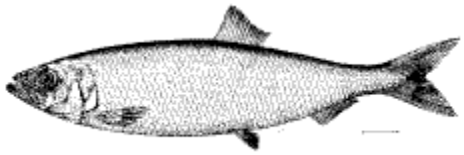
Proposed Atlantic Herring Specifications

for the 2005 Fishing Year
(January 1 – December 31, 2005)

including the
Environmental Assessment (EA),
Regulatory Impact Review (RIR), and
Initial Regulatory Flexibility Analysis (IRFA)



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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1.0 EXECUTIVE SUMMARY

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) and the Atlantic Herring Fishery Management Plan (FMP) requires the New England Fisheries Management Council (Council) to develop specifications recommendations for each fishing year. The "Proposed Atlantic Herring Specifications and associated EA, RIR and IRFA" for the 2005 and, possibly, the 2006 fishing years includes proposed values for, and analysis of, the following alternatives for specifications:

SPECIFICATION	COUNCIL-PREFERRED	NMFS-Preferred *	NO ACTION
Allowable Biological Catch (ABC)	220,000 mt	**220,000 mt**	300,000 mt
Optimum Yield (OY)	180,000 mt	**150,000 mt**	250,000 mt
Domestic Annual Harvest (DAH)	180,000 mt	**150,000 mt**	250,000 mt
Domestic Annual Processing (DAP)	176,000 mt	**146,000 mt**	226,000 mt
Total Foreign Processing (JVPt)	0 mt	**0 mt**	20,0000 mt
Joint Venture Processing (JVP)	0 mt	**0 mt**	10,000 mt
Internal Waters Processing (IWP)	0 mt	**0 mt**	10,000 mt
U.S. At-sea Processing (USAP)	0 mt	**20,000 mt**	20,000 mt
Border Transfer (BT)	4,000 mt	**4,000 mt**	4,000 mt
Total Allowable Level of Foreign Fishing (TALFF)	0 mt	**0 mt**	0 mt
Reserve	0 mt	**0 mt**	0mt
TAC Area 1A	60,000 mt	**60,000 mt**	60,000 mt
TAC Area 1B	10,000 mt	**10,000 mt**	10,000 mt
TAC Area 2	50,000 mt	**30,000 mt**	50,000 mt (Reserve 70,000 mt)
TAC Area 3	60,000 mt	**50,000 mt**	60,000 mt

* **The NMFS-Preferred alternative is the proposed action**.

Key differences between the NMFS-preferred alternative and the Council-preferred alternative relate to OY, DAH, DAP, USAP and area TACs. The NMFS-preferred OY and corresponding DAH, DAP and area TACs will allow for a 23% increase in landings as compared to 2001, the highest level of landings in recent years, while continuing to minimize the risk of overfishing the inshore component of the herring resource. The specification for USAP is proposed to remain at 20,000 mt, which will provide an additional outlet for harvesters without favoring one segment of the U.S. processing sector over another.

The NMFS-preferred alternative will not result in significant impacts to the herring resource, non-target species, protected resources, habitat or the herring fishery. The proposed reduction in ABC, OY and allocations to management areas would not increase the risk of reducing the herring stock size. While there are only minor differences in biological impacts between the Council-preferred and NMFS-preferred alternatives, the NFMS-preferred alternative is less risk prone with regard to overfishing the inshore component of the herring resource. Impacts to the social environment could be greater for the NFMS-preferred alternative, as the lower specification for OY will allow an increase in landings that is not as great as for the Council-preferred alternative. These impacts, however, are mitigated by the fact that, on average, the herring fishery has landed 100,000 mt per year for the past several years and it is not likely that an increase in landings of greater than 50% will be experienced in the fishery in the 2005 fishing year. Therefore, while the NMFS-preferred alternative has a lower OY value (150,000 mt) and lower than the No Action (250,000 mt) and the Council-preferred alternative (180,000 mt), it would still allow an increase in landings and expansion of the fishery.

2.0 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) and the Atlantic Herring Fishery Management Plan (FMP -- approved by the National Marine Fisheries Service (NMFS) on October 27, 1999) requires the New England Fisheries Management Council (Council) to develop specifications recommendations for each fishing year, which include setting values for the following: Optimum yield (OY), domestic annual harvest (DAH), domestic annual processing (DAP), total foreign 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 reserve (if any). The Council also recommends the total allowable catch (TAC) for each management area and sub-area. Once the Council has prepared its recommendations, they are sent to NMFS for review. NOAA Fisheries is required to ensure that the Council's recommended specifications comply with the FMP and are consistent with other legal requirements.

On October 8, 2004, the Council submitted its recommended specifications for Atlantic herring, which are contained in this document. Upon reviewing the Council's recommendations for Atlantic herring, the NMFS determined that those recommendations were not supported by the data. As a result, NMFS is proposing another preferred alternative for the 2005 herring specifications (Table 2), which falls within the range of alternatives considered by the Council during the specification process.

To maintain the integrity of the Council's original recommendations, and to give the reader an opportunity to compare and contrast the Council's recommendations with the NMFS-preferred alternative, this document has been modified in the following manner. The Council's original language and arguments have been left intact, and where the NMFS-preferred alternative differs from the Council-preferred alternative, either new text or new sections have been added, which analyze the differences between the two.

While the specifications discussed in this document are proposed for the 2005 fishing year, the Council may maintain these specifications through the 2006 fishing year unless stock and fishery conditions change substantially. The Herring PDT will update and evaluate stock and fishery information during 2005, and the Council may determine, based on the review by the Herring PDT, that no adjustments to the specifications are necessary for the 2006 fishing year. Maintaining the specifications for two years would provide the Council with an opportunity to complete the development of Amendment 1 to the Herring FMP, which may implement a limited access program for the herring fishery in addition to other management measures including possible adjustments to the specification process. The analyses presented in this document consider any potential impacts associated with maintaining the proposed specifications through the 2006 fishing year.

3.0 PURPOSE AND NEED

The purpose of this action is to determine the annual specifications for the herring fishery for the 2005 fishing year, and possibly the 2006 fishing year, as required by the Herring FMP. The FMP requires the Council and the Regional Administrator review the best available information regarding the status of the resource and fishery and develop appropriate fishery specifications. The FMP also provides the Regional Administrator the authority to adjust the specifications in mid-season as necessary.

The Herring FMP mandates that the total allowable catch (TAC) be distributed to the management areas shown in Figure 1 on an annual basis. The Council uses the best information available to estimate the proportion of each spawning component of the Atlantic herring stock complex in each area/season and distributes the TACs such that the risk of overfishing an individual spawning component is minimized.

The annual setting of fishery specifications, including management area TACs, is needed to provide the Council with the flexibility to respond to short-term changes in stock conditions and fish distribution, as well as to incorporate updated scientific information about the distribution or status of spawning components. However, if no significant changes in stock and fishery conditions occur within the next year, the Council intends to review updated information provided by the PDT and maintain the NMFS-preferred 2005 specifications through the 2006 fishing year.

4.0 MANAGEMENT ALTERNATIVES

4.1 COUNCIL-PREFERRED SPECIFICATIONS FOR THE ATLANTIC HERRING FISHERY

The Council-preferred specifications for the Atlantic herring fishery during the 2005 fishing year (and possibly the 2006 fishing year) are summarized in Table 1. The current management areas for the Atlantic herring fishery, to which the proposed TACs apply, are depicted in Figure 1.

Table 1 Council-Preferred Atlantic Herring Specifications for the 2005 Fishing Year

SPECIFICATION	PROPOSED ALLOCATION (MT)
Allowable Biological Catch ABC	220,000
Optimum Yield OY	180,000
Domestic Annual Harvest DAH	180,000
Domestic Annual Processing DAP	176,000
Joint Venture Processing (total) JVPt	0
Joint Venture Processing (EEZ) JVP	0
Internal Waters Processing IWP	0
U.S. At-Sea Processing USAP	0
Border Transfer BT	4,000
Total Allowable Level of Foreign Fishing TALFF	0
RESERVE	0
TAC Area 1A	60,000
TAC Area 1B	10,000
TAC Area 2	50,000, No Reserve
TAC Area 3	60,000

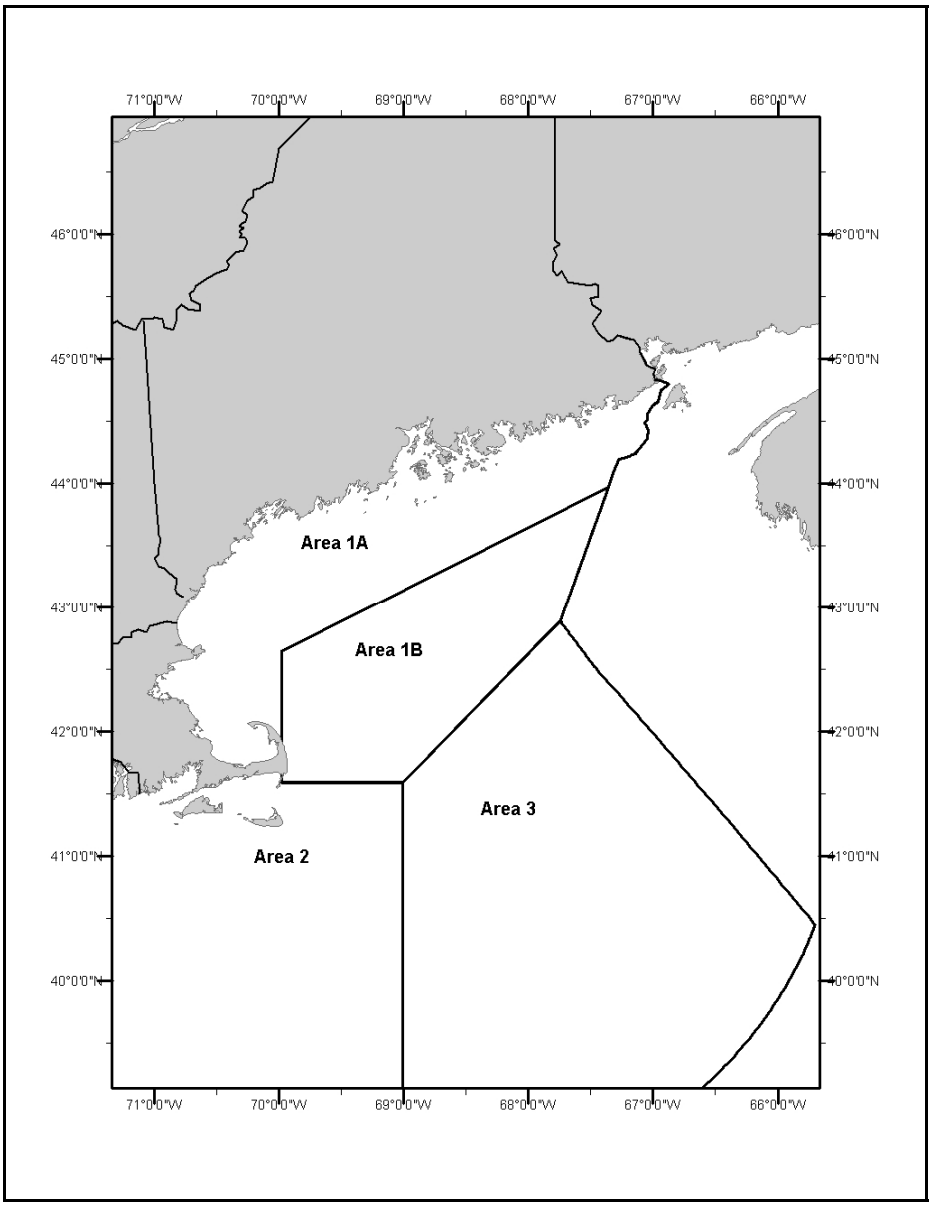
4.2 NMFS-PREFERRED SPECIFICATIONS FOR THE ATLANTIC HERRING FISHERY

The NMFS-preferred specifications for the Atlantic herring fishery during the 2005 fishing year (and possibly the 2006 fishing year) are summarized in Table 2. The current management areas for the Atlantic herring fishery, to which the proposed TACs apply, are depicted in Figure 1.

Table 2 NMFS-Preferred Atlantic Herring Specifications for the 2005 Fishing Year

SPECIFICATION	PROPOSED ALLOCATION (MT)
Allowable Biological Catch ABC	220,000
Optimum Yield OY	150,000
Domestic Annual Harvest DAH	150,000
Domestic Annual Processing DAP	146,000
Joint Venture Processing (total) JVPt	0
Joint Venture Processing (EEZ) JVP	0
Internal Waters Processing IWP	0
U.S. At-Sea Processing USAP	20,000 (in Areas 2 & 3 only)
Border Transfer BT	4,000
Total Allowable Level of Foreign Fishing TALFF	0
RESERVE	0
TAC Area 1A	60,000
TAC Area 1B	10,000
TAC Area 2	30,000, No Reserve
TAC Area 3	50,000

Figure 1 Current Management Areas for the Atlantic Herring Fishery



The differences between the Council-preferred 2005 (and possibly 2006) specifications and the current (2003/2004) specifications are:

- Reduction of ABC from 300,000 mt to 220,000 mt,
- Reduction of OY from 250,000 mt to 180,000 mt,
- Reduction of DAH from 250,000 mt to 180,000 mt,
- Reduction of DAP from 226,000 mt to 176,000 mt,
- Allocations of 0 mt for JVPt (including IWP) and USAP, and
- Elimination of the TAC reserve in Area 2.

The differences between the NMFS-preferred 2005 (and possibly 2006) specifications and the current (2003/2004) specifications are:

- Reduction of ABC from 300,000 mt to 220,000 mt,
- Reduction of OY from 250,000 mt to 150,000 mt,
- Reduction of DAH from 250,000 mt to 150,000 mt,
- Reduction of DAP from 226,000 mt to 146,000 mt,
- Reduction of Area 2 TAC from 50,000 mt to 30,000 mt
- Reduction of Area 3 TAC from 60,000 mt to 50,000 mt
- Allocation of 0 mt for JVPt (including IWP)
- Elimination of the TAC reserve in Area 2.

Days Out Provisions

In addition to the specifications proposed by the New England Fishery Management Council and by NMFS, the Atlantic States Marine Fisheries Commission (ASMFC) implements complimentary specifications through its Interstate Fishery Management Plan for Atlantic Herring. The ASMFC FMP also includes other management measures, notably spawning restrictions and days out requirements in Area 1A. The days out provisions implemented by ASMFC are described briefly below, as they are addressed in the impact analysis presented in Section 6.1.3.1.3 of this document.

Pursuant to Amendment 1 to the Interstate FMP for Atlantic Herring, States are required to implement the days out provision (landing prohibition) for an area where the TAC is consistently fully harvested. The provision was designed to slow the herring catch rate to supply the lobster bait market. The peak demand for herring occurs late in the fishing year when the available quota is almost fully harvested in Area 1A. With landings prohibited two days of the weeks earlier in the fishing year, a greater portion of the quota remains during the time of the peak demand. Additionally, the days out provision was designed to move effort out of the areas where catches are approaching the TAC and into areas where the TAC goes largely unused. The days out provision allows incidental catches (up to 2,000 pounds) of herring to landed from an area with the days out provision in effect.

The days out provision in Amendment 1 can lead to a four-day landing prohibition, resulting a major disruption of supply to the markets. In response to the negative impact, the Section modified the implementation of the days out provision to be conservation-equivalent to Amendment 1. Each year, the fishery's closure date is projected based on the implementation of the Amendment 1 days out provision. This projection is compared to the closure date of a set number of days out of the fishery (one, two or three days out are usually analyzed) starting on a specific date earlier in the fishing year. These projections are based on historical catch rates for a given management area reported through the NMFS Interactive Voice Reporting (IVR) system. The Section always selects a scenario that is more conservative than the provision specified in Amendment 1.

If the catch in a particular area or sub-area is projected to be harvested before the end of a given period, States within the management area will meet to discuss implementation of the landing prohibition. To prevent an early closure of a management area or sub-area, the States will annually agree to the start date, number of days out of the fishery, as well as which consecutive days of the week will have landing restrictions. While the start time for the landing restriction may vary by State, the States must implement the landing restriction for the same consecutive days each week.

4.3 NO ACTION ALTERNATIVE

During the fishery specification process, the Council considered several alternatives to the proposed action, including the no action alternative (Table 3). The no action alternative maintains the current fishery specifications and forms the basis of comparison for other alternatives that the Council and NMFS considered.

Table 3 No Action Alternative – 2003 and 2004 Atlantic Herring Fishery Specifications

SPECIFICATION	ALLOCATION (MT)
ABC	300,000
OY	250,000
DAH	250,000
DAP	226,000
JVPt	20,000
JVP	10,000 Area 2 and 3 only
IWP	10,000
USAP	20,000 Area 2 and 3 only
BT	4,000
TALFF	0
RESERVE	0
TAC Area 1A	60,000 (6,000 Jan 1 – May 31)
TAC Area 1B	10,000
TAC Area 2	50,000 (TAC reserve 70,000)
TAC Area 3	60,000

4.4 OPTIONS FOR AREA-SPECIFIC TACS AND OY

In addition to the Council-preferred TACs (Table 1), the Council considered three options for distributing the allowable herring catch (OY) among the various management areas. The TAC options that were considered by the Council during the specification process are summarized in Table 4 and were selected by the Committee/Section from a range of options presented in the May 5, 2004 Herring PDT/TC Report (Options 3, 5, and 6 were rejected from further consideration). OY for the U.S. fishery is directly related to the distribution of the management area TACs and is equivalent to the sum of the TACs across all management areas.

Table 4 TAC and OY Options Considered by the Council for 2005 Fishery Specifications (Including the Council-preferred Alternative)

TAC OPTION (from May 5, 2004 PDT/TC Report)	Area 1A	Area 1B	Area 2	Area 3	Total U.S. OY	NB Weir Fishery	Grand Total
1	60,000	10,000	20,000	60,000	150,000	20,000	170,000
2 (Council-Preferred Alternative)	60,000	10,000	50,000	60,000	180,000	20,000	200,000
4	45,000	10,000	35,000	60,000	150,000	20,000	170,000
7	55,000	5,000	30,000	60,000	150,000	20,000	170,000

The NMFS-preferred alternative specifications for Area-specific TACs and OY are presented in Table 2. Information to support the TACs and OY specifications proposed by the Council and by NMFS is presented in Sections 4.6.2 and 4.6.4 of this document.

4.5 ALTERNATIVES CONSIDERED FOR OTHER FISHERY SPECIFICATIONS

In addition to the Council-preferred fishery specifications (Table 1), the Council considered other alternatives for some of the specifications. The other specifications that the Council considered are summarized in Table 5 and were selected by the Committee/Section at its June 15, 2004 meeting.

Following the June 15, 2004 Herring Committee/Section meeting, the Herring Plan Development Team (PDT) met jointly with the ASMFC Herring Technical Committee (TC) to discuss the alternatives proposed for the 2005 fishery specifications and provide additional analysis and recommendations for the Committee/Section to consider. The Committee/Section met again on July 12, 2004 to review the additional information provided by the Herring PDT/TC and to recommend final specifications for the 2005 fishing year.

The New England Fishery Management Council met on July 13, 2004 and approved the specifications summarized in Table 1 for the 2005 fishing year. At the July 13, 2004 meeting, the Council also expressed interest in maintaining these specifications through the 2006 fishing year unless stock and fishery conditions change considerably, so that the Council can finish the development of Amendment 1 to the Herring FMP during 2005.

Table 5 Other Alternatives Considered by the Council for 2005 Fishery Specifications

SPECIFICATION	ALLOCATION (MT)
Allowable Biological Catch **ABC**	Current – 300,000 OS/Section June 15 – 220,000 Council-preferred – 220,000
Domestic Annual Harvest **DAH**	Current – 250,000 OS/Section June 15 – 220,000 PDT/TC – FMP states that DAH ≤ OY Council-preferred – 180,000
Domestic Annual Processing **DAP**	Current – 226,000 OS/Section June 15 – 216,000 PDT/TC – FMP states that DAP = DAH – JVPt – BT Council-preferred – 176,000
Joint Venture Processing (total) **JVPt**	Current – 20,000 OS/Section June 15 – 0 Council-preferred – 0
Joint Venture Processing (EEZ) **JVP**	Current – 10,000, Area 2 and 3 only OS/Section June 15 – 0 Council-preferred – 0
Internal Waters Processing **IWP**	Current – 10,000 OS/Section June 15 – 0 Council-preferred – 0
U.S. At-Sea Processing **USAP**	Current – 20,000, Area 2 and 3 only OS/Section June 15 – no recommendation Council-preferred – 0
Border Transfer **BT**	Current – 4,000 OS/Section June 15 – No Change Council-preferred – 4,000
Total Allowable Level of Foreign Fishing **TALFF**	Current – 0 OS/Section June 15 – No Change Council-preferred – 0
RESERVE	Current – 0 Proposed – No Change Council-preferred – 0

Information to support the specifications proposed by the Council is presented in Sections 4.6.2 and 6.0 of this document.

4.6 BACKGROUND INFORMATION AND RATIONALE TO SUPPORT THE PROPOSED SPECIFICATIONS

4.6.1 ABC

The proposed specification of ABC at 220,000 mt is consistent with the Herring PDT/TC recommendations provided in the May 5, 2004 Herring PDT/TC Report. The PDT/TC recommends establishing ABC for 2005 at 220,000 mt to be consistent with the MSY proxy proposed in Amendment 1. The 220,000 mt proxy proposed in Amendment 1 is intended to be a temporary and precautionary placeholder for MSY until the next stock assessment for the Atlantic herring stock complex is completed. Similarly, the specification of ABC at this level is intended to be a placeholder for ABC and may be re-visited through the specification process in future years as problems with the stock assessment are resolved.

This recommendation also would apply if the 2005 specifications are maintained through the 2006 fishing year, as Amendment 1 is scheduled to be implemented during 2006. Once Amendment 1 is implemented, the specification of ABC can be reconsidered for the 2007 fishing year and beyond. By this time, additional stock assessment information may be available. Additional discussion of the proposed ABC (and MSY proxy) is presented below.

Both the forward projection model (FPM) and the ADAPT virtual population assessment (VPA) model that were presented at the TRAC assessment meeting in 2003 agree on historical herring biomass estimates until about the mid-1980s. The two models diverge from about 1985 onward (Figure 2). At its June 19, 2003 meeting, some members of the Council's Scientific and Statistical Committee (SSC) suggested that a level of biomass consistent with the earlier period in the assessments may be the appropriate level on which to base an estimate of MSY. This is the approach that the Council utilized to develop the proxy for MSY proposed in Amendment 1.

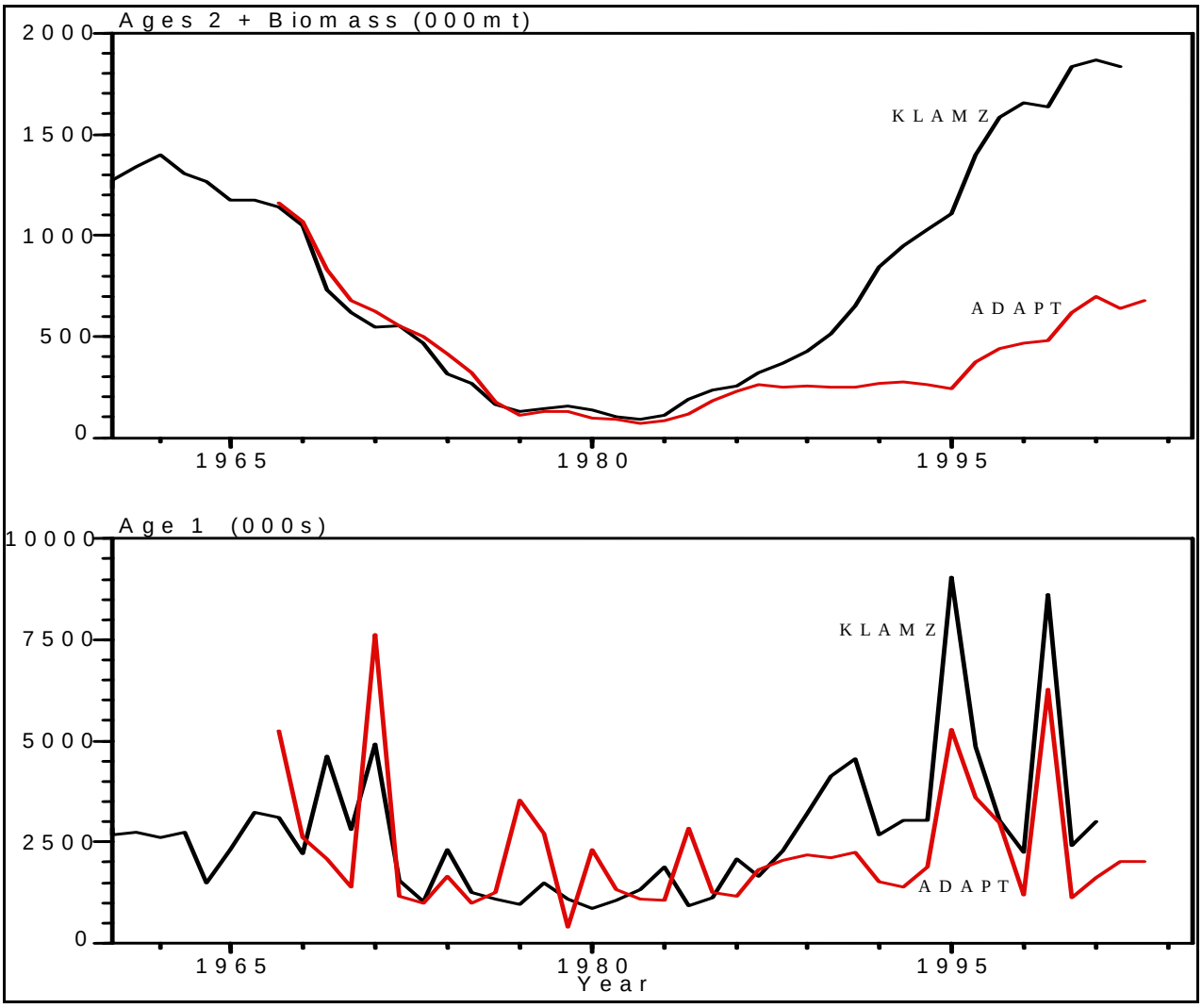
The Council applied average herring biomass estimates from the 1960-1970 time period to form the basis for a B_{MSY} proxy (from which MSY is derived). During this time period, biomass was still at a high level, and fishing mortality from foreign fishing activities ("ICNAF fisheries") had not reached peak levels. Fishing mortality from the ICNAF fisheries reached record-high levels in the early and mid-1970s, which is when the herring stock declined rapidly and crashed on Georges Bank.

At its June 19, 2003 meeting, the SSC agreed that estimates of F_{MSY} from 0.2-0.25 are reasonable and do not appear to be as sensitive to the differences between the two assessment models presented at the TRAC meeting. Figure 2 indicates that Atlantic herring biomass averaged 1.13 million mt (1,130,000 mt) during the 1960-1970 time period. Both models that were presented at the TRAC assessment agree on this result.

When developing the proposed MSY proxy of 220,000 mt, the Council rounded this historical average biomass down to 1.1 million mt. Applying the lower estimate of F_{MSY} to the 1,100,000 mt proxy for B_{MSY} results in the following proxy for MSY:

1,100,000 mt x 0.2 = 220,000 mt.

Figure 2 Herring Biomass Estimates Resulting from the KLAMZ and ADAPT Assessment Models



Best Available Scientific Information

The situation with Atlantic herring is unique in that two divergent stock assessments have been presented with no consensus on which assessment is most accurate, and consequently, no consensus regarding the current biomass of the Atlantic herring stock complex, current fishing mortality rates, and/or appropriate reference points to utilize for management purposes (aside from the range of 0.2-0.25 for F_{MSY}). The Council, therefore, must make its selection based on

the best available scientific information. The following additional information should be considered:

Relative to National Standard 2 (Best Available Scientific Information), NMFS' National Standard Guidelines (NSGs) state:

> "Scientific Information. (a) Standard 2. Conservation and management measures shall be based upon the best scientific information available. (b) FMP development. The fact that scientific information concerning a fishery is incomplete does not prevent the preparation and implementation of [[Page 33]] an FMP (see related Secs. 600.320(d)(2) and 600.340(b). (1) Scientific information includes, but is not limited to, information of a biological, ecological, economic, or social nature. Successful fishery management depends, in part, on the timely availability, quality, and quantity of scientific information, as well as on the thorough analysis of this information, and the extent to which the information is applied. **If there are conflicting facts or opinions relevant to a particular point, a Council may choose among them, but should justify the choice.**" (emphasis added)

The Council believes that the proposed MSY proxy of 220,000 mt in Amendment 1 is based on the best available science because it utilizes the scientific information and methodology for establishing an MSY proxy that was developed by the Herring PDT based on the SSC recommendations. The proposed proxy should be considered precautionary and temporary, to be replaced with a scientifically-accepted estimate of MSY for the Atlantic herring stock complex when such an estimate is available. Additional supporting biological information is provided in Section 6.1.1 of this document.

4.6.2 Council-Preferred Area-Specific TACs and OY

The specification of OY for the herring fishery relates to the geographic distribution of the selected TACs, the relative risk of overfishing individual stock components, and the extent to which development of the offshore fishery should be encouraged. As a result, a range of options for specifying OY for the upcoming fishing year was considered by the Council; the options for OY were directly correlated with the options that the Council considered for allocating area-specific TACs; each TAC option was associated with its own value for OY.

The Herring FMP specifies that OY will be less than or equal to allowable biological catch (ABC) minus the expected Canadian catch (C) from the stock complex. The estimate of the Canadian catch that is deducted from ABC will be no more than 20,000 mt for the New Brunswick weir fishery and no more than 10,000 mt for the Georges Bank Canadian harvest:

$$OY \leq ABC\text{-}C \quad (C \text{ not to exceed } 30{,}000 \text{ mt})$$

If ABC is specified at 220,000 mt, OY could be less than or equal to 190,000 mt if the maximum catch is assumed for the Canadian herring fisheries. OY values considered for the upcoming fishing year ranged from 150,000 mt – 180,000 mt, all of which are consistent with the formula specified in the Herring FMP. The Council ultimately selected an OY value of 180,000 mt for the 2005 (and possibly 2006) fishery specifications.

The FMP also states that the establishment of OY will include consideration of relevant economic, social, or ecological factors and that for this reason, OY may be less than ABC – C. In addition, the Herring PDT/TC has recommended that OY be specified at a level lower than ABC for biological and ecological reasons. Recognizing that the proposed value for ABC is conservative, a buffer between ABC and OY still may be appropriate because of scientific uncertainty, the importance of recruitment and ensuring strong year classes in the future, the importance of herring as a forage species, and the potential impact of any increase in the Canadian fisheries for herring, particularly the NB weir fishery, which catches primarily juvenile fish from the inshore component of the resource. The Council-proposed value of OY is 10,000 mt less than ABC – C and is consistent with the Herring PDT recommendations.

The TACs that the Council proposes for the 2005 (and possibly 2006) fishing year are presented in Table 6 below. Under the proposed specifications, there will no longer be a TAC reserve for Area 2. All available yield from the U.S. herring fishery will be allocated at the beginning of the fishing year. However, the seasonal split of the Area 1A TAC (6,000 mt January – May; 54,000 mt June – December) still applies.

Table 6 Council-Preferred Area TACs and OY for the 2005 Fishing Year

	Area 1A	Area 1B	Area 2	Area 3	Total U.S. OY	NB Weir Fishery	Grand Total
COUNCIL-PREFERRED ALTERNATIVE (TAC Option 2)	60,000	10,000	50,000	60,000	180,000	20,000	200,000

The Council-preferred TACs are the same as the current (2003/2004) TACs for all management areas, with the exception of the elimination of the Area 2 TAC reserve. The Council recommends its preferred TACs and a total U.S. OY of 180,000 mt for several reasons:

- Biological information provided by the Herring PDT/TC (May 5, 2004 PDT/TC Report) does not indicate that management measures are necessary to significantly reduce the catch of Atlantic herring at this time. According to the PDT/TC, available trawl survey data do not show that a significant drop in herring biomass is occurring. In terms of the Atlantic herring stock complex as a whole, available data suggest that biomass is stable and increasing over time. Available survey data suggest that the inshore component of the resource has remained relatively stable in recent years. The May 5, 2004 PDT/TC Report should be referenced for additional information, including the conclusions and recommendations of the PDT/TC.
- The Council considered a range of TAC options during the specification process, some of which would have reduced the Area 1A and/or Area 2 TACs to levels that would impose negative economic and social impacts on various sectors of the fishery. For example, economic analyses predicted losses of $25,000 to $238,000 per year per vessel for the Maine purse seine fleet under an Area 1A TAC of 45,000 mt (see Section 6.2.1.4). Similarly, processing plants most reliant on fish from Area 1A would experience negative impacts associated with the loss of supply and/or market and employment effects resulting from inconsistent supply under a lower TAC in Area 1A. The Council does not believe that

impacts of such magnitude are justified at this time, given the lack of conclusive biological information to support such reductions.

- The economic and social impacts of the TAC/OY options that the Council rejected are discussed further in Sections 6.2.1.4 and 6.2.2.3 of this document. The potential negative impacts of the TAC options that the Council rejected, in combination with the PDT/TC conclusions about the current status of the stock, appear to support the proposed TACs/OY for the upcoming fishing year. This also is the case if the Council maintains the 2005 specifications through the 2006 fishing year unless stock and/or fishery conditions change substantially during the 2005 fishing year.
- Related to concerns about imposing social and economic impacts without clear biological justification are concerns about the potential to exacerbate problems in the herring fishery that the Council is trying to address through Amendment 1 to the Herring FMP, currently under development and scheduled to be implemented during the 2006 fishing year. Amendment 1 includes a range of alternatives to establish a limited access program in the herring fishery and minimize problems associated with excess harvesting capacity as well as the race to fish in one or more management areas. When considering various TAC options for 2005 and possibly 2006, the Council recognized that a reduction in the Area 1A TAC would likely exacerbate problems associated with the current open-access nature of the herring fishery as well as derby fishing that may be occurring in Area 1A. The short-term impacts of a reduction in the Area 1A TAC and the potential to increase the race to fish in Area 1A could make it more difficult to develop long-term strategies to address these problems in Amendment 1. Without a clear biological need to take management action in the short-term, further complicating the development of Amendment 1 does not seem warranted.
- The inshore component of the Atlantic herring stock is of most concern to the Council at this time. However, harvest levels for the Atlantic herring fishery have been relatively consistent for many years, and available data, although limited, suggest that the inshore component of the stock is stable and has not experienced significant declines in biomass under these harvest levels. Without any biological targets or benchmarks specifically for the inshore component of the resource, the Herring PDT/TC could not conclude with certainty that maintaining harvest of this stock component at or near current levels will not cause a decline in biomass. Nevertheless, given a long time series of relatively consistent catch and stable surveys, the PDT/TC was comfortable concluding that no significant declines in the inshore component of the resource should be expected under harvest levels in the short-term similar to those observed in recent years. The May 5, 2004 Herring PDT/TC Report can be referenced for additional discussion of this issue.
- At its June 19, 2003 meeting, the Council's Scientific and Statistical Committee (SSC) suggested that current catch levels appear to be producing a biomass that is at least stable, if not increasing over time. The conclusions and recommendations presented by the Herring PDT/TC in the May 5, 2004 PDT/TC Report appear to support the SSC's conclusion as well. Reviewing the risk assessment developed during Amendment 1 provides an opportunity to take advantage of the most recent years of fishery data to characterize the impacts of various TAC options relative to historical catch (historical = most recent 5-year and 10-year time periods), which is also consistent with advice provided by the SSC in June 2003. The

Council considered several TAC options and evaluated their potential impacts relative to the risk assessment provided by the Herring PDT (see Section 6.1.3 of this document).

- Comparing removals of the inshore component over the most recent five-year and ten-year time period illustrate the impacts of the Atlantic herring management program and the area-specific TACs that were implemented in the Herring FMP. The Herring FMP became effective during the 2000 fishing year (through ASMFC) and implemented quotas by management area in a previously non-regulated fishery. The risk assessment presented in Section 6.1.3.1 of this document shows that five-year historical removals are lower than ten-year historical removals because the five-year average includes three years of quota-based management under area-specific TACs, which appear to have reduced the harvest of the inshore component of the resource when compared to the historical ten-year average. Therefore, relative to historical removals, current (2003/2004, Council-preferred for 2005 and possibly 2006) removals of the inshore component are lower than historical removals, which has helped to reduce the risk of overfishing the inshore stock component. Again, the Herring PDT/TC was comfortable concluding that no significant declines in the inshore component of the resource should be expected under harvest levels in the short-term similar to those observed in recent years.
- While under the Council-preferred alternative the TACs would not be changed for the 2005 fishing year (and possibly 2006), the Council proposes to eliminate the TAC reserve in Area 2, currently at 70,000 mt (for 2003 and 2004). This reduces OY for the Atlantic herring fishery from 250,000 mt to 180,000 mt. The Council chose to eliminate the reserve in Area 2 in order to reduce OY to a level well below ABC, even when assuming the maximum catch of herring from the Canadian fishery (20,000 mt in NB weir, 10,000 mt on GB). This is consistent with previous PDT advice regarding the specification of OY and also is consistent with measures under consideration in Amendment 1 (including the specification of MSY). Elimination of the Area 2 TAC reserve and the specification of OY at 180,000 mt will ensure that total removals from the fishery will not jeopardize the health of the herring resource.

4.6.3 DAH, DAP, TALFF, JVPt, 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), the total amount allocated to processing by foreign ships (JVPt), and the amount of herring that can be taken in U.S. waters and transferred to Canadian herring carriers for transshipment to Canada (BT).

DAH = DAP + JVPt + BT

Allocation to BT has remained at 4,000 mt since the implementation of the Herring FMP, and there does not appear to be a need to change this allocation for the 2005 fishing year.

4.6.3.1 Council-Preferred Alternative for Specifying DAH

When specifying DAH, important considerations relate to the actual and potential capacity of the U.S. harvesting fleet. When determining the DAH specification for the 2005 fishing year (180,000 mt), the Council considered: (1) a preliminary analysis of harvesting capacity in the U.S. herring fleet, provided by the Herring PDT, and (2) recent levels of catch/landings from the U.S. herring fishery. This information, combined with knowledge about current and future market/fishery conditions, led the Council to conclude that DAH for the 2005 fishing year should

be set equivalent to U.S. OY at 180,000 mt. The proposed specification of DAH at 180,000 mt is 70,000 mt less than the 2003/2004 specification of DAH and appears to be more realistic and consistent with current trends in the herring fishery and the potential for the fishery to expand in the short-term. This recommendation also applies if the 2005 specifications are maintained through the 2006 fishing year unless stock and/or fishery conditions change significantly during 2005.

4.6.3.1.1 Preliminary Analysis of Harvesting Capacity

Although DAH generally results from applying a formula based on DAP, JVPt, and BT, some important considerations relate to the actual and potential capacity of the U.S. harvesting fleet. In preparation for Amendment 1 to the Herring FMP, which is considering limited access for the herring fishery, the Herring PDT conducted a preliminary assessment of harvesting capacity in the herring fishery based on a relatively common analytical approach called "data envelopment analysis." This approach is described below and was considered by the Council relative to discussions about DAP and JVPt.

There are some caveats to this analysis which should be clarified:

- The purse seine fleet primarily concentrates on Area 1 and is typically unable to fish the offshore areas.
- Freezer plants require that herring be stored in refrigerated sea water (RSW) tanks prior to pumping. Since all herring vessels do not use RSW tanks, all of the capacity estimated in this preliminary assessment is not available to the freezer plants.
- Some capacity may not be physically available (the vessel either sunk or moved to another fishery). However, since there was landings history and a permit was maintained in 2002, their capacity was counted.
- The analysis is based on the market, stock, and weather conditions that existed during 1999 - 2002. Large variations from those conditions are not accounted for in the analysis.
- Vessels that entered the fishery after the control date are included in the analysis.

The caveats identified above will be addressed to the extent possible in the analyses for Amendment 1, and the following analysis will likely be updated with 2003 data in the Draft Supplemental Environmental Impact Statement (DSEIS) for Amendment 1.

Capacity measures for the single midwater trawl and purse seine fleets were estimated using data envelopment analysis (DEA). DEA is one of three methods identified by the National Marine Fisheries Service to measure capacity, which provides a per vessel estimate of capacity based on similarly configured vessels. DEA compares the catch of all vessels using the same gear type, and estimates the vessel's catch capacity based on vessels with similar length, horse power, tonnage, and crew size, given current market conditions, herring stock conditions, and regulations.

For this analysis, vessels were separated into bins according to major gear. The capacity of bottom trawl vessels was not estimated since they account for 5% or less of the landings. Landings and effort data from 1999 – 2002 were used to estimate capacity for mid-water trawl

and purse seine fleets. Not all vessels were active in all four years, but all had a herring permit in 2002. Some vessels are not active (sunk) but permit and history exists so capacity is counted.

Before running the DEA model, the upper 5% and lower 5% of herring landings were removed from the data. A moving average of landings per trip for each vessel in each month was constructed, where the landings equaled the current trip plus the previous trip divided by two. This smoothed out some of the data. Vessel capacity was then estimated for each quarter. The DEA output provided average herring catch capacity per trip for each quarter by vessel, and the total number of trips in each quarter for each vessel. Yearly catch capacity was then calculated by multiplying the average number of observed trips per quarter by the average trip capacity for the same quarter.

Using DEA to measure capacity in the pair trawl fleet is problematic. Therefore, pair trawl capacity was assumed to equal the highest level of landings recorded for each vessel during 1999–2002 time period. This approach does not assume any changes in effort so the capacity estimates remain the same for both scenarios. This approach estimates that actual capacity is at least as high as the amount of herring each vessel caught in its most productive year. Actual capacity is likely higher.

Two resulting aggregate capacity measures are reported in Table 7. One measure, a total of 180,000 mt, represents catch capacity at current levels of effort. The second measure is at an increased level of effort. For this measure, all effort in the midwater trawl and purse seine fleet was increased to at least half the number of trips of the most active vessel within a particular gear sector and quarter. As noted above, the pair trawl estimate remained the same as in the first scenario. The total capacity estimate using this measure is 234,700 mt.

Table 7 Preliminary Estimates of Harvesting Capacity Based on Data Envelopment Analysis

	Total capacity per year in metric tons CURRENT EFFORT	**Total capacity per year in metric tons INCREASED EFFORT**
Mid-water trawl (27 vessels)	69,200	119,900
Purse seine (9 vessels)	26,300	30,200
Pair trawl (15 vessels)	84,600	84,600
Total	**180,100**	**234,700**

The preliminary capacity analysis suggests that the current capacity of the U.S. harvesting fleet is consistent with the proposed value for OY and, consequently, the proposed specification of DAH. Should market and fishery conditions improve, it appears that the current U.S. fleet is capable of harvesting all available yield from the herring resource under current levels of fishing effort, especially when considering that the capacity of pair trawl vessels may be under-estimated

in the above analysis. These issues will be explored further in the DSEIS for Amendment 1 to the Herring FMP.

4.6.3.1.2 U.S. Atlantic Herring Catch

Another consideration relative to specifying DAH is the recent level of catch from the U.S. Atlantic herring fishery and the potential for the fishery to expand in the short-term. The U.S. herring fishery landed an average 101,930 mt of herring from 1996-2003.

Table 8 Total U.S. Atlantic Herring Landings, 1996-2003

YEAR	TOTAL U.S. Herring Landings (MT)
1996	107,508
1997	97,422
1998	81,601
1999	105,647
2000	108,658
2001 **32 vessels** **1,422 trips**	121,332
2002 **37 vessels** **1,245 trips**	92,594
2003 **38 vessels** **1,337 trips**	100,674

Source: Vessel Trip Reports (VTRs), Herring SAFE Reports.

Table 9 summarizes a simple projection of landings that could be expected based on the average landings from 1996-2003. The Council-preferred value for DAH (180,000 mt) allows about a 50-80% expansion of the current herring fishery.

Table 9 Potential Herring Landings Under Various Scenarios of Market/Fishery Expansion

Average Landings 1996-2003 = 101,930 mt	
Market/Fishery Expansion	**Potential Harvest (mt)**
0 – status quo	101,930
+10%	112,123
+20%	122,316
+50%	152,895
+80%	183,474
+100%	203,860

Although the Council-preferred specification of DAH assumes an increase of 50-80% in the fishery, the preliminary harvesting capacity analysis presented in Section 4.6.3.1.1 of this document suggests that the current fleet, fishing under levels of effort similar to current levels, is capable of harvesting all of the available yield from the resource. The herring fishery is a high-volume, market-driven fishery. Depending on market and fishery conditions, it is possible that the U.S. fleet could increase its catch to a level consistent with OY and the proposed DAH. This conclusion also applies if the 2005 specifications are maintained through the 2006 fishing year unless stock and/or fishery conditions change significantly during 2005.

4.6.3.2 Council-Preferred Alternative for Total Allowable Level of Foreign Fishing (TALFF)

The Council proposes to allocate 0 mt for foreign fishing activities during 2005 (and possibly 2006). The primary reason for a 0 mt allocation to TALFF relates to the potential of the U.S. harvesting fleet to utilize the available yield from the resource under current levels of effort and especially under increased levels of effort. The preliminary harvesting capacity analysis presented in Section 4.6.3.1.1 of this document suggests that the U.S. fleet, fishing under levels of effort similar to current levels, is capable of harvesting all of the available yield from the herring resource. Allowing any level of foreign fishing in U.S. waters, therefore, could reduce opportunities for the U.S. harvesting fleet to maximize benefits from the available yield, especially in a market-driven fishery like the herring fishery. Consequently, an allocation of TALFF could compromise the ability of the U.S. fleet to supply domestic markets that depend on herring (bait, for example) as well as the competitiveness of U.S. exported herring on world markets.

When some of the available optimum yield for the U.S. fishery has been allocated to TALFF in the past, much of the reason for the allocation was to provide incentives for foreign vessels to engage in joint venture processing (JVP) operations with U.S. vessels. TALFF was allocated to

promote the utilization of any JVP operation and ensure that processing vessels participating in JVP operations could obtain fish when U.S. harvesting vessels may not be able to supply them for various reasons. This may no longer be the case, as the proposed specification of 0 mt for TALFF is consistent with the proposed specification of 0 mt for JVP, which is discussed below. The Council determined that both TALFF and JVP should be set at 0 mt for 2005 (and possibly 2006) primarily due to the potential for DAH and DAP to be realized by the domestic fishery, therefore maximizing benefits to the U.S. harvesting and shoreside processing sectors.

4.6.3.3 Council-Preferred Alternative for 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). 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 ability to estimate DAP is complicated by poor information about the amount of herring being sold as bait and a lack of detailed information on current and future capacity of domestic processors, as well as any plans for new processing plants to be established.

The Herring PDT provided production estimates for the Council to consider when specifying DAP based primarily on past fishery performance (landings) and personal communication with shoreside processing facilities. Some Herring PDT members visited processing facilities and interviewed individuals at those facilities as part of ongoing research related to Amendment 1 to the Herring FMP. Table 10 summarizes the information provided by processing facilities and incorporates a 20% increase in production to account for any expansion of the fishery and markets that would allow for increased shoreside production during the upcoming fishing year(s).

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; therefore, production estimates provided in Table 10 do not include any fish that may be landed in the U.S. and trucked to Canada for processing at the sardine canneries in Canada. The estimate provided in Table 10 for the U.S. sardine canneries, however, does include any fish that may be landed in the U.S. and trucked to the two canneries in the U.S. for domestic processing.

The Herring PDT notes that the information about processing capacity provided in Table 10 may overestimate production likely to occur during the 2005 fishing year for a few reasons. First, the PDT applied a 20% increase to production estimates provided by the processing facilities to account for any expansion of the fishery or markets that may occur during the 2005 fishing year; it is unclear whether or not this increase will be realized. Second, to cross-check the production estimates in Table 10, the Herring PDT queried the 2002 dealer data (2003 data are incomplete) and found that landings to some of the processing facilities were reported to be significantly less than the estimates provided in Table 10. However, it appears that the dealer data may not reflect true landings, since only 68,400 metric tons of herring landings are recorded in the 2002 dealer database versus 92,600 mt recorded in the logbook data.

In addition, the ability of the herring fleet to access specific markets may affect the true value of DAP. For example, some processing plants have dedicated fishing vessels that offload the vast majority of their catch directly to the processing facilities. While other vessels land fish at these plants as well, much of the estimated production from these plants comes from their own vessels. Markets are also limited during the winter when demand for bait is at its lowest and the mackerel fishery season is in full-swing. During the winter, supplying the sardine canneries may be one of the few viable opportunities for vessels that fish for herring full-time (and not for mackerel).

Table 10 Information for Consideration Relative to Potential Domestic Annual Processing (DAP) in 2005

DOMESTIC PROCESSOR	POTENTIAL HERRING PRODUCTION	SOURCE OF INFORMATION AND ADDITIONAL COMMENTS
Lobster Bait	60,000 mt	• Approximately 60% of 2003 herring landings
Sardine Canneries	36,000 mt	• Personal communication –based on production estimate of 30,000 mt for two U.S. canneries provided by Connors Bros. • Added 20% to account for potential increase in production during 2005 • Includes fish trucked to the two U.S. canneries, but not fish trucked to Canadian canneries
Cape Seafoods, Gloucester MA	27,600 mt	• Personal communication – based on total 42,000 mt current production estimate provided by Cape Seafoods, of which herring is 20,000 – 26,000 mt (mean 23,000 mt) • Added 20% to account for potential increase in production during 2005
NORPEL, New Bedford MA	30,000 mt	• Personal communication – based on 20,000-30,000 mt production estimate provided by NORPEL (mean 25,000 mt) • Added 20% to account for potential increase in production during 2005
Lund's Fisheries, Cape May NJ	2,300 mt	• Personal communication – based on highest year of herring production from 2000-2003 (2000: 1,900 mt) • Added 20% to account for potential increase in production during 2005
U.S. At-Sea Processing (USAP)	20,000 mt	• Current allocation for USAP – domestic processing vessels that exceed vessel size limits • Allocation has not been utilized in previous years • Industry comments from June 15, 2004 OS/Section meeting suggest that there may be opportunities to utilize this allocation in 2005
Other	20,000 mt	• Accounts for potential increase in demand for herring as lobster bait • Accounts for domestic processing outside of USAP, including at-sea freezing by domestic catcher/processor vessels
TOTAL	**195,900 mt**	• 2002 dealer data reflect much lower amounts, and 20% expansion of fishery/markets may not occur in 2005

Note: This table does not represent an estimate of DAP for the 2005 fishing year; the table was provided by the Herring PDT for the Council to consider when specifying DAP for 2005.

The Council considered the information presented in Table 10 when it recommended a DAP specification of 176,000 mt for the upcoming fishing year. The specification of 176,000 mt for DAP is consistent with the formula in the Herring FMP that requires DAP to be a subset of DAH (DAH, JVP, and BT are proposed to be set at 180,000 mt, 0 mt, and 4,000 mt respectively):

$$DAH = DAP + JVPt + BT$$

The proposed DAP specification of 176,000 mt is 50,000 mt less than the 2003/2004 specification for DAP and appears to be more realistic, given current market and fishery conditions and the potential for the fishery to expand in the short-term. In addition, a specification of 176,000 mt for DAP may be more reasonable for 2005 than the sum of the figures presented in Table 10, especially since the PDT notes that the information about processing capacity provided in Table 10 may overestimate production likely to occur during the 2005 fishing year. Moreover, the Council proposes that the USAP allocation for the 2005 fishing year be set at 0 mt (discussed below), which reduces the production estimates provided in Table 10 to 175,900 mt.

While it is difficult to predict whether or not the U.S. processing sector will utilize all of the available DAP in 2005, it is certainly possible given the capacity of the current harvesting fleet, the potential for market expansion to occur, and the expressed intent of the U.S. industry to increase its participation in the Atlantic herring fishery. The following statements were provided to the Council at its July 12 and 13, 2004 herring meetings during the deliberations about the specifications for the upcoming fishing year(s):

- Representatives from Lund's Fisheries (Cape May, NJ) testified that Lund's is currently increasing its processing and freezing capacity for herring and other pelagics, and the company intends to process closer to 20,000-25,000 mt of herring during the upcoming fishing year(s).
- Representatives from the fishing industry testified that preparations are underway for the F/V Atlantic Frost to operate as a shoreside processor for Atlantic herring and that intentions are for this vessel to process an additional 20,000 mt of herring during the upcoming fishing year(s).

These are just two examples of what could occur in the upcoming year(s) in the domestic shoreside processing sector of the Atlantic herring fishery. The Council believes that shoreside processing capacity should expand to meet market and fishery conditions while remaining consistent with the biological capacity of the herring resource and the harvesting capacity of the domestic fleet. The Council's recommendation also applies if the 2005 specifications are maintained through the 2006 fishing year unless stock and/or fishery conditions change significantly during 2005.

4.6.3.3.1 Council-Preferred Alternative for Joint Venture Processing (JVPt)

The Council specified an allocation of 0 mt for joint venture processing during the 2005 fishing year (and possibly 2006), which includes both internal waters processing (IWP) and joint ventures in the exclusive economic zone (EEZ). The Council recommends this specification for JVP because the specification of DAP at 176,000 mt is consistent with the specification of DAH

at 180,000 mt and optimum yield (OY) for the U.S. fishery at 180,000 mt. Assuming that market and fishery conditions are such that the OY for the herring fishery can be fully utilized, the Council believes that harvesting capacity in the U.S. fishery is adequate to catch the available yield.

In a market-driven fishery like the herring fishery, harvesting capacity is directly linked to processing capacity. Estimates of potential processing capacity provided in Section 4.6.3.3 of this document suggest that U.S. shoreside processing capacity would be sufficient to fully utilize the available yield from the fishery depending on market and fishery conditions. Additional processing by foreign vessels could increase competition for product and consequently impact U.S. shoreside processing facilities.

In past years, the Council encouraged the development of the shoreside processing sector of the herring fishery but authorized JVP operations to better ensure the availability of a market for domestic harvesting vessels. Now that shoreside facilities have developed, specifications for the herring fishery should promote opportunities for these facilities and, to the extent possible, protect the economic investment that has been made in the U.S. herring fishery. The Herring FMP specifically states that "the underlying concept is that JV activity is only allowed until adequate U.S. processing capacity is developed" (see additional related discussion from the Herring FMP in Section 4.6.3.3.1).

Information presented in this document suggests that substantial U.S. processing capacity has developed and continues to develop. New processing facilities in communities like Gloucester and New Bedford have increased shoreside employment opportunities and provide other economic benefits to the communities that should be maintained to the extent possible. Future JV operations will likely compete with shoreside facilities for product, which could have a substantial negative impact on shoreside facilities in a market-driven fishery.

The limited utilization of JVP allocations in recent years indicates that there has been very little JV activity occurring, and any activity that occurred recently has been focused on Atlantic mackerel, with small amounts of herring taken as incidental catch. However, for the 2005 fishing year, the Mid-Atlantic Council is recommending a 0 mt specification for both TALFF and JVP for mackerel. The Mid-Atlantic Council concluded that due to recent increases in processing capacity and domestic landings, the U.S. has the capacity to land and process the recommended level of IOY (Initial Optimum Yield for the mackerel fishery) in 2005. In previous years, the Mid-Atlantic Council specified JVP greater than zero because it believed that U.S. processors lacked the capability to process the total amount of mackerel that U.S. harvesters could land. The Council had been systematically reducing JVP because it concluded that the surplus between DAP and DAH has been declining as U.S. shoreside processing for mackerel has expanded over the last several years. The Council received testimony from processors and harvesters that the shoreside processing sector of the industry has been undergoing significant expansion since 2002-2003. As a result, the Mid-Atlantic Council concluded that shoreside processing capacity is no longer a limiting factor relative to domestic production of Atlantic mackerel. This resulted in a recommendation for 0 mt of mackerel JVP in 2005, and the New England Council's recommendation for 0 mt of herring JVP and its rationale are consistent with the mackerel recommendations.

4.6.4 NMFS-Preferred Alternative for OY, DAH, Area-Specific TACs, TALFF, DAP, and JVP

The MSFCMA provides that the specification of TALFF, if any, shall be that portion of the OY of a fishery that will not be harvested by vessels of the United States. As a result, the Council's proposal to set OY equal to DAH necessarily results in a TALFF of zero. While NMFS agrees that there are legitimate and legally defensible reasons to set the OY at a level that can be harvested by the domestic fleet and that would thereby preclude the specification of a TALFF, it does not find that the Council's analysis justifies the levels of OY and DAH that it proposes.

The allocation of TALFF would allow foreign vessels to harvest U.S. fish and sell their product on the world market, in direct competition with the U.S. industry. The Council expressed its concern, supported by industry testimony, that an allocation of TALFF would threaten the expansion of the domestic industry. The economic benefits to the Nation from TALFF activity are limited to the payment of poundage fees. However, the Council's analysis also makes it clear that, despite the loss of poundage fees resulting from zero TALFF, the potential long-term economic benefits for U.S. Atlantic herring processors outweigh that loss. For these reasons, the Council concluded, and NMFS agrees, that the specification of an OY at a level that can be fully harvested by the domestic fleet, thereby precluding the specification of a TALFF, will assist the U.S. Atlantic herring industry to expand and will yield positive social and economic benefits to both U.S. harvesters and processors. NMFS, therefore, propose that OY be specified at 150,000 mt. NMFS believes that the commercial fishery will harvest this amount of herring in 2005, based on a reasonable projection of the commercial sector harvesting capacity. Because IOY=DAH, this specification is consistent with the Council's proposal that the level of OY should not provide for a TALFF.

The Council proposed that DAH be set at 180,000 mt. NMFS believes that this is too high for a number of reasons. First, the Council proposal presumes a dramatic increase in landings that is not justified in the Council's submission. From 1996-2003, herring landings averaged 102,000 mt. The highest level of landings in recent years was in 2001, when they reached 121,332 mt. To justify a DAH of 180,000, one would have to assume a roughly 80% increase in DAH as compared to average landings in recent years, a 50% increase in DAH as compared to the highest year in the series. NMFS proposes setting DAH at 150,000 mt. This would allow a 23% increase in landings as compared to 2001, and would, therefore, better reflect fishery performance in recent years, while at the same time giving the fishery an opportunity to expand. Given the trends in landings, and the industry's testimony that the fishery is poised for significant growth, NMFS concludes that it is reasonable to assume that in 2005 the commercial fishery will harvest 150,000 mt of herring.

The Council's proposal for TACs assumed an OY of 180,000 mt. With the OY being set at 150,000 mt, the TACs, too, have to change. While the proposed Area 1A and 1B TACs would remain the same as they were in 2004, NMFS proposes reducing the Area 2 TAC from 50,000 mt to 30,000 mt, and the Area 3 TAC from 60,000 mt to 50,000 mt. These area allocations are intended to permit the fishery to increase landings above the highest levels achieved in recent years. The highest recent landings in Area 2 were 27,198 mt in 2000, thus the allocation would allow the fishery to slightly exceed that level. The highest recent landings in Area 3 were 35,079

mt in 2001, thus the allocation would allow the fishery to exceed that level by a considerable amount because this is the area most likely to see expanded harvests.

The Council argued that DAP equals 176,000 mt, and NMFS found this argument, that current processing capacity is capable of handling that volume of fish, persuasive. However, for the purposes of these specifications, DAP is determined not only by the capability to process but also by whether domestic processors will utilize such capacity. Since DAH is proposed to be set at 150,000 mt (of which 4,000 mt would be allocated for border transfer), and JVP is proposed to be zero, DAP would be limited to 146,000 mt. This is consistent with the following relationship, which is specified in the FMP: DAH = DAP + JVPt + BT. It is certainly possible, given the capacity of the current harvesting fleet, the potential for market expansion to occur, and the expressed intent (made clear through public testimony) of the U.S. industry to increase its participation in the Atlantic herring fishery, that processors will utilize the proposed DAP. Because the proposed DAP is sufficient to process the entire DAH (minus the border transfer), the Council proposes setting JVP at zero, and NMFS agrees with this proposal. Future JV operations would likely compete with U.S. processors for product, which could have a substantial negative impact on domestic facilities in a market-driven fishery.

4.6.5 Council-Preferred Alternative for U.S. At-Sea Processing (USAP)

The Council recommends that USAP be specified at 0 mt in 2005 (and possibly 2006) for reasons similar to those discussed relative to specifying JVP at 0 mt. Now that shoreside facilities have developed, specifications for the herring fishery should promote opportunities for these facilities and, to the extent possible, protect the economic investment that has been made in the U.S. herring fishery. Future USAP operations would likely compete with shoreside facilities for product, which could have a negative impact on shoreside facilities in a market-driven fishery like the herring fishery. The Council believes that the benefits (economic, social, community) of shoreside processing facilities outweigh the benefits that may be derived from an at-sea processing operation. Some States (MA, for example) have demonstrated an ongoing commitment to the shoreside processing sector of this fishery by not allowing internal waters processing (IWP) operations in their territorial waters.

As noted, the development of a domestic offshore processing sector is likely to increase market competition with newly-developed shoreside processing facilities. Offshore processors are likely to freeze herring, either whole or as fillets, in order to compete in the world herring market where U.S. participation is already quite limited. Offshore processors are likely to have lower operating expenses than a shoreside processing facility competing for the same market and will therefore have a competitive advantage. This may impact existing shoreside facilities and inhibit the development of additional facilities. Moreover, it is uncertain whether or not participation by USAP operations would affect the supply of herring to meet demands for lobster bait.

The Herring FMP states that when determining USAP, 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 Herring FMP also states that the zero amount initially specified for USAP would prevent large domestic processing vessels from entering the

fishery in 1999. The following discussion from the Herring FMP is presented below to provide some additional perspective and historical context regarding the proposed allocations of 0 mt for both JVP and IWP.

> "Under normal circumstances, foreign vessels are prohibited from catching or processing fish in U.S. waters. In limited circumstances, foreign vessels are permitted to process fish caught by U.S. vessels, both in the EEZ and in the internal waters of a state. In the EEZ, these vessels are permitted into the fishery only when it suits the needs of the United States, and are limited to processing fish in excess of the capacity needed for domestic processors…
>
> A key element in the review of JV activities is the impact on domestic processing activity – specifically, on the east coast, shoreside processors since there have not been any large domestic at-sea processors in east coast fisheries. **The underlying concept is that JV activity is only allowed until adequate U.S. processing capacity is developed (emphasis added).** In summary, under strictly controlled, rigorously reviewed circumstances, some at-sea processing by large foreign vessels is possible. The reality is that in recent years the actual performance of herring JVs has been insignificant, and has occurred only in connection with mackerel JVs (confidentiality restrictions prevent listing actual JV herring catches in 1997).
>
> The Council may choose to allocate a portion of the Atlantic herring resource to at-sea processors if it determines that will benefit the herring industry. The Council's initial recommendation to specify USAP at 0 is because of a desire to maintain the status quo in the industry until the effectiveness of the management plan can be evaluated. In contrast to JVs, large domestic processing vessels have a great deal of flexibility once allowed into the fishery. They can compete in the same markets as other processors without restraints. Generally, regulations for domestic vessels are not as restrictive as those for foreign vessels. **Once allowed into a fishery, there is the perception that they will have earned permanent "rights" to participate. Unlike the short-term participation of JVs, there is a perception that large domestic processing vessels will seek to become permanent participants in the fishery (emphasis added).** In sum, the possible impacts of large at-sea processors in the Atlantic herring fishery are not clearly understood, arguing for a cautious approach to their introduction into the fishery.
>
> …While the MSFMCA encourages the development of underutilized species by the U.S. fishing industry, it does not prescribe that all possible sectors must have access to a particular resource. Fishery management councils are allowed considerable discretion in determining the form of the industry that will develop underutilized species and achieve optimum yield. The Council's recommendation to allocate zero metric tons to the at-sea processing sector is consistent with the exercise of that discretion…

(The question of fairness…) must be balanced against the concerns of historic industry participants and their communities, as well as new entrants who have based their investments and business plans on the existing industry structure. These decisions have been based in part on a number of legislative initiatives that have limited the size of vessels that will be allowed in the U.S. fishing industry in the future, and have prevented large domestic vessels from fishing in the mackerel fishery and from catching herring with midwater trawl gear. From their viewpoint, the sudden entry of large domestic at-sea processors is viewed as an unfair change in the planning environment…

…The initial judgment of the Council is that a lack of experience with large domestic processors argues for a cautious approach when allowing them into the fishery. For initial implementation of the plan, the Council has chosen to limit domestic participation in the fishery to traditional forms – harvesting vessels and at-sea processing vessels less than the proposed size limits, and shoreside processing facilities...National Standard 8 requires the Council to consider the impact of its actions on the sustained participation of fishing communities. Given the lack of information on the impacts of large at-sea domestic processors, the Council has chosen a cautious approach to protect the interests of those communities that are dependent on the herring fishery…

…It is not easy to eliminate large domestic at-sea processors once they are established in the fishery, as demonstrated by the recently approved $90 million buyout of large catcher-processors in the Bering Sea/Aleutian Islands groundfish fishery…"

At the July 12 and 13, 2004 meetings, as the Council discussed its recommendations for the herring specifications during the upcoming fishing year(s), the Council also expressed concern about the potential biological impacts of allowing USAP activities to occur on Georges Bank. Vessels that service at-sea processors can offload their catch to the processing vessel and return to fishing almost immediately. USAP operations would eliminate steam time to shore, thereby providing opportunities for vessels to remain on fishing grounds virtually 24 hours per day until there is a need to return to port. This raises concerns about the potential for localized depletion events to occur on Georges Bank. While the Georges Bank component of the resource is very robust and productive at this time, overfishing in the 1970s led to the collapse of this stock component, a situation which the Council intends to avoid. Uncertainty about the number and size of vessels that may participate in USAP activities, should they be authorized, increases concerns about depleting localized spawning concentrations and argues for a precautionary approach. In addition, it is unclear how localized depletion may affect the long-term health of the stock component.

USAP allocations were authorized by the Council in recent years to provide an alternative market for vessels participating in the herring fishery because very few markets existed from the shoreside perspective. However, allocations for USAP in the herring fishery have not been utilized at all since the implementation of the Herring FMP (the Herring FMP specified 0 mt for USAP, but the 2000-2004 fishery specifications allocated 20,000 mt to USAP). This suggests

that even when fewer shoreside processing facilities existed, there was no interest in pursuing domestic at-sea processing opportunities. Now that the shoreside processing sector of the fishery has developed such that the Council proposes to set DAP at 176,000 mt (almost equal to the Council-proposed value for OY), it does not appear that there is an additional need for USAP. As noted above, USAP operations would compete with the shoreside facilities that have developed with the Council's encouragement.

4.6.6 NMFS-Preferred Alternative for USAP

NMFS believes that the Council's rationale for setting USAP at zero is insufficient because the only reason given is to favor one segment of the U.S. processing sector over another. This could be perceived as inappropriate, especially since, on average, large amounts of the TAC in Areas 2 and 3 (where USAP was authorized) have not been taken each year. During the development of the specifications, at least one industry member expressed interest in pursuing USAP operations in 2005. When the Council discussed the possibility of allocating 10,000 mt to USAP, this individual stated that USAP operations would not be feasible at that level. For all these reasons, NMFS proposes recommend setting USAP at 20,000 mt in Areas 2 and 3 only. USAP could provide an additional outlet for harvesters and, therefore, increase the amount of the TACs taken. As for the Council's concern that USAPs will become permanent, this is not necessarily the case. The specifications process allows the Council to modify its recommendations in the future, provided there is justification.

5.0 AFFECTED ENVIRONMENT – UPDATED STOCK AND FISHERY INFORMATION

5.1 HERRING RESOURCE

The following description of the affected environment is incorporated by reference from the Atlantic Herring FMP (March 1999) and the recently-published Draft Environmental Impact Statement (DEIS) for Minimizing Impacts of the Atlantic Herring Fishery on Essential Fish Habitat (NMFS, July 2004). Both of these documents, as well as the Environmental Assessment for the Essential Fish Habitat (EFH) components of the Herring FMP (October 1998) should be referenced for additional information about the biological environment affected by the Atlantic herring fishery.

Atlantic herring are distributed along the Atlantic coast from North Carolina to the Canadian Maritime provinces. The management unit for the Atlantic Herring FMP is defined as the Atlantic herring resource throughout the range of the species within the U.S. waters of the northwest Atlantic Ocean from the shoreline to the seaward boundary of the exclusive economic zone (EEZ). The stock complex includes herring, which migrate through Canadian waters, beyond the range of management of the proposed Atlantic Herring FMP. Schools of adult herring undertake extensive migrations to areas where they feed, spawn and overwinter. Herring are found all along the coast in inshore and offshore waters to the edge of the continental shelf during late winter and early spring. The changing seasonal distribution of herring has given rise to both mobile and fixed gear fisheries that harvest herring of all age groups.

Atlantic herring have a tendency to return to natal spawning grounds throughout their lifetime to spawn (Ridgway 1975, Sindermann 1979). This behavior is fundamental to the species' ability to maintain discrete spawning aggregations and is the basis for hypotheses concerning stock structure in the northwest Atlantic. Evidence for this homing behavior is provided by a tagging study in Newfoundland which showed a 73% return rate of adult Atlantic herring to the same spawning grounds where they were tagged (Wheeler and Winters 1984) and by observations of year-to-year changes in the abundance and age composition of spawning aggregations on discrete banks and shoals off southwest Nova Scotia (Stephenson et al. 1998).

Spawning occurs in specific locations in the Gulf of Maine in depths of 20 to 50 meters (about 60-300 feet), on coastal banks such as Jeffreys Ledge and Stellwagen Bank located 8-40 km offshore, along the eastern Maine coast between the U.S.-Canada border and Jonesport (44º 32' N), and at various other locations along the western Gulf of Maine coast (Reid et al. 1999, Munroe 2002). In Canada, spawning also occurs south of Grand Manan Island (in the entrance to the Bay of Fundy) and on various banks and shoals south of Nova Scotia. Herring also spawn on Nantucket Shoals and Georges Bank, but not further south. Spawning occurs in the summer and fall, starting earlier along the eastern Maine coast and southwest Nova Scotia (August – September) than in the southwestern Gulf of Maine (early to mid-October in the Jeffreys Ledge area) and as late as November – December on Georges Bank) (Reid et al. 1999). Herring in the Gulf of Maine region usually reproduce at relatively high temperatures (10-15º C) and at high salinities (Munroe 2002). They do not spawn in brackish water.

Atlantic herring spawn on the bottom in discrete locations by depositing adhesive eggs which stick to any stable bottom substrate, including lobster pots and anchor lines. In some cases, the same spawning sites are used repeatedly, sometimes more than once a year (Stevenson 1989). Eggs are laid in layers and form mats or carpets. In the Gulf of Maine region, egg mats as thick as 4-5 cm have been observed in discrete egg beds that have varied in size from 0.3 to 1.4 km^2. One very large egg bed surveyed on Georges Bank in 1964 covered an area of about 65 km^2 (Noskov and Zinkevich 1967). Herring eggs in the Gulf of Maine region are deposited on gravel and rocky substrate, but are also found on sand, shells and shell fragments, and occasionally on macroalgae. Drapeau (1973) reported that gravel is the preferred substrate on Georges Bank. Spawning sites are located in areas with strong bottom currents (1.5-3 knots) which prevent the accumulation of fine sediment and provide circulation to supply oxygen and remove metabolites (Reid et al. 1999). Hatching success remains relatively high down to 20-25% dissolved oxygen levels (Aneer 1987).

Herring are synchronous spawners, producing eggs once a year once they reach maturity. Depending on their size and age, female herring can produce from 55,000 to 210,000 eggs (Kelly and Stevenson 1983). Underwater video observations have shown that female herring deposit their eggs on the bottom after the males release milt (Messieh 1988). Once they are laid on the bottom, herring eggs are preyed upon by a number of fish species, including cod, haddock, red hake, sand lance, winter flounder, smelt, tomcod, cunner, pollock, sculpins, skates, mackerel, and even herring themselves (Munroe 2002). Egg predation and adverse environmental conditions often result in high egg mortalities. Egg incubation periods are temperature dependent and range from 10-15 days in the Gulf of Maine (Munroe 2002). Hatching success is also temperature dependent: in experimental studies, all eggs held at 15ºC hatched, and none hatched at 0-5ºC or at 20º C (MacFarland 1931).

The pelagic larval phase is relatively long in Atlantic herring, lasting 4-8 months in the Gulf of Maine, depending on the timing of spawning (Reid et al. 1999). Larvae are transported long distances from spawning grounds and over-winter in coastal bays and estuaries. In the Gulf of Maine, the prevailing surface currents flow to the westward, transporting larvae that hatch in eastern Maine to the Sheepscot estuary in mid-coast Maine, a straight-line distance of about 150 km (Graham 1982; Townsend 1992). Boyar et al. (1973) reported that most of the recently-hatched larvae from the southern end of Jeffreys Ledge are transported shoreward. In some years, a few larvae that hatch later in the year in this area of the Gulf of Maine are transported eastward and enter the Sheepscot estuary (Lazzari and Stevenson 1992). Herring larvae from Nantucket Shoals and Georges Bank are widely dispersed and tend to drift to the southwest (Sindermann 1979; Lough et al. 1980; Grimm 1983). Atlantic herring larvae have been collected from inshore waters as far south as New Jersey (Able and Fahay 1998). Surveys conducted during the years when there was little or no spawning activity on Georges Bank have shown that larvae from Nantucket Shoals disperse to the east on to Georges Bank (Smith and Morse 1993). Metamorphosis occurs in the spring at a length of about 40 mm (1.5 in). Schooling behavior begins in the late larval and early juvenile, or “brit” stages.

The persistence of discrete aggregations of larvae for several months after hatching over tidally mixed continental shelf spawning grounds in the Gulf of Maine and elsewhere, despite the presence of fairly strong currents, has provided the basis for a larval "retention hypothesis" (Iles and Sinclair 1982). This hypothesis states that Atlantic herring stock structure in an area like the Gulf of Maine is determined by the number, location, and extent of geographically stable retention areas. Such retention areas have been described off southwest Nova Scotia, around Grand Manan Island, on Georges Bank (Iles and Sinclair 1982), and in eastern Maine coastal waters (Chenoweth et al. 1989).

Adult Atlantic herring are found in shallow inshore waters, 20 meters deep, to offshore waters up to 200 meters deep (NEFMC 1999; Bigelow and Schroeder 1953), but seldom migrate to depths more than 50 fathoms (300 ft or 91.4 meters) (Kelly and Moring 1986). They prefer water temperatures of 5^{o} – 9^{o} C (Bigelow and Schroeder 1953; Zinkevich 1967), but may overwinter at temperatures as low as 0^{o} C (Reid et al 1999). The lower salinity limit for adult herring is 28ppt, with a preference for increasing salinities with increasing fish age.

Juvenile Atlantic herring are usually found in water depths of 15-135 meters (NEFMC 1998a). They prefer water temperatures of 8^{o} –12^{o} C, and a salinity range of 26 - 32 ppt, although they can tolerate salinities as low as 5 ppt for short periods (Bigelow and Schroeder 1953; Kelly and Moring 1986; Brawn 1960a; Stickney 1969; Reid et al 1999). This salinity tolerance allows juvenile herring to penetrate the inshore waters of estuaries and bays. There are records of juveniles being found as far as 68 km up the Hudson River (Able and Fahay 1998; Smith 1985).

5.1.1 Summary of Stock Status

Updated information about the status of the Atlantic herring resource is provided in the following subsections. In the May 5, 2004 Report, the Herring PDT/TC offered the following conclusions regarding the updated stock information:

In general:

- Available trawl survey data do not indicate that a significant drop in herring biomass is occurring. In terms of the Atlantic herring stock complex as a whole, available data suggest that biomass is stable and increasing over time.
- Available survey data suggest that the inshore component of the resource has remained relatively stable in recent years. It is important to note that data specific to the inshore component of the resource are limited – inshore hydroacoustic data are not considered reliable enough at this time to identify trends (see Section 5.1.1.3), so the available data are generally limited to those from bottom trawl surveys and commercial catch sampling.
- Assessment of the Atlantic herring resource remains complex-wide; data are not available at this time to generate a biomass estimate, apply a target fishing mortality rate, and estimate an appropriate level of yield specifically from the inshore component of the resource. Herring PDT biologists are working on developing a separate stock assessment for the inshore component of the resource. If a separate assessment of the inshore component can be conducted, it should be peer-reviewed through a benchmark stock assessment for herring (TRAC or SARC) prior to use in the management arena.
- Available information does not provide a clear answer to the question of whether or not harvest at current levels will jeopardize the inshore component of the resource. However, harvest levels for the Atlantic herring fishery have been relatively consistent for many years, and available data suggest that the inshore component of the stock is stable and has not experienced significant declines in biomass under these harvest levels. Without any biological targets or benchmarks specifically for the inshore component of the resource, the PDT/TC cannot with certainty that maintaining harvest of this stock component at or near current levels will not cause a decline in biomass. Nevertheless, given a long time series of relatively consistent catch and stable surveys, the PDT/TC is comfortable concluding that no significant declines in the inshore component of the resource should be expected under harvest levels in 2005 similar to those observed in recent years.

5.1.1.1 NMFS Trawl Survey – All Strata

Research trawl surveys are conducted region-wide by NMFS and in inshore areas by the Massachusetts Division of Marine Fisheries (MA DMF) as well as the Maine Department of Marine Resources (ME DMR).

The Herring PDT and TC reviewed updated information related to the status of the Atlantic herring stock complex, including the inshore (GOM) and offshore (GB/NS) components of the resource. Available sources of information have been updated through 2003 and are presented in the subsections below.

Table 11 summarizes spring and autumn data (mean weight per tow and mean number per tow) from the NMFS bottom trawl survey from 2000 – 2003. Both surveys have been quite variable over the time series. No trends are apparent from the most recent survey years, but the 2003 spring survey declined in both number and weight per tow. The autumn survey number per tow has increased significantly in the last two years, and while the weight per tow is somewhat variable, the decrease in weight per tow in 2003 suggests that the survey picked up a significant amount of smaller fish.

Table 11 NMFS Trawl Survey – Herring Catch Per Tow (Mean Number and Weight in kg), 1990-2003

YEAR	SPRING SURVEY		AUTUMN SURVEY	
	number/tow	kg/tow	number/tow	kg/tow
1990	8.98	0.92	13.98	1.64
1991	25.40	2.29	20.74	2.95
1992	39.30	2.76	56.48	9.25
1993	68.52	7.68	16.81	2.51
1994	35.40	3.88	13.56	2.15
1995	27.57	3.14	69.76	13.10
1996	58.58	3.81	37.53	4.64
1997	64.66	4.66	36.86	4.87
1998	50.62	4.72	20.63	2.84
1999	84.52	9.45	13.48	1.84
2000	33.34	2.92	20.65	3.18
2001	35.07	3.35	25.33	3.69
2002	42.09	2.70	77.99	10.74
2003	19.71	1.87	94.76	6.23

5.1.1.2 NMFS, MA DMF, and ME DMR Trawl Surveys – Inshore Only

Since Fall 2000, Maine DMR, in conjunction with the Gulf of Maine Research Institute and the State of New Hampshire, have been conducting an inshore bottom trawl survey. While this survey targets principal groundfish species from the NH/MA boarder to Canada, it has regularly sampled herring. Data collected from the ME DMR survey is presented in Section 5.1.1.2.4 of this document.

A selected subset of NMFS and MA DMF trawl survey strata were chosen to represent trends in the inshore herring component during 1963-2003. NMFS strata 26-27,38-40 and Mass DMF strata 31-36 were used during spring and autumn (Figure 3 and Figure 4). In addition, the number of positive (non-zero) tows was also calculated for the NMFS spring and autumn surveys.

Figure 3 NMFS Trawl Survey Strata

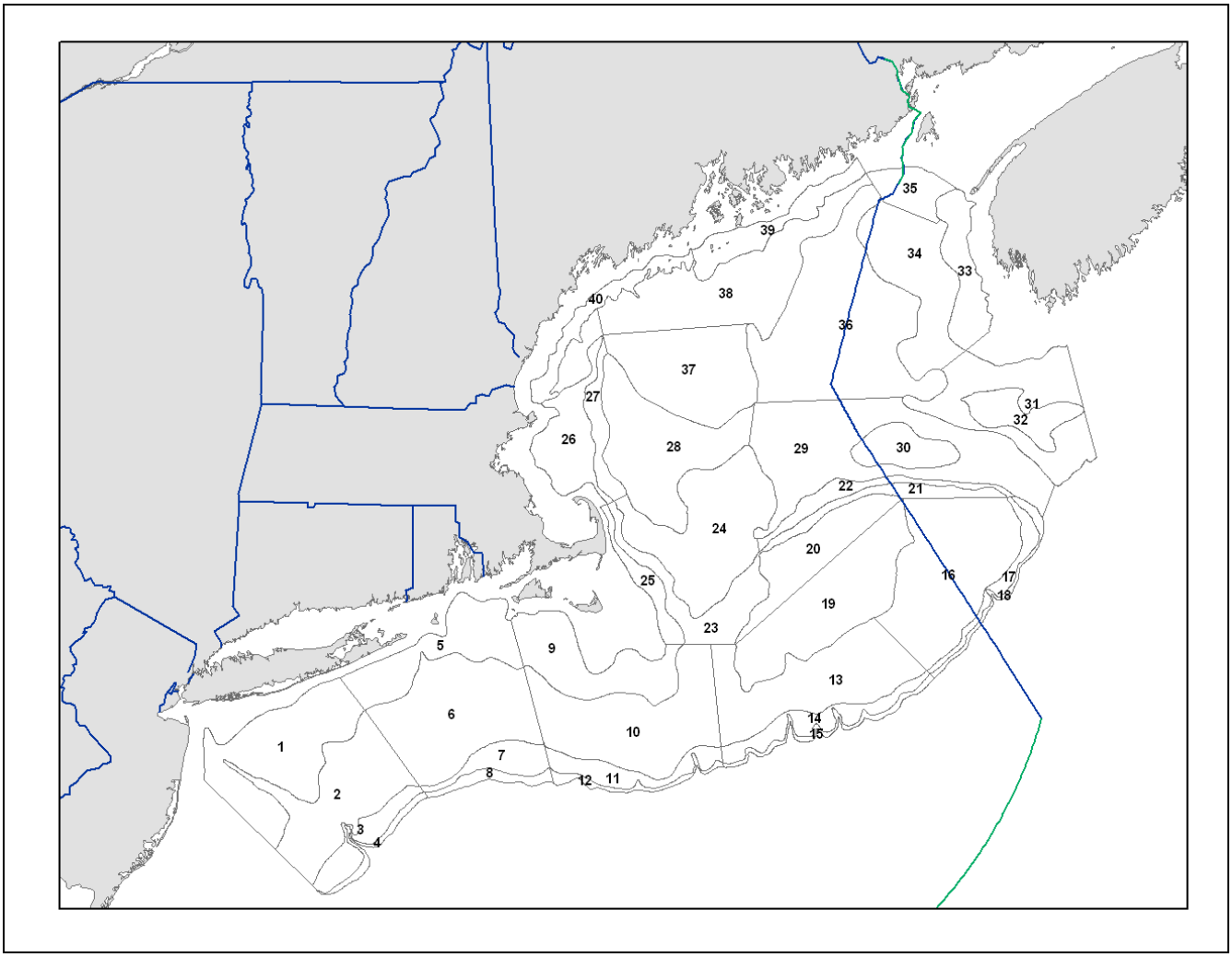
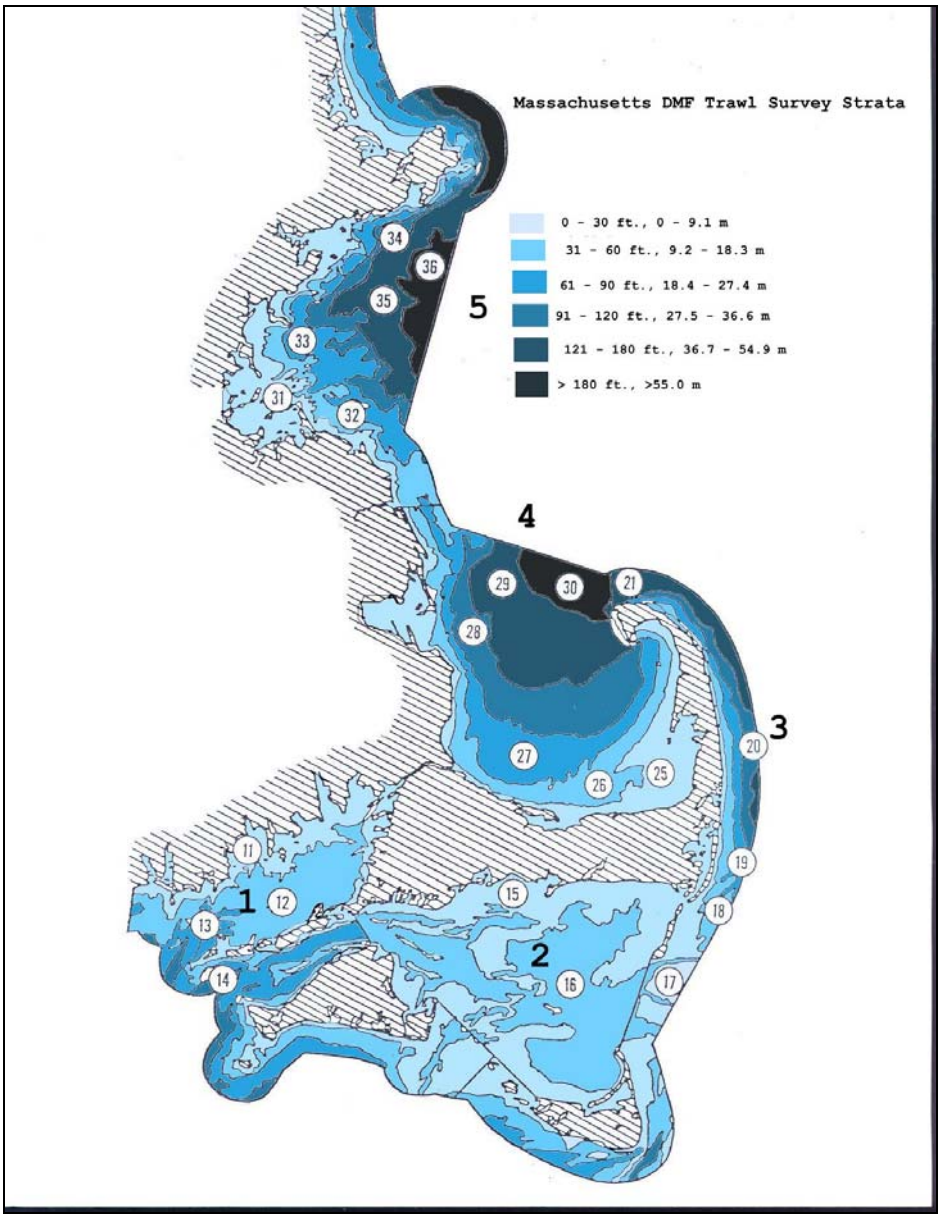


Figure 4 MA DMF Inshore Trawl Survey Strata



5.1.1.2.1 Encounter Rate in NMFS Trawl Survey

The encounter rate for herring in the spring NMFS research bottom trawl survey has increased during 1968-2003, as measured by an increase in the number of tows that encountered herring (called non-zero tows). The trend has increased linearly since 1968 and appears to be about three times higher now than during the late 1960s and early 1970s (Figure 5). In the autumn survey, the trend in non-zero tows was relatively flat during the 1960s and early 1970s and has increased by a factor of two since that time (Figure 6). Such an increase in encounter rate may suggest increased abundance. However, because herring is a schooling pelagic fish, it should be noted that an increase in the number of non-zero tows may reflect an increase in the number of

schools of herring encountered during the survey and may not represent an increase in overall abundance.

Figure 5 Non-Zero Tows for NMFS Spring Survey for Herring in Strata 26-27, 38-40 (inshore), 1968-2003

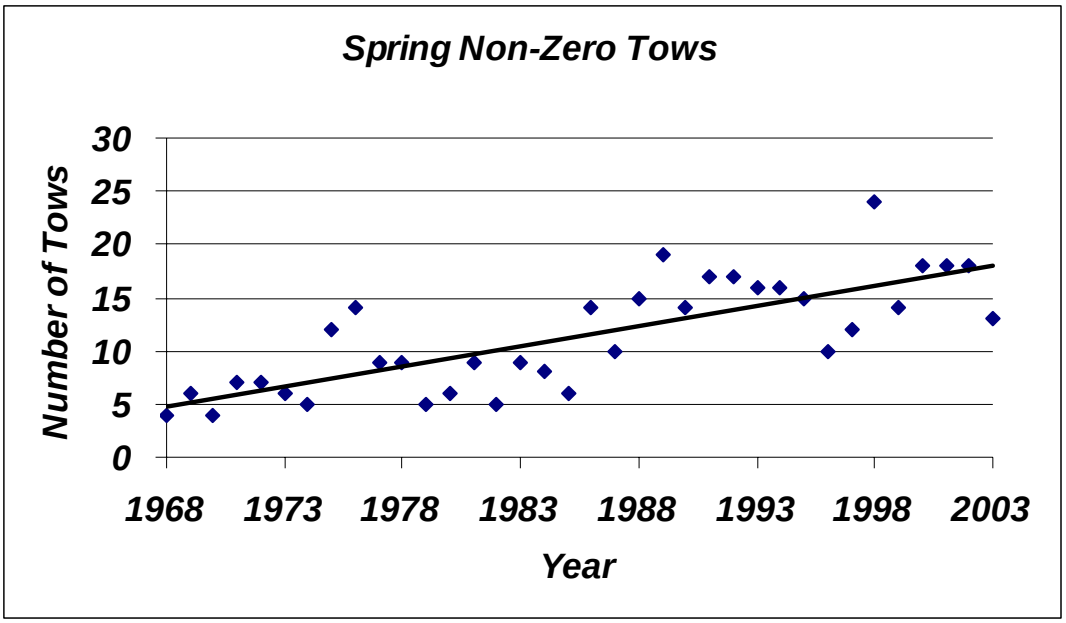
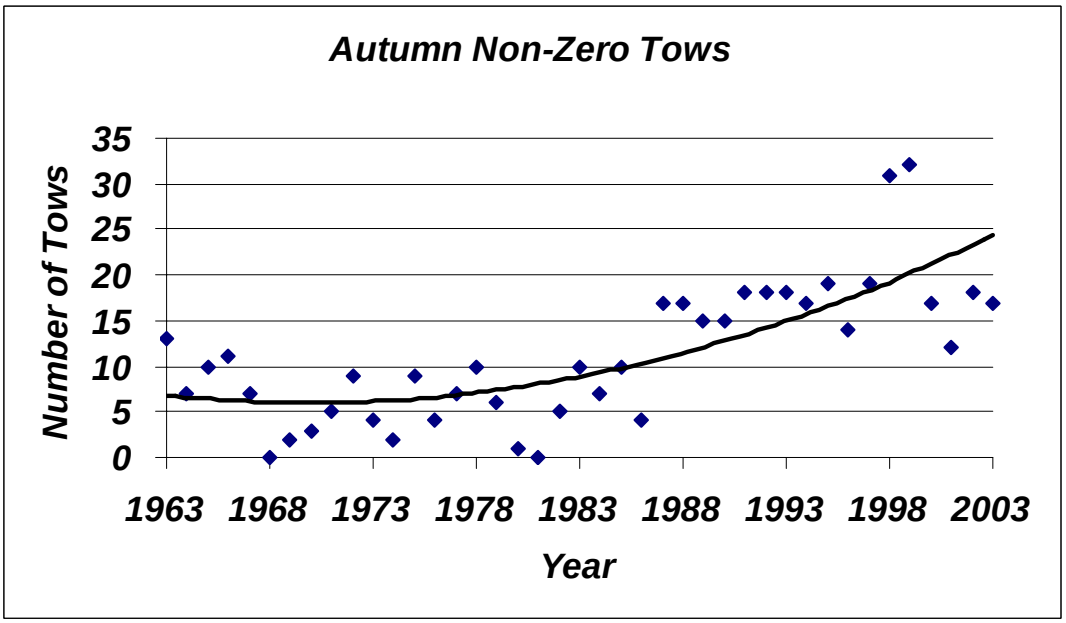


Figure 6 Non-Zero Tows for NMFS Autumn Survey for Herring in Strata 26-27,38-40 (inshore), 1963-2003



5.1.1.2.2 Catch Per Tow in NMFS Trawl Survey

The NMFS spring survey was relatively flat, averaging a few fish per tow, during the late 1960s through the early 1980s (Figure 7). In the late 1980s, the index increased significantly, and although variable, has remained relatively high, averaging 40-50 fish per tow, since that time. The autumn survey time series for the inshore area was very low from 1963 to the mid-1980s (Figure 8). Since that time, the autumn survey index has increased to about an average of 50 fish per tow (2002 data excluded) and has remained relatively high (Figure 8). An increase in the number of fish per tow, when combined with an increase in the encounter rate (Section 5.1.1.2.1), is suggestive of increased relative abundance when compared to the 1980s. However, survey catch in number per tow from the time series is noisy and should be interpreted with caution.

Figure 7 Herring Catch/Tow (Number) Indices from the NMFS Spring Bottom Trawl Survey Strata 26-27,38-40 (inshore), 1968-2003

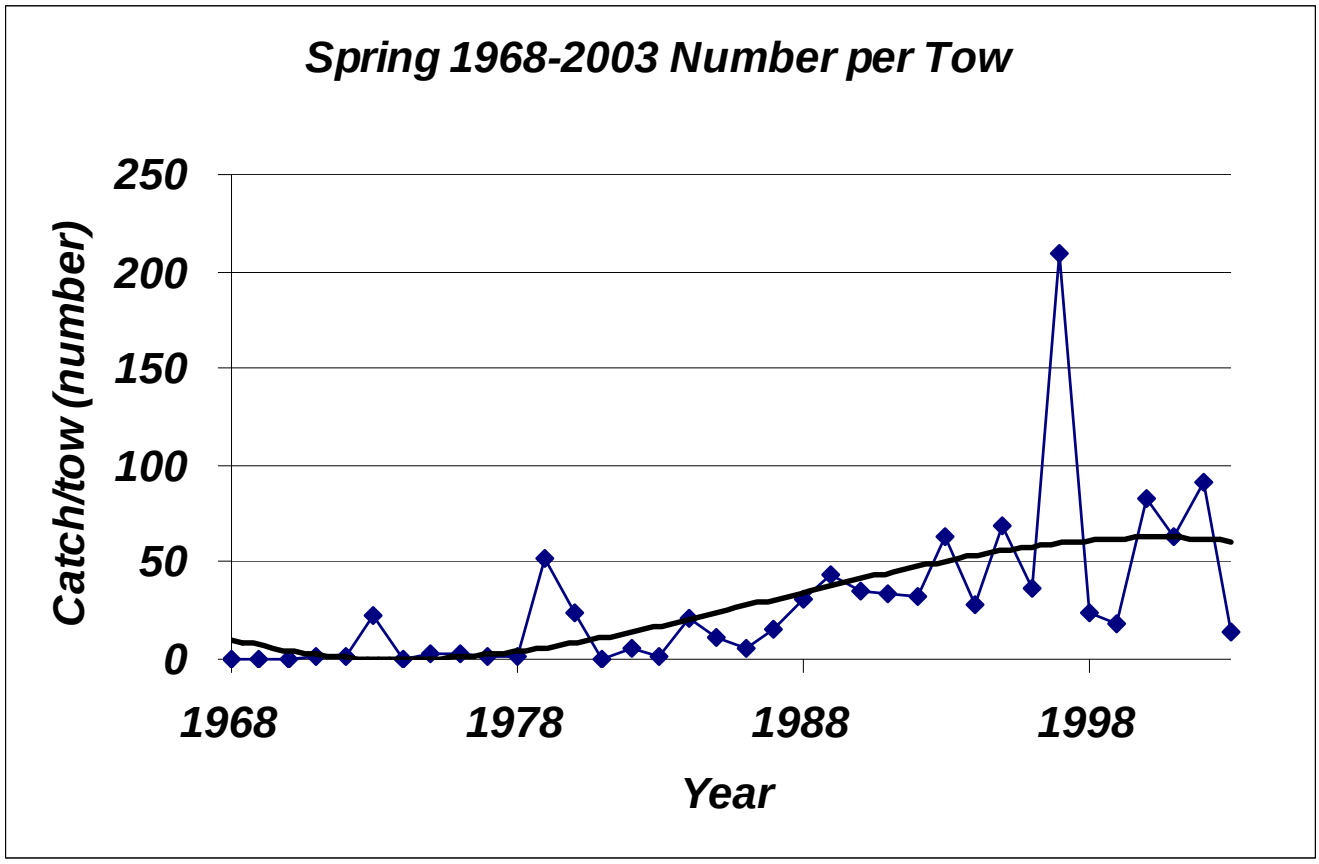
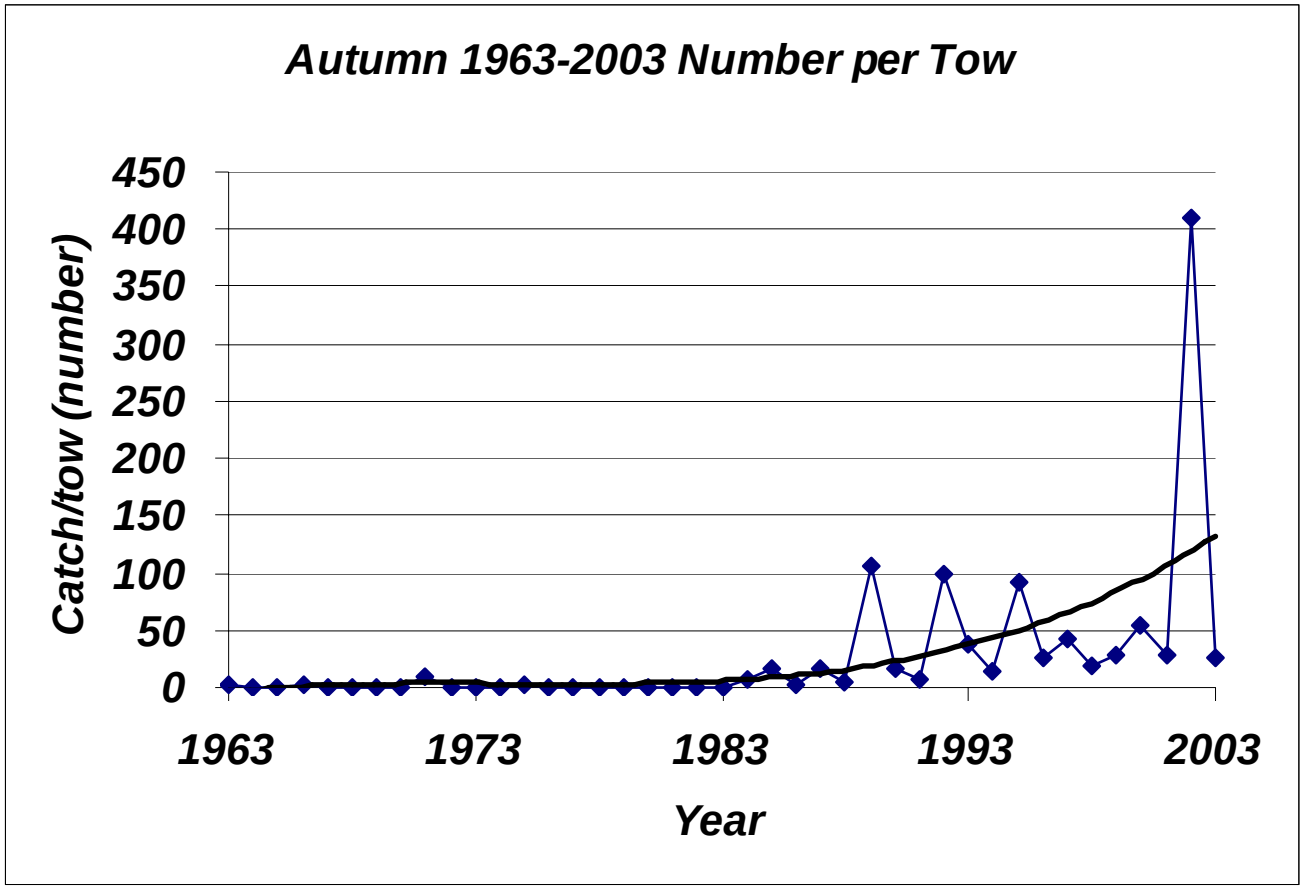


Figure 8 Herring Catch/Tow (Number) Indices from the NMFS Autumn Bottom Trawl Survey Strata 26-27,38-40 (inshore), 1968-2003



5.1.1.2.3 Catch Per Tow in MA DMF Inshore Trawl Survey

The MA DMF research bottom trawl surveys for spring and autumn were also examined for trends in the inshore herring component. Both series are highly variable with no apparent trend (Figure 9, Figure 10). This suggests that this survey is not capturing any trend in adult herring abundance. These indices, however, may be useful as a measure of recruitment to the inshore component of the resource.

Figure 9 Herring Catch/Tow (Number) Indices from the MA DMF Spring Inshore Trawl Survey Strata 31-36, 1978-2002

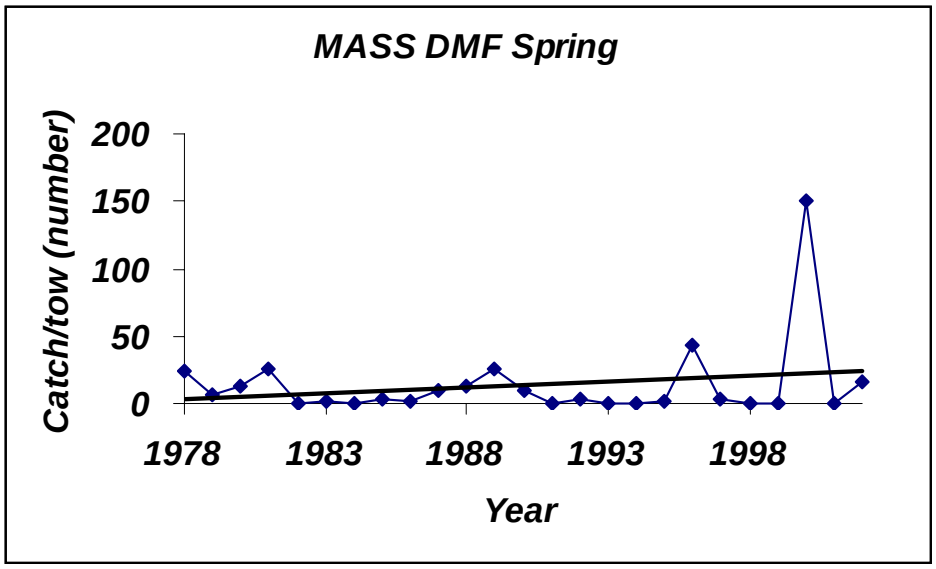
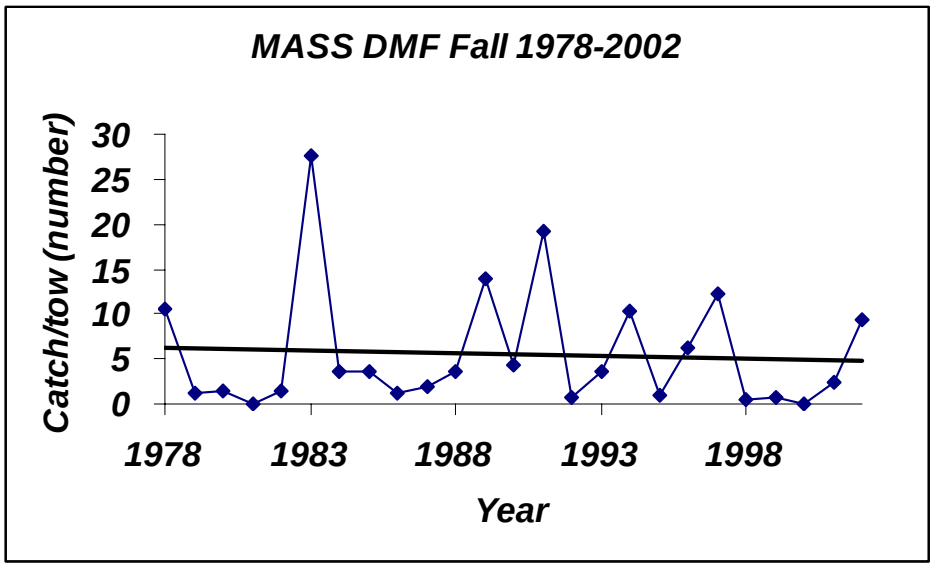


Figure 10 Herring Catch/Tow (Number) Indices from the MA DMF Autumn Inshore Trawl Survey Strata 31-36, 1978-2002



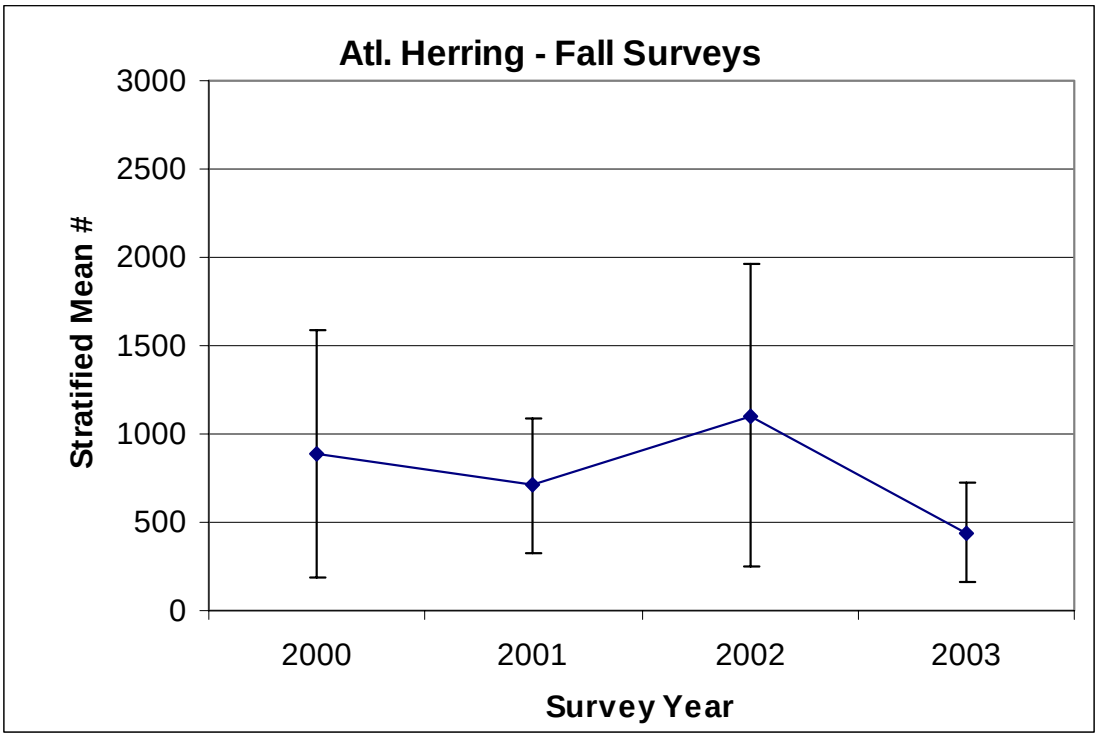
5.1.1.2.4 ME DMR Inshore Trawl Survey

Since Fall 2000, Maine DMR, in conjunction with the Gulf of Maine Research Institute and the State of New Hampshire, have been conducting an inshore bottom trawl survey. While this survey targets principal groundfish species from the NH/MA boarder to Canada, it has regularly sampled herring.

Results from this survey (Figure 11) indicate that the mean number per tow observed by the survey is at its lowest point since inception. However, if error is applied, this reduction is within the observed error of other years, and no trend is apparent. Based on the fish sampled in this survey, there is no clear indication of an overall reduction in the abundance of the inshore component of the herring resource.

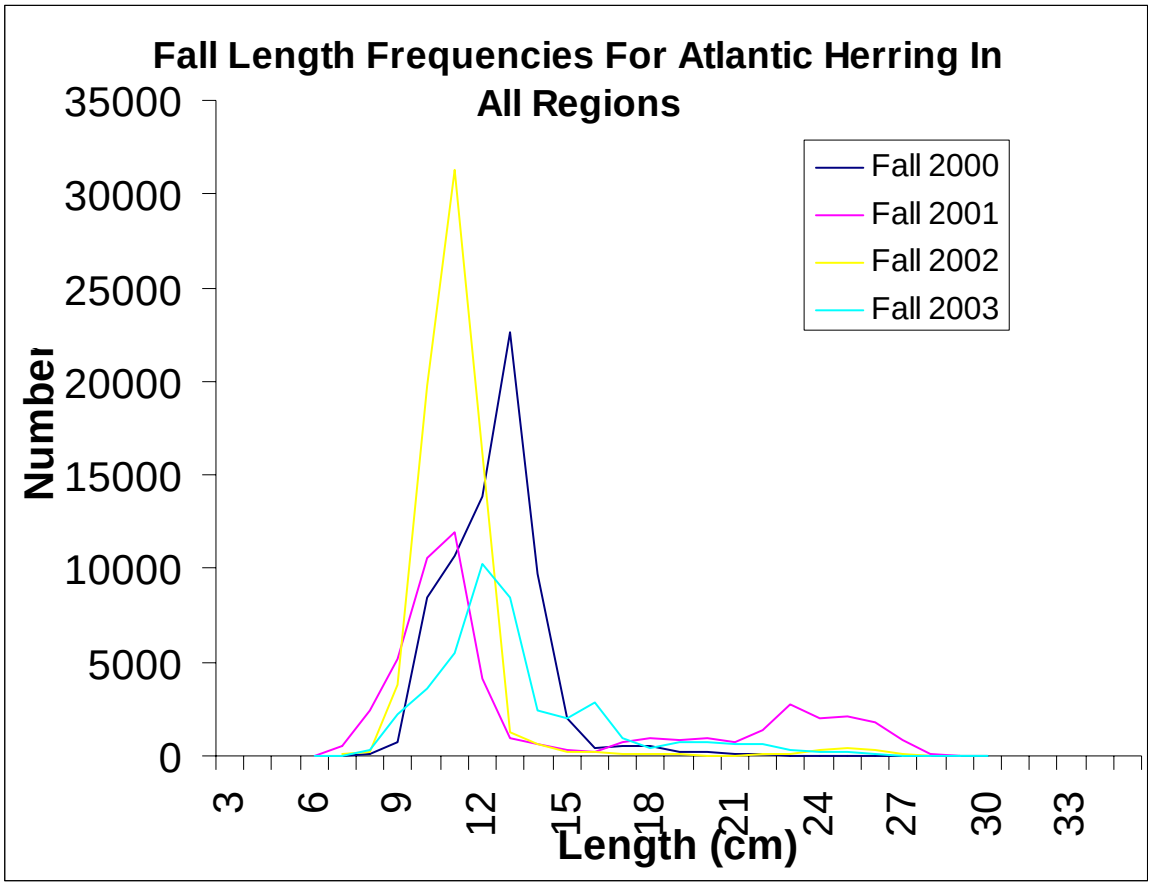
However, the ME/NH inshore bottom trawl survey samples mostly juvenile fish (less than 23 cm); which may or may not be a part of the inshore spawning component in future years (Figure 12). This is a ME/NH coast-wide bottom trawl survey, the results of which should not be viewed as an index of spawning stock biomass (SSB) for the inshore component of the herring resource. In fact, most of the fish sampled by this survey are age 1 fish. Similar to the MA DMF survey, this bottom trawl survey may provide an indication of pre-recruitment year class strength.

Figure 11 ME DMR Inshore Bottom Trawl Survey catch (in #) per tow



Note: Error is stratified error.

Figure 12 Length Frequencies for Herring Sampled by the Inshore Bottom Trawl Survey



5.1.1.2.5 NMFS Offshore Acoustic Survey

Offshore hydroacoustic surveys of Atlantic herring have been conducted by NMFS since 1999. From 1999-2001, three different surveys were conducted; in 2002, one larger survey was conducted. In 2002, 40-50% of the fish that were sampled during the survey were "spent," suggesting that spawning occurred earlier last year, and the survey may have missed the fish when they were most concentrated. Echo-intensities were therefore lower in 2002, resulting in a lower total biomass estimate, but not affecting overall distribution (Table 12). **Data from the 2003 NMFS acoustic survey are not available at the time of this writing.**

Table 12 Geostatistical Estimates of Biomass, Coefficients of Variation (CV), CV inverse, Weighted Biomass (W), and Weighted CV (W) for Acoustic Surveys on Georges Bank from 1999-2002

Year Survey Design	Biomass	CV	1/CV	W Biomass	W CV
1999					
Zigzag1	1.4173	18.74	0.0534		
Zigzag2	1.0409	20.86	0.0479	1.19E+06	10.712
Parallel	1.1467	9.79	0.1021		
2000					
Parallel	1.5025	11.49	0.087		
Zigzag	1.268	10	0.1	1.43E+06	7.222
S random	1.596	16.89	0.0592		
2001					
Parallel	2.1484	9.89	0.1011		
Zigzag	1.6172	10.8	0.0926	1.82E+06	6.604
S random	1.596	15.3	0.0654		
2002					
Parallel	0.7628	13.56		7.63E+05	13.56

5.1.1.3 ME DMR Inshore Acoustic Survey

Since 1999, the ME DMR, in partnership with the Gulf of Maine Aquarium (now the Gulf of Maine Research Institute), has been surveying the inshore spawning component in the Gulf of Maine during Autumn (September – November). This project is funded by the Northeast Consortium, and uses groundfish and herring vessels to conduct fishery-independent hydroacoustic surveys. This survey compliments the offshore hydroacoustic survey conducted by NMFS (discussed in Section 5.1.1.2.5).

Current estimates of biomass of the inshore spawning component sampled by this survey are unavailable at this time. This is due, in part, to questions surrounding survey timing, coverage, and methodology. A full peer review of this project is scheduled to be completed next year. After a thorough review and any accompanying advice, further data analysis may allow for the use of this survey as an index of inshore spawning component.

5.1.1.4 Commercial Catch Sampling

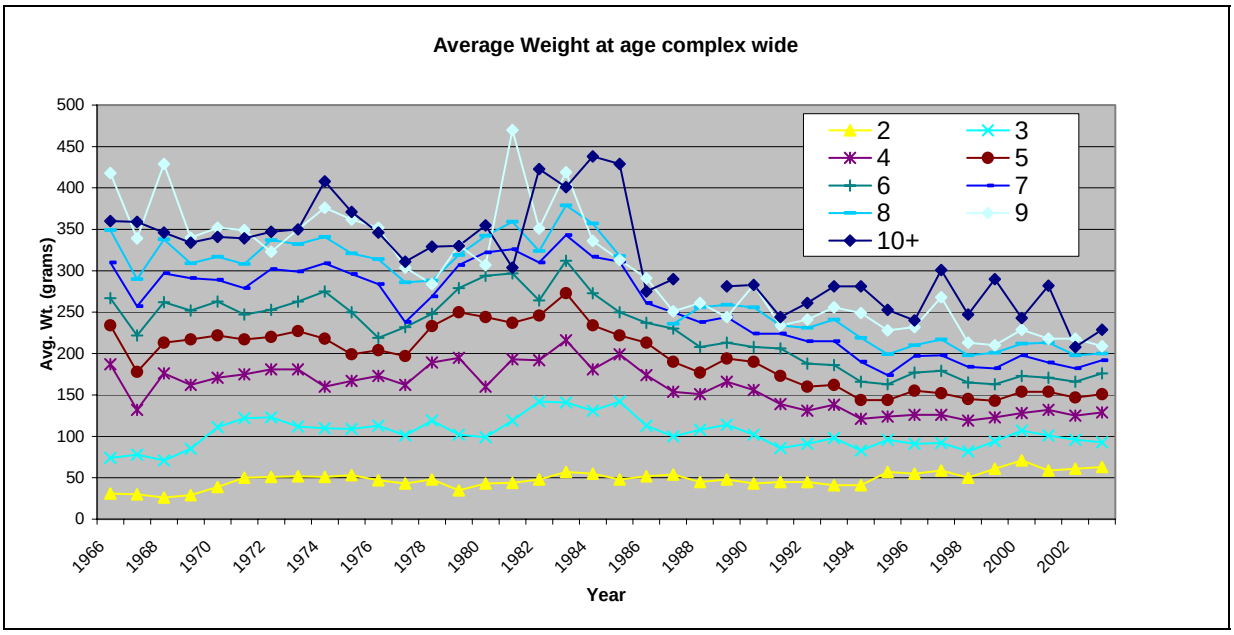
Samples of herring collected from the commercial catch are processed at the ME DMR. Historically, samples were obtained from sardine canning plants, some of which transported fish from other states. NMFS port agents, fishery biologists in other states, and the Canadian Department of Fisheries and Oceans would also provide samples or data to the State of Maine. Recently, ME DMR has been given a grant from the Atlantic Coastal Cooperative Statistic Program (ACCSP) for a dedicated herring sampler. Normally, 4-8 samples are collected each month by statistical area harvested. However, more extensive sampling has occurred during foreign fishing or processing operations. Current sampling ratio is approximately one 50-fish sample per 500 mt.

Usually, between 175 and 250 samples are processed by ME DMR each year. Samples of 50 fish are processed for length (mm total length), weight (grams), sex, and, where applicable, sexual maturity and gonad stage, using standard procedures and criteria. From each sample, the sagittal otoliths are removed from two fish per centimeter group and embedded in plastic blocks for ageing. Periodic calibration of ageing procedure is conducted with NMFS' scientists.

Atlantic Herring Stock Complex

Resulting data for the Atlantic herring stock complex as a whole suggest a large reduction in weight at age, evident since the early 1980s (Figure 13). Such reduction in both weight at age and length at age may have implication to the partial recruitment vector for this complex. While the reason for this reduction in weight at age is unknown, density dependent factors may be involved (i.e., slower growth at higher stock sizes). However, these data should not be interpreted as a result of a reduction in available food or that the complex is in danger of overpopulation.

Figure 13 Total Weight at Age for the Atlantic Herring Stock Complex

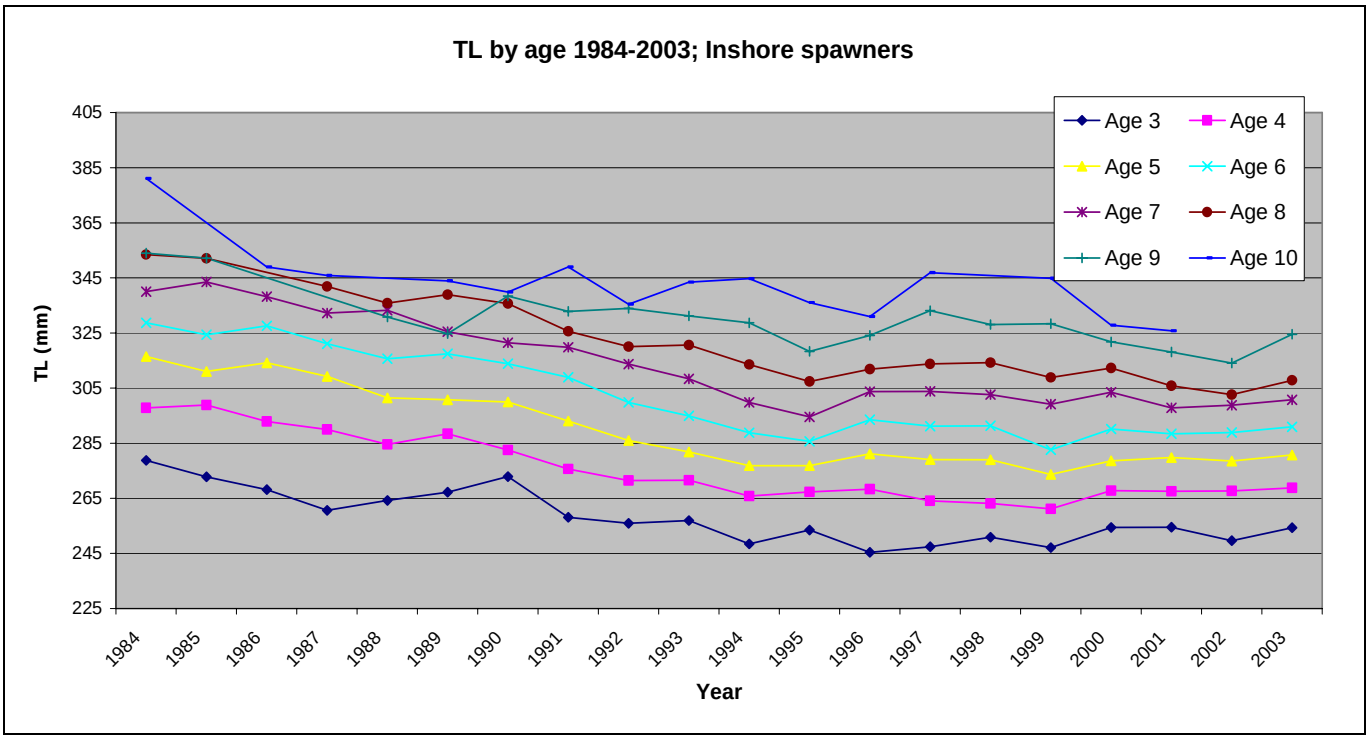


Inshore Spawning Component

Samples from the inshore spawning stock (adult sized fish, GSI > 0.10) are available for 2003 (Figure 14). Since 1984, a rather large drop in size (total length at age) is apparent. This is consistent with trends observed for the overall stock complex (see above). The biggest change in length at age for the inshore component occurred from 1984 – 1994, and since that time, the trend has been rather flat.

A decline in growth over time may indicate that density-dependent factors are at work for the inshore component. As such, it also suggests that a larger stock exists than was apparent during the mid-late 1980s. It should be noted that slower growth for individuals from the inshore component might be the result of increased stock size for the complex overall, or a change in environmental conditions affecting feed and/or growth of the different year classes. However, the declines over time that have been observed, especially from 1984-1994, are not necessarily consistent with changes in environmental conditions. In this case, the downward trend in length at age may be more suggestive of density-dependent factors at work, especially because the trend is also consistent with the overall upward trend in abundance apparent from the survey data.

Figure 14 Total Length at Age for Inshore Spawners (> 230 mm & > GSI 0.10)



5.2 HERRING FISHERY

A detailed description of the Atlantic herring fishery is provided in the Herring FMP and is incorporated into this document by reference. In addition, the Stock Assessment and Fishery Evaluation (SAFE) Reports for the Atlantic herring fishery, developed by the Herring PDT since the implementation of the Herring FMP, provide updated information relative to the herring fishery and should be referenced for additional information.

Herring fisheries have existed in Europe for over 1,000 years and in the Northwest Atlantic for about 450 years. The U.S. Atlantic herring fishery occurs over the Mid-Atlantic shelf region from Cape Hatteras to Maine. In recent years, vessels have also pursued fish on Georges Bank. While fixed gear dominated the U.S. fishery in the 1960s, purse seines became the dominant gear type in the 1980s and early 1990s. Since the mid-1990s, the herring fishery has evolved and is now prosecuted primarily by midwater trawl (single and paired) vessels.

Most U.S. commercial catches occur between May and October in the Gulf of Maine, consistent with the peak season for the lobster fishery. In addition, there is a relatively substantial winter fishery in southern New England, and catches from Georges Bank have increased somewhat in recent years. There is a very small recreational fishery for Atlantic herring that generally occurs from early spring to late fall, and herring is caught by tuna boats for use as live bait in the recreational tuna fisheries. In addition, there is a Canadian fishery for Atlantic herring from New Brunswick to St. Lawrence, which primarily utilizes fixed gear. Fish caught in the New Brunswick (NB) weir fishery are assumed to come from the same stock (inshore component) as that targeted by U.S. fishermen.

Updated information about the herring fishery is provided in the following subsections.

5.2.1 Herring Fleet

There are three sectors of the herring fleet that will be discussed in relation to impacts from the TAC options that were considered during the fishery specification process. These sectors were chosen based on gear type and the region in which the vessels' principal port of landing is located (based on vessel trip reports and the port in which the majority of the vessel's herring landings were identified). The choice of fleet sectors was dictated by the differences in expected impacts from the TAC options.

The **Maine purse seine fleet** consists of five vessels with principal ports of Addison, Prospect Harbor, Rockland, and Stonington ME. This sector made 340 trips and landed 20,256 mt of herring in 2003. The majority of the landings were from vessels with a port designation of Rockland or Stonington ME. Ninety five percent of the landings by this sector came from Area 1A in 2003. Eighty two percent (82%) of the total revenues for this sector came from Atlantic herring in 2003 (see Table 9 in May 5, 3004 PDT/TC Report).

The **North of Cape Cod midwater trawl fleet** (pair and single) consists of 15 vessels with principal ports of Gloucester MA, Newington NH, New Harbor ME, Portland ME, Rockland ME, and Vinalhaven ME. This sector made 720 trips and landed 62,145 mt of herring in 2003. Vessels with a Portland designation landed 26,493 mt (43%), and those with a Gloucester designation landed 15,294 mt (25%). Sixty six percent (66%) of the herring landings by this sector came from Area 1 (5% from Area 1B) in 2003, 14% from Area 2, and 20% from Area 3.

The **South of Cape Cod midwater trawl fleet** (pair and single) consists of eight vessels with principal ports of New Bedford MA, Newport RI, North Kingstown RI, and Point Judith RI. This sector made 181 trips and landed 17,189 mt of herring in 2003. Vessels with a New Bedford designation landed 13,176 mt (77%). Eleven percent (11%) of the herring landings by this sector came from Area 1A in 2003, 10% from Area 1B, 34% from Area 2, and 45% from Area 3.

5.2.2 2003 Herring Catch and Landings Statistics

The annual catch numbers and landings for the Atlantic herring fishery are monitored using two harvester-based reporting systems and mandatory dealer reporting.

Harvesters record trip level information using Vessel Trip Report (VTR) forms and submit them on a monthly basis. This reporting system provides detailed catch information including, set time and duration, the coordinates where fishing activity occurs, incidental catches and any observed bycatch. VTR data are useful for stock assessment and effort information.

Harvesters are also required to submit catch reports using the Interactive Voice Response (IVR) system. These reports are made using a call-in system that records the total weekly catch by federal management area. This reporting system is useful for near real-time quota monitoring. IVR data are not generally useful for stock assessment, or management questions that require trip level information.

Federal Atlantic herring dealers submit trip-level landings reports on a monthly basis. These data include the vessel name, gear type, general catch area and amount purchased. The information from this reporting system is generally not useful for stock assessment but does contribute to economic analyses.

The catch-at-age (CAA) matrix is developed by applying the commercial harvest data (from VTRs) to samples of fish taken from the commercial fleet using a program called BIOSTAT. This matrix is developed for each area by month. The results by area are then summed fishery wide from which they can be utilized in an age structured population model, or analyzed for other fishery dependent statistics.

5.2.2.1 VTR – Preliminary Data as of May 1, 2004

As reported by the National Marine Fisheries Service (NMFS) and the Maine Department of Marine Resources (ME DMR), and as of May 1, 2004, a total of 100,676 metric tons (mt), of herring were caught during the 2003 fishing year (Table 13). This amount represents a fishery wide increase of 8,084 mt from the previous year. The catch from Management Area 1A (59,451 mt) accounted for approximately 59% of the total landings, followed by Area 3 which accounted for 20% (20,226 mt).

Within Area 1A, purse seines accounted for approximately 30% of the catch, but only accounted for 18% of the annual catch for the entire stock complex (Figure 15 and Figure 16). Single boat mid-water trawlers accounted for 13% of the Area 1A catch, while pair trawlers accounted for 57%.

Maine had the highest reported landings (46%) in 2003, followed by Massachusetts (38%), New Hampshire (8%), and Rhode Island (7%) (Figure 17).

Table 13 Atlantic Herring Catch (mt) by Management Area and Month, 1999 – 2003*

1999	Month												
MGMT AREA	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
1A	805	120	93	3,945	4,995	8,432	13,371	11,731	10,759	6,057	9,863	5,414	75,585
1B	311		41		181	57		35	113	731	106	57	1,632
2X	7,335	9,488	4,504	559	15	8	79	158	0	1	4	560	22,712
3X		143	272	1,007	160	1,460	289	96	1,297	994			5,718
TOTAL	**8,451**	**9,751**	**4,910**	**5,512**	**5,352**	**9,956**	**13,738**	**12,020**	**12,169**	**7,783**	**9,973**	**6,031**	**105,647**
2000													
MGMT AREA	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**
1A	3	99	76	1,525	7,398	9,946	14,997	12,259	4,777	9,081	631		60,793
1B		0	127	82	128	234	489	73	209	0	6,126		7,468
2X	9,340	9,838	2,358	203	19	0	0	2	23	2	860	4,552	27,198
3X	54		537	87	38		743	3,006	6,686	2,048		0	13,199
TOTAL	**9,397**	**9,937**	**3,098**	**1,896**	**7,582**	**10,181**	**16,230**	**15,341**	**11,694**	**11,132**	**7,617**	**4,552**	**108,658**
2001													
MGMT AREA	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**
1A	3	1,767	1,273	2,814	6,526	8,701	7,884	7,254	5,046	9,741	2,662	57	53,728
1B	18	1	68	45	195	110		1,302	2,192	237	6,198	6,336	16,704
2X	9,129	4,376	447	869	56	100	55	2	96	3	64	623	15,821
3X						755	7,675	7,807	12,146	6,328	314	53	35,079
TOTAL	**9,150**	**6,144**	**1,788**	**3,728**	**6,778**	**9,666**	**15,615**	**16,366**	**19,480**	**16,310**	**9,237**	**7,069**	**121,332**
2002													
MGMT AREA	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**
1A	1,653	1,223	933	3,087	249	9,755	13,269	7,453	7,801	5,897	8,621	103	60,044
1B	1,701	753	355	126	1,062	412	665	159	293	31	14	1,766	7,335
2X	5,232	4,237	593	79	187	0	1	1	138	1	125	445	11,038
3X	589	0		43	805	792	3,211	2,041	3,953	2,739	4		14,177
TOTAL	**9,175**	**6,212**	**1,881**	**3,335**	**2,302**	**10,959**	**17,146**	**9,653**	**12,185**	**8,668**	**8,764**	**2,314**	**92,594**
2003													
MGMT AREA	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**
1A	185	11	14	260	4,151	8,998	6,581	11,714	12,559	7,653	7,326	0	59,452
1B	0	0	0	122	9	194	689	178	71	1	540	3,113	4,917
2X	4,670	3,101	1,901	378	353	1	1	2	419	37	277	4,939	16,079
3X	0	0	12	149	122	673	9,977	3,967	1,719	3,592	13	2	20,226
TOTAL	**4,855**	**3,112**	**1,927**	**909**	**4,635**	**9,866**	**17,248**	**15,861**	**14,768**	**11,283**	**8,156**	**8,054**	**100,674**

**2003 data are preliminary.*

Figure 15 2003 Landings of Atlantic Herring by Gear Type

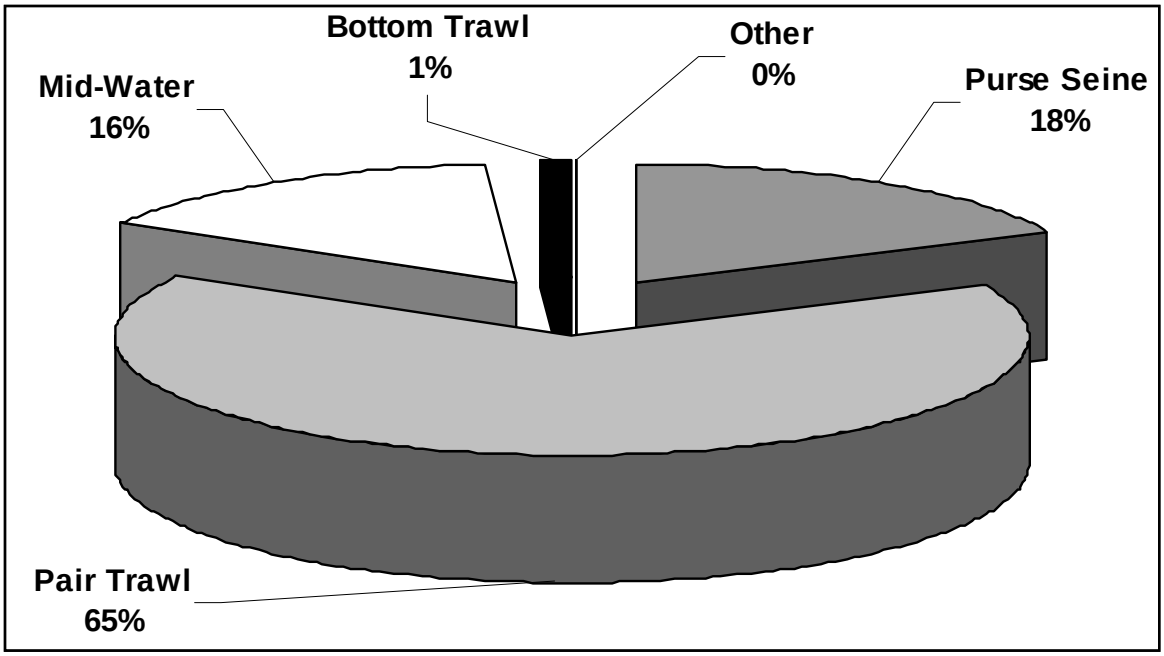


Figure 16 2003 Landings of Atlantic Herring by Gear in Management Area 1A

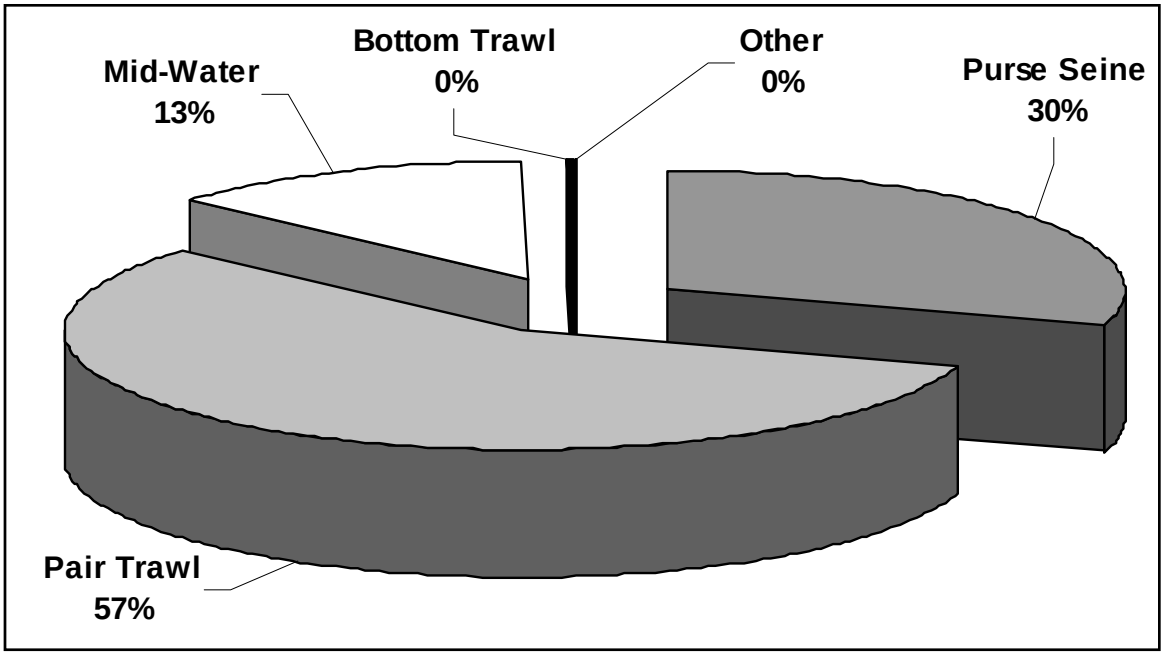
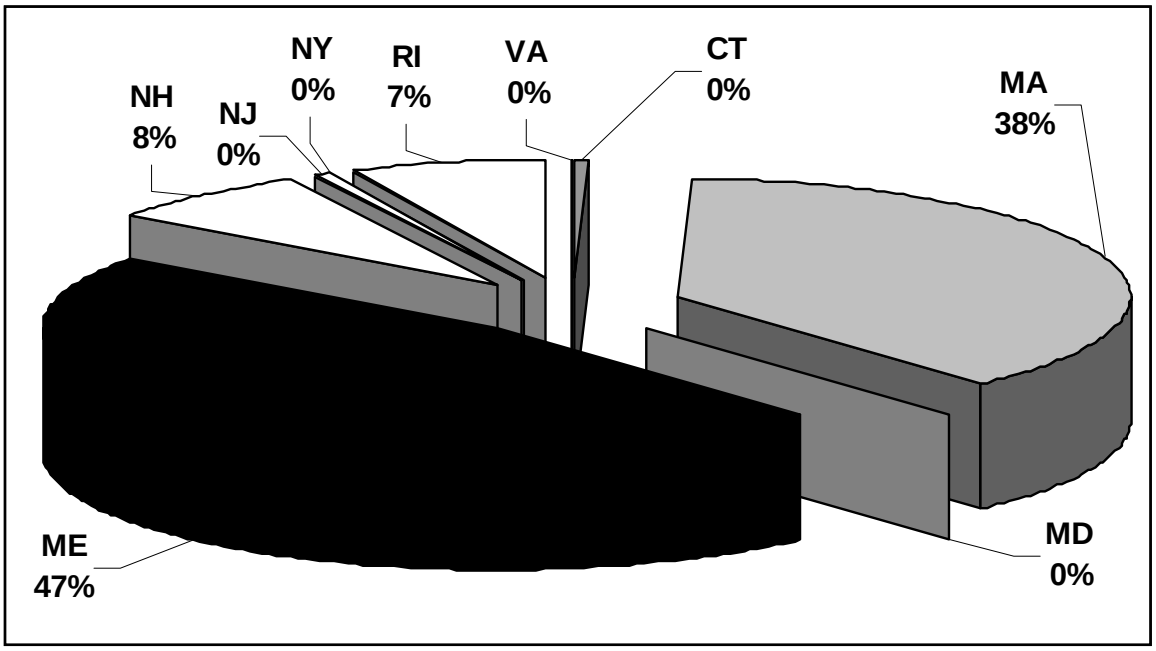


Figure 17 Percentage of 2003 Herring Landings by State



Note: Figure 17 reflects where herring were landed, not necessarily where they were caught.

5.2.2.2 IVR Landings

The Interactive Voice Response (IVR) call-in system is also a harvester report. Harvesters report combined catches by management area on weekly schedule. While both trip level information and precise location are not reported, this system is useful for near real-time quota monitoring. IVR data are not generally useful for stock assessment, or management questions that require information by sub-area or gear. Both IVR and VTR data incorporate landings to foreign vessels by domestic harvesters (JV or IWP, but not TALFF).

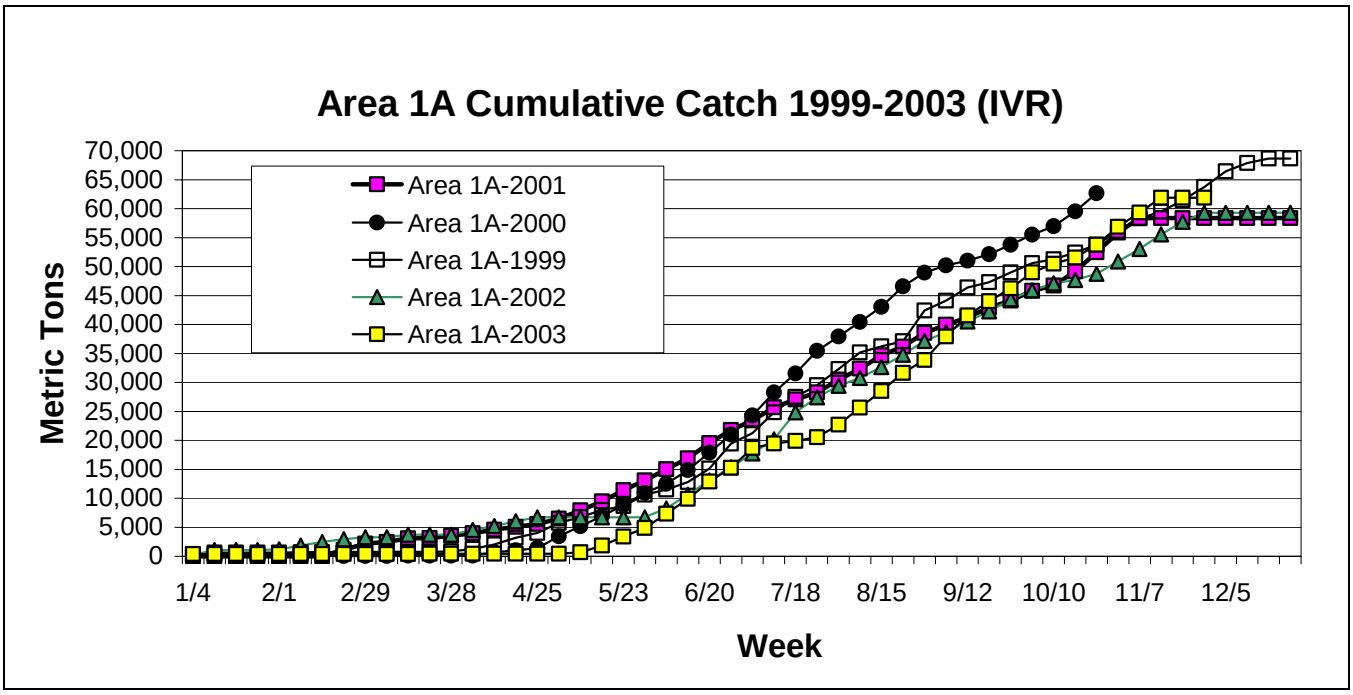
A total of 105 vessels had a Category 1 permit in 2003 (up from 96 in 2002). Of those vessels, 64 made positive reports using the IVR system. Although IVR reporting compliance among Category 1 herring permit holders was about 61%, the dedicated herring fleet (about 25 in number) had a compliance level approaching 100%.

The total IVR catch in 2003 reached 100,544 mt, a 9% increase from 2002. The Area 1A harvest accounted for approximately 62% of the total catch, followed by Area 3 with 21%, Area 2 with 12% and Area 1B with 5%. The fishery in Area 1A started very slowly in 2003, with virtually no landings prior to the middle of May (Figure 18). This resulted in almost all of the Period 1 TAC rolling over into the Period 2 fishery. By early July, the Area 1A fishery caught up to the 2002 catch levels, and in late September, the Area 1A catch almost exactly matched that of 2002 and 2001. The final catch in Area 1A was slightly over the TAC of 60,000 mt. However, it is important to note that IVR data are based on hail weights and generally are overestimated in comparison to the VTR data. Preliminary VTR data (as of May 1, 2004) indicate that the total

Area 1A catch in 2003 was 59,451 mt and the total catch for all management areas was 100,676 mt (Table 13).

Note: Direct comparisons among years are difficult because of changes in the "days out" effort controls and spawning closures.

Figure 18 IVR Reports for Area 1A 1999-2003



5.2.2.3 Catch at Age

Examination of the catch at age matrix for the entire herring fishery reveals interesting trends within the data. Strong year classes are noticeable particularly for 1994, 1996, and 1998 (Table 14). The 1994 and 1998 year classes seem particularly strong on a complex-wide basis. The 2001 year class appears to be very strong and may be the cause for increased catches of two-year olds in 2003 and one-year olds in 2002. Other strong year classes (notably from 1994 and 1998) were similarly observed as increased juvenile catch during recent years.

Overall, the age structure of Atlantic herring catch has shifted to older individuals in recent years. This trend may be attributable to many factors, including the abundance of older age classes due to increased recruitment and low fishing mortality, and industry/market trends towards landing larger fish.

The apparent large increase in juvenile (ages 1-2) catch over the last five years is most likely the result of strong recruitment to the herring complex and may not be the result of a deliberate shift in the target fish size for the fishery. Similar catches of juvenile fish have heralded other large year classes and their entry into the fishery (e.g. 1994 & 1998).

Table 14 Herring Catch at Age in Weight and Numbers*

Weight (mt) Harvested at age

	1	2	3	4	5	6	7	8	9	10	11 +	Total
1998	0	10,589	9,016	38,530	8,090	4,790	5,776	3,141	1,197	397	76	**81,601**
1999	20	6,065	25,751	9,651	29,594	12,698	6,203	3,832	886	103	0	**94,803**
2000	0	14,093	4,688	15,947	24,270	30,445	8,762	3,278	638	250	87	**102,459**
2001	5	4,544	38,144	6,775	15,035	21,531	25,152	5,604	1,081	131	24	**118,028**
2002	289	5,454	9,998	31,558	12,293	11,313	12,709	6,547	778	87	0	**91,026**
2003	23	15,936	14,533	9,048	30,249	11,269	11,664	6,289	1,449	207	0	**100,667**

Numbers (X 1000) Harvested at age

	1	2	3	4	5	6	7	8	9	10	11 +	Total
1998	0	240,609	109,839	321,663	56,069	29,267	31,640	16,064	5,764	1,618	281	**812,814**
1999	667	103,606	285,314	82,967	216,579	79,553	35,158	19,554	4,527	357	0	**828,282**
2000	0	195,108	41,892	121,107	155,341	175,833	44,078	15,388	2,832	1,037	319	**752,937**
2001	117	74,760	379,858	51,299	98,063	127,478	135,847	26,771	5,153	484	91	**899,921**
2002	11,888	93,418	100,940	247,386	80,615	67,731	70,482	32,992	3,628	416	47	**709,543**
2003	927	249,179	149,704	65,795	192,313	62,797	59,476	30,593	6,742	875	0	**818,401**

**2003 data are preliminary*

5.2.2.4 Canada – New Brunswick Weir Fishery

Catch of the Atlantic herring stock complex in Canadian waters consists primarily of fish caught in the New Brunswick weir fishery. Currently, the Herring FMP assumes that 20,000 mt of fish from the inshore component of the Atlantic herring resource will be taken annually in the NB weir fishery. This assumed catch is subtracted from the available yield from the inshore component of the resource before TACs are determined for management areas in the U.S. Exclusive Economic Zone (EEZ).

Table 15 summarizes landings from the New Brunswick (NB) weir fishery by month from 1978-2003 (2003 estimates are preliminary). The fishery is predominantly a late summer/fall fishery, with approximately 10% of the landings occurring during October, November, and December (based on 2000-2003 activity). Historical catches in the NB weir fishery were much higher and exceeded the current 20,000 mt assumption in most years prior to 1995. Preliminary catch estimates for 2003 suggest a significant decline in this fishery and are the lowest of the time series since 1984. Total landings in the NB weir fishery averaged 22,909 mt for the entire time series (1978-2003), 17,087 mt for the most recent ten-year time period (1994-2003), and 15,263 mt for the most recent five-year time period (1999-2003).

Table 15 Herring Landings from the New Brunswick Weir Fishery by Month, 1978-2003*

YEAR	NB WEIR LANDINGS BY MONTH (METRIC TONS)												GRAND TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
1978	3				512	802	5,499	10,275	10,877	4,972	528	132	**33,599**
1979	535	96			25	1,120	7,321	9,846	4,939	5,985	2,638	74	**32,579**
1980					36	119	1,755	5,572	2,352	1,016	216		**11,066**
1981					70	199	4,431	3,911	2,044	2,435	1,686	192	**14,968**
1982		17			132	30	2,871	7,311	7,681	3,204	849	87	**22,181**
1983					65	29	299	2,474	5,382	3,945	375		**12,568**
1984					6	3	230	2,344	2,581	3,045	145		**8,353**
1985					22	89	4,217	8,450	6,910	4,814	2,078	138	**26,718**
1986	43				17		2,480	10,114	5,997	6,233	2,564	67	**27,516**
1987	39	21	6	12	10	168	2,575	10,893	6,711	5,362	703	122	**26,621**
1988		12	1	90	657	287	5,993	11,975	8,375	8,457	2,343	43	**38,235**
1989		24		95	37	385	8,315	15,093	10,156	7,258	2,158		**43,520**
1990					93	20	4,915	14,664	12,207	7,741	168		**39,808**
1991					57	180	4,649	10,319	6,392	2,028	93		**23,717**
1992				15	50	774	5,477	10,989	9,597	4,395	684		**31,981**
1993					14	168	5,561	14,085	8,614	2,406	470	10	**31,328**
1994				18		55	4,529	10,592	3,805	1,589	30		**20,618**
1995					15	244	4,517	8,590	3,956	896	10		**18,228**
1996					19	676	4,819	7,767	1,917	518	65		**15,781**
1997				8	153	1,017	6,506	7,396	5,316				**20,396**
1998					560	713	3,832	8,295	5,604	525			**19,529**
1999					690	805	5,155	9,895	2,469	48			**19,063**
2000					10	7	2,105	7,533	4,940	1,713	69		**16,376**
2001					35	478	3,931	8,627	5,514	1,479			**20,064**
2002					84	20	1,099	6,446	2,878	1,260	20		**11,807**
2003					257	250	1,423	3,554	3,166	344	10		**9,003**

Source: Canadian Department of Fisheries and Oceans. 2003 estimates are preliminary.

Recent declines in catch in the NB weir fishery appear to be consistent with a reduced number of active weirs operating in the fishery (Table 16). The average number of active weirs in the NB weir fishery was 88 from 1999-2003, down from an average of 109 from 1994-1998. Canadian fishermen attribute declines in this fishery to several factors, including pollution, changes in fish behavior (fish not coming as close to shore), market conditions, conflicts with other resource user groups, expansion of the U.S. herring fishery, and expansion of the aquaculture industry and consequent loss of inshore fishing grounds for weirs to utilize. However, it should be noted that

the number of active weirs and subsequent landings from this fishery have been highly variable over the time series.

Table 16 Number of Active Weirs in New Brunswick Weir Fishery, 1978-2003*

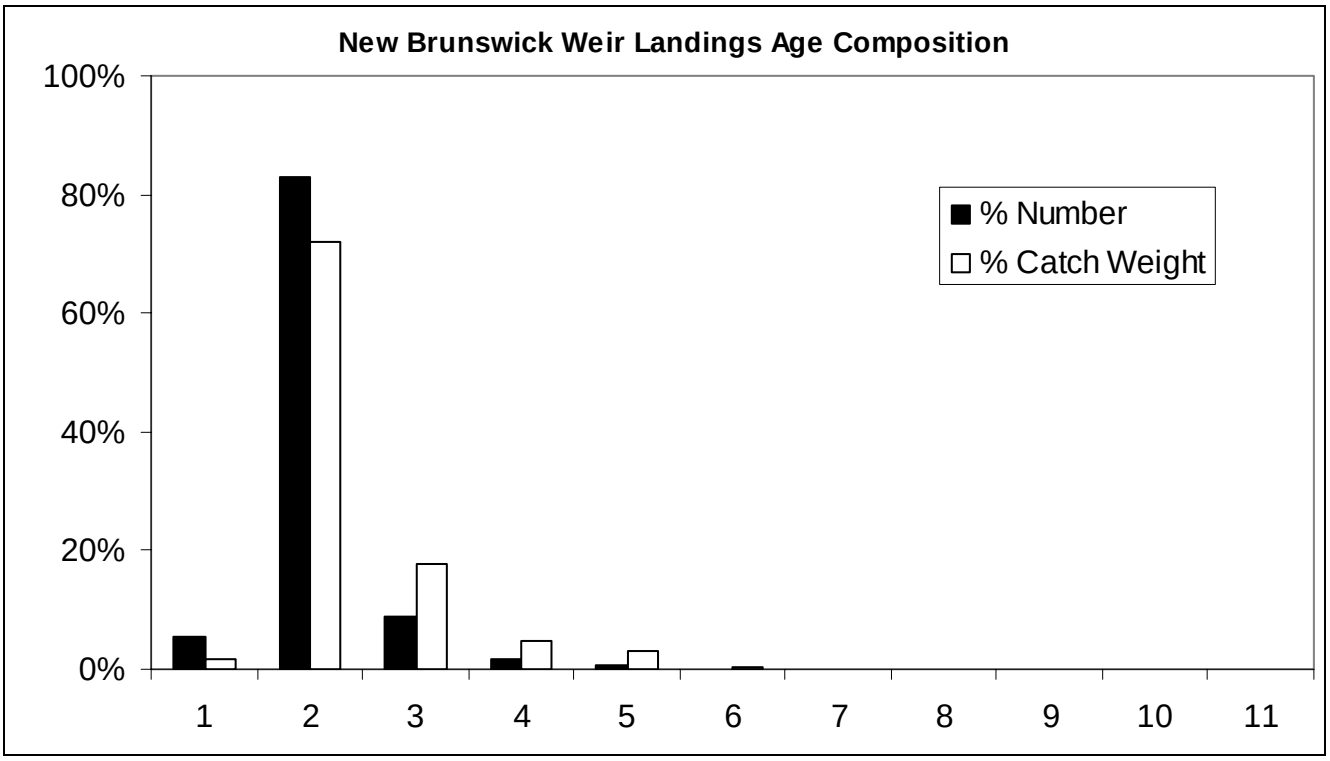
Year	No. Active Weirs in NB
1978	208
1979	210
1980	120
1981	147
1982	159
1983	143
1984	116
1985	156
1986	105
1987	123
1988	191
1989	171
1990	154
1991	143
1992	151
1993	145
1994	129
1995	106
1996	101
1997	102
1998	108
1999	100
2000	77
2001	101
2002	83
2003	78

Source: Canadian Department of Fisheries and Oceans.

**2003 estimates are preliminary.*

It is assumed that juvenile fish (age 1 and 2) caught in the NB weir fishery are from the inshore (GOM) component of the Atlantic herring stock complex, while adult fish (age 3+) caught in the NB weir fishery are from the SW Nova Scotia stock complex (4WX). Figure 19 illustrates the age composition of herring caught in the NB weir fishery during 2003. Based on numbers of fish (older fish are heavier, so characterizing catch composition by weight can be misleading), it appears that over 90% of the landings in the NB weir fishery in 2003 were juvenile fish, ages 1 and 2. Some age 3+ fish were caught in the NB weir fishery (almost 20% by weight, but about 5% by number), but very few adult and older fish were landed. The age composition of the 2003 catch in the NB weir fishery is consistent with that from previous years (1990 onward) and does not suggest that a shift towards younger/smaller fish has just recently occurred in this fishery.

Figure 19 Age Composition of Landings from the NB Weir Fishery, 2003



5.2.3 Economic Factors

In 2003, the gear type that brought the largest amount of herring to market was the midwater pair trawl at 65,901 mt. This is a 40% increase from 2002 levels. Seventeen vessels pair trawled in 2003, which is three more than 2002. Single vessel midwater trawls accounted for 15,841 metric tons of herring, which is 32% lower than 2002. Purse seine landings totaled 17,870 metric tons; a 9% decline from 2002. Bottom trawl gear accounted for 1,037 metric tons. Landings by U.S. weirs in 2003 amounted to one metric ton.

The total number of vessels landing herring in 2003 (Table 18) increased to 154, which is 14 more than in 2002. However, most of this is attributed to movement in and out of the bottom trawl and "other" (non-traditional herring gear) gear sectors. There was some movement among traditional herring gear sectors with the pair trawl fleet gaining three vessels and the single midwater trawl fleet losing nine vessels. The purse seine fleet remained at six vessels.

Most herring sold in 2003 was taken from Area 1A (59,451 mt) – just 905 mt more than 2002. Area 1B landings (4,919 mt) were 34% lower than they were in 2002. The Area 2 landings were 16,081 metric tons (up from 10,868 in 2002). Area 3 landings were 20,227 metric tons, up from 14,203 mt in 2002. Table 17 shows landings from the various gears used in 2003 and the activities of each in the herring management areas.

Table 18 differs from Table 17 in that instead of listing herring landings by gear used, each vessel was assigned a principal gear based on the gear it used that landed the most herring. Since some vessels used multiple gears to catch herring, this principal gear designation was necessary to describe herring fishery activity by vessel. For example, some vessels which primarily used midwater trawl gear landed herring with other gears; the actual gear used is shown in Table 17, while Table 18 lists all landings under the primary gear used by the vessel. For pair trawl gear, trips and days are counted for each participating vessel. For example, if two vessels make a two day pair trawl trip, the total number of trips would equal two and the total number of days at sea would equal four.

The Herring FMP distinguishes between vessels catching herring incidentally while pursuing other species and those targeting herring by defining vessels that average less than 2,000 pounds of herring caught per trip (in all areas) as incidental herring vessels. Table 19 provides the same information as Table 18 except it excludes the incidental herring vessels. In the 2003 fishing year, there were 38 vessels, defined as directed herring vessels, which sold 100,598 metric tons of herring.

Since Area 1A is the management area in which the TAC is most likely to be reached, it is important to summarize the activity of vessels targeting herring in Area 1A. Table 20 provides information for the 25 vessels that averaged more than 2,000 pounds per trip in Area 1A in 2003. Those vessels landed 59,400 mt of herring from Area 1A.

Prices for herring ranged from a low of $0.054 per pound in July to a high of $0.16 per pound in October. The average yearly price was $0.08 per pound in 2003, which is a 23% increase over the average 2002 price. Using the average monthly price of herring sold in 2003 the total value of all herring sold was $17,065,417.

Table 21 reports the average dependence on herring by state of landing and principal gear. Vessels principally using purse seine gear are the most dependent on herring in that 82% of the value of their catch is derived from herring. For pair and single mid-water trawl vessels, 59% and 32% of their revenue is from herring, respectively. The highest state level dependency rates of 82% for both pair trawl and purse seine gear occurs in Maine.

Table 22 shows the breakdown of quantity and value of landings by state landed and gear used. The state of Maine lands 46,795 mt of herring at a value of $7.4 million. Massachusetts follows next in the ranking with landings of 38,213 mt and a value of $6.5 million. Rhode Island and New Hampshire have significantly less landings of herring. Each of these states has landings in the range of 7,000 to 7,700 mt at a value of $1.3 to $1.65 million.

Table 23 and Table 24 provide information on the number of crew members employed in the herring fishery. Table 23 reports the average, minimum, and maximum number of crew members (including the captain) per trip as reported on logbooks. Table 24 defines fleet sectors by a vessel's principal gear and the state in which the vessel made the majority of its landings. Then, using the average crew size per vessel, the number of vessels and total number of crew they employ are reported by fleet sector.

Table 17 Metric Tons of Herring Sold by Gear and Management Area in 2003

	1A	1B	2	3	Total
Midwater Pair Trawl	33,765	3,784	10,967	17,385	65,901
Midwater Trawl	7,846	1,001	4,238	2,756	15,841
Purse Seine	17,738	132	0	0	17,870
Bottom Trawl	88	1	862	86	1037
Weir	0	0	1	0	1
Other	14	1	13	0	28
Total	59,452	4,920	16,081	20,227	100,680

Table 18 Number of Vessels, Herring Trips and Days, and Herring Sold (mt) by Management Area and Principal Herring Gear for 2003

		1A	1B	2	3	Total
Midwater Pair Trawl 16 vessels	**Number of trips**	396	37	105	131	669
	Days at Sea	907	98	343	561	1909
	Landings (mt)	32,804	3,784	11,286	17,576	65,450
Midwater Trawl 9 vessels	**Number of trips**	179	11	55	10	255
	Days at Sea	313	25	152	49	539
	Landings (mt)	7,352	980	3,001	2,565	13,898
Purse Seine 6 vessels	**Number of trips**	324	5	12	0	341
	Days at Sea	625	10	14	0	649
	Landings (mt)	19,193	153	810	0	20,156
Bottom Trawl 63 vessels	**Number of trips**	273	8	152	39	472
	Days at Sea	279	12	287	238	816
	Landings (mt)	88	1	970	86	1145
Weir	**Landings (mt)**	0	0	1	0	1
Other Gear 60 vessels	**Number of trips**	120	4	406	0	530
	Days at Sea	125	4	418	0	547
	Landings (mt)	14	1	12	0	27
Total 154 vessels	**Number of trips**	1292	65	730	180	2267
	Days at Sea	2249	149	1214	848	4460
	Landings (mt)	59,451	4,919	16,080	20,227	100,677

Table 19 Number of Vessels, Herring Trips and Days, and Herring Sold (mt) by Management Area and Principal Herring Gear for Vessels Averaging more than 2,000 pounds of Herring per Trip in All Areas During 2003

		1A	1B	2	3	Total
Midwater Pair Trawl 16 vessels	**Number of trips**	396	37	105	131	669
	Days at Sea	907	98	343	561	1909
	Landings (mt)	32,804	3,784	11,286	17,576	65,450
Midwater Trawl 7 vessels	**Number of trips**	156	11	55	10	232
	Days at Sea	290	25	152	49	516
	Landings (mt)	7,337	980	3,001	2,565	13,883
Purse Seine 5 vessels	**Number of trips**	323	5	12	0	340
	Days at Sea	623	10	14	0	647
	Landings (mt)	19,193	153	810	0	20,156
Bottom Trawl 10 vessels	**Number of trips**	17	0	43	36	96
	Days at Sea	17	0	147	215	379
	Landings (mt)	66	0	958	85	1109
Total 38 vessels	**Number of trips**	892	53	215	177	1337
	Days at Sea	1837	133	656	825	3451
	Landings (mt)	59,400	4,917	16,055	20,226	100,598

Table 20 Number of Vessels, Herring Trips and Days, and Herring Sold (mt) by Management Area and Principal Herring Gear for Vessels Averaging more than 2,000 Pounds of Herring per Trip in Area 1A During 2003

		1A	1B	2	3	Total
Midwater Pair Trawl 12 vessels	**Number of trips**	396	34	99	118	647
	Days at Sea	907	88	315	511	1,821
	Landings (mt)	32,804	3,484	10,785	15,559	62,632
Midwater Trawl 5 vessels	**Number of trips**	156	11	48	9	224
	Days at Sea	290	25	103	38	456
	Landings (mt)	7,337	980	2,520	2,447	13,284
Purse Seine 5 vessels	**Number of trips**	323	5	12	0	340
	Days at Sea	623	10	14	0	647
	Landings (mt)	19,193	153	810	0	20,156
Bottom Trawl 3 vessels	**Number of trips**	17	0	0	0	17
	Days at Sea	17	0	0	0	17
	Landings (mt)	66	0	0	0	66
Total 25 vessels	**Number of trips**	892	50	159	127	1228
	Days at Sea	1837	123	432	549	2941
	Landings (mt)	59,400	4,617	14,115	18,006	96,138

Table 21 Average Herring Value as a Percentage of Total Revenue by Principal Herring Gear and Principal State for 2003

	MA	ME	NH	RI	Average for all States
Midwater Pair Trawl	60%	82%	36%	5%	59%
Midwater Trawl		36%		4%	32%
Purse Seine		82%			82%
Bottom Trawl				3%	<1%

Table 22 Landings and Value by Gear Used and State

		MA	ME	NH	RI	Other Mid-Atlantic	Other New England	Total
Midwater Pair Trawl	**MT**	35,375	20,764	5,883	3,228	407	242	65,899
	Value	5,989,225	3,200,748	1,048,157	774,929	63,553	40,898	11,117,510
Midwater Trawl	**MT**	2,353	9,784	558	3,021	0	126	15,842
	Value	455,850	1,528,183	91,985	625,165	0	21,277	2,722,460
Purse Seine	**MT**	456	16,232	1,183	0	0	0	17,871
	Value	59,824	2,706,408	177,515	0	0	0	2,943,747
Bottom Trawl	**MT**	18	9	62	819	23	105	1036
	Value	3,576	1,759	8,162	239,264	3,606	20,148	276,515
Weir	**MT**	1	0	0	0	0	0	1
	Value	71	0	0	0	0	0	71
Other	**MT**	10	6	0	0	12	0	28
	Value	1,686	1,005	0	0	2,416	0	5,107
Total	**MT**	38,213	46,795	7,686	7,068	442	473	100,677
	Value	6,510,232	7,438,103	1,325,819	1,639,358	69,575	82,323	17,065,410

Table 23 Average Crew Size (including captain) by Gear Used

	Average	Minimum	Maximum
Midwater Pair Trawl	4.6	1	7
Midwater Trawl	3.7	1	12
Purse Seine	5.4	1	6
Bottom Trawl	3.3	1	13

Table 24 Total Number of Vessels and Crew (including captain) Employed per Fleet Sector

		MA	ME	NH	RI	Total
Midwater Pair Trawl	Number of Vessels	9	4	2	1	16
	Total # of Crew	44	18	8	3	73
Midwater Trawl	Number of Vessels		6		3	9
	Total # of Crew		15		20	35
Purse Seine	Number of Vessels		6			6
	Total # of Crew		31			31
Total	Number of Vessels	9	16	2	4	31
	Total # of Crew	44	64	8	23	139

5.2.4 Herring Processors

An updated, detailed description of herring processors is under development and will be included in the DSEIS for Amendment 1 to the Herring FMP. At this time, herring processors include:

- Two U.S. sardine canneries owned by Connors Bros. Ltd/Bumblebee Tuna, located in Bath ME and Prospect Harbor ME
- The Northern Pelagic Group (NORPEL), a freezer plant that opened in late 2002, located in New Bedford MA
- Cape Seafoods, Inc., a freezer plant that opened in 2001, located in Gloucester MA
- Lund's Fisheries, a freezer plant located in Cape May NJ
- Several representative bait processors, including Shafmaster Fishing Co./The Bait Lady (Newington NH), O'Hara's (Rockland ME), Purse Line Bait (Sebasco Estates ME), Channel Fish (Boston MA), Nancy's Shellfish (Portland ME), Beaver Enterprises (Rockland ME), Sunshine Seafoods (Stonington ME), and other lobster bait dealers
- Sea Freeze Ltd., an at-sea processing company located in North Kingston RI

5.2.4.1 Joint Venture Processing

Prior to the 1990s onboard canning and packing of herring into barrels was done by Soviet processor vessels through JVP/IWP agreements. After the fall of communism, these operations ceased in U.S. waters. Since that time, the focus has been on freezing whole herring at sea. Currently, there are International Fisheries Agreements, which is a prerequisite for establishing a JVP or IWP, with Russia, Estonia, Lithuania, Latvia, and Poland. There has been no JVP activity since 2002, and recent IWP operations have focused primarily on mackerel. There are also domestic shore-based and at-sea processors competing for the whole frozen market.

Table 25 summarizes catch/bycatch information reported by foreign processing vessels engaged in JV operations during 2001 and 2002. A total of 364 codends were reported to have been transferred during these JV operations in 2001 and 2002, and the data in Table 25 summarize

catch reports from all of these codend transfers. Total catch of herring and mackerel was reported to be 11,229.2 mt.

Table 25 Catch and Bycatch (mt) of All Species Reported from the Transfer of 364 Codends During JV Operations in 2001 and 2002

REPORTED TRANSFER OF 364 CODENDS			
SPECIES CAUGHT	**CATCH MT**	**BYCATCH MT**	**TOTAL MT**
HERRING, ATLANTIC	9,057.5	51.0	**9,108.5**
HERRING, ATLANTIC (MEAL)	385.0		**385.0**
MACKEREL, ATLANTIC	1,677.2	36.7	**1,713.9**
MACKEREL, ATLANTIC (HEADED)	79.5		**79.5**
MACKEREL, ATLANTIC (MEAL)	30.0		**30.0**
REDFISH		0.3	**0.3**
SILVER HAKE (WHITING)		90.8	**90.8**
RED HAKE		6.6	**6.6**
FINFISH UNCL.		7.4	**7.4**
SHARKS		8.3	**8.3**
GRAND TOTAL	**11,229.2**	**201.1**	**11,430.3**

5.2.4.2 USAP

USAP is authorized in the Herring FMP for U.S. processing vessels that exceed current vessel size limits and that process herring in the EEZ. There have been no USAP operations in the herring fishery since the 20,000 mt allocation was specified in 2000.

5.2.4.3 Other Processing

Natural pearl essence, extracted from the scales of Atlantic herring, is used to add a pearl effect (a satiny luster that creates a soft, cloud-like luster) to shampoo, fingernail polish and other personal care products and cosmetics. Engelhard Corporation owns and operates the last commercial natural pearl essence plant in the world. Located in Eastport, Maine, the facility employs 10 people (nine year-round and one part-time). Additional information about Engelhard Corporation will be provided in the DSEIS for Amendment 1 to the Herring FMP.

5.3 NON-TARGET SPECIES AND BYCATCH

5.3.1 Non-Target Species and Incidental Catch

During the development of the limited access alternatives in Amendment 1, the Herring PDT examined vessel logbook data from 2000 to 2002 to show how many trips may be affected by the proposed trip limits of 15 and 25 metric tons associated with the incidental catch permit options. The following information is useful to illustrate the current overlap between the herring fishery and other small mesh (whiting) and pelagic fisheries (squid, mackerel) occurring throughout the region. This information is intended to provide some perspective about whether the Atlantic

mackerel fishery would be impacted by a reduction in the Area 2 TAC during the 2005 fishing year if such a reduction is proposed.

In Table 26 – Table 28, incidental herring landings are summarized for directed mackerel, squid (*loligo* and *illex* combined), and whiting trips. A directed trip is defined as one in which 50% or more of the landings consisted of the species being analyzed. For the mackerel trips, only trips with more than 1 metric ton were examined.

Table 26 shows that in 2002, nine (9) of the 254 directed mackerel trips greater than 1 mt had greater than 25 mt of herring landed on the same trip. No directed mackerel trips landed between 15 and 25 metric tons of herring, and six (6) trips landed between 0 and 15 mt of incidental herring landings during 2002. In 2001, nearly all directed mackerel trips landed no herring with the exception of three (3) trips that landed between 0 and 1 mt of herring. In 2000, three (3) of the 95 directed mackerel trips greater than 1 mt landed greater than 25 mt of herring on the same trip. No directed mackerel trips landed between 15 and 25 mt of herring, and two (2) trips had between 0 and 15 mt of incidental herring landings during 2000. Therefore, based on data from recent years, the incidental catch of herring on directed mackerel trips appears to be low. This issue may become more of a concern if/when the Atlantic mackerel fishery expands beyond recent levels. Information presented in the Mid-Atlantic Council's 2005 specification package for the Atlantic mackerel fishery suggests that expansion of the mackerel fishery is already occurring and will likely continue through the 2005 fishing year.

Table 27 shows that for the directed squid trips, there were only three (3) trips in 2000 in which more than 25 mt of herring was landed. The rest of the directed squid trips during that year as well as all directed squid trips in 2001 and 2002 landed less than 15 mt of herring. Most directed squid trips landed no amount of herring. The trips that did land herring landed less than 600 pounds of herring.

Table 28 shows that all for all the directed whiting trips in 2000 to 2002, none had greater than 15 metric tons of incidental herring landings. Most directed whiting trips had no herring landings. The trips that did land herring landed less than 1.4 mt of herring.

Table 26 Incidental Catch of Herring on Directed Mackerel Trips

	2000	**2001**	**2002**
Number of directed trips with greater than 1 mt of mackerel	95	122	254
Number of trips with herring catch > 0 and < 15 mt	2	3 (maximum of 1 mt of herring)	6
Number of trips with herring catch between 15 and 25 mt	0	0	0
Number of trips with herring catch > 25	3 (maximum of 120 mt of herring)	0	9 (maximum of 109 mt of herring)

Table 27 Incidental Catch of Herring on Directed Squid (*Loligo* and *Illex* Combined) Trips

	2000	2001	2002
Number of directed trips	5,624	3,394	3,377
Number of trips with herring catch > 0 and < 15 mt	32 (maximum of 400 lbs)	26 (maximum of 500 lbs)	8 (maximum of 600 lbs)
Number of trips with herring catch between 15 and 25 mt	0	0	0
Number of trips with herring catch > = 25	3 (maximum of 36 mt)	0	0

Table 28 Incidental Catch of Herring on Directed Whiting Trips

	2000	2001	2002
Number of directed trips	1,777	1,933	1,131
Number of trips with herring catch > 0 and < 15 mt	52 (maximum of 1 mt)	76 (maximum of 625 lbs)	68 (maximum of 1.4 mt)
Number of trips with herring catch between 15 and 25 mt	0	0	0
Number of trips with herring catch > = 25	0	0	0

5.3.2 Bycatch

Table 29 summarizes catch and discards on 18 observed midwater trawl trips (single) from 1994-2002 and provides some perspective on other species that may be caught incidentally in the directed midwater trawl fishery for Atlantic herring. For these 18 observed trips, discards amounted to 5.5% of the total catch, and the vast majority of discards were Atlantic herring. Discards of all species other than Atlantic herring amounted to 0.27% of the total catch. Aside from Atlantic herring, spiny dogfish accounted for the most discards on these trips. Catch of regulated groundfish species on these 18 midwater trawl trips was minimal, totaling less than 50 pounds.

Table 29 Catch and Discards (Lbs.) of All Species on 18 Observed Midwater Trawl Trips from 1994-2002

SPECIES CAUGHT	DISCARD LBS.	KEPT LBS.	TOTAL LBS.
ALEWIFE	1	66,138	66,139
BLUEFISH	1	73	74
COD, ATLANTIC	7	11	18
DOGFISH, SMOOTH	40		40
DOGFISH, SPINY	8,777		8,777
FLOUNDER, SAND DAB (WINDOWPANE)	2		2
FLOUNDER, WINTER (BLACKBACK)	8	2	10
FLOUNDER, YELLOWTAIL	4	1	5
HADDOCK	1		1
HAKE, SILVER (WHITING)	459		459
HERRING, ATLANTIC	202,650	3,450,788	3,653,438
HERRING, BLUEBACK		3,600	3,600
HERRING, NK (SHAD)	700	10,700	11,400
LUMPFISH	5		5
MACKEREL, ATLANTIC	201	111,847	112,048
MONKFISH (ANGLER, GOOSEFISH)		9	9
OCEAN POUT	13		13
POLLOCK		4	4
SCULPIN, LONGHORN	3		3
SCULPIN, NK	1		1
SHAD, AMERICAN	2		2
SQUID, ATL LONG-FIN	5		5
SQUID, NK	1		1
SQUID, SHORT-FIN	17		17
GRAND TOTAL	**212,897**	**3,643,173**	**3,856,069**

Source: NMFS Observer Database.

Table 30 summarizes catch and discards on three observed purse seine trips in 2000 and provides some perspective on other species that may be caught incidentally in the directed purse seine fishery for Atlantic herring. For these three observed trips, catch was limited to Atlantic herring and spiny dogfish. Spiny dogfish discards amounted to 0.13% of the total catch. Total discards, including Atlantic herring, amounted to about 1% of the total catch. No regulated groundfish catch was observed on these three trips.

Table 30 Catch and Discards (Lbs.) of All Species on Three Observed Purse Seine Trips in 2000

SPECIES CAUGHT	DISCARD LBS.	KEPT LBS.	TOTAL LBS.
DOGFISH, SPINY	700		700
HERRING, ATLANTIC	5,000	545,000	550,000
GRAND TOTAL	**5,700**	**545,000**	**550,700**

Source: NMFS Observer Database.

Based on the above information, Atlantic mackerel and spiny dogfish appear to be the non-target species of which more than negligible amounts are caught in the herring fishery. However, mackerel caught in the herring fishery is an insignificant percentage of total mackerel catch and landings (mackerel landings were about 47 million pounds in 2002). In addition, the Atlantic mackerel resource is near historical high levels, and overfishing of mackerel is not occurring. The status of the spiny dogfish fishery is currently under review by the Spiny Dogfish Monitoring Committee and will be further addressed in the DSEIS for Amendment 1 to the Herring FMP.

Moreover, NMFS has received additional funding to significantly increase observer coverage in the Atlantic herring fishery during the 2004 fishing year. An additional 200 observer days have been allocated for the herring fishery in 2004, which should increase coverage above 10% for this fishery. The information collected through 2004 will be more comprehensive and should be useful for developing a strategy and sampling design to ensure that coverage in future years is adequate to obtain an accurate estimate of catch and bycatch in this fishery. Updated information from the 2004 observer coverage will be included in the DSEIS for Amendment 1 to the Herring FMP.

5.4 HABITAT AND EFH

5.4.1 Atlantic Herring

Essential Fish Habitat (EFH) for Atlantic herring is described in NEFMC (1998a) as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that meet the following conditions:

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

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

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

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

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

All of the above EFH descriptions include those bays and estuaries listed in Table 31, according to life history stage. The Council acknowledges potential seasonal and spatial variability of the conditions generally associated with this species.

5.4.2 Other Northeast Region Species

The area where the Atlantic herring fishery takes place has been identified as EFH for species managed under the following federal fishery management plans: Northeast Multispecies; Atlantic Sea Scallop; Atlantic Monkfish; Summer Flounder, Scup and Black Sea Bass; Squid, Atlantic Mackerel and Butterfish; Atlantic Surf Clam and Ocean Quahog; Atlantic Bluefish; Atlantic Billfish; and Atlantic Tuna, Swordfish and Shark. Text descriptions for all benthic (demersal) life stages for federally-managed species in the Northeast region are shown in Table 4.11 of the NMFS Draft EFH EIS for Atlantic Herring. Maps showing EFH by species and life stage are included in the 1998 Omnibus EFH Amendment (NEFMC 1998) and in various fishery management plans developed by the Mid-Atlantic and South Atlantic Fishery Management Councils during the last five years. All the EFH descriptions and maps can be viewed on the NMFS Northeast Regional Office web site.

Table 31 Essential Fish Habitat Designation of Estuaries and Embayments for Atlantic Herring

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

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

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

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

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

5.5 PROTECTED RESOURCES

A number of endangered and other protected species inhabit the management unit addressed in Atlantic Herring Fishery Management Plan. Eleven are classified as endangered or threatened under the Endangered Species Act (ESA) of 1973; the remainder are protected by the provisions of the Marine Mammal Protection Act (MMPA) of 1972. In the Northeast, protected species utilize marine habitats for purposes of feeding, reproduction, as nursery areas and as migratory corridors. Some species occupy the area year round while others use the region only seasonally or move intermittently inshore and offshore.

Entanglements of several species of marine mammals have been documented in fishing gear employed in the Atlantic herring fishery. They include the northern right whale, humpback whale, minke whale, pilot whale, white-sided and common dolphin, harbor porpoise, harbor seal and gray seal. The status of these and other marine mammal populations, inhabiting the Northwest Atlantic including those that are threatened and endangered, has been discussed in great detail in the U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments (2003). The species found in New England and Mid-Atlantic waters are listed below.

Endangered

Right whale (*Eubalaena glacialis*)
Humpback whale (*Megaptera novaeangliae*)
Fin whale (*Balaenoptera physalus*)
Sperm whale (*Physeter macrocephalus*)
Blue whale (*Balaenoptera musculus*)
Sei whale (*Balaenoptera borealis*)
Kemp's ridley (*Lepidochelys kempi*)
Leatherback turtle (*Dermochelys coriacea*)
Green sea turtle (*Chelonia mydas*)
Shortnose sturgeon (*Acipenser brevirostrum*)

Threatened

Loggerhead turtle (*Caretta caretta*)

Other Protected Species/Marine Mammals

Other species of marine mammals likely to occur in the management unit include the minke whale (*Balaenoptera acutorostrata*), white-sided dolphin (*Lagenorhynchus acutus*), white-beaked dolphin (*Lagenorhynchus albirostris*), bottlenose dolphin (*Tursiops truncatus*), pilot whale (*Globicephala melaena*), Risso's dolphin (*Grampus griseus*), common dolphin (*Dephinis delphis*), spotted dolphin (*Stenella* spp.), striped dolphin (*Stenella coeruleoalba*). Pinnipeds species include harbor (*Phoca vitulina*) and gray seals (*Halichoerus grypus*) and less commonly, hooded (*Cystophora cristata*) harp (*Pagophilus groenlandicus*) and ringed seals (*Phoca hispida*).

Additional information about these protected species is incorporated by reference to the Atlantic Herring FMP and subsequent SAFE Reports.

6.0 ENVIRONMENTAL IMPACTS OF COUNCIL-PREFERRED AND NMFS-PREFERRED ALTERNATIVES AND OTHER ALTERNATIVES

The impacts of the Council-preferred and NMFS-preferred alternatives and other alternatives that the Council considered are discussed in the following subsections. Because this document supports fishery specifications for 2005 and possibly 2006, only short-term impacts (1-2 years) are discussed and are evaluated relative to the status quo or no action alternative. Long-term impacts of measures related to or affecting the herring fishery specifications will be discussed in the DSEIS for Amendment 1 to the Herring FMP.

6.1 IMPACTS ON THE HERRING RESOURCE

6.1.1 Impacts of the Council-Preferred Action

6.1.1.1 Impacts of ABC

The proposed specification of ABC at 220,000 mt is consistent with the Herring PDT/TC recommendations provided in the May 5, 2004 Herring PDT/TC Report. The PDT/TC recommends establishing ABC for 2005 at 220,000 mt to be consistent with the MSY proxy proposed in Amendment 1. The 220,000 mt proxy proposed in Amendment 1 is intended to be a temporary and precautionary placeholder for MSY until the next stock assessment for the Atlantic herring stock complex is completed. Similarly, the specification of ABC at this level is intended to be a placeholder for ABC and may be re-visited through the specification process in future years as problems with the stock assessment are resolved.

This recommendation also would apply if the 2005 specifications are maintained through the 2006 fishing year, as Amendment 1 is scheduled to be implemented during 2006. Once Amendment 1 is implemented, the specification of ABC can be reconsidered for the 2007 fishing year and beyond. By this time, additional stock assessment information may be available.

A discussion of the methodology utilized to develop the 220,000 mt proxy for MSY and the proposed specification for ABC is provided in Section 4.6.1 of this document (p. 13). The estimate of MSY (and the proposed value for ABC) can serve as a proxy until the next stock assessment for the Atlantic herring resource occurs, which may be during 2006. The Herring PDT believes that removals of this magnitude in the short-term would not jeopardize the health of the Gulf of Maine-Georges Bank herring complex. Several additional lines of supporting evidence suggest that this would be the case (see discussion below as well as information presented in the May 5, 2004 Herring PDT/TC Report).

NEFSC Spring and autumn bottom trawl indices of abundance suggest that herring biomass from this stock complex increased dramatically during the 1990s (Figure 20 and Figure 21). The autumn time series suggests that herring are as abundant or more abundant than during the 1960s and early 1970s (Figure 21). The spring index shows that trends in both series are consistent, suggesting a major recovery in the 1990s.

Figure 20 NEFSC Spring Survey kg/tow for the Gulf of Maine-Georges Bank Herring Complex, 1963-2004

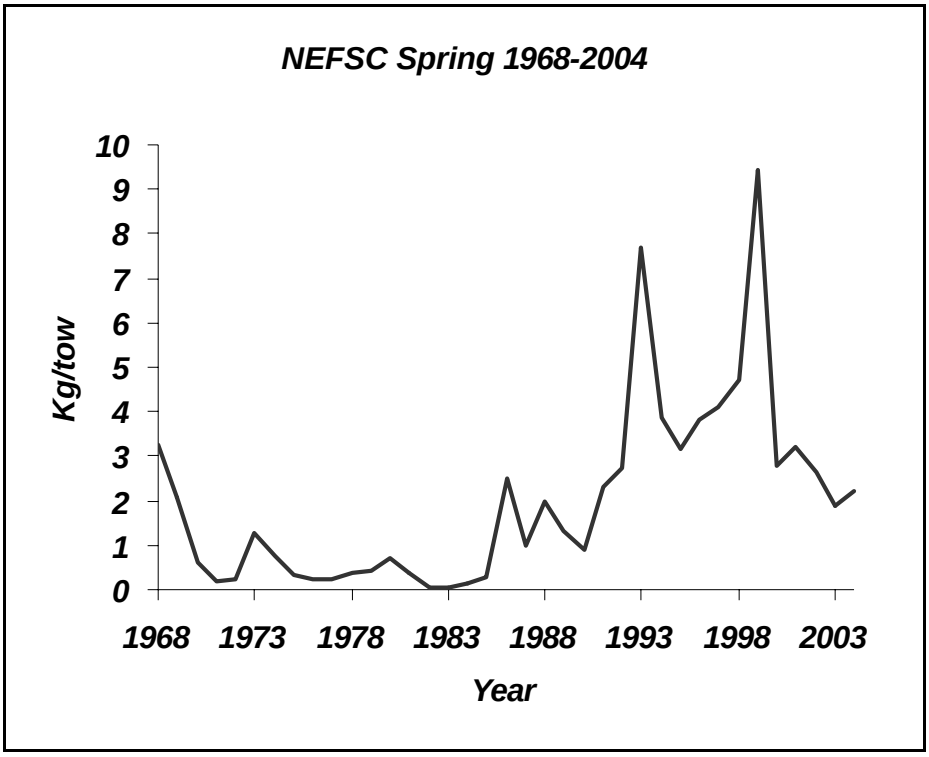
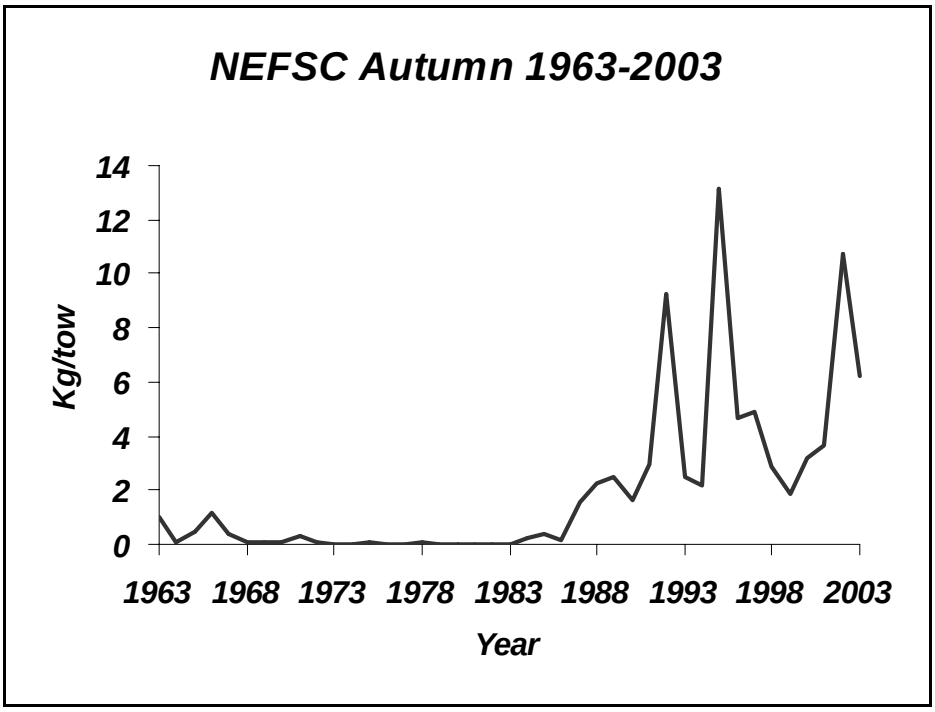


Figure 21 NEFSC Autumn Survey kg/tow for the Gulf of Maine-Georges Bank Herring Complex, 1963-2004



Hydroacoustic surveys of pre-spawning herring on Georges Bank began in 1998 and have covered the full extent of the spawning distribution since 1999 (Overholtz et al. 2004). Design and model (geostatistical) based estimates from these surveys are in agreement that herring biomass currently is at least 1.0 million mt or greater, for the offshore component. Nine of the ten design based estimates suggest that biomass exceeded 1.0 million mt (range 1.2-2.4 million mt) (Table 32) and (Overholtz et al. 2004) during 1999-2002. Biomass in 2002 was estimated to be 0.844 million mt, however herring spawned early that year and it was felt that significant numbers were missed by the survey (Overholtz et al. 2004). Bootstrap estimates of biomass (median) for the nine surveys in 1999-2001 ranged from 1.1-2.3 million mt with 80% CI's between 0.9-2.6 million mt (Overholtz et al. 2004). The median bootstrap estimate for 2002 was 0.838 million mt with an 80% CI of 0.752-0.916 million mt.

Table 32 Estimates of Herring Mean Sa (Hydroacoustic Signal Intensity) and Biomass for the Gulf of Maine-Georges Bank Herring Complex, 1999-2002

Year	Survey	Mean Sa	Biomass (million mt)
1999	Zigzag 1	3444.588	1.4422
	Zigzag 2	3059.560	1.1661
	Parallel	1164.686	1.2889
2000	Zigzag	1053.267	1.2540
	Parallel	2132.484	1.7562
	Stratified Random	1291.377	1.7171
2001	Zigzag	1447.870	1.6109
	Parallel	1997.915	2.3549
	Stratified Random	1168.296	1.4845
2002	Parallel	627.614	0.8443

All of these sources of supporting evidence suggest that the current herring biomass is large, at least in the 1 million mt range, and can support removals of 220,000 mt in the short-term. Additional surveys, analyses and stock assessment work will be necessary to confirm these estimates in future.

6.1.1.2 Impacts of TACs and OY

The impacts associated with the Council-preferred and NMFS-preferred area-specific TACs and OY for the herring fishery are discussed in Section 6.1.3 of this document.

6.1.1.3 Impacts of Other Specifications Proposed by the Council

The Council-preferred specifications for DAH, DAP, TALFF, JVPt, and USAP are allocations of the available yield from the resource, which are based on previously-determined biological specifications (ABC and OY). ABC is defined first before other fishery specifications are determined and is based on MSY. Information presented in previous sections of this document indicates that the proposed values for ABC and OY are consistent with available biological information and are considered to be precautionary in the face of scientific uncertainty. Therefore, the allocation of available yield to DAH, DAP, TALFF, JVPt, and USAP, as proposed by the Council, is not expected to result in any additional biological impacts.

6.1.1.4 Impacts of Other Specifications Proposed by NMFS

The NMFS-preferred specifications for DAH, DAP, TALFF, JVPt, and USAP are all either below or the same at the Council-preferred specifications for the same measures. Thus, the allocation of available yield to DAH, DAP, TALFF, JVPt, and USAP, as proposed by NMFS, is not expected to result in any additional biological impacts.

6.1.2 Impacts of No Action

Taking no action means that ABC for the Atlantic herring fishery would remain at 300,000 mt, based on an MSY value of 317,000 mt. While the short-term impacts of taking no action to modify ABC for Atlantic herring are uncertain, it is clear that maintaining ABC at 300,000 mt is not consistent with recent advice provided by the Council's Scientific and Statistical Committee (SSC), nor is it consistent with available biological information, despite ongoing differences of opinion regarding the last herring stock assessment (TRAC, 2003).

Both an ADAPT VPA and KLAMZ FPA assessment of the herring resource were presented and reviewed at the Transboundary Resource Assessment Committee (TRAC) Assessment Meeting in St. Andrew's, New Brunswick from February 10-14, 2003. However, the two assessments produced different results, and no consensus was reached regarding which assessment is most accurate and/or which assessment should be utilized for management purposes. The KLAMZ FPA (U.S.) assessment projections produced reference points that equate to an MSY value of about 222,000 mt. The ADAPT VPA (Canadian) assessment did not provide biological reference points and/or other information that is useful from a management perspective. However, based on the ADAPT VPA projections, the resulting estimate for MSY would be lower than 222,000 mt. Consequently, despite the differences in the assessment models and the lack of consensus as to which model is most appropriate to utilize, there is general scientific agreement that the long-term value for MSY for the Atlantic herring complex is less than the current value of 317,000 mt as well as the current value of ABC (300,000 mt). Projections from both models suggest that there may be negative long-term impacts to the herring resource of maintaining ABC and MSY at their current levels.

At its June 19, 2003 meeting, the Council's SSC was tasked to review the stock assessment information presented at the TRAC Meeting and provide recommendations regarding appropriate reference points to utilize for management purposes in Amendment 1. Although no consensus was reached by the SSC about how to address the discrepancies in the stock assessments or what the most appropriate reference points may be at this time, the SSC did conclude that "the current estimate of MSY in the Herring FMP (317,000 mt) is too high and does not seem sustainable based on historical landings and stock status data. This reference point is not precautionary."

6.1.3 Impacts of TAC/OY Options Considered by the Council and the Council-Preferred TACs/OY

At its June 15, 2004 meeting, the Herring Committee and ASMFC Herring Section identified four TAC options from the May 5, 2004 Herring PDT/TC Report to consider during the specification process: TAC Option 1, TAC Option 2 (Council-Preferred Action), TAC Option 4, and TAC Option 7. The following analyses are presented for all four TAC options that were considered for the 2005 specifications and also applies if the specifications are maintained through the 2006 fishing year, unless stock and fishery conditions change considerably during 2005.

6.1.3.1 Relative Risk Assessment of Council-Considered TAC Options

6.1.3.1.1 Background and Methodology

While the Atlantic herring stock is assessed as one meta-complex, most scientists recognize two sub-components; the inshore Gulf of Maine (GOM) and offshore Georges Bank/Nantucket Shoals component. Both of these components are separated during spawning; however, both mix while on feeding (Area 1A and 1B) and over-wintering grounds (Area 2). There is no evidence of mixing either in Area 3 or during spawning season in any location other than 1B (August- November).

At its June 19, 2003 meeting, the SSC expressed concern that the recent distribution of landings, while not jeopardizing the overall stock complex, could overexploit a stock component, particularly the inshore (Gulf of Maine) component. Therefore, the SSC recommended that the Herring PDT conduct a risk analysis of current, historic, and projected landing distributions, given a range of possible mixing regimes.

Factors that the Herring PDT considered when developing a relative risk assessment approach to determining specifications and options for area-specific TACs/OY include:

- the current seasonal mixing formula in the Herring FMP;
- other possible mixing formulas;
- the recent 10-year and 5-year average landings for the stock complex (1994-2003 and 1999-2003);
- landings from the New Brunswick (NB) weir fishery;
- all other relevant biological and fishery information; and

- the June 19, 2003 SSC recommendation to evaluate the risk of overfishing individual stock components under different TAC options so that areas can be identified where expansion of the fishery is appropriate.

This analysis was conducted by averaging weekly landings by management area over a five-year (1999-2003) and ten-year period (1994-2003) as a basis for comparison of TAC distributions. This time frame was chosen instead of a 15-year average (as suggested by the SSC) because 15 years encompassed some years when the Georges Bank/Nantucket Shoals component of the stock was still recovering from overfishing.

Uncertainty associated with the mixing of herring stock components is a critical scientific issue that is addressed in the relative risk assessment by considering a range of possible mixing scenarios instead of relying on one specific mixing formula. The Herring PDT identified three primary uncertainties associated with mixing ratios:

1. the mix of catch in the New Brunswick weir fishery (assumed to be from the inshore component);
2. the mix of catch from Area 1A in the summer; and
3. the seasonal mix of catch from Area 2, particularly in the winter fishery.

Because of the uncertainties associated with the mixing formulas, five different mixing regimes were applied to the landings data by quarter for the relative risk assessment. The Herring PDT agreed that winter and summer mixing ratios (instead of all quarters) would be adequate to illustrate the range of relative risk under different catch and mixing scenarios. Mixing scenarios are based on the quarter approach as outlined in the original FMP (Winter: December-March, Summer: April through July). The mixing scenarios considered in this risk assessment are:

1. **0.5 Summer/0.2 Winter –** In the summer, 50% of the catch from Areas 1A and 2 comes from the inshore component. In the winter, 80% of the catch in Area 1A and 20% of the catch in Area 2 comes from the inshore component (this is the mixing ratio provided in the Herring FMP based on historical tagging studies).
2. **0.6 Summer/0.2 Winter –** In the summer, 60% of the catch in Area 1A is from the inshore component and 40% from the offshore component. In the winter Area 2 fishery, 20% of the catch comes from the inshore component and 80% from the offshore component.

   The winter mixing ratio of 0.2 is from the original Herring FMP (see above). There is no specific literature reference for the summer ratio of 0.6; this ratio was included by the Herring PDT to provide for a more complete range of scenarios to be considered in the relative risk assessment.
3. **0.5 Summer/0.5 Winter –** In the summer, 50% of the catch from Areas 1A and 2 comes from the inshore component. In the winter, 50% of the catch from Areas 1A and 2 comes from the inshore component.

   The summer ratio is as described above from the original Herring FMP.

   The winter mixing ratio is based on the findings of Overholtz (2002). He observed that the NMFS spring bottom trawl survey encountered few herring south of 40.5^{o} (Figure 6, Overholtz 2002). During this time, the Georges Bank component was extirpated, and all catch is assumed to come only from the Gulf of Maine (inshore) stock component. However,

as the Georges Bank component recovered from heavy foreign fishing, the NMFS survey encountered herring farther south of 40.5°.

A mixing ratio of 0.50 is consistent with the suggestion by the SSC that the different components of the stock may stratify during the winter fishery in Area 2. The SSC suggested that the Gulf of Maine component might overwinter farther north than the Georges Bank component, which is also implied by the findings of Overholtz (2002). Since 1997, the first year for which exact fishing location (by lat/lon) is available by VTR, approximately 50% (53.5%) of winter catch of herring has occurred north of 40.5°.

The Abstract from the Overholtz (2002) paper is provided below for additional information:

Spatial patterns of the Gulf of Maine-Georges Bank Atlantic herring (*Clupea harengus*) complex were evident at three levels of resolution from analyses using bottom trawl survey data from spring 1968 to 1998 and autumn 1963 to 1998. The geographic range of the complex contracted significantly during 1973-1985 in both spring and autumn, coincident with major declines in abundance following the distant water fleet fishery during 1961-1976. Following recovery in abundance, distribution patterns that were previously observed were re-established. Medium scale patterns (e.g., 50-200 km) in the data suggest that herring were not uniformly distributed over the continental shelf during the spring and autumn, but rather aggregated in sub-groups within the range of the entire complex. Fine scale patterns in the survey data (5-50 km) suggest that herring maintained pre-collapse behavioral relationships even though the stock complex had declined by ~85%. Among-site distances between the herring schools, presumably from the Gulf of Maine spawning component, remained remarkably constant as the Georges Bank and Nantucket Shoals spawning components were extirpated. As the complex recovered, it appeared that more and perhaps larger schools of herring were present. These analyses suggest that a fully-recovered stock complex has distributional characteristics and patterns that can be monitored and quantified. Quantification of spatial patterns may have important consequences for assessment, stock identification, and fishery management.

4. **<u>0.3 Summer/0.3 Winter</u> –** In the summer, 30% of the catch from Areas 1A and 2 comes from the inshore component. In the winter, 30% of the catch from Areas 1A and 2 comes from the inshore component (Armstrong & Cadrin, 2001).

The Abstract from the Armstrong & Cadrin (2001) paper is provided below for additional information:

The purpose of this study was to characterize morphometric variation between the two major spawning components of Atlantic herring, *Clupea harengus*, in the Gulf of Maine-Georges Bank stock complex and to evaluate the use of morphometric differences for stock discrimination. Morphometric characters, including both traditional and truss network distances, were measures on herring from pre- and post-spawning aggregations on Jeffreys Ledge (inshore Gulf of Maine) and Georges Bank. Prespawning herring were morphometrically distinct from postspawning herring on the same spawning ground, principally due to differences in abdominal size. Many truss measurements were affected by spawning condition while most of the traditional measurements were not. The Jeffreys Ledge and Georges Bank stocks could not be effectively discriminated using morphometrics

based on prespawning samples due to the confounding effects of spawning condition on morphometry. Extrinsic samples of postspawning herring were classified into their respective spawning groups using discriminant analysis of morphometric characters with 88% accuracy. This study indicates that morphometric characters can be used to distinguish spawning stocks of Atlantic herring in the northwest Atlantic with moderate accuracy. However, due to the confounding effects of spawning condition, these analyses can only be accomplished on postspawning fish.

5. **0.3 Summer/0.15 Winter –** In the summer, 30% of the catch in Area 1A is from the inshore component and 70% from the offshore component. In the winter Area 2 fishery, 15% of the catch comes from the inshore component and 85% from the offshore component.

   This ratio is based on information from the TRAC Assessment and assumes that the entire complex is located in Area 2 and mixes randomly among subcomponents.

The actual stock component mixing ratios most likely vary among years due to environmental variables, changes in the relative stock sizes of the different components, and patterns in fishery exploitation. As such, they are currently the subjects of investigation by tagging and morphometric studies. While the exact mixing ratios for 2005 and 2006 are uncertain, the ratios applied in this assessment represent a reasonable range of possibilities based on available scientific literature, the June 19, 2003 SSC recommendations, and Herring PDT examination.

Using the range of mixing scenarios described above, removals from the inshore component were estimated for the historical (ten-year and five-year) time series and a range of options considered for area-specific TACs.

In all scenarios considered in the relative risk assessment, the following applies:

- Area 1B mixing rates are assumed to be 0.3 (30% GOM and 70% GB/NS) throughout the year;
- For the fall fishery (August – November), 100% of the catch from Area 1A is assumed to come from the inshore component of the stock;
- All catch from Area 3 is assumed to come from the offshore component of the stock;
- Catch from the New Brunswick weir fishery is assumed to be 20,000 mt and come from the inshore stock component.
- Each projection option accounts for seasonal and yearly TACs for each management area as currently implemented and assumes that the TACs are fully utilized in all management areas.

6.1.3.1.2 TAC Options and Relative Risk Assessment Results

The risk assessment evaluates relative risk associated with the TAC options by producing estimates of removals from the inshore component under a range of mixing scenarios, which should be compared to five-year and ten-year historical removals under the same range of mixing scenarios. More risk is associated with TAC options that project removals of the inshore component that are higher than historical removals. The Council selected the proposed TACs for Areas 1A, 1B, 2, and 3 based on updated stock information provided by the Herring PDT/TC, choices regarding both the risk of overfishing the inshore component (relative to five-year and ten-year historical removals), and issues/tradeoffs associated with allocating the catch of the inshore component of the resource between Areas 1 (primarily 1A) and 2.

Comparing removals of the inshore component over the most recent five-year and ten-year time period illustrate the impacts of the Atlantic herring management program and the area-specific TACs that were implemented in the Herring FMP. The Herring FMP became effective for the 2000 fishing year and implemented quotas by management area in a previously un-regulated fishery. Five-year historical removals are consequently lower than ten-year historical removals because the five-year average includes three years of management under area-specific TACs, which appear to have reduced the harvest of the inshore component of the resource when compared to the historical ten-year average.

Table 33 presents the results of the relative risk assessment based on the TAC options that were identified by the Committee/Section at the June 15, 2004 meeting and based on the five mixing scenarios described in the previous discussion. More risk is associated with TAC options that project removals of the inshore component that are higher than five-year and ten-year historical removals. Again, it is important to note that the risk assessment assumes that 20,000 mt of the inshore stock component is removed by the NB weir fishery and that all of the area-specific TACs are fully utilized. Figure 22 also illustrates the results of the risk assessment relative to five-year and ten-year historical removals of the inshore component.

- TAC Option 2 represents the proposed action. The projected removals of the inshore component under the proposed action illustrate the potential impacts of the current TACs, should all of the TACs be fully utilized in all management areas where inshore fish are caught.
- In a relative sense, options with projected removals that are less than the five-year average removals are the most risk-averse of the options that were analyzed. Options with projected removals that are between the five-year and ten-year average removals are relatively less risk-averse. Options with projected removals above the ten-year average are the most risk-prone of the options that were analyzed.

Table 33 Results of Relative Risk Assessment of TAC Options Under Consideration

Mixing Ratios	Summer	0.5	0.6	0.5	0.3	0.3	Median
	Winter	0.2	0.2	0.5	0.3	0.15	
Removals of Inshore Component (mt)	10-year Historical	**77,443**	**80,988**	**83,129**	**74,625**	**72,228**	**77,443**
	5-year Historical	**69,106**	**71,839**	**74,364**	**65,393**	**62,764**	**69,106**
TAC Options	1	74,906	77,289	80,571	72,030	69,198	74,906
	2 (Council-preferred)	80,543	82,926	94,663	80,485	73,425	80,543
	4	62,715	65,098	72,611	61,249	56,301	62,715
	7	70,271	72,654	78,754	68,334	64,093	70,271

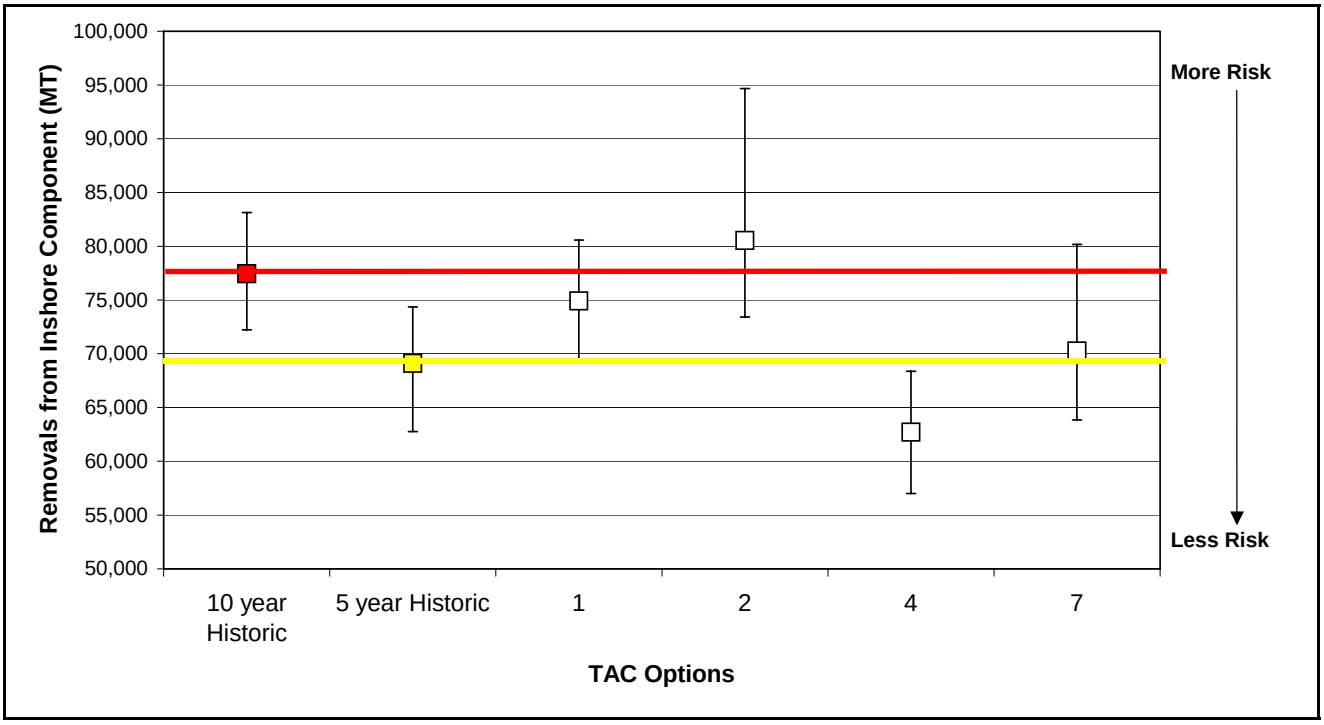
Note: TAC Option 2 represents the Council-preferred action.

The projections assume that all TACs are fully utilized in all management areas, in addition to removals of 20,000 mt of inshore fish from the NB weir fishery.

Highlighted cells represent scenarios that predict removals of the inshore component that are higher than the ten-year median value.

The results of the relative risk assessment are not expected to change if the TACs are maintained through the 2006 fishing year unless stock and fishery conditions change substantially during 2005.

Figure 22 Results of Risk Assessment Relative to Five-Year and Ten-Year Removals of the Inshore Component



Note: TAC Option 2 represents the Council-preferred action.

Note: Points on the graph represent median levels of removals, and bars represent the range of predicted removals under the various mixing scenarios (see Table 33 for actual values).

The lower horizontal line on the graph represents median five-year removals of the inshore component, while the upper horizontal line represents median ten-year removals.

This is a relative risk assessment for the purposes of comparing TAC options and only considers removals of the inshore component of the resource. The assessment assumes that all TACs are fully utilized in all management areas, in addition to removals of 20,000 mt of inshore fish from the NB weir fishery.

The relative risk assessment presented above also applies if the 2005 TACs are maintained through the 2006 fishing year unless significant changes in stock and/or fishery conditions occur during 2005.

6.1.3.1.3 Impacts of Days Out Management

Requirements for days out of the herring fishery in Area 1A is a management tool that is utilized in the ASMFC Interstate Management Plan for Atlantic Herring to extend the season in Area 1A and minimize derby fishing. The days out management strategy is described briefly in Section 4.1 of this document.

The four TAC options identified by the Herring Committee/Section at the June 15, 2004 meeting were analyzed to determine the potential impacts of applying a landings prohibition to different values for the Area 1A TAC. This model predicts the closure date for the herring fishery in Area 1A under different "days out" strategies and is utilized annually by the ASMFC and affected States to select the days out landings prohibition for the Area 1A fishery. To analyze the four TAC options identified by the Committee/Section, the model was modified to use vessel trip report (VTR) data instead of interactive voice response (IVR) data, which are normally used in the annual days out analysis. VTR data are more accurate than IVR data, but the VTR data are not available earlier in the fishing year when the days out provisions are selected by ASMFC and the affected States.

The days out model examines historical catch rates by week from 1994-2003, with adjustments made to the historical catch rates based on current management measures in the fishery (area-specific TACs, split season in Area 1A, etc.). The model predicts the closure date for the 1A fishery under the proposed TACs. For each of the TAC options under consideration, the Herring PDT examined three days out scenarios: 0, 2, and 3 days out of the fishery to determine when the fishery may close in Area 1A (Table 34).

Table 34 Predicted Closure Date for Area 1A Fishery Under TAC Options (based on 1994-2003 catch rates)

TAC Option	0 Days Out	2 Days Out (status quo)	3 Days Out
TAC Option 1 (60,000 mt)	7-Oct	11-Nov	16-Dec
TAC Option 2 COUNCIL-PREFERRED ACTION (60,000 mt)	7-Oct	11-Nov	16-Dec
TAC Option 4 (45,000 mt)	26-Aug	30-Sep	28-Oct
TAC Option 7 (55,000 mt)	16-Sep	28-Oct	2-Dec

TAC Option 2 represents the Council-preferred action.

In addition, the Herring PDT applied the cumulative 1A catch rate per week (1994-2003) and the relative risk assessment model described in Section 6.1.3.1.1 of this document to predict removals from the inshore stock component, assuming the same mixing ratios and seasonal fishing patterns that were applied to the relative risk assessment, for each of the TAC options under consideration and possible days out strategies (Table 35 and Figure 23).

Table 35 Results of Relative Risk Assessment of TAC Options Considered by the Council and Possible Days Out Strategies for Area 1A

Mixing Ratios	Summer	0.5	0.6	0.5	0.3	0.3	Median
	Winter	0.2	0.2	0.5	0.3	0.15	
Removals of Inshore Component (mt)	10-year Historical	77,443	80,988	83,129	74,625	72,228	77,443
	5-year Historical	69,106	71,839	74,364	65,393	62,764	69,106
	DAYS OUT						
TAC Option 1	0	56,505	65,145	70,349	58,370	55,572	58,370
	2	68,445	67,778	74,042	64,185	61,386	67,778
	3	73,686	72,245	79,282	70,972	68,174	72,245
TAC Option 2	0	62,101	65,145	84,340	66,765	59,769	65,145
COUNCIL-PREFERRED ACTION	2	74,042	67,778	88,033	72,579	65,584	72,579
	3	79,282	72,245	93,274	79,367	72,371	79,282
TAC Option 4	0	41,744	47,561	60,789	45,244	39,994	45,244
	2	55,775	51,944	66,275	52,937	47,687	52,937
	3	58,338	53,956	68,838	56,603	51,353	56,603
TAC Option 7	0	48,057	54,428	65,304	51,057	46,557	51,057
	2	62,146	59,209	71,146	59,020	54,520	59,209
	3	68,633	64,922	77,633	67,053	62,553	67,053

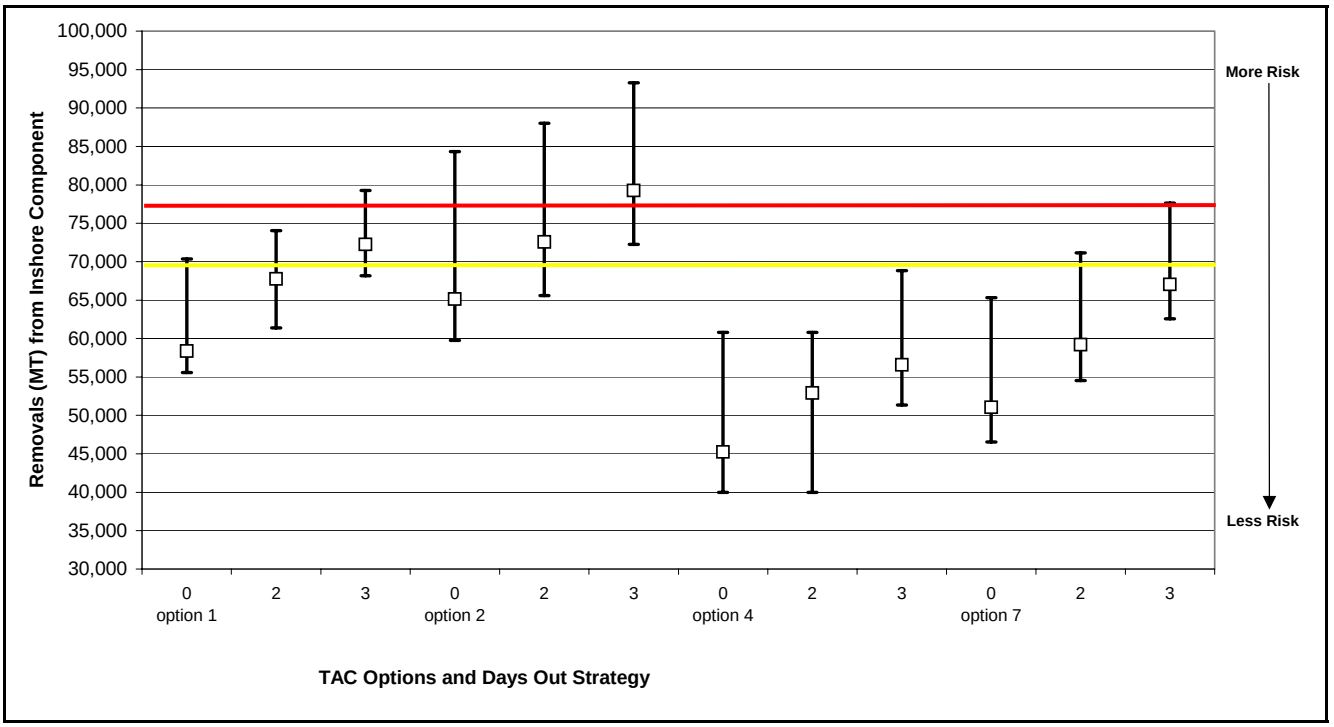
Note: This is a relative risk assessment for the purposes of comparing TAC options and only considers removals of the inshore component of the resource under various strategies for days out of the fishery.

The above analysis assumes that all TACs are fully utilized in all management areas and utilizes the actual five-year and ten-year historical removals from the NB weir fishery.

Highlighted cells represent scenarios that predict removals of the inshore component that are higher than the ten-year median value.

TAC Option 2 represents the Council- preferred action.

Figure 23 Results of Risk Assessment of TAC Options Under Consideration and Possible Days Out Strategies (Relative to Five-Year and Ten-Year Removals of Inshore Component)



Note: Points on the graph represent median levels of removals, and bars represent the range of predicted removals under the various mixing scenarios (see Table 35 for actual values). The lower horizontal line on the graph represents median five-year removals of the inshore component, while the upper horizontal line represents median ten-year removals.

TAC Option 2 represents the Council-preferred action.

The extension of the 1A fishery using days out management results in greater removals from the inshore component than if no days out are applied and the fishery closes at an earlier date. All herring caught in Area 1A from August – November are assumed to come from the inshore component of the resource, so extending the fishery through these months produces an overall increase in the proportion of inshore fish that are taken in the 1A fishery across the year. From a biological perspective, therefore, it may be more beneficial to the inshore component of the resource to allow the 1A fishery to close earlier in the fishing year. From a social and economic perspective, however, an earlier closure of the fishery could result in negative impacts on participants and affected communities. The costs and benefits of selecting an appropriate TAC distribution in combination with a days out strategy were considered by the Council when it selected TAC Option 2 for the 2005 fishing year specifications.

This analysis also applies if the 2005 TACs are maintained through the 2006 fishing year unless significant changes in stock and/or fishery conditions occur during 2005.

6.1.3.1.4 Impacts of New Brunswick Weir Fishery Assumption – Sensitivity Analysis

The PDT/TC also analyzed the proposed TAC options considered by the Council to determine the effects of recent changes in catches of the inshore component from the (Canadian) NB weir fishery. The following sensitivity analysis was conducted to provide some perspective on what removals from the inshore component may be if the NB weir catch is less than 20,000 mt and to illustrate the potential impacts of removals from the NB weir fishery as they relate to the selection of area-specific TACs and days out strategies.

Overall, removals from NB weir fishery have recently declined but are variable among years (see May 5, 2004 PDT/TC Report for a time series of catches from the NB weir fishery). Three assumptions about removals from the NB weir fishery were analyzed (Table 36); (1) 20,000 mt as suggested in the Herring FMP; (2) the most recent 10-year average removals (mean = 17,086 mt: SD = 3,928); and (3) the most recent 5-year average removals (mean = 15,262 mt: SD = 4,740).

Table 36 Results of Relative Risk Assessment of TAC Options Under Consideration and Different Assumptions about Catch in the NB Weir Fishery

Mixing Ratios	Summer	0.5	0.6	0.5	0.3	0.3	Median
	Winter	0.2	0.2	0.5	0.3	0.15	
Removals of Inshore Component (mt)	10-year Historical	77,443	80,988	83,129	74,625	72,228	77,443
	5-year Historical	69,106	71,839	74,364	65,393	62,764	69,106
	NB WEIR CATCH						
TAC Option 1	20,000	71,359	70,691	76,956	67,098	64,300	70,691
	5-year (15,262)	66,621	65,953	72,218	62,360	59,562	65,953
	10-year (17,086)	68,445	67,778	74,042	64,185	61,386	67,778
TAC Option 2	20,000	76,956	70,691	90,947	75,493	68,498	75,493
COUNCIL-PREFERRED ACTION	5-year (15,262)	72,218	65,953	86,209	70,755	63,760	70,755
	10-year (17,086)	74,042	67,778	88,033	72,579	65,584	72,579
TAC Option 4	20,000	58,689	54,858	69,189	55,850	50,600	55,850
	5-year (15,262)	53,951	50,120	64,451	51,112	45,862	51,112
	10-year (17,086)	55,775	51,944	66,275	52,937	47,687	52,937
TAC Option 7	20,000	65,060	62,123	74,060	61,933	57,433	62,123
	5-year (15,262)	60,322	57,385	69,322	57,195	52,695	57,385
	10-year (17,086)	62,146	59,209	71,146	59,020	54,520	59,209

Note: The above analysis assumes that all TACs are fully utilized in all management areas and incorporates current management measures into the projections, including two days out of the fishery in Area 1A.

Highlighted cells represent scenarios that predict removals of the inshore component that are higher than the ten-year median value.

TAC Option 2 represents the Council-preferred action.

The sensitivity analysis of the NB weir fishery catch suggests a relatively predictable pattern of removals of the inshore stock component. Overall, the variability of removals by the NB weir fishery contributes less to the result than the distribution of the area-specific TACs and/or days out strategies. Currently, there are no controls on either catch or effort in the NB weir fishery. From a statistical perspective, it is probable that catches from the NB weir fishery could exceed the 10-year or 5-year averages in the short-term, given the high degree of variability over the last 5-10 years (see standard deviations associated with historical removals from NB weir fishery).

This analysis also applies if the 2005 TACs are maintained through the 2006 fishing year unless significant changes in stock and/or fishery conditions occur during 2005.

6.1.4 Impacts of NMFS-Preferred TACs and OY

When the herring PDT performed the relative risk assessment it was unaware of the NMFS-preferred alternative, and, therefore the impacts of that alternative were not considered. It is not necessary to re-run the relative risk assessment to adequately evaluate the NMFS-preferred alternative, however, because the NMFS-preferred alternative falls within the range of alternatives considered by the Council and are presented and evaluated in this document. NMFS notes that according to that risk assessment the Council-preferred alternative is the least risk-averse of all the alternatives considered by the Council (see the Council's discussion under Section 6.1.3.1). Of all the alternatives, and all the mixing ratios considered, the Council's preferred alternative (2) results in the highest removals from the inshore component. Indeed, for five out of the six mixing ratios considered, the Council-preferred alternative resulted in removals from the inshore component that were higher than the ten-year median value for such removals (Table 33). None of the other alternatives considered by the Council resulted in such a high level of removals for more than one of the mixing ratios considered.

Although the PDT did not assess the risks of the NMFS-preferred alternative, it is possible to make some judgements about the likely impacts of that alternative on removals of the inshore component (the component of highest concern). The NMFS-preferred alternative is very similar to alternative 1, which the Council considered. The only differences are that the NMFS-preferred alternative increases the Area 2 TAC by 10,000 mt, and reduces the Area 3 by 10,000 mt; the OY for both alternatives is the same, 150,000 mt. Although there would certainly be differences between the risk assessment numbers generated for alternative 1 and the NMFS-preferred alternative, they would likely be relatively small. And, certainly, the reduction in potential mortality of the NMFS-preferred alternative on the inshore component would be greater than the impact of the Council-preferred alternative, because the NMFS-preferred alternative would take significantly fewer fish from both Areas 2 and 3. Thus, as it relates to the risk assessment approach discussed in Section 6.1.3.1, the NMFS-preferred alternative would be more risk-averse, and less risk-prone than the alternative proposed by the Council, relative to overfishing the inshore component of the herring resource.

6.2 IMPACTS ON THE HERRING FISHERY (INCLUDING ECONOMIC AND SOCIAL IMPACTS)

6.2.1 Economic Impacts

6.2.1.1 Economic Impacts of the Council-Preferred Specifications

Since the TACs in all management areas remain the same as 2003 and 2004 under the Council-preferred action for 2005, there are no economic impacts expected if the proposed TACs are implemented for the 2005 fishing year. No economic impacts from the proposed action are expected for either the herring fleets identified in Section 5.2.1 or any of the processing plants participating in the herring fishery. This also applies if the 2005 specifications are maintained for the 2006 fishing year unless stock and/or fishery conditions change substantially during 2005.

TAC Option 2 represents the proposed action and maintains the current (2003/2004) TACs for the herring management areas, with the exception of the proposed elimination of the Area 2 TAC reserve (70,000 mt). The Herring FMP specifies that the Area 2 TAC reserve can be released during the fishing year by the Regional Administrator only if the initial Area 2 TAC (50,000 mt) is fully utilized and only if it can be demonstrated that the fish caught in Area 2 under the reserve are not part of the inshore stock component. Since the Area 2 TAC has never been fully utilized, the TAC reserve has never been released. As a result, there are no direct economic impacts of eliminating the Area 2 reserve for the 2005 (and 2006) fishing year. Total landings from Area 2 during 2003 were just over 16,000 mt, which is only about 1/3 of the Area 2 TAC. Based on current market and fishery conditions, the proposed elimination of the Area 2 TAC reserve is not expected to reduce short-term opportunities for vessels fishing in Area 2.

For the 2005 fishing year (and possibly 2006), the Council proposes that the JVPt and USAP allocations for the herring fishery be set at 0 mt. This eliminates opportunities for both joint venture processing by foreign vessels and at-sea processing for domestic vessels. Further discussion of the Council's rationale for the proposed action is provided in Section 4.6.3 of this document.

The Council-preferred alternative establishes an OY for the herring fishery of 180,000 mt. With catches averaging 106,000 mt since 1999 and never exceeding 122,000 mt in any recent year, there could be economic consequences of setting either of these categories (JVP and USAP) at zero in 2005. If the markets served by on-shore processors do not expand to the extent anticipated (an 80% increase could occur before the total TAC for the fishery would be reached), then economic opportunities for domestic harvesters may be lost by setting JVPt and USAP at zero.

JVP/IWP and USAP operations provide additional outlets for U.S. catcher vessels to sell their catch. These additional opportunities generate profits for vessel owners and income for captains and crew. Profits made on the sale of inputs used in the harvest sector provide benefits to marine-related businesses. In the case of USAP, U.S. processing companies (new or existing) could benefit from this new type of processing that may offer some advantages to shore-based processing. Potential advantages include the ability to move processing operations in response to

TAC closures and fishery seasonality, and, from a net national benefit perspective, less permanency of capital.

When the Herring FMP was implemented, the Council proposed an allocation of 0 mt for USAP (see Section 4.6.3 of this document for a summary of the Council's rationale). The Council modified this specification and allocated 20,000 mt for USAP as part of the fishery specifications for the 2000 fishing year. Analysis of the socio-economic impacts of the no action alternative, i.e., maintaining a 0 mt allocation for USAP for the 2000 fishing year, is presented below and applies to the current proposal to change the allocation back to 0 mt.

> "The no action alternative (USAP at 0 mt) may have adverse economic impacts on the herring fishery and fishers…Large domestic processing vessels would not be able to participate in the fishery because the USAP allocation would be set at 0 mt. Not only does this adversely impact the owners and operators of those vessels, it restricts the ability of some vessels to convert into the herring fishery and target herring in Areas 2 and 3. Smaller vessels may be unable to fish in these areas and land enough herring in a suitable condition for existing bait and sardine cannery markets.
>
> The no action alternative (0 mt for USAP) also interferes with the optimal market allocation of sectors. By artificially limiting one processing sector (offshore processing), it inhibits the ability of the market to use various prices and costs of production to choose an optimal activity level within each sector. The result of this distortion could be higher overall production costs, which would reduce net benefits to the Nation…
>
> The lack of markets for herring may limit some fishermen who want to enter the fishery. Because herring is of relatively low value, it is a high-volume fishery. Smaller vessels may be unable to return to port with enough herring to make this fishery profitable. In addition, if smaller vessels fish offshore and try to bring large catches of herring to port, this may cause safety problems in the industry if the vessels are overloaded…
>
> The alternative (0 for USAP) does not provide the maximum opportunities for vessels in the groundfish fishery to target herring…The lack of markets and the inability to deliver a quality product from offshore areas without major vessel modifications limit the ability of vessels to convert to the herring fishery. Since foreign vessels are showing little interest in herring joint ventures, a large domestic processing vessel could provide a new market and remove the requirement for smaller vessels to deliver their herring catch to the shore. By eliminating this option, the alternative is limiting the ability of groundfish vessels to seek an alternative in the herring fishery. This will prevent communities suffering from the decline in the groundfish resource from taking advantage of the abundant herring resource. Finally, this alternative will not increase social/human capital in the fishery through increased participation in harvesting herring to supply offshore processing vessels."

On the other hand, to the extent that JVP/IWP and USAP operations (run by companies new to the U.S. Atlantic herring fishery) compete with on-shore processing, there could be negative impacts to processors. This would occur if these activities increase substantially and on-shore processors are not able to sell as much product as they could in the absence of a JVPt and USAP allocations. This is one of the reasons that the Council chose to propose 0 mt allocations for JVPt and USAP in 2005 (and possibly 2006). Additional discussion of this issue is provided in Section 4.6.3 of this document.

It also should be noted that the Council-preferred specifications for USAP and JVP (0 mt) have minimal direct economic impact associated with them, as the USAP allocation has not been utilized in the past, and very little of the JVP allocation for herring has been utilized. Allocating 0 mt to USAP and JVP for 2005 and 2006 may result in a loss of short-term economic opportunities but are not expected to result in the loss of revenues for any vessels or companies involved in the herring fishery.

The Council recommends maintaining a TALFF of zero. The Council is aware that there are minimal losses to the nation from the loss of poundage fees collected from foreign vessels. As discussed in previous EAs for herring fishery specifications as well as in this document, expanding U.S. processing capabilities are expected to result in increasing harvest by the U.S. fishery. The recommendation reflects the concern that fish caught under a TALFF allocation could compete directly with U.S. caught and processed herring in overseas markets, thus, producing a negative economic impact to herring vessels by reducing revenues either through lower prices, lower quantities demanded, or both. However, other than poundage fees, the economic benefits of TALFF would be indirect, e.g. economic benefits of goodwill since TALFF produces no revenues for U.S. entities. The indirect benefits of TALFF would be offset by the direct impact such activity might have on the competitiveness of U.S.-exported herring in world markets. Therefore, despite the reduction in economic gain for the Nation that could result by specifying TALFF at zero, the Council continues to believe the potential long-term benefits for U.S. Atlantic herring processors outweigh that loss. The Council remains concerned that the competition that TALFF represents to U.S. processors will impede future expansion of domestic processing facilities. This loss could far outweigh the short-term gains to the Nation that poundage fees collected through TALFF represent.

6.2.1.2 Economic Impacts of the NMFS-Preferred Specifications

The economic impacts of the NMFS-preferred TAC alternatives are considered below, as part of the discussion of the economic impacts of other alternatives. The potential economic impacts of the NMFS-preferred alternative on USAP are as follows. If the USAP allocation of 20,000 mt were utilized in 2005 it could generate approximately $2.8 million (based on an average price of $143/mt). The Council has argued the allocation of USAP might discourage investment in onshore processing capacity, and, similarly that it might have a negative impact on shoreside facilities in a market-driven fishery like the herring fishery. Although the reduced OY and TACs associated with the NMFS-preferred alternative might have a negative impact on shoreside-processor profits, NMFS believes that this is unlikely, and the degree to which it occurs, if at all, would be marginal. The NMFS-preferred alternative still sets OY and the TACs higher than they

have reached in recent years, and provides the fishery (harvesters and processors) with the opportunity to continue expanding their operations and increasing their profits. The NMFS-preferred allocation of USAP might discourage investment in onshore processing, but the degree to which this might occur is not known.

6.2.1.3 Economic Impacts of No Action

Taking no action would maintain the current (2003/2004) specifications for the Atlantic herring fishery. Relative to the area-specific TACs, the no action alternative would maintain the current TACs, as does the proposed action, so the economic impacts of taking no action are equivalent to those associated with the proposed action (discussed in the previous subsection).

There may be additional economic opportunities associated with the no action alternative, as this alternative maintains the Area 2 TAC reserve (70,000 mt), a USAP allocation of 20,000 mt, and a JVPt allocation of 20,000 mt (10,000 mt for IWP). However, any additional economic benefits that the no action alternative may produce in the short-term are largely indirect and difficult to predict because neither the Area 2 TAC reserve nor the USAP allocation have been utilized in the past, and very little of the JVPt allocation has been utilized in recent years.

6.2.1.4 Economic Impacts of Other Alternatives Considered

The Council considered the potential economic impacts of other TAC options and other fishery specifications that were identified during the specification process. The Council selected its proposed action, in part, because the potential economic (and social) impacts of some of the other TAC options were considered to be too extensive, especially because the biological (stock status) information presented by the Herring PDT did not clearly show that measures with such impacts are necessary at this time. The economic impacts of the TAC options that the Council rejected are discussed below relative to the herring fleets identified in Section 5.2.1.

6.2.1.4.1 Impacts on Maine Purse Seine Fleet

TAC Option 1 (60K-1A, 10K-1B, 20K-2, 60K-3)

Because the Area 1A and 1B TACs are not reduced under this option and almost all of this sector's landings come from Area 1, there are no expected impacts to this sector of the fleet.

TAC Option 4 (45K-1A, 10K-1B, 35K-2, 60K-3)

With a 15,000 metric ton decrease in the combined Area 1 TAC, the impact of this option on this sector could be relatively large. In 2003, the purse seine fleet caught almost 29% of the Area 1 TAC (1% of the Area 1B TAC). If the proportion of the herring catch by the purse seine fleet remains the same and the decrease in the Area 1A TAC cannot be made up from fishing in other areas, there would be a 4,350 mt loss in catch which is worth approximately $623,000 or $125,000 per vessel (five vessels in the sector). On an individual vessel basis, the losses would range from $25,000 to $238,000 per year per vessel. These predictions may represent a "worst-case scenario," as they are based on fishing patterns observed in 2003 (95% of this sector's landings came from Area 1A in 2003) and assume that there is no movement of this gear sector to other areas or other fisheries. It also assumes no increase in the purse seine sector's

proportion of Area 1A catch relative to other gear types. In this assessment, the reduction in the Area 1A TAC translates directly into lost revenues for purse seine vessels.

Purse seine vessels would have to either increase their proportion of the herring catch in Area 1A relative to midwater trawlers or move to other areas. Moving to offshore areas may be problematic due to the size of the vessels (see Table 37) and the schooling behavior of the fish in offshore areas. There were no landings from Area 3 by the purse seine fleet in 2003. It may also be impractical to move to Area 2 since the markets these vessels primarily serve are during the summer and fall in Maine and herring are not in Area 2 at that time. Four percent (4%) of the purse seine catch was from Area 2 in 2003. If the Maine purse seine vessels move to Areas 2 and 3, the cost to harvest the fish will increase due to increased steaming costs (see the discussion below of increased costs due to longer steam times). The safety of smaller purse seine vessels in offshore areas is an important concern as well.

Since the full 15,000 mt reduction in TAC is in Area 1A, the purse seine fleet will have to rely more on Area 1B. The Area 1B TAC has historically not been reached (50% was utilized in 2003). Since Area 1B is farther from shore than Area 1A, the cost of harvesting herring will increase (see the discussion below of increased costs due to longer steam times). The smallest vessels in the fleet, which fished exclusively in Area 1A in 2003, will be impacted the most to the extent they are unable to fish in Area 1B.

Area 1B will only be able to provide limited relief for vessels impacted by the reduction in the Area 1A TAC because the catch in Area 1B has been at or above 5,000 mt in recent years, with the TAC at 10,000 mt. Since the shortfall of 15,000 mt in Area 1A cannot be made up in Area 1B, the Area 1B season will be shortened (see the general discussion of shorter fishing seasons below).

A decrease in the Area 1 TAC may perpetuate the race for fish between purse seine and midwater vessels and among individual vessels of any gear type. There are a number of potential impacts associated with a more intense race for fish. See below for a description of these impacts.

TAC Option 7 (55K-1A, 5K-1B, 30K-2, 60K-3)

With a 10,000 metric ton decrease in the combined Area 1 TAC, the impact to this sector could be significant. In 2003, the purse seine fleet caught almost 29% of the Area 1 TAC (1% from Area 1B). If the proportion of catch by the purse seine fleet remains the same and the decrease in Area 1 TAC cannot be made up from fishing in other areas, there would be a 2,900 mt loss in catch which is worth approximately $416,000 or $83,000 per vessel (five vessels in the sector). On an individual vessel basis, the losses would range from $17,000 to $159,000 per year per vessel.

Purse seine vessels would have to either increase their proportion of the catch relative to midwater trawlers or move to other areas. Moving to offshore areas may be problematic due to the size of the vessels (see Table 1) and the schooling behavior of the fish in offshore areas. There were no landings from Area 3 by the purse seine fleet in 2003. It may also be impractical to move to Area 2 since the markets they serve are during the summer and fall in Maine and

herring are not in Area 2 at that time. Four percent of the purse seine catch was from Area 2 in 2003. If the Maine purse seine vessels move to Areas 2 and 3, the cost to harvest the fish will increase due to increased steaming costs (see the discussion below of increased costs due to longer steam times). The safety of smaller purse seine vessels in offshore areas is an important concern as well.

Since the catch in Area 1B has been at or above 5,000 mt (the new Area 1B TAC) in recent years, the TAC is likely to be reached before the end of the year and will not provide relief to the 5,000 mt decrease in Area 1A.

A decrease in the Area 1 TAC may perpetuate the race for fish between purse seine and midwater vessels and among individual vessels of any gear type. There are a number of potential impacts associated with a more intense race for fish. See below for a description of these impacts.

NMFS-Preferred TAC Option (60K-1A, 10K-1B, 30K-2, 50K-3)

Because the Area 1A and 1B TACs are not reduced under this option and almost all of this sector's landings come from Area 1, there are no expected impacts to this sector of the fleet.

Table 37 Herring Vessel Characteristics by Principal Gear (for vessels which averaged more than 2,000 lbs per trip)

	Purse Seine	Single Midwater Trawl	Pair Trawl
Number of Vessels	5	7	16
Average Length (ft) (min, max)	59 (43, 79)	80 (38, 128)	102 (67, 149)
Average Gross Ton (min, max)	82 (5, 170)	179 (17, 476)	188 (74, 394)
Average Horse Power (min, max)	483 (333, 580)	1,196 (485, 2,985)	1,253 (450, 2,100)

6.2.1.4.2 Impacts on North of Cape Cod Midwater Trawl Vessels (Single and Paired)

TAC Option 1 (60K-1A, 10K-1B, 20K-2, 60K-3)

The only area TAC that would be reduced under this option is the Area 2 TAC. The most recent year in which the landings from this area were greater than 20,000 mt (the proposed TAC) was 2000 (27,198 mt). In 1999, herring landings from Area 2 were 22,712 mt. The average landings from 2001 – 2003 were 14,300 mt with 2003 landings at 16,079 mt.

Under current market conditions, the new TAC may become constraining if the fishery in 2005 is similar to that in 1999 and 2000. If this is the case, then the Area 2 TAC fishing season could end before the end of the year. See a description of this type of impact below.

Even with a market expansion of 50% (landings up to 150,000 mt), there would still be enough total TAC to meet that need. However, the majority of the expansion would have to come from Area 3. For vessels in the North of Cape Cod midwater trawl sector, which have the ability to fish offshore, it would not involve a significant increase in steaming time to go to Area 3 than to go to Area 2, especially for the Maine-based vessels. For vessels based in NH and MA, increases in steaming time may be occur depending on the relative location of fish in each of the areas. See the discussion of the cost of increased steaming time below.

TAC Option 4 (45K-1A, 10K-1B, 35K-2, 60K-3)

With 66% of this sector's landings coming from Area 1, the 15,000 mt decrease in the Area 1A TAC proposed in this option will shorten the Area 1A season, and likely the Area 1B season (see the discussion of impacts from shortened seasons below). The loss of catch in Area 1A will likely force vessels in this sector to make up the difference in Areas 1B, 2 and 3. An Area 2 TAC of 35,000 mt should not be constraining given recent landings history (see the discussion of TAC Option 1), which may provide flexibility for this sector to shift harvest into Area 2 or Area 3. Shifting to Areas 1B, 2 and 3 will come at an increased cost, however (see discussion below).

TAC Option 7 (55K-1A, 5K-1B, 30K-2, 60K-3)

This option will have similar impacts to TAC Option 4. However, with a proposed Area 1B TAC of 5,000 mt, the dependence of this section on catch from Areas 2 and 3 will be greater. This may be tempered, however, by the higher Area 1A TAC and greater combined Area 1 TAC than Option 4.

NMFS-Preferred TAC Option (60K-1A, 10K-1B, 30K-2, 50K-3)

Under this alternative the TAC for Area 2 would be reduced by 20,000 mt (to 30,000 mt) and the TAC for Area 3 would be reduced by 10,000 mt (to 50,000 mt). Under current market conditions, it is highly unlikely that in either case these TACs would place any constraints on these segments of the fishery. Since 1999, the Area 2 landings have never been greater than 30,000 mt. The Area 2 landings in 2001 came close to 30,000 mt, totaling 27,198 mt, but in all other years since 1999 the Area 2 landings have fallen far short of 30,000 mt, and in the most recent years the gap between 30,000 mt and the actual landings has been very large, e.g., in 2002, Area 2 landings were 11,038 mt, and in 2003 they were 16,079 mt. The average landings for Area 2 from 2001 – 2003 were 14,300 mt, less than half of the NMFS-preferred TAC for this area of 30,000 mt. The situation in Area 3 is similar. Since 1999, the highest landings in Area 3 were in 2001, when they reached 35,079 mt. The average landings for Area 3 from 2001 – 2003 were 23,160 mt, less than half of the NMFS-preferred TAC for this area of 50,000 mt.

6.2.1.4.3 Impacts on South of Cape Cod Midwater Trawl Vessels (Single and Paired)

TAC Option 1 (60K-1A, 10K-1B, 20K-2, 60K-3)

The only area TAC reduced under this option is that for Area 2. The most recent year in which landings from this area were greater than 20,000 mt (the proposed TAC) was 2000 (27,198 mt). In 1999, the landings from Area 2 were 22,712 mt. The average landings from 2001 – 2003 were 14,300 mt, with 2003 landings at 16,079 mt.

Under current market conditions, the new TAC may become constraining if the fishery in 2005 is similar to that in 1999 and 2000. If this is the case, then the Area 2 TAC fishing season could end before the end of the year. See a description of this type of impact below.

Even with a market expansion of 50% (landings up to 150,000 mt), there would still be enough total TAC to meet that need. However, the majority of the expansion would have to come from Area 3. For vessels in the South of Cape Cod midwater trawl sector that have the ability to fish offshore, an increase in steaming time is required to go to Area 3. With 45% of their catch already coming from Area 3 and with un-used TAC in that area, a greater reliance on Area 3 is feasible for the sector. The overall harvest costs for the sector will increase due to the increased steam times (see discussion below).

TAC Option 4 (45K-1A, 10K-1B, 35K-2, 60K-3)

With 21% of this sector's landings coming from Area 1, this option's proposed 15,000 mt decrease in the Area 1A TAC will shorten the Area 1A season and is likely to shorten the Area 1B season as well (see the discussion of impacts from shortened seasons below), consequently forcing vessels in this sector to make up the difference in Areas 1B, 2 and 3. An Area 2 TAC of 35,000 mt proposed under this options should not be constraining given recent landings history (see the discussion of TAC Option 1), which provides greater flexibility for this sector to shift harvest to Area 2 or Area 3. Assuming that this sector chose optimal harvest strategies in the past, shifting to other areas will come at an increased cost (see discussion below).

TAC Option 7 (55K-1A, 5K-1B, 30K-2, 60K-3)

This TAC option will have similar impacts to TAC Option 4, except that with a proposed Area 1B TAC of 5,000 mt, the dependence on Areas 2 and 3 will likely be greater. Relative to TAC Option 4, however, the higher Area 1A TAC and greater combined Area 1 TAC proposed in this option may temper some of the increased dependence on other areas.

NMFS-Preferred TAC Option (60K-1A, 10K-1B, 30K-2, 50K-3)

Under this alternative the TAC for Area 2 would be reduced by 20,000 mt (to 30,000 mt) and the TAC for Area 3 would be reduced by 10,000 mt (to 50,000 mt). Under current market conditions, it is highly unlikely that in either case these TACs would place any constraints on these segments of the fishery. Since 1999, the Area 2 landings have never been greater than 30,000 mt. The Area 2 landings in 2001 came close to 30,000 mt, totaling 27,198 mt, but in all other years since 1999 the Area 2 landings have fallen far short of 30,000 mt, and in the most recent years the gap between 30,000 mt and the actual landings has been very large, e.g., in 2002, Area 2 landings were 11,038 mt, and in 2003 they were 16,079 mt. The average landings for Area 2 from 2001 – 2003 were 14,300 mt, less than half of the NMFS-preferred TAC for this area of 30,000 mt. The situation in Area 3 is similar. Since 1999, the highest landings in Area 3 were in 2001, when they reached 35,079 mt. The average landings for Area 3 from 2001 – 2003 were 23,160 mt, less than half of the NMFS-preferred TAC for this area of 50,000 mt.

6.2.1.4.4 Impacts on Processors – Council-Preferred Alternative

A complete description of the processing facilities involved in the Atlantic herring fishery was provided to the Herring Committee/Section and Council when it selected the proposed action at the July 12 and 13, 2004 meetings. The Council-preferred alternative is not expected to result in

any economic impacts on processors. A brief discussion of the potential impacts on processors of the TAC options that the Council considered but rejected is provided below. A comprehensive description of the processing facilities will be provided in the DSEIS for Amendment 1 to the Herring FMP.

The following discussion describes the indirect impacts of the TAC options considered but rejected on herring processors. The term "indirect" is used because processors are not directly regulated by the Fishery Management Plan. Impacts to processors result from regulations that are directly applied to businesses in the harvesting sector.

The sardine canneries require the herring they purchase to be as fresh as possible. This makes them reliant on fish from Area 1A since vessels fishing in that area can deliver fish to the plants soon after they are caught. The options which reduce the Area 1A TAC in 2005 may impact the sardine canneries in three ways. The first impact may be a decrease in the quality of the fish that is delivered to the plant. As the Area 1A TAC is used and vessels must fish farther from shore, the time between harvest and delivery may increase and product quality may suffer.

The second impact is that it may be difficult for the plant to adjust to irregular deliveries. The canneries may experience difficulty planning production if there is a pattern of gluts and shortages in product. Product flow fluctuations impact market timing and scheduling the appropriate number of plant workers. Canneries have some ability to smooth these fluctuations on the retail side by carrying inventory. However, there are costs associated with carrying higher levels of inventory.

The third impact is potential price distortions from fluctuating supplies. With periods of shortages and an overall increase in harvest costs, there may be pressure to increase the price paid to harvesters. However, assuming that herring canneries are price takers in a world sardine market and cannot pass on higher input costs by increasing the price of canned product, it is difficult to predict who will bear the increased harvest costs. The canneries would bear the cost if they pay higher ex-vessel prices, the harvest sector would bear the cost if ex-vessel prices remain the same, or depending on the increase in ex-vessel price, the costs could be shared by each.

The impacts on freezer plants are similar to those on canneries but to a lesser extent because freezer plants are not as dependant on Area 1A. Particularly, the issue of freshness is not as significant if the freezer plants can receive a consistent supply of product from vessels with RSW tanks. Also, the supply fluctuations should be less for freezer plants since the vessels which supply them are able to move to offshore areas where there is ample TAC.

Long-term economic impacts of the management program on processors will be explored further in the DSEIS for Amendment 1 to the Herring FMP.

6.2.1.4.5 Impacts on Processors – NMFS-Preferred Alternative

The NMFS-preferred TACs, although lower than the Council-preferred alternatives, are still well above what has been achieved recently in the fishery. Therefore, the NMFS-preferred alternative

provides the opportunity for the processing sector to expand, and it should not have a constraining affect on processors in 2005. This relationship would likely hold even if the 20,000 mt of USAP were utilized – leaving 130,000 mt available to the rest of the processing sector (well above the average the roughly 100,000 mt it has, on average, processed in recent years).

6.2.1.4.6 Other Impacts

The following subsections generally discuss other short-term impacts that could be expected from the TAC options that were considered but rejected. Again, the Council considered these impacts when it selected its preferred action. The expected impacts from the TAC options that were rejected were believed to be too extensive, especially because biological information presented by the PDT did not clearly show that measures with such impacts are needed at this time. The Council also was concerned about exacerbating problems associated with derby fishing in Area 1A, an issue that the Council intends to address in Amendment 1 to the Herring FMP, which is currently under development.

6.2.1.4.6.1 Impacts from Intensifying the Race to Fish (Derby Fishing)

At its current level of 60,000 mt, the TAC in Area 1A is fully utilized and has been since the implementation of the Herring FMP. This is the management area in which the majority of the herring fishery currently occurs. Any reduction in the Area 1A TAC will likely intensify the "race to fish" in this area (also referred to as derby fishing). The extent of the derby in Area 1A will depend on market conditions and competition to catch herring for food (sardines, frozen export) or for bait (primarily lobster).

Recently, the Area 1A TAC has been reached and the fishery has been closed around November of each fishing year. While recent patterns in the fishery may not suggest that the fishery in Area 1A is a derby (the split season implemented in Framework 1 also helped to address this issue), the TAC is still fully utilized before the end of the fishing year, and the fishery remains open-access at this time, allowing opportunities for increased effort in Area 1A to catch the same or a lesser amount of fish, depending on which TAC option is ultimately selected. It is important to acknowledge that a reduction in the Area 1A TAC is likely to exacerbate problems associated with the open-access nature of this fishery as well as derby fishing. The associated short-term impacts of a reduction in the Area 1A TAC may make it more difficult to develop long-term strategies to address these problems in Amendment 1 to the Herring FMP.

In addition, whether or not the race for fish shortens the season or increases the number of days out per week while the season is open, the overall result is fewer fishing days per year. Reductions in the choice of fishing days can lead to disruptions in the market and safety concerns.

In a market-driven fishery such as herring, vessel owners ideally plan their fishing days around the quantities the market requires, the price, and the location and condition of the fish. Removing potential fishing days in the week disrupts the flow of product to the processing plants and the bait dealers. This can lead to overages and shortages that may affect the price. These effects are amplified if an area is closed because the TAC is reached. Not only does it affect the price to vessels, it may also influence the price to processors if they inefficiently supply the

market and if product quality declines.

Reductions in the choice of fishing days may also lead to safety risks. If a vessel owner has limited flexibility in choosing fishing days, he may choose to fish in poor weather or take his vessel farther from shore than he would normally. The safety of fishermen and fishing operations at sea is an extremely important social impact factor, as decreased safety often increases stress at the individual and family level, which can exacerbate many other family and societal problems. In addition, the impacts of fishing-related casualties can be felt throughout fishing communities, many of which are close-knit groups with longstanding family and social networks.

6.2.1.4.6.2 Impacts from Increased Steam Time

There are two primary ways an option which causes vessels to fish in locations farther than their principal port may impact vessels. The first is increased vessel operating costs, primarily increased fuel costs, related to longer steaming times if a vessel's optimal fishing location is in an area in which the TAC has been reached and the vessel must choose the second-best location in an open area. The second is the cost of decreased net revenues (revenues minus the cost of items that vary directly with the quantity of fish caught such as pumping, refrigeration, and packaging costs) from choosing the second-best fishing location. These two impacts are related in that the choice of fishing location depends on the cost of reaching a location and the expected abundance and quality of fish at that location. These choice factors, and others including business relationships with buyers (choice of market); the vessel's homeport; and the status of the TAC in a management area, influence the selection of fishing locations.

If an area is closed because the TAC is reached and the best fishing location happens to be in that area, then the captain is faced with balancing the additional costs of choosing a more distant location with the expected catch from the alternative area. Given that the second-best choice involves increased operating costs, the total impacts would include the increased vessel operating costs and the decreased net revenues, if any.

6.2.2 Social and Community Impacts

6.2.2.1 Social/Community Impacts of the Council-Preferred Alternative

Since the TACs in all management areas remain the same as 2003 and 2004 under the Council-preferred action for 2005, there are no additional social and community impacts expected if the Council-preferred specifications are implemented for the 2005 fishing year.

There may be lost opportunities associated with the proposed action, as the proposed specifications eliminate the Area 2 TAC reserve and allocate 0 mt to USAP and JVPt. However, the short-term social and community impacts of these lost opportunities are indirect and difficult to predict because neither the Area 2 TAC reserve nor the USAP allocation have been utilized in the past, and very little of the JVPt allocation has been utilized in recent years. There are no sectors of the fishery or fishing communities that are dependent on these opportunities at this time and would likely experience losses from the elimination of these allocations in 2005.

This also applies if the 2005 specifications are maintained for the 2006 fishing year unless stock and/or fishery conditions change substantially during 2005.

6.2.2.2 Social/Community Impacts of No Action

Taking no action would maintain the current (2003/2004) specifications for the Atlantic herring fishery. Relative to the area-specific TACs, the no action alternative would maintain the current TACs, as does the proposed action, so the social impacts of taking no action are equivalent to those associated with the proposed action (discussed in the previous subsection). In summary, there are no additional short-term social and community impacts expected from either the proposed action or the no action alternative.

There may be additional economic opportunities associated with the no action alternative, as this alternative maintains the Area 2 TAC reserve (70,000 mt), a USAP allocation of 20,000 mt, and a JVPt allocation of 20,000 mt (10,000 mt for IWP). Additional economic opportunities, if exploited, often result in positive social impacts and benefits to fishing communities. However, any additional benefits that the no action alternative may produce in the short-term are difficult to predict because neither the Area 2 TAC reserve nor the USAP allocation have been utilized in the past, and very little of the JVPt allocation has been utilized in recent years.

6.2.2.3 Social/Community Impacts of TAC/OY Options and Other Alternatives Considered by the Council

The Council considered the potential social and community impacts of other TAC options that were identified during the specification process. The Council selected the proposed action, in part, because the potential social (and economic) impacts of some of the other TAC options were considered to be too extensive, especially because the biological (stock status) information presented by the Herring PDT did not clearly show that measures with such impacts are necessary at this time. Consideration of the extent of the social and community impacts is especially important relative to the communities in which processing facilities reliant on fish from Area 1A are located.

6.2.2.3.1 From a Harvesting Perspective

From a harvesting perspective, purse seine vessels would have been most impacted by the reductions in the Area 1A TAC that were considered by the Council. These vessels are most dependent on Area 1A for fishing and have very limited flexibility to move to other areas in order to compensate for revenues lost by a reduction in the Area 1A TAC. The communities in which these vessels are homeported may experience negative impacts from the reduced TAC in Area 1A as well; however, the purse seine fleet is relatively small, and impacts associated with this fleet are more likely to be experienced at the individual vessel level rather than the community level. There may be some negative impacts to smaller marine-related businesses in the local communities that provide supplies to the purse seine vessels. Individual vessel impacts affect not only the vessel owner, but also the owner's family as well as the crew and their families. Average crew size on purse seine vessels in 2003 was 5.4, which is larger than the average crew size for either single or paired midwater trawl vessels (see the May 5 Herring

PDT/TC Report). Thirty one individuals were reported to be employed on purse seine operations in 2003.

Midwater trawl (single) and pair trawl vessels that are reliant on Area 1A also are likely to be impacted by the proposed reductions in the Area 1A TAC. These vessels fall primarily into the North of Cape Cod midwater trawl sector (see description in Section 5.2.1) and land fish primarily in the communities of Gloucester MA, Newington NH, Portland ME, and Rockland ME. Midwater trawl vessels, on average, are 80 feet in length or larger and therefore have more flexibility to move to other fishing areas and perhaps compensate for some or all of the losses they may experience as a result of a lower TAC in Area 1A (paired midwater trawl vessels average 100 feet in length). The extent to which the negative impacts of a reduction in the Area 1A TAC can be mitigated will depend greatly on market conditions and the feasibility of landing marketable fish from areas farther offshore. In general, the impacts on midwater and pair trawl vessels fishing north of Cape Cod are not likely to translate directly into impacts on the communities in which these vessels are homeported. Impacts on some of these communities are likely to be associated more with impacts on the processing facilities, which are discussed in more detail below.

Herring midwater trawlers reliant on Area 1A would have to fish on Georges Bank and might utilize certain ports in the western Gulf of Maine to a lesser extent. Depending on the extent of the reduction in the Area 1A TAC, there could be an indirect effect caused by vessels landing more herring in ports that are located farther away from lobster fishing communities in the Gulf of Maine. This could cause shortages and increased prices in the lobster bait market (this has happened before when herring were scarce in the GOM and fishing shifted to GB). In addition to direct economic effects, this could have negative social impacts in fishing communities that are dependent on the lobster fishery, especially in Maine. Other possible direct effects of reductions in the Area 1A TAC include the impact of longer fishing trips (to Georges Bank) on crew satisfaction and family life and increased safety concerns.

Midwater trawl (single) and pair trawl vessels that are reliant on Area 2 could be impacted by a reduction in the Area 2 TAC, depending on how large the reduction may be. The South of Cape Cod midwater trawl fleet is most dependent on Area 2 and includes vessels that land fish primarily in the communities of New Bedford MA, Newport RI, North Kingstown RI, and Point Judith RI. Since the current Area 2 TAC (50,000 mt) has never been fully utilized, and given recent average landings, TAC Option 1 is most likely to negatively affect these vessels in terms of lost revenues. Again, however, single and paired midwater trawl vessels are large enough that they maintain some flexibility to move to other areas and perhaps compensate for some losses associated with the TAC reductions. The extent to which the negative impacts of a reduction in the Area 2 TAC can be mitigated will depend greatly on market conditions and the feasibility of landing quality fish from areas farther offshore. In general, though, impacts on some of the communities in which these vessels land are likely to be associated more with impacts on processing facilities.

Other associated impacts may be experienced by the vessels in the south of Cape Cod midwater trawl sector that participate in the mackerel fishery if a substantial reduction in the Area 2 TAC is concurrent with a significant expansion of the winter mackerel fishery in Area 2. Current

conditions in both the herring and mackerel fisheries do not suggest that these impacts are likely to be significant in the short-term, but the nature of impacts is dependent on the degree to which the mackerel fishery in Area 2 expands. If the Area 2 TAC for herring is reduced substantially (to 20,000 mt, for example), the TAC could be reached before the peak season for the mackerel fishery ends (January – April). In this case, mackerel vessels would be required to discard herring they catch above the 2,000 pound incidental catch trip limit. This may be very difficult in a high-volume fishery and may result in negative impacts associated with regulatory discarding. Regulatory discarding is an important social problem, just as it is an ecological problem. Regulatory discarding of otherwise marketable fish leaves fishermen feeling demoralized and disgusted with fishing, which is more than just a job to most fishermen. Fishermen recognize that discarding marketable and oftentimes dead fish does nothing to benefit them or their families, the health of the resource, their hold on markets, or seafood consumers. Fishing is a family business, so the impacts of this are felt throughout the entire family and the entire fishing community. In addition, separating mackerel and herring on-board a pelagic midwater trawl vessel fishing in a high-volume fishery simply may not be possible in all situations.

6.2.2.3.2 From a Processing Perspective

While many of the individual vessels in the herring fishery may be able to adapt, at least in part, to reductions in either the Area 1A or Area 2 TAC, there are likely to be impacts on markets for herring, and consequently processors, from reductions in the TACs, particularly in Area 1A. Impacts on processing facilities are more likely to translate into impacts on the communities in which they are located and the communities in which the majority of their employees reside. In general, if the supply of herring provided by midwater trawlers is reduced (because these boats must fish farther away), processing plants may be impacted economically, especially if fishing costs increase and vessels demand higher prices for their product. This could result in a loss of jobs and income to plant workers and associated social impacts on families and communities.

The two remaining U.S. sardine canneries located in Bath and Prospect Harbor ME are likely to be most impacted by a large reduction in the Area 1A TAC, such as the reduction proposed in TAC Option 4 (45,000 mt). Much of the Area 1A catch is assumed to supply the sardine canneries and the lobster bait market, although some of the catch has supplied freezer plants in more recent years. The Area 1A TAC is fully utilized at its current 60,000 mt level; reductions from this level will increase competition between markets for bait and food products (primarily sardines) and may affect the supply of herring to the canneries, particularly later in the year and especially if the TAC in Area 1A is reached early and the fishery closes.

To the extent that the supply of herring (in terms of volume and/or consistency) to the sardine canneries is affected, the canneries may experience difficulty maintaining year-round employment opportunities in addition to overall losses in revenues that may occur. Together, the Bath and Prospect Harbor canneries employ about 250 individuals. Individuals who work at the Bath cannery may have better opportunities to seek alternative year-round and/or seasonal employment because of their proximity to Portland and other larger towns. Individuals who work at the Prospect Harbor plant are at a greater disadvantage in terms of seeking alternative or additional employment. Fewer alternative employment opportunities exist around the Prospect

Harbor plant, further illustrating the importance of this cannery to the local economy and community. Of the TAC options under consideration, Option 4 is likely to produce the greatest negative impact on the sardine canneries and their local communities, followed by Option 7, Option 1, and Option 2 (proposed action).

Two relatively new processing plants have been established in two of New England's most important fishing communities and provide employment and related benefits that have likely boosted the economy of both communities. These communities are experiencing significant impacts as a result of increased restrictions in other fisheries and the recent implementation of Amendment 13 to the Northeast Multispecies FMP. The development of the pelagic freezer plants in these communities has likely mitigated some of the impacts of Amendment 13 at the community level and provides employment opportunities for upwards of 100 individuals (collectively). The fishing vessels that are dedicated to these facilities provide economic benefits to local marine-related businesses in the area (fuel and supplies, for example).

Recognizing that these freezer plants will be impacted by any changes to the TACs that affect the supply of herring and/or increase competition between markets, in a more general sense, the options that reduce the Area 1A TAC are likely to impact processing plants adjacent to the Gulf of Maine most, while the options that reduce the Area 2 TAC are likely to impact processing plants in southern New England most. The impacts of the proposed TAC options on these processing facilities may be mitigated, in part, by the ability of the dedicated fishing vessels to shift to other fishing areas and increased opportunities in the Atlantic mackerel fishery (mackerel is more valuable than herring). The extent to which the impacts can be mitigated is somewhat uncertain, as it depends on the ability to land a marketable product from other fishing grounds as well as the expansion of the mackerel fishery and its associated markets. While the short-term impacts are not expected to be significant, long-term impacts should be monitored closely and minimized to the extent possible so that these communities maintain their ability to participate in the herring fishery. Long-term participation in the herring fishery, related shoreside employment opportunities, and the more far-reaching economic benefits associated with these facilities will become increasingly important as opportunities in other fisheries decrease. This is especially true in New Bedford and Gloucester, both of which include vessels, families, and businesses that are engaged in numerous fisheries throughout the region.

6.2.2.4 Social/Community Impacts of the NMFS-Preferred Alternative

The NMFS-preferred TACs, although lower than the Council-preferred alternatives, are still well above what has been achieved recently in the fishery. Therefore, the NMFS-preferred provides the opportunity for both the harvesting and the processing sector to expand, and it should not have a constraining affect on either harvester or processors in 2005. This relationship would likely hold even if the 20,000 mt of USAP were utilized – leaving 130,000 mt available to the rest of the processing sector (well above the average of 102,000 mt it has processed in recent years). Because the NMFS-preferred alternative would likely not have a constraining effect on either harvesters or processors, it is unlikely that this alternative will result in any negative social/community impacts in the region.

6.2.3 Summary of Social and Economic Impacts

Table 38 provides a very qualitative ranking of the TAC options considered, from an economic and social/community impact perspective. Overall, TAC Option 4 would result in the most negative impacts due to the proposed 25% reduction in the Area 1A TAC. The Area 1A TAC is the only TAC that is fully utilized on an annual basis, and a 25% reduction in this TAC is expected to affect the greatest number of individuals, vessels, and processors both directly and indirectly. TAC Options 7 and 1 would both result in medium-level impacts relative to TAC Option 4 and relative to TAC Option 2 (the Council-preferred action), which is not expected to result in any additional impacts. The impacts of TAC Option 7 are associated with the proposed reduction in both the Area 1A and Area 1B TACs but are expected to be much less severe than those associated with Option 4 because the proposed reduction in Area 1A is smaller.

The impacts of TAC Option 1 are associated with the proposed 60% reduction in the Area 2 TAC. The nature and extent of social impacts associated with Option 1 are difficult to characterize because they depend, in part, on the expansion of the herring and mackerel fisheries in Area 2. In the short-term, based on recent conditions in these fisheries, the impacts associated with Option 1 are not expected to be as severe as the impacts associated with reductions in the TAC in Area 1A (Options 4 and 7). However, monitoring the expansion of the pelagic fisheries in Area 2 will be extremely important to ensure that long-term impacts to vessels, processors, and fishing communities can be minimized and/or eliminated. To the extent that these impacts cannot be eliminated over the long-term, the proposed set-asides for incidental catch in the mackerel fishery (Amendment 1) may help to mitigate them.

Table 38 Qualitative Ranking of TAC Options Relative to Potential Social and Economic Impacts

TAC OPTION	WHO/WHAT MAY BE IMPACTED?	NATURE OF IMPACTS	OTHER COMMENTS
4 Largest Impact	• Purse seine vessels • Other vessels dependent on Area 1A • Sardine canneries • Other processors in communities adjacent to GOM • Lobster fishery	• Loss in revenues/income • Loss of supply/effects on markets • Price effects • Derby fishing • Longer steam time • Safety considerations	• This option is likely to produce the most negative social and community impacts • Purse seine vessels most reliant on Area 1A and most limited in terms of flexibility • Possible impacts from reduction in Area 2 TAC, but unlikely in the short-term because proposed TAC at level not yet reached
7	• See Option 4	• See Option 4 • See Option 1 for potential impacts from reduction in Area 2 TAC	• Impacts likely to be much less severe than Option 4, esp. for vessels that can shift to other areas • Reduction in Area 1B makes 1B less available as a relief from closure in Area 1A • Possible impacts from reduction in Area 2 TAC, but unlikely in the short-term because proposed TAC at level not yet reached
1	• Vessels most dependent on Area 2 • Processors in communities adjacent to southern New England/Mid-Atlantic • Possible impacts on mackerel fishery	• Loss in revenues/income • Loss of supply/effects on markets • Possible derby fishing – depending on extent of winter fishery for herring and mackerel • Possible regulatory discarding (mackerel fishery) • Longer steam time • Safety considerations	• Almost all midwater trawl vessels – more flexibility to shift to other areas • Extent of impacts associated with mackerel fishery unknown – depends on markets and further expansion of fishery • Short-term impacts on mackerel fishery not expected to be significant
NMFS-Preferred Action	N/A – Lowers current TACs, but still keeps them at levels significantly higher than the fishery has achieved in recent years.	N/A – Lowers current TACs, but still keeps them at levels significantly higher than the fishery has achieved in recent years.	N/A – Lowers current TACs, but still keeps them at levels significantly higher than the fishery has achieved in recent years.
2 Council-	N/A – Maintains current TACs	N/A – Maintains current TACs	N/A – Maintains current TACs

Preferred Action **No Impact**			

6.3 IMPACTS ON NON-TARGET SPECIES AND BYCATCH

National Standard 9 addresses bycatch in fisheries and requires Councils to consider the bycatch effects of existing and planned conservation and management measures. Bycatch can, in two ways, impede efforts to protect marine ecosystems and achieve sustainable fisheries and the full benefits they can provide to the Nation. First, bycatch can increase substantially the uncertainty concerning total fishing-related mortality, which makes it more difficult to assess the status of stocks, to set the appropriate OY and define overfishing levels, and to ensure that OYs are attained and overfishing levels are not exceeded. Second, bycatch may also preclude other more productive uses of fishery resources.

The term "bycatch" refers to fish that are harvested in a fishery but are not sold or kept for personal use. Bycatch includes the discard of whole fish at sea or elsewhere, including economic discards and regulatory discards, and fishing mortality due to an encounter with fishing gear that does not result in capture of fish (i.e., unobserved fishing mortality). Bycatch does not include any fish that legally are retained in a fishery and kept for personal, tribal, or cultural use, or that enter commerce through sale, barter, or trade. Bycatch does not include fish released alive under a recreational catch-and-release fishery management program.

6.3.1 Impacts of Council-Preferred Alternative

A general summary of species that may be caught incidentally and/or as bycatch in the directed fishery for Atlantic herring is provided in Section 5.3 of this document. Since the TACs in all management areas remain the same as 2003 and 2004 under the Council-preferred alternative for 2005, there are no additional impacts on non-target species and bycatch expected if the proposed specifications are implemented for the 2005 fishing year. This conclusion also applies if the Council maintains the 2005 specifications through the 2006 fishing year unless stock and fishery conditions change considerably during 2005.

Based on the information provided in Section 5.3 of this document, Atlantic mackerel appears to be the only non-target species of which more than negligible amounts are caught in the herring fishery. However, mackerel caught in the herring fishery is an insignificant percentage of total mackerel catch and landings (mackerel landings were about 47 million pounds in 2002). In addition, the Atlantic mackerel resource is near historical high levels, and overfishing of mackerel is not occurring. As a result, all alternatives considered during the herring specification process are not expected to have any impact on the mackerel resource.

There may be indirect positive impacts on non-target species from eliminating the Area 2 TAC reserve under the proposed action. However, because the reserve has never been utilized in the past, it is not possible to characterize the benefits that may accrue from eliminating it in 2005 and/or 2006.

6.3.2 Impacts of NMFS-Preferred Alternative

Since the OY and the TACs in Areas 2 & 3 are lower under the NMFS-preferred alternative, there are no additional impacts on non-target species and bycatch expected if the NMFS-preferred alternative is implemented for the 2005 fishing year. This conclusion also applies if the Council maintains such specifications through the 2006 fishing year unless stock and fishery conditions change considerably during 2005.

6.3.3 Impacts of No Action

The impacts on non-target species and bycatch associated with the no action alternative are similar to those associated with the proposed action, which are discussed in the previous subsection.

6.3.4 Impacts of TAC/OY Options

Based on the information provided in Section 5.3 of this document, Atlantic mackerel appears to be the only non-target species of which more than negligible amounts are caught in the herring fishery. However, mackerel caught in the herring fishery is an insignificant percentage of total mackerel catch and landings (mackerel landings were about 47 million pounds in 2002). In addition, the Atlantic mackerel resource is near historical high levels, and overfishing of mackerel is not occurring.

Also, it may be a misconception that a significant amount of herring is landed incidentally on directed trips in the Atlantic mackerel fishery at this time. All TAC/OY options considered during the herring specification process, as well as the NMFS-preferred alternative, were not expected to have any impact on the mackerel resource in the short-term. Should the mackerel fishery expand significantly, the incidental catch of herring may increase, and impacts on the mackerel fishery may become a more significant concern, especially if the expansion of the mackerel fishery is coincident with a reduction in the TAC for herring in Area 2.

There may be indirect positive impacts on other non-target species from reducing a TAC in one or more management areas (Area 1A and/or Area 2, for example). However, the extent to which benefits to a particular species may accrue under any TAC scenario in the Atlantic herring fishery is unclear and cannot be characterized with any accuracy, given available data (see Section 5.3). This issue will be explored further in Amendment 1 to the Herring FMP.

6.3.5 Impacts of DAH, DAP, TALFF, JVPt, and USAP Alternatives

Based on the information provided in Section 5.3 of this document, Atlantic mackerel appears to be the only non-target species of which more than negligible amounts are caught in the herring fishery. However, mackerel caught in the herring is an insignificant percentage of total mackerel catch and landings (mackerel landings fishery were about 47 million pounds in 2002). In addition, the Atlantic mackerel resource is near historical high levels, and overfishing of mackerel is not occurring. As a result, all alternatives considered during the herring specification process, as well as the NMFS-preferred alternative, are not expected to have any impact on the mackerel resource.

6.4 IMPACTS ON HABITAT

6.4.1 Habitat Impacts of Council-Preferred and the NMFS-Preferred Altnernatives

Because fishing with midwater trawls, the gear predominantly used in the herring fishery, does not impact EFH in a manner that is more than minimal and less than temporary in nature, the impacts to EFH of either of these alternatives are negligible. For more information, please refer to Section 5.0 of the EFH DEIS for the Atlantic Herring FMP that includes the gear effects evaluation and adverse impacts determination.

6.4.2 Habitat Impacts of No Action

Because fishing with midwater trawls, the gear predominantly used in the herring fishery, does not impact EFH in a manner that is more than minimal and less than temporary in nature, the impacts to EFH of this alternative are negligible. For more information, please refer to Section 5.0 of the EFH DEIS for the Atlantic Herring FMP that includes the gear effects evaluation and adverse impacts determination.

6.4.3 Habitat Impacts of TAC/OY Options and Other Alternatives Considered

Because fishing with midwater trawls, the gear predominantly used in the herring fishery, does not impact EFH in a manner that is more than minimal and less than temporary in nature, the impacts to EFH of this alternative are negligible. For more information, please refer to Section 5.0 of the EFH DEIS for the Atlantic Herring FMP that includes the gear effects evaluation and adverse impacts determination.

6.4.4 Essential Fish Habitat (EFH) Assessment

This essential fish habitat (EFH) assessment is provided pursuant to 50 CFR 600.920 of the EFH Interim Final Rule to initiate EFH consultation with the National Marine Fisheries Service.

Description of the Council-preferred and the NMFS-preferred alternatives -- See Section 4.1 for a description of the Council-preferred and the NMFS-preferred alternatives. The activity described by this proposed action, Atlantic herring fishing, occurs throughout the U.S. EEZ. The area affected by either the Council-preferred or the NMFS-preferred alternatives in the Atlantic herring fishery has been identified as EFH for species managed by the FMPs for Atlantic Surf Clam and Ocean Quahog; Northeast Multispecies; Atlantic Sea Scallop; Skates; Summer Flounder, Scup and Black Sea Bass; Atlantic Mackerel, Squid and Butterfish; Bluefish; Atlantic Billfish; Spiny Dogfish; Monkfish; and Atlantic Tunas, Swordfish and Sharks.

Analysis of the effects of the Council-preferred and the NMFS-preferred alternatives – Current levels of fishing activity could increase in management areas 1B, 2 and 3 because the TACs for these three areas, for both the Council-preferred and the NMFS-preferred alternative, exceed current catch levels. However, fishing gear utilized to harvest Atlantic herring has not been shown to have an adverse impact to the EFH of any species (see Section 4.0 of the Omnibus EFH Amendment). Further, a current review of the gear effects evaluations for this fishery indicates no change to the original adverse effects conclusions. The nature of the annual

specifications proposed herein is to simply set area-specific total allowable catch levels and to allocate portions of the catch and processing among the various categories (e.g., DAP, JVPt, IWP, USAP, etc.). This allocation will not have any adverse impacts on the EFH of any managed species.

C. Conclusions -- The annual specifications proposed under either the Council-preferred or the NMFS-preferred alternative have no potential adverse effects on the EFH of any species managed by the New England, Mid-Atlantic or South Atlantic Fishery Management Councils. Because there are no potential adverse impacts associated with this action, no EFH consultation is required.

D. Proposed mitigation -- None required.

6.5 IMPACTS ON PROTECTED SPECIES

6.5.1 Impacts of Council-Preferred Action on Protected Species

Because of the similarity between 2003 and 2004 specification packages with the proposed changes in 2005, impacts to protected species are likely to be consistent with many of those identified in the packages submitted in the two previous years. Specifically, the Council-proposed area TACs remain unchanged from 2004, likely resulting in few differing impacts to endangered, threatened, or other protected species from the Status Quo or No Action Alternative.

For 2005, the Allowable Biological Catch is proposed to be reduced from 300,000 to 220,000 metric tons (mt), possibly leading to conjecture that more forage would be available to protected species, although removals of Atlantic herring have been stable at around 100,000 mt for 15 years (well below the ABC proposed, as well the previous levels of ABC specified). Further, biomass levels have hit record highs during this period and many although clearly not all populations of protected species, but particularly herring-dependent species such as humpback whales and harbor seals, have been increasing during this same timeframe.

Positive benefits, therefore, are likely to be accruing to protected species in general as a result of the overall condition of the herring resource as managed under the Herring FMP (at least during the timeframe in which herring landings have remained at 100,000 mt.) Similar comments would apply to the proposed reduction of Optimum Yield from 250,000 mt to 180,000 mt. A full discussion of herring as forage will be addressed in Amendment 1 to the Herring Fishery Management Plan (FMP) which is currently in preparation.

The reduction of U.S. At-Sea Processing from 20,000 mt to zero would produce little if any changes in impacts since the 2004 specifications were implemented, given that USAP was not utilized in 2004.

With respect to Joint Venture Processing and Total Allowable Level of Foreign Fishing (each proposed to be set at zero), protected species interactions have been recorded for herring midwater trawl gear, including takes of pilot whales and common dolphins by foreign midwater vessels in the 1970s and 1980s. In 2001, foreign processing vessels engaged in JV operations

while fishing under an allocation for TALFF reported the take of a single pilot whale, and two Atlantic white-sided dolphins, and 12 pilot whales (one decomposed) were taken in JV operations during the same year. Elimination of these allocations might be beneficial to protected species as the result of a reduction in potential risk to some number of animals, but any more definitive remarks require more comprehensive observer coverage and data as well as estimates of takes by gear type in this fishery.

Unfortunately, until very recently, the level of observer coverage has been minimal despite the 1999 re-categorization of the herring midwater trawl fishery to Category II on the Marine Mammal Protection Act's (MMPA's) List of Fisheries. This change was to have permitted observers to collect data to more accurately document interactions. Category II fisheries have an occasional likelihood of causing incidental mortality and/or serious injury to marine mammals. The recent 2004 ramping up of observer coverage could provide information to enhance the development of more substantive comments on protected species interactions in herring midwater gear, whether vessels are engaged in domestic or foreign fishing. This will be explored further in the DSEIS for Amendment 1 to the Herring FMP.

6.5.2 Impacts of NMFS-Preferred Action on Protected Species

The impacts of the NMFS-preferred alternative on protected species, because it proposes a lower OY and lower TACs in Areas 2 and 3, as compared with the Council-preferred alternative, are likely to be consistent with or less than many of those impacts identified in the specifications' packages submitted in the two previous years (see discussion in 6.5.1). Furthermore, the NMFS-preferred alternative is not expected to affect endangered and threatened species or critical habitat in any manner not considered in prior consultations on this fishery.

6.5.3 Impacts of No Action on Protected Species

While Total Allowable Catches (TACs), as proposed, remain unchanged from 2004 under the No Action Alternative, Allowable Biological Catch and Optimum Yield are set at higher levels, 300,000 mt and 250,000 mt. respectively. JVP and USAP would be available, but TALFF would remain at zero as in the proposed action.

Following the rationale used in the discussion in the previous section potentially decreased availability of herring to protected species – an outcome of higher levels of ABC and OY in the No Action Alternative – could result in negative impacts to protected species. Again, such a discussion is conjecture given the fishery information available and our knowledge of the food web in the Northwest Atlantic. Furthermore, greater or lesser availability of a particular forage species which also occur naturally may result in shifts in the distribution of protected species and not necessarily negative impacts to populations of protected species (Weinrich, 1997). Again, a discussion of herring as forage will be addressed in Amendment 1 to the Herring Fishery Management Plan (FMP).

The TAC reserve in Area 2 contained in the No Action Alternative was not used in 2004 or previous years, but was adjusted in 2003. In that year, 10,000 mt of the reserve was transferred

to the Area 3 TAC, with no discernable impacts. Similarly, the impact of its elimination is unknown.

JV operations fishing under an allocation of TALFF in 2001 reported the take of a single pilot whale, and two Atlantic white-sided dolphins, and 12 pilot whales (one decomposed) were taken in JV operations during the same year. Interactions of this nature have been historic in the herring fishery, as noted in the Environmental Impact Statement for the Atlantic Herring Fishery Management Plan. A continuance of zero TALFF may provide benefits to protected species if interactions are reduced, while the inclusion of JVP may produce negative, although unquantifiable benefits. Information on takes in JV operations, particularly pilot whales, are well documented, but until observer data is collected and analyzed across the fishery, the impacts of interactions in the domestic herring fishery continue to be unknown.

6.5.4 Impacts of TAC/OY Options and Other Alternatives on Protected Species

Additional options under consideration for specifying TACs and OY for the 2005 fishing year are described in Section 4.4 of this document. Greater or lesser TACs might result in changes to local aggregations of herring, which could translate into greater or lesser availability of prey species to some protected species and possible shifts in fishing effort. None of these outcomes are predictable and the same speculative discussion in the above sections applies to the alternative TAC and OY options that were considered.

6.6 CUMULATIVE EFFECTS

The term "cumulative effects" is defined in the Council of Environmental Quality's (CEQ) regulations in 40 CFR Part 1508.7 as:

"The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Cumulative effects are linked to incremental actions or policy changes that individually may have small outcomes, but that, in the aggregate and combined with other factors, can result in greater environmental effects on the affected environment. At the same time, the CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action on the universe; analyses focus on those effects that are truly meaningful.

The following analysis will identify and characterize the impact on the environment by the preferred alternative proposed in this document when analyzed in the context of other past, present, and reasonably foreseeable future actions. The analysis is generally qualitative in nature because of the limitations of determining effects over the large geographic areas under consideration. The geographic scope of this analysis is the range of the Atlantic herring resource in the U.S. EEZ and adjacent fishing communities. The time frame for the analysis is primarily the 1970's, 1980's, and 1990's for past actions and two years into the future for reasonably foreseeable future actions affecting the herring fishery and other valued ecosystem components (VECs). VECs are elements of the environment on which an analysis of the proposed action was

performed. In this document, VECs are: (1) the herring resource; (2) the herring fishery; (3) non-target species and bycatch; (4) habitat and EFH, and; (5) protected resources.

6.6.1 Past, Present, and Reasonably Foreseeable Future Actions

Section 5.0 of this document summarizes the current state of the herring resource, herring fishery, and provides additional information about habitat, protected resources, and non-target species that may be affected by the NMFS-preferred action.

Past and Present

Although not explicitly described in this document, numerous previous actions to protect marine resources and habitat have contributed to existing conditions. For example, fishery management actions that include gear restrictions, time and area closures, and harvest restrictions have been implemented as part of many MSFMCA managed species' FMPs. Atlantic herring management measures were implemented in two related, but separate FMPs in 1999 – one by the federal government (NEFMC 1999) and one by the states (ASMFC 1999).

Herring Stocks

The status of the herring resource is updated in Section 5.1 of this document, and the history of the herring fishery is summarized in Section 5.2 of this document. The offshore stock has recovered from its collapse in the early 1970s and, overall, the coastal Atlantic herring resource is not overfished. There is more concern for the inshore stock since it receives more fishing pressure.

EFH

The EFH designations for Atlantic herring were developed as part of an Omnibus Amendment prepared by the New England Fishery Management Council (NEFMC) for all NEFMC managed species. The EFH Omnibus Amendment was approved for Atlantic herring by the Secretary of Commerce on October 27, 1999. The final rule implementing the Atlantic herring FMP to allow for the development of a sustainable Atlantic herring fishery was published on December 11, 2000 (65 FR 77450).

The Habitat Closed Areas (HCAs) established in 2004 under Amendment 13 to the Northeast Multispecies FMP and Amendment 10 to the Atlantic Sea Scallop FMP currently prohibit all bottom-tending mobile gear as part of a level 3 closure. Groundfish closed areas, established in 1994 and 1998 to protect the overfished stocks of cod, haddock and other groundfish species, overlap in some areas with the HCAs.

Herring EFH is generally described in Section 5.4 of this document. Herring EFH has not been adversely affected in more than a minimal or temporary manner by fishing activities because the primary substrates utilized by herring for egg deposition are not affected by disturbance, and the fact that the noise produced by fishing operations only temporarily disperses schools of juvenile and adult herring.

Protected Species

A general description of protected species that may be affected by the proposed action is provided in Section 5.5 of this document. The populations of the potentially-affected protected species are generally healthy with notable increases in recent years for some seal species. There is a harbor porpoise Take Reduction Plan in place that is anticipated to reduce takes in gillnet gear, which will have a positive effect on the population of this species. Leatherback sea turtles are endangered and have been declining in the Western North Atlantic area. A comprehensive strategy to address bycatch of turtles in the fisheries of the Atlantic and Gulf Coasts is currently in the planning phase.

Human Environment

Updated information about the human environment is provided in Section 5.2 of this document. The Atlantic herring fishery is stable. Landings have declined dramatically since the 1960s but have been variable since then, averaging about 100,000 mt/year, and have not shown a definite trend. There was a shift to more mobile gear (purse seines and mid-water trawls) from fixed gear in the early 1980s. With that change, the domestic fishery transformed from what was primarily a canning industry for human consumption to a fishery that supplies lobster bait and an overseas market for frozen herring. The economic and social structure of the industry has adjusted to these changes and has not changed significantly in recent years.

Based on the above conclusions, impacts of past and present actions to the VECs considered in this assessment are neutral.

Reasonably Foreseeable Future Actions

Currently under development is Amendment 1 to the Herring Fishery Management Plan. Amendment 1 includes consideration of the following measures which may affect the herring resource and/or fishery: specification of maximum sustainable yield (MSY); adjustments to the specification process for the Atlantic herring fishery; a limited access program for some or all of the herring fishery; adjustment to Atlantic herring management areas; other modifications to permit and reporting requirements; establishment of a purse seine and fixed gear-only area; requirements for observer coverage; bycatch caps for groundfish stocks of concern; and other administrative and procedural measures or adjustments. The management measures for consideration in Amendment 1 are currently being refined at this time. Amendment 1 is scheduled to be implemented sometime during the 2006 fishing year.

In the spring of 2003, the New England Council initiated a Habitat Omnibus Amendment that will be considered Amendment 2 to the Atlantic Herring FMP. It will also amend the Northeast Multispecies (Amendment 14) the Sea Scallop (Amendment 11), Monkfish (Amendment 3), Skate (Amendment 1), Red Crab (Amendment 1) and Atlantic Salmon (Amendment 1) FMPs. This omnibus amendment will fulfill the five year EFH review and revision requirement specified in 50 CFR Section 600.815(a)(10). Although it is not known at this time how the recommendations might change fisheries or fisheries management, the intention is to provide additional habitat and species protection where it appears to be needed.

The Atlantic States Marine Fisheries Commission is developing an amendment to herring management in state waters to promote consistency with federal regulations and the measures under consideration in the Council's Amendment 1. One aspect of the ASMFC herring

management plan that differs from the NMFS management plan is the inclusion of spawning closures (ASMFC 1999). Spawning closures prohibit the exploitation of mature, adult herring in the Gulf of Maine (state waters) during the spawning season (late summer and fall). At this time, it is not possible to predict any impact on the herring resource or herring EFH that would result from any management measures that may be considered in state waters.

Also under development is an EIS entitled "Minimizing Impacts of the Herring Fishery on Essential Fish Habitat," (Herring EFH EIS). The draft NMFS document evaluates the use of herring gear on EFH, as well as all fishing gear on herring EFH, and explores alternatives to minimize impacts, if impacts exist. The final EIS is expected to be published in January, 2005.

The impacts associated with reasonably foreseeable future actions to the VECs considered in this assessment are neutral, as most impacts cannot be predicted at this time.

6.6.2 Non-Fishing Impacts

Non-fishing activities pose a risk to the herring resource. As discussed in detail in the draft Herring EFH EIS (NMFS, July 1, 2004), impacts resulting from non-fishing activities like pollution, loss of coastal wetlands, marine transportation, and marine mining are unknown and/or unquantifiable. In general, the greatest potential for adverse impacts to herring and herring EFH occurs in close proximity to the coast where human induced disturbances, like pollution and dredging activities, are occurring. Because inshore and coastal areas support essential egg, larval and juvenile herring habitats, it is likely that the potential threats to inshore and coastal habitats are of greater importance to the species than threats to offshore habitats. It is also likely that these inshore activities will continue to grow in importance in the future. Activities of concern include chemical pollutants, sewage, changes in water temperature, salinity and dissolved oxygen, suspended sediment and activities that involve dredging and the disposal of dredged material.

6.6.3 Cumulative Impacts on Herring Resource

The Council met the requirements of the MSFCMA and National Standard 1 when it developed the Herring FMP and implemented conservation and management measures that are intended to prevent overfishing and achieve, on a continuing basis, the optimum yield for the Atlantic herring fishery. Fishing mortality from all fishing activities that land Atlantic herring is controlled and accounted for by the TACs described in Section 4.2 of this document. Any additional mortality from non-directed fisheries (bycatch) is accounted for through the stock assessment process. Any additional indirect effects on the Atlantic herring resource from non-fishing activities are difficult to quantify at this time.

The NMFS-preferred fishery specifications for 2005 and possibly 2006 are intended to continue to achieve the goals and objectives of the Herring FMP. The direct and indirect impacts of the NMFS-preferred specifications on the affected environment and the VECs are discussed in detail in Section 6.0 of this document. The TACs are intended to achieve the goals and objectives of the FMP and the MSFCMA by preventing overfishing and providing for OY in the fishery that will produce the greatest overall benefit to the Nation.

As discussed in Section 6.1 of this document, there are no short-term impacts expected on the herring resource from the NMFS-preferred specifications for the 2005 fishing year. The herring resource can support the NMFS-preferred removals and will not experience any adverse direct or indirect impacts resulting from the NMFS-preferred specifications. No cumulative effects are expected in addition to those identified relative to previous actions that affect the herring fishery. Long-term cumulative effects will be evaluated in Amendment 1 to the Herring FMP.

6.6.4 Cumulative Impacts on Fishery

The direct and indirect impacts of the NMFS-preferred specifications on the affected environment and the VECs are discussed in detail in Section 6.0 of this document. The TACs are intended to achieve the goals and objectives of the FMP and the MSFCMA by preventing overfishing and providing for OY in the fishery that will produce the greatest overall benefit to the Nation.

As discussed in Section 6.2 of this document, there are no short-term impacts expected on the herring fishery from the proposed specifications for the 2005 (and possibly the 2006) fishing year. The NMFS-preferred OY and TACs will allow expansion of the fishery, while taking into account biological uncertainty, and, as a result, no cumulative effects are expected in addition to those identified relative to previous actions that affect the herring fishery. Long-term cumulative effects will be evaluated in Amendment 1 to the Herring FMP.

6.6.5 Cumulative Impacts on Non-Target Species and Bycatch

Non-target species are generally summarized in Section 5.3 of this document. There are no direct or indirect impacts of the NMFS-preferred action expected on non-target species or bycatch. When considered in conjunction with other past, present and reasonably foreseeable future actions, the cumulative effects of the alternatives considered are: 1) not discernable because of very low landings of species other than mackerel; and 2) are implicitly considered and mitigated by FMPs for non-target species. All species caught to any degree in the herring fishery, such as alewives, spiny dogfish, blueback herring, and Atlantic mackerel are managed under other FMPs. These FMPs identify significant sources of mortality or other fisheries impacts.

6.6.6 Cumulative Impacts on Habitat (Including EFH)

A general description of habitat and EFH is provided in Section 5.4 of this document. Section 6.4 of this document addresses the direct and indirect impacts of the NMFS-preferred specifications for the 2005 fishing year on habitat and supports the conclusion that no impacts on habitat are expected from the NMFS-preferred action. The impacts of the NMFS-preferred specifications on habitat are not projected to be different than those discussed in the EA for the 2003 or 2004 fishery specifications. In sum, because the NMFS-preferred action equates to both maintaining the No Action (Area 1) or decreasing relative to the No Action (Areas 2 and 3) in terms of area-specific TACs, no additional cumulative effects on habitat are expected. This conclusion applies if the 2005 specifications are maintained through the 2006 fishing year unless stock and fishery conditions change considerably during 2005. The EAs for the 2003 and 2004 herring fishery specifications can be referenced for additional information.

6.6.7 Cumulative Impacts on Protected Species

A general description of protected species is provided in Section 5.5 of this document. Section 6.5 of this document addresses the direct and indirect impacts of the NMFS-preferred specifications for the 2005 fishing year on protected species and supports the conclusion that no impacts on protected species are expected from the NMFS-preferred action. The impacts of the NMFS-preferred specifications on protected species are not projected to be different than those discussed in the EA for the 2003 or 2004 fishery specifications. In sum, because the NMFS-preferred action equates to maintaining (Area 1) and decreasing (Areas 2 and 3), no additional cumulative effects on protected species are expected. This conclusion applies if the 2005 specifications are maintained through the 2006 fishing year unless stock and fishery conditions change considerably during 2005. The EAs for the 2003 and 2004 herring fishery specifications can be referenced for additional information.

6.6.8 Summary of Cumulative Impacts

The NMFS-preferred alternative, together with past and reasonably foreseeable future actions, are not expected to result in significant cumulative impacts to the components of the environment deemed to be affected by this action. The Atlantic herring fishery has been effectively managed since the implementation of the FMP in 1999. Both the resource and the fishery it supports appear to be in good condition. As management continues to protect the stock components from overfishing, the fishery and it's associated communities and industry should continue to prosper. The analysis of the cumulative effects of the NMFS-preferred 2005 (and possibly 2006) specifications, when considered with future actions discussed above, concludes that no significant impacts are expected to the resource or VECs.

7.0 APPLICABLE LAW

7.1 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (MSFCMA)

The proposed specifications for the Atlantic herring fishery implement the requirements of the Atlantic Herring FMP, which established the specification process and its related requirements. The Atlantic Herring FMP was found to be in compliance with the National Standards and other required provisions of the MSFCMA. Nothing related to the proposed specifications for the 2005 (and possibly 2006) fishing year changes this determination.

7.2 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

7.2.1 Finding of No Significant Impact (FONSI)

NOAA Administrative Order 216-6 provides guidance for the determination of significance of the impacts resulting from the management measures contained in fishery management plans, their amendments, and framework adjustments. The nine criteria to be considered are addressed below:

1. *Can the proposed action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action?*

The NMFS-preferred action is not expected to jeopardize the sustainability of the target species affected by this action – Atlantic herring. Relative to the no action alternative, there are no additional biological impacts expected from the NMFS-preferred action in the short-term, as the NMFS-preferred action decreases the current TACs in management areas 2 and 3 designated for the Atlantic herring fishery. The NMFS-preferred action does not allow harvest levels in the Atlantic herring fishery to exceed levels established in recent years. Moreover, the NMFS-preferred reduction in ABC is not likely to result in any short-term impacts because: (1) OY is to be set at a level lower than ABC for reasons discussed in Section 4.6.2, and (2) yield from the domestic herring fishery has never reached the level NMFS-preferred for ABC. The long-term impacts of reducing ABC to 220,000 mt will be discussed further in the DSEIS for Amendment 1 to the Herring FMP, as Amendment 1 is proposing an MSY proxy equivalent to 220,000 mt. Based on updated stock information and conclusions provided by the Herring PDT/TC, the Council has concluded the herring resource is healthy at this time, and the NMFS-preferred action is therefore biologically sound.

2. *Can the proposed action be reasonably expected to jeopardize the sustainability of any non-target species?*

A general description of the non-target species that may be affected by the NMFS-preferred action is provided in Section 5.3 of this document, and potential impacts are discussed in Section 6.3. The NMFS-preferred action is not expected to jeopardize the sustainability of any non-target species. The NMFS-preferred action does not allow harvest levels in the Atlantic herring

fishery to exceed levels established in recent years, and there are no significant changes in fishing effort and/or fishing patterns expected from the NMFS-preferred action. Since this action proposes to decrease OY and the area 2 and 3 TACs through 2005 and possibly 2006, there is no indication that impacts on non-target species will be greater than those expected in 2003 and 2004. The Environmental Assessments for the 2003 and 2004 specifications can be referenced for additional information.

3. Can the proposed action be reasonably expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Act and identified in FMPs?

EFH and habitat are generally described in Section 5.4 of this document, and impacts are discussed in Section 6.4. This action is not expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Act and identified in the FMP. In general, EFH that occurs in areas where the fishery occurs is designated as the bottom habitats consisting of varying substrates (depending upon species) within the Gulf of Maine, Georges Bank, and the continental shelf off southern New England and the Mid-Atlantic south to Cape Hatteras. The primary gears utilized to harvest Atlantic herring are purse seines and midwater trawls which typically do not impact bottom habitats. NOAA fisheries concluded that a consultation under the Magnuson-Stevens Act's EFH provisions was not required for the 2003 and 2004 herring specifications, and the same holds true for the specifications NMFS-preferred for the 2005 fishing year. This also would be the case if these specifications were maintained for the 2006 fishing year.

4. Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

When developing management measures, the Council usually receives extensive comments from affected members of the public regarding the safety implications of measures under consideration. The NMFS-preferred specifications are not expected to have substantial adverse impacts on public health or safety.

5. Can the proposed action be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Protected resources that may be affected by the NMFS-preferred action are generally described in Section 5.5 of this document, and impacts are discussed in Section 6.5. The NMFS-preferred action is not reasonably expected to have an adverse impact on endangered or threatened species, marine mammals, or critical habitat for these species. The activities to be conducted under the NMFS-preferred action are within the scope of the FMP and do not change the basis for the determinations made in previous consultations.

6. Can the proposed action be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Cumulative effects related to the NMFS-preferred action are discussed in Section 6.6 of this document. This action equates to lowering OY and the TACs for areas 2 and 3 for the herring fishery through the 2005 fishing year, resulting in no significant cumulative adverse effects to the herring resource or non-target species associated with the fishery. The NMFS-preferred

specifications account for uncertainly regarding the herring stock status while allowing for expansion of the fishery and associated economic opportunities. This determination also applies if the 2005 specifications are maintained for the 2006 fishing year, unless stock and fishery conditions change substantially during 2005.

7. Can the proposed action be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships)?

The NMFS-preferred action is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area. While herring is recognized as one of many important forage fish for marine mammals, other fish, and birds throughout the region, the resource appears to be large enough at this time to accommodate all predators including Atlantic bluefish, Atlantic striped bass, and several other pelagic species such as shark and tunas. The Atlantic herring itself is not known to prey on other species of fish but prefers chaetognaths and euphausiids. The NMFS-preferred action will likely continue to ensure biodiversity and ecosystem stability over the short-term. A comprehensive assessment of this issue and a discussion of long-term impacts on biodiversity will be included in the DSEIS for Amendment 1 to the Herring FMP, currently under development.

8. Are significant social or economic impacts interrelated with significant natural or physical environmental effects?

A discussion of the impacts of the NMFS-preferred action is presented in Section 6.0 of this document. Although the NMFS-preferred action decreases the area TACs in areas 2 and 3 for the Atlantic herring fishery from the 2004 fishing year and maintains the USAP allocation of 20,000 mt this allocation will not result in significant economic and social impacts, nor are there any significant natural or physical environmental effects expected to result from the NMFS-preferred action.

9. To what degree are the effects on the quality of human environment expected to be highly controversial?

The NMFS-preferred action is not expected to be highly controversial. The OY and TACs specified are not expected to be controversial and will allow expansion of the herring fishery while, at the same time, minimize the risk of overfishing the inshore component of the resource, which is recognized as the limiting factor when allocating catches by management area. The degree of controversy associated with the NMFS NMFS-preferred USAP specification of 20,000 mt is difficult to predict and may be controversial, generating negative responses from shoreside processors and their supporters. While the Council recommended USAP to be set at 0 mt, the justification for this recommendation is not sufficiently robust to support the prioritization of one segment of the U.S. industry over another.

FONSI STATEMENT

In view of the analysis presented in this document, the EA/RIR/IRFA for the 2005 specifications, and the EIS for the Atlantic Herring Fishery Management Plan, implementing the proposed specifications through the 2005 and 2006 fishing year will not have a significant effect on the human environment, with specific reference to the criteria contained in Section 6.02 of NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act, May 20, 1999.

Assistant Administrator for Fisheries, NOAA Date

7.3 MARINE MAMMAL PROTECTION ACT

The NEFMC has reviewed the impacts of the 2005 herring specifications on marine mammals and has concluded that the management actions proposed are consistent with the provisions of the MMPA, and will not alter existing measures to protect the species likely to inhabit the herring management unit. For further information on the potential impacts of the fishery and the proposed management action on marine mammals, see Section 6.5 of this document.

7.4 ENDANGERED SPECIES ACT

Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The NEFMC has concluded, using information available at this writing, that the proposed herring specifications and the prosecution of the herring fishery is not likely to jeopardize any ESA-listed species or alter or modify any critical habitat, based on the discussion of impacts in this document (Section 6.5). Several changes were made between the 2004 and 2005 specifications and are discussed in Section 6.5. The NEFMC is seeking the concurrence of the National Marine Fisheries Service in this matter.

7.5 ADMINISTRATIVE PROCEDURES ACT

The Council is not requesting relief from the requirements of the APA for notice and comment rulemaking.

7.6 PAPERWORK REDUCTION ACT

The proposed contains no new or additional collection-of-information requirements.

7.7 COASTAL ZONE MANAGEMENT ACT

The Council determined that the proposed 2005 (and possibly 2006) Atlantic herring specifications are consistent with the approved coastal management programs of Maine, New

Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina.

This determination was submitted for review by the responsible state agencies under §307 of the Coastal Zone Management Act.

7.8 DATA QUALITY ACT

Pursuant to NOAA Fisheries guidelines implementing Section 515 of Public Law 106-554 (Data Quality Act), all information products released to the public must first undergo a Pre-Dissemination Review to ensure and maximize the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies. The following section addresses these requirements.

Utility

Utility means that disseminated information is useful to its intended users. "Useful" means that the content of the information is helpful, beneficial, or serviceable to its intended users, or that the information supports the usefulness of other disseminated information by making it more accessible or easier to read, see, understand, obtain or use. The intended users of the information contained in this document are participants in the Atlantic herring fishery and other interested parties and members of the general public. The information contained in this document may be useful to owners of vessels holding an Atlantic herring permit as well as Atlantic herring dealers and processors since it serves to notify these individuals of any potential changes to management measures for the fishery. This information will enable these individuals to adjust their fishing practices and make appropriate business decisions based on the new management measures and corresponding regulations.

The information being provided in this specifications package concerning the status of the Atlantic herring fishery is updated based on landings and effort information through the 2003 fishing year (January 1 – December 31, 2003). Information presented in this document is intended to support the proposed specifications for the 2005 (and possibly 2006) fishing year, which have been developed through a multi-stage process involving all interested members of the public. Consequently, the information pertaining to management measures contained in this document has been improved based on comments from the public, fishing industry, members of the Council, and NOAA Fisheries.

The media being used in the dissemination of the information contained in this document will be contained in a *Federal Register* notice announcing the proposed and final rules for this action. This information will be made available through printed publication and on the Internet website for the Northeast Regional Office (NERO) of NOAA Fisheries.

Integrity

Integrity refers to security – the protection of information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification. Prior to

dissemination, NOAA information, independent of the intended mechanism for distribution, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information.

Objectivity

Objective information is presented in an accurate, clear, complete, and unbiased manner, and in proper context. The substance of the information is accurate, reliable, and unbiased; in the scientific, financial, or statistical context, original and supporting data are generated and the analytical results are developed using sound, commonly-accepted scientific and research methods. "Accurate" means that information is within an acceptable degree of imprecision or error appropriate to the particular kind of information at issue and otherwise meets commonly accepted scientific, financial, and statistical standards.

Several sources of data were used in the development of this document, including the analysis of potential impacts. These data sources include, but are not limited to: landings data from vessel trip reports, landings data from individual voice reports, information from resource trawl and hydroacoustic surveys, data from the dealer weighout purchase reports, descriptive information provided (on a voluntary basis) by processors and dealers of Atlantic herring, and ex-vessel price information. Although there are some limitations to the data used in the analysis of impacts of management measures and in the description of the affected environment, these data are considered to be the best available.

The policy choices (i.e., management measures) proposed in this specifications package are supported by the best available scientific information. Qualitative discussion is provided in cases where quantitative information was unavailable, utilizing appropriate references as necessary.

The review process for any action under an FMP involves the Northeast Regional Office (NERO) of NOAA Fisheries, the Northeast Fisheries Science Center (Center), and NOAA Fisheries Headquarters (Headquarters). The Council review process involves public meetings at which affected stakeholders have the opportunity to provide comments on the proposed changes to the FMP. Reviews by staff at NERO are conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. The Center's technical review is conducted by senior-level scientists with specialties in population dynamics, stock assessment methodology, fishery resources, population biology, and the social sciences.

Final approval of this specification package and clearance of the proposed and final rules is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget. This review process is standard for any action under an FMP, and provides input from individuals having various expertise who may not have been directly involved in the development of the proposed action. Thus, the review process for any FMP modification, including the herring specifications for the 2005 (and possibly 2006) fishing year, is performed by technically-qualified individuals to ensure the action is valid, complete, unbiased, objective, and relevant.

7.9 IMPACTS RELATIVE TO FEDERALISM/E.O. 13132

The Executive Order on Federalism established nine fundamental federalism principles to which Executive agencies must adhere in formulating and implementing policies having federalism implications. The E.O. also lists a series of policy making criteria to which agencies must adhere when formulating and implementing policies that have federalism implications. However, no federalism issues or implications have been identified relative to the proposed action.

The proposed action does not contain policies with federalism implications sufficient to warrant preparation of an assessment under E.O. 13132. The affected States have been closely involved in the development of the proposed specifications through their involvement in the Regional Fishery Management Council process (i.e., all affected states are represented as voting members on at least one Council) and the ASMFC process. The proposed specifications were developed with the full participation and cooperation of the state representatives of the New England Council and the ASMFC Atlantic Herring Section. No comments were received from any state officials relative to any federalism implications of the proposed specifications.

7.10 REGULATORY FLEXIBILITY ACT/E.O. 12866

7.10.1 Regulatory Impact Review and Initial Regulatory Flexibility Analysis (IRFA)

This section provides the analysis and conclusions to address the requirements of Executive Order 12866 and the Regulatory Flexibility Act (RFA). Since many of the requirements of these mandates duplicate those required under the Magnuson-Stevens Act and NEPA, this section contains references to other sections of this document. The following sections provide the basis for concluding that the proposed action is not significant under E.O. 12866 and will not have a significant economic impact on a substantial number of small entities under the RFA.

7.10.2 Description of Management Objectives

The goals and objectives of the management plan for the Atlantic herring resource are stated in Section 2.3 of the Atlantic Herring FMP. The proposed action is consistent with, and does not modify those goals and objectives.

7.10.3 Description of the Fishery

Section 4.0 of the Herring FMP contains a detailed description of the Atlantic herring fishery. Following development of the FMP, Stock Assessment and Fishery Evaluation (SAFE) Reports have been prepared for each fishing year from 1998-2003. The May 5, 2004 Herring PDT/TC Report serves as the SAFE Report for the 2003 fishing year, and much of the updated information from this report is presented in Section 5.0 of this document.

7.10.4 Statement of the Problem

The purpose and need for this action is identified in Section 3.0 of this document. The Herring FMP requires that the Council and the Regional Administrator annually review the best available stock and fishery data when developing specifications for the upcoming fishing year.

7.10.5 Description of the Alternatives

The proposed action is described in Section 4.2 of this document. Alternatives to the proposed action that were considered during the specification process are described in Sections 4.3 (no action), 4.4 (TAC and OY options), and 4.5 (other fishery specifications) of this document.

7.10.6 Economic Analysis

The economic impacts of the proposed action are discussed in Section 6.2.1 of this document. In general, no economic impacts are expected because the proposed action lowers the OY and the Area 2 and 3 TACs, as compared to 2003/2004, but still maintains those measures at levels higher than have been achieved in recent years, thereby presenting no economic constraints to the fishery. The economic impacts of other alternatives considered during the specification process are discussed in Section 6.2.1 of this document.

7.10.7 Determination of Significance Under E.O. 12866

NMFS Guidelines provide criteria to be used to evaluate whether a proposed action is significant. A significant regulatory action means any regulatory action that is likely to result in a rule that may:

1. *Have an annual effect on the economy of $100 million or more, or adversely effect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or tribal governments or communities.*

   The proposed action will not have an effect on the economy in excess of $100 million. The proposed action is not expected to have any adverse impacts on the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local or tribal governments or communities.

2. *Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency.*

   The proposed action will not create a serious inconsistency with or otherwise interfere with an action taken or planned by another agency. No other agency has indicated that it plans an action that will affect the Atlantic herring fishery in the EEZ.

3. *Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof.*

   The proposed action will not materially alter the budgetary impact of entitlements, grants, user fees or loan programs, or the rights and obligations of their participants.

4. *Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.*

   The proposed action does not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in E.O. 12866.

7.10.8 Initial Regulatory Flexibility Analysis

The following sections contain analyses of the effect of the proposed action on small entities. Under Section 603(b) of the RFA, each initial regulatory flexibility analysis is required to address:

1. Reasons why the agency is considering the action,
2. The objectives and legal basis for the proposed rule,
3. The kind and number of small entities to which the proposed rule will apply,
4. The projected reporting, record-keeping and other compliance requirements of the proposed rule, and
5. All Federal rules that may duplicate, overlap or conflict with the proposed rule.

7.10.9 Reasons for Considering the Action

The purpose and need for this action is identified in Section 3.0 of this document. The Herring FMP requires that the Council and the Regional Administrator annually review the best available stock and fishery data when developing specifications for the upcoming fishing year.

7.10.10 Objectives and Legal Basis for the Action

The objective of the proposed action is to implement specifications for the 2005 Atlantic herring fishery, and possibly 2006, as required under the regulations implementing the Atlantic Herring FMP, which are provided in 50 CFR 648.

7.10.11Description and Number of Small Entities to Which the Rule Applies

All of the potentially affected businesses are considered small entities under the standards described in NOAA Fisheries guidelines because they have gross receipts that do not exceed $3.5 million annually. During the 2003 fishing year, there were 154 vessels that landed herring, 38 of which averaged more than 2000 lb of herring per trip.

7.10.12 Recordkeeping and Reporting Requirements

The proposed action does not introduce any new reporting, recordkeeping, or other compliance requirements.

7.10.13 Duplication, Overlap, or Conflict with Other Federal Rules

The proposed action does not duplicate, overlap or conflict with any other Federal rules.

7.10.14 Economic Impacts on Small Entities Resulting from the Council-Preferred Alternative

Section 6.2.1 of this document contains the economic analysis of the Council-preferred alternative and other alternatives that were considered during the specification process. The proposed action is not expected to produce a negative economic impact to vessels prosecuting the fishery because it maintains the current (2003/2004) TACs for herring in all management areas. The Council-preferred, 2005 specifications should allow for incremental growth in the industry, while taking into consideration biological uncertainty.

The specification of 180,000 mt for OY and DAH is recommended for the 2005 fishery, and possibly for the 2006 fishery if stock and/or fishery conditions do not change significantly during 2005. At this level, there could be an increase of up to 80,000 mt in herring landings or $11,440,000 in revenues based on a market price of $143/mt. This could allow individual vessels to increase their profitability under the 2005 specifications, depending on whether or not new vessels enter the fishery (the herring fishery will remain an open-access fishery for the 2005 fishing year). The magnitude of economic impacts related to the 176,000 mt specification of DAP will depend on the shoreside processing sector's ability to expand markets and increase capacity to handle larger amounts of herring during 2005 and 2006.

The potential loss associated with eliminating the JVPt allocation (20,000 mt for 2003 and 2004) could approximate $2.8 million (based on an average price of $143/mt) if all of the 20,000 mt allocation would have been utilized (10,000 mt for JVP and 10,000 mt for IWP). However, very little of the 10,000 mt JVP allocation was utilized in 2002 and 2003, and as of August 2004, no JVP activity for herring has occurred during the 2004 fishing year. The Council received no indication that demand for the JVP allocation will increase in 2005 and 2006. As a result, no substantial economic impacts are expected from reducing the JVP allocation to 0 mt in 2005 and possibly 2006.

The Area 1A and 1B TACs of 60,000 and 10,000 mt, respectively, remained unchanged since the 2000 fishery. In 2002 and 2003, the Area 1A TAC for the directed herring fishery was fully utilized and is expected to be fully utilized for the 2005 fishery. Therefore, no change is expected in profitability of vessels from the 2005 Area 1A specification. Since only 4,917 mt of herring were harvested in Area 1B in 2003, the proposed 2005 specification of 10,000 mt should allow for increased economic benefits to individual vessels prosecuting the fishery in this management area.

The potential loss associated with eliminating the USAP allocation (20,000 mt for 2003 and 2004) could approximate $2.8 million (based on an average price of $143/mt) if all of the 20,000 mt allocation would have been utilized in 2005. However, since the allocation of 20,000 mt to USAP has never been utilized, setting this allocation at 0 mt for 2005 will not result in economic impacts in the short-term. The long-term implication of keeping USAP as a separate specification that gets an allocation, even though the allocation has never been utilized, is that it discourages investment in a form of processing that may be better able to respond to changing market and stock conditions, and it may have encouraged investment in more permanent onshore processing capacity.

7.10.15 Economic Impacts on Small Entities Resulting from the NMFS-Preferred Alternative

Section 6.2.1 of this document contains the economic analysis of the NMFS-preferred alternative. This alternative is not expected to produce a negative economic impact to vessels prosecuting the fishery because, while it reduces the current (2003/2004) TACs for herring in Areas 2 & 3 (while keeping Areas 1A and 1B the same), it still allows for landings levels that are significantly higher than the average landings achieved by the fishery in recent years. The NMFS-preferred, 2005 specifications should allow for incremental growth in the industry, while taking into consideration biological uncertainty.

The specification of 150,000 mt for OY and DAH is recommended for the 2005 fishery, and possibly for the 2006 fishery if stock and/or fishery conditions do not change significantly during 2005. At this level, there could be an increase of up to 50,000 mt in herring landings or $7,150,000 in revenues based on a market price of $143/mt. This could allow individual vessels to increase their profitability under the 2005 specifications, depending on whether or not new vessels enter the fishery (the herring fishery will remain an open-access fishery for the 2005 fishing year). The magnitude of economic impacts related to the 146,000 mt specification of DAP will depend on the shoreside processing sector's ability to expand markets and increase capacity to handle larger amounts of herring during 2005 and 2006.

The potential loss associated with eliminating the JVPt allocation (20,000 mt for 2003 and 2004) could approximate $2.8 million (based on an average price of $143/mt) if all of the 20,000 mt allocation would have been utilized (10,000 mt for JVP and 10,000 mt for IWP). However, very little of the 10,000 mt JVP allocation was utilized in 2002 and 2003, and as of August 2004, no JVP activity for herring has occurred during the 2004 fishing year. The Council received no indication that demand for the JVP allocation will increase in 2005 and 2006. As a result, no substantial economic impacts are expected from reducing the JVP allocation to 0 mt in 2005 and possibly 2006.

The Area 1A and 1B TACs of 60,000 and 10,000 mt, respectively, remained unchanged since the 2000 fishery. In 2002 and 2003, the Area 1A TAC for the directed herring fishery was fully utilized and is expected to be fully utilized for the 2005 fishery. Therefore, no change is expected in profitability of vessels from the 2005 Area 1A specification. Since only 4,917 mt of herring were harvested in Area 1B in 2003, the proposed 2005 specification of 10,000 mt should allow for increased economic benefits to individual vessels prosecuting the fishery in this

management area. The potential economic gains associated with allocating 20,000 mt for USAP could approximate $2.8 million (based on an average price of $143/mt) if all of the 20,000 mt allocation were utilized in 2005.

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9.0 LIST OF PREPARERS AND AGENCIES CONSULTED

This document was prepared by the New England Fishery Management Council and the National Marine Fisheries Service, in consultation with the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council. Members of the New England Fishery Management Council's Herring Plan Development Team and the ASMFC Herring Technical Committee include:

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In addition, the following agencies were consulted during the development of the herring fishery specifications, either through direct communication/correspondence and/or participation on the Herring Committee or PDT:

NOAA Fisheries, National Marine Fisheries Service, Northeast Regional Office, Gloucester MA

Northeast Fisheries Science Center, Woods Hole MA

Atlantic States Marine Fisheries Commission and Atlantic Herring Section

Mid-Atlantic Fishery Management Council

Letters were also sent to the potentially-affected States for the purposes of reviewing the consistency of the proposed action relative to each State's Coastal Zone Management Program (see Section 7.7 of this document for a list of States that were contacted).

10.0 LIST OF ACRONYMS

ABC	Allowable Biological Catch
ASMFC	Atlantic States Marine Fisheries Commission or Commission
B	Biomass
BT	Border Transfer
CEQ	Council on Environmental Quality
DAH	Domestic Annual Harvest
DAP	Domestic Annual Processing
DEA	Data Envelopment Analysis
DSEIS	Draft Supplemental 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 of 1973
F	Fishing Mortality Rate
FMP	Fishery Management Plan
FY	Fishing Year
HCA	Habitat Closed Area
HPTRP	Harbor Porpoise Take Reduction Plan
IRFA	Initial Regulatory Flexibility Analysis
IOY	Initial Optimal Yield
IVR	Interactive Voice Response
IWP	Internal Waters Processing
JVP	Joint Venture Processing
LWTRP	Large Whale Take Reduction Plan
M	Natural Mortality Rate

MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistical Survey
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
mt	metric tons
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS	National Standard
NSGs	National Standard Guidelines
OY	Optimum Yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
RIR	Regulatory Impact Review
SARC	Stock Assessment Review Committee
SAV	Submerged Aquatic Vegetation
SAW	Stock Assessment Workshop
SSB	Spawning Stock Biomass
SSC	Scientific and Statistical Committee
SFA	Sustainable Fisheries Act
TAC	Total Allowable Catch
TALFF	Total Allowable Level of Foreign Fishing
TC	Technical Committee
USAP	U.S. At-Sea Processing
VECs	Valuable Environmental Components
VMS	Vessel Monitoring System
VPA	Virtual Population Analysis
VTR	Vessel Trip Report