

Atlantic States Marine Fisheries Commission

**ADDENDUM II TO AMENDMENT 2 TO THE
INTERSTATE FISHERY MANAGEMENT PLAN FOR
ATLANTIC HERRING**



*ASMFC Vision Statement:
Healthy, self-sustaining populations for all Atlantic coast fish species or successful
restoration well in progress by the year 2015*

November 2010

List of Acronyms:

abc = Allowable biological catch
ABC = Acceptable biological catch
ACL = Annual Catch Limit
AM = Accountability Measures
BT = Border Transfer
DAH = Domestic Annual Harvesting
DAP = Domestic Annual Processing
IWP = Internal Waters Processing
JVP = Joint Venture Processing
JVpt = Total Joint Venture Processing
MSRA = Magnuson Stevens Reauthorization Act of 2006
OFL = Overfishing Level
OY = Optimal yield
PDT = Plan Development Team
RSA = Research Set Aside
TAC = Total Allowable Catch
TALFF = Total Allowable Level of Foreign Fishing
TC = Technical Committee
USAP = U.S. At-Sea Processing

1.0 Introduction

This Addendum modifies Amendments 1 and 2 to the Interstate Fishery Management Plan (FMP) for Atlantic Sea Herring to change the specification setting process and associated definitions.

Amendment 1 established the initial specification process and definitions for allowable biological catch (abc¹) optimum yield (OY), domestic annual harvesting (DAH), domestic annual processing (DAP), total joint venture processing (JVpt), joint venture processing (JVP), internal waters processing (IWP), U.S. at-sea processing (USAP), border transfer (BT), total allowable level of foreign fishing (TALFF), and total allowable catch (TAC). Amendment 2 modified the specification setting process to allow the Atlantic Herring Section (Section) to establish specifications for up to 3 years, established a research set aside (RSA) provision, and modified the management area boundaries to be consistent with the New England Fishery Management Council's (NEFMC) Amendment 1.

The majority (~97%) of commercial Atlantic herring fishing takes place in federal waters by federal permit holders.

2.0 Management Program

2.1.1 Statement of the Problem

The Magnuson-Stevens Reauthorization Act of 2006 (MSRA) requires regional management councils and the National Marine Fisheries Service (NMFS) to establish annual catch limits (ACL) such that overfishing does not occur in the fishery, and accountability measures (AM) for the overages of harvest levels, for every federally managed fishery.

NEFMC developed Draft Amendment 4 (Amendment 4) to the Herring FMP to comply with the MSRA requirements. While the overall management scheme (quota distributed to 3 management areas including 2 sub-areas) will not change with the new set of definitions and process, the change does require new terminology and definitions for setting the specifications, and paybacks for quota overages.

Having two sets of acronyms, one for the NEFMC plan and one for the Atlantic States Marine Fisheries Commission (ASMFC) plan, for a cooperatively managed species is confusing. As such, this Addendum establishes an identical set of definitions and acronyms as those that NEFMC is required to use under MSRA and included in Amendment 4.

The previous process under ASMFC Amendment 2 has never been used by the Section² and the majority of the language establishing the specification setting process (*Section*

¹The Addendum denotes allowable biological catch with a lowercase abc to minimize confusion with acceptable biological catch denoted with an uppercase ABC. Allowable biological catch is denoted as abc in this document only.

² Amendment 2 only suggests a process and schedule to set specifications.

4.2 *Specification Process*) was taken verbatim from NEFMC Amendment 1. This language is not specific to the Section which is not bound by the same requirements as NEFMC. Amendment 2 presents the Section with a suggested process that was designed for use by NEFMC but that will no longer be used by NEFMC starting in 2011. As such, this Addendum establishes a new specification setting process that is consistent with the Section's usual process for setting specifications while taking into account the new process to be used by NEFMC.

2.1.2 Background

Atlantic herring are regulated by ASMFC's Atlantic Herring Section in state waters from Maine through New Jersey. The Section developed and adopted Amendment 2 as a complementary document to NEFMC's Amendment 1. The Section's adoption of Amendment 2 and NEFMC's adoption of Amendment 1 were vital steps towards the creation of a complementary and comprehensive herring management program between state and federal waters. 2007 was the first full year under both amendments.

Management in state and federal waters is nearly identical. ASMFC and NEFMC plans delineate four management areas, each of which are assigned a maximum total allowable catch (TAC). ASMFC and NEFMC have worked cooperatively to establish identical TACs (Table 1) for each area since these areas were created. TACs are set based on maximum sustainable yield (MSY) derived from optimum yield (OY), allowing fishermen to harvest a sustainable amount of herring while accounting for herring's role as a forage species. Three percent of the TAC for each area may be set aside for research. Table 2 shows the terms associated with specifications as established in ASMFC's Amendments 1 and 2.

Table 1. ASMFC and NEFMC Atlantic Herring Specifications for 2008-2009.

SPECIFICATIONS	ASMFC Specifications	NEFMC Specifications
ABC	194,000	194,000
U.S. OY	145,000	145,000
TAC Area 1A	45,000 (5,000 available Jan-May)	45,000 (5,000 available Jan-May)
TAC Area 1B	10,000	10,000
TAC Area 2	30,000	30,000
TAC Area 3	60,000	60,000
Research Set-Aside	3% from each area TAC (2008 and 2009 FY only)	3% from each area TAC (2008 and 2009 FY only)

Table 2. Terms, acronym, and description as established in ASMFC Amendment 1 & 2

Term	Acronym	Description
<i>Allowable Biological Catch</i>	abc	Target F x Estimated Biomass
<i>U.S. Optimum Yield</i>	OY	Amount of fish that will provide the greatest overall benefit to the nation (DAH + Reserve)
<i>Domestic Annual Harvesting</i>	DAH	DAP + JVPt +BT
<i>Domestic Annual Processing</i>	DAP	Amount expected to be used by domestic processors
<i>Total Joint Venture Processing</i>	JVPt	Total amount allocated to processing by foreign ships (JVP + IWP)
<i>Joint Venture Processing</i>	JVP	Herring processed in federal waters by foreign vessels, that was taken by domestic vessels
<i>Internal Waters Processing</i>	IWP	Herring processed in state waters by foreign vessels, that was taken by domestic vessels
<i>U.S. At-Sea Processing</i>	USAP	Amount allocated for at sea processing by domestic vessels
<i>Border Transfer</i>	BT	Amount of herring taken in US waters and transferred to Canadian herring carriers for transshipment to Canada
<i>Total Allowable Level of Foreign Fishing</i>	TALFF	Amount allocated to foreign vessels for harvest
<i>RESERVE</i>	Reserve	Amount reduced from OY for risk averse approach
<i>Total Allowable Catch Area 1A</i>	TAC Area 1A	Quota for Area 1A
<i>Total Allowable Catch Area 1B</i>	TAC Area 1B	Quota for Area 1B
<i>Total Allowable Catch Area 2</i>	TAC Area 2	Quota for Area 2
<i>Total Allowable Catch Area 3</i>	TAC Area 3	Quota for Area 3
<i>Research Set-Aside (RSA)</i>	RSA	Percent of TAC allocated for research projects

The terms from Table 2 are explained in *Section 4.2.2 Specification of OY, DAH, JVPt, IWP, BT, USAP, and Reserve, 4.2.3 IWP/JVP Allocations, 4.2.5.1 Domestic Fishermen and Foreign Processing Vessels, and 4.2.7 Catch Control Measures of Amendment 1, and 4.2.3 Research Set Asides of Amendment 2* as follows.

4.2.2 Specification of OY, DAH, JVPt, JVPs, IWP, BT, USAP and Reserve

The Regional Administrator, after consulting with the New England Fishery Management Council, determines annual specifications relating to OY, DAH, DAP, JVPt, JVPs, IWP, BT and the reserve. The Council and the Regional Administrator will review annually the best available biological data pertaining to the stock. The allowable biological catch (ABC) (based on the target fishing mortality and the estimated biomass) for the Coastal Stock Complex (CSC) will be determined. The fishing

mortality rate associated with the ABC will not exceed the overfishing definition. The biomass of Atlantic herring at the end of the fishing year will not be less than the minimum stock size threshold specified in the overfishing definition.

ABC will be equal to the target fishing mortality (F_{target}) times the estimated biomass.

The current biomass is estimated to be much larger than B_{MSY} and is only lightly exploited. Applying F_{target} to this biomass results in a quantity greater than F_{MSY} times B_{MSY} . Because estimates of current biomass are very uncertain, the wide fluctuations in stock size often experienced by pelagic resources, and the key role of herring in the ecosystem, ABC will be limited to F_{MSY} times B_{MSY} during an initial "fishing up" period. This will allow for a reasonable expansion of the fishery and preserve the option for larger harvests in the future as the quality of data and assessment information improves.

Optimum yield (OY) will be less than or equal to ABC minus the expected Canadian catch (C) from the stock complex. This formula could result in an unrestricted Canadian catch severely limiting the US harvest; therefore the estimate of the Canadian catch deducted from the ABC will not be more than 20,000 mt for the New Brunswick juvenile harvest, and no more than 10,000 mt for the Georges Bank Canadian harvest. The size of the Canadian harvest and its impact on the US fishery will be monitored by the NEFMC Herring Committee and the ASMFC Herring Section. Successful management of this trans-boundary resource will rely on developing an effective means to coordinate US and Canadian management decisions.

$$OY < ABC - C$$

OY will not exceed MSY.

$$OY < MSY$$

This restriction, however, may not preclude the harvest in a specific year from exceeding the harvest associated with MSY. When stock biomass is larger than B_{MSY} , the target fishing mortality may produce a harvest that exceeds the MSY in the short term. This approach will not be taken during the initial period of the plan for the reasons given in the discussion on ABC.

The establishment of OY will include consideration of relevant economic, social, or ecological factors. Management of herring in U.S. waters is complicated by historical variations and fluctuations in abundance,

questions concerning the intermixing rates of various spawning components, the importance of herring as a prey resource and uncertainties concerning the Canadian harvest. One of the goals of Amendment 1 is to provide controlled opportunities to U.S. fishers to enter the fishery, providing an economic opportunity to vessels under severe restrictions in other fisheries. Estimates of the available domestic harvesting capacity show that the domestic fleet has the capacity to harvest the entire herring resource should fishers choose to do so. This choice is contingent on expanding existing herring markets or developing new markets. The complexities of predicting world demand for herring products and the opportunities available to the export market argue for a conservative stance when allocating the herring resource. For these reasons, OY may be less than ABC - C, and none of the available OY will be assigned to TALFF. Setting OY equal to DAH (plus a reserve) will help achieve a risk averse approach to management of the herring stock while it encourages U.S. development of the resource. This will provide the greatest overall benefit to the nation by stimulating further development of an underutilized fishery and diverting effort away from other overfished fisheries.

OY is equal to the expected domestic annual harvest (DAH) plus a reserve.

$$OY = DAH + Reserve$$

Factors to be considered in determining the amount of OY, if any, assigned to the reserve will include:

- uncertainty and variability in the estimates of stock size and ABC;*
- uncertainty in the estimates of Canadian harvest from the CSC;*
- requirement to insure the availability of herring to provide controlled opportunities for vessels in other fisheries in the Mid-Atlantic and New England;*
- excess U.S. harvesting capacity available to enter the herring fishery;*
- total world export potential by herring producing countries;*
- total world import demand by herring consuming countries;*
- U.S. export potential based on expected U.S. harvests, expected U.S. consumption, relative prices, exchange rates, and foreign trade barriers;*
- increased/decreased revenues to the United States from foreign fees;*
- increased/decreased revenues to U.S. harvesters (with/without joint ventures);*
- increased/decreased revenues to U.S. processors and exporters;*
- increases/decreases in U.S. harvesting productivity due to decreases/increases in foreign harvest;*
- increases/decreases in U.S. processing productivity;*

-potential impact of increased/decreased TALFF on foreign purchases of U.S. products and services and U.S.-caught fish, changes in trade barriers, technology transfer, and other considerations.

The Regional Administrator, in consultation with the Council and the ASMFC, may transfer any amount from the reserve to the DAH. DAH is composed of domestic annual processing (DAP), the total amount allocated to processing by foreign ships (JVPt), and the amount of herring taken in US waters and transferred to Canadian herring carriers for transshipment to Canada (BT). When determining JVPt, the Council will consult with the Atlantic States Marine Fisheries Commission (ASMFC) to insure close coordination with the Commission's allocation for Internal Waters Processing (IWP) operations.

$$DAH = DAP + JVPt + BT$$

Part of DAP may be allocated for at-sea processing in the EEZ, by domestic vessels that exceed any vessel size limits adopted by the Council. 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.

4.2.3 IWP/JVP Allocations

Joint Venture Processing (JVP) and Internal Waters Processing (IWP) operations are essentially the same type of operation from a domestic fishermen's perspective. A foreign processing vessel is contracted to process fish harvested by domestic vessels. The only difference at this time is where the processing vessel is located and under whose authority the JVP or IWP is granted. JVP vessels process fish in federal waters while IWP vessels process fish in state waters. Currently, both receive fish harvested primarily in federal waters.

All herring harvested by domestic vessels is used in some manner. The DAH is comprised of the amount used by domestic processors and the amount used by foreign processing vessels (regardless of whether the processing vessel is located in the EEZ or in state internal waters) and the amount transshipped to Canada on Canadian herring carriers (BT). The amount available for use by foreign processing vessels is the total joint venture allocation - JVPt.

$$DAH = DAP + JVPt + BT$$

Once DAH is estimated, the amount expected to be used by domestic processors (DAP) must be estimated and subtracted from the DAH along with herring transported to Canada. If there is any DAH remaining, it is available for joint venture processing operations.

$$JV_{Pt} + BT = DAH - DAP$$

As explained above, JV_{Pt} includes all herring available for foreign processing vessels. This includes both joint venture processing in the EEZ and internal waters processing within state waters. The amount available for processing in the EEZ is called JVPs; the amount available for state internal waters is IWP.

$$JV_{Pt} = JVPs + IWP$$

The Council Herring Committee and the Commission Herring Section will consult and recommend the breakdown of the JV_{Pt} allocation into JVPs and IWP. Factors to be considered include: requests received, demonstrated intent to conduct an operation, and consideration of resource status and potential increases in DAP. Recommendations will be forwarded to the Regional Administrator through the Council and implemented as described in the section on FMP monitoring (Section 4.2.6).

The Commission Herring Section will allocate the amount available for IWP to the individual states. These allocations will be established as a compliance criteria for the states and will include reporting criteria for the processing vessels. Reporting criteria will be established based on the recommendations developed through the Atlantic Coastal Cooperative Statistics Program (ACCS).

The total allocations (DAP, JV_{Pt} , BT and the reserve) in any one management area or subarea will not exceed the TAC set for that area or subarea during that fishing year. In the event of a closure to a directed herring fishery in any one management area or subarea, BT, JVPs and IWP operations will cease to receive any herring caught from a closed area or subarea.

Nothing in this section will restrict a state from allowing foreign processing vessels to process herring in state internal waters which were caught in federal waters in conjunction with the Magnuson-Stevens Act requirements section 306(c), so long as the area or subarea in which they were caught is open to directed herring fishing.

4.2.5.1 Domestic Fishermen and Foreign Processing Vessels

The operator of any domestic vessel issued a permit to fish for herring must maintain on board the vessel, and submit, an accurate daily fishing log report for all fishing trips, regardless of species fished for or taken, on forms supplied by or approved by the Regional Administrator. Fishing vessel log reports must include the following information, and any other information specified by the Regional Administrator:

Vessel name; USCG documentation number (or state registration number, if undocumented); permit number; date/time sailed; date/time landed; trip type; trip number; number of crew; number of anglers (if a charter or party boat); gear fished; quantity and size of gear; mesh/ring size; chart area fished; average depth; latitude/longitude (or loran station and bearings); total hauls per area fished; average tow time duration; pounds, by species, of all species landed or discarded; dealer permit number; dealer name; date sold; port and state landed; and vessel operators name, signature, and operator permit number.

In order to facilitate monitoring of area specific TACs, vessels will be required to report, on a weekly basis, their catch of herring from each management area. This may be accomplished through submittal of VTRs on a weekly basis until an Interactive Voice Response (IVR) system can be implemented. In an IVR system, the vessel owner or operator will place a telephone call and report required information to a computerized database that will facilitate timely tracking of landings. The IVR system will require operators to submit the information necessary to accurately track landings of herring from management areas. Such information may include vessel identification and all herring landings and discards by trip and management area, and any other information deemed necessary by the Regional Administrator.

If authorized in writing by the Regional Administrator, vessel owners or operators may submit reports electronically, for example by using a VTS or other media. The operator of any foreign processing vessel issued a permit to fish (as defined in 50 CFR 600.10) for herring must submit the fishing logs and reports specified in 50 CFR 600.502.

4.2.7 Catch Control Measures

4.2.7.1 Establishment of Total Allowable Catch (TAC)

Total Allowable Catch (TAC) will be determined for the Coastal Stock Complex. The TAC will serve as an analytical device for purposes of evaluating the conditions of the resource and rate of capture. TACs will also be determined for each management area. TAC s will be

recommended on an annual basis by the PDT/TC (see Section 4.2.2). The total of any assigned TACs will not exceed OY.

4.2.7.2 TAC Limitation

In the event that effort controls fail to restrict the catch of herring, the catch in an area will not exceed 100% of the TAC assigned for a particular time period. The directed fishery for herring will be closed in a management area or sub-area when the Regional Administrator projects the catch will exceed 95% of the TAC for that area or sub-area. Up to 5% of each area's or subarea's TAC will be set aside for bycatch in other fisheries. This level can be adjusted downward (making a larger percentage of the TAC available for the directed fishery) by the Regional Administrator if it appears to overestimate catches of herring in other fisheries. Such an adjustment will be made on an annual basis after providing an opportunity for public comment. Incidental catch of herring in an area closed to directed herring fishing will be limited to 2,000 pounds per trip as described in Section 4.2.8.1.

4.2.7.3 TAC Distribution

The Total Allowable Catch (TAC) will be distributed to Management Areas 1A, 1B, 2 and 3 on an annual (January through December fishing year) basis. The individual area TACs are designed to allow flexibility in the harvest of herring while protecting individual spawning components. All available information, including tagging studies and the NMFS fall bottom trawl survey, will be used to estimate the proportion of each spawning component (Gulf of Maine, Georges Bank/Nantucket Shoals) that occupies each management area during each season, and the size of each stock, the overall TAC is distributed so that spawning components are not overfished. This amendment includes the flexibility to revise the distribution of the TAC as relative stock sizes change, additional information is learned on stock migration and mixing, or improved assessment techniques allow a more refined estimate of the size of the individual spawning components.

Using estimates of stock size developed through the assessment of the coastal stock complex of herring, the allowable biological catch (ABC) can be determined. While the assessment is performed on the entire stock complex, it is widely acknowledged that there are separate spawning components of herring that should not be overfished (Iles and Sinclair 1982, Boyar et al. 1973, Haegle and Schweigert 1985). Any distribution of the annual TAC that ignores the existence of these spawning components risks damaging the resource by overfishing a specific component, while remaining within the overall harvest level. For this reason, the overall TAC will be distributed to separate areas. This will allow the setting of

these area specific TACs to reduce the risk of overfishing a specific herring spawning component.

The determination of area specific TACs is complicated by incomplete information on the migration of herring and the relative sizes of the spawning components. During spawning season, there is believed to be little or no mixing of the separate spawning components. An examination of NEFSC fall trawl survey data (conducted during the spawning season for herring) by the 27th SAW resulted in estimates of minimum population size for each of three areas: the Gulf of Maine, Nantucket Shoals, and Georges Bank. An annual ratio of population size to total population was determined for each of these areas for the time periods: 1988-97 and 1993-97. Coastal Maine accounted for 27% of the population biomass during the ten year period, declining slightly to 25-26% in the shorter, more recent period. Nantucket Shoals accounted for 63% of the biomass in the longer time period, declining to 57% in the 1993-97 period. Georges Bank accounted for 10% of the biomass in the longer period, but has increased to approximately 17- 18% in the recent period, reflecting the resurgence of the Georges Bank component (NEFSC 1998a). These relative stock size ratios can be applied to the ABC to estimate how much herring can be taken from each spawning component. These estimates should be viewed as guidelines only rather than absolutes as the accuracy of the percentages has not been determined.

The various spawning components however, are known to intermingle outside of the spawning season. This mixing must be taken into account when distributing the annual TACs to minimize the risk of overfishing a specific spawning component. Some of the Gulf of Maine component for example, is believed to migrate into Management Area 2 during the winter months. Table 6 summarizes current estimates of the distribution of the various spawning components throughout the year. This percentages are based on current knowledge of herring migration and mixing; as additional information is learned, the estimates of the percent of a spawning component in a management area may be revised. For example, changes in relative size of the various spawning components may result in different percentages of the total stock complex in an area during a specific season. The PDT/TC annual review of the management plan will update the estimates of stock distribution when determining TACs for the following year.

It is possible to assign seasonal and area TACs based on this estimated distribution of the various spawning components. Such a system, however, would be difficult to administer and monitor, and would risk frequent interruptions in fishing and the supply of herring as seasonal TACs are approached and effort controls are implemented. A simpler approach is adopted for Amendment 1 using annual TACs in each of four areas that

consider the seasonal distribution of herring and relative size of spawning components.

The maximum size of an individual area TAC is based on the percentage of the ABC that can be harvested from each of the spawning components. Estimates of Canadian catches in the New Brunswick juvenile and Georges Bank fisheries are then subtracted to determine the US harvest available from each spawning component (as described/limited in Section 4.2.2). The amount that can be harvested from each area is determined after considering the migration and mixing of the various components, the pattern of the fishery, and any other relevant factors.

Most herring are currently harvested in the inshore area of Management Area 1. A TAC is established in Area 1A to limit harvest to acceptable levels. Because some Gulf of Maine herring migrate into Management Area 2 in the winter months, the TAC set for Area 1 must consider the impact of the winter fishery in the northern part of Management Area 2. Twenty percent (20%) of the fish caught in this area/time period are believed to be GOM fish. This means the Area 1A TAC will not equal the entire amount that can be removed from the GOM spawning component if there is a winter fishery in Management Area 2. The amount of this impact will change as the fishery develops and if relative spawning component sizes change.

The process to be followed in determining annual TACs will be as follows:

- (1) Estimate the relative abundance of herring in each of three area during spawning season;*
- (2) Consider existing information on stock distribution and adjust the distribution of spawning components by area (Table 6) as necessary;*
- (3) Examine seasonal patterns in the fishery to identify changes in the exploitation of various spawning components over time;*
- (4) Based on ABC, estimate the allowable US harvest from the components of herring that spawn in the Gulf of Maine, Georges Bank, and Nantucket Shoals;*
- (5) Estimate the expected harvest of Gulf of Maine herring in the winter fishery in Management Area 2;*
- (6) Estimate the expected harvest of Georges Bank and Nantucket Shoals herring in Management Area 1;*
- (7) Establish the TAC _s for Areas 1A, 1B, 2 and 3;*
- (8) Determine the amount, if any, of the TAC that will be assigned to a TAC reserve.*

The TACs for each area will be forwarded to the Regional Administrator who may implement them as described in Section 4.2.6 (FMP Monitoring) The Regional Administrator may apportion any or all of the TAC reserve

to a Management Area after consulting with the Council. The Regional Administrator will project whether the New Brunswick juvenile fishery will harvest 20,000 mt by October 1 of each year. If it is determined this fishery will harvest less than 20,000 mt, the TAC for Management Area 1A will be increased by the difference.

4.2.3 Research Set Asides

In the past, industry members have put forth collaborative efforts outside of a costly public regulatory and administrative process for best utilization of resources to address research needs for the resource. For example, in 2003, the ECPA dedicated approximately 30% of its annual budget to acoustic and tagging research efforts in collaboration with industry, the Gulf of Maine Research Institute, and the Maine Department of Marine Resources. In addition to this support, individual vessels (ECPA members and others) have made significant (cash and in-kind) donations to maintain and further these efforts. Perhaps most important, the herring industry's role as an essential partner in the Gulf of Maine herring spawning stock survey results in the industry having confidence in the resulting stock abundance estimates and the industry's leadership in exploring how Gulf of Maine herring should be managed on a precautionary basis. Independent of the Commission or Council process, states, industry, and other interested parties have supported successful research that was conducted in the last few years with herring vessels in two ways:

1. Chartering vessels for a daily rate on mandatory days out of the fishery, and
2. Providing a special permit for landing herring on mandatory days out

Table 9. Atlantic Herring Research Projects and Funding Source

Current Research Projects	Project Coordinator	Current Funding source	Need to seek long-term funding?
Herring migration and movement	Maine DMR	Industry	Needed
Commercial catch sampling	Maine DMR	Maine DMR/ ACCSP	Needed
Inshore acoustic survey	Gulf of Maine Research Institute	Industry/Northeast Consortium	Needed
NMFS offshore acoustic survey	NEFSC	Federal	Not needed at current funding levels
Morphometric study	NEFSC	Federal	Unlikely

In addition to the above industry-oriented process, the Atlantic Herring Section and the Council may establish a mechanism to set aside a percentage of one or more management area TACs to help support

research on the herring stock complex and fishery. A TAC set-aside for research in the herring fishery could help to eliminate the constant pursuit of soft money to fund industry-based research programs (i.e. herring tagging and inshore hydroacoustic surveys). A TAC set-aside for research in the herring fishery could help secure reliable funding for long-term resource monitoring programs such as migration and movement studies and the inshore acoustics project. This measure authorizes NEFMC and ASMFC to set-aside 0 - 3% of the TAC from any management area(s) or the total TAC for the herring fishery to support herring-related research. The Council and Section will determine the specific percentages for the research set-asides and the management area(s) to which they apply during the fishery specification process.

*Currently, the herring fishery closes in a particular management area when it is projected that 95% of the area TAC has been/will be caught. The remaining 5% of the TAC is set-aside for incidental catch in other fisheries (under a 2,000-pound trip limit) after the directed fishery is closed. **The research set-aside is intended to be in addition to the current 5% set-aside for incidental catch once the directed fishery in a management area closes.***

The current process for setting specifications was established as a ‘suggestion’ in 4.2 SPECIFICATION PROCESS Amendment 2 as follows. These guidelines replaced the process established in Amendment 1.

4.2 Specification Process

4.2.1 Specification Process: Determining the Distribution of Area-Specific TACs

The specification process for the entire Atlantic herring fishery, both state and federal waters, has been a joint process. The Section annually meets with the Atlantic Herring Oversight Committee to establish area TACs that apply throughout the management area despite the border between state and federal waters. Amendment 2 expands upon the specification process outlined in Amendment 1 (see below) by allowing for the use of other analytical approaches when determining the distribution of area TACs. As such, the current process is still used but provides a specific approach to establishing the area-specific TACs. The ASMFC’s Technical Committee (TC) and NEFMC’s Plan Development Team (PDT) can modify the methodology to employ the best available scientific information for the Atlantic herring stock complex and its components.

The specification approach outlined in Amendment 1 was adopted, in part, to prevent the overfishing of individual stock components by establishing area-specific TACs based on current fishing patterns and estimates of

stock mixing. Using this approach, the process for determining area-specific TACs would continue as follows:

- 1. Estimate the relative abundance of herring in each of three areas during spawning season.*
- 2. Consider existing information on stock distribution and adjust the distribution of spawning components by area (Table 8) as necessary.*
- 3. Examine seasonal patterns in the fishery to identify changes in the exploitation of various spawning components over time.*
- 4. Based on ABC, estimate the allowable U.S. harvest from the components of herring that spawn in the Gulf of Maine, Georges Bank, and Nantucket Shoals.*
- 5. Estimate the expected harvest of Gulf of Maine herring in the winter fishery in Management Area 2.*
- 6. Estimate the expected harvest of Georges Bank and Nantucket Shoals herring in Management Area 1.*
- 7. Establish the TACs for Areas 1A, 1B, 2, and 3.*
- 8. Determine the amount, if any, of the TAC that will be assigned to a TAC reserve.*

The mixing regime currently included in the Herring FMP, which is applied to this approach, is described in Table 8.

By allowing for the consideration of other analytical approaches, Amendment 2 authorizes the NEFMC's PDT and ASMFC's TC, in consultation with the Herring Committee, Section, Advisory Panels and other interested parties, to utilize the most appropriate analytical approach for determining the distribution of area-specific TACs during the fishery specification process, as long as the justification is provided. Depending on stock/fishery conditions as well as on the quality and resolution of available scientific information, the most appropriate approach for calculating the distribution of area-specific TACs may be: the approach currently outlined in the Herring FMP, a "risk assessment" approach (described generally below), an approach that utilizes assessment information specific to individual stock components (currently not available, but may be in the future), or another analytical approach. This measure allows the NEFMC PDT and ASMFC TC to utilize all available information to determine the most appropriate analytical approach as part of the fishery specification process.

It is important to note that adopting this management measure may extend the specification process and require additional meetings of the NEFMC PDT/ASMFC TC, Herring Committee/Advisory Panels/Section, and/or Council to address the herring fishery specifications. Instead of addressing the specifications over the course of about two months

(June/July), the process will likely begin earlier and occur over the course of about four months (April – July). Utilizing this approach, the fishery specification process will generally occur as follows:

- 1. NEFMC Herring PDT and ASMFC Herring TC meet to update and evaluate available stock and fishery information, prepare SAFE Report and FMP Review, select analytical approach for calculating area-specific TACs, and develop supporting rationale (likely to occur during April based on a January – December fishing year);*
- 2. Herring Committee/Advisory Panel and ASMFC Section meet to review information provided by the Herring PDT and TC and recommend a range of TAC options for analysis (likely to occur during May based on a January – December fishing year);*
- 3. Herring PDT and TC conduct an analysis of the proposed TAC options relative to status quo (likely to occur during May/June based on a January – December fishing year);*
- 4. Herring Committee/Advisory Panel and ASMFC Section meet to review PDT analysis and recommend a preferred TAC option (likely to occur during June based on a January – December fishing year). The Section will make a final decision on the upcoming fishing year specifications;*
- 5. Council meets to consider Committee/Advisory Panel recommendations and select final area-specific TACs for upcoming fishing year(s) (likely to occur during July based on a January – December fishing year).*

Some of the increased costs (administrative, analytical, manpower) associated with extending the specification process under this measure may be mitigated by adjusting the timing of the specification process to allow fishery specifications to remain effective for multiple fishing years (see Section 4.2.2.).

Example of an Alternative Analytical Approach – “Risk Assessment”

One new approach to calculate area-specific TACs and analyze the impacts associated with a range of TAC options may be a risk assessment approach. This approach was developed by the NEFMC’s Herring PDT during the Amendment 1 process, primarily in response to advice from the Council’s SSC to conduct a relative risk assessment when determining the aerial distribution of catches in the herring fishery (see SSC Recommendations, Appendix V, Volume II).

While there is flexibility in the methodology for conducting a risk assessment, the approach can be generally summarized as follows:

- *Estimate the biomass of the inshore (GOM) spawning component of the herring resource using the most recent information from hydroacoustic surveys and/or other sources of relevant information.*
- *Calculate average historical removals of the inshore component. The time period for estimating historical removals of the inshore component could be determined by the PDT and TC, provided the selection is justified. Fishery-independent indices (trawl surveys, acoustic surveys) in addition to landings data would be used to determine an appropriate historical reference time frame.*
- *Evaluate a reasonable range of options for TAC distributions (including the status quo) using a relative risk assessment.*
- *The risk assessment should apply the current biomass estimate for the inshore component and a range of possible mixing scenarios across all management areas to account for uncertainties associated with the mixing scenarios.*
- *The assumption about how much of the inshore component of the resource will be taken by the New Brunswick weir fishery would be re-evaluated periodically and adjusted as necessary, especially if landings from the NB weir fishery increase or decrease significantly in the future. (The current assumption of catch from this fishery is 20,000 mt.) If the option is selected to include the Downeast Maine fixed gear fishery catch in the assumption about the NB weir fishery catch, then it will be even more important to re-evaluate this assumption and possibly adjust it based not only on the NB weir fishery catch, but also on the Downeast ME fixed gear fishery catch.*
- *The assessment would evaluate relative risk associated with the TAC options by producing estimates of removals from the inshore component under a range of mixing scenarios, which would be compared to average historic removals under the same range of mixing scenarios.*
- *The Council and Section would select TACs for Areas 1A, 1B, 2, and 3 based on choices regarding both the risk of overfishing the inshore component (relative to historical removals) and issues/tradeoffs associated with allocating the catch of the inshore component of the resource between Areas 1 (primarily 1A) and 2.*

One benefit of a risk assessment approach may be that it accounts for uncertainties related to stock mixing by not relying on one specific mixing scenario. Instead, this approach estimates potential removals from the inshore component of the resource based on a range of possible mixing scenarios. Consequently, a range of projected removals under each TAC option that is evaluated would result from the risk assessment. The inshore component of the resource has been identified by the Herring PDT as the limiting factor when allocating catches by management area. The intent of this approach would be to minimize the relative risk of

overfishing the inshore component of the resource under a total MSY and OY that are not expected to compromise the health of the resource as a whole.

4.2.2 Specification Process – Tri-annual Planning Horizon

Under this measure, the NEFMC's PDT and the ASMFC's TC will meet tri-annually to review the most recent stock status information. The PDT and TC will recommend necessary changes to the next three fishing year's specifications by July. With this type of multi-year management measure, the NEFMC and ASMFC will have the ability to modify the specifications during the interim years. This measure is summarized below:

- *The Herring PDT will meet with the Commission's TC to review the status of the stock and the fishery and prepare a SAFE Report every three years. While a SAFE Report will only be prepared every three years, the Herring PDT will meet at least once on alternate years to review the status of the stock relative to the overfishing definition if information is available to do so.*
- *When conducting a three-year review and preparing a SAFE Report, the PDT/TC will report to the Council/Commission no later than July with any necessary adjustments to the specifications.*
- *Specifications and TACs will be implemented by the Regional Administrator once approved by the Council. Specifications are implemented for the state waters fishery upon the Atlantic Herring Section's approval. Specifications will be set for three fishing years.*
- ***This measure maintains flexibility to adjust the fishery specifications in the interim years.*** *If the Council and Section determine that the specifications should be adjusted during the three-year time period, it can do so through the same process during one or both of the interim years.*
- *If the specifications will not be changed for the upcoming three fishing years, this will be announced through a notice action in the Federal Register.*

NEFMC is required by MSRA to update its FMP to set specifications using the following terms which will be included in Amendment 4.

OFL: Overfishing Level. 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. Catches that exceed this amount would be expected to result in overfishing. The annual OFL can fluctuate above and below MSY depending on the current size of the stock. This specification will replace the current specification of *allowable biological catch* in the herring fishery.

ABC: Acceptable Biological Catch. The maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan. ABC can equal but never exceed the OFL. ABC should be based on F_{MSY} or its proxy for the stock if overfishing is not occurring and/or the stock is not in a rebuilding program, and should be based on the rebuilding fishing mortality (F_{reb}) rate for the stock if it is in a rebuilding program. The specification of ABC will consider scientific uncertainty.

ACL: Annual Catch Limit. The catch level selected such that the risk of exceeding the ABC is consistent with the management program. 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 ACL serves as the level of catch that determines whether accountability measures (AMs) become effective.

$$OFL \geq ABC \geq ACL$$

$$OFL - \text{Scientific Uncertainty} = ABC$$

$$ABC - \text{Management Uncertainty} = ACL$$

AM: Accountability Measure(s). 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.

Table 3. Overview of New Definitions used in Proposed ACL Process

Acronym	Definition	Considerations
OFL	Catch at FMAX	Current stock size
ABC	Catch at FMSY or Frebuild \leq OFL	Biological uncertainty over current stock size, estimate of F, or other parameters (stock mixing ratios, recruitment, etc.)
ACL	\leq ABC	Uncertainty from other sources, evaluation of risk to achieving management goals if ABC is exceeded
AM	Accountability Measures	(1) minimizing risk of exceeding ACL during the fishing year; (2) addressing ACL overages, if they occur

In addition to changing/replacing the specifications to include OFL, ABC, and ACL, Amendment 4 removed JVPT, JVP, IWP, TALFF, and the reserve (Table 4.) because these terms involve foreign fishing vessels who no longer fish in US waters.

Table 4. Changes NEFMC Atlantic Herring Fishery Specifications in Amendment 4.

CURRENT SPECIFICATIONS	AMENDMENT 4 SPECIFICATIONS
Allowable Biological Catch (ABC)	Overfishing Limit (OFL)
	Acceptable Biological Catch (ABC)
U.S. Optimum Yield (OY)	U.S. Optimum Yield (OY) (Stock-Wide ACL)
Domestic Annual Harvesting (DAH)	Domestic Annual Harvesting (DAH)
Domestic Annual Processing (DAP)	Domestic Annual Processing (DAP)
Total Joint Venture Processing (JVPT)	N/A
Joint Venture Processing (JVP)	N/A
Internal Waters Processing (IWP)	N/A
U.S. At-Sea Processing (USAP)	U.S. At-Sea Processing (USAP)
Border Transfer (BT)	Border Transfer (BT)
Total Allowable Level of Foreign Fishing (TALFF)	N/A
RESERVE	N/A
TAC Area 1A	Sub-ACL Area 1A
TAC Area 1B	Sub-ACL Area 1B
TAC Area 2	Sub-ACL Area 2
TAC Area 3	Sub-ACL Area 3
Research Set-Aside	Research Set-Aside (and/or Other Set-Aside)

In addition, NEFMC Amendment 4 contains the following AM provisions:

ACL Overage Deduction: This option establishes a process to address ACL/sub-ACL overages in the Atlantic herring fishery. Once the final total catch for a fishing year is determined during the subsequent fishing year using the best available information (including VTR reports to account for incidental catch in other fisheries), any ACL/sub-ACL overage would result in a reduction of the corresponding ACL/sub-ACL for the fishing year after the final total catch is tallied. The ACL/sub-ACL deduction would be equal to the amount that was exceeded. NMFS would make these determinations and publish any changes to the ACLs in the *Federal Register* prior to the start of the fishing year during which the deduction would occur.

Haddock Catch Cap Accountability Measure. This option establishes an AM for the current haddock catch cap, consistent with the establishment of the catch cap as a sub-ACL in the groundfish fishery (Amendment 16) and consistent with current regulations regarding the catch cap. When the Regional Administrator has determined that the haddock catch cap has been caught, all vessels issued an Atlantic herring permit or fishing in the Federal portion of the GOM/GB Herring Exemption Area, would be prohibited from fishing for, possessing, or landing herring in excess of 2,000 lb per trip in or from the GOM/GB Herring Exemption Area unless the vessel has a multispecies permit and is fishing on a declared groundfish trip. Upon this determination, possession of haddock would be prohibited for all vessels that possess a limited access Category A or B permit, regardless of where they are fishing.

2.1.3 Management Measures

This Addendum changes the specification definitions and the specification setting process as established in ASMFC Amendment 1 & 2.

2.1.3.1 Specifications

The language in this section completely replaces *Section 4.2.2 Specification of OY, DAH, JVPt, IWP, BT, USAP, and Reserve, 4.2.3 IWP/JVP Allocations, 4.2.5.1 Domestic Fishermen and Foreign Processing Vessels, and 4.2.7 Catch Control Measures* of Amendment 1, and *4.2.3 Research Set Asides* of Amendment 2.

Having different specifications in state and federal waters is confusing. Transitioning from the old terminology to new, consistent terminology does not impact the current management scheme which will continue to allocate an overall quota to 3 management areas, including 2 sub areas, use days out to control harvest rate, and close when 95% of an areas quota is harvested.

Consistent with NEFMC Amendment 4, this Addendum adjusts the specification definitions and terms as shown in Table 5 below. OFL, ABC, and ACL are defined consistent with the text on page 18 & 19 of this Addendum. DAH, DAP, USAP, BT and RSA are defined consistent with Amendment 1 & 2 and text on page 5 – 15 of this Addendum. Sub-ACLs (which replace TAC’s) are defined using the previous definition of TAC’s consistent with Amendment 1 and text on Page 5 – 15 of this Addendum.

Table 5. Changes to Atlantic Herring Fishery Specifications. N/A denotes an old specification that was removed by this Addendum.

Previous Specifications	New Specifications
Allowable Biological Catch (ABC)	Overfishing Limit (OFL)
	Acceptable Biological Catch (ABC)
U.S. Optimum Yield (OY)	Annual Catch Limit (ACL)
Domestic Annual Harvesting (DAH)	Domestic Annual Harvesting (DAH)
Domestic Annual Processing (DAP)	Domestic Annual Processing (DAP)
Total Joint Venture Processing (JVPt)	N/A
Joint Venture Processing (JVP)	N/A
Internal Waters Processing (IWP)	N/A
U.S. At-Sea Processing (USAP)	U.S. At-Sea Processing (USAP)
Border Transfer (BT)	Border Transfer (BT)
Total Allowable Level of Foreign Fishing (TALFF)	N/A
RESERVE	N/A
TAC Area 1A	Area 1A Sub-ACL
TAC Area 1B	Area 1B Sub-ACL
TAC Area 2	Area 2 Sub-ACL
TAC Area 3	Area 3 Sub-ACL
Research Set-Aside	Research Set-Aside (and/or Other Set-Aside)

2.1.3.2 Specification Setting Process

This section replaces 4.2.1 *Specification Process: Determining the Distribution of Area-Specific TACs* and 4.2.1 *Specification Process – Tri-annual Planning Horizon* of Amendment 2.

As discussed in 2.1.1 *Statement of the Problem* and 2.2.1 *Background* of this Addendum, the previous process for setting the specifications (as specified in Amendment 2) is a remnant of language from NEFMC Amendment 1 and the Section has never followed this process to set specifications. A new federal specification process was established in NEFMC Amendment 4 making the Section even less likely to follow the process as currently specified in Amendment 2.

The Atlantic Herring Section will set specifications for up to three years using the following general process. If the Section does set specifications for three years, it is recommended that the TC review the specifications during each interim year and provide updates to the Section. The Section can make mid-year adjustments by a majority vote during any Section meeting that has sufficient attendance to form a quorum.

1. The TC will review the best available science, which is likely be the most recent stock assessment and/or stock assessment and fishery evaluation (SAFE) report prepared by the PDT. ASMFC staff will facilitate TC involvement in PDT meetings (or schedule joint meetings) during the development of the SAFE report. The PDT and TC currently have significant overlap of membership making joint meetings practical at this time.
2. Following the review, the TC will make recommendations to the Section for the following:
 - OFL estimates for one to three fishing years, based on the point estimates of F_{MSY} (or its proxy) and the point estimate of future stock size.
 - ABC recommendations for one to three fishing years, based on either F_{MSY} (if the stock is not in a rebuilding program) or F_{REB} (if the stock is in a rebuilding program). If possible, the Herring TC recommendation should report the catch that is expected to result from the point estimates of the target fishing mortality rate and projected stock size (i.e., the OFL). If the TC recommends reducing the ABC from this amount, the recommendation should include an explicit discussion of the scientific uncertainties that are taken into account in developing the recommendation.
 - ACL recommendations, taking into account necessary adjustments for Canadian catch (New Brunswick weir fishery), state waters landings, discards, and other sources of potential management uncertainty (risk).
 - An evaluation whether the ABC and the ACLs have been exceeded in earlier years.
3. The Atlantic Herring Section will review TC recommendations and set specifications prior to the opening of the fishing season. Prior to the Section

taking final action, ASMFC staff will facilitate joint meetings of the NEFMC Herring Committee and Section to review progress and give guidance to the PDT/TC during the development of the SAFE report. There is significant overlap between the Herring Committee and Section making joint meetings practical at this time.

2.1.3.3 ACL/Sub-ACL Overage Deduction (Accountability Measures)

This measure establishes annual paybacks for ACL/Sub-ACL overages.

Once a final total catch for a fishing year is determined during the subsequent fishing year using the best available information (including VTR reports to account for incidental catch in other fisheries), ACL/Sub-ACL overage would result in a reduction of the corresponding ACL/sub-ACL for the fishing year after the final total catch is tallied. The deduction will be equal to the amount that was exceeded.

NEFMC is required to implement AMs as part of MSRA. NMFS' Guidelines state that accountability measures are management controls implemented for stocks such that exceeding the ACL is prevented, where possible, and corrected or mitigated if it occurs. NMFS suggests that three kinds of AMs that could be considered: (1) those that can be applied in-season, designed to prevent the ACL from being reached; and (2) those that are applied after the fishing year, designed to address the operational issue that caused the ACL overage and ensure that it does not happen in subsequent fishing years, and, as necessary, address any biological harm to the stock; and (3) those that are based on multi-year average data which are reviewed and applied annually. AMs should address and minimize the frequency and magnitude of overages and should be designed so that if an ACL is exceeded, specific adjustments are effective in the next fishing year or as soon as possible. Multi-year specifications (like those for the Atlantic herring fishery) should include AMs that provide for automatic adjustments in the subsequent year's harvest if an ACL is exceeded in one year.

Several of the management measures in the Atlantic herring fishery function as AMs as described above. These measures are designed primarily to prevent the management area TACs (ACLs) from being exceeded during the fishing year, as well as improve the likelihood that OY can be caught on a continuing basis while preventing overfishing.

Specifically, NMFS and ASMFC close the directed fishery when 95% of an area's TAC is projected to be harvested. This precautionary closure helps ensure that an area's TAC is not exceeded.

ASMFC controls catch rates though days out of the fishery. Vessels are prohibited from landing more than 2,000 lbs of Atlantic herring on a day out and this measure further reduces the likelihood of a TAC overage.

3.0 Compliance Schedule

The measures contained in Addendum II do not require states to adjust their current regulations.