<b>Average Percent of 2014 Gross Revenue for Herring and Mackerel Vessels</b>	<b>Average Percent of 2014 Gross Revenue for Squid Vessels</b>
<b>Variable Costs</b>	Annual fuel, oil, food, water, ice, carrier vessel, communication, fishing supplies, crew supplies, and catch handling costs	25%	35%
<b>Crew Share</b>	Total annual payments to crew	28%	26%
<b>Repair, Maintenance, Upgrades, Haulout (RMUH)</b>	Annual cost of repairs to engines, deck equipment, machinery, hull, fishing gear, electronics, processing equipment, refrigeration, safety equipment, upgrades and haulout. Because these costs vary considerably from year to year and are typically spread out over several years, only a portion of these costs were applied to 2014 revenue	13%	11%
<b>Fixed Costs</b>	Annual mooring, dockage, permits and licenses, insurance, quota and DAS lease, crew benefits, vessel monitoring, workshop and storage, office, vehicle, travel, association, professional, interest, taxes, and non-crew labor costs Note: principal payments on business loans are not included in fixed costs.	19%	21%
<b>Return to Owner</b>	Gross revenue less variable, crew share, RMUH, and fixed costs	15%	7%

Prior to any trip declared into the herring fishery, vessel representatives would be required contact NMFS and request monitoring coverage. If an SBRM observer was not selected to cover that trip, NMFS would notify the vessel representative whether monitoring coverage must be procured through an industry-funded monitoring service provider. For the purposes of this analysis, however, it is assumed that there would be no SBRM coverage of trips. Therefore, the economic impacts of industry-funded monitoring cost alternatives described in this section may be an overestimate of actual costs.

The NEFMC is considering four types of industry-funded monitoring for the herring fishery, including NEFOP-level observers, at-sea monitors, EM, and portside sampling coverage. NEFOP-

level and at-sea monitoring coverage would function independently, but EM and portside are intended to be used together.

### **Summary of Economic Analyses**

In general, the paired midwater trawl vessels have the highest monitoring costs as a percentage of RTO. This is because these vessels have, on average, more sea days declared into the herring fishery than other gear types. Therefore, midwater trawl vessels have more sea days that would be subject to monitoring costs than vessels that use other gear types.

There are differences across gear types regarding the sources of revenue that would be used to pay for monitoring costs. For example, for small mesh bottom trawl vessels, roughly half of their revenue is generated by participating in the herring fishery and the other half is generated by participating in other fisheries. This means that small mesh bottom trawl vessels may need to use revenue from other fisheries to pay the industry-funded monitoring costs associated with the herring fishery. A metric for considering different revenue sources across gear types is evaluating monitoring costs as a percent of herring revenue. For small mesh bottom trawl vessels, industry-funded monitoring costs as a percent of herring revenue are higher than for other gear types.

Exempting trips that land less than 25 mt of herring (Herring Alternative 2 Sub-Option 5) from industry-funded monitoring costs reduces the monitoring cost substantially in many cases. The degree of saving varies by gear type. Using Alternative 2.1 as an example, aggregate NEFOP-level observer costs decline by 48% for purse seine vessels (\$320k to \$166k). For paired midwater trawl vessels, the percentage difference (20%; \$673k to \$541k) is not as great.

Selecting Herring Alternative 2.5 rather than Herring Alternative 2.1 reduces total industry monitoring costs from \$811,000 to \$75,000 – a 91% reduction. However, Herring Alternative 2.5 only provides increased monitoring in the Groundfish Closed Areas.

Initial industry cost assumptions for Herring Alternative 2.4 estimated \$325 per sea day for electronic monitoring (cameras on every midwater trawl vessel, video collected for the duration of the trip, 100% video review) and \$5.12 per mt for portside sampling (administration and sampling cost) on close to 100% of trips. Revised industry cost assumptions for Herring Alternative 2.4 estimated \$187 per sea day for electronic monitoring (cameras on every midwater trawl vessel, video collected around haulback, 50% video review) and \$3.84 per mt for portside sampling (only sampling costs) on close to 50% of trips. Using the revised cost assumptions rather than the initial cost assumption for Herring Alternative 2.4 reduces total

industry monitoring costs by 51% (\$457,595 to \$222,958) in Year 2 for paired midwater trawl vessels and reduces costs by 54% (\$134,165 to \$61,067) in Year 2 for single midwater trawl vessels.

The tables and box plots on the following pages provide summarized economic data for each of the herring coverage target alternatives. The economic impact on vessels associated with paying for monitoring coverage is described as a percentage of RTO for each herring coverage target alternative in the following figures. The tables provide the mean and median number of sea days per vessel that would result from each of the alternatives, as well as the mean and median RTO that would ultimately be reduced by the industry-funded monitoring costs. Additionally, fleet level effort, revenue, and monitoring cost information for each herring coverage target alternative are also provided. Additional economic analysis is available in Appendix 4.

#### ***1.5.3.1 Impacts of Herring Alternatives 1 and 2 on Fishery-Related Businesses***

Herring Alternative 1 would not specify a coverage target for an industry-funded monitoring program in the Herring FMP. Monitoring 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 fishery associated with monitoring coverage, if there were any, 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.

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, but it may affect the ability of the herring fishery to fully harvest the ACLs if less

monitoring (when compared to Herring Alternative 2) results in catch caps for haddock and river herring/shad limiting effort in the herring fishery.

Under Herring Alternative 2, the NEFMC would specify the details of an industry-funded monitoring program 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.

Herring Alternative 2 is intended to allow for increased monitoring in the herring fishery by specifying coverage targets, above and beyond SBRM (Herring Alternative 1), for industry-funded monitoring. The realized coverage level in a given year would be determined by the amount of funding available to cover NMFS cost responsibilities in that year and would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified coverage target (Herring Alternatives 2.1-2.6).

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 positive and negative economic impacts on vessels participating in the herring fishery.

Indirect positive impacts on herring vessels associated with Herring Alternative 2 may result from increased monitoring helping reduce variability around catch and bycatch estimates in the herring fishery leading to additional harvesting opportunities. If increased monitoring reduces the variability in the catch of haddock and river herring and shad tracked against catch caps, herring vessels may be less likely to be constrained by catch caps and more likely to be able to fully harvest herring sub-ACLs.

Direct negative impacts on herring vessels associated with Herring Alternative 2 would likely result from reduced RTO after paying for monitoring coverage. The magnitude of the economic impact associated with paying for monitoring coverage would vary with herring coverage target alternative (Herring Alternatives 2.1-2.6). If increased monitoring results in fishery catch caps being harvested more often than expected, an indirect negative impact on herring vessels may be that vessels are not able to fully harvest herring sub-ACLs. While the full extent of positive

and negative impacts to herring vessels may be difficult to quantify under Herring Alternative 2, the impacts may not be realized under Herring Alternative 1.

If Federal funding is not available to cover NMFS cost responsibilities associated with industry-funded monitoring in the herring fishery, fishing effort may be reduced under Herring Alternative 2 to match available levels of monitoring coverage. If fishing effort is reduced to match available monitoring levels, herring vessels may not be able to fully harvest herring sub-ACLs. This direct negative economic impact associated with Herring Alternative 2 would be less likely to be realized under Herring Alternative 1.

Herring Alternative 2 would allow several sub-options to apply to the industry-funded monitoring alternatives. Sub-Option 1 would allow vessels to be issued waivers to exempt them from industry-funded monitoring requirements, for either a trip or the fishing year, if coverage was unavailable due to funding or logistics. Selection of this sub-option preserves the NEFMC's intent to increase monitoring in the herring fishery, but would not prevent vessels from participating in the herring fishery if monitoring coverage was not available. Should the NEFMC not select Sub-Option 1, then any industry-funded monitoring requirements established in this amendment would have the potential to reduce effort in the herring fishery. Sub-Option 2 would exempt a wing vessel pair trawling with another vessel from industry-funded monitoring requirements, provided the vessel does not carry any fish. Sub-Option 3 would require that industry-funded monitoring requirements expire two years after implementation. Sub-Option 4 would require the NEFMC to examine the results of any increased coverage in the herring fishery two years after implementation, 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. Lastly, Sub-Option 5 would exempt trips that land less than 25 mt of herring from industry-funded monitoring requirements.

If selection of the sub-options under Herring Alternative 2 minimizes the likelihood of positive or negative economic impacts on herring vessels, then the economic impacts associated with the sub-options may be reduced and/or similar to impacts under Herring Alternative 1. Additionally, under Herring Alternative 2, because the 25 mt threshold differs from the triggers used to determine which trips count against catch caps for haddock (1 lb of herring) and river herring and shad (6,600 lb of herring), the data generated by selecting Sub-Option 5 may bias (either higher or lower) the catch tracked against catch caps when compared to not selecting Sub-Option 5.

Impacts under Herring Alternative 2 assume that the future behavior of fishery participants will be similar to that in past years, when in reality fishery participants are likely to engage in a range of mitigation behaviors to reduce the economic impact associated with industry-funded monitoring. For example, vessels that have historically participated in many fisheries may stop fishing for herring and only participate in fisheries that do not have industry-funded monitoring requirements. However, if a vessel does not have the ability to participate in other fisheries, it may not be able to mitigate the impacts of industry-funded monitoring in that way. At this time, it is not possible to predict what, if any, mitigation behaviors may be used by herring fishery participants.

### **Coverage Target Alternatives**

Herring Alternative 2 would specify a level and type of industry-funded monitoring for the herring fishery. The types of industry-funded monitoring considered by the NEFMC for the herring fishery include: NEFOP-level observers, at-sea monitors, and electronic monitoring and portside sampling. Monitoring alternatives allocate coverage by fleet or permit category. Monitoring requirements could apply across all herring management areas or to just midwater trawl vessels fishing in the Groundfish Closed Areas.

Under Herring Alternative 2, the amount, quality, and cost of information collected as part of an industry-funded monitoring would vary with the type of coverage target alternative specified for the herring fishery. Economic impacts on vessels participating in the herring fishery associated with specific coverage target alternatives (Herring Alternatives 2.1-2.6) are discussed in the following section.

### **Monitoring and Service Provider Requirements**

Herring Alternative 2 would specify that industry-funded observer requirements include a HVF certification for the herring fishery. The HVF certification was developed in order to more effectively train certified NEFOP observers in high volume catch sampling and documentation. HVF certification allows observers 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 consideration in Herring Amendment 5.

Observers in the herring fishery are currently required to possess a HVF certification under Herring Alternative 1 and would be required to possess a HVF certification under Herring Alternative 2. Herring vessels do not pay for observer training under Herring Alternative 1, but



vessels would be responsible for additional observer training costs under Herring Alternative 2. Therefore, the economic impact on herring vessels of a HVF certification requirement under Herring Alternative 2 would be more negative than under Herring Alternative 1.

Under Herring Alternative 2, the process for vessel notification and selection and payment of industry cost responsibilities would be developed during the rulemaking and amendment approval process.

#### ***1.5.3.2 Impacts of Herring Coverage Target Alternatives 2.1- 2.6 on Fishery-Related Businesses***

Herring Alternatives 2.1-2.6 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 Alternative 2 may have both positive and negative economic impacts on vessels participating in the herring fishery.

While the positive and negative economic impacts on herring vessels may be difficult to quantify under Herring Alternatives 2.1-2.6, the impacts would be less likely to be realized under Herring Alternative 1.

The magnitude of positive and negative economic impacts on herring vessels is expected to vary with the monitoring 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 that year and would fall somewhere between no additional coverage above SBRM (Herring Alternative 1) and the specified monitoring coverage target (Herring Alternatives 2.1-2.6).

Herring Alternatives 2.1-2.6 differ by (1) the type of information collected, (2) the specified amount of coverage, and (3) how coverage is allocated. Both the type of information collected and the amount of monitoring coverage will have a direct economic impact on vessels paying for monitoring coverage in the herring fishery.

Currently, vessel and dealer data are used to track retained catch of haddock and mackerel, and SBRM observer data are used to track catch of river herring and shad as well as the discarded catch of haddock and mackerel. Additionally, vessel and SBRM observer data are used for stock assessments and to estimate total removals.

The herring fishery is managed with gear and area specific catch caps for haddock and river herring and shad. If a catch cap is harvested, effort in the fishery using that gear in that area is restricted. River herring and shad catch caps are in place for vessels using midwater trawl gear (Gulf of Maine, Cape Cod, and Southern New England catch caps) and small mesh bottom trawl gear (Southern New England catch cap), while the haddock catch cap is only specified for vessels using midwater trawl gear (Gulf of Maine and Georges Bank catch cap).

Herring Alternatives 2.1 would specify NEFOP-level observer coverage, Herring Alternatives 2.2 would specify at-sea monitor coverage, Herring Alternative 2.3 would specify at-sea monitor coverage as well as EM and portside sampling coverage, and Herring Alternative 2.4 would specify EM and portside sampling coverage.

The industry cost responsibility associated with NEFOP-level observer coverage is the most expensive (\$818 per sea day), followed by at-sea monitor coverage (\$717 per sea day), and EM (\$187-\$325 per sea day) and portside sampling (\$3.84-\$5.12 per mt).

The following table describes the potential reduction to RTO associated with paying for monitoring coverage across herring coverage target alternatives. Shaded cells in the following table indicate when the potential reduction to RTO associated with paying for monitoring coverage exceeds 10%. Additional background and summary information can be found in the tables and box plots displayed starting on page 62.

**TABLE 14. POTENTIAL REDUCTION TO RETURN-TO-OWNER FOR HERRING COVERAGE TARGET ALTERNATIVES 2.1 – 2.5**

Herring Coverage Target Alternatives 2.1 - 2.5									
Alternative	Gear Type	Paired MWT		Single MWT		Purse Seine		SMBT	
	Median potential reduction to RTO from coverage	≥1 lb	> 25 MT	≥1 lb	> 25 MT	≥1 lb	> 25 MT	≥1 lb	> 25 MT
2.1	100% NEFOP-level	44.7%	42.2%	24.4%	5.8%	13.9%	10.4%	11.5%	14.2%
2.2 and 2.3	100% ASM	38.9%	36.7%	21.3%	5.1%	12.1%	9.1%	10.0%	12.3%
	75% ASM	29.5%	28.2%	15.9%	3.8%	9.1%	6.8%	7.5%	9.4%
	50% ASM	20.4%	18.9%	10.5%	2.5%	6.0%	4.5%	5.4%	6.4%
	25% ASM	10.1%	9.6%	5.6%	1.4%	3.0%	2.2%	3.5%	3.8%
2.3 and 2.4	EM/Portside Year 1 <sup>1</sup>	42.2%	40.1%	37.3%	19.5%	N/A		N/A	
	EM/Portside Year 2 <sup>1</sup>	29.1%	27.5%	12.8%	4.9%				
	EM/Portside Year 1 <sup>2</sup>	25.1%	24.2%	26.7%	16.9%				
	EM/Portside Year 2 <sup>2</sup>	14.4%	13.3%	6.9%	2.4%				
2.5	100% NEFOP-level	5.4%	5.4%	1.0%	1.0%				
1 – Initial cost assumptions based on video collected for the duration of a trip, 100% video review, and including portside administration costs. This cost would apply to 100% of trips. 2 – Revised cost assumptions based on video collected only around haulback, 50% video review, and not including portside administration costs. This cost would apply to 50% of trips.									

In general, the negative economic impact on herring vessels of paying for monitoring coverage (as measured by the potential reduction in the RTO) is greatest with Herring Alternative 2.1, followed by Herring Alternatives 2.2, 2.3, and 2.4. These impacts are influenced by the type of information collected and amount of coverage specified. Because paired midwater trawl vessels average more sea days than other gear types, paired midwater trawl vessels have a greater negative economic impact associated with paying for observer coverage, followed by purse seine, single midwater trawl, and small mesh bottom trawl vessels.

NEFOP-level observer coverage provides species composition data on both retained and discarded catch, while at-sea monitor coverage provides species composition data on discarded catch and portside sampling coverage provides species composition information on retained catch. NEFOP-level observers and at-sea monitors can estimate amounts of discards. EM cannot estimate the amount of discards, but EM can verify retention of catch.

Alternatives with NEFOP-level observer coverage and EM and portside sampling coverage have an increased likelihood to collect information on the catch of haddock, river herring, and shad than alternatives with only at-sea monitoring coverage. Herring Alternatives 2.1, 2.3, and 2.4 have a greater potential to reduce the variability in haddock, river herring, and shad catch and increase the likelihood that vessels can fully harvest the herring sub-ACLs than Herring Alternative 2.2.

Herring Alternative 2.1 specifies monitoring coverage at 100% while Herring Alternatives 2.2-2.4 allow monitoring coverage to range between 25% and 100%. The economic impact on herring vessels of paying for higher levels of monitoring coverage would be more negative than paying for lower levels of monitoring. Therefore, alternatives that specify higher coverage rates may have a more negative direct impact on herring vessels paying for monitoring coverage than alternatives with lower coverage rates.

While high levels of monitoring are not always necessary to address a monitoring goal, because the NEFMC is interested in increasing monitoring to improve the accuracy of catch estimates, in particular the ability to track catch against catch caps, more monitoring could be more effective than less monitoring. Additionally, because the catch of river herring and shad is highly variable, both spatially and temporally, increased monitoring for those species would be more effective than less monitoring. To the extent that increased monitoring helps reduce the variability of data tracked against catch caps and helps increase the likelihood that vessels can fully harvest herring sub-ACLs, Herring Alternatives 2.1, 2.3, and 2.4 may have more indirect positive economic impacts on herring vessels than Herring Alternative 2.2.

Herring Alternatives 2.1 and 2.2 would primarily allocate monitoring coverage by vessel permit category (i.e., Category A and B herring permits), Herring Alternative 2.4 would allocate monitoring coverage by fishing fleet (i.e., midwater trawl fleet), and Herring Alternative 2.3 would allocate monitoring coverage by permit category and 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 and 2.4. The additional information on catch and discard estimates in the herring fishery obtained via Herring Alternatives 2.1, 2.2, and 2.3 (at-sea monitoring data) can be used for tracking catch against catch caps but it is unlikely that those data will be used for stock assessments and estimating total removals. Additional data on catch and bycatch estimates in herring fishery obtained via Herring Alternatives 2.3 (EM and portside sampling data) and 2.4 could be used for catch cap monitoring as well as stock assessments and estimating total removals. Any indirect economic benefits for herring vessels related to data utility would be more likely to be realized under Herring Alternatives 2.3 and 2.4 than under Herring Alternatives 2.1 and 2.2.

The realized coverage level in a given year would be determined by the amount of funding available to cover NMFS cost responsibilities in that year. If coverage is not available (either due to logistics or a lack of funding) for a specific trip, Herring Alternatives 2.1-2.4 specify that the vessels would be prohibited from participating in the herring fishery on that trip. The selection of Herring Alternative 2 - Sub-Option 1 would enable coverage requirements to be waived on a specific trip to allow vessels to continue participating in the herring fishery, even if monitoring coverage is not available. Should fishing effort be limited by the availability of monitoring coverage, such that the herring sub-ACLs in a given year are not harvested, there is the potential for additional negative economic impacts on herring vessels. The selection of Herring Alternative 2 - Sub-Option 1 would enable monitoring coverage requirements to be waived on a specific trip, allowing a vessel to continue participating in the herring fishery, even if monitoring coverage is not available.

Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Groundfish Closed Areas must carry a NEFOP-level observer while Herring Alternative 2.6 would specify that coverage for midwater trawl vessels fishing in Groundfish Closed Areas matches the coverage target recommend by the NEFMC for the rest of the fishery. The Herring Alternative 2 Sub-Options would apply to Herring Alternative 2.6 but not to Herring Alternative 2.5. If the benefits associated with increased monitoring and/or the negative economic impacts of paying for monitoring coverage associated with Herring Alternative 2.6 are reduced or minimized by the selection of any of the sub-options, then the benefits of increased monitoring and/or

negative economic impacts associated with paying for monitoring coverage may be less under Herring Alternative 2.6 than under Herring Alternative 2.5.

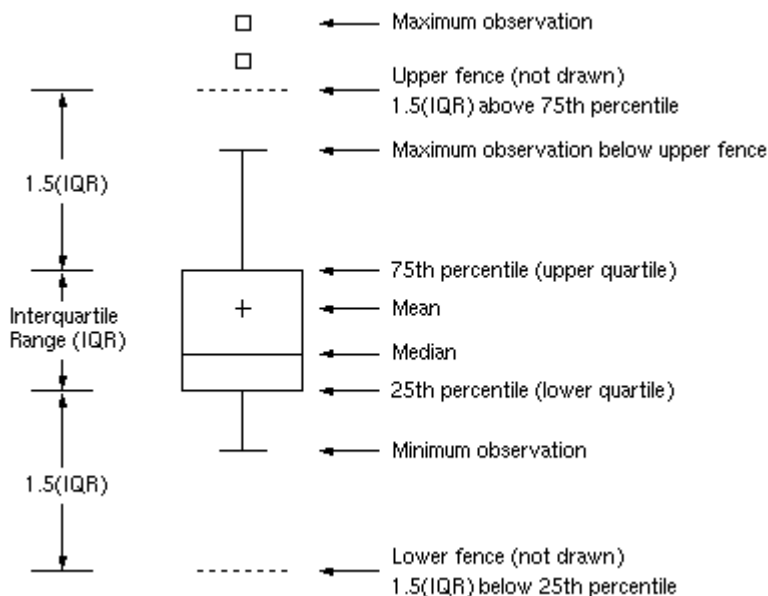
During 2005-2010, less than 10% of the herring effort, less than 12% of the herring harvest, and less than 13% of the herring revenue for the midwater trawl fleet came from inside the Groundfish Closed Areas. Additionally, herring catch accounted for almost 100% of the revenue generated by the midwater trawl fleet. Haddock is the only non-target species of interest that is typically harvested by midwater vessels inside the Groundfish Closed Areas. The haddock catch by midwater trawl vessels inside Groundfish Closed Areas is tracked against the haddock catch caps and haddock ACL. The magnitude of potential reduction to RTO associated with Herring Alternative 2.5 is much less than under Herring Alternatives 2.1-2.4 because of the limited amount of time the midwater trawl fleet spends inside the Groundfish Closed Areas. The benefits of increased monitoring to herring vessels associated with Herring Alternative 2.5 would be similar to other alternatives that specify NEFOP-level observer coverage (Herring 2.1) and allocate monitoring coverage by midwater trawl fleet (Herring Alternatives 2.3-2.4), and would be greater than at-sea monitoring alternatives that allocate coverage by permit category (Herring Alternative 2.2). However, the magnitude of those benefits would be less than Herring Alternatives 2.1-2.4 because increased monitoring would be focused on effort in the Groundfish Closed Areas and not across all herring management areas.

Herring Alternative 2.6 specifies that industry-funded monitoring requirements inside Groundfish Closed Areas would match monitoring requirements for the general herring fishery. Therefore, the economic impacts, both positive and negative, associated with Herring Alternative 2.6 have already been accounted for in Herring Alternatives 2.1-2.4. The magnitude of economic impacts associated with Herring Alternative 2.6 is expected to be similar to the magnitude of impacts associated with Herring Alternative 2.5.

Herring Alternative 2.5 specifies that midwater trawl vessels fishing in the Groundfish Closed Areas must carry a NEFOP-level observer while Herring Alternative 2.6 would specify that coverage for midwater trawl vessels fishing in Groundfish Closed Areas would match the coverage targets recommended by the NEFMC for the rest of the fishery. The Herring Alternative 2 Sub-Options would apply to Herring Alternative 2.6 but not to Herring Alternative 2.5. Even though Herring Alternative 2.5 would not allow coverage requirements to be waived for a trip inside the Groundfish Closed Areas, it is unlikely that monitoring availability would reduce fishing effort such that the herring ACLs are not able to be harvested.

In general, the direct economic impacts on herring vessels associated with Herring Alternatives 2.1-2.6 are negative. Impacts result from reductions in RTO related to paying for monitoring coverage and possible reductions in fishing effort to match monitoring availability and would vary in magnitude by alternative. Indirect positive economic impacts on herring vessels result from increased monitoring and relate to the potential for vessels to be able to fully harvest the herring ACLs without being constrained by catch caps.

The following box plots show of the distribution of monitoring costs and the distribution of monitoring costs as a percent of a vessel's RTO. Box plots are a useful tool to show how data are distributed. The following schematic shows what the various pieces of a box plot show regarding the distribution of data.

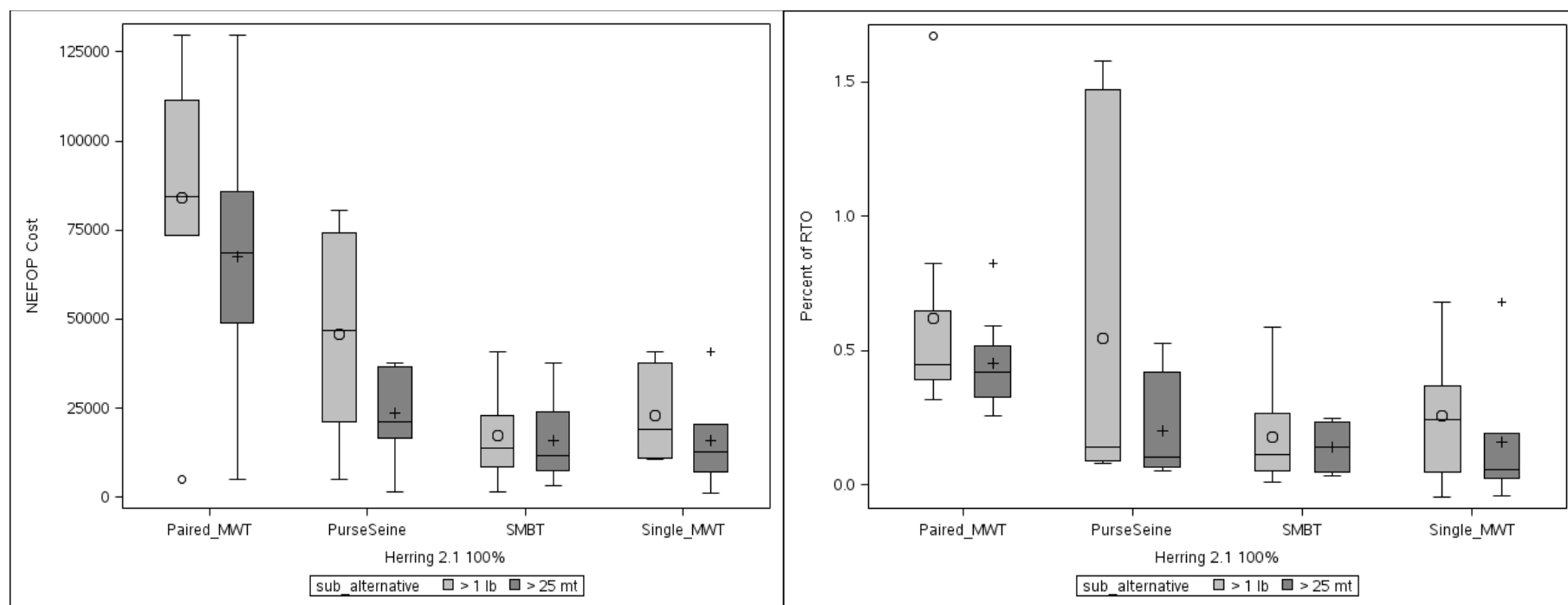


When examining the box plots, it is important to note the differences between mean and median values by gear type and by alternatives, as well as the differences in the variability of values by these criteria. For example, in the first figure (Herring Alternative 2.1) there is a much wider range of costs for purse seine vessels than small mesh bottom trawl vessels, as represented by the length of the rectangle. Further, the difference between alternatives for purse seine vessels shows that the mean and median values are lower under the 25 mt threshold (Sub-Option 5) but also that the likely range of NEFOP costs are much narrower.

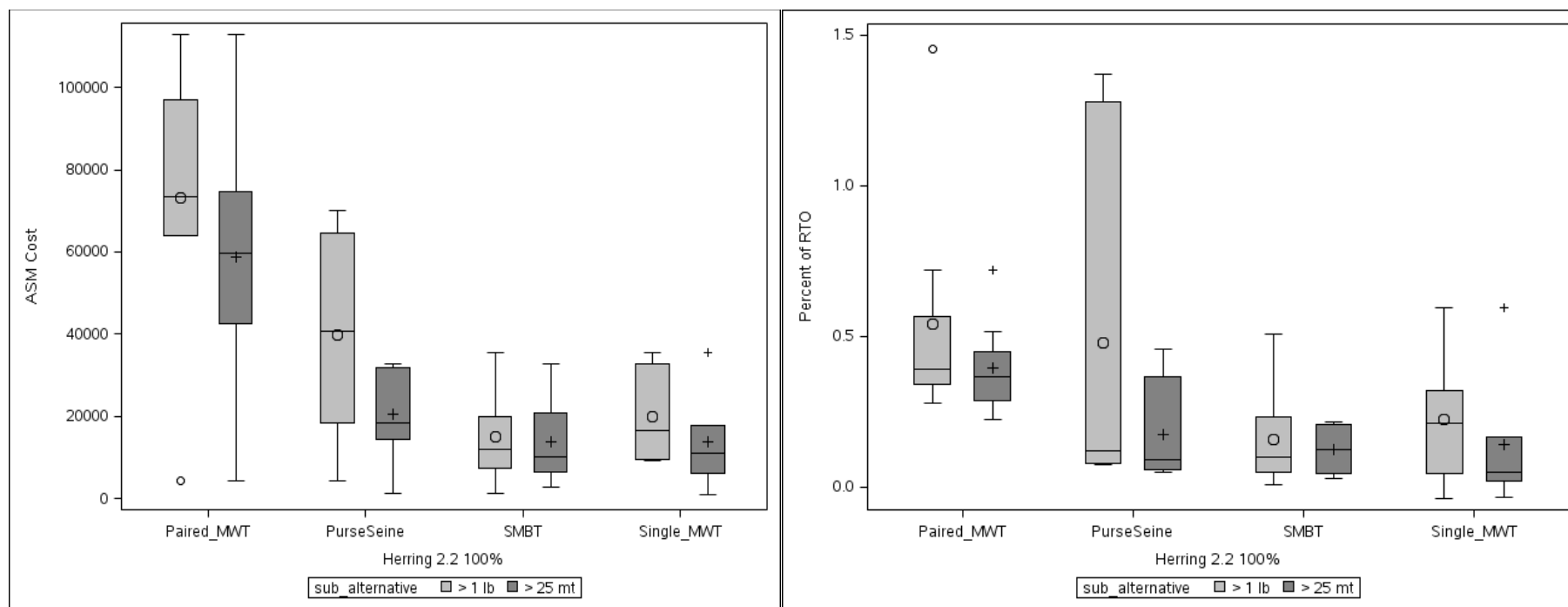
**TABLE 15. HERRING ALTERNATIVES 2.1, 2.2, 2.3 (PURSE SEINE AND SMBT) – ANNUAL AVERAGE PER VESSEL SUMMARY**

	Paired MWT		Purse Seine		Single MWT		SMBT	
	> 1 lb	> 25 mt	> 1 lb	> 25 mt	> 1 lb	> 25 mt	> 1 lb	> 25 mt
Mean RTO	\$163,080		\$241,180		\$141,169		\$144,125	\$163,329
Median RTO	\$159,529		\$253,048		\$60,156		\$121,026	\$135,782
Mean Sea Days (100%)	103	83	56	29	28	19	21	20
Median Sea Days (100%)	104	84	57	26	23	16	17	15
Mean Sea Days (75%)	77	62	42	22	21	15	17	15
Median Sea Days (75%)	77	63	43	20	18	12	13	11
Mean Sea Days (50%)	52	42	28	15	14	10	12	10
Median Sea Days (50%)	51	42	29	13	12	8	9	8
Mean Sea Days (25%)	26	21	14	8	8	6	8	7
Median Sea Days (25%)	26	21	14	7	7	5	6	6

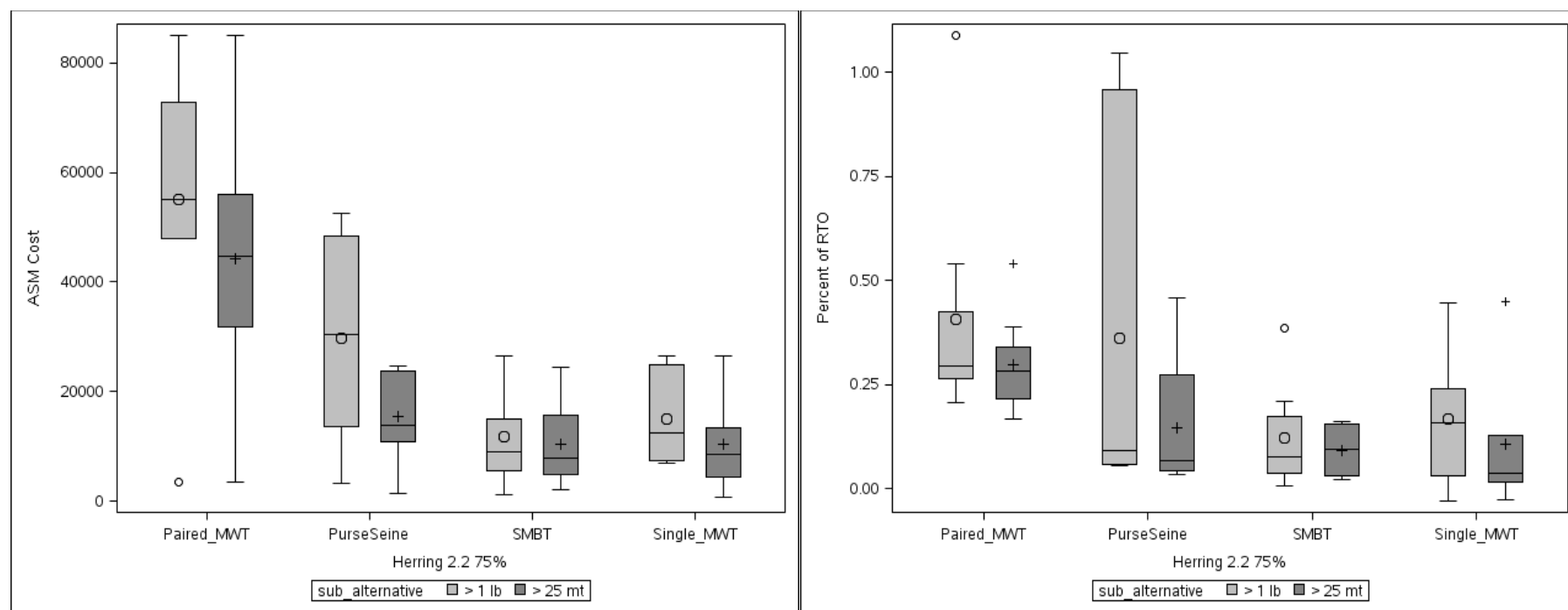




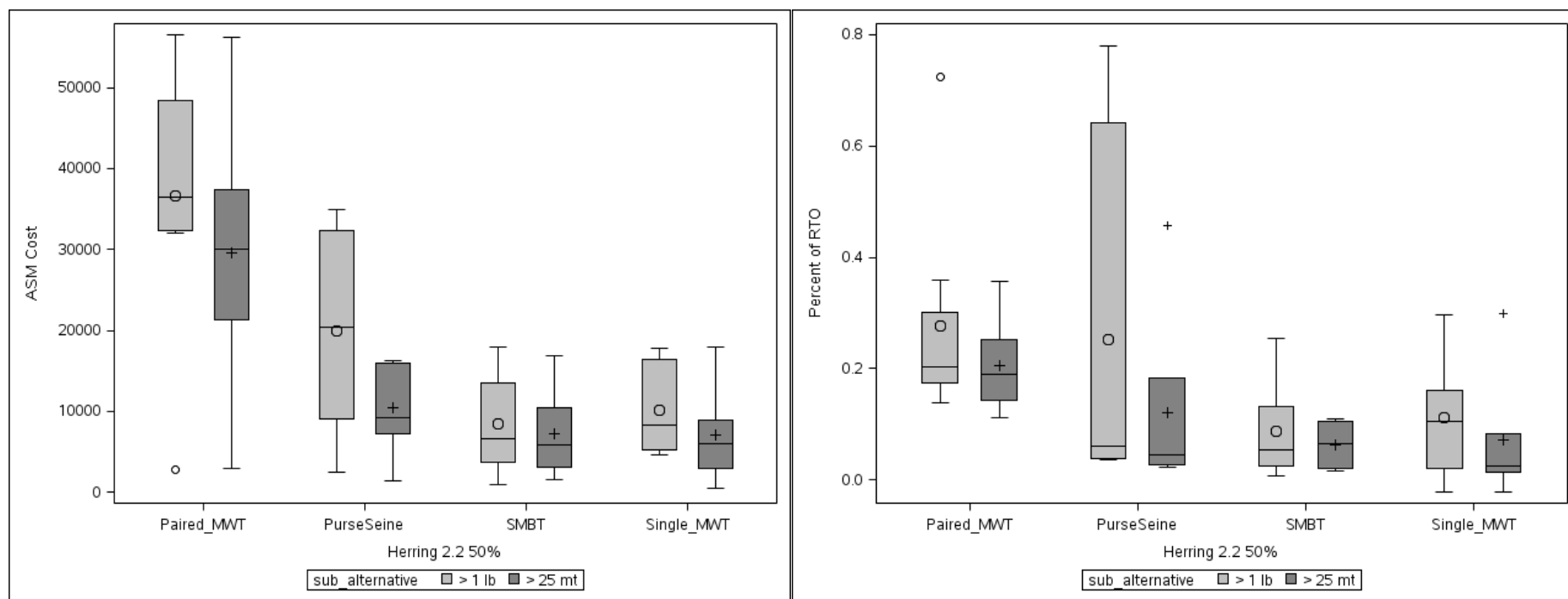
**FIGURE 1. HERRING ALTERNATIVE 2.1 100% NEFOP COST AND PERCENT OF RTO**



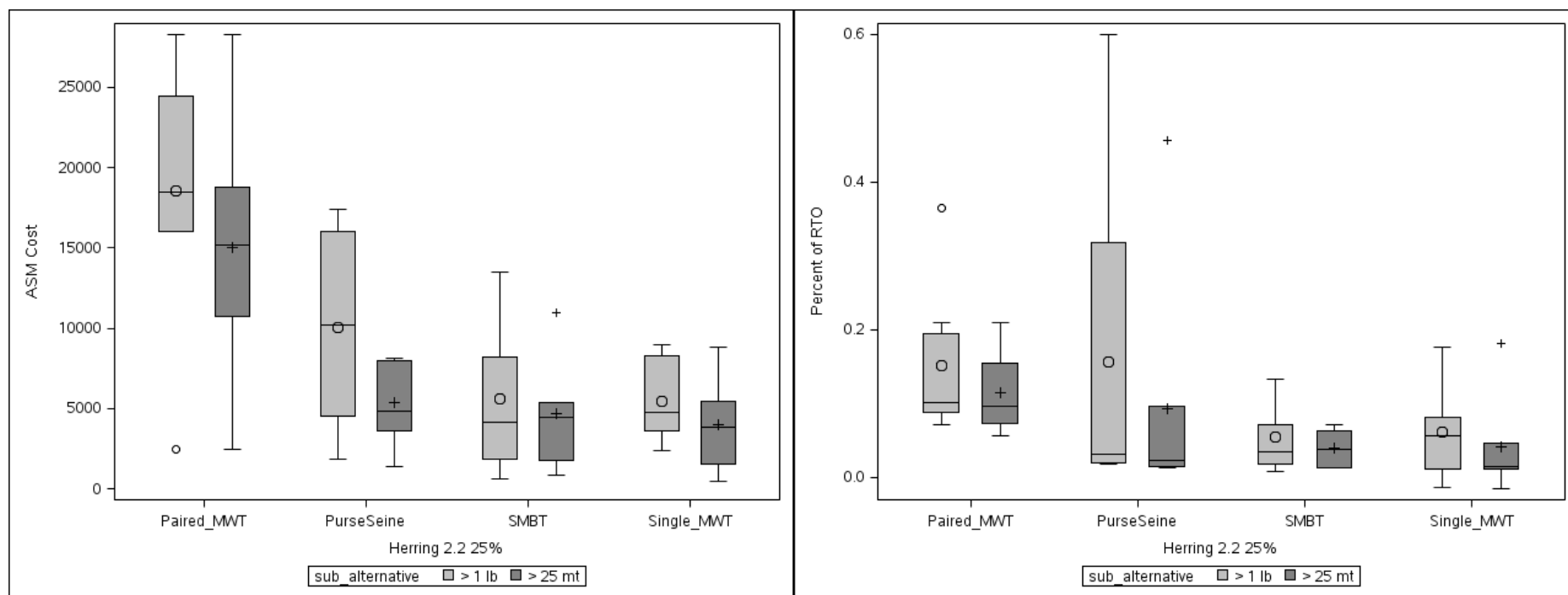
**FIGURE 2. HERRING ALTERNATIVE 2.2 100% ASM COST AND PERCENT OF RTO**



**FIGURE 3. HERRING ALTERNATIVE 2.2 75% ASM COST AND PERCENT OF RTO**



**FIGURE 4. HERRING ALTERNATIVE 2.2 50% ASM COST AND PERCENT OF RTO**



**FIGURE 5. HERRING ALTERNATIVE 2.2 25% ASM COST AND PERCENT OF RTO**

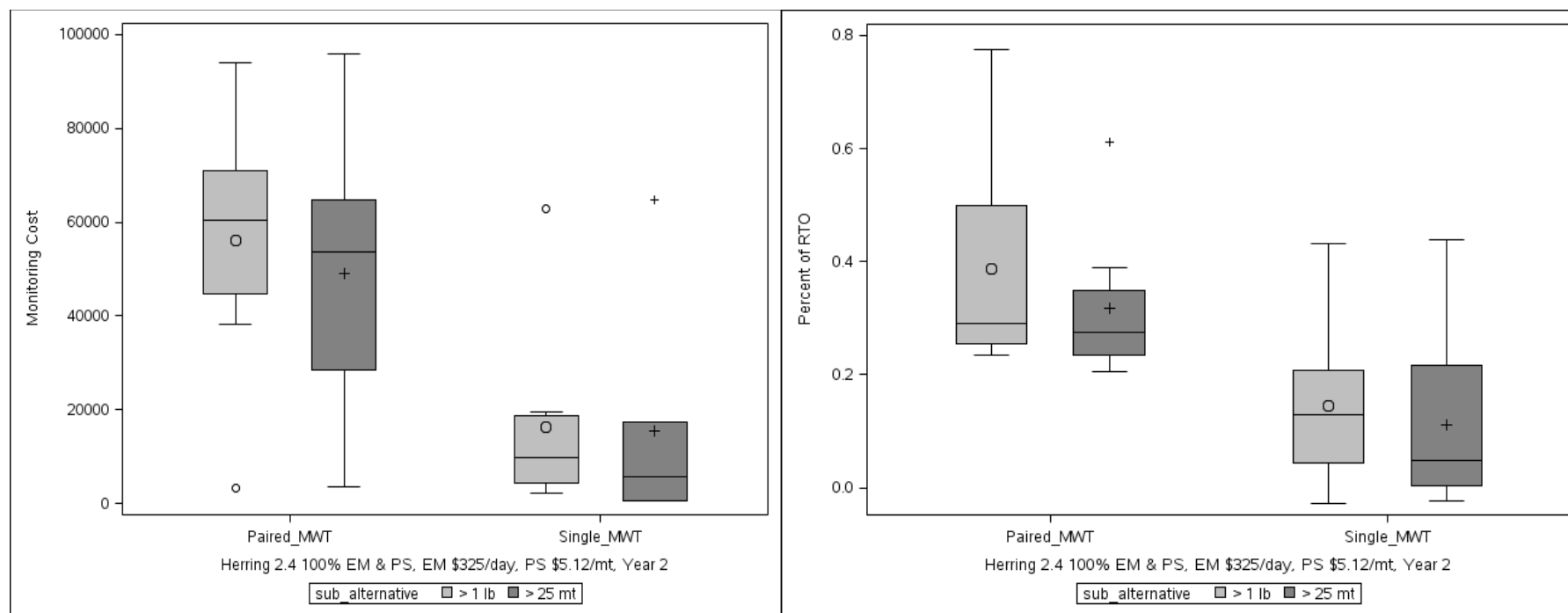
Note: The box plots for purse seine and SMBT vessels shown in Figures 2-5 under Herring Alternative 2.2 also describe the distribution of values for Herring Alternative 2.3.

**TABLE 16. HERRING ALTERNATIVES 2.1, 2.2, 2.3 (PURSE SEINE AND SMBT) – ANNUAL FLEET SUMMARY**

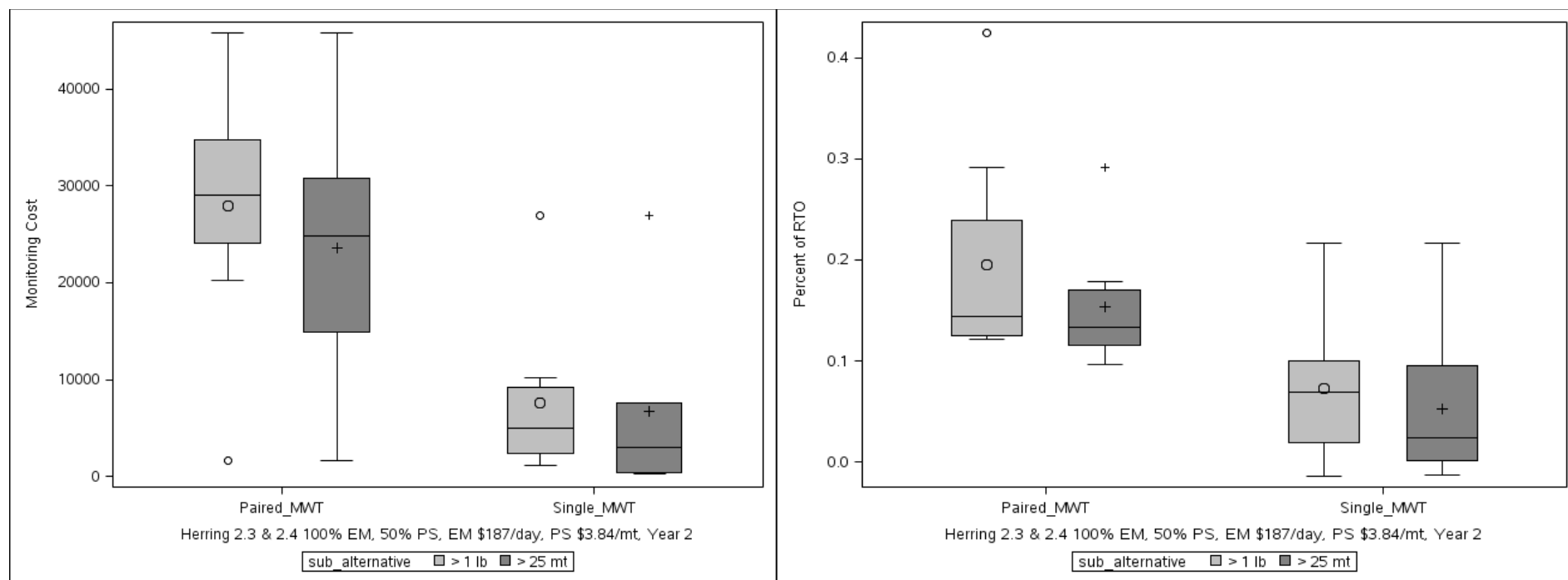
Fleet Level	Paired MWT ≥ 1 LB	Paired MWT > 25 MT	Single MWT ≥ 1 LB	Single MWT > 25 MT	Purse Seine ≥ 1 LB	Purse Seine > 25 MT	SMBT ≥ 1 LB	SMBT > 25 MT
Number of Vessels	8	8	6	6	7	7	9	6
Days at Sea	825	663	170	116	392	204	192	117
Total NEFOP Cost (2.1)	\$673k	\$541k	\$138k	\$95k	\$320k	\$166k	\$156k	\$96k
Total ASM Cost (2.2)	\$586k	\$471k	\$120k	\$82k	\$278k	\$145k	\$136k	\$83k
Total Revenue	\$10.6M	\$9.8M	\$4.5M	\$4.2M	\$11.0M	\$10.3M	\$2.6M	\$1.8M
% Revenue Herring	89%	93%	86%		100%		58%	78%
% Revenue Mackerel	11%	7%	13%		-		3%	2%
% Revenue Squid	-		-		-		20%	10%
Data shown by trips harvesting ≥ 1 lb of herring and > 25 mt of herring								

**TABLE 17. HERRING ALTERNATIVES 2.3 AND 2.4 – ANNUAL AVERAGE PER MIDWATER TRAWL VESSEL SUMMARY**

	Paired MWT		Single MWT	
	> 1 lb	> 25 mt	> 1 lb	> 25 mt
Mean RTO	\$163,080		\$134,205	\$149,714
Median RTO	\$159,529		\$60,156	\$80,070
Mean EM Days (100%)	103	83	22	17
Median EM Days (100%)	104	84	18	13



**FIGURE 6. HERRING ALTERNATIVE 2.4 100% EM AND PORTSIDE COST AND PERCENT OF RTO**



**FIGURE 7. HERRING ALTERNATIVE 2.4 50% EM AND PORTSIDE COST AND PERCENT OF RTO**

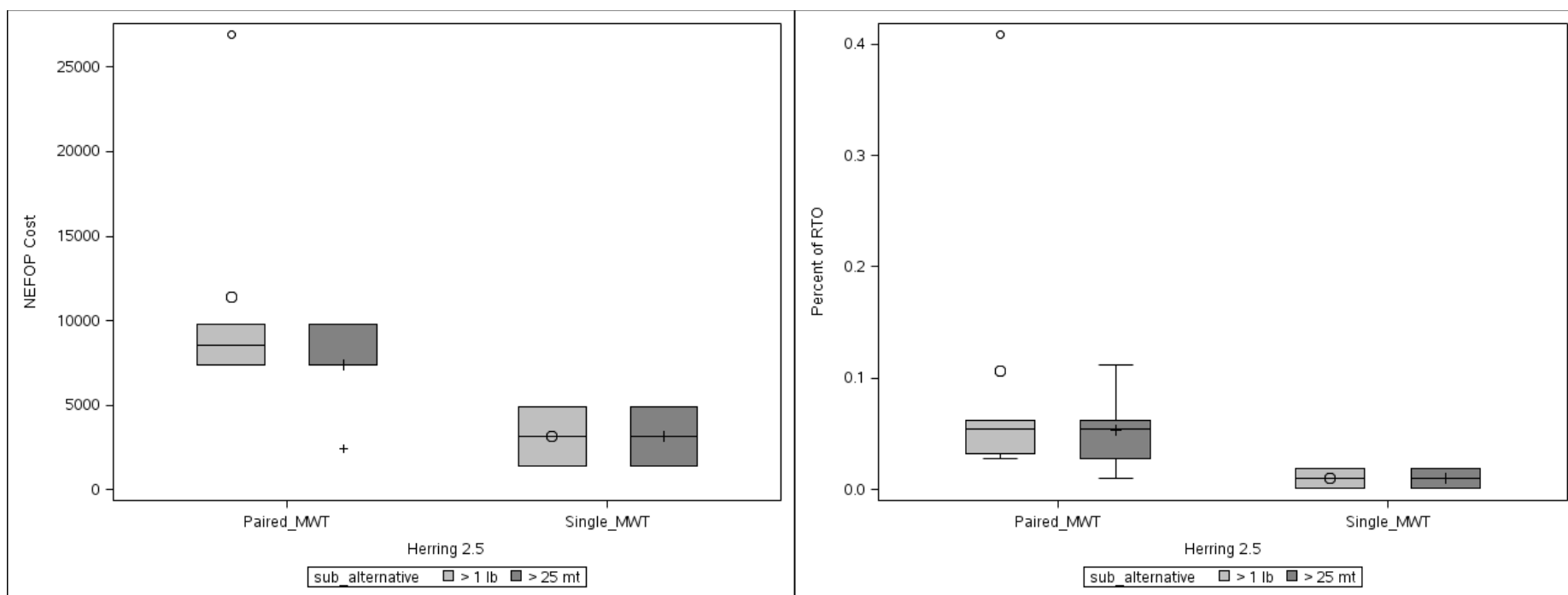


**TABLE 18. HERRING ALTERNATIVES 2.3 AND 2.4 – ANNUAL MIDWATER TRAWL FLEET SUMMARY**

Fleet Level	Paired MWT ≥ 1 LB	Paired MWT > 25 MT	Single MWT ≥ 1 LB	Single MWT > 25 MT
Number of Vessels	8	8	8	7
Days at Sea	825	663	180	117
Total Monitoring Cost (100% EM at \$325/day, 100% PS at \$5.12/mt, year 2)	\$457,595	\$393,117	\$134,165	\$107,580
Total Monitoring Cost (100% EM at \$187/day, 50% PS at \$3.84/mt, year 2)	\$222,958	\$188,376	\$61,067	\$47,083
Total Revenue	\$10.6M	\$9.8M	\$4.5M	\$4.2M
% Revenue Herring	89%	93%	86%	86%
% Revenue Mackerel	11%	7%	13%	14%
% Revenue Squid	-	-	-	-
<i>Data shown by trips harvesting ≥ 1 lb of herring and &gt; 25 mt of herring</i>				

**TABLE 19. HERRING ALTERNATIVE 2.5 – ANNUAL AVERAGE PER MIDWATER TRAWL VESSEL SUMMARY**

	Paired MWT		Single MWT	
	> 1 lb	> 25 mt	> 1 lb	> 25 mt
Mean RTO	\$172,922		\$545,609	
Median RTO	\$159,529		\$545,609	
Mean Sea Days	14	9	4	4
Median Sea Days	11	9	4	4

**FIGURE 8. HERRING ALTERNATIVE 2.5 100% NEFOP FOR MIDWATER TRAWL VESSELS IN GROUNDFISH CLOSED AREAS COST AND PERCENT OF RTO**

**TABLE 20. HERRING ALTERNATIVE 2.5 – ANNUAL MIDWATER TRAWL FLEET SUMMARY**

Fleet Level	Single and Paired MWT ≥ 1 LB	Single and Paired MWT > 25 MT
Number of Vessels	8	8
Days at Sea	92	62
Total NEFOP Cost	\$74,827	\$50,347
Total Revenue	\$1.4M	\$1.4M
% Revenue Herring	99.9%	100%
% Revenue Mackerel	-	-
% Revenue Squid	-	-
% Other Species	0.1%	0%
<i>Data shown by trips harvesting ≥ 1 lb of herring and &gt; 25 mt of herring</i>		

Economic and effort data for Herring Alternative 2.6 is included in tables for Herring Alternatives 2.1-2.4.

## **Appendix 1 – Monitoring and Service Provider Requirements**

The following sections are the existing regulations for monitoring service providers. Omnibus Alternative 2 would revise these requirements to apply to all industry-funded monitoring programs in the New England and Mid-Atlantic FMPs.

### **§ 648.11 -- At-sea sea sampler/observer coverage.**

(g)((5)(3) ) Owners of scallop vessels shall pay observer service providers for observer services within 45 days of the end of a fishing trip on which an observer deployed.

(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/](http://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 of 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 service 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 scallop 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 (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: [www.nmfs.noaa.gov/op/pds/categories/science\\_and\\_technology.html](http://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.

(j) In the event that a vessel is requested by the Regional Administrator to carry a NMFS-certified fisheries observer pursuant to paragraph (a) of this section and is also selected to carry an at-sea monitor as part of an approved sector at-sea monitoring program specified in §648.87(b)(1)(v) for the same trip, only the NMFS-certified fisheries observer is required to go on that particular trip.

### **§ 648.87(b) -- Groundfish Sector At-Sea and Electronic Monitoring Requirements**

(4) Independent third-party monitoring provider standards. Any service provider intending to provide at-sea/electronic monitoring services described in paragraph (b)(1)(v) of this section must apply to and be approved/certified by NMFS in a manner consistent with the Administrative Procedure Act. NMFS shall approve/certify service providers and/or at-sea monitors as eligible to provide sector monitoring services specified in this part and can disapprove/decertify service providers and/or individual monitors through notice in writing to individual service providers/monitors if the following criteria are no longer being met:

(i) Service provider information. As part of the application for service provider approval/certification, potential service providers must include at least the following information:

(A) Identification of corporate structure, including the names and duties of controlling interests in the company such as owners, board members, authorized agents, and staff; and articles of incorporation, or a partnership agreement, as appropriate;

(B) Contact information for official correspondence and communication with any other office;

(C) A statement, signed under penalty of perjury, from each owner, board member, and officer that they are free from a conflict of interest with fishing-related parties including, but not limited to, vessels, dealers, shipping companies, sectors, sector managers, advocacy groups, or research institutions and will not accept, directly or indirectly, any gratuity, gift, favor, entertainment, loan, or anything of monetary value from such parties;

(D) A statement, signed under penalty of perjury, from each owner, board member, and officer describing any criminal convictions, Federal contracts they have had, and the performance rating they received on the contract, and previous decertification action while working as an observer or observer service provider;

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

- (F) A description of the applicant's ability to carry out the responsibilities and duties of a sector monitoring/reporting service provider and the arrangements to be used, including whether the service provider is able to offer at-sea monitoring services;
- (G) Evidence of adequate insurance (copies of which shall be provided to the vessel owner, operator, or vessel manager, when requested) to cover injury, liability, and accidental death to cover at-sea monitors (including during training); vessel owner; and service provider;
- (H) Proof of benefits and personnel services provided in accordance with the terms of each monitor's contract or employment status;
- (I) Proof that the service provider's at-sea monitors have passed an adequate training course sponsored by the service providers to the extent not funded by NMFS that is consistent with the curriculum used in the current yearly NEFOP training course, unless otherwise specified by NMFS;
- (J) An Emergency Action Plan describing the provider's response to an emergency with an at-sea monitor, including, but not limited to, personal injury, death, harassment, or intimidation; and
- (K) Evidence that the company is in good financial standing;
- (ii) Service provider performance requirements. At-sea monitoring service providers must be able to document compliance with the following criteria and requirements:
- (A) A service provider must establish and carry out a comprehensive plan to deploy NMFS-certified at-sea monitors, or other at-sea monitoring mechanism, such as electronic monitoring equipment that is approved by NMFS, according to a prescribed coverage level (or level of precision for catch estimation), as specified by NMFS, including all of the necessary vessel reporting/notice requirements to facilitate such deployment, as follows:
- (1) A service provider must be available to industry 24 hr per day, 7 days per week, with the telephone system monitored a minimum of four times daily to ensure rapid response to industry requests;
  - (2) A service provider must be able to deploy at-sea monitors, or other approved at-sea monitoring mechanism to all ports in which service is required by sectors, or a subset of ports as part of a contract with a particular sector;
  - (3) A service provider must report at-sea monitors and other approved at-sea monitoring mechanism deployments to NMFS and the sector manager in a timely manner to determine whether the predetermined coverage levels are being achieved for the appropriate sector;
  - (4) A service provider must assign at-sea monitors and other approved at-sea monitoring mechanisms without regard to any preference by the sector manager or representatives of vessels other than when the service is needed and the availability of approved/certified monitors and other at-sea monitoring mechanisms;

(5) A service provider's at-sea monitor assignment must be fair, equitable, representative of fishing activities within each sector, and able to monitor fishing activity throughout the fishing year;

(6) For service providers offering catch estimation or at-sea monitoring services, a service provider must be able to determine an estimate of discards for each trip and provide such information to the sector manager and NMFS, as appropriate and as required by this section;

(B) The service provider must ensure that at-sea monitors remain available to NMFS, including NMFS Office for Law Enforcement, for debriefing for at least 2 weeks following any monitored trip/offload;

(C) The service provider must report possible at-sea monitor harassment; discrimination; concerns about vessel safety or marine casualty; injury; and any information, allegations, or reports regarding at-sea monitor conflict of interest or breach of the standards of behavior to NMFS and/or the sector manager, as specified by NMFS;

(D) The service provider must submit to NMFS, if requested, a copy of each signed and valid contract (including all attachments, appendices, addendums, and exhibits incorporated into the contract) between the service provider and those entities requiring services (i.e., sectors and participating vessels) and between the service provider and specific dockside, roving, or at-sea monitors;

(E) The service provider must submit to NMFS, if requested, copies of any information developed and used by the service providers distributed to vessels, such as informational pamphlets, payment notification, description of duties, etc.;

(F) A service provider may refuse to deploy an at-sea monitor or other approved at-sea monitoring mechanism on a requesting fishing vessel for any reason including, but not limited to, the following:

(1) If the service provider does not have an available at-sea monitor or other at-sea monitoring mechanism approved by NMFS within the advanced notice requirements established by the service provider;

(2) If the service provider is not given adequate notice of vessel departure or landing from the sector manager or participating vessels, as specified by the service provider;

(3) For the purposes of at-sea monitoring, if the service provider has determined that the requesting vessel is inadequate or unsafe pursuant to the reasons described in §600.746; and

(4) Failure to pay for previous deployments of at-sea monitors, or other approved at-sea monitoring mechanism.

(G) With the exception of a service provider offering reporting, dockside, and/or at-sea monitoring services to participants of another fishery managed under Federal regulations, a service provider must not have a direct or indirect interest in a fishery managed under Federal regulations, including, but not limited to, fishing vessels, dealers, shipping companies, sectors, sector managers, advocacy groups, or research institutions and may 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 service providers;

(H) A system to record, retain, and distribute the following information to NMFS, as requested, for a period specified by NMFS, including:

(1) At-sea monitor and other approved monitoring equipment deployment levels, including the number of refusals and reasons for such refusals;

(2) Incident/non-compliance reports (e.g., failure to offload catch); and

(3) Hail reports, landings records, and other associated interactions with vessels and dealers.

(I) A means to protect the confidentiality and privacy of data submitted by vessels, as required by the Magnuson-Stevens Act; and

(J) A service provider must be able to supply at-sea monitors with sufficient safety and data-gathering equipment, as specified by NMFS.

(iii) Standards for individual at-sea monitors. For an individual to be approved/certified as an at-sea monitor, the service provider must demonstrate that each potential monitor meets the following criteria:

(A) A high school diploma or legal equivalent;

(B) Successful completion of all NMFS-required training and briefings before deployment;

(C) Physical and mental capacity for carrying out the responsibilities of an at-sea monitor on board fishing vessels, pursuant to standards established by NMFS such as being certified by a physician to be physically fit to work as an at-sea monitor after consideration of at least the following work-related issues:

(1) Susceptibility to chronic motion sickness;

(2) Ability to live in confined quarters;

(3) Ability to tolerate stress;

(4) Ability to lift and carry heavy objects up to 50 lb (22.7 kg);

(5) Ability to drag heavy objects up to 200 lb (90.7 kg); and

(6) Ability to climb a ladder.

(D) A current Red Cross (or equivalent) CPR/first aid certification;

(E) Absence of fisheries-related convictions, based upon a thorough background check; and

(F) Independence from fishing-related parties including, but not limited to, vessels, dealers, shipping companies, sectors, sector managers, advocacy groups, or research institutions to prevent conflicts of interest.

(5) At-sea/electronic monitoring operational standards. In addition to the independent third-party monitoring provider standards specified in paragraph (b)(4) of this section, any at-sea/electronic monitoring program developed as part of a sector's yearly operations plan pursuant to paragraph (b)(1)(v)(B) of this section must meet the following operational standards to be approved by NMFS:

(i) Gear. Each at-sea monitor must be provided with all of the equipment specified by the Northeast Fisheries At-sea Monitoring Program. A list of such equipment is available from the Northeast Fisheries Science Center upon request. At-sea/electronic monitoring service providers are responsible for the cost of providing such gear to at-sea monitors to the extent not funded by NMFS. This gear shall be inspected by NMFS upon the completion of training required pursuant to paragraph (b)(4)(i)(I) of this section.

(ii) Vessel selection protocol. An at-sea/electronic monitoring program service provider must develop a formal vessel-selection protocol to deploy at-sea monitors and electronic monitoring equipment in a statistically random manner consistent with the coverage levels required pursuant to paragraph (b)(1)(v)(B)(1) of this section. This protocol must include a method to allow for waivers in specific circumstances, including how waivers would be requested, assessed, and recorded.

(iii) Reporting/recordkeeping requirements—(A) Vessel requirements. In addition to all other reporting/recordkeeping requirements specified in this part, to facilitate the deployment of at-sea monitors and electronic monitoring equipment pursuant to paragraph (b)(1)(v)(B)(1) of this section, the operator of a vessel fishing on a sector trip must provide at-sea/electronic monitoring service providers with at least the following information: The vessel name, permit number, trip ID number in the form of the VTR serial number of the first VTR page for that trip or another trip identifier specified by NMFS, whether a monkfish DAS will be used, and an estimate of the date/time of departure in advance of each trip. The timing of such notice shall be sufficient to allow ample time for the service provider to determine whether an at-sea monitor or electronic monitoring equipment will be deployed on each trip and allow the at-sea monitor or electronic monitoring equipment to prepare for the trip and get to port, or to be installed on the vessel, respectively. The details of the timing, method (e.g., phone, email, etc.), and information needed for such pre-trip notifications shall be included as part of a sector's yearly operations plan. If a vessel has been informed by a service provider that an at-sea monitor or electronic monitoring equipment has been assigned to a particular trip pursuant to paragraph (b)(5)(iii)(B)(1) of this section, the vessel may not leave port to begin that trip until the at-sea monitor has arrived and boarded the vessel, or the electronic monitoring equipment has been properly installed.

(B) At-sea/electronic monitoring service provider requirements—(1) Confirmation of pre-trip notification. Upon receipt of a pre-trip notification pursuant to paragraph (b)(5)(iii)(A) of this section, the service provider shall inform the vessel operator whether the vessel will be monitored by an at-sea observer or electronic monitoring equipment for that trip, or will be issued an at-sea/electronic

monitoring waiver for that trip based upon the vessel selection protocol specified in paragraph (b)(5)(ii) of this section.

(2) At-sea/electronic monitoring report. A report detailing area fished and the amount of each species kept and discarded shall be submitted electronically in a standard acceptable form to the appropriate sector and NMFS within 48 hr of the completion of the trip, as instructed by the Regional Administrator. The data elements to be collected and the format for submission shall be specified by NMFS and distributed to all approved at-sea/electronic monitoring service providers and sectors. At-sea/electronic monitoring data shall not be accepted until such data pass automated NMFS data quality checks.

(iv) Safety hazards—(A) Vessel requirements. The operator of a sector vessel must detail and identify any safety hazards to any at-sea monitor assigned pursuant to paragraph (b)(5)(iii)(B)(1) of this section prior to leaving port. A vessel cannot begin a trip if it has failed a review of safety issues pursuant to paragraph (b)(5)(iv)(B) of this section, until the identified safety deficiency has been resolved, pursuant to §600.746(i).

(B) At-sea/electronic monitoring service provider requirements. An at-sea monitor must complete a pre-trip vessel safety checklist provided by NMFS before an at-sea monitor can leave port onboard a vessel on a sector trip. If the vessel fails a review of safety issues pursuant to this paragraph (b)(5)(iv)(B), an at-sea monitor cannot be deployed on that vessel for that trip.

(v) Adjustment to operational standards. The at-sea/electronic monitoring operational standards specified in paragraph (b)(5) of this section may be revised by the Regional Administrator in a manner consistent with the Administrative Procedure Act.



## Appendix 2 – Monitoring Cost Estimates for the Industry-Funded Monitoring Omnibus Amendment

*NMFS Costs for NEFOP-level observers, at-sea monitors and dockside monitors.* Based on fiscal year 2013 expenses, Table 1 shows the level of costs required to support the deployment of all Northeast Region at-sea monitoring programs, including NEFOP observers, and groundfish at-sea monitors, and the scallop industry-funded monitoring program. 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, supported 10,666 sea days in FY 2013, but could support about a maximum of 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. NMFS costs for dockside monitoring programs are likely similar to the costs described in this annual estimate.

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 1. NMFS COST RESPONSIBILITIES FOR MONITORING**

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	
<b>Total</b>		<b>\$5,107,500</b>

The groundfish electronic monitoring cost comparison report estimates NMFS costs for the groundfish at-sea monitoring program for fiscal year 2014 costs. In fiscal year 2014, NMFS spent an estimated

\$531,953 on training, \$626,043 on data processing, and \$719,548 on program management for the groundfish at-sea monitoring program for a total cost of \$1,877,544 (Table 2). This total cost is divided by the number of at-sea monitor sea days accomplished in 2014 (3,541 days) to get a per sea day administrative costs of \$530 (Table 2).

**TABLE 1: ANNUAL AT-SEA MONITORING COSTS FOR NOAA FISHERIES**

	Estimated Cost	
Program Component	Total	Per Sea Day
<b>Training</b>	\$531,953	\$150
<b>Data Processing</b>	\$626,043	\$177
<b>Program Management</b>	\$719,548	\$203
<b>Total</b>	\$1,877,544	\$530

*NMFS cost responsibilities for electronic monitoring.* In this section, we estimate NMFS costs for administering the example EM programs for groundfish sectors (audit approach) and the midwater trawl fleet (optimized/full retention approach) based on the roles and responsibilities described above. The reader should note that generalized descriptions for industry costs for electronic monitoring programs presented in this section were derived separately and differently than the NMFS costs presented here.

Many of the costs to NMFS for administering the example EM program would be driven by the scale of the program and the level of participation, although these costs do not necessarily increase linearly with the amount of sea days. Thus, we present a range of potential NMFS costs from overseeing an audit approach EM program for a single hypothetical sector (20 vessels) to a program for the entire active groundfish fleet (400 vessels), and for an optimized/full retention approach EM program for an example midwater trawl fleet (9 vessels). We based NMFS costs for the EM program on costs the Northeast Fishery Observer Program incurred for administering programs with similar roles and responsibilities and from the New England EM Project (Archipelago, 2014). These are rough estimates of NMFS potential costs and, unlike the NEFOP-level observer/at-sea monitoring program costs presented in the section above, may not reflect efficiencies or economies of scale that are possible in a mature program. NMFS would also have other incremental costs for enforcement and use of the data for management, which were not estimated here in order to be consistent with the estimates of the NEFOP-level observer/at-sea monitoring program.

In Table 3, training costs include labor and costs of licenses for any proprietary EM review software. The number of annual trainings that would need to be held and, hence, the number of trainers, would depend on the number of EM reviewers employed by the service providers, which would depend on the number and activity levels of vessels using EM in the fishery. For the audit model, training costs do not increase linearly. Although the number of participants increases by a factor of 20 when scaling up from 20 vessels to a fleet-wide program, the training costs increase by a factor of 8. This type of relationship makes it difficult to estimate costs at a unit that is easily multiplied (e.g., sea day cost). For the optimized/full retention model, although the example fleet includes only 9 midwater trawlers, there is a

large amount of video footage to be reviewed, due to a high number of assumed trips (500) and the assumed rate of video review (100 percent) used in the analysis. This much video footage may require a larger cadre of EM reviewers than the number of vessels might indicate, also increasing demand for training and certifications and NMFS's training costs.

NMFS may also have some costs for reviewing and approving individual Vessel Monitoring Plans (VMPs), which are each vessels individualized plans for equipment specifications, installation, and catch handling, and inspecting equipment installation on the vessel. Annual labor and travel associated with this activity is estimated at \$15,500 for 9 vessels, \$31,000 for 20 vessels and \$232,500-\$310,000 for 400 vessels.

For the audit model, NMFS costs for auditing the service provider's review of logbooks were estimated to be \$46,795 for 20 vessels and \$432,405-\$525,905 for 400 vessels (Table 3), assuming NOAA Fisheries audits 5 percent of trips. These costs include staff time and licenses for proprietary EM review software. Use of open source software would negate the cost of software licenses in this category. For the optimized full retention model, the staff time and equipment costs to conduct periodic video reviews to audit the service providers are estimated at \$26,295, assuming 5 percent of trips are audited.

Program management cost is labor for a program manager, which is necessary to administer the new program, liaise with the service providers, vessel, and enforcement, and coordinate staff. Program management cost is estimated at \$86,000 annually, irrespective of the number of vessels participating in the program.

Not included in these cost estimates is the cost of storing any EM data submitted by the service providers or sectors. NMFS data storage costs would be driven by record-keeping and security requirements for EM data, which NMFS is still working to determine. Alternately, NMFS may be able to get remote access to EM data and video stored by the provider, and reduce or eliminate its data storage costs (Van Oyen, pers. comm., 2014).

**TABLE 3: NMFS COST RESPONSIBILITIES FOR ELECTRONIC MONITORING PROGRAMS**

	<b>Estimated NMFS Cost Responsibilities for Audit and Optimized/Full Retention EM program models</b>		
	<b>Audit Model</b>		<b>Optimized/Full Retention Model</b>
<b>Program Component</b>	<b>20 vessels</b>	<b>400 vessels</b>	<b>9 vessels</b>
<b>EM Reviewer Training</b>	\$25,000	\$187,500 - \$250,000	\$12,500
<b>VMP Approval, Inspections</b>	\$31,000	\$232,500 - \$310,000	\$15,500

<b>EM Review Audit</b>	\$46,795	\$423,405 - \$525,905	\$26,295
<b>Program Management</b>	\$86,000	\$86,000	\$86,000
<b>Total</b>	\$188,795	\$929,405 - \$1,171,905	\$140,295

*Industry Costs for NEFOP-level observers and FMP-specific at-sea monitors.* 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 tables 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 the period from October 2012 through May 2014 and are averaged across the three service providers.

**TABLE 4. INDUSTRY COST RESPONSIBILITIES FOR NEFOP AND AT-SEA MONITORING**

<b>Industry Cost Responsibilities</b>	<b>NEFOP-level observer cost per observed sea day (FY2013)</b>	<b>Fishery Specific At-sea monitoring cost per sea day</b>
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 Travel: \$71/day Meals: \$22/day Other non-sea day charges: \$12/day	Sea day charge paid to providers: \$561/day Travel: \$67/day Meals: \$18/day Other non-sea day charges: \$14/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	Training: \$50/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	TBD – won't know these costs until an industry funded observer coverage program is implemented in a fishery
<b>Total (not including other costs)</b>	<b>\$818/day</b>	<b>\$710/day</b>

Additional estimates for industry contributions for NEFOP-level observer coverage and the groundfish at-sea monitoring program were provided in the Fisheries Monitoring Roadmap (Lowman et al., 2013).

This report based the estimated costs on the 2011 fiscal year. For 2011, the industry cost for NEFOP-level coverage was estimated at \$917 per sea day, and the industry cost groundfish at-sea monitoring was estimated at \$847 per sea day. These additional estimates are provided to highlight the inter-annual variability in the sea day estimate for NMFS and industry costs, as outlined in the introduction (Section 1.0).

*Industry cost responsibilities for dockside monitoring.* The industry costs of a dockside monitoring program are generally broken into several components: Program management and overhead costs of the provider company; travel costs for the monitor to travel from home or office to offload port, for non-principle ports; and hourly salary for the monitor, including, in some instances, waiting time at the dock.

A number of example industry costs for dockside monitoring are presented below. Dockside monitoring costs can be represented in three ways: 1) as a cost per sea day; 2) as a cost per landing event; and 3) as a cost per pound landed. The paragraphs below will discuss the different available estimates of dockside monitoring costs using each of these representations, and the pros and cons of each representation.

- **Cost per sea day** – This document uses a cost estimate of \$106 per sea day based on publicized estimates for other dockside monitoring programs. In particular, the estimate is influenced by the industry costs for the NE Multispecies dockside monitoring program. The Fisheries Monitoring Roadmap (Lowman et al., 2013) provides per sea day rates of \$51 and \$82 for dockside monitoring for the British Columbia Hook and Line Groundfish fishery and the Pacific Groundfish (non-whiting) IFQ fishery, respectively. The “cost per sea day” representation makes the cost of dockside monitoring easy to compare against industry costs for at-sea and electronic monitoring. However, this representation of dockside monitoring costs implies that costs scale linearly with trip length, which does not accurately represent dockside monitoring costs. For example, if we assume the cost for monitoring is \$106 per sea day, then a 3 day trip would cost \$318 and 10 day trip would cost \$1,060 to monitor. However, a 10-day trip could come back with its hold only half full with fish, or a 3-day trip could come back with a full hold. In this example, the 3-day trip with the full hold would actually cost more to monitor than the 10-day trip.
- **Cost per landing event** - The average cost per landing event for the NE Multispecies groundfish dockside monitoring program ranged from \$36.87-\$212.32 for all sectors. Though this range is a more accurate representation of costs than the cost per sea day representations, it is not easy to compare against industry costs for at-sea and electronic monitoring.
- **Cost per pound of fish landed** – The analysis assumes the cost per pound landed for each specific FMP is the most accurate way to represent the potential industry costs for monitoring. The average cost per pound of groundfish landed for the NE Multispecies groundfish dockside monitoring program range ranged from \$0.006-\$0.12 per pound for all sectors. The average cost per pound landed and per trip is inversely related to the average pounds landed – that is, larger trips are less expensive to monitor, by pound, than smaller trips. This was due to several

factors, including that larger trips typically landed in a principle port (no roving monitor required and, depending on the location, no travel costs) and much of the cost of providing a monitor is fixed, due to the logistics of having monitors present while vessels land their catch (e.g., insurance, administrative costs). The analysis uses estimated a cost of \$0.002 per pound of herring landed, based on state dockside monitoring programs for herring, to analyze the economic impacts of Herring Alternative 2.3 and 2.4 and Mackerel Alternative 2.3 and 2.4.

*Industry cost responsibilities for electronic monitoring.* Portions of the discussion that follows were originally included in the March 2015 version of the Environmental Assessment for the Omnibus Standardized Bycatch Reporting Methodology Amendment. The description of costs and costs responsibilities below is generalized to encompass a range of potential program designs.

The economic impacts associated with the alternative to implement an electronic video monitoring program for one or more fisheries in the Greater Atlantic Region are derived directly from the expected costs to purchase, install, and maintain the electronic monitoring systems. Industry would be required to purchase, install, and maintain the electronic monitoring equipment aboard their vessels.

Based on cost estimates as of May 2006, it is likely that the cost to purchase a complete electronic video monitoring system would be approximately \$7,200 per vessel (Archipelago Marine Research, Ltd. 2006).<sup>1, 2</sup> Installation costs are highly variable and depend upon the size of the vessel, the number of cameras to be installed, and other complicating factors such as the need to retrofit the vessel to support the installation of the equipment. Kinsolving (2006) estimates installation costs as ranging from \$650 to \$4,225 per vessel, based on a service rate of \$65 per hour and the installation time ranging from 10 hours to as many as 65 hours per vessel, depending on the aforementioned complexity. In addition to the cost to purchase and install a system, it is expected that an annual registration fee would be required by the contractor providing the equipment and this is estimated to be approximately \$600 per year. Maintenance costs would be expected to vary, but for the purposes of analysis, Kinsolving's (2006) estimate of \$975 per year is used. The total first year costs would be approximately \$10,200 per vessel, with continuing costs of approximately \$1,600 per vessel per year for the second year and beyond (see **Error! Reference source not found.**).

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<sup>1</sup> Archipelago Marine Research, Ltd. (2006), identifies the costs to purchase, install, and maintain a complete electronic monitoring system. While this fee schedule is focused on the British Columbia groundfish longline fisheries, the costs identified are presumed to be transferable to other fisheries. Published costs in Canadian dollars were converted to U.S. dollars based on the published exchange rate for September 7, 2006.

<sup>2</sup> Kinsolving (2006) also provides estimates of the cost to purchase a complete electronic monitoring system, ranging from \$4,250, if off-the-shelf components are used, to \$8,000 if a package system is purchased from an approved contractor. For the purposes of this analysis, the costs published by Archipelago Marine Research, Ltd. (2006), were used to simplify the analysis and to clearly identify the source of the costs used.

**TABLE 5. ESTIMATED COSTS PER FISHING VESSEL TO PURCHASE, INSTALL, AND MAINTAIN AN ELECTRONIC VIDEO MONITORING SYSTEM (ARCHIPELAGO MARINE RESEARCH, LTD. 2006; KINSOLVING 2006).**

	Year 1 (per vessel)	Year 2+ (per vessel)
Equipment purchase	\$7,194	N/A
Installation costs (average)	\$2,438	N/A
Annual program registration fee	\$608	\$608
Annual maintenance	N/A	\$975
<b>Total</b>	<b>\$10,240</b>	<b>\$1,583</b>

The information presented above and in **Error! Reference source not found.** provide an estimate of the per vessel costs of implementing an industry-funded electronic monitoring requirement. The next step is to estimate the number of affected vessels within the fisheries for which this alternative would be considered.

The costs discussed above address only the purchase, installation, and annual maintenance of the electronic video monitoring systems, but do not address the costs associated with extracting the data from the video recording systems, or storing, maintaining, editing, and reviewing the data.

Agency or contractor personnel would be required to obtain the video data from fishing vessels (either through dockside extraction or a mail-in hard drive exchange program), to review the video footage in order to document discard events, to oversee and perform quality control on the extracted data, and to archive and maintain the data. Video reviewing and data archiving equipment would also be required. Kinsolving (2006) estimates that data storage systems would be required to support approximately 20 terabytes of data per year, but this was an estimate solely for the Pacific rockfish pilot program, which has a fleet of approximately 25 vessels (consolidating to 18 active vessels) that make an average of seven fishing trips per year, with trips averaging 3 days each. Therefore, extrapolating to determine the data storage needs were this program implemented in the Greater Atlantic Region would most likely be orders of magnitude greater.

*Potential Industry Cost Saving with Electronic Monitoring and Portside Monitoring.* For both electronic monitoring and portside monitoring it is difficult to predict whether and/or how costs may change if industry is contracting directly with providers (versus the federal government contracting with providers). General program overhead/management is a substantial part of the costs and it is difficult to know whether these costs will be reduced when industry is contracting with providers, and if so how much. Based on the amount of coverage/monitoring several potential cost savings have been identified however, as described below. It is also important to remember that all of these cost figures (including the original values) are estimates, and may be higher or lower than actual costs once implemented.

#### Electronic Monitoring

Based on “A Cost Comparison of At-Sea Observers and Electronic Monitoring for a Hypothetical Midwater Trawl Herring/Mackerel Fishery.”

[https://www.greateratlantic.fisheries.noaa.gov/stories/2015/september/em\\_cost\\_assessment\\_for\\_gar\\_herring\\_150904\\_v6.pdf](https://www.greateratlantic.fisheries.noaa.gov/stories/2015/september/em_cost_assessment_for_gar_herring_150904_v6.pdf)

100% recording, 100% Review: **\$325**

Haulback Recording Only, 100% Review: **\$248** - Reduction: \$78 of the \$160 data services cost (49%).  
 $[(325 - (.49 * 160)) = (325 - 78) = \$248]$ . \$82 of data services costs remaining.

Haulback Recording Only, 50% Review: **\$218** - \$61 is the cost for haulback review, so if only half of the trips are reviewed, this would save about another \$30.  $[(248 - (61/2)) = (248 - 30.5) = \$218]$

Field Services are \$78/day, and "Field services costs are largely driven by the frequency of hard drive retrievals from the vessel, and the associated travel and labor costs." "Repair and technical support needs also drive field services costs." However, the document also states that repair and technical support costs were low because it was believed that minor problems could be addressed during data retrieval. If 25% of costs were repair and technical support but this amount doubled due to additional single purpose technical support trips, an overall 40% savings from mailing hard drives appears reasonable. 40% of \$78 = \$31. Saving \$31 would reduce the overall cost to around **\$187** per seaday.  
 $[(218 - 31) = \$187]$

### Portside Monitoring

The Portside Monitoring cost estimate is \$5.12/mt, but this includes administration costs that have been borne by the State of Massachusetts, and could be paid for by NMFS (subject to funds being available to run such a program). For NEFOP observers, the administrative cost for NMFS is approximately 37% (\$479 NMFS cost \$818 at-sea industry cost - <http://s3.amazonaws.com/nefmc.org/150929-NEFMC-Meeting-Presentation-without-notes.pdf>, slide 32). If one assumes that 25% or 33% of these costs would not be directed at vessels (conservatively less than 37%), the cost for vessels per mt would be \$3.84/mt and \$3.41/mt respectively.

If only 50% of trips were sampled, while any particular trip might still have to pay \$3.84/mt or \$3.41/mt, over the course of a year it should reduce average costs to \$1.92/mt or \$1.71/mt. The table below describes the total costs for trips landing different amounts of fish, and daily costs assuming a 3-day trip.

	25% Admin		33% Admin	
Full Cost	\$5.12	Per day cost with 3/day trip	\$5.12	Per day cost with 3/day trip
Cost less Admin	\$3.84		\$3.41	
50% Coverage	\$1.92		\$1.71	
100 mt trip cost	\$192		\$171	
200 mt trip cost	\$384	\$128	\$341	\$114
300 mt trip cost	\$576	\$192	\$512	\$171
400 mt trip cost	\$768	\$256	\$683	\$228

Table 6 summarizes the ways that sea day costs can be minimized reduced in an industry-funded monitoring program. The discussion provided in Table 6 was generated from information provided by NEFOP personnel, observers, and representatives from service providers in the northeast and west coast. To the extent that the issues identified in Table 6 can be addressed through the management



measures that establish/implement the IFM program, sea day costs borne by the fishing industry can be reduced.

**TABLE 6 SUMMARY DISCUSSION – HOW TO REDUCE SEA DAY COSTS**

How to Reduce Sea Day Costs	Discussion/Rationale
<b>Build from existing observer sampling protocols; do not require new/different data to be collected</b>	<ul style="list-style-type: none"> <li>Collecting data in a new/different way will require modifications to existing observer sampling protocols and training procedures, new/revised manuals/logs, possibly new/additional sampling equipment, and database design or restructure; this could increase administrative and training costs</li> </ul>
<b>Eliminate SCA and related regulatory requirements for Federal contracts</b>	<ul style="list-style-type: none"> <li>Federal requirements for wage structure/overtime/paid holidays/vacation are not necessary for contracts between vessels/providers; without specifically implementing these requirements as part of the IFM regulations, wage structure and benefits for employees would be determined by individual service provider companies; MRAG report (June 2012) estimates that eliminating these requirements may reduce costs by \$50-\$100 per sea day;</li> <li>FLSA and other Federal labor laws would still apply to service provider companies; however, eliminating the SCA requirements from IFM regulations is likely to result in some reduction in sea day cost;</li> <li>Not likely to result in \$100 per sea day cost savings in this region due to existing pay structure/benefits for observers required by Federal contracts</li> </ul>
<b>"Grandfather in" current service providers approved for NEFOP observer coverage and GF ASM programs – approve these providers immediately for any new, fishery-specific ASM program</b>	<ul style="list-style-type: none"> <li>Reduces expense of applying/re-approving service provider companies already approved for other programs in the region; observers/monitors for approved service providers would still need to be certified for existing monitoring programs to participate as fishery-specific at-sea monitors;</li> <li>Allows vessels to select from multiple service providers when program is established; increases negotiating opportunities for vessels at onset of program by creating competition between companies;</li> <li>Provides opportunity for existing service providers to offer more work days to their observers (could reduce staff/overhead expenses for both programs)</li> </ul>
<b>Allow cross-certification of NEFOP and GF ASM observers for new, fishery-specific ASM programs; combine/overlap training and recertification whenever possible</b>	<ul style="list-style-type: none"> <li>Cross-training and applying training courses to multiple certifications reduces training costs (travel, hotel, per diem for service providers);</li> <li>Reduces equipment costs for service providers – no need to purchase duplicative equipment</li> <li>As previously noted, this may reduce overhead costs for service providers by providing their observers with a greater number of days to work (improving ability for service providers to retain full-time employees)</li> </ul>

Table 6 continued. Summary Discussion – How to Reduce Sea Day Costs

How to Reduce Sea Day Costs	Discussion/Rationale
<b>Provide detailed information about fishing patterns for vessels participating in the industry-funded monitoring program</b>	<ul style="list-style-type: none"> <li>• Allows providers to more accurately estimate manpower/resources needed, logistics, overhead, and travel costs - reduces need for providers to over-estimate these costs to cover expenses that cannot be predicted prior to the start of the year;</li> <li>• Increases predictability of fishery for observer/monitor deployment;</li> <li>• Increases efficiency for service providers</li> </ul>
<b>Minimize observer deployment logistics</b>	<ul style="list-style-type: none"> <li>• Simplifying the selection process for vessels/trips that require industry-funded observers/monitors reduces costs for service providers because vessel selection/notification would not require additional staff or resources</li> </ul>
<b>Allow industry to negotiate less significant costs with providers</b>	<ul style="list-style-type: none"> <li>• Structure the provisions in the industry-funded monitoring program to allow the industry to negotiate as many minor costs as possible with service providers, to better meet their individual vessel needs circumstances;</li> <li>• These may include costs for trip cancellations and no-shows, meal reimbursements, partial day/hourly billing (see below), land-hour rates (if necessary), or other costs</li> </ul>
<b>Encourage service providers/industry to negotiate billing by partial days (versus 24 hour days)</b>	<ul style="list-style-type: none"> <li>• Sea scallop regulations 648.11(g)(5)(i)(A)(2) state that "For the purposes of determining a daily rate...a service provider may charge a vessel owner for not more than the time an observer boards a vessel until the vessel disembarks (dock to dock), where a day is defined as a 24-hour period, and portions of other days would be pro-rated at an hourly charge."</li> <li>• Industry participants should be aware that this can be negotiated in contracts with providers; may be an opportunity to reduce sea day costs for some vessels depending on fishing operations;</li> <li>• Consideration should be given to the possibility of land hour time for observers/monitors, which may be necessary if days are billed partially or by the hour</li> </ul>
<b>Allow observers to be deployed on the same vessel for more than two consecutive multi-day trips, and more than twice in any given month for multi-day deployments</b>	<ul style="list-style-type: none"> <li>• Prohibited in current regulations for industry-funded observer coverage, implemented in SBRM amendment</li> <li>• Increases flexibility and reduces travel costs for service providers; appears to be consistent with regulations for Groundfish ASM</li> </ul>

Table 6 continued. Summary Discussion – How to Reduce Sea Day Costs

How to Reduce Sea Day Costs	Discussion/Rationale
<b>Encourage vessels in close proximity to negotiate contracts together so that they can utilize the same observers and minimize travel expenses</b>	<ul style="list-style-type: none"> <li>Industry can reduce costs by collaborating with vessels that fish from same ports and/or during same seasons to reduce travel and related costs for observers/monitors</li> </ul>
<b>Streamline debriefing and re-certification requirements</b>	<ul style="list-style-type: none"> <li>Reduces costs to service providers (travel/per diem)</li> </ul>
<b>Insurance</b>	<ul style="list-style-type: none"> <li>There may be ways to reduce/streamline insurance requirements to reduce costs for providers. To the extent that duplicative or redundant insurance requirements can be eliminated, costs can be reduced. This issue requires further investigation.</li> </ul>
<b>Combine the IFM programs for multiple fisheries, when appropriate</b>	<ul style="list-style-type: none"> <li>Would reduce complexity (PTNS, deployment, travel) and increase efficiency for service providers; increases number of sea days for amortizing travel/training expenses over the year;</li> <li>Could increase the total number of work days available for ASM-certified observers/monitors and may reduce staff/overhead costs for service providers</li> </ul>

*Cost drivers for electronic monitoring.* There are a number of variables in the design of an electronic monitoring program. The text below briefly summarizes some of the program specifications related to data submission, video review, video audit, and data storage that can reduce the industry contribution for electronic monitoring programs.

#### Data Submission

- Allow the hard drives that store EM footage to be submitted by mail, rather than requiring them to be retrieved by a technician.
- For fisheries that have dockside monitoring programs in addition to EM, consider having dockside monitor retrieve/transmit hard drives.

#### Video Review

- Design a random sampling program to select trips or portions of trips (i.e., around haulback on herring and mackerel trips) from which video would be reviewed.
- For audit approaches, specify an assumed discard rate in lieu of additional video review in the instances where the EM validation fails.
- Documentation of discards at the species level, including identifying and counting the fish and measuring the length of the fish, for only a few species of interest (e.g., only species in the NE multispecies complex on groundfish trips).
- Software solutions may be able to automate review of portions of video footage.

### Data storage

- Allow video data to be stored in the “cloud” (as permitted within security and data confidentiality regulations).
- Determine the lowest possible frame rate and image resolution necessary to document the activity of interest for the EM program. Slow activities such as identifying large objects in a pile of fish being sorted, requires more frames per second. The higher the frame rate, the more likely it is that the camera will capture detailed information. Similarly, identifying fish to species requires higher resolution than verifying when fishing gear is deployed. Higher frame rate and resolution results in larger video files and requires additional storage requirements.



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## Herring and Mackerel Vessel Annual Cost Survey for 2014



**Thank you very much for participating in this important survey!**

**The questions in this survey relate to the following vessel only:**

**[Vessel name]**

**Coast Guard Documentation or State Registration Number: [12345678]**

**Your responses and participation in this survey are**

**CONFIDENTIAL**

*Photo credit: Lisa Colburn, NOAA Fisheries*

**Completed surveys should be mailed to:**

**Jason Didden**

**Mid-Atlantic Fishery Management Council**

**800 North State Street, Suite 201**

**Dover, DE 19901-3910**

## General Instructions:

- **This survey is about your costs in 2014 for the vessel identified in this survey.** In your answers, include combined costs for all state and/or federal fisheries for this vessel in 2014, including costs incurred while the vessel was inactive.

**Please note that all responses are completely confidential.**

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### **Section A: Vessel Information**

This section is only about the vessel identified in this survey. **All costs requested are for 2014.**

**1. Ownership type for this vessel (*check one*):**

- ☐ Sole proprietorship
- ☐ General partnership
- ☐ Limited partnership
- ☐ C Corporation
- ☐ S Corporation
- ☐ Limited Liability Company (LLC)
- ☐ Other \_\_\_\_\_

**2. Number of owners, including yourself:** \_\_\_\_\_

**3. Was this vessel acquired from a previous owner or was it bought new (*check one*)?**

- ☐ Acquired from a previous owner
- ☐ Purchased New

**4. In what calendar year did you become the owner of the vessel?** \_\_\_\_\_

**5. What port did this vessel operate from most of the time during 2014?**

\_\_\_\_\_

## **Section B: Repair/Maintenance/Upgrade/Improvements Costs**

**6a. Was this vessel hauled out in 2014 for any reason?** (Possible reasons include regular repair and maintenance, emergency haul-out, long term storage, etc.)

- ☐ Yes  
☐ No [please go to 6c]

**6b. What were the haul-out costs in 2014, including taking the vessel out of the water and any transportation?** (*Do not include any repair/maintenance costs – we'll ask you for them in question 7.*)

Haul out cost in 2014: \$ \_\_\_\_\_

**6c. How often do you usually haul-out this vessel?**

- ☐ Every year  
☐ Every other year  
☐ Every \_\_\_\_ years  
☐ Every \_\_\_\_ months  
☐ Other (please describe) \_\_\_\_\_

**7. What were your repair/maintenance and upgrade/improvement costs for this vessel in 2014? Include the cost of any tools and equipment you may have purchased. If you did not have any expenses in 2014, then check \$0.**

*We know that these kinds of costs may vary significantly year to year. However, **this survey is about 2014 expenses only.***

\$ \_\_\_\_\_

☐ \$0

**If you are able to provide a breakdown of these total repair/maintenance and upgrade/improvement costs, please do so in the following table. Otherwise, skip to question #8.**



7.	<i>Do not include vessel haul-out costs reported above in question 6b.</i>	
<b>Expense Category</b>	<b>Repair/Maintenance/Upgrades/Improvements, 2014</b>	
<b>Propulsion Engine</b> (such as engine, drive train, exhaust/cooling systems)	<div style="text-align: right;">\$ _____</div> <div style="text-align: right;"><input type="checkbox"/> \$0</div>	
	<b>Description:</b>	
<b>Deck Equipment/ Other Machinery</b> (such as winches, haulers, generators, hydraulics, compressors, reels, pumps)	<div style="text-align: right;">\$ _____</div> <div style="text-align: right;"><input type="checkbox"/> \$0</div>	
	<b>Description:</b>	
<b>Hull</b> (such as frame, deck, wheelhouse, keel, steering, rigging, fish holds, fuel tanks)	<div style="text-align: right;">\$ _____</div> <div style="text-align: right;"><input type="checkbox"/> \$0</div>	
	<b>Description:</b>	
<b>Fishing Gear</b> (such as codends, nets/panels, dredges, buoys, highfliers, doors, pots/traps, cables)	<div style="text-align: right;">\$ _____</div> <div style="text-align: right;"><input type="checkbox"/> \$0</div>	
	<b>Describe Upgrade/Improvement:</b>	

7.	<i>Do not include vessel haul-out costs reported above in question 6b.</i>	
<b>Expense Category</b>	<b>Repair/Maintenance/Upgrades/Improvements, 2014</b>	
<b>Wheelhouse and Electronics</b> (such as Radar, GPS, VMS, sounder, radio, depth/temperature/net sensors)	\$_____ <input type="checkbox"/> \$0	
	<b>Describe Upgrade/Improvement:</b>	
<b>Processing/ Refrigeration</b> (such as RSW, packaging equipment, icemaker)	\$_____ <input type="checkbox"/> \$0	
	<b>Describe Upgrade/Improvement:</b>	
<b>Safety Equipment</b> (such as EPIRB, rafts, fire extinguishers, flares, survival suits)	\$_____ <input type="checkbox"/> \$0	
	<b>Describe Upgrade/Improvement:</b>	
<b>Other Repair/maintenance or upgrade/improvement:</b>	\$_____ <input type="checkbox"/> \$0	
	<b>Describe Upgrade/Improvement:</b>	

## Section C: Vessel Related Costs

**8. For each expense category listed in the table below, please enter the total amount spent in 2014 for this vessel (and average per day cost for crew and hired captain). If you did not have an expense in 2014, then check \$0.**

<p><b><u>Mooring/Dockage Fees</u></b> for this vessel in 2014 (including upkeep expenses):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0</p>	<p><b><u>Permit and/or License fees</u></b> for this vessel in 2014:</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0</p>
<p><b><u>Vessel insurance premium</u></b> in 2014 for this vessel (premium paid for either hull or P &amp; I insurance):</p> <p>\$ _____</p> <p>Number of months insured: _____</p> <p><input type="checkbox"/> \$0</p>	<p><b><u>Quota or DAS lease payments</u></b> in 2014 for this vessel (if non-monetary payments were used to obtain quota or DAS, please estimate the value of those non-monetary payments):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0</p>
<p><b><u>Total payments to crew and hired captain</u></b> in 2014 for this vessel only:</p> <p>Crew: Annual \$ _____ Avg per day \$ _____</p> <p>Hired Cpt: Annual \$ _____ Avg per day \$ _____</p> <p><b><u>(Do not include</u></b> what you earn when you are the captain)</p> <p><input type="checkbox"/> \$0</p>	<p><b><u>Crew benefits</u></b> for this vessel in 2014 (the cost to you, as the vessel owner, for providing retirement benefits; health, life, or disability insurance premiums; and unemployment insurance for your <u>crew and hired captain</u>):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0</p>
<p><b><u>Vessel Activity/Quota Monitoring Cost</u></b> for this vessel in 2014 (such as observer or dockside monitoring cost):</p>	<p><b><u>Other costs</u></b> for this vessel in 2014:</p> <p><i>Describe:</i></p> <p>_____</p>

\$ \_\_\_\_\_

☐ \$0

\$ \_\_\_\_\_

☐ \$0

## **Section D: Operating Costs**

**9. For each expense category listed in the table below, please enter the total amount spent in 2014 for this vessel, including all payments made by you and/or the crew. Also please enter the average cost per day.**

- If nothing was spent in a category, please check \$0.
- We are aware that these kinds of costs may vary significantly from year to year. Please bear in mind that this survey is about 2014 expenses only.

<p><b><u>Fuel/oil/filter</u></b> for this vessel in 2014:</p> <p>Annual \$_____ Avg per day \$_____</p> <p><input type="checkbox"/> \$0 <input type="checkbox"/> I Don't Know</p>	<p><b><u>Food and Drinking Water</u></b> for this vessel in 2014:</p> <p>Annual \$_____ Avg per day \$_____</p> <p><input type="checkbox"/> \$0 <input type="checkbox"/> I Don't Know</p>
<p><b><u>Ice</u></b> for this vessel in 2014:</p> <p>Annual \$_____ Avg per day \$_____</p> <p><input type="checkbox"/> \$0 <input type="checkbox"/> I Don't Know</p>	<p><b><u>Carrier vessel fees</u></b> for this vessel in 2014:</p> <p>Annual \$_____ Avg per day \$_____</p> <p><input type="checkbox"/> \$0 <input type="checkbox"/> I Don't Know</p>
<p><b><u>Fresh Water</u></b> for use in this vessel in 2014:</p> <p>Annual \$_____ Avg per day \$_____</p> <p><input type="checkbox"/> \$0 <input type="checkbox"/> I Don't Know</p>	<p><b><u>Communication Costs</u></b> for this vessel in 2014 (such as cell phones, radio, VMS etc.): <i>Do not include office phone use.</i></p> <p>Annual \$_____ Avg per day \$_____</p> <p><input type="checkbox"/> \$0 <input type="checkbox"/> I Don't Know</p>
<p><b><u>General Fishing Supplies</u></b> for this vessel in 2014 (such as knives, picks, hooks, boxes, bags, ties, lobster bands, rags, tape, links/rings, lines/twine, etc.):</p> <p>Annual \$_____ Avg per day \$_____</p> <p><input type="checkbox"/> \$0 <input type="checkbox"/> I Don't Know</p>	<p><b><u>General Crew Supplies</u></b> for this vessel in 2014 (such as gloves, boot liners and foul-weather gear):</p> <p>Annual \$_____ Avg per day \$_____</p> <p><input type="checkbox"/> \$0 <input type="checkbox"/> I Don't Know</p>
<p><b><u>Catch Handling Costs</u></b> for this vessel in 2014 (such as auction, lumping, pumping,</p>	<p><b><u>Other Costs</u></b> for this vessel in 2014: <i>Describe:</i>_____</p>

grading, shipping and sales rep):			
Annual \$ _____	Avg per day \$ _____	Annual \$ _____	Avg per day \$ _____
<input type="checkbox"/> \$0	<input type="checkbox"/> I Don't Know	<input type="checkbox"/> \$0	<input type="checkbox"/> I Don't Know

### **Section E: Typical Crew Payment System**

**10a. Did you hire a captain for the majority of this vessel's trips in 2014, or were you the captain for most trips?**

- ☐ Mostly Owner-operated  
☐ Mostly Hired Captain  
☐ Other \_\_\_\_\_

**10b. On average, how many crew were on this vessel when it went out in 2014?  
DO NOT COUNT YOURSELF OR THE CAPTAIN.**

\_\_\_\_\_ Average number of crew members, not including you or the captain, in 2014

- If you answered 0 (you had no crew in 2014), SKIP TO QUESTION 11
- If your answer was > 0 (you had crew in 2014), please CONTINUE WITH QUESTION 10c

**10c. Please use the diagram on the next page to list the types of expenses that were normally taken out of gross revenue, crew's share, and captain's share in 2014.**

**You do not need to list the dollar amounts. Just list the *types* of expenses deducted (for example: "fuel" "ice" "food").**

Diagram is on  
the next page

***NOTE: If the diagram below is not appropriate for your settlement system, please describe your system on the next page.***

GROSS REVENUE

EXPENSES YOU DEDUCT BEFORE ANY DISTRIBUTION (list the types of expenses only, not the amount):

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Boat's percentage + Crew's percentage + Captain's percentage = 100%

BOAT'S PERCENTAGE:   \_\_ \_\_ %

CREW'S PERCENTAGE :   \_\_ \_\_ %

EXPENSES YOU DEDUCT FROM CREW'S PERCENTAGE (list the types of expenses only, not the amount):

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CAPTAIN'S PERCENTAGE:   \_\_ \_\_ %

EXPENSES YOU DEDUCT FROM CAPTAIN'S PERCENTAGE (list the types of expenses only, not the amount):

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**If the diagram displayed on the previous page is not appropriate for your crew payment, then please describe your crew payment system in the space below:**



**10d. Please list the *types* (not the cost) of items crew members purchase for themselves.**

Examples include: “food on day boats”, “foul weather gear”, “gloves”, etc.  
(These expenses would NOT be included in the diagram above.)

_____	_____
_____	_____
_____	_____

## Section F: Overall Business Cost

**11a. Including the vessel listed in this survey, how many vessels did your fishing business operate or maintain in 2014?**

\_\_\_\_\_ vessel(s) operated or maintained in 2014

**11b. For each expense category listed below, please enter the amount spent for either all your vessels or just this vessel in 2014. Indicate by checking the appropriate box. If you did not spend anything on that expense category in 2014, please check \$0.**

<p><b><u>Workshop/Storage Expenses</u></b> for 2014 (such as gear shed rental and workshop expense):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>	<p><b><u>Office Expenses</u></b> for 2014 (such as office supplies, office rental, home office, office utilities (such as electric, heat, etc.), postage photocopying, computer and office phone use, excluding <b><u>communication costs</u></b>):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>
<p><b><u>Business Vehicle Usage Costs</u></b> for 2014 (for fishing business related purposes only; such as number of miles the vehicle was used for business multiplied by a standard mileage rate):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>	<p><b><u>Business Travel Costs</u></b> for 2014 (such as cost of lodging, travel, and transportation for business associated travel <b><u>excluding business vehicle costs</u></b>):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>
<p><b><u>Association Fees Paid</u></b> in 2014 (such as co-operative, fishing organization, sector fees and union dues):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>	<p><b><u>Professional Fees Paid</u></b> in 2014 (such as settlement, accounting, and legal fees):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>
<p><b><u>Principal Paid on Business Loans</u></b> for 2014 (enter only payments made, <i>not</i> amount owed):</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>	<p><b><u>Interest Paid on Business Loans</u></b> for 2014:</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>
<p><b><u>Taxes paid (income, property, etc.)</u></b> for 2014:</p> <p>\$ _____</p> <p><input type="checkbox"/> \$0    <input type="checkbox"/> for all vessels    <input type="checkbox"/> for this vessel only</p>	<p><b><u>Non-Crew Labor Services</u></b> for 2014 (such as night watchman, shore engineer, and office secretary):</p> <p>\$ _____</p> <p>Describe: _____</p>

☐ \$0     ☐ for all vessels     ☐ for this vessel only

**Section G: Other Costs and Earnings**

**12. Did you have any other costs in 2014 that we have not asked about in this survey? If so, please list them below. (Please do not report your personal costs).**

**Other costs for the identified vessel only:**

Cost	Description of other annual costs incurred in 2014
\$ _____	_____
\$ _____	_____

**Other costs for your entire business:**

Cost	Description of other annual costs incurred in 2014
\$ _____	_____
\$ _____	_____

**13. Please record the total gross revenue from all activities generated by this vessel in 2014.**  
*(Note: Although we collect revenue information from the dealer reporting system, this question is for cross-checking our record in order to improve our overall data quality.) :*

Gross revenue from commercial trips: \$\_\_\_\_\_

Gross revenue from non-commercial trips (e.g. charter trips): \$\_\_\_\_\_

☐ \$0 (this vessel was inactive during 2014)

**15. In the following table, Please record the number of days this vessel spent in each fishery in 2014. Be as specific as possible in the fishery description noting things such as gear type, target species, fishing region, etc.**

<u>Fishery Description</u> <u>(gear/species/region)</u>	<u>Number of Days in 2014</u>

Thank you for your response! Please use the space below for comments.

## APPENDIX 4 -- ATLANTIC HERRING ALTERNATIVE ECONOMIC IMPACTS ON HERRING FISHING BUSINESSES

### Impact Analysis Methods

Four types of industry-funded monitoring for the herring fishery are being considered: Northeast Fisheries Observer Program (NEFOP) level observer, at-sea monitor (ASM), Electronic Monitoring (EM), and portside sampling (PS) coverage. NEFOP-level and at-sea monitoring coverage would function independently, but EM and portside are intended to be used together.

### **MONITORING COSTS TO INDUSTRY**

<b>Types of Monitoring</b>	<b>NEFOP-Level Observer</b>	<b>At-Sea Monitor</b>	<b>Electronic Monitoring</b>	<b>Portside Sampling</b>
<b>Industry Cost Responsibility</b>	\$818 per seaday	\$710 per seaday	Year 1: \$15,000 one-time set up cost then \$325 (also \$187) per seaday Year 2: \$325 (also \$187) per seaday	\$0.0023 per lb (\$5.12 per mt) and at \$0.00174 per lb (\$3.84 per mt)

Trips that occurred in 2014 were used to estimate the likely future impacts of the herring alternatives. This is the most recent year for which data is available and 2014 activity should represent what is likely to occur in future years in terms of the vessels participating in the fishery, the condition of the stock, the regulatory environment, and fishing methods. Each alternative has different criteria for defining which types of trips would be monitored (based on permit type, gear used, etc.). Trips from 2014 that met these criteria were evaluated in terms of how the monitoring costs impacted annual returns to owner (see below for description of how return-to-owner (RTO) was calculated). If an alternative specified 100% coverage, then the monitoring costs that would have been paid for all trips occurring in 2014 were calculated and assessed in terms of impacts to RTO. For alternatives that have options with less than 100% coverage, trips from the pool of 2014 trips were randomly selected until the coverage target was met. This was repeated 1,000 times for each trip selection simulation. Mean annual ASM/NEFOP costs per vessel are then calculated from the simulated trip selections.

Vessels were assigned a major gear type based on the gear that earned the greatest revenue (from all species landed) among the trips selected for evaluation (according to the criteria in the alternative). It is not necessarily the major gear for the year for a particular vessel.

In the tables, any information that pertains to amounts of revenue from various species and numbers of days at sea and trips are for the trips that met the criteria under each of the alternatives only, not for the year.

### Return-to-Owner

A previous analysis of economic impacts of herring and mackerel coverage target alternatives was based on trip cost data collected by the NEFOP and showed the economic impact of the alternatives on vessel net revenues (gross revenues less trip costs). Because NEFOP only collects a limited amount of cost data, industry participants expressed concern that net revenue estimates used in the previous economic analysis underestimated vessel costs. In response, Jason Didden, staff of the Mid-Atlantic Council, offered to survey herring and mackerel vessels to collect more detailed cost information.

The survey requested information from vessel owners on total trip costs in 2014. The cost survey collected information on variable trip costs, the cost of repairs/maintenance/upgrades/haulout, fixed costs, and payments to crew. These data were used to update the impact analyses. If the vessel owner completed a survey then that vessel's actual costs were used in the analysis. Otherwise, respondent data were used to project costs on other vessels that did not provide a survey response. To do this, responses from the surveys were categorized by the annual primary species caught based on value. Two categories were used: herring/mackerel vessels and squid vessels. For each of these vessel types, costs were assigned into one of four categories: variable costs, crew share, repair/maint/upgrades/haulout, and fixed costs. Average percentages of annual gross revenue by cost category and vessel type were used to estimate costs for vessels that did not have survey data. See table below for cost category descriptions and average percentages of gross revenue.

Surveys were sent to approximately 18 vessel owners (representing about 26 vessels) in the herring and/or mackerel fisheries. Surveys were sent in May 2015 and information was submitted for 16 of the 26 vessels.

Cost category	Description	Average percent of gross revenue	
		Herring/ mackerel vessels	Squid vessels
<b>Variable costs</b>	Annual fuel, oil, food, water, ice, carrier vessel, communication, fishing supplies, crew supplies, and catch handling costs	25%	35%
<b>Crew share</b>	Total annual payments to crew	28%	26%
<b>Repair/ maintenance/ upgrades/ haulout (RMUH)</b>	Annual cost of repairs to engines, deck equipment, machinery, hull, fishing gear, electronics, processing equipment, refrigeration, and safety equipment. Includes haulout costs.  Because these costs vary considerably from year to year and upgrade costs were combined with repair/maintenance costs, half of these costs were amortized over 7 years.	13%	11%
<b>Fixed costs</b>	Annual mooring/dockage, permits/licenses, insurance, quota/DAS lease, crew benefits, vessel monitoring, workshop/storage, office, vehicle, travel, association, professional, interest, taxes, and non-crew labor costs.  Note: principal payments on business loans are not included in fixed costs.	19%	21%
<b>Return to Owner (RTO)</b>	Gross revenue less variable, crew share, RMUH, and fixed costs	15%	7%

### Major Findings

Across the vessel types examined, the paired MWT vessels have the highest monitoring costs as a percentage of RTO. This is due to the fact that these vessels have, on average, more sea days that would have monitoring costs than the other vessel types.

There are differences among vessel types in terms of the sources of revenue that would be used to pay for monitoring costs. For example, for SMBT vessels, half of their revenue comes from herring and the other half from other species. What this means is that for monitoring that is required for the herring fishery, other non-herring sources of revenue must be used to cover the herring related costs. A metric for evaluating these differences is monitoring cost as a percent of herring revenue. For SMBT monitoring costs as a percent of herring revenue are higher than for other vessel types.

Exempting trips less than 25 mt of herring (Herring Alternative 2 Sub-Option 5) from industry-funded monitoring costs reduces the monitoring cost substantially in many cases. The degree of saving varies by gear type. Using Alternative 2.1

as an example, aggregate NEFOP costs decline by 48% for purse seine vessels (\$320k to \$166k). For paired midwater trawl vessels, the percentage difference (20%; \$673k to \$541k) is not as great.

For midwater trawl vessels, selecting Herring Alternatives 2.3 or 2.4 rather than Herring Alternative 2.2 results in about a 60% cost saving for paired midwater vessels in Year 2 and beyond and about a 45% cost saving for single midwater trawl vessels.

Selecting Herring Alternative 2.5 rather than Herring Alternative 2.1 reduces total industry monitoring costs from \$811k to \$75k – a 91% reduction.

Reducing EM costs from \$325 to \$187 per day and only monitoring half of the portside sampling trips at a rate of \$3.84 per mt, as opposed to all trips at \$5.12 per mt, reduces total monitoring costs by 51% for paired MWT vessels (\$457,595 to \$222,958) in year 2. For single MWT vessels, costs are reduced by 54% (\$134,165 to \$61,067).



Herring Alternative 2.1

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Stnd Dev	Average	Stnd Dev	Average	Stnd Dev	Average	Stnd Dev
<b>Annual Gross Revenue</b>	\$1,338,354	\$704,254	\$1,364,372	\$920,296	\$1,026,390	\$1,179,521	\$1,875,233	\$1,505,034
<b>Annual Variable Costs</b>	\$318,252	\$167,769	\$330,865	\$233,767	\$284,996	\$267,061	\$594,112	\$412,374
<b>Annual Crew Share</b>	\$410,406	\$213,633	\$358,167	\$270,086	\$292,093	\$332,733	\$519,728	\$451,846
<b>Annual Repair/Maint/Upgrade/Haulout</b>	\$177,888	\$98,231	\$182,172	\$119,312	\$120,240	\$101,172	\$149,714	\$94,073
<b>Annual Fixed Costs</b>	\$268,728	\$172,799	\$251,988	\$177,397	\$187,892	\$200,926	\$467,553	\$476,899
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$144,125	\$113,903
<b>Annual Cost of NEFOP</b>	\$84,150	\$37,945	\$45,700	\$28,075	\$23,077	\$13,108	\$17,380	\$14,134
<b>NEFOP as pct of RTO (median)</b>	44.7%		13.9%		24.4%		11.5%	
<b>post-NEFOP RTO</b>	\$78,930	\$77,928	\$195,480	\$159,212	\$118,091	\$352,542	\$126,745	\$110,764
<b>Percent of Revenue from Herring</b>	91.2%	9.5%	100.0%	0.0%	81.9%	17.0%	52.4%	42.0%
<b>Percent of Revenue from Mackerel</b>	13.9%	8.2%			19.4%	17.0%	2.6%	4.1%
<b>Percent of Revenue from Squids</b>							44.3%	39.7%
<b>Percent of Revenue from Other Species</b>	0.1%	0.1%			7.7%	17.0%	21.5%	17.9%
<b>Average Number of Days at Sea</b>	103	47	56	34	28	16	21	17
<b>Average Number of Trips</b>	34	16	64	37	22	20	11	16

Herring Alternative 2.1

<b>Fleet Level</b>	<b>Paired MWT</b>	<b>Purse Seine</b>	<b>Single MWT</b>	<b>SMBT</b>
<b>Number of Vessels</b>	8	7	6	9
<b>Total Days at Sea</b>	825	392	170	192
<b>Total Number of Trips</b>	275	451	129	103
<b>Total Herring Revenue</b>	\$9,409,389	\$11,042,232	\$3,842,873	\$1,483,242
<b>Total Mackerel Revenue</b>	\$1,155,588	\$225	\$570,246	\$97,806
<b>Total Squid Revenue</b>				\$529,723
<b>Total Other Species Revenue</b>	\$5,906		\$50,399	\$485,180
<b>Total Revenue</b>	\$10,570,883	\$11,042,457	\$4,463,518	\$2,595,951
<b>Total NEFOP Cost</b>	\$673,200	\$319,902	\$138,463	\$156,420
<b>NEFOP as pct of Total Revenue</b>	6.4%	2.9%	3.1%	6.0%
<b>NEFOP as pct of Herring Revenue</b>	7.2%	2.9%	3.6%	10.5%

## Herring Alternative 2.1 – Sub Option 5

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Std Dev	Average	Std Dev	Average	Std Dev	Average	Std Dev
<b>Annual Gross Revenue</b>	\$1,338,354	\$704,254	\$1,364,372	\$920,296	\$1,026,390	\$1,179,521	\$2,057,720	\$1,835,879
<b>Annual Variable Costs</b>	\$318,252	\$167,769	\$330,865	\$233,767	\$284,996	\$267,061	\$626,872	\$501,818
<b>Annual Crew Share</b>	\$410,406	\$213,633	\$358,167	\$270,086	\$292,093	\$332,733	\$583,258	\$550,531
<b>Annual Repair/Maint/Upgrade/Haulout</b>	\$177,888	\$98,231	\$182,172	\$119,312	\$120,240	\$101,172	\$141,508	\$110,893
<b>Annual Fixed Costs</b>	\$268,728	\$172,799	\$251,988	\$177,397	\$187,892	\$200,926	\$542,753	\$581,061
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$163,329	\$137,021
<b>Annual Cost of NEFOP</b>	\$67,626	\$36,730	\$23,759	\$13,141	\$15,756	\$13,934	\$15,975	\$12,682
<b>NEFOP as pct of RTO (median)</b>	42.2%		10.4%		5.8%		14.2%	
<b>post-NEFOP RTO</b>	\$95,454	\$72,095	\$217,421	\$153,564	\$125,412	\$351,076	\$147,354	\$135,976
<b>Percent of Revenue from Herring</b>	94.9%	6.3%	100.0%	0.0%	88.0%	15.0%	88.5%	17.9%
<b>Percent of Revenue from Mackerel</b>	8.1%	6.1%			19.5%	17.1%	2.1%	1.3%
<b>Percent of Revenue from Squids</b>							12.2%	8.5%
<b>Percent of Revenue from Other Species</b>	0.0%	0.1%			0.4%	0.5%	20.3%	12.5%
<b>Average Number of Days at Sea</b>	83	45	29	16	19	17	20	16
<b>Average Number of Trips</b>	28	15	46	29	12	15	10	12

## Herring Alternative 2.1 – Sub Option 5

Fleet Level	Paired MWT	Purse Seine	Single MWT	SMBT
<b>Number of Vessels</b>	8	7	6	6
<b>Total Days at Sea</b>	663	204	116	117
<b>Total Number of Trips</b>	221	320	73	59
<b>Total Herring Revenue</b>	\$9,152,836	\$10,263,855	\$3,606,269	\$1,352,045
<b>Total Mackerel Revenue</b>	\$657,345	\$225	\$570,246	\$28,633
<b>Total Squid Revenue</b>				\$171,323
<b>Total Other Species Revenue</b>	\$4,109		\$2,721	\$237,472

<b>Total Revenue</b>	\$9,814,290	\$10,264,080	\$4,179,236	\$1,789,473
<b>Total NEFOP Cost</b>	\$541,008	\$166,313	\$94,538	\$95,852
<b>NEFOP as pct of Total Revenue</b>	5.5%	1.6%	2.3%	5.4%
<b>NEFOP as pct of Herring Revenue</b>	5.9%	1.6%	2.6%	7.1%

Herring Alternative 2.2 & 2.3 (100%) – ASM Coverage Only

<b>Per Vessel</b>	<b>Paired MWT</b>		<b>Purse Seine</b>		<b>Single MWT</b>		<b>SMBT</b>	
	Average	Std Dev	Average	Std Dev	Average	Std Dev	Average	Std Dev
<b>Annual Gross Revenue</b>	\$1,338,354	\$704,254	\$1,364,372	\$920,296	\$1,026,390	\$1,179,521	\$1,875,233	\$1,505,034
<b>Annual Variable Costs</b>	\$318,252	\$167,769	\$330,865	\$233,767	\$284,996	\$267,061	\$594,112	\$412,374
<b>Annual Crew Share</b>	\$410,406	\$213,633	\$358,167	\$270,086	\$292,093	\$332,733	\$519,728	\$451,846
<b>Annual Repair/Maint/Upgrade/Haulout</b>	\$177,888	\$98,231	\$182,172	\$119,312	\$120,240	\$101,172	\$149,714	\$94,073
<b>Annual Fixed Costs</b>	\$268,728	\$172,799	\$251,988	\$177,397	\$187,892	\$200,926	\$467,553	\$476,899
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$144,125	\$113,903
<b>Annual Cost of ASM</b>	\$73,219	\$33,016	\$39,764	\$24,428	\$20,079	\$11,405	\$15,122	\$12,298
<b>ASM as pct of RTO (median)</b>	38.9%		12.1%		21.3%		10.0%	
<b>post-ASM RTO</b>	\$89,862	\$78,545	\$201,417	\$159,318	\$121,089	\$353,817	\$129,003	\$111,075
<b>Percent of Revenue from Herring</b>	91.2%	9.5%	100.0%	0.0%	81.9%	17.0%	52.4%	42.0%
<b>Percent of Revenue from Mackerel</b>	13.9%	8.2%	0.0%		19.4%	17.0%	2.6%	4.1%
<b>Percent of Revenue from Squids</b>							44.3%	39.7%
<b>Percent of Revenue from Other Species</b>	0.1%	0.1%			7.7%	17.0%	21.5%	17.9%
<b>Average Number of Days at Sea</b>	103	47	56	34	28	16	21	17
<b>Average Number of Trips</b>	34	16	64	37	22	20	11	16

Herring Alternative 2.2 & 2.3 (100%) – ASM Coverage Only

<b>Fleet Level</b>	<b>Paired MWT</b>	<b>Purse Seine</b>	<b>Single MWT</b>	<b>SMBT</b>
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<b>Number of Vessels</b>	8	7	6	9
<b>Total Days at Sea</b>	825	392	170	192
<b>Total Number of Trips</b>	275	451	129	103
<b>Total Herring Revenue</b>	\$9,409,389	\$11,042,232	\$3,842,873	\$1,483,242
<b>Total Mackerel Revenue</b>	\$1,155,588	\$225	\$570,246	\$97,806
<b>Total Squid Revenue</b>				\$529,723
<b>Total Other Species Revenue</b>	\$5,906		\$50,399	\$485,180
<b>Total Revenue</b>	\$10,570,883	\$11,042,457	\$4,463,518	\$2,595,951
<b>Total ASM Cost</b>	\$585,750	\$278,346	\$120,477	\$136,100
<b>ASM as pct of Total Revenue</b>	5.5%	2.5%	2.7%	5.2%
<b>ASM as pct of Herring Revenue</b>	6.2%	2.5%	3.1%	9.2%

Herring Alternative 2.2 & 2.3 – Sub Option 5 (100%) – ASM Coverage Only

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Std Dev	Average	Std Dev	Average	Std Dev	Average	Std Dev
<b>Annual Gross Revenue</b>	\$1,338,354	\$704,254	\$1,364,372	\$920,296	\$1,026,390	\$1,179,521	\$2,057,720	\$1,835,879
<b>Annual Variable Costs</b>	\$318,252	\$167,769	\$330,865	\$233,767	\$284,996	\$267,061	\$626,872	\$501,818
<b>Annual Crew Share</b>	\$410,406	\$213,633	\$358,167	\$270,086	\$292,093	\$332,733	\$583,258	\$550,531
<b>Annual Repair/Maint/Upgrade/Haulout</b>	\$177,888	\$98,231	\$182,172	\$119,312	\$120,240	\$101,172	\$141,508	\$110,893
<b>Annual Fixed Costs</b>	\$268,728	\$172,799	\$251,988	\$177,397	\$187,892	\$200,926	\$542,753	\$581,061
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$163,329	\$137,021
<b>Annual Cost of ASM</b>	\$58,841	\$31,959	\$20,673	\$11,434	\$13,710	\$12,124	\$13,900	\$11,034
<b>ASM as pct of RTO (median)</b>	36.7%		9.1%		5.1%		12.3%	
<b>post-ASM RTO</b>	\$104,239	\$73,608	\$220,508	\$154,643	\$127,459	\$352,543	\$149,429	\$136,046
<b>Percent of Revenue from Herring</b>	94.9%	6.3%	100.0%	0.0%	88.0%	15.0%	88.5%	17.9%
<b>Percent of Revenue from Mackerel</b>	8.1%	6.1%	0.0%		19.5%	17.1%	2.1%	1.3%
<b>Percent of Revenue from Squids</b>							12.2%	8.5%
<b>Percent of Revenue from Other Species</b>	0.0%	0.1%			0.4%	0.5%	20.3%	12.5%
<b>Average Number of Days at Sea</b>	83	45	29	16	19	17	20	16
<b>Average Number of Trips</b>	28	15	46	29	12	15	10	12

Herring Alternative 2.2 & 2.3 – Sub Option 5 (100%) – ASM Coverage Only

Fleet Level	Paired MWT	Purse Seine	Single MWT	SMBT
<b>Number of Vessels</b>	8	7	6	6
<b>Total Days at Sea</b>	663	204	116	117
<b>Total Number of Trips</b>	221	320	73	59
<b>Total Herring Revenue</b>	\$9,152,836	\$10,263,855	\$3,606,269	\$1,352,045
<b>Total Mackerel Revenue</b>	\$657,345	\$225	\$570,246	\$28,633
<b>Total Squid Revenue</b>				\$171,323
<b>Total Other Species Revenue</b>	\$4,109		\$2,721	\$237,472

<b>Total Revenue</b>	\$9,814,290	\$10,264,080	\$4,179,236	\$1,789,473
<b>Total ASM Cost</b>	\$470,730	\$144,709	\$82,257	\$83,400
<b>ASM as pct of Total Revenue</b>	4.8%	1.4%	2.0%	4.7%
<b>ASM as pct of Herring Revenue</b>	5.1%	1.4%	2.3%	6.2%

Herring Alternative 2.2 & 2.3 (75%) – ASM Coverage Only

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Std Dev	Average	Std Dev	Average	Std Dev	Average	Std Dev
Annual Return-to-owner	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$144,125	\$113,903
Annual Cost of ASM	\$54,936	\$24,736	\$29,898	\$18,339	\$15,021	\$8,472	\$11,709	\$9,100
ASM as pct of RTO (median)	29.7%		9.1%		15.9%		7.5%	
post-ASM RTO	\$108,144	\$80,253	\$211,282	\$159,725	\$126,148	\$356,073	\$132,416	\$111,831
Percent of Revenue from Herring	91.3%	9.4%	100.0%	0.0%	82.5%	16.2%	52.7%	42.0%
Percent of Revenue from Mackerel	13.8%	8.0%	0.0%		19.3%	16.7%	2.6%	4.0%
Percent of Revenue from Squids							44.3%	39.8%
Percent of Revenue from Other Species	0.1%	0.1%			7.5%	16.5%	22.6%	19.1%
Average Number of Days at Sea	77	35	42	26	21	12	16	13

Herring Alternative 2.2 & 2.3 (75%) – ASM Coverage Only

Fleet Level	Paired MWT	Purse Seine	Single MWT	SMBT
Number of Vessels	8	7	6	9
Total Days at Sea	619	295	127	148
Total Herring Revenue	\$7,069,090	\$8,301,401	\$2,870,099	\$1,106,513
Total Mackerel Revenue	\$865,766	\$225	\$436,137	\$73,907
Total Squid Revenue				\$440,897
Total Other Species Revenue	\$4,749		\$39,714	\$385,635
Total Revenue	\$7,939,606	\$8,301,626	\$3,345,950	\$2,006,952
Total ASM Cost	\$439,489	\$209,288	\$90,126	\$105,382
ASM as pct of Total Revenue	5.5%	2.5%	2.7%	5.3%
ASM as pct of Herring Revenue	6.2%	2.5%	3.1%	9.5%



Herring Alternative 2.2 & 2.3 – Sub Option 5 (75%) – ASM Coverage Only

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Stnd Dev	Average	Stnd Dev	Average	Stnd Dev	Average	Stnd Dev
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$163,329	\$137,021
<b>Annual Cost of ASM</b>	\$44,198	\$23,997	\$15,571	\$8,472	\$10,298	\$9,099	\$10,474	\$8,230
<b>ASM as pct of RTO (median)</b>	28.2%		6.8%		3.8%		9.4%	
<b>post-ASM RTO</b>	\$118,882	\$76,712	\$225,610	\$156,562	\$130,870	\$354,992	\$152,855	\$136,065
<b>Percent of Revenue from Herring</b>	94.9%	6.2%	100.0%	0.0%	88.1%	14.8%	89.2%	16.8%
<b>Percent of Revenue from Mackerel</b>	8.7%	6.0%	0.0%		19.4%	17.0%	2.2%	1.1%
<b>Percent of Revenue from Squids</b>							11.8%	8.4%
<b>Percent of Revenue from Other Species</b>	0.0%	0.1%			0.5%	0.8%	19.6%	11.3%
<b>Average Number of Days at Sea</b>	62	34	22	12	15	13	15	12

Herring Alternative 2.2 & 2.3 – Sub Option 5 (75%) – ASM Coverage Only

Fleet Level	Paired MWT	Purse Seine	Single MWT	SMBT
<b>Number of Vessels</b>	8	7	6	6
<b>Total Days at Sea</b>	498	154	87	89
<b>Total Herring Revenue</b>	\$6,874,690	\$7,702,188	\$2,712,401	\$1,024,121
<b>Total Mackerel Revenue</b>	\$526,863	\$225	\$433,487	\$21,556
<b>Total Squid Revenue</b>				\$130,869
<b>Total Other Species Revenue</b>	\$3,148		\$2,345	\$190,706
<b>Total Revenue</b>	\$7,404,700	\$7,702,413	\$3,148,233	\$1,367,252
<b>Total ASM Cost</b>	\$353,586	\$108,996	\$61,791	\$62,845
<b>ASM as pct of Total Revenue</b>	4.8%	1.4%	2.0%	4.6%
<b>ASM as pct of Herring Revenue</b>	5.1%	1.4%	2.3%	6.1%

Herring Alternative 2.2 & 2.3 (50%) – ASM Coverage Only

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Std Dev	Average	Std Dev	Average	Std Dev	Average	Std Dev
Annual Return-to-owner	\$163,080	\$163,080	\$241,180	\$241,180	\$141,169	\$141,169	\$144,125	\$144,125
Annual Cost of ASM	\$36,875	\$16,417	\$19,846	\$12,053	\$10,145	\$5,662	\$8,483	\$6,375
ASM as pct of RTO (median)	20.4%		6.0%		10.5%		5.4%	
post-ASM RTO	\$126,205	\$82,980	\$221,334	\$160,394	\$131,024	\$358,152	\$135,643	\$112,417
Percent of Revenue from Herring	91.4%	9.3%	100.0%	0.0%	83.3%	15.4%	53.6%	42.2%
Percent of Revenue from Mackerel	14.1%	8.0%	0.0%		19.1%	16.2%	2.9%	4.4%
Percent of Revenue from Squids							44.5%	39.8%
Percent of Revenue from Other Species	0.1%	0.2%			8.2%	17.9%	24.7%	21.7%
Average Number of Days at Sea	52	23	28	17	14	8	12	9

Herring Alternative 2.2 & 2.3 (50%) – ASM Coverage Only

Fleet Level	Paired MWT	Purse Seine	Single MWT	SMBT
Number of Vessels	8	7	6	9
Total Days at Sea	415	196	86	108
Total Herring Revenue	4,732,456	5,510,474	1,943,001	748,019
Total Mackerel Revenue	591,520	225	310,908	56,804
Total Squid Revenue				369,787
Total Other Species Revenue	3,503		33,722	312,508
Total Revenue	5,327,480	5,510,699	2,287,630	1,487,117
Total ASM Cost	\$294,999	\$138,922	\$60,867	\$76,346
ASM as pct of Total Revenue	5.5%	2.5%	2.7%	5.1%
ASM as pct of Herring Revenue	6.2%	2.5%	3.1%	10.2%



Herring Alternative 2.2 & 2.3 – Sub Option 5 (50%) – ASM Coverage Only

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Std Dev	Average	Std Dev	Average	Std Dev	Average	Std Dev
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$163,329	\$137,021
<b>Annual Cost of ASM</b>	\$29,489	\$15,844	\$10,464	\$5,525	\$6,999	\$6,001	\$7,247	\$5,562
<b>ASM as pct of RTO (median)</b>	18.9%		4.5%		2.5%		6.4%	
<b>post-ASM RTO</b>	\$133,591	\$80,718	\$230,716	\$158,500	\$134,170	\$357,624	\$156,082	\$136,133
<b>Percent of Revenue from Herring</b>	95.0%	6.2%	100.0%	0.0%	88.5%	14.0%	90.2%	15.2%
<b>Percent of Revenue from Mackerel</b>	10.3%	6.6%	0.0%		19.3%	16.4%	2.7%	0.6%
<b>Percent of Revenue from Squids</b>							11.2%	7.8%
<b>Percent of Revenue from Other Species</b>	0.0%	0.1%			0.8%	1.3%	20.1%	9.6%
<b>Average Number of Days at Sea</b>	42	22	15	8	10	8	10	8

Herring Alternative 2.2 & 2.3 – Sub Option 5 (50%) – ASM Coverage Only

Fleet Level	Paired MWT	Purse Seine	Single MWT	SMBT
<b>Number of Vessels</b>	8	7	6	6
<b>Total Days at Sea</b>	332	103	59	61
<b>Total Herring Revenue</b>	\$4,580,747	\$5,158,742	\$1,820,329	\$708,574
<b>Total Mackerel Revenue</b>	\$417,898	\$225	\$310,536	\$15,657
<b>Total Squid Revenue</b>				\$95,931
<b>Total Other Species Revenue</b>	\$2,109		\$2,117	\$159,514
<b>Total Revenue</b>	\$5,000,754	\$5,158,967	\$2,132,982	\$979,676
<b>Total ASM Cost</b>	\$235,915	\$73,250	\$41,994	\$43,482
<b>ASM as pct of Total Revenue</b>	4.7%	1.4%	2.0%	4.4%
<b>ASM as pct of Herring Revenue</b>	5.2%	1.4%	2.3%	6.1%

Herring Alternative 2.2 & 2.3 (25%) – ASM Coverage Only

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Stnd Dev	Average	Stnd Dev	Average	Stnd Dev	Average	Stnd Dev
Annual Return-to-owner	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$144,125	\$113,903
Annual Cost of ASM	\$18,578	\$7,854	\$10,041	\$5,914	\$5,498	\$2,600	\$5,642	\$4,539
ASM as pct of RTO (median)	10.1%		3.0%		5.6%		3.5%	
post-ASM RTO	\$144,503	\$86,107	\$231,139	\$161,277	\$135,671	\$360,600	\$138,483	\$112,951
Percent of Revenue from Herring	91.8%	9.0%	100.0%	0.0%	85.0%	13.7%	55.0%	42.1%
Percent of Revenue from Mackerel	16.3%	8.9%	0.1%		20.0%	15.2%	3.1%	4.4%
Percent of Revenue from Squids							44.6%	39.8%
Percent of Revenue from Other Species	0.2%	0.4%			9.0%	19.4%	27.6%	26.7%
Average Number of Days at Sea	26	11	14	8	8	4	8	6

Herring Alternative 2.2 & 2.3 (25%) – ASM Coverage Only

Fleet Level	Paired MWT	Purse Seine	Single MWT	SMBT
Number of Vessels	8	7	6	9
Total Days at Sea	209	99	46	72
Total Herring Revenue	\$2,394,688	\$2,774,156	\$981,948	\$448,402
Total Mackerel Revenue	\$357,710	\$225	\$213,945	\$39,547
Total Squid Revenue				\$305,034
Total Other Species Revenue	\$2,470		\$28,154	\$249,797
Total Revenue	\$2,754,868	\$2,774,381	\$1,224,046	\$1,042,780
Total ASM Cost	\$148,622	\$70,288	\$32,987	\$50,782
ASM as pct of Total Revenue	5.4%	2.5%	2.7%	4.9%
ASM as pct of Herring Revenue	6.2%	2.5%	3.4%	11.3%



Herring Alternative 2.2 & 2.3 – Sub Option 5 (25%) – ASM Coverage Only

Per Vessel	Paired MWT		Purse Seine		Single MWT		SMBT	
	Average	Stnd Dev	Average	Stnd Dev	Average	Stnd Dev	Average	Stnd Dev
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$241,180	\$162,152	\$141,169	\$362,448	\$163,329	\$137,021
<b>Annual Cost of ASM</b>	\$14,949	\$7,649	\$5,370	\$2,578	\$3,994	\$2,978	\$4,560	\$3,380
<b>ASM as pct of RTO (median)</b>	9.6%		2.2%		1.4%		3.8%	
<b>post-ASM RTO</b>	\$148,131	\$85,224	\$235,811	\$160,535	\$137,175	\$360,395	\$158,769	\$136,042
<b>Percent of Revenue from Herring</b>	95.4%	5.8%	100.0%	0.0%	89.3%	12.8%	90.9%	14.1%
<b>Percent of Revenue from Mackerel</b>	15.5%	9.9%	0.1%		20.1%	15.6%	3.1%	0.1%
<b>Percent of Revenue from Squids</b>							11.0%	7.2%
<b>Percent of Revenue from Other Species</b>	0.0%	0.1%			1.3%	2.0%	21.7%	8.6%
<b>Average Number of Days at Sea</b>	21	11	8	4	6	4	6	5

Herring Alternative 2.2 & 2.3 – Sub Option 5 (25%) – ASM Coverage Only

Fleet Level	Paired MWT	Purse Seine	Single MWT	SMBT
<b>Number of Vessels</b>	8	7	6	6
<b>Total Days at Sea</b>	168	53	34	39
<b>Total Herring Revenue</b>	\$2,317,299	\$2,591,280	\$940,773	\$452,532
<b>Total Mackerel Revenue</b>	\$336,069	\$225	\$205,825	\$10,562
<b>Total Squid Revenue</b>				\$68,202
<b>Total Other Species Revenue</b>	\$1,128		\$1,920	\$135,106
<b>Total Revenue</b>	\$2,654,496	\$2,591,505	\$1,148,518	\$666,402
<b>Total ASM Cost</b>	\$119,591	\$37,587	\$23,964	\$27,358
<b>ASM as pct of Total Revenue</b>	4.5%	1.5%	2.1%	4.1%
<b>ASM as pct of Herring Revenue</b>	5.2%	1.5%	2.5%	6.0%

Herring Alternative 2.3 and 2.4 (100% EM at \$325 per day, 100% PS at \$5.12 per mt)

Per Vessel	Paired MWT		Single MWT	
	Average	Stnd Dev	Average	Stnd Dev
<b>Annual Gross Revenue</b>	\$1,338,354	\$704,254	\$912,105	\$1,024,851
<b>Annual Variable Costs</b>	\$318,252	\$167,769	\$264,620	\$232,352
<b>Annual Crew Share</b>	\$410,406	\$213,633	\$239,242	\$297,854
<b>Annual Repair/Maint/Haulout</b>	\$177,888	\$98,231	\$110,742	\$90,131
<b>Annual Fixed Costs</b>	\$268,728	\$172,799	\$163,296	\$175,943
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$134,205	\$310,157
<b>Annual Cost of EM - year 1</b>	\$48,516	\$15,113	\$22,300	\$5,316
<b>Annual Cost of EM - year 2</b>	\$33,516	\$15,113	\$7,300	\$5,316
<b>Annual Cost of PS</b>	\$23,684	\$15,503	\$9,471	\$16,229
<b>Total Monitoring Costs as pct of RTO - year 1 (median)</b>	42.2%		37.3%	
<b>Total Monitoring Costs as pct of RTO - year 2 (median)</b>	29.1%		12.8%	
<b>Post-monitoring RTO -- year 1</b>	\$90,881	\$74,211	\$102,434	\$292,275
<b>Post-monitoring RTO -- year 2</b>	\$105,881	\$74,211	\$117,434	\$292,275
<b>Percent of Revenue from Herring</b>	91.2%	9.5%	86.0%	16.3%
<b>Percent of Revenue from Mackerel</b>	13.9%	8.2%	15.5%	17.1%
<b>Percent of Revenue from Squids</b>			2.9%	
<b>Percent of Revenue from Other Species</b>	0.1%	0.1%	6.4%	15.5%
<b>Average Number of Days at Sea</b>	103	47	23	17
<b>Average Number of Trips</b>	34	16	18	18



Herring Alternative 2.3 and 2.4 (100% EM at \$187 per day, 50% PS at \$3.84 per mt)

Per Vessel	Paired MWT		Single MWT	
	Average	Stnd Dev	Average	Stnd Dev
Annual Return-to-owner	\$163,080	\$89,827	\$134,205	\$310,157
Annual Cost of EM - year 1	\$34,284	\$8,696	\$19,200	\$3,059
Annual Cost of EM - year 2	\$19,284	\$8,696	\$4,200	\$3,059
Annual Cost of PS	\$8,585	\$5,620	\$3,433	\$5,883
Total Monitoring Costs as pct of RTO - year 1 (median)	25.1%		26.7%	
Total Monitoring Costs as pct of RTO - year 2 (median)	14.4%		6.9%	
Post-monitoring RTO -- year 1	\$120,211	\$82,109	\$111,572	\$302,913
Post-monitoring RTO -- year 2	\$135,211	\$82,109	\$126,572	\$302,913

Herring Alternative 2.3 and 2.4(100% EM at \$325 per day, 100% PS at \$5.12 per mt)

Fleet Level	Paired MWT	Single MWT
Number of Vessels	8	8
Total Days at Sea	825	180
Total Number of Trips	275	140
Total Herring Revenue	\$9,409,389	\$3,873,778
Total Mackerel Revenue	\$1,155,588	\$570,248
Total Squid Revenue		\$441
Total Other Species Revenue	\$5,906	\$50,421
Total Revenue	\$10,570,883	\$4,494,888
Total EM Cost - year 1	\$388,125	\$178,398
Total EM Cost - year 2	\$268,125	\$58,398
Total PS Cost	\$189,470	\$75,767
Total Monitoring Costs - year 1	\$577,595	\$254,165
Total Monitoring Costs - year 2	\$457,595	\$134,165
Monitoring Costs as pct of Total Revenue -- year 1	5.5%	5.7%

<b>Monitoring Costs as pct of Total Revenue -- year 2</b>	4.3%	3.0%
<b>Monitoring Costs as pct of Herring Revenue -- year 1</b>	6.1%	6.6%
<b>Monitoring Costs as pct of Herring Revenue -- year 2</b>	4.9%	3.5%

Herring Alternative 2.3 and 2.4 (100% EM at \$187 per day, 50% PS at \$3.84 per mt)

<b>Fleet Level</b>	<b>Paired MWT</b>	<b>Single MWT</b>
<b>Number of Vessels</b>	8	8
<b>Total Days at Sea</b>	825	180
<b>Total Number of Trips</b>	275	140
<b>Total Herring Revenue</b>	\$9,409,389	\$3,873,778
<b>Total Mackerel Revenue</b>	\$1,155,588	\$570,248
<b>Total Squid Revenue</b>		\$441
<b>Total Other Species Revenue</b>	\$5,906	\$50,421
<b>Total Revenue</b>	\$10,570,883	\$4,494,888
<b>Total EM Cost - year 1</b>	\$274,275	\$153,601
<b>Total EM Cost - year 2</b>	\$154,275	\$33,601
<b>Total PS Cost</b>	\$68,683	\$27,465
<b>Total Monitoring Costs - year 1</b>	\$342,958	\$181,067
<b>Total Monitoring Costs - year 2</b>	\$222,958	\$61,067
<b>Monitoring Costs as pct of Total Revenue -- year 1</b>	3.2%	4.0%
<b>Monitoring Costs as pct of Total Revenue -- year 2</b>	2.1%	1.4%
<b>Monitoring Costs as pct of Herring Revenue -- year 1</b>	3.6%	4.7%
<b>Monitoring Costs as pct of Herring Revenue -- year 2</b>	2.4%	1.6%

Herring Alternative 2.3 and 2.4 – Sub Option 5 (100% EM at \$325 per day, 100% PS at \$5.12 per mt)

Per Vessel	Paired MWT		Single MWT	
	Average	Std Dev	Average	Std Dev
<b>Annual Gross Revenue</b>	\$1,338,354	\$704,254	\$990,082	\$1,081,027
<b>Annual Variable Costs</b>	\$318,252	\$167,769	\$284,110	\$243,803
<b>Annual Crew Share</b>	\$410,406	\$213,633	\$259,816	\$315,519
<b>Annual Repair/Maint/Haulout</b>	\$177,888	\$98,231	\$120,806	\$92,369
<b>Annual Fixed Costs</b>	\$268,728	\$172,799	\$175,636	\$186,264
<b>Annual Return-to-owner</b>	\$163,080	\$89,827	\$149,714	\$331,640
<b>Annual Cost of EM - year 1</b>	\$41,934	\$14,629	\$20,425	\$5,543
<b>Annual Cost of EM - year 2</b>	\$26,934	\$14,629	\$5,425	\$5,543
<b>Annual Cost of PS</b>	\$22,205	\$15,461	\$9,943	\$17,483
<b>Total Monitoring Costs as pct of RTO - year 1 (median)</b>	40.1%		19.5%	
<b>Total Monitoring Costs as pct of RTO - year 2 (median)</b>	27.5%		4.9%	
<b>Post-monitoring RTO -- year 1</b>	\$98,941	\$73,425	\$119,346	\$312,177
<b>Post-monitoring RTO -- year 2</b>	\$113,941	\$73,425	\$134,346	\$312,177
<b>Percent of Revenue from Herring</b>	94.9%	6.3%	89.7%	14.4%
<b>Percent of Revenue from Mackerel</b>	8.1%	6.1%	19.5%	17.1%
<b>Percent of Revenue from Squids</b>				
<b>Percent of Revenue from Other Species</b>	0.0%	0.1%	0.4%	0.5%
<b>Average Number of Days at Sea</b>	83	45	17	17
<b>Average Number of Trips</b>	28	15	11	15

Herring Alternative 2.3 and 2.4 – Sub Option 5 (100% EM at \$187 per day, 50% PS at \$3.84 per mt)

Per Vessel	Paired MWT		Single MWT	
	Average	Stnd Dev	Average	Stnd Dev
Annual Return-to-owner	\$163,080	\$89,827	\$149,714	\$331,640
Annual Cost of EM - year 1	\$30,498	\$8,417	\$18,122	\$3,189
Annual Cost of EM - year 2	\$15,498	\$8,417	\$3,122	\$3,189
Annual Cost of PS	\$8,049	\$5,605	\$3,604	\$6,338
Total Monitoring Costs as pct of RTO - year 1 (median)	24.2%		16.9%	
Total Monitoring Costs as pct of RTO - year 2 (median)	13.3%		2.4%	
Post-monitoring RTO -- year 1	\$124,533	\$81,356	\$127,988	\$323,695
Post-monitoring RTO -- year 2	\$139,533	\$81,356	\$142,988	\$323,695

Herring Alternative 2.3 and 2.4 – Sub Option 5 (100% EM at \$325 per day, 100% PS at \$5.12 per mt)

Fleet Level	Paired MWT	Single MWT
Number of Vessels	8	7
Total Days at Sea	663	117
Total Number of Trips	221	75
Total Herring Revenue	\$9,152,836	\$3,618,705
Total Mackerel Revenue	\$657,345	\$570,246
Total Squid Revenue		
Total Other Species Revenue	\$4,109	\$2,721
Total Revenue	\$9,814,290	\$4,191,672
Total EM Cost - year 1	\$335,475	\$142,978
Total EM Cost - year 2	\$215,475	\$37,978
Total PS Cost	\$177,642	\$69,602
Total Monitoring Costs - year 1	\$513,117	\$212,580
Total Monitoring Costs - year 2	\$393,117	\$107,580
Monitoring Costs as pct of Total Revenue -- year 1	5.2%	5.1%

<b>Monitoring Costs as pct of Total Revenue -- year 2</b>	4.0%	2.6%
<b>Monitoring Costs as pct of Herring Revenue -- year 1</b>	5.6%	5.9%
<b>Monitoring Costs as pct of Herring Revenue -- year 2</b>	4.3%	3.0%

Herring Alternative 2.3 and 2.4 – Sub Option 5 (100% EM at \$187 per day, 50% PS at \$3.84 per mt)

<b>Fleet Level</b>	<b>Paired MWT</b>	<b>Single MWT</b>
<b>Number of Vessels</b>	8	7
<b>Total Days at Sea</b>	663	117
<b>Total Number of Trips</b>	221	75
<b>Total Herring Revenue</b>	\$9,152,836	\$3,618,705
<b>Total Mackerel Revenue</b>	\$657,345	\$570,246
<b>Total Squid Revenue</b>		
<b>Total Other Species Revenue</b>	\$4,109	\$2,721
<b>Total Revenue</b>	\$9,814,290	\$4,191,672
<b>Total EM Cost - year 1</b>	\$243,981	\$126,852
<b>Total EM Cost - year 2</b>	\$123,981	\$21,852
<b>Total PS Cost</b>	\$64,395	\$25,231
<b>Total Monitoring Costs - year 1</b>	\$308,376	\$152,083
<b>Total Monitoring Costs - year 2</b>	\$188,376	\$47,083
<b>Monitoring Costs as pct of Total Revenue -- year 1</b>	3.1%	3.6%
<b>Monitoring Costs as pct of Total Revenue -- year 2</b>	1.9%	1.1%
<b>Monitoring Costs as pct of Herring Revenue -- year 1</b>	3.4%	4.2%
<b>Monitoring Costs as pct of Herring Revenue -- year 2</b>	2.1%	1.3%

Herring Alternative 2.5

<b>Per Vessel</b>	<b>Average</b>	<b>Std Dev</b>
<b>Annual Gross Revenue</b>	\$1,752,994	\$822,480
<b>Annual Variable Costs</b>	\$409,945	\$181,028
<b>Annual Crew Share</b>	\$527,920	\$227,404
<b>Annual Repair/Maint/Upgrade/Haulout</b>	\$208,650	\$73,627
<b>Annual Fixed Costs</b>	\$340,386	\$171,281
<b>Annual Return-to-owner</b>	\$266,094	\$239,382
<b>Annual Cost of NEFOP</b>	\$9,353	\$7,604
<b>NEFOP as pct of RTO (median)</b>	4.0%	
<b>post-NEFOP RTO</b>	\$256,740	\$244,116
<b>Percent of Revenue from Herring</b>	99.9%	0.4%
<b>Percent of Revenue from Mackerel</b>		
<b>Percent of Revenue from Squids</b>		
<b>Percent of Revenue from Other Species</b>	0.2%	0.4%
<b>Average Number of Days at Sea</b>	11	9
<b>Average Number of Trips</b>	4	3

<b>Fleet Level</b>	
<b>Number of Vessels</b>	8
<b>Total Days at Sea</b>	92
<b>Total Number of Trips</b>	33
<b>Total Herring Revenue</b>	\$1,437,094
<b>Total Mackerel Revenue</b>	
<b>Total Squid Revenue</b>	
<b>Total Other Species Revenue</b>	\$1,170
<b>Total Revenue</b>	\$1,438,264
<b>Total NEFOP Cost</b>	\$74,827
<b>NEFOP as pct of Total Revenue</b>	5.2%
<b>NEFOP as pct of Herring Revenue</b>	5.2%

## Herring Alternative 2.5 – Sub Option 5

Per Vessel	Average	Std Dev
Annual Gross Revenue	\$1,752,994	\$822,480
Annual Variable Costs	\$409,945	\$181,028
Annual Crew Share	\$527,920	\$227,404
Annual Repair/Maint/Upgrade/Haulout	\$208,650	\$73,627
Annual Fixed Costs	\$340,386	\$171,281
Annual Return-to-owner	\$266,094	\$239,382
Annual Cost of NEFOP	\$6,293	\$3,131
NEFOP as pct of RTO (median)	3.7%	
post-NEFOP RTO	\$259,800	\$241,604
Percent of Revenue from Herring	100.0%	0.0%
Percent of Revenue from Mackerel		
Percent of Revenue from Squids		
Percent of Revenue from Other Species	0.0%	0.0%
Average Number of Days at Sea	8	4
Average Number of Trips	3	1

Fleet Level	
Number of Vessels	8
Total Days at Sea	62
Total Number of Trips	23
Total Herring Revenue	\$1,379,191
Total Mackerel Revenue	
Total Squid Revenue	
Total Other Species Revenue	
Total Revenue	\$1,379,191
Total NEFOP Cost	\$50,347
NEFOP as pct of Total Revenue	3.7%
NEFOP as pct of Herring Revenue	3.7%



### Herring Alternative 2.6

Analyses are not yet complete for this alternative. Alternative 2.6 applies the same criteria as found in Alternatives 2.2, 2.3, and 2.4 but only for vessels that fish in groundfish closed areas. However, in order to provide a means for obtaining a reasonably reliable estimate of the impacts of Alternative 2.6, the following two tables are provided. The first table shows the major differences between Alternatives 2.1 and 2.5 at 100% coverage for trips with > 1 lb of herring landed (the second table shows the differences for trips > 25 mt – Sub-Option 5). These two alternatives are identical except that Alternative 2.5 applies only to vessels that fish in groundfish closed areas and applies to MWT vessels with category A through E herring permits whereas Alternative 2.1 applies to vessel with category A and B permits only. Therefore, these differences can be used to estimate the impacts of Alternative 2.6.

#### Trips with Herring Landings > 1 lb (includes all gear types)

	Herring Alternative 2.1	Herring Alternative 2.5	Herring Alternative 2.5 as a Percent of Alternative 2.1	
<b>Number of Vessels</b>	30	8	26.7%	
<b>Total Days at Sea</b>	1,579	92	5.8%	
<b>Number of Trips</b>	958	33	3.4%	
<b>Total Revenue</b>	\$28,672,809	\$1,438,264	5.0%	Use this for estimating portside sampling costs for Alternative 2.6
<b>Total NEFOP Cost</b>	\$1,287,985	\$74,827	5.8%	Use this for estimating EM and ASM costs for Alternative 2.6

Trips with Herring Landings > 25 mt (Sub-Option 5) (includes all gear types)

	<b>Herring Alternative 2.1</b>	<b>Herring Alternative 2.5</b>	<b>Herring Alternative 2.5 as a Percent of Alternative 2.1</b>	
<b>Number of Vessels</b>	27	8	29.6%	
<b>Total Days at Sea</b>	1,100	62	5.6%	
<b>Number of Trips</b>	673	23	3.4%	
<b>Total Revenue</b>	\$246,047,079	\$1,379,191	5.6%	Use this for estimating portside sampling costs for Alternative 2.6
<b>Total NEFOP Cost</b>	\$897,711	\$50,347	5.6%	Use this for estimating EM and ASM costs for Alternative 2.6

**Omnibus Industry-Funded Monitoring (IFM) Amendment**  
***Amendment 7 to the Atlantic Herring FMP***

**DRAFT**

**Options Under Consideration**  
**to Establish IFM in the Atlantic Herring Fishery**  
***(Coverage Targets, Program Requirements, Sea Day Costs)***

*Lori Steele, NEFMC Staff, Herring Plan Development Team (PDT) Chairman*  
*Industry-Funded Monitoring FMAT*

**DATE: 8/7/15 for Draft Omnibus IFM Amendment/EA**

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## 1.0 SUMMARY OF HERRING IFM OPTIONS UNDER CONSIDERATION

The options under consideration to establish industry-funded monitoring (IFM) in the Atlantic herring fishery are described in detail in the Draft omnibus IFM amendment. The options under consideration are grouped into two categories: (1) options for industry-funded observer coverage (herring OBS options, HER OBS); and (2) options for industry-funded at-sea monitoring (herring ASM options, HER ASM). The primary difference between these options is that the herring OBS options require comprehensive sampling (catch and bycatch) to provide data that is consistent with NEFOP observer data collected to meet the requirements of the standardized bycatch reporting methodology (SBRM). The herring ASM options require comprehensive sampling of bycatch only, i.e., any catch that is not retained on board the vessel for any reason, including full and partial slippage events, operational discards, and catch that is sorted on board the vessel and then discarded. The industry (vessels/vessel owners) would pay for at-sea monitors to collect bycatch data, while NEFOP observers would continue to be deployed to collect observer data on herring vessels to meet SBRM requirements. The details of the industry-funded herring OBS and ASM options under consideration are discussed in the following subsections of this document.

The intent of considering two different kinds of industry-funded monitoring programs for the Atlantic herring fishery is to address specific monitoring needs identified by the Council while providing a basis for understanding and comparing the costs of the monitoring program, particularly those which will be borne by the fishing industry. This approach also provides a mechanism to consider options that may reduce costs for the industry. For comparison purposes, information about the current multispecies (groundfish) at-sea monitoring program (GF ASM) for sector vessels is provided throughout this document as well. Since the sea day costs of the GF ASM program are better understood and current estimates of these costs are available, the sea day costs of a herring ASM program can be estimated based on a comparison to the groundfish ASM program, with particular consideration of the factors that can drive sea day costs up (see Section 2.1, p. 3).

Under the herring OBS options, vessels would be required to hire/pay sea day costs for NMFS-approved observers on some number of trips (based on coverage targets) above those on which vessels are required to carry an observer deployed through the standardized bycatch reporting methodology (SBRM). The industry-funded observers would require NEFOP certification to collect observer data, including a high-volume certification, and they would collect comprehensive catch/bycatch data consistent with NEFOP protocols for observer data collected under the SBRM. Under the herring ASM options, vessels would be required to hire/pay sea day costs for NMFS-approved at-sea monitors on trips (based on coverage targets) other than those on which vessels are required to carry an observer deployed through the SBRM. The industry-funded at-sea monitors would require NEFOP certification for the herring ASM program (HER ASM), and they would collect bycatch (discard) data consistent with NEFOP protocols.

Each set of options for IFM in the Atlantic herring fishery includes sub-options to consider allowances for waivers in the event that an observer or at-sea monitor cannot be provided for a fishing trip (to allow the vessel to fish). Additional sub-options are under consideration to exempt wing vessels (in a pair trawl operation) that do not take on fish from requirements to carry observers/monitors under the industry-funded monitoring program. These vessels would be required to notify NMFS ahead of time (through the pre-trip call-in and/or VMS) and would be prohibited from fishing for or possessing herring on exempted trips.

Some of the herring IFM options under consideration in the IFM amendment would apply to all Category A/B Atlantic herring vessels (single and paired midwater trawl, purse seine, small mesh bottom trawl) on trips declared into the herring fishery, while other options would apply only to midwater trawl vessels (single and paired, all permit categories). The options that apply only to midwater trawl vessels are based on SBRM fleet divisions (gear type and area).

## 2.0 WHAT IS A SEA DAY COST?

For the purposes of this discussion document, the *sea day cost* is amount that the participants in the fishery (vessels/vessel owners) pay to service provider companies for deploying an observer/at-sea monitor for a fishing trip to meet the requirements of an industry-funded monitoring program. As described in the Draft omnibus IFM amendment, the *sea day cost* incurred by the industry generally includes travel and salary for observer training, deployment and debriefing; service provider overhead and project management costs; special equipment costs; and other expenses determined by the service provider to meet the monitoring program requirements. Sea day costs are usually estimated based on a 24-hour day but can be billed based on full days, partial days, or hours. In many cases, vessel owners will enter into contracts with service providers to negotiate and secure a specific sea day cost for an agreed-upon number of sea days. Vessels may enter into contracts with multiple service providers to meet the monitoring requirements for a fishery. There are several elements of a sea day cost that can be negotiated through these contracts.

In an industry-funded monitoring program, a primary component of a *sea day cost* (sometimes upwards of 50% of the sea day cost) is **labor**, i.e., wages/salary for observers, which can be estimated by the service provider based on the anticipated number of days per month that each observer will work in the monitoring program. **Insurance** is another significant component of the sea day cost, the annual cost of which (per observer) is spread across the estimated number of sea days. Additional costs related to observer **training** (daily stipend, travel, and lodging), employee **benefits** (health insurance, vacation), and project management and **overhead** (staff, offices) are estimated for the year and then distributed across the estimated number of sea days for the monitoring program.\*

*\*Insurance and workers compensation expenses are higher in the Northeast Region than in west coast fisheries.*

There are currently no industry-funded monitoring programs in the Greater Atlantic Region that include contracts between service provider companies and fishing industry participants. Until now, all contracts for observer coverage and at-sea monitoring have been entered into by the Federal government and service providers, administered by NMFS/NEFOP. The contract for NEFOP observer coverage under the SBRM requirements is signed for five years with one provider (currently MRAG Americas). Until recently, the Federal government has been covering industry sea day costs in the groundfish at-sea monitoring program through contracts with three service providers. Later in 2015, when groundfish sectors will become responsible for paying their at-sea monitoring sea day costs, there will be an opportunity for sector vessels to enter into contracts with provider companies to negotiate sea day costs. There is likely to be some reduction in sea day costs that will result from “privatizing” contracts and eliminating the Federal government as a party entering into the contract (see following discussion). Several industry-funded monitoring programs in U.S. west coast fisheries use vessel/provider contracts; reviewing these programs is helpful to understand the factors that drive sea day costs up and the ways that the monitoring program can be structured to reduce these costs (see Section **Error! Reference**



**source not found.** of this document for more information about industry-funded monitoring programs in other U.S. fisheries).

Sea day costs are determined by individual service providers based on their overhead and the estimated costs associated with deploying their employees as observers in the monitoring program. There are many elements of the sea day cost that will be unique to individual service provider companies and cannot be predicted or estimated with any certainty. In addition, sea day costs can be variable, and service providers can bid different sea day costs to different vessels under the same monitoring program, depending on the details of the individual contracts. Ultimately, it will be up to the participants in the fishing industry to negotiate sea day costs with service providers in contracts designed to better meet their individual needs. To the extent that vessels that fish out of the same ports can work together to negotiate costs with service provider companies, there may be savings by reducing observer travel costs and offering more days in total for the providers to distribute overhead costs. In addition, there may be opportunities for the industry to reduce their sea day costs by allowing some costs (travel, meals, cancellations) to be negotiated in the contracts with service providers.

A large part of the sea day cost is determined by service providers based on predictions/assumptions of how vessels participating in the monitoring program will operate over the course of a fishing year and how the fishery will respond. If service providers have adequate information to accurately predict their overhead and related costs, then they can increase their efficiency and transfer these cost savings to the industry.

## 2.1 WHAT DRIVES SEA DAY COSTS UP?

There are several factors that can significantly affect sea day costs in any industry-funded monitoring program. During the development of this discussion document, representatives from the NEFOP, service provider companies in the northeast U.S., and representatives from U.S. west coast service provider companies identified the following factors that most commonly increase sea day costs. In an effort to reduce sea day costs, the elements of the herring ASM options under consideration (described in Section 3.0 of this document) specifically address the following factors, to the extent possible.

*Discussion of each of these factors with respect to the herring ASM options is provided below in italics.*

- **Requirements for New Data Collection/New Equipment.** New or different sampling protocols require modifications to observer training, which could increase training costs for both the government and service providers. If new or different sampling equipment is required to meet the monitoring program needs, the expense of the additional equipment will be incurred by the service provider. In addition, re-designing existing observer databases to incorporate new data introduces a significant administrative expense.

*The herring ASM options build on existing observer data collection protocols and do not require the collection of new/different data and/or new/additional sampling equipment. The protocols for the herring ASM options focus on the sampling of bycatch and is based on existing protocols for sampling bycatch and completing a NEFOP discard log for observed herring trips (see Section 3.1 for more information).*

- **SCA and FLSA Requirements.** Requirements associated with the Service Contract Act (SCA) and Fair Labor Standards Act (FLSA) apply to any contracts in which the Federal government is involved. There is likely to a reduction in sea day cost associated with eliminating any legal requirements that

apply specifically to contracts involving the Federal government. However, service provider companies would still be subject to FLSA requirements and other applicable labor laws.

The SCA applies to every contract entered into by the United States (government) or the District of Columbia. Contractors and subcontractors performing on these Federal contracts must observe minimum wage standards (based on the prevailing wage for a locality, as determined by the Department of Labor) as well as safety and health standards, and they must maintain certain records. The SCA requires that every employee working under the contract must be paid not less than the monetary wages, and must be furnished fringe benefits, which are determined based on locality. Fringe benefits include paid holiday leave, vacation time, and minimum requirements for health and welfare (80/20 compensation for health insurance). Because contracts in the Atlantic herring industry-funded monitoring program will be between service providers and participants in the fishing industry, it will not be necessary for these contracts to meet the requirements of the SCA.

However, even without the SCA requirements, service provider companies will still be required to pay employees not less than the federal minimum wage provided in the Fair Labor Standards Act (FLSA). The FLSA establishes minimum wage, overtime pay, recordkeeping, and youth employment standards affecting employees *in the private sector as well as in Federal, State, and local governments*. Covered non-exempt workers are entitled to a minimum wage of not less than \$7.25 per hour effective July 24, 2009. Overtime pay at a rate not less than one and one-half times the regular rate of pay is required after 40 hours of work in a workweek.

According to a report published by MRAG Americas (June 2012), Northern Economics (2011) estimated that the SCA and FLSA requirements are likely to add \$50-\$100 to the sea day cost for an industry-funded monitoring program. However, eliminating SCA requirements by privatizing contracts in this region is not likely to decrease sea day costs by as much as \$100 for two reasons: (1) FLSA requirements for minimum wage and overtime would still apply to vessel/provider contracts; and (2) employees working for companies currently providing observer coverage and at-sea monitoring services in this region have been working (some for many years) under government contracts, which are consistent with SCA requirements for wages and fringe benefits. It may be very difficult for service providers in this region to change the wage and benefit structure they offer to their employees, many of whom have been working in observer and ASM programs in this region for several years. Therefore, the reduction in sea day cost that can be expected from the privatization of contracts cannot be estimated with certainty but is likely to be on the lower end of the range predicted in the MRAG Report.

*\*This savings is not reflected in the current estimate of sea day costs for the groundfish ASM program.*

- **Ability to Predict the Fishery.** Sea day costs will likely be higher if service providers cannot predict how the fishery will operate (numbers of vessels/trips, length of trips, seasonality and spatial distribution of trips) in order to accurately estimate costs (administrative, overhead, communications, logistics) associated with deploying observers to meet the needs of the monitoring program. Predictability increases efficiency and therefore reduces costs. With limited information to predict the fishery, service providers are more likely to over-estimate costs associated with travel and observer deployment to ensure that they cover their costs.

*The Atlantic herring fishery is a small group of vessels that fish in a relatively predictable manner. Ultimately, in order to reduce costs, it will be up to industry participants to provide as much detail as*

*possible about their fishing patterns to the service providers when they negotiate contracts for sea days.*

- **Complicated Logistics (Vessel Selection and Observer Deployment).** The more infrastructure necessary to efficiently deploy observers to meet the needs of the monitoring program (field offices, coordinators, communications networks), then the higher the sea day costs will be. If pre-trip notification systems need to be expanded to determine observer/monitor deployment, this will likely increase costs.

*The existing pre-trip notification system (PTNS) can be utilized for vessel selection under the herring ASM options. The coverage targets are relatively simple and should not create overhead/staff costs associated with vessel selection/notification and observer deployment. In addition, travel costs associated with deploying observers on Category A/B herring vessels may be less than those for other IFM programs. The Atlantic herring fishery operates with a relatively small number of boats in a limited geographical area (versus the area covered by west coast fisheries), so observers can reach a number of deployment ports across several states more easily (ex., driving vs. flying).*

## 2.2 HOW CAN SEA DAY COSTS BE REDUCED?

Table 1 summarizes the ways that sea day costs can be in an industry-funded monitoring program. The discussion provided in Table 1 was generated from information provided by NEFOP personnel, observers, and representatives from service providers in the northeast and U.S. west coast. To the extent that the issues identified in Table 1 can be addressed through the management measures that establish/implement the IFM program, sea day costs borne by the fishing industry can be reduced.

**Table 1 Summary Discussion – How to Reduce Sea Day Costs**

How to Reduce Sea Day Costs	Discussion/Rationale
<b>Build from existing observer sampling protocols; do not require new/different data to be collected</b>	<ul style="list-style-type: none"> <li>Collecting data in a new/different way will require modifications to existing observer sampling protocols and training procedures, new/revised manuals/logs, possibly new/additional sampling equipment, and database design or restructure; this could increase administrative and training costs</li> </ul>
<b>Eliminate SCA and related regulatory requirements for Federal contracts</b>	<ul style="list-style-type: none"> <li>Federal requirements for wage structure/overtime/paid holidays/vacation are not necessary for contracts between vessels/providers; without specifically implementing these requirements as part of the IFM regulations, wage structure and benefits for employees would be determined by individual service provider companies; MRAG report (June 2012) estimates that eliminating these requirements may reduce costs by \$50-\$100 per sea day;</li> <li>FLSA and other Federal labor laws would still apply to service provider companies; however, eliminating the SCA requirements from IFM regulations is likely to result in some reduction in sea day cost;</li> <li>Not likely to result in \$100 per sea day cost savings in this region due to existing pay structure/benefits for observers required by Federal contracts;</li> <li><i>Needs NOAA GC Input*</i></li> </ul>
<b>"Grandfather in" current service providers approved for NEFOP observer coverage and GF ASM programs – approve these providers immediately for Herring ASM program</b>	<ul style="list-style-type: none"> <li>Reduces expense of applying/re-approving service provider companies already approved for other programs in the region; observers/monitors for approved service providers would still need NEFOP certification for Herring ASM program;</li> <li>Allows herring vessels to select from multiple service providers when program is established; increases negotiating opportunities for vessels at onset of program by creating competition between companies;</li> <li>Provides opportunity for existing service providers in GF ASM program to offer more work days to their observers (could reduce staff/overhead expenses for both programs)</li> </ul>
<b>Allow cross-certification of NEFOP and GF ASM observers for HER ASM program; combine/overlap training and recertification whenever possible</b>	<ul style="list-style-type: none"> <li>Cross-training and applying training courses to multiple certification reduces training costs (travel, hotel, per diem for service providers);</li> <li>Reduces equipment costs for service providers – no need to purchase duplicative equipment</li> <li>As previously noted, this may reduce overhead costs for GF ASM service providers by providing their observers with a greater number of days to work (improving ability for service providers to retain full-time employees)</li> </ul>

**Table 1 continued. Summary Discussion – How to Reduce Sea Day Costs**

How to Reduce Sea Day Costs	Discussion/Rationale
<b>Provide detailed information about fishing patterns for vessels participating in the industry-funded monitoring program</b>	<ul style="list-style-type: none"> <li>• Allows providers to more accurately estimate manpower/resources needed, logistics, overhead, and travel costs - reduces need for providers to over-estimate these costs to cover expenses that cannot be predicted prior to the start of the year;</li> <li>• Increases predictability of fishery for observer/monitor deployment;</li> <li>• Increases efficiency for service providers</li> </ul>
<b>Minimize observer deployment logistics</b>	<ul style="list-style-type: none"> <li>• Simplifying the selection process for vessels/trips that require industry-funded observers/monitors reduces costs for service providers because vessel selection/notification would not require additional staff or resources;</li> <li>• Pre-trip notification and selection for Herring ASM options could be built into existing herring PTNS; 100% coverage target options (and 50% coverage target options) eliminate need for service provider to develop a plan to meet specified coverage targets for the monitoring program;</li> </ul>
<b>Allow industry to negotiate less significant costs with providers</b>	<ul style="list-style-type: none"> <li>• Structure the provisions in the industry-funded monitoring program to allow the industry to negotiate as many minor costs as possible with service providers, to better meet their individual vessel needs circumstances;</li> <li>• These may include costs for trip cancellations and no-shows, meal reimbursements, partial day/hourly billing (see below), land-hour rates (if necessary), or other costs</li> </ul>
<b>Encourage service providers/industry to negotiate billing by partial days (versus 24 hour days)</b>	<ul style="list-style-type: none"> <li>• Sea scallop regulations 648.11(g)(5)(i)(A)(2) state that "For the purposes of determining a daily rate...a service provider may charge a vessel owner for not more than the time an observer boards a vessel until the vessel disembarks (dock to dock), where a day is defined as a 24-hour period, and portions of other days would be pro-rated at an hourly charge."</li> <li>• Industry participants should be aware that this can be negotiated in contracts with providers; may be opportunity to reduce sea day costs for some vessels depending on fishing operations;</li> <li>• Consideration should be given to the possibility of land hour time for observers/monitors, which may be necessary if days are billed partially or by the hour</li> </ul>
<b>Allow observers to be deployed on the same vessel for more than two consecutive multi-day trips, and more than twice in any given month for multi-day deployments</b>	<ul style="list-style-type: none"> <li>• Prohibited in current regulations for industry-funded observer coverage (Herring OBS options), implemented in SBRM amendment</li> <li>• Increases flexibility and reduces travel costs for service providers; appears to be consistent with regulations for Groundfish ASM</li> </ul>

**Table 1 continued. Summary Discussion – How to Reduce Sea Day Costs**

How to Reduce Sea Day Costs	Discussion/Rationale
<b>Encourage vessels in close proximity to negotiate contracts together so that they can utilize the same observers and minimize travel expenses</b>	<ul style="list-style-type: none"> <li>• Industry can reduce costs by collaborating with vessels that fish from same ports and/or during same seasons to reduce travel and related costs for observers/monitors</li> </ul>
<b>Streamline debriefing and re-certification requirements</b>	<ul style="list-style-type: none"> <li>• Reduces costs to service providers (travel/per diem)</li> </ul>
<b>Insurance</b>	<ul style="list-style-type: none"> <li>• There may be ways to reduce/streamline insurance requirements to reduce costs for providers. To the extent that duplicative or redundant insurance requirements can be eliminated, costs can be reduced. This issue requires further investigation.</li> </ul>
<b>Combine the IFM programs for herring and mackerel fisheries</b>	<ul style="list-style-type: none"> <li>• Would reduce complexity (PTNS, deployment, travel) and increase efficiency for service providers; increases number of sea days for amortizing travel/training expenses over the year;</li> <li>• Could increase the total number of work days available for ASM-certified observers/monitors and may reduce staff/overhead costs for service providers</li> <li>• The New England and Mid-Atlantic Councils should consider this further when the goals/objectives for IFM programs in the Atlantic herring and mackerel fisheries are more clearly articulated.</li> </ul>

As noted in Table 1, one way to reduce sea day costs is to provide service provider companies with accurate, detailed information about the fishery characteristics to better predict how vessels participating in the industry-funded monitoring program will operate over the course of the upcoming year. This allows providers to more accurately estimate the staff, resources, and overhead that will be needed to meet their contractual requirements. This information also helps service providers predict any travel expenses they may incur, therefore reducing the need to over-estimate these costs to cover expenses that cannot be anticipated ahead of time. Table 2 describes the types of fishery data that can help to better predict how vessels in the fishery will operate over the upcoming fishing year. Ultimately, in order to reduce sea day costs, it will be up to industry participants to provide as much detail as possible about their fishing patterns to the service providers when they negotiate contracts for sea days.

**Table 2 Types of Information/Data That Can Improve Predictability of the Fishery**

<b>Number of vessels and trips by gear type, area, and month</b>	<p><i>This information helps service providers estimate:</i></p> <ul style="list-style-type: none"> <li>• No. of observers are needed for the monitoring program</li> <li>• Number of days per month observers may work</li> <li>• Staff/overhead to deploy observers and maintain communications</li> <li>• Travel expenses and other logistics</li> </ul>
<b>Length of vessels, other vessel characteristics</b>	
<b>Length of fishing trips</b>	
<b>Percentage/proportion of back-to-back trips</b>	
<b>Port sailed/port landed; geographical extent of fishing</b>	
<b>Proportion of trips with different port sail/land</b>	
<b>Total ports sailed from (by month or season)</b>	
<b>How many boats will be out fishing at any given time?</b>	
<b>Number of hauls per trip (per day)</b>	<p><i>This helps to determine minimum number of hours of work per sea day; some service providers may pay their observers differently, depending on the work schedule at sea.</i></p>

### 3.0 ELEMENTS OF HERRING OPTIONS UNDER CONSIDERATION

The following subsections describe the elements of the options under consideration in the IFM amendment to establish industry-funded monitoring (IFM) in the Atlantic herring fishery, including the options for industry-funded observer coverage (Herring OBS) and the options for industry-funded at-sea monitoring (Herring ASM). The primary focus of the discussion in this document is regarding the details of the herring ASM options, which were added to the IFM amendment by the New England Council in January 2015. (The Mid-Atlantic Council added similar options for industry-funded monitoring in the Atlantic mackerel fishery.)

To the extent possible, the herring ASM options were developed based on the current multispecies (groundfish) at-sea monitoring (GF ASM) program for sectors. However, the elements of the herring ASM options have been designed with a more explicit intent of reducing sea day costs (borne by the fishing industry) to the extent possible. For comparison purposes, and for a better understanding of the factors that can increase sea day costs, the elements of the Groundfish ASM program are discussed throughout the following subsections. Since the sea day costs of the GF ASM program are currently better understood and recent estimates of these costs are available, the sea day costs of a herring ASM program can be estimated based on a comparison to the Groundfish ASM program.

In addition to the coverage targets specified within each option (see Draft IFM Amendment), the elements of the options for industry-funded monitoring in the Atlantic herring fishery include the sampling objectives, sampling design, data to be collected, service provider requirements, training and certification requirements, sampling equipment, logistics (trip notification) and related provisions, debriefing, and data management.

Under all of the herring at-sea monitoring options (HER ASM), to reduce sea day costs for vessels that are subject to the industry-funded monitoring requirements, the following provisions would apply:

- Existing service providers approved for observer coverage (NEFOP) and groundfish at-sea monitoring (GF ASM) would be “grandfathered in” as approved service providers for Herring ASM (observers working for these companies would still require certification for Herring ASM – see Section 3.2 for more information). Re-approval of the Herring ASM service providers after Year 1 would be consistent with the process for re-approving Groundfish ASM service providers.
- Cross-certification of observers from NEFOP and GF ASM programs would be allowed to certify observers for Herring ASM (see Section 3.2 for more information). Any training that is completed for a NEFOP and/or GF ASM certification could be applied to a Herring ASM certification during the same year. Training, certification, debriefing, and re-certification would be streamlined and combined with the NEFOP and GF ASM programs to the extent possible.

### 3.1 SAMPLING OBJECTIVES, SAMPLING DESIGN, DATA COLLECTED

The herring OBS options under consideration in the IFM amendment focus on the collection of comprehensive catch and bycatch data, along with other environmental and economic information, consistent with the NEFOP sampling protocols for high-volume fisheries. The herring ASM options focus on the collection of bycatch data, including documentation of full and partial slippage events,



operational discards, and catch that is discarded after being brought on board the vessel, i.e., any catch that is not kept/landed by the vessel. The intent of focusing the herring ASM options on the collection of bycatch (discard) data only is to reduce some of the training and equipment expenses associated with the monitoring program, thereby reducing sea day costs for the industry. The herring ASM options also represent one component of a comprehensive long-term catch monitoring program for the Atlantic herring fishery, which will also incorporate portside sampling and electronic monitoring (EM).

There would be no new or different data collection requirements under the herring ASM options; rather, the ASM options would require that a subset of the catch data that is currently collected by NEFOP observers on a limited number of herring trips (determined by the SBRM) be collected on more trips, i.e., trips with an industry-funded at-sea monitor. The sampling protocols for the ASM options would be developed by NEFOP based on information needed to document catch that is not kept/landed by the vessels, including slippage events and operational discards. In order to streamline training and equipment costs, the bycatch data (data elements and sampling protocols) collected by herring at-sea monitors would be consistent with bycatch data collected by groundfish at-sea monitors.

In general, data elements collected under the Herring ASM options would be identified based on existing NEFOP haul logs and the NEFOP discard log that was developed in 2010 specifically for vessels that pump fish. Table 3 represents a generic NEFOP haul log, and Table 4 represents a NEFOP discard log, which was developed by the NEFOP in 2010 specifically to meet the monitoring needs of the herring fishery. The discard log is currently required to be completed by observers on all hauls in which fish are pumped, as well as any significant discard events on vessels that do not pump fish. Under the herring ASM options, the discard log would be required to be completed by at-sea monitors on all observer hauls, regardless of gear type or fishing method. Basing the Herring ASM sampling design on the NEFOP discard log allows data collected by herring at-sea monitors to be compared to observer data since the discard log was created in 2010.

Table 3 NEFOP Generic Haul Log (Example)

"GENERIC" HAUL LOG NMFS FISHERIES OBSERVER PROGRAM OBHAU OBSPP 05/01/13										OBS/ TRIP ID A		DATE LAND (mm/yy) B /		PAGE # C OF	
GEAR CODE D	GEAR # E	HAUL # F	HAUL OBS? NO 0 YES 1 G	ON-EFFORT? NO 0 YES 1 H	CATCH? NO 0 YES 1 I	ING TAKE? NO 0 YES 1 J	WEATHER CODE K	WIND SPEED L DIRECTION M °		WAVE HEIGHT N ft	DEPTH, HAUL BEGIN O fm				
SET INFO		DATE mm/dd/yy	AND 24 hours	LATITUDE / LONGITUDE (DD MM.M) - LORAN (XXXXXX)				TARGET SPECIES Q		CODE(S) R					
S BEGIN		/ /	:	Station 1 Latitude	/ Bearing	Station 2 Longitude	/ Bearing								
E END		/ /	:	9960 -	P	9960 -									
T END		/ /	:	9960 -		9960 -									
HAUL INFO															
H BEGIN		/ /	:	9960 -		9960 -									
A END		/ /	:	9960 -		9960 -									
U END		/ /	:	9960 -		9960 -									
COMMENTS															
SAMPLE WEIGHT MULTIPLIER Z															
SPECIES						WEIGHT		SPECIES							
NAME	CODE	SUB-SAMPLE WEIGHT	POUNDS	DISP CODE	DYR	EST METHOD CODE		NAME	CODE	SUB-SAMPLE WEIGHT	POUNDS	DISP CODE	WEIGHT EST METHOD CODE		
S	T	U	V	W	X	Y									
							11								
							12								
							13								
							14								
							15								
							16								
							17								
							18								
							19								
							20								

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Table 4 NEFOP Discard Log (Example)

DISCARD LOG NMFS FISHERIES OBSERVER PROGRAM OBPDQ 05/01/13					OBS/ TRIP ID DATE LAND (mm/yy) PAGE #	
GEAR CODE <input type="text"/>	GEAR # <input type="text"/>	HAUL # <input type="text"/>	Why was the catch discarded on this haul? (CHECK ALL THAT APPLY)	Who estimated the weight of the discarded catch?	Was there an observer onboard the other vessel? If yes, provide the Tripid and Haul Number.	Check off the discard event. (CHECK ALL THAT APPLY)
Were there discards for this tow? No (0) Yes (1) Unknown (9)	When the pumping/hauling process was complete were you able to see the contents of the codend/bunt? No (0) Yes, all contents seen on deck (1) Yes, all/some contents seen in water (2)	<input type="checkbox"/> Unknown (0) (comment) <input type="checkbox"/> Market (1) <input type="checkbox"/> Regulations (2) <input type="checkbox"/> Quality (4) <input type="checkbox"/> Not brought onboard (5) <input type="checkbox"/> Other (9) (comment) <input type="checkbox"/> Not applicable	Observer (1) Captain (2) Combination (8) Not applicable	No (0) Yes (1) Unknown (9)	<input type="checkbox"/> Unknown (0) (comment) <input type="checkbox"/> Operational discards (1) <input type="checkbox"/> Tow was partially released (2) <input type="checkbox"/> Tow was fully released (3) <input type="checkbox"/> Discarded after being brought onboard (4) <input type="checkbox"/> Other (9) (comment) <input type="checkbox"/> Not applicable	REASONS NOT BROUGHT ONBOARD: Describe any reasons why the catch could not be pumped/hailed onboard.
CATCH COMPOSITION OF DISCARDED CATCH: Describe the catch composition of the discarded catch and how those determinations were made.				CHALLENGES OBSERVING THIS HAUL: Describe any challenges that occurred with observing this haul.		

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Different kinds of reporting and/or monitoring can provide different kinds of information with varying levels of verification, as illustrated for the Atlantic herring and mackerel fisheries in Table 5 and Table 6. These tables were developed by the IFM FMAT based on similar tables provided in the 2013 Fisheries Monitoring Roadmap Report (Lowman et al, 2013).

For landings, vessel trip reporting and dealer landings reporting provide dual records of reported landings with the general location coming from the vessel trip report. If specific location of catch is important, VMS, observers, and monitors can provide independent verification of location. Portside sampling can provide independent verification of total landings amounts but no information on location of catch. If small amounts of incidentally-caught species are typically mixed in and retained with the target species, portside sampling may be the best way to estimate/document those landings.

For discards (of targeted or incidental species), vessel trip reporting provides reported discards, but independent verification of discards is often desired. Observers and monitors can provide detailed location-specific discard information, though monitors may or may not collect species composition and may limit their data collection to confirming retention and generally documenting discarding frequency. Cameras (electronic monitoring) can also confirm retention. If retention is confirmed (by whatever means), then portside monitoring can provide full catch verification. Affidavits of discard/slippage events can provide details of why discard/slippage events occur. If retention is not confirmed, then portside sampling can provide independent verification of landings composition but uncertainty regarding discards will persist (assuming observer coverage is not complete).

Biological information (age/length data) must generally be collected by observers/monitors at sea or dockside samplers/port agents on land.

Depending on the level of detail desired for tracking landings and/or discards, some combination of the above monitoring and reporting requirements should address Council needs (the costs of the various requirements are described in Section 4.0 of this document). If independent verifications of both landings and discards are desired, then having either a high level of observer/monitor coverage that subsamples catch or verification of retention (by monitors or cameras) coupled with portside sampling should address that objective.

**Table 5 Monitoring Approaches for the Atlantic Herring Fishery Based on Data Needs**

		Self-Reporting			Independent monitoring					
Data Need		Vessel	Dealer	Affidavits	VMS	NEFOP Observers	Cameras	Portside	At-sea monitors	At-sea monitors
									With sampling for species comp	w/o sampling for species comp
Total herring catch accounting [ACL monitoring]	Verifying retained	Vessels report by species	Dealer reports by species		Can verify location fishing activity	Verifying location of fishing activity	Not quantifying, but confirming retention	Not useful for vessels fishing in more than one area	Verifying location of fishing activity	Not quantifying, but confirming retention
	Quantifying discards	Vessels report by species			Can verify location fishing activity	Species composition data Estimates amount of discards	Not quantifying, but confirming retention		Species composition data	Not quantifying, but confirming retention
Non-target catch accounting	Haddock catch cap monitoring [ACL monitoring]	Used for total retained		Can help with details of why slippage occurs	Can verify location fishing activity	Species composition data Estimates amount of discards	Not quantifying, but confirming retention	Not useful for vessels fishing in more than one area	Species comp and estimates of discarded catch	Not quantifying, but confirming retention
	River herring and shad catch cap monitoring	Used for total retained		Can help with details of why slippage occurs	Can verify location fishing activity	Species composition data Estimates amount of discards	Not quantifying, but confirming retention	Not useful for vessels fishing in more than one area	Species comp and estimates of discarded catch	Not quantifying, but confirming retention
Scientific information	Stock assessments for herring	VTR only				Collect age, length data		Collect age, length data	Collect age, length data for discards only	
	Stock assessments for non-target species	VTR only				Collect age, length data		Collect age, length data	Collect age, length data for discards only	
	Spawning information					Collect age, length data		Collect age, length data	Collect age, length data for discards only	

**Table 6 Monitoring Approaches for the Atlantic Mackerel Fishery Based on Data Needs**

		Self-Reporting			Independent monitoring					
Data Need		Vessel	Dealer	Affidavits	VMS	NEFOP Observers	Cameras	Portside	At-sea monitors	At-sea monitors
									With sampling for species comp	Without sampling for species comp
Total mackerel catch accounting [ACL monitoring]	Verifying retained	Vessels report by species	Dealer reports by species		Can verify location fishing activity	Verifying location of fishing activity	Not quantifying, but confirming retention	Not useful for vessels fishing in more than one area	Verifying location of fishing activity	Not quantifying, but confirming retention
	Quantifying discards	Vessels report by species			Can verify location fishing activity	Species comp data Estimates amount of discards	Not quantifying, but confirming retention		Species comp data	Not quantifying, but confirming retention
Non-target catch accounting	River herring and shad catch cap monitoring	Used for total retained		Can help with details of why slippage occurs	Can verify location fishing activity	Species comp data Estimates amount of discards	Not quantifying, but confirming retention	Not useful for vessels fishing in more than one area	Species comp and estimates of discarded catch	Not quantifying, but confirming retention
Scientific information	Stock assessments for mackerel	VTR only				Collect age, length data		Collect age, length data	Collect age, length data for discards only	
	Stock assessments for non-target species	VTR only				Collect age, length data		Collect age, length data	Collect age, length data for discards only	

Table 7 summarizes the sampling objectives, the primary elements of the sampling design, and the data to be collected under the options for industry-funded monitoring in the Atlantic herring fishery (herring OBS and herring ASM options – see description of options in the Draft IFM Amendment); the elements of the current groundfish ASM program are also provided in the table for comparison purposes. Under all of the options, the details of the sampling protocols and logs to be completed would be determined by NEFOP upon implementation of the IFM amendment.

**Table 7 Herring IFM Options: Sampling Objectives, Sampling Design, Data Collected**

	<b>Industry-Funded Observer Coverage Options (OBS)</b>	<b>NE GROUNDFISH ASM PROGRAM</b>	<b>Industry-Funded Herring ASM Options (Herring ASM)</b>
<b>Sampling Objectives</b>	SBRM, MMPA, MSA, ESA Stock Assessment, Discard Estimation	MSA Catch monitoring; discard estimation	<i>Bycatch documentation</i> - catch that is not kept/landed on Herring Category A/B herring vessels, including full and partial slippage events and operational discards; also including catch that may be brought aboard, sorted, and then discarded <i>Elements of data collection based on GF ASM; Herring ASM program is intended to complement portside sampling/EM for comprehensive catch monitoring program (landings + discards)</i>
<b>Sampling Design</b>	Comprehensive catch and bycatch data collection program; protected species documentation; biological sampling; environmental parameters; economic information	Catch monitoring to ensure that ACLs are not exceeded; data on catch composition to estimate total discards by sectors and common pool vessels, by gear type and stock area	Sampling protocols based on NEFOP Haul Log ("modified" - discards); Discard Log; Documentation of bycatch (discards); Protected species interactions; <i>(in addition to pre-trip safety checklist and other logs/reports as determined by NEFOP)</i>
<b>Data Collected</b>	Comprehensive catch/bycatch catch/bycatch; biological samples; protected species; fishery information; environmental parameters	Catch/Bycatch	Catch not brought on board the vessel for any reason; Slippage events; Operational discards; Discards brought on board <i>No subsampling for kept catch estimation</i>

*\*The elements of the Groundfish ASM program are provided in the table above for comparison purposes.*

### 3.2 SERVICE PROVIDER REQUIREMENTS

Under the herring OBS options, the requirements for approving service providers and certifying observers for observer coverage (HER OBS) are proposed to be consistent with those implemented recently through the SBRM amendment (CFR 648.11(h)). Under the herring ASM options, the requirements for approving service providers and certifying observers for the herring at-sea monitoring program (HER ASM) are proposed to be consistent with those for the groundfish sector ASM program, implemented through Amendment 16 to the Multispecies FMP (CFR 648.47(b)(4) and (b)(5)). This approach is consistent with the January 2015 Council motion regarding the addition of the Herring ASM options.

Appendix I of this document provides a detailed comparison of the service provider regulatory requirements for approval/certification under the herring observer coverage options (HER OBS) and the herring at-sea monitoring options (HER ASM). As previously noted, the HER ASM service provider requirements are based on the current requirements for the groundfish ASM program. The major elements of the options as well as the differences between the herring OBS options and herring ASM options are discussed below.

#### *Under the Herring OBS Options:*

- Service provider requirements for industry-funded observer coverage would be consistent with those recently implemented through the SBRM amendment (CFR 648.11(h), Table 8, see details in Appendix I).
- Certified observers would be required to qualify/receive and additional NEFOP high-volume certification to work on herring OBS trips. MRAG Americas is currently the only service provider with high-volume certified observers because this is the company that has the existing (five-year) contract with NMFS for observer coverage under the SBRM amendment. Under the herring OBS options, additional service provider companies would need to apply and be approved by NMFS for observer coverage and train/certify their observers through NEFOP for observer coverage in high-volume fisheries.

#### *Under the Herring ASM Options:*

- Service provider requirements for industry-funded herring at-sea monitoring would be consistent with those for the multispecies (groundfish) sector at-sea monitoring program, implemented in Amendment 16 to the Northeast Multispecies FMP (CFR 648.47(b)(4) and (b)(5), Table 8, see details in Appendix I).
- Existing service providers approved for observer coverage and the groundfish ASM program would be “grandfathered in,” i.e., automatically approved for the herring ASM program, when the omnibus IFM amendment becomes effective. This increases negotiating opportunities for participants in the fishery by providing competition between companies at the onset of the industry-funded monitoring program (versus having only one service provider available at the program onset).



- Observers working for HER ASM-approved service providers would be required to obtain a Herring ASM certification before being deployed for at-sea monitoring trips on herring vessels. Re-approval of the herring ASM service providers after Year 1 would be consistent with the process for re-approving groundfish ASM service providers.
- Cross-certification for existing providers/observers across multiple monitoring programs would be allowed and encouraged to minimize additional training for a HER ASM certification. Observers employed by the service provider companies that are approved for NEFOP observer coverage and/or groundfish ASM could apply their training for these certifications to a herring ASM certification during the same year. An abbreviated herring ASM training program would be developed to certify new (HER ASM only) observers who are not already certified/certifying for observer coverage or groundfish ASM. This is discussed more in Section 3.3 of this document.
- Provisions for re-certification of herring ASM observers would be consistent with those for Groundfish ASM, but the time needed for re-certification would likely be shorter (see Section 3.3).

The primary differences between the service provider requirements proposed under the HER OBS options and the HER ASM options is that there is no requirement for observers to have a college degree for HER ASM, and there is no prohibition on deploying observers on back-to-back multi-day trips or multiple multi-day trips on the same vessel in the same month (Table 8). Eliminating the college degree requirement and prohibition on multiple trips should reduce sea day costs by increasing the potential pool of observers for-hire and reducing logistics and travel expenses associated with deploying observers on multiple fishing trips. However, concerns about observer retention and data quality have been expressed regarding the elimination of the college degree requirement; these concerns should be considered carefully under the HER ASM options.

Another difference between the options is that the regulations regarding service provider approval and responsibilities under the herring ASM options do not include requirements for service providers to meet SCA/FLSA and Department of Labor (DOL) wage/overtime standards. While it is expected that service provider companies will continue to adhere to DOL and other applicable Federal labor laws, the proposed regulations for the HER ASM options would not further address these requirements, which is also consistent with the current service provider requirements for the Groundfish ASM program. As previously discussed (see Sections 2.1 and 2.2), there is likely to be a sea day cost savings by eliminating these requirements.

**Table 8 Herring IFM Options: Service Provider Requirements**

	<b>Industry-Funded Observer Coverage Options (HER OBS)</b>	<b>NE GROUND FISH ASM PROGRAM</b>	<b>Industry-Funded Herring ASM Options (HER ASM)</b>
<b>Service Provider Requirements</b>	<i>Implemented through SBRM Amendment</i>	<i>Implemented through Am 16 Multispecies FMP</i>	<i>Same as Groundfish ASM Program</i>
	CFR 648.11( h) Observer Service Provider Approval/Responsibilities	CFR 648.47(b)(4) and (b)(5)	<i>No requirement for providers to meet SCA/FLSA/DOL wage/overtime standards</i>
	Bachelor's Degree required	High School Diploma or equivalency	<i>High School Diploma or equivalency</i>
		<i>No prohibition on observer deployment on back-to-back trips or multiple multi-day trips</i>	<i>No prohibition on observer deployment on back-to-back trips or multiple multi-day trips</i>
<b>Current NMFS-Approved Providers</b>	MRAG Americas	MRAG Americas East West Technical Services AIS, Inc. ACD USA Ltd.* Fathom Research, LLC*	MRAG Americas East West Technical Services AIS, Inc. ACD USA Ltd.* Fathom Research, LLC*

*\*Service provider companies with an asterisk by their names have been approved for Groundfish ASM but are not currently providing sea day coverage.*

*The elements of the Groundfish ASM program are provided in the table above for comparison purposes.*

### 3.3 OBSERVER TRAINING, CERTIFICATION, AND SAMPLING EQUIPMENT

General provisions related to observer training, certification, and sampling equipment under the herring OBS and ASM options are summarized in Table 9 and Table 10. Training and certification of industry-funded observers under the HER OBS and HER ASM options would be administered/managed through NEFOP, consistent with training and certification for the groundfish ASM program (GF ASM). Approved service providers would be responsible for covering the costs associated with providing their employees with a daily stipend, meals, hotel/lodging, and covering other related expenses associated with attending training/certification courses at NEFOP (Falmouth, MA). This can include lodging, meals, and a daily stipend over weekends if training courses more than one week.

Cross-certification of observers and carryover of overlapping training/equipment from NEFOP and GF ASM programs would be allowed to certify observers under the herring ASM options. Any training courses that are completed for a NEFOP observer coverage certification and/or GF ASM certification could be applied to a herring ASM certification during the same year. Training, certification, debriefing, and re-certification would be streamlined (ex., provided remotely) and combined with the NEFOP and GF ASM programs to the extent possible. Because the herring ASM program focuses only on the collection of discard data on Category A/B herring vessels, training requirements and equipment needs for a HER ASM only certification (observers not certified for other programs) would be less than those for the industry-funded observer coverage (OBS options) or the GF ASM program. Therefore, the costs paid by service providers to certify observers for the HER ASM program are expected to be less than those for observer coverage (OBS options) and the GF ASM program, which is likely to reduce the sea day costs for the HER ASM options. Any newly-approved service providers that do not have observers currently certified for either NEFOP observer coverage or GF ASM would incur the largest training/certification/equipment costs under the HER ASM options.

#### ***Under the Herring OBS Options:***

- Observers (employed by approved service providers) would need to attend 15 training days to obtain a NEFOP certification for observer coverage (Table 9). Newly certified observers would be required to work four training trips, including one trip with a veteran observer. Additional experience (sea days) is necessary prior to qualifying for a high-volume certification, which would then require one additional training day.
- Current GF ASM-certified observers could obtain a NEFOP certification for observer coverage under the Herring OBS options with additional training days and a high-volume certification.

***Under the Herring ASM Options:***

- Any training that is completed for a NEFOP observer coverage and/or GF ASM certification by observers working for approved service providers could be applied to a HER ASM certification during the same year. Observers already certified for NEFOP and/or GF ASM would not require training trips with a veteran observer to certify for HER ASM. This should significantly reduce costs for existing service providers that may want to “dual certify” their observers for multiple monitoring programs, including herring ASM. Many costs associated with training/certifying observers under the herring ASM options would be incurred only by service provider companies that are certifying their observers for HER ASM only.
- Current NEFOP-certified observers with high-volume certification would not require additional training days to certify for HER ASM, but would likely require some overview/instruction regarding the protocols for HER ASM trips (possibly conducted remotely/online).
- Current groundfish ASM-certified observer would likely require 1-2 additional training days to learn more about herring fishing operations (midwater trawl, purse seine, and small mesh bottom trawl gear) and sampling protocols in high-volume fisheries. Based on cost information provided by service provider companies (\*see below), the cost of certifying GF ASM observers for HER ASM would be about \$320-\$640 (1-2 training days), or about 10-20% of the cost of certifying observers for the GF ASM program (11 training days).
- New observers certifying for HER ASM-only (employed by approved service providers) would likely require 4-5 training days, which includes two days of safety training plus 2-3 days of training for the HER ASM program (herring fishing operations, sampling protocols, data entry, species identification). To obtain a HER ASM certification, new observers would be required to work four training trips, including one trip with a veteran observer. Based on the cost information provided by service provider companies (\*see below), the cost of certifying new observers for HER ASM only would be about \$1,500-\$2,000 per observer (4-5 training days), or about 50% of the cost of certifying observers for the GF ASM program (11 training days).
- Annual recertification would be required for the HER ASM program, but the recertification process could likely be reduced to one day. The GF ASM program recertification currently lasts three days. The costs to service providers for recertifying observers under the herring ASM options, therefore, is expected to be 1/3 of the cost for recertifying observers for Groundfish ASM. To the extent possible, the recertification courses for these programs would be combined and/or provided remotely.

*\*The cost for training/certifying one observer for the Groundfish ASM program is estimated by service providers to be \$3,000-\$4,000 (personal communication). This includes travel, meals, lodging, and a daily stipend for 11 training days at the NEFOP training center in Falmouth, MA. This results in an average estimate of about \$320 per training day per observer.*

Under the herring ASM options, expenses for sampling equipment would be shared between the Federal government and the service providers in a manner that is similar to the current groundfish ASM program. Because of the focus on bycatch/discards only, less sampling equipment would likely be needed for the herring ASM options versus the herring OBS options (Table 10). Personal safety equipment (immersion suit, inflatable vest, etc.) would continue to be paid for by the service providers; existing observers certified observer coverage and the GF ASM program already possess personal safety equipment and would not need to purchase it again to certify for HER ASM. Other personal issue and off-the-shelf gear such as small scales, gloves, bags, measuring tapes, knives, clipboards, etc. would be covered by the service provider. Additional costs for this equipment would be incurred primarily by newly-approved service providers that do not have observers currently certified for either NEFOP observer coverage or GF ASM. Special prints, special electronics, and not-off-the-shelf gear would continue to be funded by the Federal government, although the availability of future funding is unknown. This includes manuals, field guides, tablets, logs, laptops, and other electronics. The costs of any sampling equipment not provided by the Federal government must be covered by the service providers and is therefore transferred to the industry in the sea day cost.

Overall, because of the need for less sampling equipment and the ability for current NEFOP and GF ASM observers to utilize existing equipment for a herring ASM program, the equipment costs associated with the herring ASM options are expected to be less than those for the herring OBS options. The equipment costs for the herring ASM options will also be lower for service providers with observers who are already certified for groundfish ASM.\*

*\*Information provided by NMFS indicates that the estimated sea day cost incurred by the service provider for equipment in the Groundfish ASM program is \$17.50 per observer (based on the observer working 150 sea days in a year).*

**Table 9 Herring IFM Options: Observer Training and Certification**

	Industry-Funded Observer Coverage Options (OBS)	NE GROUND FISH ASM PROGRAM	Industry-Funded Herring ASM Options (Herring ASM)
<b>Training and Certification</b>			
<i>Training Courses</i>	15 days (3 working weeks) comprehensive training, plus high-volume certification for qualified observers (one extra day); <b>Current Groundfish ASM-certified Observers</b> - can certify for OBS with additional training days and high-volume certification	11 days (covers multiple gear types - gillnet, longline, otter trawl, handline - catch estimation procedures, protected species)	<b>NEFOP-Certified Observers with Current High-Volume Certification</b> - no extra training days, but possibly some instruction on protocols for ASM trips; <b>GF ASM-Certified Observers</b> - 1-2 training days for herring/high-volume; <b>New HER ASM Observers</b> - 4-5 training days for HER ASM only certification (2 days safety, plus herring/high-volume training);  <i>Providers pay for travel/lodging, and daily pay to observers for attending training;</i> <i>Est. provider cost for Gfish ASM training (11 days) - \$3000-\$4000 per observer (\$325/day)</i>
<i>Certification/Shadow Trips</i>	Yes, 4 trips incl. 1 with trainer	Yes, 4 trips incl. 1 with trainer	Not required for existing NEFOP and GF ASM-certified observers (already certified); New HER ASM only observers - one shadow trip with trainer; first four trips would be training trips
<i>Re-certification</i>	No	Yes, Annual	Yes, annual - one day (Gfish ASM - 3 days; cost reduced by 2/3)
<i>Safety Refresher (two days)</i>	Yes, every 18 months	Yes, every 18 months	Yes; cross-certify; additional cost only for HER ASM-only observers
<i>CPR/First Aid Certification</i>	Annual	Annual	Annual; cross-certify; additional cost only for HER ASM-only observers

**Table 10 Herring IFM Options: Observer Equipment**

	Industry-Funded Observer Coverage Options (Herring OBS)	NE GROUND FISH ASM PROGRAM	Industry-Funded Herring ASM Options (Herring ASM)
<b>Equipment</b>	Comprehensive - 83 items	Limited - 44 items	Limited - Similar to Groundfish ASM; any equipment necessary for discard sampling/documentation
<i>Personal Safety Equipment- Immersion suit, PLB, Inflatable Vest</i>	Yes	Yes, covered by provider	Yes, covered by provider; Equipment for NEFOP and GFASM can be used; Additional cost only for HER ASM-only observers
<i>Personal Issue and Off-the-Shelf Gear</i>	(baskets, small scales, gloves, bags, measuring tapes, disposable cameras, knives, clipboards)	Yes, covered by provider	Yes, covered by provider; Est. total cost for new observer (\$2,600 amortized for life of equipment); Est. sea day cost (service provider) per observer (150 days) - \$17.50
<i>Special Prints, Electronics, Not Off-the-Shelf Gear</i>	(manuals, guides, Marek scales, tablets, logs, electronics)	Yes, covered by NMFS	Yes, covered by NMFS; future funding unknown

*The elements of the Groundfish ASM program are provided in the tables above for comparison purposes.*

### 3.4 PRE-TRIP NOTIFICATION, DEBRIEFING, AND DATA MANAGEMENT

Provisions related to vessel selection (through pre-trip call-in/notification), debriefing, and data management for the herring OBS and ASM options are summarized in Table 11. Under all of the herring OBS and ASM options, vessel selection/notification for industry-funded coverage would occur through the existing pre-trip call-in system for Atlantic herring vessels (Amendment 5). The Atlantic herring notification process differs from the Groundfish Pre-Trip Notification System.

The existing notification system for observer deployment on Atlantic herring vessels requires all limited access herring vessels (as well as Category D vessels fishing with midwater trawl gear in Areas 1A, 1B, and/or 3) and all Atlantic herring carrier vessels to notify NMFS/NEFOP at least 48 or 72 hours (depending on permit category) prior to the beginning of any trip where the vessel may harvest, possess, or land Atlantic herring. Vessels/representatives must provide information including the vessel name, permit number/permit category, contact person name and contact phone number, date sail, time sail, port of departure, gear type, and area intending to fish (i.e., herring management area, closed area, etc., consistent with regulatory requirements), as well as target species (target species is helpful to identify directed herring versus directed mackerel trips). Notification is through a telephone number. Vessels can provide pre-trip notification for multiple trips at one time. If a trip is cancelled, a vessel representative must notify NMFS of the cancelled trip, even if the vessel is not selected to carry an observer. All waivers or observer selection notices for observer coverage are issued to the vessel by VMS so as to have on-board verification of the waiver or selection.

The existing pre-trip notification system (PTNS) for observer deployment on groundfish and longfin vessels requires all vessels fishing on PTNS-eligible groundfish trips or PTNS-eligible longfin trips to notify NMFS/NEFOP at least 48 hours prior to the beginning of any trip. Groundfish sector vessels with category A, C, D, E, F, and HA multispecies permits must notify for all multispecies trips. Common pool vessels with categories A, D, E, and F permits, as well as those fishing monkfish or multispecies using A DAS must notify for their groundfish trips. Vessels with a longfin/butterfish moratorium (SMB 1) permit must notify for all trips on which they plan on landing greater than 2500 pounds of longfin squid. Vessels/representatives must provide information including the vessel name, permit number, contact person name and contact phone number, date sail, time sail, port of departure, estimated length of trip, gear type, and area intending to fish. There are several methods available for the pre-trip notification: internet, email, and telephone. Vessels can provide pre-trip notification for multiple trips at one time and may enter their own trips directly into the PTNS without contacting FSB staff. Trips are entered into the PTNS and go through a programmed algorithm to determine which trips get selected for observer coverage. Trips are cancelled by FSB staff based on automated sail reports. All waivers or observer selection notices for observer coverage are issued to the vessel via VMS so as to have on-board verification of the waiver or selection. The PTNS system in all its complexity requires a full time contractor to oversee the system on a daily basis. The NEFOP also contracts with an afterhours phone service to provide access 24 hours a day, 7 days a week to allow for notifications or troubleshooting.

Under the Herring OBS and ASM Options, vessels would be notified via VMS if they are selected for industry-funded coverage. The 100% coverage target options simplify vessel selection, as all vessels that are not selected for observer coverage under the SBRM provisions would be required to obtain an industry-funded observer employed by one of the service providers approved for the monitoring program.

**Debriefing** is an important component of any monitoring program, as it helps to resolve data issues expeditiously and ultimately enhances data quality. It also provides an opportunity to review observer performance and address any problems with data collection and data entry. Provisions for debriefing under the Herring ASM options would be consistent with those for the Groundfish ASM program. To the extent possible, debriefing will be streamlined (for example, conducted remotely) to reduce travel and other related costs. The most successful debriefings are conducted soon after the vessel lands and after the preliminary data are uploaded to the NEFOP program. Preliminary data can be reviewed by staff and follow-up questions answered in a timely manner. Information is then edited near real-time and is therefore more accurate. Sampling in the high volume fisheries can be challenging and direct communication with observers after trips land is key to understanding the data, especially slippage information.

Responsibilities and provisions for **data management** under the Herring ASM options would be the same as those for observer data and data collected for Groundfish ASM. The NEFOP would manage the data. A summary of preliminary data would be uploaded electronically, by observers and reviewed by the NEFOP staff. Once verified the data are available for use by GARFO and other end users. Data are stored in master tables in the Observer database, and fully audited data are available 90 days after date landed.



**Table 11 Herring IFM Options: Logistics (Notification), Debriefing, and Data Management**

	Industry-Funded Observer Coverage Options (HER OBS)	NE GROUND FISH ASM PROGRAM	Industry-Funded Herring ASM Options (HER ASM)
Logistics and Related Provisions	PTNS	Gfish PTNS	Build into existing pre-trip notification system for Herring A/B vessels (different from GFish) <i>No need to develop strategy for vessel selection under 100% coverage options (or possibly 50%)</i>
Debriefing	Yes	Yes	Yes; Pre-trip and post-trip briefing important for discard logs; <i>Streamline/combine debriefing to the extent possible</i>
Data Management	NEFSC/NEFOP	NEFSC/NEFOP	Data submitted to NEFOP for use by all users (NEFSC, GARFO, NEFMC) under a separate program code
	Upload OB PRELIM record 48 hours from landing	Upload OB PRELIM record 48 hours from landing	OBPRELIM upload - a) Delivery of paper log data shall be received within 5 calendar days (120 hours) of the vessel landing (b) Delivery of electronic data shall be received within 2 calendar days (48 hours) of the vessel landing
	Paper logs due 5-7 business days	Paper logs due 5-7 business days	Paper logs due 5-7 business days

*\*The elements of the Groundfish ASM program are provided in the table above for comparison purposes.*

### 3.5 SUMMARY: COMPARISON OF HERRING OBS AND ASM OPTIONS

Table 12 provides a qualitative comparison of some of the pros/cons associated with the options under consideration in the IFM amendment to establish industry-funded monitoring in the Atlantic herring fishery.

**Table 12 Qualitative Comparison of Options for Industry-Funded Monitoring in the Atlantic Herring Fishery (Herring OBS Options vs. Herring ASM Options)**

<b>Observer Coverage Options (HER OBS)</b>	<b>Pros</b>	<b>Cons</b>
	Comprehensive catch sampling (kept and discarded)	Higher sea day cost
	Biological samples collected	Limited ability to reduce industry/sea day costs
	More applications/uses for data (stock assessment, catch monitoring, etc.)	Industry-funded observer data not collected consistently with SBRM strata (gear type, area) not utilized for bycatch estimation and stock assessment
		Limited to only one service provider at onset of industry-fund program; higher costs for other providers to certify observers
<b>At-Sea Monitoring Options (HER ASM)</b>	<b>Pros</b>	<b>Cons</b>
	Reduces sea day costs for industry	Discard data only; more limited applications of data
	Builds on existing discard data collected by observers (provides basis for comparison to observer data)	Loss of opportunity to collect other important data while paying for an observer
	Focuses on at-sea component of comprehensive long-term catch monitoring program that will likely include portside sampling and EM	
	Multiple service providers available at onset of industry-funded program; increases flexibility and negotiating ability for industry; competition reduces costs	
	Discard data collected by at-sea monitors can help to inform decisions about maximized retention provisions for the portside sampling/EM components of the IFM program	

#### **4.0 ESTIMATED SEA DAY COSTS FOR THE HERRING ASM OPTIONS**

For the purposes of the omnibus IFM Amendment, an estimate of the sea day cost that may be expected under the Herring ASM options will be developed by the IFM FMAT based on estimates of sea day costs for NEFOP observer coverage (currently estimated at \$806 in the Draft IFM Amendment) and the Groundfish ASM program. This sea day cost can be used in the economic analysis for a comparison of the impacts of the Herring ASM options to the Herring OBS options.

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# Omnibus Industry-Funded Monitoring (IFM) Amendment

## *Amendment 7 to the Atlantic Herring FMP*

### DRAFT APPENDIX I: SERVICE PROVIDER REQUIREMENTS

*Proposed Regulations for Herring Industry-Funded Observer Coverage (OBS) and Herring Industry-Funded At-Sea Monitoring (ASM)*

#### **Regulations for Service Provider Approval**

	Industry-Funded Observer Coverage (OBS) Options Service Provider Requirements <i>Consistent with SBRM Amendment</i>	Proposed Atlantic Herring At-Sea Monitoring (ASM) Service Provider Requirements <i>Consistent with NE Groundfish ASM Requirements</i>
<b>At-Sea Sampler/Observer Coverage (CFR 648.11)</b>		<b>Independent Third-Party Monitoring Provider Standards</b>
<b>CFR 648.11( h) Observer Service Provider Approval/Responsibilities</b>		<b>CFR 648.47(b)(4) and (b)(5)</b>
<b>3. Contents of Application</b>	<i>Corporate structure, contact information, conflict-of-interest and other statements</i>	<i>Same requirements (b)(4)</i>
	<i>Summary of prior experience, monitoring services provided</i>	<i>Same requirements (b)(4)</i>
	<i>Proof of Insurance - Workers Compensation and Maritime Employer's Liability Insurance \$5M min)</i>	<i>Addressed in i(G) Evidence of adequate insurance to cover in jury, liability, and accidental death</i>
	<i>Proof that salaries meet/exceed DOL Guidelines, compensation for FLSA non-exempt employees, information about benefits and personnel services provided</i>	<i>Addressed in (b)(4)(i)(H) Proof of benefits and personnel services, but no reference to DOL Guidelines or FLSA requirements</i>
	<i>Names of NMFS-certified observers and trainees</i>	<i>Addressed in (b)(4)(i)(I) Proof that monitors have passed adequate training course to the extent not funded by NMFS, consistent with NEFOP</i>
	<i>Emergency Action Plan</i>	<i>(b)(4)(i)(J) Same</i>
		<i>(b)(4)(i)(K) Evidence that the company is in good financial standing</i>

**Regulations for Service Provider Responsibilities**

	<b>Industry-Funded Observer Coverage (OBS) Options Service Provider Requirements</b> <i>Consistent with SBRM Amendment</i>	<b>Proposed Atlantic Herring At-Sea Monitoring (ASM) Service Provider Requirements</b> <i>Consistent with NE Groundfish ASM Requirements</i>
<b>At-Sea Sampler/Observer Coverage (CFR 648.11)</b>		<b>Independent Third-Party Monitoring Provider Standards</b>
<b>CFR 648.11( h) Observer Service Provider Approval/Responsibilities</b>		<b>CFR 648.47(b)(4) and (b)(5)</b>
<b>5. Responsibilities of Observer Service Providers</b>	<i>Provide observers with transportation to initial location of deployment, subsequent vessel assignments, and debriefing locations</i>	<i>(b)(4)(ii)(A) Must establish and carry out a comprehensive plan to deploy NMFS-certified at-sea monitors, or other at-sea monitoring mechanism (ex., NMFS-approved EM equipment) to meet specified coverage levels;</i>  <i>(b)(4)(ii)(A)(1)-(A)(6) include specific requirements for groundfish sector monitoring</i>
	<i>Lodging, per diem, and any other services for observers to attend training classes</i>	
	<i>Required observer equipment prior to training or deployment</i>	<i>Addressed in (b)(4)(ii)(J); and (b)(5)(i) - providers are responsible for cost of gear to the extent not funded by NMFS</i>
	<i>Individually-assigned communication equipment (cell phones, other devices)</i>	
<i>iii. Logistics</i>	<i>Must be able to deploy observers based on comprehensive plan (24/7) with phone system to secure coverage, must access all ports, report deployments to NMFS, fair/equitable assignment of observers</i>	<i>Addressed in (b)(4)(ii)(A)</i>
<i>iv. Limitations</i>	<i>Review/edit/approve data from first four deployments by candidate observer before certifying</i>	
	<i>Observers cannot be deployed on the same vessel for more than two consecutive multi-day trips; observers cannot be deployed on the same vessel more than twice in any given month for multi-day deployments</i>	<i>Not addressed in Groundfish ASM Provider Requirements</i>
<i>v. Communications with Observers</i>	<i>Must have employee on call 24/7 to handle issues</i>	
<i>vi. Observer Training Requirements</i>	<i>Must submit information about trainees at least 7 days prior to training</i>	
<i>vii. Reports</i>	<i>Observer deployment reports w/in 24 hours; reports back in OBSCON data w/in 24 hours of landing; raw data w/in four days of landing</i>	
	<i>Safety refusals within 24 hours; Return biological samples within 7 days; Debriefing availability for up to 2 weeks following trip; Observer availability report to NMFS by 5 p.m.; other reports (harassment, discrimination, injury, etc.) within 24 hours of event</i>	<i>(b)(4)(ii)(B) Monitors must remain available to NMFS for debriefing at least two weeks following trip; (b)(4)(ii)(C) similar requirements for other reports in this section</i>
	<i>Requirements for observer status reports, vessel contracts, observer contracts and additional information that may be distributed to vessels</i>	<i>(b)(4)(ii)(D) contracts and (b)(4)(ii)(E) other paperwork distributed to vessels</i>
<i>viii. Refusal to Deploy Observer</i>	<i>If provider does not have observer available within 48 hours of request; if the vessel is determined unsafe; other reasons including failure to pay for previous deployments (if authorized in writing by NMFS)</i>	<i>(b)(4)(ii)(F); also includes refusal for inadequate notice for departure or landing</i>
<b>6. Limitations on Conflict of Interest</b>	<i>No direct/indirect interest in fishery/vessels/dealers/research/advocacy; must assign observers without preference; must not solicit or accept gifts, favors, loans, etc.</i>	<i>Addressed in (b)(4)(ii)(G)</i>
<b>7. Removal of Service Provider</b>	<i>Process for removal if provider does not meet requirements/conditions of service, conflict of interest, criminal convictions, embezzlement, theft, etc., crimes of dishonesty, unsatisfactory performance ratings on Federal contracts, evidence of de-certification</i>	<i>(b)(4)(ii)(I) A means to protect the confidentiality and privacy of data submitted by vessels, as required under the MSA</i>

## Regulations for Observer Certification

	Industry-Funded Observer Coverage (OBS) Options Service Provider Requirements <i>Consistent with SBRM Amendment</i>	Proposed Atlantic Herring At-Sea Monitoring (ASM) Service Provider Requirements <i>Consistent with NE Groundfish ASM Requirements</i>
<b>648.11(i) Observer Certification</b>		<b>Independent Third-Party Monitoring Provider Standards</b>
<b>(1) Eligibility Standards</b>	Observers must meet NMFS National Minimum Eligibility Standards (National Observer Program), Provided Below	<b>CFR 648.47(b)(4) and (b)(5)</b>
Education/Experience	<i>Unless waived by the RA, must possess Bachelor's Degree with a major in one of the sciences; must have had at least one undergrad course on math/stats; must have experience with data entry on computers; these requirements can be waived by RA or NEFSC Directors if skills have been acquired through alternative training program (observing fishing activities, research cruises, marine mammal data recording, collecting biological samples, entering data, completing NMFS biological training program)</i>	(b)(4)(iii)(A) High school diploma or legal equivalent
Training Requirement	Must pass tests 80% or greater for program; must complete acknowledgement of risk	(b)(4)(iii)(B) Successful completion of NMFS-required training and briefings before deployment
Conflict of Interest	No direct financial interest, ownership, etc. in catching, taking, harvesting, processing fish; may not solicit or accept gifts; may not observe on vessels previously employed in another capacity; must not work for other vessels/processors while hired as observer	Addressed in (b)(4)(ii)(G)
Physical/Mental Confition	Documentation of physician certification within 12 months of completing training	Addressed in (b)(4)(iii)(C)
Communication Skills	Must be able to communicate verbally and written in English	
Citizenship/Ability to Work Legally in US	Must be a U.S. citizen, non-citizen with green card, TN authorization, H1 visa, or valid work visa, and social security card	
(2) Observer Training	Must pass NMFS/NEFOP course(s); one training trip with another observer; data from first four trips reviewed/approved for certification	Addressed in (b)(4)(iii)(B)
(3) Observer Requirements	Must be NMFS/NEFOP certified; completed all required training and briefings for observers	
	Physically and mentally capable fo carrying out responsibilities	
	Red Cross/CPR certification	Addressed in (b)(4)(iii)(D)
	Must accurately record sampling data, write complete reports, report observations accurately	
(4) and (5) Probation/Decertification	Process for NMFS to review certifications and written issuance of de-certification	
	<i>Automatic background check when observers are issued a "CAC" card</i>	(b)(4)(iii)(E) Absence of fisheries-related convictions, based upon a thorough background check
		(b)(4)(iii)(F) Independence from fishing-related parties
		(b)(5)(ii) includes requirements for groundfish vessel selection protocols



## **Appendix 6 -- Summary Information about Midwater trawl Trips in Groundfish Year-Round Closed Areas**

Establishing criteria and provisions for midwater trawl access to groundfish year-round closed areas – including requirements for industry-funded observer coverage in these areas – is largely a policy decision to be made by the Council.

### ***Current Requirements for Midwater trawl Vessels in Year-Round Groundfish Closed Areas***

Additional sampling and monitoring requirements became effective for midwater trawl vessels fishing in Closed Area 1 in late 2010; Amendment 5 to the Atlantic Herring FMP (March 2014) extended those requirements to all of the year-round groundfish closed areas. The following management measures apply to midwater trawl vessels fishing in the year-round groundfish closed areas:

- Midwater trawl vessels are **required to carry an observer on 100%** of trips in the groundfish year-round closed areas. If an observer cannot be provided, the midwater trawl vessel is prohibited from fishing in the year-round groundfish closed areas on that fishing trip.
- Vessels are required to **pump aboard all fish** from the net for inspection and sampling by the observer. Vessels that do not pump fish are required to bring all fish aboard the vessel for inspection and sampling by the observer. Unless specific conditions are met (see below), vessels are prohibited from releasing fish from the net, transferring fish to another vessel that is not carrying a NMFS-approved observer, or otherwise discarding fish at sea, unless the fish have first been brought aboard the vessel and made available for sampling and inspection by the observer.
- Vessels may make short **test tows** in the area to check the abundance of target and non-target species without pumping or bringing the fish on board if the net is reset without releasing the contents of the test tow. In this circumstance, catch from the test tow will remain in the net and would be available to the observer to sample when the subsequent tow is pumped out or all fish are brought aboard.
- Fish that have not been pumped or brought aboard may be released (**slippage**) if the vessel operator finds that:
  - (1.) Pumping the catch or bringing all fish aboard could compromise the **Safety** of the vessel;
  - (2.) **Mechanical Failure** precludes bringing some or all of the catch aboard the vessel; or
  - (3.) **Spiny Dogfish** have clogged the pump and consequently prevent pumping of the rest of the catch.
- If the net is released for any of the reasons stated above, the vessel operator is required to complete and sign a **Released Catch Affidavit Form** (available from NMFS) providing information about where, when, and why the net was released, as well as a good-faith estimate of the total weight of fish caught on the tow and weight of fish released. Released Catch Affidavit Forms are required for all slippage events and must be submitted within 48 hours of completion of the fishing trip.
- Midwater trawl vessels are required to **leave the closed area for the remainder of the fishing trip** if a slippage event occurs in the closed area for any of the three reasons (1) safety; (2) mechanical failure; or (3) spiny dogfish.

- **Operational discards are prohibited** on observed midwater trawl trips in the year-round groundfish closed areas. If fish remain in the net at the conclusion of pumping operations, those fish must be brought on board the vessel and made available for sampling and inspection by the observer, unless one of the other three slippage exemptions applies.

*\*Upon implementation of the omnibus habitat amendment, the above provisions would apply to the remaining year-round groundfish closed areas.*

### **Amendment 5 Analysis**

The analysis in the FEIS for Amendment 5 to the Atlantic Herring FMP evaluated the proportion of Atlantic herring fishing effort that may occur in the year-round groundfish closed areas based on 2005-2010 fishery data. While somewhat dated, this information is still useful to generally characterize the proportion of the Atlantic herring fishery that may occur in the year-round groundfish closed areas, recognizing that fish availability, observer coverage requirements, and other regulations have likely affected fishing patterns in recent years to some extent.

Table 1 characterizes the spatial distribution of the midwater trawl directed Atlantic herring fishery relative to the five year-round groundfish closed areas from 2005-2010. The data in Table 1 were pulled based on midwater trawl trips landing 2,000 pounds or more Atlantic herring from 2005-2010. At that time, approximately 9-12% of Atlantic herring fishing (as measured by revenues, catch, and fishing effort) occurred in the five multispecies year-round closed areas. Vessels fished for Atlantic herring in Closed Area I the most during these years.

**Table 1 Herring Fishing Effort and Revenues in the Groundfish Closed Areas 2005-2010**

	Cashes Ledge	Closed Area I	Closed Area II	NLSCA	Western GOM	Subtotal Closed Areas	Open Areas	Grand Total
<b>Fishing Time (hours)</b>	1.5%	3.8%	1.2%	0.5%	2.2%	9.2%	90.8%	100%
<b>Atlantic Herring Catch</b>	1.7%	3.8%	1.4%	1.8%	2.8%	11.5%	88.5%	100%
<b>Atlantic Herring Revenue</b>	2.1%	4.6%	1.8%	0.8%	3.1%	12.4%	87.6%	100%

### **Updated Observer Data from Groundfish Closed Areas**

Increased monitoring requirements for midwater trawl vessels in groundfish closed areas have been effective in Closed Area 1 since 2010 and in all other year-round groundfish closed areas since the implementation of Amendment 5 in March 2014. To evaluate the need for additional monitoring

(industry-funded) in the year-round groundfish closed areas, observer data from Atlantic herring trips in these areas from 2010-2014 were queried and are summarized below.

Figure 1 summarizes observed Atlantic herring catch on midwater trawl trips targeting Atlantic herring from 2010-2014 for any trips with a begin or end haul location within a groundfish closed area (any haul starting or ending in a groundfish closed area during the trip). From 2010-2014, there were 149 observed midwater trawl trips with at least one haul starting or ending in a groundfish closed area. With the exception of 2012, the Atlantic herring catch observed on these trips represented less than 10% of the total Atlantic herring catch for the year (19% of the total Atlantic herring catch in 2012 was observed on these trips).

**Figure 1 Observed Atlantic Herring Catch on Midwater Trawl Trips in Groundfish Closed Areas (2010-2014)**

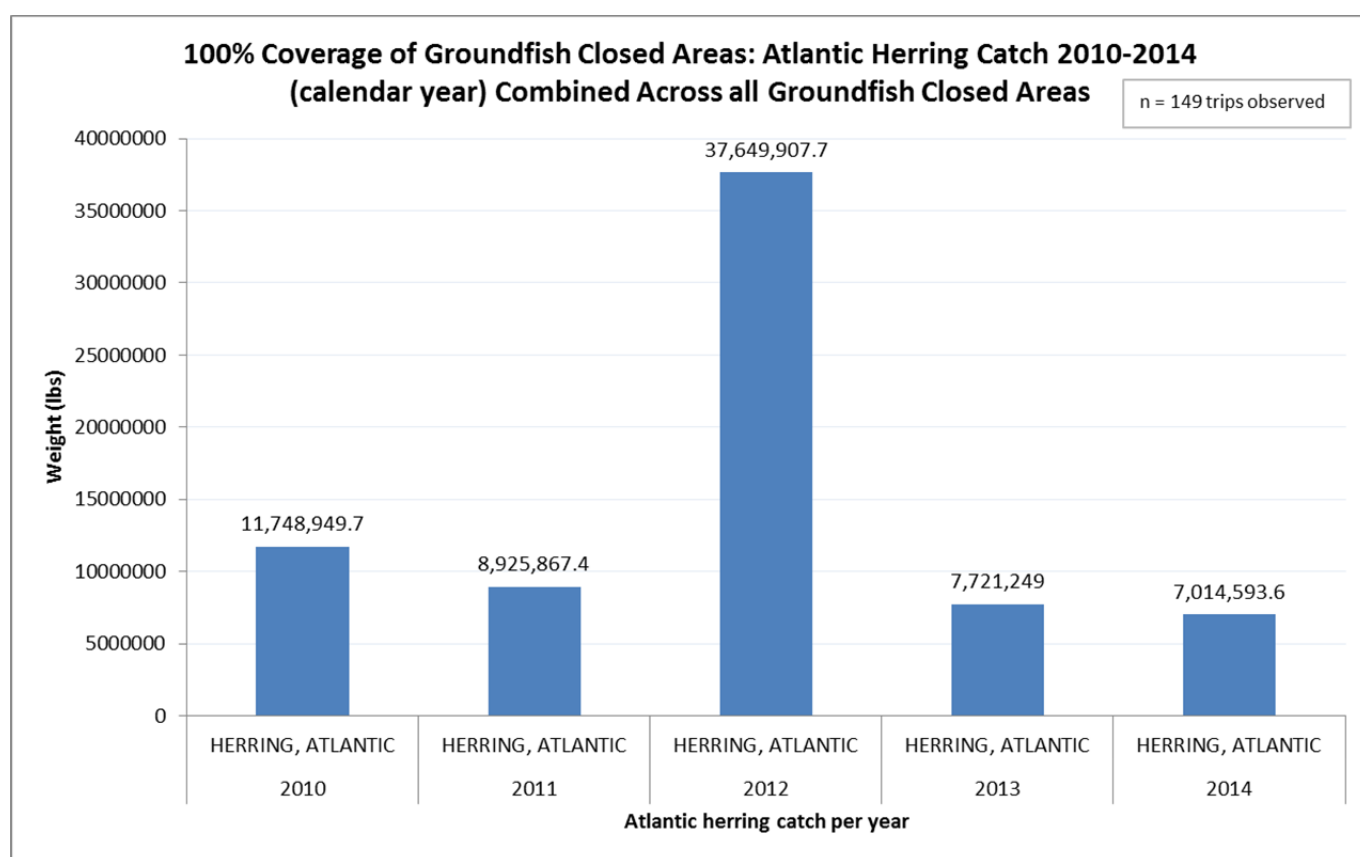
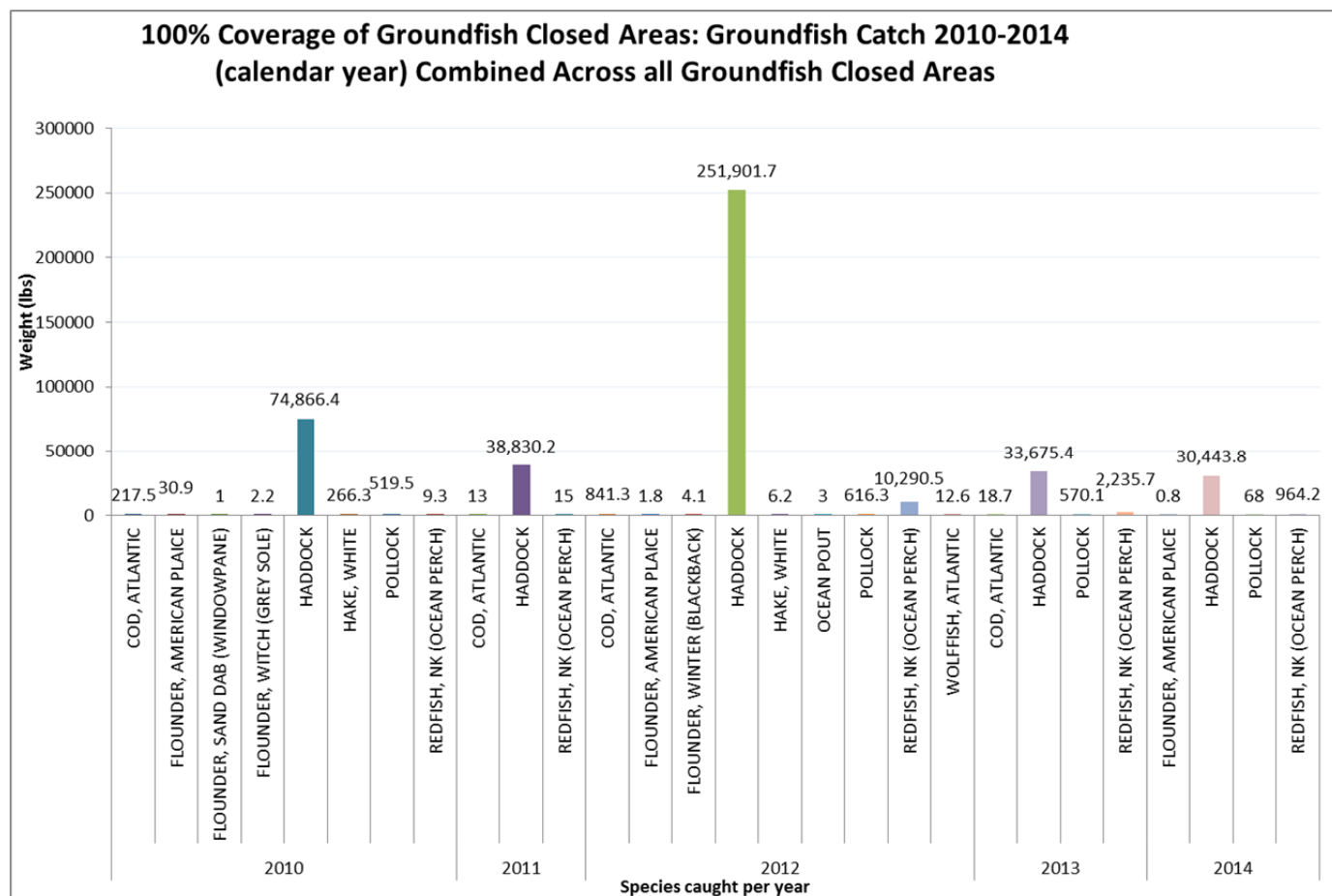


Figure 2 summarizes the groundfish catch observed on the 149 midwater trawl trips with at least one haul starting or ending in a groundfish closed area from 2010-2014. The vast majority of observed groundfish catch by midwater trawl vessels in the groundfish closed areas is haddock. Aside from haddock, pollock, redfish, and small amounts of other multispecies were caught by midwater trawl vessels in the groundfish closed areas.

**Figure 2 Observed Groundfish Catch on Midwater Trawl Trips in Groundfish Closed Areas (2010-2014)**



Haddock comprises the largest component of groundfish bycatch by midwater trawl vessels, and the catch of haddock by these vessels is managed by the Council through a catch cap (Framework 46 to the Multispecies FMP) and increased sampling/monitoring (Amendment 5 to the Atlantic Herring FMP). Vessels issued a Category A/B Atlantic herring permit and on a declared herring trip, regardless of gear or area fished, and or a vessel issued a Category C permit and/or an Category D permit (open access) that fishes with midwater trawl gear in Areas 1A, 1B, and 3 are **prohibited from discarding haddock at-sea**. These vessels are limited to possessing/landing up to 100 lb. of other NE multispecies. Atlantic herring **processors and dealers are required to separate out, and retain** such haddock for at least 12 hours for inspection by authorized NMFS officers. However, haddock or other NE multispecies separated from the herring catch may not be sold, purchased, received, traded, bartered, or transferred, or attempted to be sold, purchased, received, traded, bartered, or transferred for, or intended for, human consumption.

Further investigation of the 18 observed midwater trawl trips (single and paired) that entered the year-round groundfish closed areas during 2014 (all trips in the groundfish closed areas occurred June – September 2014) showed that these vessels are generating almost 100% of their revenues on these trips from the catch of Atlantic herring. Single midwater trawl vessels generated a small fraction (less than 2%) of revenues on these trips from whiting, redfish, and illex squid; pair trawl vessels generated 100% of their revenues on these trips from Atlantic herring.

### ***Haddock Catch Cap in the Atlantic Herring Fishery***

Table 2 summarizes haddock catch in the Atlantic herring fishery by herring vessels subject to the haddock catch caps during the 2006 – 2010 groundfish fishing years (May 1 – April 30). The catch cap was not applied by gear type and haddock stock area during this time period, and data from observed tows only were counted against the cap for those years. The catch in the GOM and GB areas was combined for the report/data for these years (2006-2010). With the implementation of Framework 46 to the Multispecies FMP in the 2011 fishing year, the haddock catch cap was split into two areas (GOM and GB) and applied to herring midwater trawl vessels.

**Table 2 Haddock Catch by Midwater Trawl Vessels Subject to Haddock Catch Cap (2006-2010)**

<b>FY</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
<b>Areas</b>	<b>Gulf of Maine and Georges Bank Combined</b>				
Haddock Cap in Lbs.	161,377 (73 mt)	404,991 (184 mt)	541,925 (246 mt)	316,218 (143 mt)	189,597 (86 mt)
Haddock Catch in Lbs.	18,067 (8 mt)	13,496 (6 mt)	37,126 (17 mt)	52,382 (24 mt)	153,382 (70 mt)
% of Cap	11.2	3.3	6.8	16.5	81

*Catch Caps are based on groundfish fishing year (May 1 – April 30).*

*Source: NOAA/NMFS ([http://www.nero.noaa.gov/ro/fso/reports/reports\\_frame.htm](http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm))*

Under Framework 46, the midwater trawl fleet (which includes both single and paired midwater trawl vessels) is subject to a stock-specific cap on haddock catch that is equal to 1% of the GB haddock ABC and 1% of the GOM haddock ABC. Haddock catch estimates are calculated by expanding NEFOP sea sampling observations to the entire fleet by haddock stock area. The method for estimating haddock catch by midwater trawl herring vessels matches the method used for estimating catch and discards in the multispecies fisheries. This method replaces estimated pounds with observed pounds where available. The cumulative method uses catch from the entire year to estimate a haddock catch ratio for each herring stock area. The haddock bycatch ratio is calculated for a stock area by dividing observed haddock catch for the year by the observed kept-all (total amount of all species) for the year. Haddock catch on unobserved trips is then estimated by multiplying the catch ratio by the kept all from all unobserved herring midwater trawl vessels fishing within that haddock stock area.

Table 3 summarizes haddock catch by the herring midwater trawl vessels from 2011-2014. Starting in 2011, data used to estimate/monitor the cap include observer data, vessel trip reports (VTR), and dealer reports. During the 2012 groundfish fishing year, the haddock catch cap was fully utilized in the GB area. The 2013 Georges Bank cap was slightly exceeded. As a result, the 2014 catch cap was adjusted downward from 179 mt to 162 mt to account for the overage. There remains very little catch of Gulf of Maine haddock by midwater trawl vessels in the Atlantic herring fishery.

**Table 3 Haddock Catch by Midwater Trawl Vessels Subject to Haddock Catch Cap (2011-2014)**

FY	2011		2012		2013		2014	
Areas	GB	GOM	GB	GOM	GB	GOM	GB	GOM
Haddock Cap in Lbs.	701,063 (318 mt)	24,251 (11mt)	630,516 (286 mt)	19,841 (9 mt)	601,862 (273 mt)	6,613 (3 mt)	394,627 (162 mt)	6,613 (3 mt)
Haddock Catch in Lbs.	223,546 (101 mt)	5,544 (3 mt)	628,317 (285 mt)	0 (0 mt)	628,317 (285 mt)	220 (0.1 mt)	251,503 (114 mt)	0 (0 mt)
<b>% of Cap</b>	<b>32%</b>	<b>23%</b>	<b>100%</b>	<b>0%</b>	<b>105%</b>	<b>2%</b>	<b>70%</b>	<b>0%</b>

*Catch Caps are based on groundfish fishing year (May 1 – April 30).*

*Source: NOAA/NMFS ([http://www.nero.noaa.gov/ro/fso/reports/reports\\_frame.htm](http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm))*

The haddock catch caps for FY2015 (May 1, 2015 – April 30, 2016) are 227 mt for the Georges Bank stock and 14 mt for the Gulf of Maine stock. Based on data reported through August 12, 2015, almost 8% of the GB catch cap and none of the GOM catch cap has been utilized by the midwater trawl fleet.

### ***Slippage by Midwater Trawl Vessels***

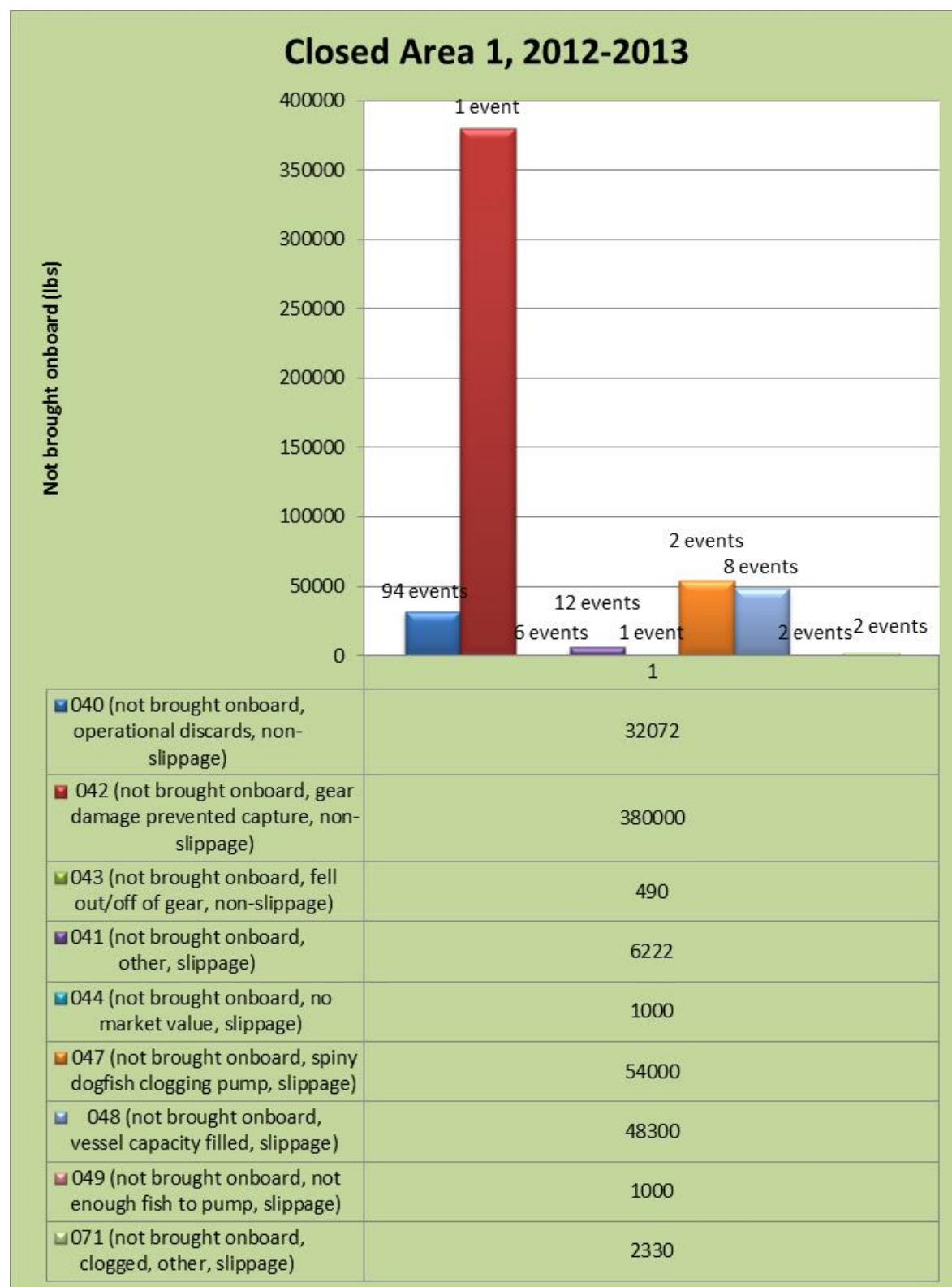
An important consideration related to observer coverage and industry-funded monitoring requirements in the year-round groundfish closed areas relates to the need to document slippage events in the Atlantic herring fishery. Observer data for 2012, 2013, and 2014 were queried for additional information about slippage that may have been observed in the year-round groundfish closed areas. Most of the observer data is for Closed Area 1, as the requirement for 100% observer coverage in the other groundfish closed areas was not implemented until 2014. Information from 2012 and 2013 is summarized in a combined manner below; preliminary observer data for slippage events in the closed areas during 2014 is summarized separately.

Across the entire Atlantic herring fishery, 64 slippage events and 231 operational discard events were observed on 348 midwater trawl trips during 2012 and 2013. Twenty seven (27) of these events were observed to have occurred on tows that either started or ended in Closed Area I. One very large released catch event was observed in Area 3 and recorded to be due to gear damage (380,000 pounds); in this instance, the net tore and released a large catch before it could be brought on board. This event actually occurred in Closed Area I (see Table 4 and Figure 3). The amount of fish estimated to be released during this event (380,000 pounds) totaled almost as much as the estimated slipped catch on all 64 observed slippage events on midwater trawl vessels over the two year time period (473,982 pounds). Of the 473,982 pounds estimated by observers to be slipped by midwater trawl vessels during 2012 and 2013, 29% of these fish was slipped on events that were due to spiny dogfish clogging the pump. Of the 112,852 pounds estimated by observers to be released in Closed Area I during 2012 and 2013, 48% was slipped on events that were due to spiny dogfish clogging the pump.

**Table 4 Summary of NEFOP Observer Data for Catch Not Brought on Board, 2012-2013  
Observed Midwater Trawl Trips (Single and Paired) in Closed Area I**

CLOSED AREA 1: Midwater trawl, paired & single			
	NOT BROUGHT ONBOARD		
AREA 3: CLOSED AREA 1	SLIPPAGE EVENTS		NON-SLIPPAGE EVENTS
			Other
Closed Area 1	27		94: Operational Discards  1: Gear damage  6: Fell from gear
Total Trips 91	Total Kept Atl. Herring 34,939,236 lbs	Total Slipped Catch 112,852 lbs	Total Non-slipped Catch 412,562 lbs
Total Slippage (or non-slippage)/Total Kept	N/A	0.3%	1%
TOTAL SLIPPED CATCH		112,852 lbs	
% dogfish		48%	
% safety		0%	
% mechanical failure		0%	

**Figure 3 Number of Events and Estimated Weight of Catch Not Brought on Board by Disposition Code, 2012-2013 Observed Midwater Trawl Trips in Closed Area I**





In 2014, seven slippage events were observed to have occurred on midwater trawl tows that either started or ended in Closed Area I (see Table 5 and Figure 4). There were also two observed operational discard events by midwater trawl vessels on trips that fished in the western Gulf of Maine closed area during 2014, totaling an estimated 60 pounds.

**Table 5 Summary of NEFOP Observer Data for Catch Not Brought on Board, 2014 Observed Midwater Trawl Trips (Single and Paired) in Closed Area I**

CLOSED AREA 1: Midwater trawl, paired & single			
	NOT BROUGHT ONBOARD		
AREA 3: CLOSED AREA 1	SLIPPAGE EVENTS		NON-SLIPPAGE EVENTS
			Other
Closed Area 1	7		20: Operational Discards  1: Not brought onboard, fell out/off of gear
Total Trips 23	Total Kept Atl. Herring 10,469,157 lbs	Total Slipped Catch 3,950 lbs	Total Non-slipped Catch 1,016 lbs
Total Slippage (or non-slippage)/Total Kept	N/A	0.3%	1%
TOTAL SLIPPED CATCH		3,950 lbs	
% dogfish		0%	
% safety		0%	
% mechanical failure		0%	

**Figure 4 Number of Events and Estimated Weight of Catch Not Brought on Board by Disposition Code, 2014 Observed Midwater Trawl Trips in Closed Area I**

