

Draft Discussion Document:

Atlantic Herring Fishery Specifications

for the 2016-2018 Fishing Years
(January 1, 2016 – December 31, 2018)



Prepared by the
New England Fishery Management Council

in consultation with
Atlantic States Marine Fisheries Commission
National Marine Fisheries Service
Mid-Atlantic Fishery Management Council

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LIST OF ACRONYMS

ABC	Acceptable Biological Catch
ABC CR	ABC Control Rule
ACL	Annual Catch Limit
AM	Accountability Measure
ASMFC	Atlantic States Marine Fisheries Commission or Commission
B	Biomass
BT	Border Transfer
CAA	Catch at Age
CC	Cape Cod
CZMA	Coastal Zone Management Act
DAH	Domestic Annual Harvest
DAP	Domestic Annual Processing
DMF	Division of Marine Fisheries
DMR	Department of Marine Resources
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
E.O.	Executive Order
ESA	Endangered Species Act
F	Fishing Mortality Rate
FEIS	Final Environmental Impact Statement
FGSA	Fixed Gear Set-Aside
FMP	Fishery Management Plan
FW	Framework
FY	Fishing Year
GB	Georges Bank
GMRI	Gulf of Maine Research Institute
GOM	Gulf of Maine
IFM	Industry-Funded Monitoring
IVR	Interactive Voice Response
IWP	Internal Waters Processing
JVP	Joint Venture Processing
M	Natural Mortality Rate
MA DMF	Massachusetts Division of Marine Fisheries

MAFMC	Mid-Atlantic Fishery Management Council
ME DMR	Maine Department of Marine Resources
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistical Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
mt	Metric Tons
NB	New Brunswick
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fisheries Observer Program
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NSGs	National Standard Guidelines
OFL	Overfishing Limit
OY	Optimum Yield
PDT	Plan Development Team
PS/FG	Purse Seine/Fixed Gear
RFA	Regulatory Flexibility Act
RFFA	Reasonably Foreseeable Future Action
RH/S	River Herring/Shad
RIR	Regulatory Impact Review
RSA	Research Set-Aside
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SSB	Spawning Stock Biomass
SSC	Scientific and Statistical Committee
SFA	Sustainable Fisheries Act
SNE/MA	Southern New England/Mid-Atlantic
TC	Technical Committee
TRAC	Transboundary Resource Assessment Committee
TRT	Take Reduction Team
USAP	U.S. At-Sea Processing
VMS	Vessel Monitoring System
VTR	Vessel Trip Report

1.0 INTRODUCTION

This document provides background information and describes the options under consideration for the Atlantic herring (*Clupea harengus*) fishery specifications for the 2016-2018 fishing years, as required by the Atlantic Herring Fishery Management Plan (FMP). The proposed specifications for 2016-2018 are consistent with the provisions contained in the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and regulations implementing the Atlantic Herring FMP. The Atlantic herring fishery specifications are annual amounts (for the 2016-2018 fishing years, January – December) including:

- Overfishing Limit (OFL);
- Acceptable Biological Catch (ABC);
- A Stock-wide Atlantic Herring Annual Catch Limit (ACL) = U.S. Optimum Yield (OY);
- Domestic Annual Harvest (DAH);
- Domestic Annual Processing (DAP);
- U.S. At-Sea Processing (USAP);
- Border Transfer (BT, U.S.-caught herring transferred to Canadian vessels for export);
- Management Area sub-ACLs;
- Research Set-Asides (RSA);
- Fixed Gear Set-Aside (FGSA);
- Seasonal (Monthly) Sub-ACL Divisions; and
- Gear/Area-Specific Catch Caps for River Herring and Shad (RH/S).

1.1 BACKGROUND

The Atlantic herring (*Clupea harengus*) fishery is managed as one stock complex, but this stock is comprised of inshore and offshore components that segregate during spawning. In recognition of the spatial structure of the Atlantic herring resource, the total annual catch limit (ACL) is assigned to four herring management areas (sub-ACLs, see Figure 1). Area 1 is the Gulf of Maine (GOM) divided into an inshore (Area 1A) and offshore section (Area 1B). Area 2 is located in the coastal waters between MA and NC, and Area 3 is on Georges Bank (GB).

Framework 3 to the Atlantic Herring FMP became effective in late 2014 and established provisions for gear-specific and/or area-specific RH/S catch caps, which apply to vessels participating in the directed Atlantic herring fishery. Framework 3 also specified RH/S catch caps for the 2014 and 2015 fishing years and included provisions to allow future RH/S catch caps to be specified through the Atlantic herring fishery specifications process. The RH/S catch cap areas established in Framework 3 are shown in Figure 1.

Table 1 and Table 2 summarize the current (2013-2015) Atlantic herring fishery specifications as well as the 2014/2015 RH/S catch caps that were implemented in Framework 3.

Figure 1 Atlantic Herring Management Areas (Lines) and RH/S Catch Cap Areas (Shaded)

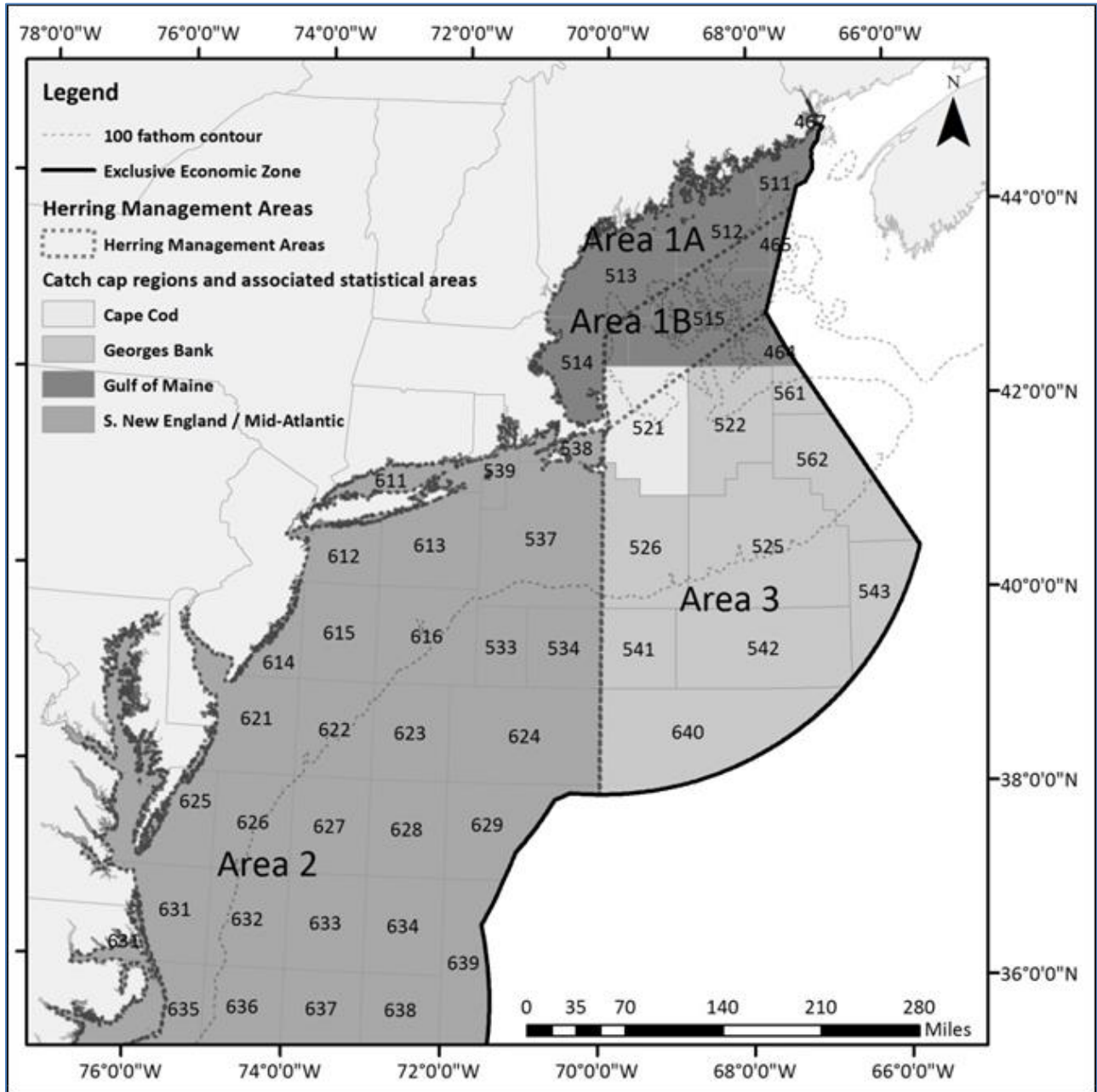


Table 1 Current (2013-2015) Atlantic Herring Specifications (Initial Allocations)

SPECIFICATION	2013-2015 INITIAL ALLOCATION (MT)
Overfishing Limit (OFL)	169,000 – 2013 136,000 – 2014 114,000 – 2015
Acceptable Biological Catch (ABC)	114,000
U.S. Optimum Yield (OY)/Annual Catch Limit (ACL)	107,800
Domestic Annual Harvesting (DAH)	107,800
Domestic Annual Processing (DAP)	103,800
U.S. At-Sea Processing (USAP)	N/A
Border Transfer (BT)	4,000
Sub-ACL Area 1A (28.9% of ACL)	31,200
Sub-ACL Area 1B (4.3% of ACL)	4,600
Sub-ACL Area 2 (27.8% of ACL)	30,000
Sub-ACL Area 3 (39% of ACL)	42,000
Research Set-Aside (RSA)	3% of each sub-ACL
Fixed Gear Set-Aside (1A)	295

Seasonal Sub-ACL Distributions for 2014 and 2015

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

Table 2 Current (2014-2015) RH/S Catch Caps

Area	2014-2015 RH/S Catch Cap (mt)
GOM	Midwater Trawl – 85.5
CC	Midwater Trawl – 13.3
SNE/MA	Midwater Trawl – 123.7 Bottom Trawl – 88.9
GB	0

1.2 DEFINITIONS AND FORMULAS

The following definitions/formulas apply to the 2016-2018 Atlantic herring fishery specifications.

Overfishing Level (OFL). The catch that results from applying the maximum fishing mortality threshold to a current or projected estimate of stock size. When the stock is not overfished and overfishing is not occurring, this is usually F_{MSY} or its proxy.

$$OFL \geq ABC \geq ACL$$

The proposed Atlantic herring OFL specification for 2016-2018 is derived from short-term projections following the 2015 Atlantic herring update assessment and was recommended by the SSC at its May 20, 2015 meeting.

Acceptable Biological Catch (ABC) – The maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan. The MSA interpretation of ABC includes consideration of biological uncertainty (stock structure, stock mixing, other biological/ecological issues), and recommendations for ABC should come from the Council's SSC. ABC can equal but never exceed the OFL.

$$OFL - \text{Scientific Uncertainty} = ABC \text{ (Determined by SSC)}$$

The proposed Atlantic herring ABC specification for 2016-2018 is derived from short-term projections following the 2015 Atlantic herring update assessment and was recommended by the SSC at its May 20, 2015 meeting.

ABC Control Rule (ABC CR). The specified approach to setting the ABC for a stock or stock complex as a function of scientific uncertainty in the estimate of OFL and any other scientific uncertainty. The ABC control rule will consider uncertainty in factors such as stock assessment issues, retrospective patterns, predator-prey issues, and projection results. The ABC control rule will be specified and may be modified based on guidance from the SSC during the specifications process. Modifications to the ABC control rule can be implemented through the specifications package or framework adjustments to the Herring FMP (in addition to future amendments), as appropriate.

The current ABC CR for Atlantic herring is described below. This ABC CR considered an interim control rule, i.e., a placeholder until the Council can develop a long-term control rule through a more comprehensive management action. The Council initiated Amendment 8 to the Atlantic Herring FMP in January 2015 to consider a range of alternatives to establish a long-term ABC CR for Atlantic herring, including alternatives that account for Atlantic herring's role in the ecosystem. Until Amendment 8 is implemented, the Council, based on recommendations from its SSC, will continue to base the annual specification of ABC on the interim ABC CR.

Interim ABC Control Rule: Under the interim ABC CR, ABC will be specified for three years based on the annual catch that is projected to produce a probability of exceeding F_{MSY} in the third year that is less than or equal to 50%. For 2016-2018, this value is 110,000 mt (see Section **XXX**).

Annual Catch Limit (ACL) – A stock-wide ACL will be established that accounts for both scientific uncertainty (through the specification of ABC) and management uncertainty (through the specification of the stock-wide ACL and buffer between ABC and the ACL).

The ACL is the annual catch level specified such that the risk of exceeding the ABC is consistent with the management program. The ACL can be equal to but can never exceed the ABC. ACL should be set lower than the ABC as necessary due to uncertainty over the effectiveness of management measures. The stockwide Atlantic herring ACL equates to the U.S. optimum yield (OY) for the Atlantic herring fishery and serves as the level of catch that determines whether accountability measures (AMs) become effective.

$$\text{ABC} - \text{Management Uncertainty} = \text{Stock-wide ACL} = \text{OY}$$

Sub-ACLs – Area-based sub-divisions of the stockwide/total Atlantic herring ACL, intended to minimize the risk of overfishing any stock sub-component. The Council has chosen to apply Accountability Measures (AMs) to the sub-ACLs (closure of the area at 92%), further reducing the risk of overfishing.

Accountability Measure(s) (AMs). Management measures established to ensure that (1) the ACL is not exceeded during the fishing year; and (2) any ACL overages, if they occur, are mitigated and corrected.

Domestic Annual Harvest (DAH). DAH is established based on the expected catch from U.S. fishing vessels during the upcoming fishing year(s). The Herring FMP, as modified in Amendment 4, specifies that OY is equal to DAH.

$$\text{OY} = \text{DAH}$$

The Herring FMP, as modified in Amendment 4, also specifies that domestic annual harvest (DAH) will be composed of domestic annual processing (DAP) and the amount of Atlantic herring that can be taken in U.S. waters and transferred to Canadian herring carriers for transshipment to Canada (BT).

$$\text{DAH} = \text{DAP} + \text{BT}$$

Domestic Annual Processing (DAP) – The amount of U.S. harvest that domestic processors will use, combined with the amount of the resource that will be sold as fresh fish (including bait). The Herring FMP specifies that DAP is a subset of DAH and is composed of estimates of production from U.S. shoreside and at-sea processors. The Herring FMP authorizes the allocation of a portion of DAP for at-sea processing by domestic processing vessels that exceed the current size limits (U.S. at-sea processing, USAP).

U.S. At-Sea Processing (USAP) – Domestic at-sea processing capacity by U.S. vessels that exceed current size limits (0 mt for 2013-2015 fishery specifications). When determining the USAP allocation, the Council should consider the availability of other processing capacity, development of the fishery, status of the resource, and opportunities for vessels to enter the herring fishery.

Border Transfer (BT) – The amount of herring that can be taken in U.S. waters and transferred to Canadian herring carriers for transshipment to Canada, (4,000 mt for 2013-2015 and previous specifications).

Research Set-Aside (RSA) – (RSAs) are allowed in any or all of the herring management areas with a sub-ACL of 0-3%.

Fixed Gear Set-Aside (FGSA) – This can be specified up to 500 mt in Area 1A and will be returned to the 1A sub-ACL if not utilized by November 1.

2.0 2015 ATLANTIC HERRING OPERATIONAL ASSESSMENT

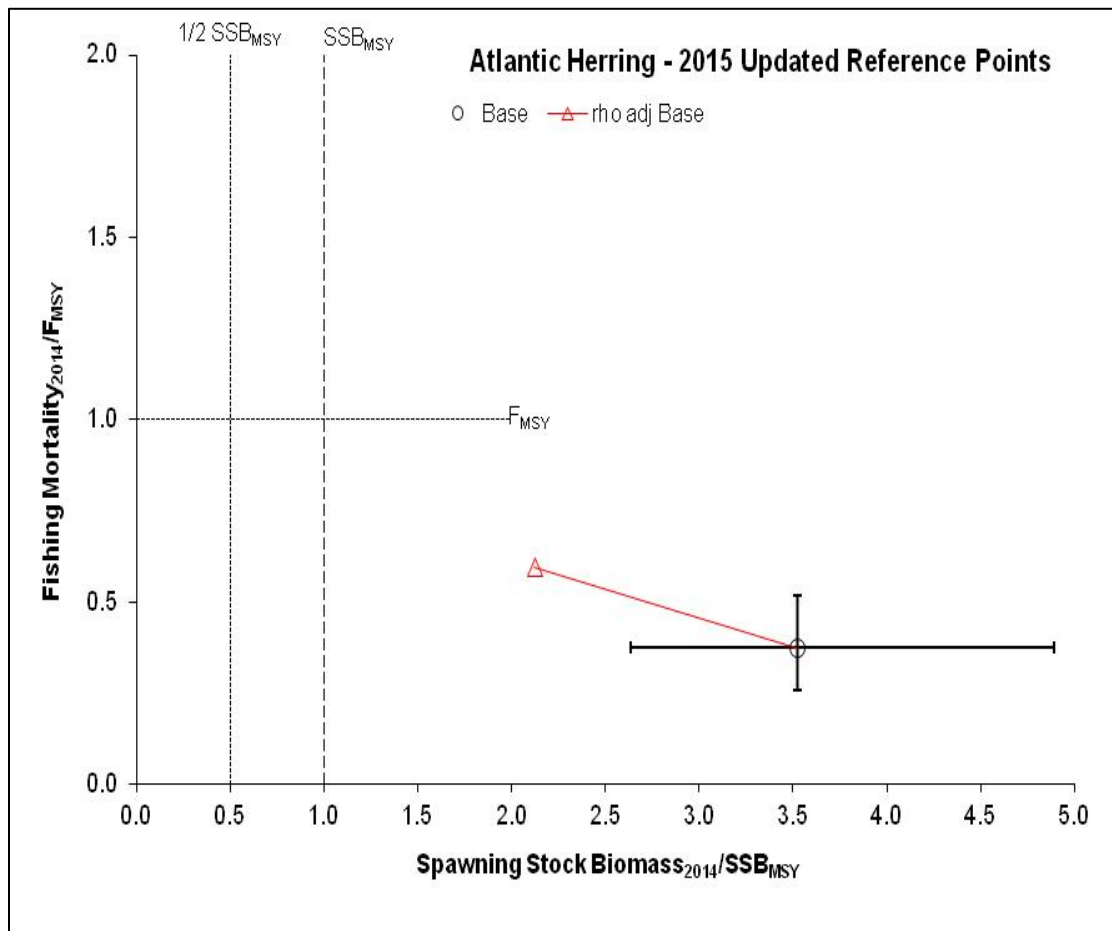
The Atlantic herring operational (update) assessment meeting was held in Woods Hole, MA on April 8-9, 2015. This assessment serves as an update to the SAW/SARC 54 benchmark assessment conducted in 2012.

Overall, the updated assessment indicates that the Atlantic herring resource continues to remain well above its biomass target (rebuilt), and fishing mortality remains well below the F_{MSY} threshold (not overfishing). A retrospective pattern re-emerged when updating the assessment model, which suggests that Atlantic herring spawning stock biomass (SSB) is likely to be overestimated and fishing mortality (F) is likely to be underestimated in the terminal year of the assessment. Resolution of a technical error in the contribution of recruitment to the objective function (i.e., negative log-likelihood) of the assessment model also affected the severity of the retrospective pattern. As a result, the assessment review panel applied a retrospective adjustment to the SSB and F values for the terminal year (2014) using Mohn's Rho. The retrospective adjustments resulted in approximately a 40% decrease in the terminal year (2014) SSB estimate and a 60% increase in the 2014 F estimate. Even with the retrospective adjustments, the Atlantic herring stock complex remains above the biomass target and below the fishing mortality threshold (Table 3, Figure 2).

Table 3 Summary of Atlantic Herring Reference Points and Terminal Year SSB/F Estimates from Benchmark Assessment (2012) and Update Assessment (2015)

	2012 SAW 54 Benchmark	2015 Update (Non-Adjusted)	2015 Update (Retro-Adjusted)
Terminal Year SSB	518,000 mt (2011)	1,041,500 mt (2014)	622,991 mt (2014)
Terminal Year F	0.14 (2011)	0.10 (2014)	0.16 (2014)
SSB_{MSY}	157,000 mt	311,145 mt	
F_{MSY}	0.27	0.24	
MSY	53,000 mt	77,247 mt	

Figure 2 Atlantic Herring Operational Assessment: 2014 Fishing Mortality and SSB Relative to F_{MSY} and SSB_{MSY} Reference Points, Including Retrospective Adjustment (Red Line)



Note: Error bars represent 10th and 90th percentiles of 2014 F/SSB estimates.

The results of the 2015 update assessment form the basis of the SSC's and Council's recommendations for the 2016-2018 specifications of OFL and ABC. The operational assessment report and the May 20, 2015 SSC Report should be referenced for more detailed information.

3.0 PROPOSED 2016-2018 ATLANTIC HERRING FISHERY SPECIFICATIONS

3.1 OVERFISHING LIMIT (OFL) AND ACCEPTABLE BIOLOGICAL CATCH (ABC)

Based on recommendations from its SSC (May 20, 2015), the Council adopted the following specifications for OFL and ABC at its June 2015 meeting:

2016 – 138,000 mt OFL/111,000 mt ABC

2017 – 117,000 mt OFL/111,000 mt ABC

2018 – 111,000 mt OFL/111,000 mt ABC

Table 4 Current (2013-2015) and Proposed (2016-2018) Atlantic Herring OFL and ABC Specifications

	2016-2018		
	2016	2017	2018
OFL	138,000	117,000	111,000
ABC	111,000	111,000	111,000
	2013-2015		
	2013	2014	2015
OFL	169,000	136,000	114,000
ABC	114,000	114,000	114,000

Short-term projections were provided in the operational assessment report to evaluate the potential impacts of 2016-2018 catch or F on SSB. A simulation of 1,000 projections was used to capture possible outcomes of SSB for 2016-2018. To account for retrospective bias, the assessment review panel made a retrospective adjustment to the terminal year (2014) estimates of SSB (40% decrease) and F (60% increase) used to determine stock status. Likewise, numbers-at-age in 2015 used for the projections were also retrospective-adjusted. Table 5 summarizes F and SSB projection results for the proposed 2016-2018 Atlantic herring OFL and ABC specifications.

Table 5 Three-Year F/SSB Projection Based on Proposed OFL/ABC Specification for 2016-2018

	Constant Catch with Probability $F > F_{MSY} = 0.50$ in 2018		
	2016	2017	2018
Median F	0.19	0.23	0.25
80%CI	0.13-0.29	0.15-0.36	0.15-0.42
Catch mt	111,000	111,000	111,000
80%CI	-	-	-
Median SSB mt	557,000	458,000	427,000
80%CI	343,000-942,000	283,000-760,000	237,000-738,000
Prob SSB < ($SSB_{MSY}/2$)	0.00	0.00	0.02
Prob $F > F_{MSY}$	0.23	0.43	0.50

Projections for other 2016-2018 Atlantic herring OFL/ABC specifications considered by the SSC are provided in the May 13, 2015 Herring PDT Report.

3.2 SPECIFICATION OF MANAGEMENT UNCERTAINTY AND A STOCK-WIDE ATLANTIC HERRING ACL/OY

An additional element of any buffer established between the ABC and the stockwide ACL relates to what the Council specifies as a buffer for management uncertainty. The management uncertainty buffer further ensures that Atlantic herring catch will not exceed the ABC. As part of the 2013-2015 Atlantic herring fishery specifications, the Council considered three possible sources of management uncertainty:

1. Canadian Catch
2. State Waters Catch
3. Atlantic Herring Discards

For the 2013-2015 Atlantic herring fishery specifications, the Council deducted **6,200 mt** from the ABC to account for management uncertainty associated with the potential catch of Atlantic herring in the NB weir fishery during the 2013-2015 fishing years. The resulting stockwide Atlantic ACL for the 2013-2015 fishing years was 107,800 mt.

The Council considered a range of possible management uncertainty buffers in 2013-2015, including: the 2010-2012 specification of management uncertainty (14,800 mt), which represents average 2+ landings from the 1999-2008 NB weir fishery when eliminating the highest and lowest year of the time series; and a range of 3-year, 5-year, and 10-year average catch totals from the NB weir fishery (Table 6, shaded row represents 2013-2015 management uncertainty buffer). The Council selected the three-year average NB weir catch (2009-2011) as the buffer for management uncertainty in 2013-2015.

Table 6 Range of Deductions Considered for Management Uncertainty in 2013-2015 Specifications

Option	Deduction (mt, rounded)
2010-2012 specification	14,800
3-year average NB weir catch (2009-2011)	6,200 (ACL/OY 107,800 mt)
5-year average NB weir catch (2007-2011)	11,200
10-year average NB weir catch (2002-2011)	12,400

Source: NEFSC (SAW 54 Assessment Report)

The Council should consider whether it is necessary to change the management uncertainty buffer for the 2016-2018 fishing years. Updated information about Canadian catch, state waters catch, and Atlantic herring discards are provided in the following sub-sections. For further consideration, Table 7 below provides a range of possible deductions for 2016-2018 based on updated 3-year, 5-year, and 10-year average catch totals from the NB weir fishery, consistent with the options that were considered during the 2013-2015 specifications process, and assuming an ABC specification of 111,000 mt. Maintaining the current management uncertainty buffer (6,200 mt) would be more conservative than specifying the buffer based on the most recent three-year average catch in the NB weir fishery (3,000 mt). The status quo approach would also be more conservative than specifying management uncertainty based on the most recent five-year average catch.

Table 7 Possible Deductions for Management Uncertainty (NB Weir Fishery) in 2016-2018 Atlantic Herring Specifications

Option	Management Uncertainty Deduction (mt, rounded)	Stockwide Atlantic Herring ACL/OY (ABC = 111,000 mt)
2013-2015 Specifications (status quo)	6,200	104,800
3-year average NB weir catch (2012-2014)	3,000	108,000
5-year average NB weir catch (2010-2014)	4,800	106,200
10-year average NB weir catch (2005-2014)	9,100	101,900

3.2.1 Updated Canadian Catch – NB Weir Fishery

Catch of the Gulf of Maine/Georges Bank Atlantic herring stock complex in Canadian waters consists primarily of fish caught in the New Brunswick (NB) weir fishery (the SARC 54 Panel noted that the Atlantic herring stock on the Scotian Shelf region is unknown). Table 8 provides the time series of Atlantic herring catch that was used in the 2015 operational assessment, including catch from the NB weir fishery through the 2014 fishing year.

Table 8 Total Atlantic Herring Catch (mt), 1970 – 2014

Year	Mobile	US Fixed	NB Weir
1970	302,107	4,316	15,070
1971	327,980	5,712	12,136
1972	225,726	22,800	31,893
1973	247,025	7,475	19,053
1974	203,462	7,040	19,020
1975	190,689	11,954	30,816
1976	79,732	35,606	29,207
1977	56,665	26,947	19,973
1978	52,423	20,309	38,842
1979	33,756	47,292	37,828
1980	57,120	42,325	13,526
1981	26,883	58,739	19,080
1982	29,334	15,113	25,963
1983	29,369	3,861	11,383
1984	46,189	471	8,698
1985	27,316	6,036	27,864
1986	38,100	2,120	27,885
1987	47,971	1,986	27,320
1988	51,019	2,598	33,421
1989	54,082	1,761	44,112
1990	54,737	670	38,778
1991	78,032	2,133	24,574
1992	88,910	3,839	31,968
1993	74,593	2,288	31,572
1994	63,161	539	22,242
1995	106,179	6	18,248
1996	116,788	631	15,913
1997	123,824	275	20,551
1998	103,734	4,889	20,092
1999	110,200	654	18,644
2000	109,087	54	16,830
2001	120,548	27	20,210
2002	93,176	46	11,874
2003	102,320	152	9,008
2004	94,628	96	20,685
2005	93,670	68	13,055
2006	102,994	1,007	12,863
2007	81,116	403	30,944
2008	84,650	31	6,448
2009	103,458	98	4,031
2010	67,191	1,263	10,958
2011	82,022	421	3,711
2012	87,164	9	504
2013	95,182	9	6,431
2014	92,651	518	2,149

Source: NEFSC Assessment Update Report (2015).

3.2.2 Updated State Waters Catch

The vast majority of the Atlantic herring resource is harvested in Federal waters. Catch by Federal permit holders that occurs in State waters is reported and counted against the sub-ACLs. Catch by state-only permit holders is monitored by the ASMFC and is not large enough to substantially affect management of the Federal fishery and the ability to remain under the sub-ACLs.

The non-federally permitted commercial landings of Atlantic herring are primarily from Maine fixed gear fishermen and a small number of seiners. Table 9 provides updated catch estimates from the fixed gear fishery through 2013. The Council specifies a set-aside for West of Cutler fixed gear fishermen (FGSA), currently 295 mt. The un-used portion of the FGSA is returned to the 1A fishery after November 1. The ASMFC's requirement that fixed gear fishermen must report through IVR (and therefore have catch counted against the sub-ACL) has reduced any management uncertainty associated with State waters landings to an insignificant amount.

Table 9 Atlantic Herring Landings from Fixed Gear Fishery Before and After November 1 Rollover Date

Year	Sub-ACL Closure Date	Area 1A Sub-ACL (mt)	Cumulative Catch (mt) by Dec 31	Fixed Gear Landings (mt) Jan-Oct	Fixed Gear Landings (mt) Nov-Dec
2004	11/19/2004	60,000	60,071	49	0
2005	12/2/2005	60,000	61,570	53	0
2006	10/21/2006	50,000	59,980	528	0
2007	10/25/2007	50,000	49,992	392	0
2008	11/14/2008	43,650	42,257	24	0
2009	11/26/2009	43,650	44,088	81	0
2010	11/17/2010	26,546	27,741	823	0
2011	10/27/2011	29,251	29,359	23	0
2012	11/5/2012	27,668	25,057	0	0
2013	10/15/2013	29,775	29,820	0	0

Source: ASMFC.

3.2.3 Discards (Atlantic Herring)

The 2012 benchmark assessment for Atlantic herring (SAW 54) incorporated Atlantic herring discards from the VTR data provided to them by NMFS. Discard estimates have only been available since 1996 and are generally less than 1% of the landings and do not represent a significant source of mortality. However, this is not considered problematic to the stock assessment according to SAW 54.

To date, uncertainty related to estimating Atlantic herring discards has not been a significant source of management uncertainty. There does not appear to be a need to change this conclusion when considering management uncertainty for the 2016-2018 Atlantic herring fishery specifications. This is because increased sampling has improved bycatch accounting and reduced uncertainty associated with estimating Atlantic herring discards in recent years. Moreover, management measures implemented through Amendment 5 and other future actions will continue to improve catch monitoring and the accuracy of herring discard estimates in future years.

(ADD Updated Observer Data)

3.3 SPECIFICATION OF DAH, DAP, BT, AND USAP

The Herring FMP specifies that domestic annual harvest (DAH) will be set less than or equal to OY and will be composed of domestic annual processing (DAP) and the amount of Atlantic herring that can be taken in U.S. waters and transferred to Canadian herring carriers for transshipment to Canada (BT).

3.3.1 Domestic Annual Harvest (DAH)

Domestic annual harvest (DAH) is established based on the expected catch from U.S. fishing vessels during the upcoming fishing year and equals OY for the U.S. fishery.

$$\text{Stockwide ACL} = \text{OY} = \text{DAH}$$

The Herring FMP, as modified in Amendment 4, also specifies that domestic annual harvest (DAH) will be composed of domestic annual processing (DAP) and the amount of Atlantic herring that can be taken in U.S. waters and transferred to Canadian herring carriers for transshipment to Canada (BT).

$$\text{DAH} = \text{DAP} + \text{BT}$$

When specifying DAH for the Atlantic herring fishery, important considerations relate to the actual and potential capacity of the U.S. harvesting fleet. Recent fishery performance (landings) is also an important factor in this fishery. The Herring FMP became effective during the 2001 fishing year, and since 2001, total landings in the U.S. fishery have decreased. Table 10 summarizes total Atlantic herring catch as a percentage of the total available catch in each year from 2003-2014. Atlantic herring catch has been somewhat consistent over the time period (and in previous years), averaging about 91,925 mt from 2003-2014, with the highest catch of the time series observed in 2009 (103,943 mt) and lowest in 2010 (72,852 mt). However, the quota allocated to the fishery (stockwide ACL/OY) has decreased 50% over the twelve-year period. Consequently, and without increasing fishing effort, the Atlantic herring fishery has become more fully utilized in recent years, and the fishery utilized 100% of the total Atlantic herring ACL for the first time in 2012. The 2013-2015 Atlantic herring fishery specifications increased the stockwide Atlantic herring ACL by more than 15,000 mt from the 2010-2012 specifications; an additional 5,000 mt was caught under the higher quota in 2013 and 2014, and overall, the fishery utilized about 90% of the stockwide Atlantic herring ACL.

Table 10 Total Annual Atlantic Herring Catch 2003-2014

YEAR	TOTAL HERRING CATCH (MT)	TOTAL ACL ALLOCATED (MT)	PERCENT OF ACL UTILIZED
2003	101,607	180,000	57%
2004	93,205	180,000	52%
2005	96,116	150,000	64%
2006	98,714	150,000	66%
2007	85,819	145,000	59%
2008	83,240	143,350	58%
2009	103,943	143,350	73%
2010	72,852	91,200	80%
2011	86,245	93,905	92%
2012	90,561	90,683	100%
2013	95,764	106,375	90%
2014*	95,037	104,088	91%

Source: NMFS. 2014 totals are preliminary.

In prior years when considering the DAH specification, the Council has evaluated the harvesting capacity of the directed Atlantic herring fleet and determined that the herring fleet is capable of fully utilizing the available yield from the fishery. Therefore, the **DAH specification for the 2016-2018 fishing years is proposed to be equal to the stockwide Atlantic herring ACL**, i.e., the U.S. OY specified by the Council for each of the 2016-2018 fishing years.

3.3.2 Domestic Annual Processing (DAP)

Domestic Annual Processing (DAP) is defined in the Herring FMP as the amount of U.S. harvest that domestic processors will use, combined with the amount of the resource that will be sold as fresh fish (including bait). DAP was set equal DAH minus 4,000 mt for BT during the 2013-2015 fishing years and in prior specifications.

Processing, with respect to the Atlantic herring fishery, is defined in the regulations as *the preparation of Atlantic herring to render it suitable for human consumption, bait, commercial uses, industrial uses, or long-term storage, including but not limited to cooking, canning, roe extraction, smoking, salting, drying, freezing, or rendering into meat or oil*. The definition of processing does not include trucking and/or transporting fish.

While it is difficult to predict whether or not the U.S. processing sector will utilize all of the available DAP in 2016-2018, it is certainly possible given the capacity of the domestic processing sector. Therefore, the **DAP specification for the 2016-2018 fishing years is proposed to be equal to the DAH specification minus the BT specification**.

3.3.3 Border Transfer (BT)

The Border Transfer specification represents U.S.-caught herring transferred to Canadian vessels for export. This specification is not a set-aside; rather, it represents a maximum amount of Atlantic herring caught from any management area that can be transferred to Canadian vessels for export. NMFS GARFO tracks BT utilization through a separate dealer code. Specification of BT has remained at 4,000 mt since the implementation of the Herring FMP, and there was no change for the 2013-2015 fishing years. There does not appear to be a need to change this specification for 2016-2018. Therefore, the **BT specification is proposed to remain 4,000 mt for the 2016-2018 fishing years.**

Table 11 indicates a decrease in BT from 1994-2011, with 2011 utilizing 946 mt (24% of 4,000 border transfer mt).

Table 11 Utilization of Border Transfer (mt)

(Update)

YEAR	MT Utilized in BT
1994	2,456
1995	2,117
1996	3,690
1997	1,280
1998	1,093
1999	839
2000	1,546
2001	445
2002	688
2003	1,311
2004	184
2005	169
2006	653
2007	53
2008	0
2009	XXX
2010	XXX
2011	946
2012	Update
2013	Update
2014	Update

Source: NMFS.

3.3.4 U.S. At-Sea Processing (USAP)

The Herring FMP states that “part of DAP may be allocated for at-sea processing by domestic vessels that exceed the vessel size limits (see Section 3.6.6 of the Herring FMP). This allocation will be called the ‘U.S. at-sea processing’ (USAP) allocation. The term ‘at-sea processing’ refers to processing activities that occur in the Exclusive Economic Zone outside State waters. When determining this specification, the Council will consider the availability of other processing capacity, development of the fishery, status of the resource, and opportunities for vessels to enter the herring fishery.” The USAP specification serves as a cap for USAP activities and is not a specific allocation to this processing sector.

USAP can provide an additional outlet for U.S. harvesters, particularly those who operate vessels that do not have refrigerated saltwater (RSW) systems to maintain catch quality for delivery to shoreside processors. Such vessels could offload product to USAP vessels near the fishing areas, increasing the benefits to the U.S. industry. This is consistent with one of the objectives of the Atlantic Herring FMP: to provide, to the extent practicable, controlled opportunities for fishermen and vessels in other Mid-Atlantic and New England fisheries.

During the 2007-2009 fishing years, the Council maintained a USAP specification of 20,000 mt (Areas 2/3 only) based on information received about a new at-sea processing vessel that intended to utilize a substantial amount of the USAP specification. At that time, landings from Areas 2 and 3 – where USAP is authorized – were considerably lower than allocated sub-ACLs for each of the past several years. Moreover, the specification of 20,000 mt for USAP did not restrict either the operation or the expansion of the shoreside processing facilities during the 2007-2009 fishing years. However, this operation never materialized, and none of the USAP specification was used during the 2007-2009 fishing years. Consequently, the Council set USAP at zero for the 2010-2012 fishing years and the 2013-2015 fishing years. The Council has not received any information that would suggest changing this specification for the 2016-2018 fishing years. Therefore, **specification of USAP for the 2016-2018 fishing years is proposed to remain at 0 mt.**

3.4 MANAGEMENT AREA SUB-ACLS

As part of the Atlantic herring fishery specifications, sub-ACLS are specified for each of the four herring management areas known as Area 1A, 1B, 2, and 3 (represented in Figure 1 on p. 2). The total of the sub-ACLS equals the stockwide Atlantic herring ACL. The Council uses the best information available to distribute the total Atlantic herring ACL by management area such that the risk of overfishing an individual spawning component is minimized to the extent possible. When 92% of the sub-ACL is reached in a management area (not including RSAs), the directed fishery in the management area closes, and all vessels fishing in the area are limited to a 2,000 pound possession limit for Atlantic herring.

Because the Atlantic herring ABC specification proposed for 2016-2018 (111,000 mt) is not substantially different than the 2013-2015 ABC specification (114,000 mt, see Section 3.1), the Council may likely determine that there is no need to consider making significant changes to the distribution of the total ACL among the Atlantic herring management areas for 2016-2018. To this end, a “status quo” option for 2016-2018 Atlantic herring sub-ACLS is provided below, based on an ABC specification of 111,000 mt and a status quo management uncertainty specification of 6,200 mt. The status quo option applies the same (2013-2015) proportional distribution of the stockwide Atlantic herring ACL among the management areas. If the Council selects a different management uncertainty buffer for 2016-2018, the status quo option could be adjusted accordingly by applying the 2013-2015 sub-ACL proportions to the resulting stockwide Atlantic herring ACL.

Table 12 Status Quo Option – Proposed Sub-ACLS (mt) for 2016-2018

	2013-2015	2016-2018
OFL (mt)	169,000/136,000/114,000	138,000/117,000/111,000
ABC (mt)	114,000	111,000*
ACL (mt)	107,800	104,800*
Sub-ACL Area 1A	31,200 (28.9%)	30,300
Sub-ACL Area 1B	4,600 (4.3%)	4,500
Sub-ACL Area 2	30,000 (27.8%)	29,100
Sub-ACL Area 3	42,000 (39%)	40,900
RSA	3%	TBD
FGSA	295 mt	TBD

**Based on SSC recommendation of 111,000 mt for ABC and status quo management uncertainty buffer (6,200 mt).*

Proposed Seasonal (Monthly) Sub-ACL Divisions (2016-2018)

- Area 1A: 0% January-May; 100% June-December (authorized under Framework 1);
- Area 1B: 0% January-April; 100% May-December

Note: According to the catch information presented in Table 13 (see following page), it is anticipated that there will be a deduction from the 2016 sub-ACLs for Area 1A and Area 1B to account for overages that occurred in these areas during the 2014 fishing year. There should also be a carryover of some portion (up to 10%) of the unused 2014 sub-ACL from Areas 2 and 3 to the 2016 sub-ACLs for these areas (but the stockwide Atlantic herring ACL will not increase).

Atlantic Herring Catch by Management Area

The Atlantic herring ACL and management area sub-ACLs are tracked/ monitored based on the total catch – landings and discards – which are provided and required by herring permitted vessels through daily vessel monitoring system (VMS) catch reports and weekly vessel trip reports (VTRs) as well as through Federal/state dealer data. Herring harvesters are required to report discards in addition to landed catch through these independent methods. NMFS' catch estimation methods for the Atlantic herring fishery are described in detail in both Framework Adjustment 2 and Framework Adjustment 3 to the Atlantic Herring FMP (see Section 3.6.1 of Framework 3, NEFMC 2014).

Table 13 summarizes recent Atlantic herring catch estimates by year and management area from 2004-2014. The following bullets describe how these estimates were derived:

- 2004-2006 herring catch estimates are provided from quota management implemented by NMFS through the Atlantic Herring FMP and are based on interactive voice reporting (IVR) data from the call-in system used to monitor TACs. Reported herring discards are included in the totals.
- 2007-2009 herring catch estimates are based on IVR data supplemented with dealer data. Reported discards are included in the totals.
- 2010-2014 Atlantic herring catch estimates are based on a comprehensive methodology developed by NMFS in response to Amendment 4 provisions and the need to better monitor sub-ACLs. The methodology for estimating catch is based on landings data obtained from dealer reports (Federal and State) supplemented with VTRs (Federal and State of Maine) with the addition of discard data from extrapolated observer data.

Table 13 Atlantic Herring Catch by Year and Management Area, 2004-2014

YEAR	AREA	SUB-ACL (MT)	CATCH (MT)	% UTILIZED
2004	1A	60,000	60,095	100%
2004	1B	10,000	9,044	90%
2004	2	50,000	12,992	26%
2004	3	60,000	11,074	18%
2005	1A	60,000	61,102	102%
2005	1B	10,000	7,873	79%
2005	2	30,000	14,203	47%
2005	3	50,000	12,938	26%
2006	1A	60,000	59,989	100%
2006	1B	10,000	13,010	130%
2006	2	30,000	21,270	71%
2006	3	50,000	4,445	9%
2007	1A	50,000	49,992	100%
2007	1B	10,000	7,323	73%
2007	2	30,000	17,268	58%
2007	3	55,000	11,236	20%
2008	1A	43,650	42,257	97%
2008	1B	9,700	8,671	89%
2008	2	30,000	20,881	70%
2008	3	60,000	11,431	19%
2009	1A	43,650	44,088	101%
2009	1B	9,700	1,799	19%
2009	2	30,000	28,032	93%
2009	3	60,000	30,024	50%
2010	1A	26,546	28,424	107%
2010	1B	4,362	6,001	138%
2010	2	22,146	20,831	94%
2010	3	38,146	17,596	46%
2011	1A	29,251	30,676	105%
2011	1B	4,362	3,530	81%
2011	2	22,146	15,001	68%
2011	3	38,146	37,038	97%
2012	1A	27,668	24,302	88%
2012	1B	2,723	4,307	158%
2012	2	22,146	22,482	102%
2012	3	38,146	39,471	103%
2013	1A	29,775	29,820	100%
2013	1B	4,600	2,458	53%
2013	2	30,000	27,569	92%
2013	3	42,000	37,833	90%
2014*	1A	33,031	33,428	101%
2014*	1B	2,878	4,733	164%
2014*	2	28,764	19,624	68%
2014*	3	39,415	37,252	95%

Source: NMFS. 2014 totals are preliminary.

Note: shaded rows indicate overages.

3.5 RESEARCH SET-ASIDE (RSA)

There is a research set-aside established in Amendment 1 (0-3% for any management area) and a corresponding requirement that when the catch in a management area is projected to reach 92% of its specified sub-ACL (or whatever the appropriate percentage is, based on the RSA), the Regional Administrator closes the area to all directed herring fishing. The Council deducted a 3% RSA for all management areas for the 2013-2015 Atlantic herring fishery specifications and identified river herring bycatch avoidance and portside sampling as top priorities for cooperative research to be funded by herring RSA in 2014 and 2015.

The RSA process is a competitive grants process administered by the Northeast Fisheries Science Center. Proposals are requested for research, and incoming proposals are reviewed and ranked by a technical body. With competitive grants awarded through this process, different entities will apply. For catch monitoring, it is important to ensure that only qualified entities apply, and it would be difficult to ensure a consistent monitoring program with multiple entities potentially competing for the available funds in any given year.

At its July 22, 2015 meeting, the Herring Committee should develop a recommendation regarding the specification of Atlantic herring RSA for the 2016-2018 fishing years.

Top Priorities for Cooperative Research 2016-2018

At its January 27-29, 2015 meeting, the Council approved a motion (14/0/1) to recommend the following four research priorities under any RSAs that may be allocated in the 2016-2018 Atlantic herring fishery specifications (without ranking, i.e., equally-important):

1. Portside Sampling
2. River Herring Bycatch Avoidance
3. Electronic Monitoring
4. Research to Support/Enhance the Atlantic Herring Stock Assessment

In addition, the Council unanimously passed a motion to request input from the NEFSC regarding the fourth cooperative research priority. The NEFSC identified four research projects that would support or enhance the Atlantic herring assessment, while at the same time being appropriate for Atlantic herring RSA. These topics include: stock structure/spatial management; availability and detectability; fishery acoustic indices; and volume-to-weight conversion. The NEFSC provided some additional information to the Council regarding the applicability of these research topics to the Atlantic herring RSA program.

Possible Adjustments to RSA Provisions?

In November 2014, the Herring PDT discussed the details of the SMAST/SFC/MADMF River Herring Bycatch Avoidance Program and the performance of this program under the 2014 and 2015 Atlantic herring RSA. At that time, the Herring PDT expressed support for considering modifications to provisions for the Atlantic herring RSA program in the 2016-2018 Atlantic herring fishery specifications package to address challenges identified by participants in the river herring bycatch avoidance program. The Herring Committee also reviewed the river herring bycatch avoidance program and agreed that any changes to Atlantic herring RSA provisions should be considered in the 2016-2018 fishery specifications package.

The SMAST/MADMF/SFC river herring bycatch avoidance program was funded for 2014 and 2015, in part, through the Atlantic herring research set-aside (RSA) program allocated through the Atlantic herring fishery specifications process, but the participants in the program have encountered some difficulties related to the limitations that the program places on the harvest of RSA fish. The Herring PDT identified some possible modifications to the provisions for the herring RSA program that could be considered during the 2016-2018 fishery specifications process. The intent of these adjustments would be to increase the incentive for herring vessels to participate in the RSA program, which has been particularly challenging in areas where the herring sub-ACLs are not fully utilized. Some possible modifications that could be considered include:

- Set-asides for catch caps (RH/S and haddock) to allow for RSA fishing in the event that a catch cap closes an area to the directed herring fishery;
- RSA carryover provisions;
- Provisions to allow for transfer of RSA fish between Atlantic herring management areas.

At its July 22, 2015 meeting, the Herring Committee should consider/discuss this issue further and determine whether there is a need to consider options to adjust Atlantic herring RSA provisions in the 2016-2018 Atlantic herring specifications package.

3.6 FIXED GEAR SET-ASIDE (FGSA)

Amendment 1 allows the Council to set-aside up to 500 metric tons of Atlantic Herring until November 1 for fixed gear fishermen fishing West of Cutler. The Commission's Amendment 2 to the Interstate FMP for Atlantic Herring requires fishermen East of Cutler to report weekly through the federal IVR system. ME DMR require the ME state commercial fixed gear fishermen to be compliant with the federal IVR weekly reporting requirements and regulations as well as reporting monthly to ME DMR. The FGSA was set to 295 mt for the 2013-2015 specifications in Area 1A.

Table 9 on p. 12 of this document provides updated Atlantic herring catch estimates from the fixed gear fishery through 2013. According to Table 9, none of the FGSA was utilized in recent years; however, the unutilized portion of the set-aside is returned to the 1A fishery after November 1.

4.0 OPTIONS FOR 2016-2018 RH/S CATCH CAPS

The following subsections provide background information and analyses related to the specification of RH/S catch caps for the 2016-2018 fishing years. At its July 22, 2015 meeting, the Herring Committee should review the updated RH/S catch information and develop recommendations regarding the specification of RH/S catch caps for the 2016-2018 fishing years.

4.1 CURRENT (2014/2015) RH/S CATCH CAPS

Table 2 lists the RH/S catch caps for the 2014 and 2015 fishing years, implemented through Framework 3 to the Atlantic Herring FMP. Framework 3 became effective late in during the 2014 fishing year, so 2015 represents the first year that the directed herring fleet will be operating under the RH/S catch caps. The RH/S catch caps apply to midwater trawl vessels in the Gulf of Maine and Cape Cod Catch Cap Areas, and to both midwater trawl and small mesh bottom trawl vessels in the southern New England/Mid-Atlantic Catch Cap Area (see RH/S Catch Cap Areas shaded on Figure 1, p. 2) on all trips landing more than 6,600 pounds of Atlantic herring.

Table 14 Current (2014-2015) RH/S Catch Caps

RH/S Catch Cap Area	2015 RH/S Catch Cap (mt)
GOM	Midwater Trawl – 85.5
CC	Midwater Trawl – 13.3
SNE/MA	Midwater Trawl – 123.7 Bottom Trawl – 88.9
GB	0

For the 2014 and 2015 fishing years, the Council based the RH/S catch caps on the median value of estimated RH/S catch from 2008-2012. RH/S catch was estimated by the Herring PDT using all available observer and portside sampling data from 2008-2012 (see Framework 3, Appendix II). The Council selected annual “median” RH/S catch cap amounts for the midwater trawl fishery in the GOM, CC, and SNE/MA RH/S Catch Cap areas and a “median” RH/S catch cap for the bottom trawl fishery in the SNE/MA RH/S Catch Cap areas. No RH/S catch cap was adopted for the GB Catch Cap Area in 2014-2015 because of low observed RH/S catch in that area between 2008 and 2012.

The Council selected the median option as the *Preferred Option* in Framework 3 for specifying 2014-2015 RH/S catch caps in the GOM, CC, and SNE/MA Areas because this option creates a strong incentive for the herring midwater trawl fleet (and bottom trawl fleet in southern New England) to minimize RH/S catch, while still providing the opportunity to fully utilize the herring ACL if the fleet can continue to avoid RH/S. The Council also intended to encourage participation in the SMAST/SFC/MADMF river herring bycatch avoidance program. At that time, this option was also consistent with the Mid-Atlantic Fishery Management Council’s

specification of the RH/S catch cap in the Atlantic mackerel fishery (236 mt, median value 2005-2012).

RH/S Catch Cap Monitoring

Prior to any trip that may harvest, possess, or land Atlantic herring, all limited access herring vessels (Categories A/B/C, as well as Category D vessels fishing with midwater trawl gear in Areas 1A, 1B, and/or 3), Atlantic mackerel vessels that obtain the new Area 2/3 permit for 20,000 pounds of herring (Category E), and all herring carrier vessels are required to notify the Northeast Fisheries Observer Program (NEFOP) through a pre-trip notification system. These vessels also must declare that they are participating in the herring fishery through VMS by entering the code "HER" and a gear code prior to leaving port. Amendment 5 requires the vessels identified above to notify NMFS Law Enforcement via VMS of the time and place of offloading at least six hours prior to landing or, if fishing ends less than six hours before landing, immediately upon leaving the fishing grounds.

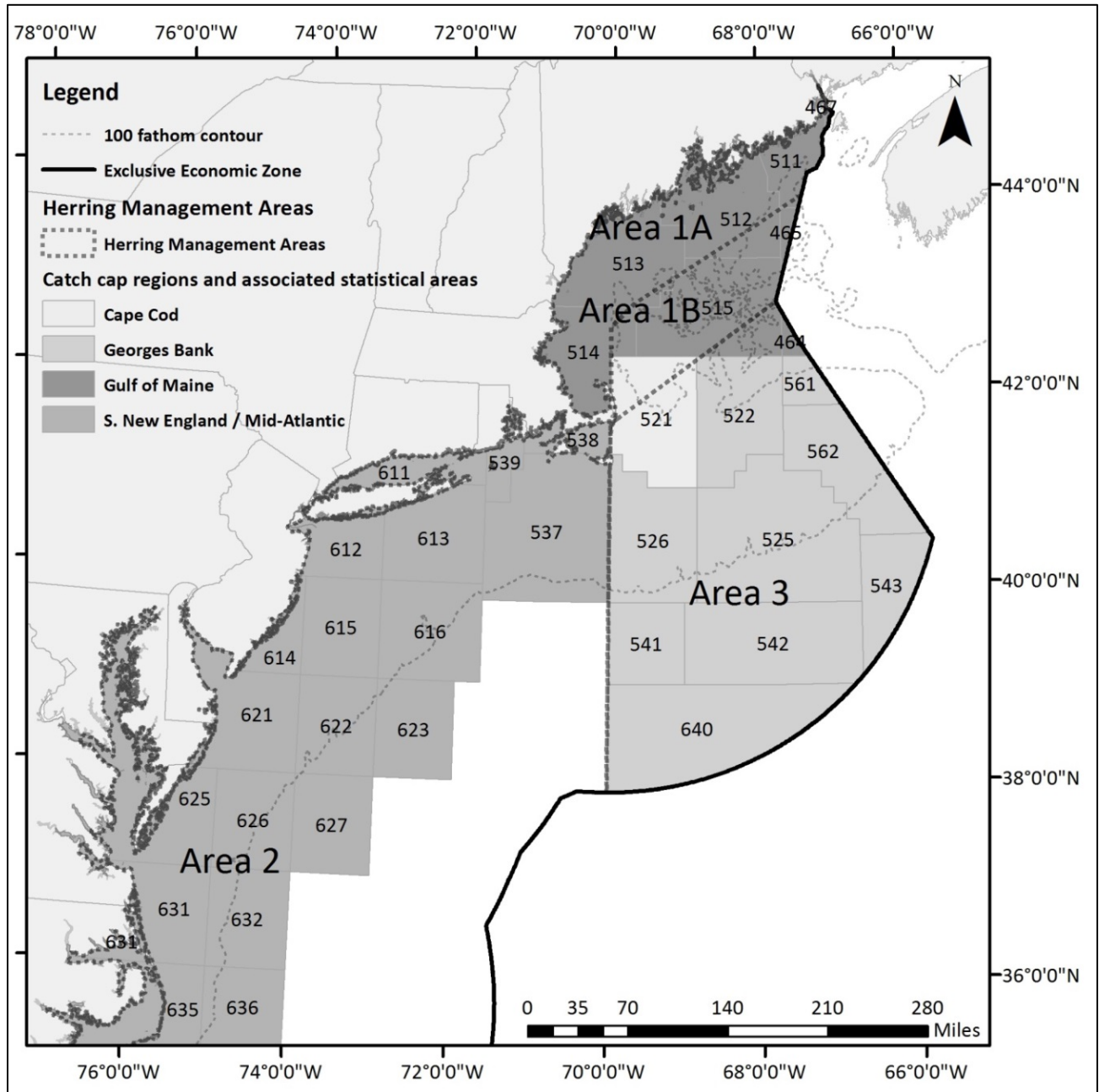
The RH/S catch cap monitoring methodology was determined by NMFS NERO, in consultation with the Council. The method for estimating RH/S catch by Atlantic herring vessels is similar to the method for estimating RH/S catch in the Atlantic mackerel fishery. This method replaces estimated pounds with observed pounds where available. The cumulative method uses catch from the entire year to estimate a RH/S catch ratio for each RH/S catch cap area and gear type. The RH/S catch ratio is calculated for a catch cap area and gear type by dividing observed RH/S catch for the year by the observed kept all (total amount of all species) for the year. RH/S pounds per unobserved trip are then estimated by multiplying the catch ratio by the kept all from unobserved Atlantic herring vessels fishing in that RH/S catch cap area with that gear type (see more detailed description of monitoring methods provided by GARFO).

At its May 13, 2015 meeting, the Herring PDT discussed concerns associated with monitoring the 2016-2018 RH/S catch caps and agreed to seek additional guidance from the Herring Committee regarding this issue at the July 22, 2015 meeting (see May 13, 2015 Herring PDT Report for additional information).

RH/S Catch Triggers and Closure Areas

When 95% of the RH/S catch for a gear type under a catch cap is projected to be reached in a RH/S Catch Cap Area (Figure 1, p. 2), the directed Atlantic herring fishery for that gear type would close in the associated closure area (see Figure 3 on the following page), and all vessels fishing with that gear type in the closure area are subject to a possession limit of 2,000 pounds of Atlantic herring for the remainder of the fishing year. Vessels using other gear types in the closure area are not affected. Vessels participating in the herring fishery outside of the RH/S catch cap closure area are able to use any gear type (consistent with other regulations) until the Atlantic herring sub-ACL trigger is reached in a herring management area/areas.

Figure 3 Closure Areas (Shaded) for Associated RH/S Catch Caps



4.2 UPDATED RH/S CATCH DATA (2013/2014) AND OPTIONS FOR 2016-2018 RH/S CATCH CAPS

(Preliminary)

The Herring PDT updated RH/S catch data and estimates of RH/S catch by gear type and RH/S catch cap area for the 2013 and 2014 fishing years, providing a longer time series of data (2008-2014) than Framework 3 (2008-2012). As part of this process, the 2008-2012 RH/S catch cap data used in Framework 3 were also revised/updated by the Herring PDT to: (1) incorporate some shad landings that were previously omitted; (2) include trips from multiple catch cap areas that were previously omitted because sub-trips (catch from one cap area) did not meet the 6,600-pound Atlantic herring landings threshold; and (3) improve matching of trips sampled by multiple agencies (for removal of redundancies).

The Herring PDT acknowledged that using the median value of a short time series can be problematic, especially given the variability in this time series. In the case of RH/S catch estimation, using a weighted mean may be more appropriate to account for sampling variability. The PDT agreed to provide the Herring Committee with options for specifying catch caps based on both median values and weighted mean values of RH/S catch during the selected time series.

When reviewing all available at-sea and portside observations of RH/S bycatch between 2008-2012, the Herring PDT that nearly all of the observed RH/S bycatch was *landed* and not discarded at-sea. Because only rare and small amounts of discarded bycatch were observed at-sea from 2008-2012, the PDT did not consider this a problem for combining portside and at-sea datasets when Framework 3 was developed. However, bycatch data from the most recent two fishing years (2013-2014) indicates that discards now constitute a much larger proportion of total RH/S bycatch, particularly for SNE/MA bottom trawl (up to ~73% in 2014). This is predominantly a result of changes to observer coverage levels on both the midwater trawl and small mesh bottom trawl fleet in 2013 and 2014, not result of changes to fishing practices. Consequently, a more formal treatment of the two data types (landed bycatch vs discarded bycatch) is warranted when utilizing these data to form the basis of the 2016-2018 RH/S catch caps.

The RH/S catch cap calculations were modified by estimating total RHS_{kept} separately from $RHS_{discard}$. RHS_{kept} was estimated using the combined dataset of at-sea and portside observations of landed bycatch. $RHS_{discard}$ was estimated using only the at-sea observations of discarded bycatch. The variances for each component were added together to achieve the variance of total RH/S bycatch.

The Herring PDT also discussed the “scaling factor” that was applied in Framework 3 to scale estimated RH/S catch by RH/S catch cap area to the total Atlantic herring ACL. This was done to account for changes to the ACL over the reference period (2008-2012), essentially making the RH/S cap a maximum allowable bycatch rate (i.e., lbs. of RH/S per lbs. of Atlantic herring ACL). The Herring PDT agreed that a scaling factor would not be necessary if the intent of the Council in Framework 3 was to cap RH/S catch/removals at the actual amount estimated under

the reference time frame. The Herring PDT agreed to provide the scaled and unscaled data to the Herring Committee to select the preferred option for the 2016-2018 RH/S catch caps.

The tables/figures on the following pages provide updated RH/S catch estimates by gear/area/year and encompass all of the changes from the Framework 3 data/methods listed below:

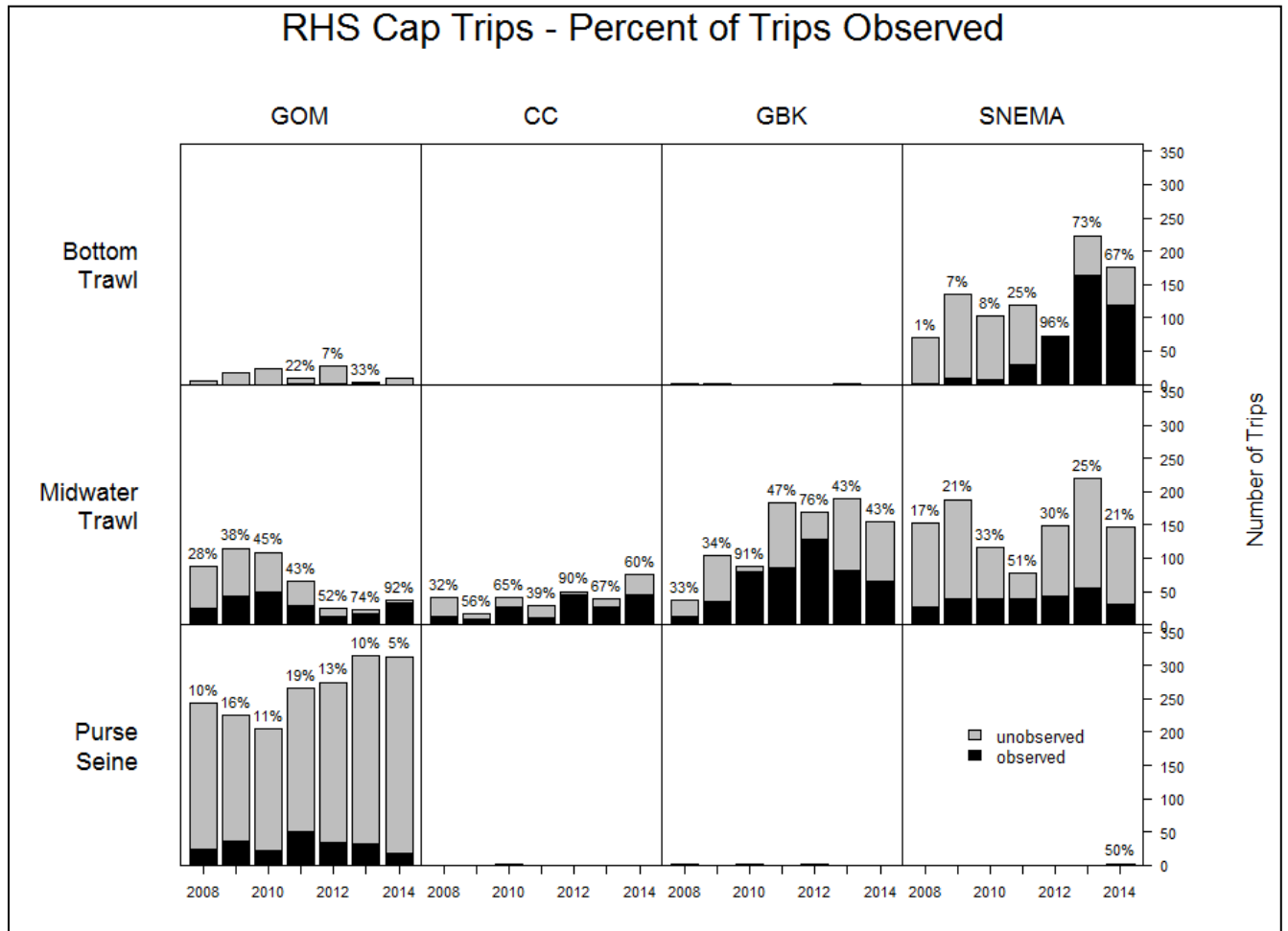
- Includes shad landings that were previously omitted from RH/S catch estimates;
- Includes trips that were previously omitted because sub-trips did not meet 6,600 lbs Atlantic herring criteria;
- Improved matching of trips sampled by multiple agencies (for removal of redundancies);
- Use of *true ratio estimator*, expanded by KALL of all cap trips: $RHS_{tot} = KALL_{tot} * \frac{\sum RHS_{obs}}{\sum KALL_{obs}}$
- Use of DMIS KALL (total lbs of all species kept from NOAA-reconciled dealer/fishermen data) in all expansions (to the trip and to the fishery);
- $RHS_{obs} = RHS_{kept} + RHS_{discard}$; RHS_{kept} is based on a pooled at-sea and portside dataset, whereas $RHS_{discard}$ is based only on at-sea data.

Table 15 At-Sea and Portside Sampled RH/S Catch Cap Trips by Strata, 2008-2014

NEFOP At-Sea Observed Cap Trips*									
<i>* only includes trips with >6,600 lbs herring</i>									
Gear	Cap Area	2008	2009	2010	2011	2012	2013	2014	Total
Bottom Trawl	GOM	0	0	0	2	2	1	0	5
	SNEMA	1	9	7	20	19	46	47	149
Midwater Trawl	CC	11	9	24	11	38	14	36	143
	GB	12	33	79	77	114	72	44	431
	GOM	17	40	40	25	8	11	20	161
	SNEMA	26	30	34	34	23	13	5	165
Purse Seine	GOM	24	35	22	51	35	31	15	213
	Total	91	156	206	220	239	188	167	1,267
MADMF Portside Observed Cap Trips*									
<i>* only includes trips with >6,600 lbs herring that were not also sampled at-sea by NEFOP</i>									
Gear	Cap Area	2008	2009	2010	2011	2012	2013	2014	Total
Bottom Trawl	SNEMA	0	0	0	9	49	112	67	237
Midwater Trawl	CC	2	0	2	0	6	12	9	31
	GB	0	2	0	9	13	9	22	55
	GOM	8	4	9	3	4	6	13	47
	SNEMA	0	7	4	5	20	31	18	85
Purse Seine	GOM	0	2	0	0	0	0	1	3
	Total	10	15	15	26	92	170	130	458
MEDMR Portside Observed Cap Trips*									
<i>* only includes trips with >6,600 lbs herring that were not also sampled at-sea by NEFOP</i>									
Gear	Cap Area	2008	2009	2010	2011	2012	2013	2014	Total
Bottom Trawl	SNEMA	0	0	1	1	2	5	4	13
Midwater Trawl	CC	0	0	0	0	1	0	0	1
	GB	0	0	0	0	1	0	0	1
	SNEMA	0	2	0	0	1	11	7	21
Purse Seine	GOM	0	0	0	0	0	1	1	2
	Total	0	2	1	1	5	17	12	38

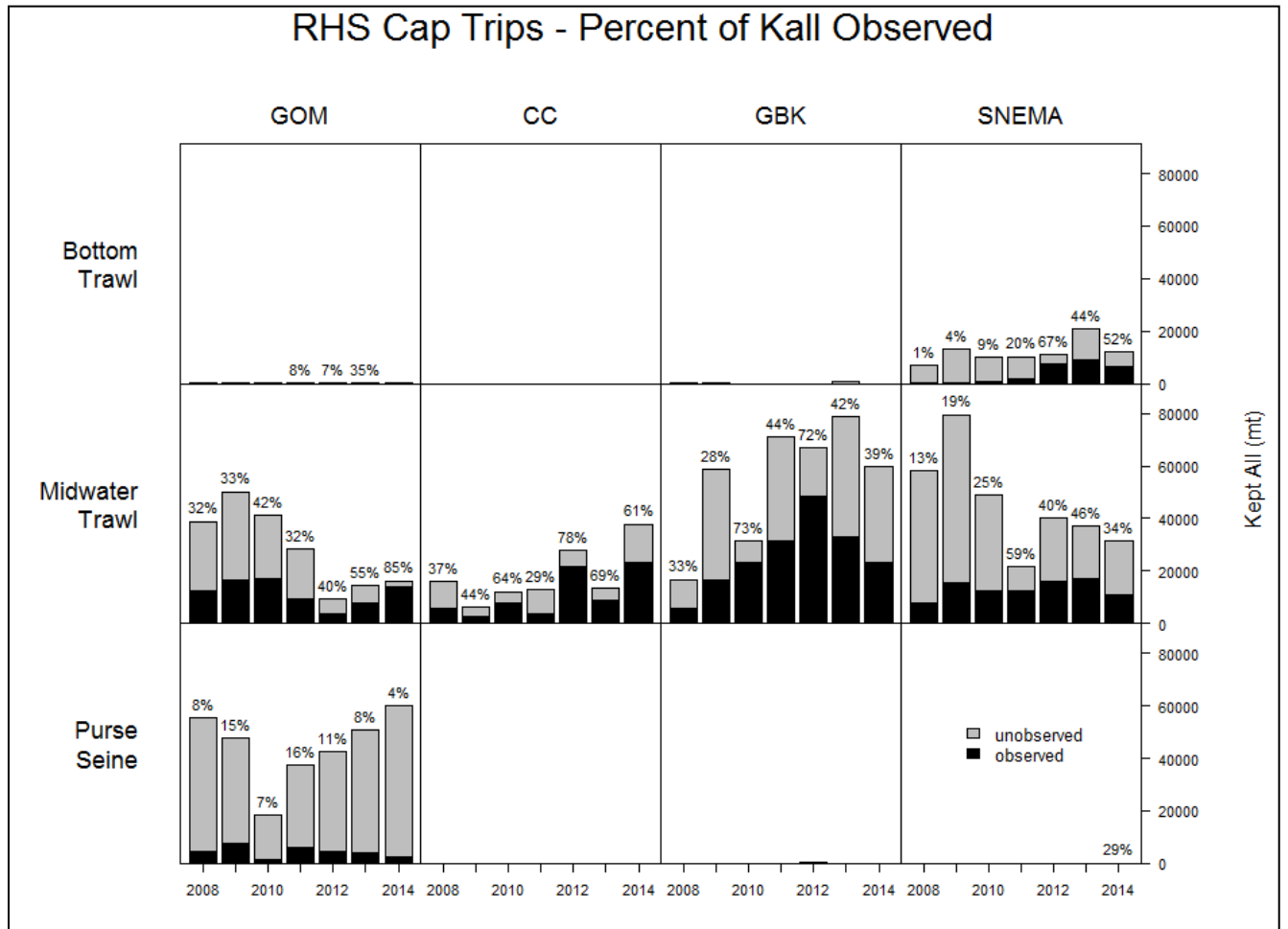
**If a trip occurred in multiple areas, it was assigned to the area where the majority of catch occurred.*

Figure 4 Total Number of Trips that Caught >6,600 lbs of Atlantic Herring by Year, Gear, and RH/S Catch Cap Area, 2008-2014



The dark portion of each bar represents the proportion of total trips that was observed in that year, with the % observed shown above each bar.

Figure 5 Total Catch of All Species (Kall) from Trips that Caught >6,600 lbs of Atlantic Herring by Year, Gear, and Catch Cap Area, 2008-2014



The dark portion of each bar represents the proportion of total Kall that was observed in that year, with the % observed shown above each bar.

Table 16 Updated RH/S Catch Estimates and Options for 2016-2018 RH/S Catch Caps (Unscaled)

		Bottom Trawl		Midwater Trawl	
		Median	Wgt Mean	Median	Wgt Mean
GOM	Fw3 (08-12)			85.5	96.3
	Fw3 Revised (08-12)			98.1	98.3
	Seven Years (08-14)			11.3	76.7
CC	Fw3 (08-12)			13.3	32.5
	Fw3 Revised (08-12)			8.9	27.6
	Seven Years (08-14)			29.5	32.4
SNE/MA	Fw3 (08-12)	88.9	61.5	123.7	235.3
	Fw3 Revised (08-12)	19.6	28.2	83.9	115.4
	Seven Years (08-14)	24.0	122.3	83.9	129.6

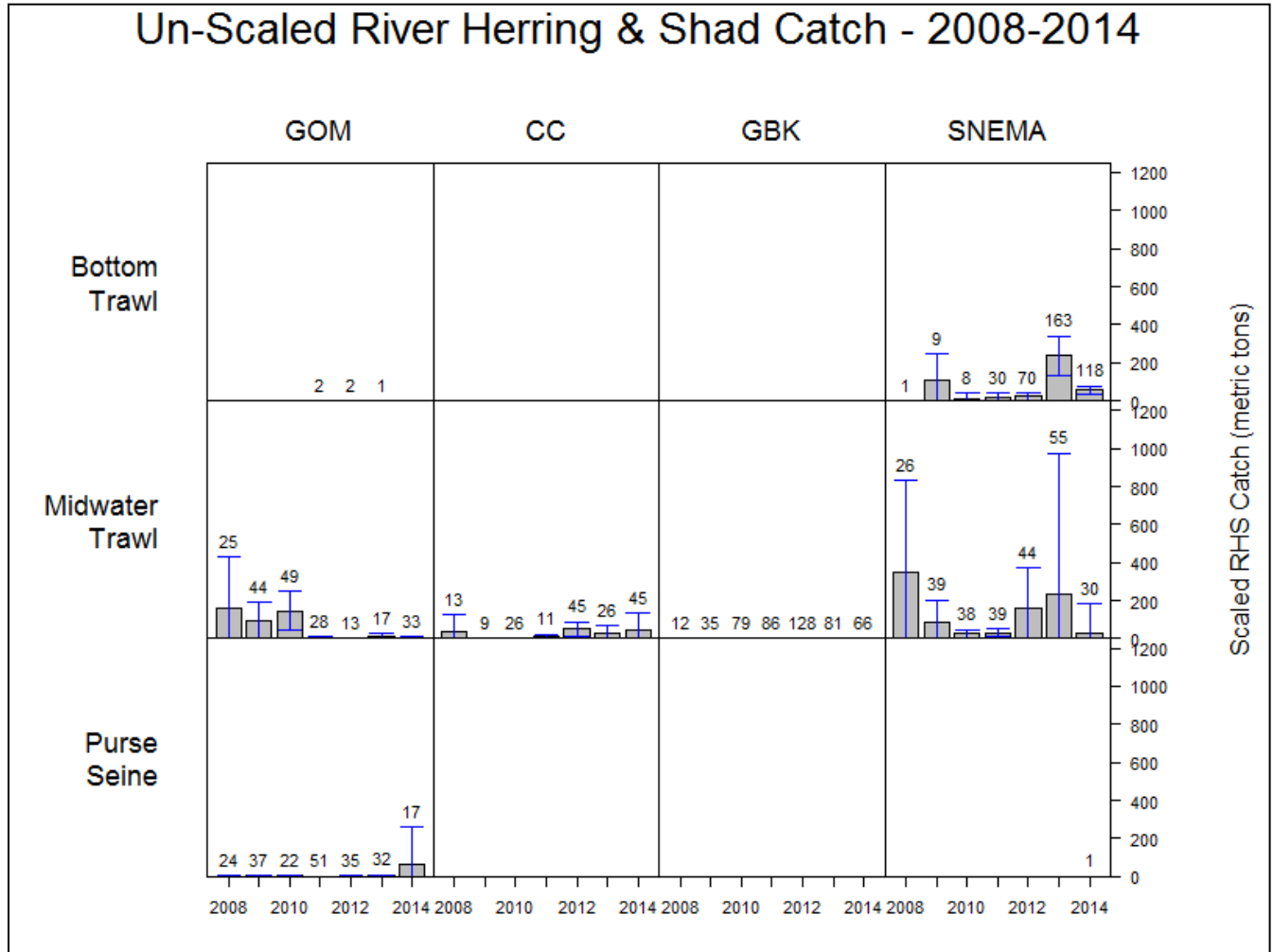
Note: “Wgt Mean” is the arithmetic average of the total RH/S catch per year, weighted by the number of sampled trips. The Framework 3 catch cap values are shaded in gray.

Table 17 Updated RH/S Catch Estimates and Options for 2016-2018 RH/S Catch Caps (Scaled to the 2015 Atlantic Herring ACL)

		Bottom Trawl		Midwater Trawl	
		Median	Wgt Mean	Median	Wgt Mean
GOM	Fw3 (08-12)			85.5	96.3
	Fw3 Revised (08-12)			73.7	93.8
	Seven Years (08-14)			11.3	73.4
CC	Fw3 (08-12)			13.3	32.5
	Fw3 Revised (08-12)			10.3	30.5
	Seven Years (08-14)			29.5	34.2
SNE/MA	Fw3 (08-12)	88.9	61.5	123.7	235.3
	Fw3 Revised (08-12)	33.8	40.9	89.0	159.7
	Seven Years (08-14)	42.6	126.0	89.0	159.9

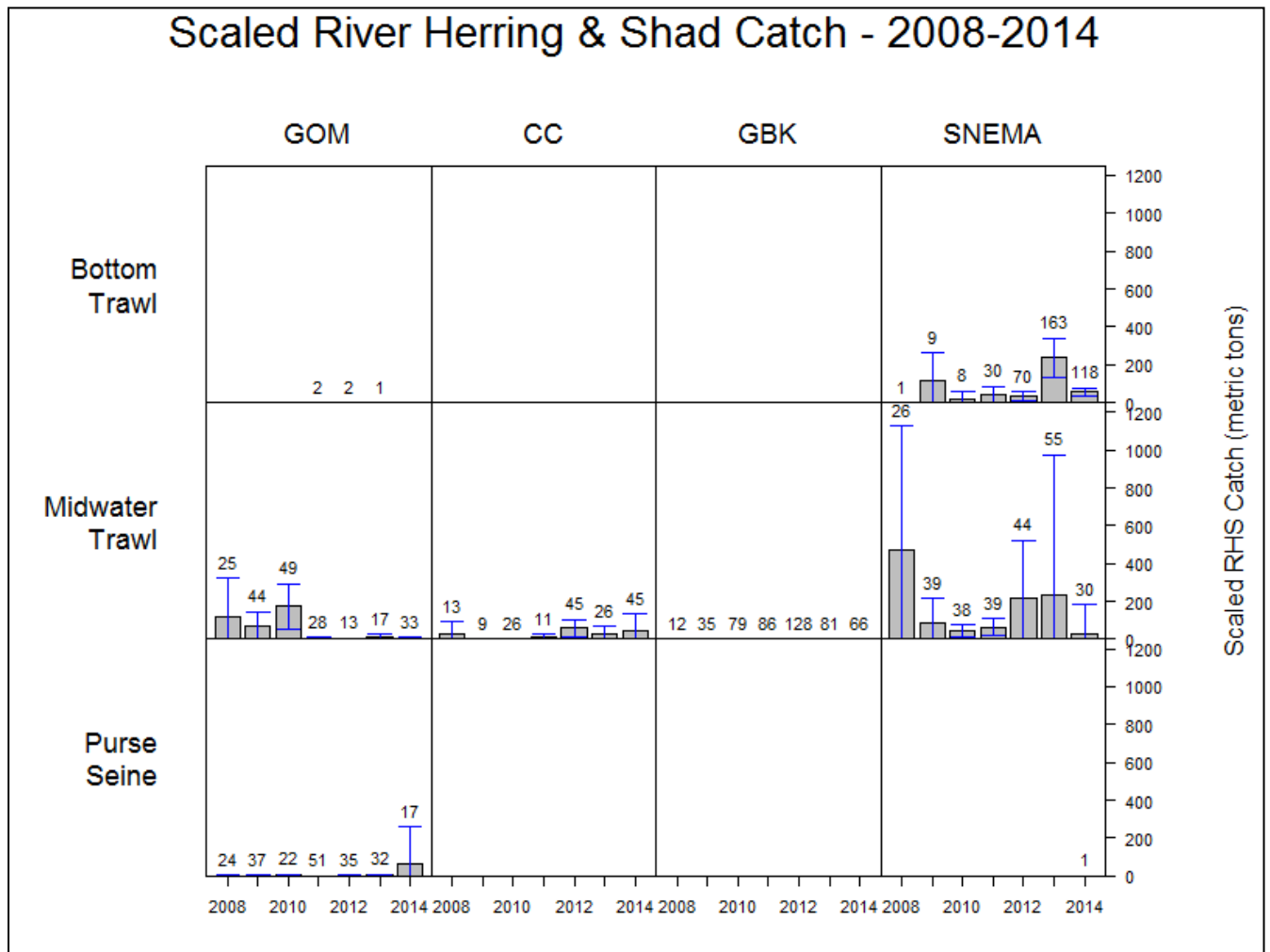
Note: “Wgt Mean” is the arithmetic average of the total RH/S catch per year, weighted by the number of sampled trips. The Framework 3 catch cap values are shaded in gray.

Figure 6 Estimated Total RH/S Catch from Trips that Caught >6,600 lbs of Atlantic Herring by Year, Gear, and Catch Cap Area, 2008-2014



The blue error bars represent 2 standard errors, and the number above each bar is the number of observed trips.

Figure 7 Estimated Total RH/S Catch from Trips that Caught >6,600 lbs of Atlantic Herring by Year, Gear, and Catch Cap Area, 2008-2014, Scaled to the 2015 Atlantic Herring ACL



The blue error bars represent 2 standard errors, and the number above each bar is the number of observed trips.