Atlantic States Marine Fisheries Commission

Atlantic Herring Section

November 2, 2015
10:45 a.m. – 12:15 p.m.
St. Augustine, Florida

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order (*T. Stockwell)* 10:45 a.m.

2. Board Consent 10:45 a.m.
   - Approval of Agenda
   - Approval of Proceedings from August 2015

3. Public Comment 10:50 a.m.

4. 2016-2018 Atlantic Herring Fishery Specifications **Final Action** 11:00 a.m.
   - Review New England Fishery Management Council Specifications (*A. Harp*)
   - Set Seasonal Splitting of Sub-ACL for Areas 1A, 1B, and 2, Quota Rollover and Sub-ACL Trigger

5. Consider Draft Amendment 3 for Public Comment **Action** 11:35 a.m.
   - Review Revised Spawning Area and Empty Fish Hold Provision Options (*A. Harp*)

6. Other Business/Adjourn 12:15 p.m.

The meeting will be held at the World Golf Village Renaissance, 500 South Legacy Trail, St. Augustine, FL

MEETING OVERVIEW

Atlantic Herring Section Meeting
November 2, 2015
10:45 a.m. – 12:15 p.m.
St. Augustine, Florida

Chair: Terry Stockwell (ME) *Assumed Chairmanship 10/13*	Technical Committee Chair: Renee Zobel	Law Enforcement Committee Michael Eastman
Vice Chair: Ritchie White (NH)	Advisory Panel Chair: Jeff Kaelin	Previous Section Meeting: August 4, 2015
Voting Members: ME, NH, MA, RI, CT, NY, NJ (7 votes)		

2. Section Consent

- Approval of Agenda
- Approval of Proceedings from August 2015

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the Agenda. Individuals that wish to speak at this time must sign in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Section Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Section Chair may allow limited opportunity for comment. The Section Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Set 2016-2018 Atlantic Herring Fishery Specifications
(11:00 – 11:35 a.m.)

Background

- Set the specifications in 1A for the 2016-2018 fishery **(NEFMC Motions and Selected Alternatives/Options in Briefing Materials)**

Presentation

- Review New England Fishery Management Council Specifications by A. Harp

Board Actions for Consideration at this Meeting

- Set Seasonal Splitting of Sub-ACL for Areas 1A, 1B, and 2, Quota Rollover and Sub-ACL Trigger

5. Consider Draft Amendment 3 for Public Comment
(11:35 – 12:15 p.m.)

Background

- The Section approved Draft Amendment 3 for public comment at the May 2015 meeting but then withdrew the document from public comment in June when Section members expressed concern about the highly technical nature of the proposed measures and the potential impacts of these measures to the fishing industry.
- In August 2015, the Section tasked the PDT with revising the options based on the primary goal of protecting spawning fish in the areas they spawn.
- The PDT created new and revised options in the Spawning Efficacy section and the Empty Fish Hold Provision section. **(Public Comment in Briefing Materials; Draft Amendment 3 Options in Supplemental Materials)**

Presentation

- Revised Spawning Area and Empty Fish Hold Provision Options by A. Harp

Board Actions for Consideration at this Meeting

- Consider approval of Draft Amendment 3 options for public comment

6. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC HERRING SECTION

The Westin Alexandria
Alexandria, Virginia
August 4, 2015

These minutes are draft and subject to approval by the Atlantic Herring Section
The Section will review the minutes during its next meeting

TABLE OF CONTENTS

CALL TO ORDER **1**
APPROVAL OF THE AGENDA **1**
APPROVAL OF THE PROCEEDINGS **1**
REVIEW OF DRAFT AMENDMENT 3 ..... **1**
UPDATE ON NEFMC ACTIVITIES **16**

INDEX OF MOTIONS

1. Move that the PDT develop options to protect spawning fish by prohibiting landing of Atlantic herring caught within the specific spawning areas defined as eastern Maine and western Maine/MA/NH.
Motion made by Dr. Pierce and seconded by Mr. Grout. Motion carries (7 in favor) on page 10

2. **Move to include in Draft Amendment 3 the timing options regarding spawning stage, defaults, and end of spawning closure. These issues are described in memo to the Board dated July 22, 2015.**
Motion made by Dr. Pierce and seconded by Rep. Kumiega. Motion carries on page 14.

ATTENDANCE

Section Members

Terry Stockwell, ME, proxy for P. Keliher (AA)
Steve Train, ME (GA)
Rep. Walter Kumiega, ME (LA)
Doug Grout, NH (AA)
G. Ritchie White, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Jocelyn Cary, MA, proxy for Rep. S. Peake, MA (LA)
David Pierce, MA (AA)
Bill Adler, MA (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
David Borden, RI (GA)
Mark Gibson, RI, proxy for R. Ballou (AA)
Dave Simpson, CT (AA)
Dr. Lance Stewart, CT (GA)
Rep. Craig Miner, CT (LA)
Katherine Heinlein, NY, proxy for Sen. Boyle (LA)
Emerson Hasbrouck, NY (GA)
Jim Gilmore, NY (AA)
Adam Nowalsky, NJ, proxy for Asm. Sgt. R. Andrzejczak (LA)
Tom Baum, NJ, proxy for D. Chanda (AA)
Tom Fote, NJ (GA)

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Jeff Kaelin, Advisory Panel Chair
Renee Zobel, Technical Committee Chair
Michael Eastman, Law Enforcement Representative

Staff

Robert Beal
Toni Kerns
Jeff Kipp
Melissa Yuen

Guests

Raymond Kane, CHOIR

The Atlantic Herring Section of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of The Westin Alexandria, Alexandria, Virginia, August 4, 2015, and was called to order at 10:25 o'clock a.m. by Chairman Terry Stockwell.

CALL TO ORDER

CHAIRMAN TERRY STOCKWELL: Good morning, everyone. We're going to convene the Atlantic Herring Section. I want to begin the meeting by welcoming Ashton Harp to the commission and the section. I'll call the meeting to order.

APPROVAL OF THE AGENDA

CHAIRMAN TERRY STOCKWELL: The first order of business is approval of the agenda. Are there any issues or edits to the agenda?

APPROVAL OF THE PROCEEDINGS

CHAIRMAN TERRY STOCKWELL: Seeing none; we will approve the proceedings from May of 2015. Are there any edits or changes to the minutes? Seeing none; are there any comments from the public on items that are not on the agenda? Seeing none; we're going to move right ahead into our major agenda item to develop further guidance for the PDT on Draft Amendment 3. I want to thank Renee and the technical committee for putting together a PowerPoint presentation for us and turn it over to Renee.

REVIEW OF DRAFT AMENDMENT 3

MS. RENEE ZOBEL: As we were looking through the information from the meeting this winter and other information, it seemed like there is a little bit of confusion over what was presented. We wanted to kind of give a little bit of an overview, and then we're looking for some clarification as well. We thought at first it would be a little bit informative to over where we've been for spawning closure history since the original FMP in 1993.

With the number of the items that have been in discussion as we've been developing this amendment, we took a look at the closures, the tolerances, the default dates. Basically the takeaway is that a lot has change over time with these spawning closures. In the original FMP we had four areas; we had a 25 percent tolerance; various default dates. We then went to a full 13-week closure for all areas, which ended up with a local depletion problem and we had to import fish from Canada as a result.

Then following that, we went to three areas because our default dates for Central Maine and Western Maine were the same and they were closing at the same time. A decision was made at that time to combine those areas. In Amendment 2 we did away with the tolerance and went to zero tolerance. Going back through those management actions that appeared to be primarily from a law enforcement perspective; that was something that came out of the Law Enforcement Committee, as well as the goal to prevent spawning fish from hitting the dock.

We've have had a sampled-based closure history since 2000 where we've taken 50-fish samples. Now we take a hundred fish samples and we have to have fewer than seven days that exceed the GSI values for the different size classes to trigger those closures. This is all just an overview, so don't get hung up too much on the details here.

Over time it appears that the goals and objectives of spawning closures have changed somewhat. In the original FMP the goal was to provide adequate protection for spawning herring and prevent damage to herring egg beds. In Addendum I, where they did away with some of the tolerance, it was specific measures which are designed to reduce the exploitation and destruction of herring spawning aggregations while providing a limited opportunity to harvest herring during that time of the year.

That in particular was in response to a very long closure for all of the areas and the problem harvesting in the area at the time. Then in Amendment 2 we go back and again specify that we're looking for adequate protection for spawning herring in prevent damage to herring egg beds. As the technical committee looking at these, basically our question is what are the goals and objectives of the spawning closures?

Previously all of the management measures that I've stated so far were all based on expert opinion, literature and public input. As the technical committee we were tasked to look at spawning closure efficacy; and we did it from over ten years of data that we now have available to us. The question is – and it could be other goals as well – are the goals to prevent spawning fish from being taken, the goal to prevent fishing operations that will disrupt spawning activity or is it some combination of the two or something that hasn't been presented in any management actions thus far?

Having those goals and objectives clarified would help us as the technical committee know how to advise from a technical perspective these different management actions that we're looking at. Just some things about those, in Amendment 2 there are considerations where it was preventing spawning fish from being taken. There are concerns about the tolerance provision via public comment and law enforcement.

The public comment, some of which were quite strong, was that there shouldn't be catch of spawning herring. The 2,000 pound bycatch allowance was established at that time. Likewise, to prevent fishing operations that will disrupt spawning activity; there is a bit of anecdotal evidence that suggests fishing in an area where there is spawning behavior and the herring are not necessarily being caught had some disruption to the biological processes of the fish.

Our first closure parameters were established in the early 1990's. They were based, like I said, primarily on expert opinion, literature and public comment. They had very little basis on data. We reviewed the data as tasked, looked at the efficacies of the spawning closure and were able to look over ten years' worth of GSI sampling data by the states of Maine and Massachusetts to examine the effectiveness of the current closures and recommend, where appropriate, options based on the data.

There are over 8,000 samples that were taken during that timeframe for us to be able to inform the methodology, which Micah has presented prior to me during an overview about our forecasting methodology. Just a quick review – I know this was a very technical moment in the last meeting so I'm going to review it on a very surface basis more conceptually.

Micah went into a lot of detail about this, some of which is probably a little bit confusing just due to the technical nature of the work. The technical committee took a look at the data and found that there was a wonderful relationship between the linear

relationship with the GSIs and the length of fish over time as the maturity went on throughout the course of the season.
What this does is through samples, due to this linear relationship, it allows us to forecast the date at which those fish will reach spawning potential. When they're fully mature, having those samples and being able to track them over time can give us a really great indication of when spawning is going to happen, which is essentially what is up there now.

This just goes into different years and projected spawning dates for the area. As you can see, there is a lot of variability between each year, which is another huge advantage of going with the methodology like this. We've seen that there is a significant amount of inter-annual variability; so spawning could happen very early one year and very late the next year. There could be a big difference year to year in those timings.

You see the numbers up there. There are GSI thresholds that Micah presented that basically come down to risk tolerance. Looking at the different numbers, the fish were all standardized to length of 30. Why that happened is because the larger the fish is the earlier it spawns; so we wanted to be as precautionary as possible.

In order to do this type of forecasting, all the fish are standardized to the same length. In this case you can come up to different GSI values that will correspond to the percent of mature fish spawning. The closer that you get to that hundred percent, the more risky it is. The lower you get, the more pre-spawning fish you're going to be protecting in the process, too, so that comes back to your management goals.

Micah had laid out a few different options; one that would trigger at 70 percent of mature fish spawning; one that would trigger at 80 percent; and one that would trigger at 90 percent. Using those different triggers results in different potential dates for defaults. Looking at all those data, we took the median values of the forecast based on each year's worth of data.

The lower that GSI – so, for example, the 70 percent of mature fish that is in red on the bottom; and you can see that the lower the number, so that corresponded to a GSI of 23, the earlier the closure would be because you're encompassing more pre-spawning fish. So that makes sense, earlier closure more pre-spawning fish.

As you're getting closer to the spawning event, those are going to get later; so you see the 90 percent value would be a median of October 17th would be the start of a default closure. This is for Western Maine and Massachusetts/New Hampshire. This is not for Eastern Maine. The length of the closure – as Micah said, we took a look at the literature, and the biology in our area seems to indicate that our fish are spawning for approximately 40 days.

Worldwide that is actually a very low number, but the data seems correct. For our area that 40 is about correct. Through all of these things there is a number of different topics where the technical committee is providing recommendations. Now, these can all be treated separately. I know this document is being developed; so other options are going to be included in the document; but please remember that each of these can be treated separately.

It can create a range of different options overall. Just because you choose to go with a forecasted process, it doesn't mean you have to choose to go with a specific default date or a specific length of spawning closure. The process, as I described before,

is a GSI-based forecasting process. We looked at many years of data. I'll go into some benefits of this process.
We believe that this is the most effective way to make sure that we are encompassing the spawning events that happen; and we recommend these are the proposed forecasting protocol that was presented by Micah for spawning closures.

Where you want to draw that line, whether it is on a lower risk side of things so on a lower number GSI trigger or a higher risk side of things, a higher GSI trigger later in the year, a spawning closure that would be a little bit later is completely up to the section. We have no recommendation there. It completely depends on risk tolerance and management goals.

As far as area, we've also been tasked in the past to take a look at area. We took a look at the data for the different areas, in particular Western Maine and Massachusetts and New Hampshire, and found there is no significant difference in the timing of spawning. We do recommend combining those spawning closure areas as a result.

One point of confusion here is that often people are seeing different size fish in the terminal ends of those two different areas, which can lead to a lot of confusion and make this a little bit confusing that people would be seeing fish of a certain size spawning in one area and fish of a different size in another area; but as far as the data are concerned there is no significant difference in those areas.

Eastern Maine; there is minimal literature and very minimal data. It is very challenging to get data there; so the technical committee recommends a status quo on area and default start date for a spawning closure. For Western Maine and Massachusetts/New Hampshire, the methodology that the technical committee has developed and is proposing should actually negate almost the reliance on default dates, especially from lack of samples.

There should be plenty of sampling particularly if those areas are combined. That will increase the availability for sampling. This methodology forecasts different dates based on each year's data; so real-time data of what is happening that year and not reliance on a default to encompass all that variability.

The technical committee recommends the median values based on the section's choice of GSI risk tolerance; so those are those triggers I was talking about, whether it be at 70 percent, 80 percent or 90 percent. The length of closure, as I went over, the literature and sampling supports a 40-day closure; so the technical committee does recommend a six-week closure based on the biology of the fish and the literature.

Potential benefits from this new forecasting methodology and some of the other options; sampling, right now in order to close for spawning, there have to be two samples within seven days of each other. The forecasting method does away with that. There has to be sampling, but the sampling leads up throughout the course of the season to the spawning closure.

There is no requirement for two samples in very close proximity, which has been a big problem for a lot of the spawning closures in the past and has led to heavy reliance on a default date. Because use of a transparent closure method, it is the same method for that entire area. It allows for advanced public notice.

One of the beauties of the forecast thing is that you can choose a date ahead of time and

that can be the date where you announce. As you get closer to the spawning closure, as we're tracking the GSI over time, you're able to predict that date at which spawning will happen; so you have flexibility in determining how far ahead of that you want to be able to put in your rules of whatever it is that needs to happen in order to close.

You could, seven days ahead, say, okay, in seven days we're going to close this based on our forecasting. It creates a really nice avenue for advanced public notice. Like I said before, it is less reliance on the default dates. There is a bit of variability between each of the years; and this allows for it to be accounted for within season.

Each year's data are taken into consideration and each year may be very different; so it is a more real-time perspective. Like I just said, accounting for documented inter-annual variability; so the changes in those spawning events year to year, it may be very early one year and it may be very late another year. That's all taken into account in this new methodology.

These are some other things that came up over review of the prior management actions. Public comment suggested spawning closures should be based on real-time data. Fishermen specifically noted spawning closures occurred too early in some instances and were therefore not as effective. Those were from the public comments in some of the previous management actions.

Something to keep in mind as you're discussing this is that forecasted spawning closures may be earlier than our current defaults. They may also be later. They're specifically based on the biology of those fish, what those fish are doing in any given year; so that is not going to be as firm as it is right now where typically we close on a default date and the closure happens for approximately the same period of time, at the same time every year.

The spawning closure is going to move around under our forecasted method. That has potential implications for gear conflicts or a potential perceived or unperceived gear-specific access to various spawning areas. That is all I have. If anyone has any questions, I would be happy to take them.

CHAIRMAN STOCKWELL: Thank you, Renee, for repackaging Micah's presentation and for incorporating much of the comments that I made in the white paper that is all part of the briefing documents. Just to refresh everyone's memory, we did have a conference call on June 15th where we withdrew the draft amendment from public consideration.

I committed to providing a white paper which laid out the concerns that I had at the time; and here we are today. Before we go into providing further guidance to the PDT; are there any questions to Renee on her presentation? Doug.

MR. DOUGLAS E. GROUT: Renee, you present a very good report here and it does make things much clearer for me. There was one aspect of it that I wasn't quite clear on is sort of the connection or lack of a connection between increase or decrease in the board's risk tolerance here and there not being any change in the length of time of a spawning closure.

Maybe I'm not understanding this; that if we're looking at something that is more risk averse, we're starting a closure at a lower GSI level; but wouldn't that indicate that if we were encompass a full four weeks, aren't you sort of – if you're starting the closure earlier because you are at a lower GSI level, wouldn't it suggest that you might have a

longer closure as opposed to a more risky higher GSI, which you'd probably have the spawning completed after four weeks?

MS. ZOBEL: That is something I took a look at, too, because that was language coming from the original technical committee paper in Micah's presentation; but I looked at it in a very similar way. You're losing risk on one end and gaining a little bit of risk on the other. So if we're saying, yes, there is a 40-day closure; if you want to get as close to when 100 percent of those fish are spawning, then that puts you at more risk of – under the lower number you have more pre-spawning fish that will be protected. Under the higher numbers, you're getting at that spawning event.

Certainly, yes, you lose protection on one end. For the other, if we're saying there is a 40-day spawning event, hypothetically getting as close as possible to that spawning event, it is just whether there is a risk of spawning fish at the dock at that point is the question. You may see spawning fish at the dock at that point, but you're going to close it as close as possible as the primary spawning of that group through 40 days. I guess it is almost a cost benefit one way or the other. That's a great clarification; thank you.

DR. DAVID PIERCE: Renee, you've given us, I think, five or so recommendations from the technical committee. What I'm trying to do is determine if the first recommendation from the technical committee encompasses all the rest. This is why I asked for clarification. You said the technical committee is recommending that we approve/adopt their proposed forecasting protocol for spawning closures. Here is where I got a little bit lost because then you went into some more detail and some more recommendations; so I lost track of what exactly is the protocol. Could you describe that again?

MS. ZOBEL: The protocol for the forecasted spawning closure will be based on sampling. The GSI samples and the fish are basically standardized up to a 30-centimeter fish because we know biologically that the larger the fish the earlier they spawn. We're being conservative on that size. We're just getting it all standardized to that value. Then the GSI; you can track the GSI over time and develop a linear pattern and sets itself up beautifully in that linear manner so that you are then able to project out to the date when those fish will be at spawning. Does that make more sense? Okay.

MR. JEFF KAELIN: Renee, I'm trying to understand the justification for the expansion of the closures from four to six weeks. I went back and looked at Micah's comments in the May meeting and the statement was that we don't have GSI samples to tell us the duration of spawning and that the literature indicates that it could be up to 40 days.

My question is, is part of that time the protection of the egg beds when the eggs are on the bottom before they're released into the water column? That's my question because to date the egg beds have never been protected. That has never been a consideration in these closures. In fact if you were going to prevent damage to egg beds, you probably would eliminate bottom fishing and not herring fishing. My question is, is the justification for the PDT's recommendation to go from four to six weeks in part to protect herring egg beds?

MS. ZOBEL: It is not; and it looks like that was the confusing part of the last presentation as well. Micah used literature – and our literature starts for spawning events

there is mention of eggs a number of times. Basically they're looking at the length of eggs being dropped. It has nothing to do with protection of egg beds. It strictly has to do with length of spawning events.

MR. KAELIN: When you were talking the tolerance and the justification for losing the tolerance back about 15 years ago, whenever it was, I thought that you said something about there was some concern about localized depletion and that the industry had to import fish or something like that; what was that comment about?

MS. ZOBEL: In Amendment 1, which was in 1999, there was a 13-week closure. All areas were closed for 13 weeks and the quota was not caught and fish had to be taken in from Canada. That's what I was referring to there. It didn't have anything to do with the tolerance. It was just the closure.

MR. KAELIN: It was the duration of the closure; okay, thank you.

MR. G. RITCHIE WHITE: To follow up on Jeff's idea he brought up; if we did want to protect the beds after spawning occurred, that would require more than a six-week closure, then?

MS. ZOBEL: We strictly looked at the length of the spawning event. We did not look at protection of eggs.

CHAIRMAN STOCKWELL: Are there any further questions for Renee? Seeing none; given Renee's presentation and the white paper that I generated, Section Members, what guidance to the PDT might you have to further develop the amendment, including the goals and whether or not the range of alternatives is broad enough. What are folks' thoughts? David.

DR. PIERCE: If you'd provide a bit more explanation or assistance, Mr. Chairman, I'm referencing now the memo that you sent to us dated July 22nd with discussion points for this meeting. At the back of that memo there is an outline providing a great deal of information. My question to you is, is this what you or is this what the staff has provided as a laundry list or a template of options that potentially we could adopt? I think you should put it in a proper context.

CHAIRMAN STOCKWELL: This is strictly my laundry list that I put together with the help of Matt Cieri to stimulate my thought process and hopefully all of yours to determine whether or not this amendment should move forward first; and second whether or not there should be any further development of it. David.

DR. PIERCE: Well, if our intent today is to review what has been given to us from the technical committee as recommendations for us change the way we do business regarding how we protect the spawning fish, then I guess you're looking for a series of motions that would respond to the technical committee recommendations? If you are, I can make some and see how they work out.

CHAIRMAN STOCKWELL: I think foremost we need to wrestle with the question that has been posed specific to the eastern area and the recommendation from the technical committee to maintain status quo on the area and the default start date and the fact that the memo states that last year we closed the eastern area when there is no spawning fish being landed. Is it the section's intent to be protecting spawning fish or is it the section's intent to be protecting areas where fish might spawn? I think that is, in talking with Renee and the technical committee members, the guidance that they need to fine tune the development of this amendment. David.

DR. PIERCE: Well, that is the first motion that we should consider and that is that – well, I'll make a motion that for the Eastern Maine Area we adopt the technical committee's recommendation for status quo and the default start date.

CHAIRMAN STOCKWELL: Well, we're not making final decisions, David. This is just to go in the public – this will be repackaged to go out for public comment. Toni, is going to provide some more counsel.

MS. TONI KERNS: Just as a reminder to the section; at the last meeting in May the section had approved a document to go out for public comment that included a series of options that looked at spawning protections combining some of the areas. Those spawning protections also had default closure dates that changed from the status quo to be for four weeks that extended out to six weeks.

A couple weeks after the section meeting in May, the board got together via conference call and voted to pull that document from public hearing because it didn't meet the goals and objectives as set by the section. I think what the PDT needs direction from the section is what are those goals and objectives that the document did not meet.

That's what Terry is asking here; do we want to protect spawning fish or protect pre-spawning fish? If we walk through I think Terry's memo, maybe we can get at some of that direction so that PDT can go back and bring forward a document at the annual meeting for you to consider for public comment. If that is the direction that the section is going, the section can also say you don't want to move forward with Draft Amendment 3 at all anymore and the document will be off the table and we'll move on with section business.

CHAIRMAN STOCKWELL: David, I think if your intent is to make a motion; it would be probably clearer for the section and the PDT if your motion was specific to the goal – is it the goal to protect spawning fish by prohibiting landings or is to prevent fishing operations that might disrupt spawning activities; two very different things.

DR. PIERCE: Yes, I'll withdraw the motion I made, first of all, and there was no seconder so it is not a motion. Okay, if I'm hesitating it is because I have few documents in front of me; and, frankly, I'm working primarily off of your discussion points. It is kind of hard to walk through this.

Could you point us to that which you've just stated, the two options regarding what the objectives might be? The PowerPoint was given and it had it, and it was very useful. We don't have that presentation or a document that would reflect that.

CHAIRMAN STOCKWELL: We're going to put that back up on the board, David. For those who have the July 22nd memorandum, it is at the bottom of the first page under the bold of questions concerning the draft amendment.

DR. PIERCE: In that case I would make a motion that the goal is to protect spawning fish by prohibiting landing of all Atlantic herring.

CHAIRMAN STOCKWELL: Prohibiting all Atlantic herring within the specific spawning area?

DR. PIERCE: Yes, within the specific spawning areas. In other words, I'm not making a motion that would have us set as a

goal preventing fishing operations that might disrupt spawning activities in a large geographic area. That is too all-encompassing. It is not about disrupting spawning activities. It is about catching spawning fish, which has always been our concern over all these years; are they spawning or are they not? I'm going with the first option in the list of two, which is to protect the spawning fish by prohibiting their landing in the defined spawning areas.

CHAIRMAN STOCKWELL: David, while is still a working motion, Toni has just recommended that you move that the PDT develop options that will protect spawning fish; is that correct, Toni?

MS. KERNS: Yes.

DR. PIERCE: I'm receptive to any improvement that would make the plan development team's work easier; so certainly I would accept that.

CHAIRMAN STOCKWELL: David, to the motion on the board; is that good with you?

DR. PIERCE: Let's modify that; "within the specific spawning areas defined as Eastern Maine and Western Maine/Massachusetts/New Hampshire. Otherwise, it suggests we're going to be looking at specific spawning beds and we're not in the position to do that.

CHAIRMAN STOCKWELL: Is there a second?

MR. GROUT: I'll second it and also offer a friendly perfection to it of herring caught within the specific spawning areas – excuse me, where did the landings go – okay.

CHAIRMAN STOCKWELL: So you want inserted between "herring caught" –

MR. GROUT: Well, originally I was talking about reflecting what we have right now is develop options to protect spawning fish by prohibiting landing of Atlantic herring caught within the specific spawning areas defined.

CHAIRMAN STOCKWELL: Are you friendly with that, David?

DR. PIERCE: Yes, I am; and there is a mistake in the motion on the board. It should be Western Maine at the third line from the bottom.

CHAIRMAN STOCKWELL: Okay, the motion was seconded by Doug Grout. Discussion on the motion. Steve.

MR. STEPHEN R. TRAIN: Mr. Chair, I don't want to overthink this; and I know it is developing options; but when prohibit fishing from a spawning area, should we have dates on that or more specific? We've got a lot of spawning areas identified. Are they going to be closed, period?

CHAIRMAN STOCKWELL: My sense, Steve, is one step at a time. We've got the three existing spawning areas, and this motion would respond to the question that Renee highlighted in the technical committee document and the one identified in the white paper. Is there further discussion on the motion on the board? Toni has got a question before we vote.

MS. KERNS: Just for clarification for the PDT; the document before had talked about combining some of the areas or leaving them status quo. Do we still want to have those options or is it just specifically what you have outlined here and no more consideration of changing the areas?

DR. PIERCE: No more consideration of changing the areas. This is responsive to the

technical committee's recommendation that we should not treat Western Maine separate from New Hampshire and Maine; that all the data indicate it is the same for practical purposes. This is very specific and there is no other option for a different breakdown, geographic breakdown.

CHAIRMAN STOCKWELL: This just specifies the goal is to protect spawning fish within the areas identified by the technical committee. Is there further discussion? Move that the PDT develop options to protect spawning fish by prohibiting landing of Atlantic herring caught within the specific spawning areas defined as Eastern Maine and Western Maine/Massachusetts/New Hampshire. Motion made by Dr. Pierce and seconded by Mr. Grout.

Those who support the motion on the board, please indicate so; is there any opposition; are there any nulls or abstentions? The motion carries seven, zero, zero, zero. Okay, further guidance for the PDT. Mark.

MR. MARK GIBSON: Are you past the GSI spawning protection matter?

CHAIRMAN STOCKWELL: No; have at it.

MR. GIBSON: Okay, there are other elements of the action; namely, the empty hold provision. Since the council action, which I gather has been submitted for consideration to the agency, there have been some issues and concerns come up in Rhode Island about impacts of the empty hold provision on herring operations that have no intention or ability to discard herring at sea; mainly freezer trawlers that may have processed and frozen packaged material product left on board or smaller vessels that have no capability, have no fish pump on board and couldn't pump anything off if they wanted to but may choose for business reasons to leave some fish on board, top it off.

It is a matter of trailer trucks. You don't want to hire a half truck; you hire whole trucks; and how your fish match up with that matters. Is it your understanding do we need to offer any guidance on that or can that come out in the public hearing process? What is your suggestion on that?

CHAIRMAN STOCKWELL: My suggestion would be that those are the types of comments that would be applicable during the public comment period and that the section can work them after the public comments and come out with accommodations for the wet-pack boats as well as the sea-freeze boats.

Before we go on to something else, are there other options that section members would like to see developed further in the document? I'm specifically referring to if you look at the memo that was generated; should the PDT develop a fast-track closure mechanism for either of the areas as we move ahead with the consideration of a combined Massachusetts/New Hampshire area? Is six weeks the right number; should we do four weeks; different alternatives to take out for public comment or is the section satisfied with the range of alternatives that the PDT has compiled to date? David.

DR. PIERCE: Mr. Chairman, I can't recall all of the alternatives that the plan development team has put together to date. I apologize; I thought we were going to be focusing primarily on the technical committee recommendations as to how to improve the process for protecting the spawning fish, again as a component or an element of the amendment.

Again, I'm looking to you for further guidance as to how we should proceed.

Certainly, we need to address the technical committee's recommendation regarding Eastern Maine, status quo, the default start dates. We have to address, I assume, the proposal for the forecasting protocol for the spawning closures; the GSI that we're going to pick, is it going to be 25 percent or 30 percent or 20 percent? Is it going to be the 30-centimeter fish; 80 percent fish spawning as opposed to 75 percent, as opposed to 90 percent? Again, I'm looking to you for guidance as to how we're going to deal with those issues in the context of what is on the agenda.

CHAIRMAN STOCKWELL: All right, let me try to tease a motion out of you. The section has just approved a motion that the goal is to protect spawning fish. We have the Eastern Gulf of Maine; and there are samples coming in with no spawning fish in; so we have a default date that is in place that has not been met.

Should spawning fish come be landed; should we consider a fast-track mechanism to close an area if it is currently open and spawning fish are encountered on the dockside monitoring program? One the issues that the section has discovered over the last couple of years and has gone back and forth between Doug and myself is the lack – at least from my perspective, a lack of a definitive definition upon whether or not the area closes if there is no spawning fish or does it stay open? Last year the area was closed with no spawning fish coming in; so it is something that I hope this section can wrap their head around. Steve.

MR. TRAIN: The last motion, if we could get it back up, I thought was that broad enough that it would allow the PDT to develop alternatives whether they were fast-tracked or not. Did I misunderstand that? It seems pretty broad in what they can do to protect spawning fish.

MS. KERNS: Renee presented levels of risk that the section could consider; and for the length of the closure, we depend on the level risk that you're willing to look at. Do we want to look at all ranges of risk? Before we just had a six-week option and a four-week option; so do we want to increase that range of the options? I think Renee presented a couple of questions out there that would be helpful to get a little guidance so that we don't have to keep going back and forth between the PDT and section on developing the document.

REPRESENTATIVE WALTER A. KUMIEGA III: It seems to me that the least risky option would be a six-week closure with the lower GSI number and the most risky would be a four-week closure with a higher GSI number. If we put those two options in and then we can consider anything in between, that gives us probably a good range.

I would also like to see – I mean, where you've talked about the default dates; is there enough data to make the default dates either make more sense or just make them later in the year so that there is more likely to be spawning going on? It seems like the way the default date is in Eastern Maine and the data that was up there; the default is well before the spawning usually takes place. I don't know how to put that into a motion or if you needed it in a motion.

CHAIRMAN STOCKWELL: As Renee laid out in her presentation, the data in Eastern Maine is extremely limited. I guess my question to you, Renee, is referencing back to Steve's comment; do you feel the previous motion gives you and the PDT and Ashton enough leeway to develop alternatives that would include the concept of a fast-track closure or do you need specific guidance?

MS. ZOBEL: I think that is broad enough to develop that in the document.

MR. ERIC REID: We're talking about protecting spawning fish. We're talking about default dates that go into effect but don't really do anything is what you're indicating for Eastern Maine. Now we're talking about a fast-track to close an area should there be evidence of spawning. This in its nature said, okay, we're going spawning fish.

However, does it also guarantee access to any of those areas should spawning fish not be present – how does that work, which is what I think you're trying to get at? If there is no spawning fish in Eastern Maine or Western Massachusetts or anywhere; is that going to guarantee access in the fishery to those areas?

CHAIRMAN STOCKWELL: Well, at present the technical committee and the PDT are proposing two different alternatives. One is to treat the Eastern Gulf of Maine separately and combine the two western areas into one area that would be – should this amendment move forward would be closed by projections rather than by the current cutting that we do in between the three states right now. I mean there is an opportunity to provide guidance for any range of alternatives within reason that they can actually analyze. If you've got a proposal, please put it out. Doug.

MR. GROUT: Mr. Chairman, as I understand it, the way the document is written right now, we have a proposal to go with the new projection method in the Western Gulf of Maine/Massachusetts/New Hampshire spawning area closures. Clearly, within that range there might be a range of alternative risk policies in there.

Right now we have a recommendation from the technical committee that there be a 40-day closure or six-week closure. I think that is what is currently in the document, which leaves the Eastern Maine at status quo, which we already have a process defined in Addendum V on Page 10 that talks about getting at least two samples of a hundred fish of either females greater than 28 centimeters that have reached a mean GSI of 20 percent or female herring greater than 23 centimeters and less than 28 that have a GSI of 15 percent.

Then it goes on to say if sufficient sample information is not available for a reliable estimating of the GSI in either of the size categories, the restrictions will go into effect automatically on the default date, which in Eastern Maine is August 15th. Sufficient sample information shall mean at least two samples of a hundred fish or more in either length categories taken from commercial catches during a period not to exceed seven days apart.

I think it is pretty clear what would trigger both a non-default date closure and then what would trigger the default closure. Now, the point here is right now that's the status quo. That's what used to apply to all regions, but we're proposing potentially changing that for the other two regions. I guess it is up to the board. I'm comfortable with the way this is written right now. I think it is very clear what has to happen. If there is desire on the part of the section to have an option that would change that, I think we'd need a motion to include that as an option.

CHAIRMAN STOCKWELL: The gray area to me, though, is we've gone back and forth the last couple years, is with the samples coming out of there – I mean what I'm hearing from you is that interpretation of our existing regulations that as long as the

samples are indicating there is no spawning occurring; that the area does not have to be closed. That's not crystal clear to myself or the state of Maine.

MR. GROUT: Does the state of Maine have a proposal for a clarification of this; wording that would change this as a clarification, as a proposed option for this addendum?

CHAIRMAN STOCKWELL: Well, it was just made clear by Dr. Pierce in this motion that you seconded that the goal is protect spawning fish. I think I'm pretty close to turning the Chair to somebody else; but before I do that, I'm going to go to Dr. Pierce.

DR. PIERCE: Terry, I want to get back to the memo that you provided us the ideas and kind of a summary of where we are right now relative to a lot of options pertaining to areas and timing and a few other things. I don't want that to be missed because you did work into that memo technical committee recommendations that should be included – I suspect should be included in the list options we bring out to a public hearing on this amendment.

With that said, what I would like to do is make a motion; and the motion would be – because you teased me, and I think I have been teased the right way here because what you've got here makes sense. I would move that we adopt the timing options regarding spawning stage, defaults, and end of spawning closure. These issues are described at the bottom of Page 3 and the top of Page 4 in your memo to us.

I won't get into all the details; they're all described. I just recommend the section reference those areas. It pertains to the GSI options of 20 to 30. It pertains to the degree of precaution, which is a GSI of 23, 25 or 28 relative to how many fish are spawning; 70 percent, 80 percent and 90 percent. It pertains to the defaults meaning status quo or the point that you've raised earlier about the fast-track closure mechanism.

It corporates the reference to the median date recommendation that was offered up by the technical committee. It also gets to the end of the spawning closure issues, which are status quo; the recommendation of six weeks and then another option of four weeks; no provision to re-close. I think it covers all the bases and incorporates in a very important way the technical committee's recommendation. I'll read the motion again on the screen: Move to adopt the timing options regarding spawning stage, defaults, and end of spawning closure. Okay, these issues are described in the memo to the board. That's the motion.

CHAIRMAN STOCKWELL: Sufficiently teased; thank you, David. I do have one recommendation, though, is that rather than adopt it should be to include in the document.

DR. PIERCE: I'm sorry, I couldn't hear.
CHAIRMAN STOCKWELL: You should move to include in the document these options so they can go out for public comment.

DR. PIERCE: Yes; that's a better way to phrase it.

CHAIRMAN STOCKWELL: Seconded by Walter. Is there discussion from the section? Eric.

MR. REID: So does this mean that closures will be done by one or the other of a spawning stage or default or is it designed to use one of those two mechanisms in an effort to ensure access to fish that are not spawning?

CHAIRMAN STOCKWELL: This is a range of alternatives.

MR. REID: Okay, so it would be a range of alternatives. One would be to eliminate default dates and the other one would be to use a spawning stage as a mechanism for closures?

CHAIRMAN STOCKWELL: It is a suite of alternatives to go out to the public to comment on.

REPRESENTATIVE KUMIEGA: To Dr. Pierce would it be considered a friendly perfection to also include a fast-closure process?

CHAIRMAN STOCKWELL: That's in there. You can refer to Page 3 of my memo and it is included in Issue F. Is there further discussion of the motion on the board? I'll read it: Move to include in Draft Amendment 3 the timing options regarding spawning stage, defaults, and end of spawning closure. These issues are described in memo to the Board dated July 22, 2015. The motion was made by Dr. Pierce and seconded by Representative Kumiega. You have a question, Doug?

MR. GROUT: Could you refer to Page 3 again and where it references the fast-track, quote-unquote, spawning? Is it under Issue 2?

CHAIRMAN STOCKWELL: Issue 3, timing, Section F, Number 4.

MR. GROUT: But there isn't a specific definition of what fast-track would involve. That is something that is going to come up from the PDT. Do they need guidance on what that means?

MS. ZOBEL: I think guidance would be helpful on specifically what you would like to see as far as fast-track is concerned.

CHAIRMAN STOCKWELL: Do you have a recommendation, Doug?

MR. GROUT: It may be a different recommendation than I think what you had intended. Based on our conversations, I'm comfortable with the seven days. I think that is a fast process to be able to particularly get information out to the industry in preparation for this, especially if it is in an area that may or may not be under the projection method. Clearly, the projection method gives the industry sufficient time; but a closure immediately, particularly if it might apply to the area that my state is involved, may be problematic. I know we could shorten it up a little bit.

CHAIRMAN STOCKWELL: So are folks comfortable with up to seven days? I'm seeing no opposition. Are you okay, Doug? Okay, is there any further discussion of the motion on the board? Seeing none; those that support it please indicate so; those who don't; those who are abstaining or nulling. Okay, the motion carries seven to zero. Is there further guidance to the PDT or, Renee, do you seek further guidance from the section for the work that you need to do between now and our fall meeting?

MS. ZOBEL: I think your memo plus the motions have laid out guidance as far as document development between now and then.

DR. PIERCE: I didn't hear what Renee said regarding – I guess I need to find out if we've covered the base that we've already highlighted and then Renee highlighted about the technical committee proposed forecasting protocol for the spawning closures that is using the 30-centimeters

fish? Is that in the mix already or does that have to be considered as a separate action?

MS. ZOBEL: That was within the options that were presented earlier; and I believe that's already within the options that will be presented in the document.

DR. PIERCE: Okay, good, I just wanted to make sure because that's an important thing. It is included; good.

CHAIRMAN STOCKWELL: Yes; my sense is that it is embodied in the current document. Bill.

MR. WILLIAM A. ADLER: In other words, the issue of spawning as adjusted today will be put into the document. The other two issues in the amendment will go to public hearing as are in the document now. There is still the three and basically what we've been doing here is fixing number one; is that correct?

CHAIRMAN STOCKWELL: That is correct. Jeff.

MR. KAELIN: So the PDT or the technical committee is going to go back and revise the document and then it will come back in Florida in November and then there would be an opportunity for the AP to check in after that document is finalized and during the public hearing process. That is my question in terms of timing; but I have two issues I want to raise that have been raised with me by many people over the last few weeks that I want to mention before we end here today. Thanks.

MS. KERNS: The AP will be involved as we develop the options; so we'll have either a conference call or an in-person meeting depending on what we make work between now and the annual meeting; and then we'll also have an AP meeting while the document is out for public comment. We will strive to have that meeting after the public hearings have occurred so that you can least have a notion of what happened in those meeting to the best we can with scheduling.

MR. KAELIN: That sounds good; but there are two reoccurring issues that I'm hearing from folks. In fact, I'm getting text today. The first is on the biological issues. There doesn't seem to be any relationship to the biomass strength and this potential extension of spawning closures for another two weeks. I think even with the operational assessment and the adjustment to eliminate the retrospective in the model run, the biomass is still over 200 percent of the target.

The second issue is that there is no quantitative analysis of impact by fleet or gear to a two-week extension of the spawning closures in the area. Those are the two things that people keep coming to me with; and I wanted to mention them today with the section here in case the technical committee could address one or both of those outstanding issues. Thank you.

DR. PIERCE: To the first issue that Jeff raised; that is a very important issue. We have some new information regarding stock status. I think we've all heard it already. It caught me by surprise. I didn't think the resource was as robust or as large as it is assessed to be now. Great information, very positive information.

The resource itself is in excellent shape according to the most recent assessment. People may challenge that, but it is what we have. That information certainly will be incorporated into the amendment; and I suspect it is going to have an influence on section members and certainly those at the public hearing regarding whether or not we need to have the longer spawner period or

shorter spawning period.

It would seem that if the resource was in poorer shape that a larger period would be favorable. Since the resource is in great shape, I suppose there will be a lot of debate and arguments that we don't need the longer period. I'm glad that Jeff raised it. It needs to be incorporated into the document. It will help the public understand where we are, help the public address the issue and then later on how we finally decide what to do.

MR. EMERSON C. HASBROUCK, JR.: Mr. Chairman, relative to that discussion, in terms of not only helping the public understand, I'm having a little trouble understanding here. If the goal is to protect spawning fish and yet the spawning stock biomass – and what I've just heard is that 200 percent of the target – all right, whether we remove a fish a day before it spawns or a week before it spawns or six months before it spawns, it has still been removed from the spawning stock biomass and that fish isn't going to spawn.

I'm not sure what these closures are doing; and maybe I'm a little late to the ballgame here. I know that I am because this plan has been in effect for a long time; but how are we protecting spawning fish with a closure? Aren't we just allowing those fish to spawn unmolested?

MS. ZOBEL: That's exactly what we're asking for clarification on; what the management goal was.

CHAIRMAN STOCKWELL: Before we move on to Toni's report, is there any further discussion? The only further input I have is a request that some economic analysis be incorporated so that as we move forward with taking to the public a document that proposes a six-week closure during prime lobster fishing season; that the public has an ability to fairly comment. Okay, Toni.

UPDATE ON NEFMC ACTIVITIES

MS. KERNS: I'm going to go through this rather quickly so that we can get our lunch and then get started with the Lobster Board. The Herring Committee from the New England Fishery Management Council met at the end of July to make recommendations that are to go through in order to make recommendations to the full council for their upcoming meeting on herring specifications. For the majority of the specifications, they went ahead and recommended status quo for the uncertainty or for the uncertainty buffer for the ACLs, the management areas sub-ACLs as well as the fixed-gear set-asides and the research set-aside.

The one thing that they did that was somewhat different from last year is how they looked at the gear and area catch caps for river herring and shad. They are making a recommendation to the full council that we use a seven-year weighted average mean; so from 2008 to 2014 – and this is an unscaled average – to specify the river herring and shad catch caps for the 2016 to 2018 fishing years.

In terms of how we utilize this information to go through this process; typically the commission will set the specifications for the upcoming fishing year at our annual meeting, and this will be after the Herring Committee has made its recommendations to the full council and the full council then votes to make those recommendations to NOAA Fisheries.

We try to make those recommendations based on what the full council does. Are there any other clarifying points that members of the New England Council want to make since I wasn't at that meeting that

you wanted to point out?

MR. GROUT: Mostly some clarifications that the actual ACLs aren't exactly the same. It is the sub-ACLs because the ABC was reduced by a slight amount – I think about 3,000 metric tons; and so the sub-ACLs are actually lower. What it was is the percentage allocation to each sub-ACL is the same. We made a recommendation there would be no change on that.

There is one thing on the management uncertainty buffer that we also forward as a recommendation is that there is a provision to allow a thousand metric tons of the 6,200 metric ton management uncertainty buffer to be returned to the 1A fishery after October 1 if the New Brunswick Weir Catch is less than 4,000 metric tons as of October 1st.

The reason we did that is our management uncertainty; we considered three areas of management uncertainty, but the main one which we drew from was we don't know what the New Brunswick Weir Catch is going to be; and we have no control over that. We stuck with the same management uncertain buffer that we used in the last specifications; but added in this provision that if they've used less than 4,000 metric tons, just a small portion, a thousand metric tons would be returned to our allocation.

CHAIRMAN STOCKWELL: Questions for Doug or Toni? Seeing none; is there any further business to come before the Herring Section? Doug.

MR. GROUT: Is it the intent that we will undertake an addendum beginning at our next board meeting to update these specifications for plan, too, or should we initiate that today?

MS. KERNS: Doug, would we need the addendum because of the changes in the provision to allow the thousand metric tons rolled over; is that what you're getting at? We can do the numbers' specifications by section action; but I'd have to look into whether or not we would need an addendum for the rolling over portion for the weir fishery.

MR. GROUT: Yes; maybe what we need to do is have you – let's look into that and see whether we need to do it by addendum but prepared to take some kind of action at the fall meeting.

MS. KERNS: We can definitely do that and we will be prepared to present the full recommendations from the council at their upcoming fall meeting.

CHAIRMAN STOCKWELL: Everyone comfortable with that game plan? Seeing so; this meeting is adjourned.

(Whereupon, the meeting was adjourned at 11:45 o'clock a.m., August 4, 2015.)

NEW ENGLAND FISHERY MANAGEMENT COUNCIL
Radisson Hotel, Plymouth, MA
September 29-October 1, 2015
DRAFT MOTIONS AND SELECTED ALTERNATIVES/OPTIONS

Tuesday, September 29, 2015

ELECTION OF COUNCIL OFFICERS

Chairman:
Mr. Terry Stockwell

Vice chairman:
Dr. John Quinn

Executive Committee members:
Mr. Douglas Grout
Dr. Michael Sissenwine
Mr. Peter Kendall

HERRING COMMITTEE REPORT

1. Mr. Grout moved on behalf the Herring committee:
that the Council selects Alternative 3 as the Preferred Alternative for the 2016-2018 specifications, including all items as displayed in Table 6, p. 14, of the Draft 2016-2018 Atlantic herring specifications document; adopting the New Brunswick weir payback option that would consider landings through October 1 and maintain the current seasonal splits for Areas 1a and 1b.

   The motion ***carried*** on a show of hands (15/0/0/1) with 1 recusal.

   Recusal Statement: *Ms. Tooley* - I will be recusing myself because I am employed by a company that harvests greater than 10% of the landings in this fishery.

Alternative 3 (*Preferred Alternative*) – SELECTED ALTERNATIVE
Alternative 3 was developed by the Herring Committee at its July 22, 2015 meeting and represents the ***Preferred Alternative*** for the 2016-2018 Atlantic herring fishery specifications at this time. Alternative 3 would specify Atlantic herring ABC at the level recommended by the SSC (111,000 mt) and would maintain the 2013-2015 specification of management uncertainty for 2016-2018. Under Alternative 3, the management uncertainty buffer would be specified at 6,200 mt to account for catch in the NB weir fishery (average catch 2009-2011). This alternative would maintain a status quo approach to all other Atlantic herring fishery specifications for 2016-2018, including set-asides and the seasonal (monthly) distribution of sub-ACLs. The Council is also considering an option that would allow for 1,000 mt of Atlantic herring to be returned to the Area 1A fishery from the management uncertainty buffer if certain conditions are met (see below). The specifications that would be implemented under Alternative 3 are listed in **Error! Not a valid bookmark self-reference.**.

Table 1 Alternative 3 (*Preferred Alternative*) for 2016-2018 Atlantic Herring Specifications

Specifications	Alternative 3 *Preferred Alternative*
OFL	2016 – 138,000 2017 – 117,000 2018 – 111,000
ABC	111,000
Management Uncertainty	6,200 (Value in 2015)
ACL/OY	104,800[1]
DAH	104,800
DAP	100,800
USAP	0
BT	4,000
Area 1A Sub-ACL (28.9%)	30,300
Area 1B Sub-ACL (4.3%)	4,500
Area 2 Sub-ACL (27.8%)	29,100
Area 3 Sub-ACL (39%)	40,900
RSA	3%
FGSA	295

2. Mr. Grout moved on behalf of Herring committee:
that the Council adopt River herring/Shad Alternative 3, Option 2 (weighted mean) for the preferred Alternative for the 2016-2018 River herring/Shad catch caps.

2a. Dr. Pierce moved to substitute and Dr. McKenzie seconded:
that the Council adopt Alternative 1 (No Action).

The motion to substitute ***failed*** on a show of hands (6/9/0/1) with 1 recusal.

Recusal Statement: *Ms. Tooley* - I will be recusing myself because I am employed by a company that harvests greater than 10% of the landings in this fishery.

Main motion:
That the Council adopt River herring/Shad Alternative 3, Option 2 (weighted mean) for the preferred Alternative for the 2016-2018 River herring/Shad catch caps.

2b. Dr. Sissenwine moved to substitute and Mr. John Bullard seconded:
to adopt Alternative 2, Option 2 (weighted mean) as the Preferred Alternative.

2c. Mr. Grout moved to amend and Mr. Gibson seconded:
to adopt Alternative 2, Option 2 (weighted mean) as the Preferred Alternative and to change the small mesh SNE/MA catch cap to 88.9.

The motion to substitute ***carried*** on a show of hands (10/5/0/1) with 1 recusal.

The motion to substitute as amended ***failed*** on a show of hands (5/10/0/1) with 1 recusal.

Recusal Statement: *Ms. Tooley* - I will be recusing myself because I am employed by a company that harvests greater than 10% of the landings in this fishery.

Main motion:
That the Council adopt River herring/Shad Alternative 3, Option 2 (weighted mean) for the preferred Alternative for the 2016-2018 River herring/Shad catch caps.

2d. Mr. Mark Alexander moved to amend and Dr. McKenzie seconded:
that the Council adopt River herring/Shad Alternative 3, Option 2 (weighted mean) for the preferred Alternative for the 2016-2018 River herring/Shad catch caps for the GOM. Cape Cod and SNE/MA catch caps will remain at the "no action" levels.

The motion to amend ***failed*** (5/8/2/1) with 1 recusal.

Recusal Statement: *Ms. Tooley* - I will be recusing myself because I am employed by a company that harvests greater than 10% of the landings in this fishery.

Main motion:
That the Council adopt River herring/Shad Alternative 3, Option 2 (weighted mean) for the preferred Alternative for the 2016-2018 River herring/Shad catch caps.

The motion ***carried*** on a show of hands (9/5/1/1) with 1 recusal.

Recusal Statement: *Ms. Tooley* - I will be recusing myself because I am employed by a company that harvests greater than 10% of the landings in this fishery.

RH/S Alternative 3 (*Preferred*): Revised Data with Seven-Year Time Series (Weighted Mean) – SELECTED ALTERNATIVE AND OPTION

Under RH/S Alternative 3, the 2016-2018 RH/S catch caps would be specified based on RH/S catch estimates from 2008-2014, using the Herring PDT's revised/updated data (see Section **Error! Reference source not found.** and Appendix I). This alternative would incorporate RH/S catch estimates from the most recent two years, extending the time series to seven years, with options to select either the median or weighted mean values as the 2016-2018 RH/S catch caps (**Error! Reference source not found.**). The RH/S catch caps under this alternative would continue to apply to midwater trawl vessels in the Gulf of Maine and Cape Cod Catch Cap Areas, and to both midwater trawl and small mesh bottom trawl vessels in the southern New England/Mid-Atlantic Catch Cap Area (see RH/S Catch Cap Areas shaded on **Error! Reference source not found.**, p. **Error! Bookmark not defined.**) on all trips landing more than 6,600 pounds of Atlantic herring. No RH/S catch cap would be adopted for the GB Catch Cap Area. Alternative 3 (using Option 2, the weighted mean) represents the ***Preferred Alternative*** for specifying 2016-2018 RH/S catch caps at this time.

Option 2: Weighted Mean. Option 2 would base the 2016-2018 RH/S catch caps on the weighted mean values of the 2008-2014 revised RH/S catch estimates. The weighted mean represents the arithmetic average of the total RH/S catch per year (by area and gear type for each of the seven years in the time series), weighted by the number of sampled trips in that stratum (see Appendix I for more information). This option represents the ***Preferred Alternative*** for specifying the 2016-2018 RH/S catch caps.

3. Dr. Pierce moved and Mr. Terry Alexander seconded:
that because River herring/Shad bycatch in the sea herring fishery is monitored by NOAA fisheries solely from observer data, the Council requests NMFS include state port-side monitoring of River herring/Shad catch to determine that catch relative to the bycatch caps.

3a. Ms. Tooley moved to postpone and Mr. Terry Alexander seconded: to postpone until the December Council meeting.

The motion to postpone ***carried*** on a show of hand (14/2/0).

DRAFT

Atlantic Herring Fishery Specifications

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

Prepared by the
New England Fishery Management Council

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

Date: September 29 – October 1 NEFMC Meeting

Intentionally Blank

EXECUTIVE SUMMARY

TBD FOR FINAL DOCUMENT

Intentionally Blank

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Background 2
1.2 Purpose and Need 5
1.3 Definitions and Formulas 6
2.0 PROPOSED MANAGEMENT ACTION AND OTHER ALTERNATIVES CONSIDERED 9
2.1 Alternatives for 2016-2018 Atlantic Herring Fishery Specifications 9
2.1.1 Background – OFL and ABC Specifications for 2016-2018 11
2.1.2 Alternative 1 (No Action Alternative) 12
2.1.3 Alternative 2 (Non-Preferred) 13
2.1.4 Alternative 3 (*Preferred Alternative*) 14
2.2 Supporting Information and Rationale for Proposed 2016-2018 Atlantic Herring Specifications 15
2.2.1 Specification of Management Uncertainty and Stockwide Atlantic Herring ACL/OY 15
2.2.2 Specification of DAH, DAP, BT, and USAP 29
2.2.3 Specification of Management Area Sub-ACLs for 2016-2018 32
2.2.4 Specification of Research Set-Asides (RSAs) 33
2.2.5 Specification of Fixed Gear Set-Aside (FGSA) 34
2.3 Alternatives for 2016-2018 River Herring/Shad (RH/S) Catch Caps 35
2.3.1 RH/S Alternative 1: No Action (Framework 3 Catch Caps) 35
2.3.2 RH/S Alternative 2 (Non-Preferred) 36
2.3.3 RH/S Alternative 3 (*Preferred*): Revised Data with Seven-Year Time Series (Weighted Mean) 37
2.3.4 Summary of RH/S Catch Cap Alternatives Under Consideration 38
2.4 Alternatives Considered but Rejected 38
3.0 AFFECTED ENVIRONMENT 39
3.1 Atlantic Herring 39
3.1.1 Atlantic Herring Stock Status 40
3.1.2 Considerations Related to Scientific Uncertainty 42
3.2 Non-Target Species 45
3.2.1 Overview 45
3.2.2 Observer Coverage in the Atlantic Herring Fishery 47
3.2.3 River Herring and Shad (RH/S) 50
3.3 Physical Environment and Essential Fish Habitat 60
3.3.1 Physical Environment 60
3.3.2 Essential Fish Habitat (EFH) 61

3.4 Protected Resources 70
3.4.1 Species and Critical Habitat Not Likely to be Affected by the Proposed Action ... 72
3.4.2 Species Potentially Affected by the Proposed Action 73
3.4.3 Interactions Between Gear and Protected Resources 81
3.5 Fishery-Related Businesses and Communities 87
3.5.1 Atlantic Herring Catch 88
3.5.2 Monthly Atlantic Herring Quota Utilization 91
3.5.3 Atlantic Herring Permit Categories 91
3.5.4 Atlantic Herring Vessels 92
3.5.5 Atlantic Herring Dealers 96
3.5.6 Atlantic Herring Prices, Use as Bait, and Substitute Goods 97
3.5.7 Atlantic Herring Fishing Communities 101
4.0 IMPACTS OF PROPOSED MANAGEMENT ACTION AND OTHER ALTERNATIVES 105
4.1 Impacts on Atlantic Herring 107
4.1.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on Atlantic Herring 108
4.1.2 Impacts of 2016-2018 RH/S Catch Caps on Atlantic Herring 116
4.2 Impacts on Non-Target Species 121
4.2.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on Non-Target Species 122
4.2.2 Impacts of 2016-2018 RH/S Catch Caps on Non-Target Species 126
4.3 Impacts on Physical Environment and Essential Fish Habitat 130
4.3.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on the Physical Environment and EFH 131
4.3.2 Impacts of 2016-2018 RH/S Catch Caps on the Physical Environment and EFH 131
4.4 Impacts on Protected Resources 134
4.4.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on Protected Resources 134
4.4.2 Impacts of 2016-2018 RH/S Catch Caps on Protected Resources 136
4.5 Impacts on Fishery-Related Businesses and Communities 141
4.5.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on Fishery-Related Businesses and Communities 142
4.5.2 Impacts of 2016-2018 RH/S Catch Caps on Fishery-Related Businesses and Communities 146
4.6 Cumulative Effects Assessment 150
4.6.1 Valued Ecosystem Components 150
4.6.2 Spatial and Temporal Boundaries 151
4.6.3 Analysis of Total Cumulative Effects 152
4.6.4 Past, Present, and Reasonably Foreseeable Future Actions 152

4.6.5 Baseline Conditions 152
4.6.6 Summary of Impacts from 2016-2018 Atlantic Herring Fishery Specifications .. 152
4.6.7 Cumulative Effects Summary 152
5.0 RELATIONSHIP TO APPLICABLE LAW 153
5.1 Magnuson-Stevens Fishery Conservation and Management Act (MSA) 153
5.1.1 National Standards 153
5.1.2 Other Required Provisions of MSA 157
5.2 National Environmental Policy Act (NEPA) 160
5.2.1 Environmental Assessment 160
5.2.2 Finding of No Significant Impact (FONSI) 160
5.3 Marine Mammal Protection Act (MMPA) 166
5.4 Endangered Species Act (ESA) 166
5.5 Paperwork Reduction Act (PRA) 166
5.6 Information Quality Act (IQA) 167
5.7 Impacts on Federalism/E.O. 13132 170
5.8 Administrative Procedures Act (APA) 170
5.9 Coastal Zone Management Act (CZMA) 170
5.10 Regulatory Flexibility Act (RFA)/E.O. 12866 (Regulatory Planning and Review) 171
5.10.1 Regulatory Flexibility Act (RFA) – Initial Regulatory Flexibility Analysis 171
5.10.2 E.O. 12866 (Regulatory Planning and Review) 171
5.11 E.O. 13158 (Marine Protected Areas) 171
5.12 E.O 12898 (Environmental Justice) 171
6.0 REFERENCES 172
7.0 LIST OF PREPARERS AND AGENCIES CONSULTED 174

Appendix I. Development of Options for River Herring and Shad Catch Caps in the Atlantic Herring Fishery, 2016-2018 (Herring PDT Analysis)

LIST OF TABLES

Table 1 Current (2013-2015) Atlantic Herring Specifications (Initial Allocations) 4
Table 2 Current (2014-2015) RH/S Catch Caps 5
Table 3 Alternatives Under Consideration for 2016-2018 Atlantic Herring Fishery Specifications 10
Table 4 Alternative 1 (No Action) for 2016-2018 Atlantic Herring Specifications 12
Table 5 Alternative 2 (Non-Preferred) for 2016-2018 Atlantic Herring Specifications 13
Table 6 Alternative 3 (*Preferred Alternative*) for 2016-2018 Atlantic Herring Specifications .. 14
Table 7 Total Atlantic Herring Catch (mt), 1970 – 2014 17
Table 8 Number of Active Weirs and Catch per Weir in the NB Weir Fishery, 1978-2014 18
Table 9 Monthly Weir Landings (mt) for Weirs Located in New Brunswick, 1978 to 2008 19
Table 10 Possible Deductions for Management Uncertainty (NB Weir Fishery) in 2016-2018 Atlantic Herring Specifications 20
Table 11 Atlantic Herring Landings from Fixed Gear Fishery Before and After November 1 Rollover Date 21
Table 12 Atlantic Herring Discards (mt) by Reporting Method, 2010-2013 23
Table 13 Summary of NEFOP Observer Data for Catch Not Brought on Board, 2014 Observed Purse Seine Trips 25
Table 14 Disposition Code Reported for Catch Not Brought on Board Purse Seine Vessels on Observed Trips in 2014 25
Table 15 Summary of NEFOP Observer Data for Catch Not Brought on Board, 2014 Observed Midwater Trawl Trips (Single and Paired) in All Areas 27
Table 16 Disposition Code Reported for Catch Not Brought on Board Midwater Trawl Vessels on Observed Trips in 2014 28
Table 17 Utilization of Border Transfer (mt) 31
Table 18 Status Quo Approach for 2016-2018 Atlantic Herring Sub-ACLs 32
Table 19 RH/S Alternative 1 (No Action) 35
Table 20 RH/S Alternative 2 36
Table 21 RH/S Alternative 3 (*Option 2 Preferred*) 37
Table 22 Alternatives/Options for Specifying 2016-2018 RH/S Catch Caps 38
Table 23 Summary of Atlantic Herring Reference Points and Terminal Year SSB/F Estimates from Benchmark Assessment (2012) and Update Assessment (2015) 40
Table 24 Haddock Catch by Midwater Trawl Vessels Subject to Haddock Catch Cap (2011-2014) 46
Table 25 2012 NEFOP Coverage Rates by Gear Type and Herring Management Area (Pounds Observed/Pounds Landed) 47
Table 26 2013 NEFOP Observer Coverage on Midwater Trawl Trips 48
Table 27 NEFOP Observer Coverage on Trips in the Atlantic Herring Fishery, 2014 and 2015 YTD (Preliminary) 49

Table 28 Total Number of RH/S Catch Cap Trips and Landings by Strata, 2008-2014 55
Table 29 Annual Estimates of Total RHS Catch (landed + discarded) on Directed Atlantic Herring Trips, 2008-2014 57
Table 30 RH/S Catch on Trips Subject to RH/S Catch Cap (2015 YTD) 58
Table 31 EFH Designation of Estuaries and Embayments for Atlantic Herring 64
Table 32 Listing of Sources for Current EFH Designation Information 69
Table 33 Species and/or Critical Habitat Protected Under the ESA and/or MMPA that Occur in the Affected Environment of the Atlantic Herring Fishery 70
Table 34 Large Whale Species Present in the Affected Environment of the Atlantic Herring Fishery 74
Table 35 Large Cetacean Occurrence in the Affected Environment of the Atlantic Herring Fishery 76
Table 36 Small Cetacean Occurrence in the Affected Environment of the Atlantic Herring Fishery 78
Table 37 Pinniped Occurrence in the Affected Environment of the Atlantic Herring Fishery ... 80
Table 38 Descriptions of the Tier 2 Fishery Classification Categories (50 CFR 229.2) 82
Table 39 Cetacean and Pinniped Species Observed Seriously Injured and/or Killed by Category II Midwater Fisheries in the Affected Environment of the Atlantic Herring Fishery from 2007-2012 84
Table 40 2005-2014 Observed Gray and Harbor Seal Interactions with the GOM Atlantic Herring Purse Seine Fishery 85
Table 41 Atlantic Herring Catch by Year and Management Area, 2004-2014 89
Table 42 Total Annual Atlantic Herring Catch 2003-2014 90
Table 43 2015 Atlantic Herring Sub-ACLs (Adjusted) and Catch YTD (mt) 91
Table 44 Fishing Vessels with Federal Atlantic Herring Permits, 2008-2011 92
Table 45 Fishing Vessels with Federal Atlantic Herring Permits, 2012-2014 93
Table 46 Atlantic Herring Landings by Fishing Gear Type and Area, 2008-2011 94
Table 47 Atlantic Herring Landings by Fishing Gear Type and Area, 2012-2014 94
Table 48 Percentage of Revenue from Atlantic Herring by Permit Category and Management Area for Trips Landing Atlantic Herring, 2008-2011 95
Table 49 Percentage of Revenue of Atlantic Herring by Permit Category and Management Area, 2012-2014 95
Table 50 Issued Atlantic Herring Dealer Permits, 2012-2015 96
Table 51 Bait Usage in the Inshore Gulf of Maine Lobster Fishery 99
Table 52 Atlantic Herring Use as for Lobster Bait in New Hampshire 100
Table 53 Distribution of Herring Permit Holders in 2011 and 2015 which have an Atlantic Herring Community of Interest as a Homeport 103
Table 54 Landing Port Distribution of Atlantic Herring Landings from Fishing Areas (2008-2011) 104
Table 55 Terms Used in Tables to Summarize Impacts of Proposed Action on VECs 106

Table 56 Potential Removals of Atlantic Herring (mt) Under Alternatives for 2016-2018 Specifications 109
Table 57 Three-Year F/SSB Projection Under Alternative 1 (No Action) 113
Table 58 Three-Year F/SSB Projection Under Alternatives 2 and 3 114
Table 59 Potential Removals of River Herring/Shad (mt) Under Each RH/S Catch Cap Alternative 127

LIST OF FIGURES

Figure 1 Atlantic Herring Management Areas (Lines) and RH/S Catch Cap Areas (Shaded) 3
Figure 2 Atlantic Herring Operational Assessment: 2014 Fishing Mortality and SSB Relative to F_{MSY} and SSB_{MSY} Reference Points, Including Retrospective Adjustment (Red Line) ... 41
Figure 3 Atlantic Herring Operational Assessment: 2014 Estimated Natural Mortality (M) and Fishing Mortality (F) by Age 43
Figure 4 Atlantic Herring Operational Assessment: Estimated Removals from Natural Mortality (M) and Fishing Mortality (F) Relative to Total Estimated Biomass (B) 44
Figure 5 Total Number of Trips that Caught >6,600 lbs of Atlantic Herring by Year, Gear, and RH/S Catch Cap Area, 2008-2014 56
Figure 6 2015 RH/S Catch YTD by Herring Midwater Trawl Vessels in the Cape Cod Catch Cap Area 58
Figure 7 2015 RH/S Catch YTD by Herring Midwater Trawl Vessels in the SNE/MA Catch Cap Area 59
Figure 8 2015 RH/S Catch YTD by Herring Small Mesh Bottom Trawl Vessels in the SNE/MA Catch Cap Area 59
Figure 9 Atlantic Herring Management Areas and the Northeast U.S. Shelf Ecosystem 61
Figure 10 EFH Designation for Atlantic Herring Eggs 65
Figure 11 EFH Designation for Atlantic Herring Larvae 66
Figure 12 EFH Designation for Atlantic Herring Juveniles 67
Figure 13 EFH Designation for Atlantic Herring Adults 68
Figure 14 Average Nominal Price per Metric Ton of Atlantic Herring, 2008-2012 98
Figure 15 Average Nominal Price per Metric Ton of Atlantic Herring, 2010-2015 98

LIST OF ACRONYMS

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

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

1.0 INTRODUCTION

This document contains the New England Fishery Management Council's recommendations for the Atlantic herring fishery specifications for the 2016-2018 fishing years, consistent with the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Atlantic Herring Fishery Management Plan (FMP), initially approved by the National Marine Fisheries Service (NMFS) on October 27, 1999. This document also contains information and supporting analyses required under other applicable law, including the National Environmental Policy Act (NEPA) and Regulatory Flexibility Act (RFA).

The Atlantic herring fishery specifications are annual amounts specified for the 2016-2018 fishing years (January – December), including:

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

In addition, annual gear-specific and area-specific catch caps for river herring and shad (RH/S) are specified for trips landing more than 6,600 pounds of Atlantic herring (3 mt) during the 2016-2018 fishing years, consistent with Framework Adjustment 3 to the Atlantic Herring FMP.

The 2016-2018 Atlantic herring fishery specifications are developed by the Council based on the best available scientific information. The 2015 Atlantic herring operational stock assessment and the recommendations of the Council's Scientific and Statistical Committee (SSC) form the basis of the OFL and ABC specifications for 2016-2018.

1.1 BACKGROUND

The Atlantic herring (*Clupea harengus*) fishery specifications are annual amounts recommended by the New England Fishery Management Council every three years through a process established in the Atlantic Herring FMP (and modified in Amendments 1 and 4). In recognition of the spatial structure of the Atlantic herring stock complex (multiple stock components that separate to spawn and mix during other times of the year), the total annual catch limit for Atlantic herring (stockwide ACL/OY) is divided and assigned as sub-ACLs to four management areas (see Figure 1 on p. 3). Management Area 1 represents the Gulf of Maine (GOM), which is divided into an inshore (Area 1A) and offshore section (Area 1B). Area 2 is located in the coastal waters between MA and NC (southern New England/Mid-Atlantic), and Area 3 represents the offshore Georges Bank (GB) area. The Council utilizes the best available information to consider the proportion of each spawning component of the Atlantic herring stock complex in each area/season and distribute the sub-ACLs such that the risk of overfishing an individual spawning component is minimized to the extent practicable.

Amendment 1 to the Herring FMP (2006) established a process that allows the Council to set multi-year (up to three fishing years) specifications. In Amendment 4, the Council updated the Atlantic herring specifications process to ensure consistency with the newly-implemented provisions of the MSA and implemented provisions for annual catch limits (ACLs) and accountability measures (AMs) in the Atlantic herring fishery. The Council opted to retain the general provisions for establishing specifications for the Atlantic herring fishery but eliminated the need to annually specify Joint Venture Processing (JVP), Internal Waters Processing (IWP), Total Allowable Level of Foreign Fishing (TALFF), and a sub-ACL reserve. While TALFF will not have to be considered by the Council during the specifications process, countries interested in foreign fishing for herring may still request TALFF allocations from NMFS, and these requests will be addressed as they arise. Framework 2 paralleled the 2013-2015 Atlantic herring fishery specifications and authorized the Council to split Atlantic herring sub-ACLs seasonally (by month) during the specifications process. It also established a general policy for authorizing annual carryover of unutilized sub-ACL (up to 10%) under specific conditions.

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

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

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

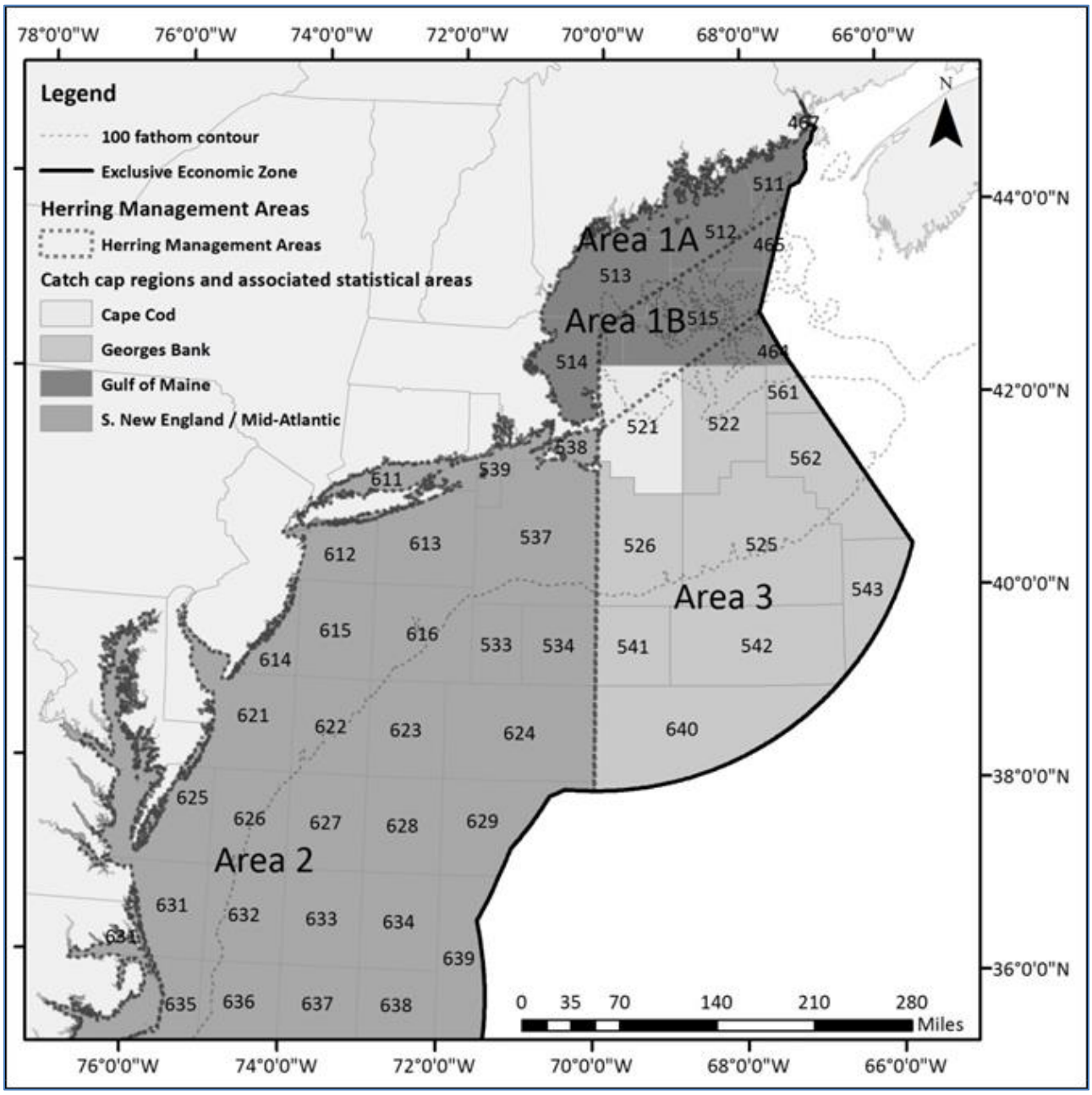


Table 1 Current (2013-2015) Atlantic Herring Specifications (Initial Allocations)

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

Seasonal Sub-ACL Divisions for 2014 and 2015

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

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

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

**RH/S Catch Cap Areas shown in Figure 1 on p. 3.*

1.2 PURPOSE AND NEED

The purpose of this action is to specify the overfishing level (OFL) and allowable biological catch (ABC) for the Atlantic herring fishery, and to set specifications for the 2016-2018 fishing years consistent with the best available science and the requirements of the Atlantic Herring FMP, while providing additional flexibility and promoting the full utilization of optimum yield (OY). The requirement to set multi-year specifications is also needed to prevent overfishing and, pursuant to the requirements of the MSA, the specifications and RH/S catch caps are needed to ensure that the Atlantic herring management program addresses and minimizes bycatch to the extent practicable.

The 2016-2018 Atlantic herring fishery specifications are intended to meet the goal and several of the objectives of the Atlantic Herring FMP, as modified in Amendment 1:

Goal

- Manage the Atlantic herring fishery at long-term sustainable levels consistent with the National Standards of the Magnuson-Stevens Fishery Conservation and Management Act.

Objectives

- Harvest the Atlantic herring resource consistent with the definition of overfishing contained in the Herring FMP and prevent overfishing;
- Prevent the overfishing of discrete spawning components of Atlantic herring;
- Avoid patterns of fishing mortality by age which adversely affect the age structure of the stock;
- Provide for long-term, efficient, and full utilization of the optimum yield from the herring fishery while minimizing waste from discards in the fishery. Optimum yield is the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, taking into account the protection of marine ecosystems, including maintenance of a biomass that supports the ocean ecosystem, predator

consumption of herring, and biologically sustainable human harvest. This includes recognition of the importance of Atlantic herring as one of many forage species of fish, marine mammals, and birds in the Northeast Region;

- Minimize, to the extent practicable, the race to fish for Atlantic herring in all management areas;
- Provide, to the extent practicable, controlled opportunities for fishermen and vessels in other mid-Atlantic and New England fisheries;
- Promote and support research, including cooperative research, to improve the collection of information in order to better understand herring population dynamics, biology and ecology, and to improve assessment procedures;
- Promote compatible US and Canadian management of the shared stocks of herring; and
- Continue to implement management measures in close coordination with other Federal and State FMPs and the ASMFC management plan for Atlantic herring, and promote real-time management of the fishery.

1.3 DEFINITIONS AND FORMULAS

The following definitions/formulas were adopted in the Atlantic Herring FMP (modified in Amendment 4) and are described below as they apply to the 2016-2018 Atlantic herring fishery specifications.

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

OFL>=ABC>=ACL

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

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

OFL – Scientific Uncertainty = ABC (Determined by SSC)

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

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

The current ABC CR for Atlantic herring is described below. This ABC CR considered an interim control rule, i.e., a placeholder until the Council can develop a long-term control rule through a more comprehensive management action. The Council initiated Amendment 8 to the Atlantic Herring FMP in January 2015 to consider a range of alternatives to establish a long-term ABC CR for Atlantic herring, including alternatives that account for Atlantic herring's role in the ecosystem. For the 2016-2018 Atlantic herring fishery specifications, the Council, based on recommendations from its SSC (May 20, 2015), will continue to base the annual specification of ABC on the interim ABC CR. It is anticipated that Amendment 8 will be adopted prior to development of the next fishery specifications package (2019-2021).

Interim ABC Control Rule: Under the interim ABC CR, ABC will be specified for three years based on the annual catch that is projected to produce a probability of exceeding F_{MSY} in the third year that is less than or equal to 50%. For 2016-2018, this value is 110,000 mt (see Section 2.1.1 of this document, p. 11).

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

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

ABC – Management Uncertainty = Stockwide ACL = OY

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

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

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

$$OY = DAH$$

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

$$DAH = DAP + BT$$

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

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

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

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

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

2.0 PROPOSED MANAGEMENT ACTION AND OTHER ALTERNATIVES CONSIDERED

This section describes the 2016-2018 Atlantic herring fishery specifications and RH/S catch caps proposed by the New England Fishery Management Council as well as other alternatives/options that the Council considered during the specifications process.

- The alternatives for the fishery specifications, including the Preferred Alternative, are described in Section 2.1 (p. 9).
- Information and rationale to support the Council's Preferred Alternative for the 2016-2018 Atlantic herring fishery specifications is provided in Section 2.2 (p. 15).
- The options for the 2016-2018 RH/S catch caps, including the Preferred Alternative, are described in Section 2.3 (p. 35).

The impacts of all alternatives/options considered by the Council on the affected biological, physical, and human environment are discussed in Section 4.0 of this document (p. 105).

2.1 ALTERNATIVES FOR 2016-2018 ATLANTIC HERRING FISHERY SPECIFICATIONS

The development of the 2016-2018 Atlantic herring fishery specifications package was a multi-step decision-making process that involved the Council, the Scientific and Statistical Committee (SSC), and the Herring Plan Development Team (PDT), with input from the Herring Committee and Herring Advisory Panel (AP). The alternatives under consideration by the Council for the 2016-2018 specifications are described individually in the following subsections and are summarized in Table 3 below. These alternatives are based on the SSC's recommendations for OFL and ABC (see discussion in following subsection).

Table 3 Alternatives Under Consideration for 2016-2018 Atlantic Herring Fishery Specifications

Specifications	No Action Alternative (2015 Specifications)	Alternative 2	Alternative 3 *Preferred Alternative*
OFL	114,000	2016 – 138,000 2017 – 117,000 2018 – 111,000	2016 – 138,000 2017 – 117,000 2018 – 111,000
ABC	114,000	111,000	111,000
Management Uncertainty	6,200 (3 year avg. 2009-2011)	3,000 (3 year avg. 2012-2014)	6,200 (Value in 2015)
ACL/OY	107,800	108,000	104,800[1]
DAH	107,800	108,000	104,800
DAP	103,800	104,000	100,800
USAP	0	0	0
BT	4,000	4,000	4,000
1A Sub-ACL	31,200	31,212	30,300
1B Sub-ACL	4,600	4,644	4,500
2 Sub-ACL	30,000	30,024	29,100
3 Sub-ACL	42,000	42,120	40,900
RSA	3%	3%	3%
FGSA	295	295	295

[1]***Option for Alternative 3 –*** If, by considering landings through **October 1 or October 15 (TBD),** NMFS determines that less than 4,000 mt has been caught in the NB weir fishery, NMFS will allocate an additional 1,000 mt to the Area 1A sub-ACL to be made available to the directed herring fishery as soon as possible, through the remainder of the fishing year (until the AM is triggered).

**The Preferred Alternative is shaded in grey.*

2.1.1 Background – OFL and ABC Specifications for 2016-2018

Following the Atlantic herring operational (update) assessment meeting (April 2015), the SSC met on May 20, 2015 to review the operational assessment results and develop recommendations for the Atlantic herring overfishing limit (OFL) and acceptable biological catch (ABC) specifications for the 2016-2018 fishing years. The SSC reviewed a number of projections and possible approaches for specifying ABC (control rules) and recommended that the Council specify ABC for the 2016-2018 fishing years based on the interim ABC control rule for Atlantic herring (adopted in the 2013-2015 fishery specifications). The interim ABC control rule utilizes a constant catch approach, with the annual ABC set such that the probability of overfishing does not exceed 50% in any of those years (but may reach 50% in the third year). This approach produces an ABC specification of 111,000 mt for 2016, 2017 and 2018, and associated OFLs of 138,000 mt in 2016, 117,000 mt in 2017, and 111,000 mt in 2018. The SSC provided the following rationale for this recommendation:

- Key attributes of the stock and assessment (SSB, recruitment, F, survey indices, etc.) have not changed significantly since the benchmark assessment, on which the current control rule was based. However, survey indices suggest that the 2011 year class is the second largest in time series and will contribute significantly to the total population abundance and biomass in 2016-2018.
- The most significant change since the benchmark stock assessment (SAW 54, 2012) is that the retrospective pattern has become worse in the operational assessment. The assessment implemented a Mohn's rho correction to SSB in an attempt to account for the retrospective pattern, but there is no guarantee that the retrospective pattern will persist in sign and magnitude.
- Although the probability of overfishing may reach 50% in the third year, the probability of the stock becoming overfished is close to 0% in all years (see OFL/ABC projections in Section 4.1.1.2, p 113).
- The realized catch in the Atlantic herring fishery is generally well below the ABC, which reduces the expected risk of overfishing.
- In the assessment model, the current ratio of catch to estimated consumption is 1:4, which means that fishing is likely not the largest driver of stock abundance at present, however this does not negate the need to manage the fishing removals on this stock.
- A constant catch strategy is the preferred approach of the Council and the industry.

The considerations above led the SSC to conclude that ABC should remain relatively constant for 2016-2018, or perhaps be reduced modestly. The recommended ABC of 111,000 mt, compared with status quo estimate of 114,000 mt, achieves that outcome. Additionally, the SSC noted that the current high herring biomass, bolstered by two very large year classes, likely meets ecosystem goals by default and not design, as ecosystem goals are not identified or captured in the current ABC control rule.

2.1.2 Alternative 1 (No Action Alternative)

Alternative 1 represents the no action alternative. This alternative would maintain the 2015 Atlantic herring fishery specifications for the 2016-2018 fishing years. The specifications that would be implemented under the no action alternative are listed in Table 4. Under the no action alternative, specification of Atlantic herring ABC would remain at 114,000 mt, which is above the SSC recommendation for 2016-2018 (111,000 mt). Specification of the management uncertainty buffer would be based on the most recent three-year average catch in the New Brunswick weir fishery (2009-2011, based on 2013-2015 Atlantic herring fishery specifications).

Table 4 Alternative 1 (No Action) for 2016-2018 Atlantic Herring Specifications

Specifications	No Action Alternative 2015 Specifications (metric tons)
OFL	114,000
ABC	114,000
Management Uncertainty	6,200 (3 year average 2009-2011)
ACL/OY	107,800
DAH	107,800
DAP	103,800
USAP	0
BT	4,000
Area 1A Sub-ACL (28.9%)	31,200
Area 1B Sub-ACL (4.3%)	4,600
Area 2 Sub-ACL (27.8%)	30,000
Area 3 Sub-ACL (39%)	42,000
RSA	3%
FGSA	295

Alternative 1 Seasonal (Monthly) Sub-ACL Divisions (2016-2018)

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

2.1.3 Alternative 2 (Non-Preferred)

Alternative 2 would specify Atlantic herring ABC at the level recommended by the SSC (111,000 mt), and would maintain a status quo approach to specifying the management uncertainty buffer for 2016-2018, using the most recent three-year average catch in the NB weir fishery. In this case, the average from 2012-2014 was 3,000 mt. This alternative would also maintain a status quo approach to all other Atlantic herring fishery specifications, including set-asides and the seasonal (monthly) distribution of sub-ACLs. The specifications that would be implemented under Alternative 2 are listed in Table 5.

Table 5 Alternative 2 (Non-Preferred) for 2016-2018 Atlantic Herring Specifications

Specifications	Alternative 2 (metric tons)
OFL	2016 – 138,000 2017 – 117,000 2018 – 111,000
ABC	111,000
Management Uncertainty	3,000 (3 year average 2012-2014)
ACL/OY	108,000
DAH	108,000
DAP	104,000
USAP	0
BT	4,000
Area 1A Sub-ACL (28.9%)	31,212
Area 1B Sub-ACL (4.3%)	4,644
Area 2 Sub-ACL (27.8%)	30,024
Area 3 Sub-ACL (39%)	42,120
RSA	3%
FGSA	295

Alternative 2 Seasonal (Monthly) Sub-ACL Divisions (2016-2018)

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

2.1.4 Alternative 3 (*Preferred Alternative*)

Alternative 3 was developed by the Herring Committee at its July 22, 2015 meeting and represents the ***Preferred Alternative*** for the 2016-2018 Atlantic herring fishery specifications at this time. Alternative 3 would specify Atlantic herring ABC at the level recommended by the SSC (111,000 mt) and would maintain the 2013-2015 specification of management uncertainty for 2016-2018. Under Alternative 3, the management uncertainty buffer would be specified at 6,200 mt to account for catch in the NB weir fishery (average catch 2009-2011). This alternative would maintain a status quo approach to all other Atlantic herring fishery specifications for 2016-2018, including set-asides and the seasonal (monthly) distribution of sub-ACLs. The Council is also considering an option that would allow for 1,000 mt of Atlantic herring to be returned to the Area 1A fishery from the management uncertainty buffer if certain conditions are met (see below). The specifications that would be implemented under Alternative 3 are listed in Table 6.

Table 6 Alternative 3 (*Preferred Alternative*) for 2016-2018 Atlantic Herring Specifications

Specifications	Alternative 3 *Preferred Alternative*
OFL	2016 – 138,000 2017 – 117,000 2018 – 111,000
ABC	111,000
Management Uncertainty	6,200 (Value in 2015)
ACL/OY	104,800[1]
DAH	104,800
DAP	100,800
USAP	0
BT	4,000
Area 1A Sub-ACL (28.9%)	30,300
Area 1B Sub-ACL (4.3%)	4,500
Area 2 Sub-ACL (27.8%)	29,100
Area 3 Sub-ACL (39%)	40,900
RSA	3%
FGSA	295

[1]***Option –*** If, by considering landings through **October 1 or October 15 (TBD),** NMFS determines that less than 4,000 mt has been caught in the NB weir fishery, NMFS will allocate an additional 1,000 mt to the Area 1A sub-ACL to be made available to the directed herring fishery as soon as possible, through the remainder of the fishing year (until the AM is triggered). If this occurs, the stockwide ACL would increase to **105,800 mt** under this alternative.

Alternative 3 Seasonal (Monthly) Sub-ACL Divisions (2016-2018)

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

2.2 SUPPORTING INFORMATION AND RATIONALE FOR PROPOSED 2016-2018 ATLANTIC HERRING SPECIFICATIONS

This section provides updated information and rationale to support the Council's ***Preferred Alternative*** for the 2016-2018 Atlantic herring fishery specifications. Because the specification of ABC for the 2016-2018 fishing years (recommended by the SSC, see Section 2.1.1) only differs from the 2013-2015 ABC specification by 3,000 mt (2.6%), and because available stock/fishery information does not indicate a need to consider major changes to the distribution of allowable catch or other specifications, the alternatives that the Council considered maintain the status quo for many of the specifications; they differ primarily through the specification of the management uncertainty buffer and the stockwide Atlantic herring ACL.

2.2.1 Specification of Management Uncertainty and Stockwide Atlantic Herring ACL/OY

The difference between the Atlantic herring ABC and the stockwide ACL equates to what the Council specifies as management uncertainty. The management uncertainty specification further ensures that Atlantic herring catch will not exceed the ABC in a given year by buffering against uncertainty related to the management system. The deduction for management uncertainty occurs based on the SSC's recommendation for ABC (111,000 mt) to derive a stockwide ACL, which represents the U.S. Atlantic herring OY for 2016-2018.

During the specifications process, the Council considered a range of deductions of management uncertainty based on three possible factors:

1. Canadian Catch of Atlantic Herring (New Brunswick (NB) Weir Fishery);
2. Uncertainty Around Estimates of State Waters Atlantic Herring Catch; and
3. Uncertainty Around Estimates of Atlantic Herring Discards.

2.2.1.1 Canadian Catch of Atlantic Herring (New Brunswick Weir Fishery)

Catch of the Atlantic herring stock complex in Canadian waters consists primarily of fish caught in the New Brunswick (NB) weir fishery. During the benchmark stock assessment for Atlantic herring (2012), the SARC 54 Panel noted that the contribution of the Atlantic herring stock on the Scotian Shelf region is unknown. It is generally 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).

Table 7 provides the time series of Atlantic herring catch that was used in the 2015 Atlantic herring operational (update) assessment, including catch from the NB weir fishery through the 2014 fishing year. The column labeled "NB Weir (Incl. Shutoff)" is used to represent catch from the NB weir fishery. For the most part, however, shutoffs are not located in the same area as weirs, and herring catch from shutoffs are thought to be from the 4WX stock component (not the inshore GOM Atlantic herring stock component). NB weir fishery catch is not tracked in-season against the U.S. Atlantic herring ACL. Rather, the annual expected catch in the NB weir fishery is estimated and then subtracted from the ABC, as an element of the management uncertainty buffer, to calculate the stockwide Atlantic herring ACL, which represents OY for the U.S. fishery.

Table 8 shows the number of active weirs and the average catch per weir reported for the NB weir fishery from 1978-2014. The NB weir catch estimates provided in Table 8 only include weir catch and not catch from the shutoff fishery. Catch from shutoffs generally represent a small component of the total NB weir fishery catch.

Table 7 Total Atlantic Herring Catch (mt), 1970 – 2014

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

Source: NEFSC Assessment Update Report (2015).

Table 8 Number of Active Weirs and Catch per Weir in the NB Weir Fishery, 1978-2014

Year	NB Weir Catch (mt)	No. Active Weirs	Catch Per Weir (mt)
1978	33,570	208	162
1979	32,477	210	155
1980	11,100	120	92
1981	15,575	147	102
1982	22,183	159	140
1983	10,594	143	88
1984	8,374	116	72
1985	26,724	156	171
1986	27,515	105	262
1987	26,622	123	216
1988	32,554	191	200
1989	43,475	171	255
1990	38,224	154	258
1991	23,713	143	166
1992	31,899	151	212
1993	31,431	145	216
1994	20,622	129	160
1995	18,198	106	172
1996	15,781	101	156
1997	20,416	102	200
1998	19,113	108	181
1999	18,234	100	191
2000	16,472	77	213
2001	20,064	101	199
2002	11,807	83	142
2003	9,003	78	115
2004	20,620	84	245
2005	12,639	76	166
2006	11,641	89	131
2007	30,145	97	311
2008	6,041	76	79
2009	3,603	38	95
2010	10,671	77	139
2011	2,643	37	71
2012	494	4	124
2013	5,902	49	120
2014	1,571	26	60
Long-Term Average	**18,962 mt**	**110 weirs**	**163 mt**
3-Year Average	**2,656 mt**	**26**	**101 mt**
5-Year Average	**4,256 mt**	**39**	**103 mt**
10-Year Average	**8,535 mt**	**57**	**130 mt**

Source: DFO.

Table 9 lists herring landings by month for weirs located in New Brunswick from 1978 to 2008. Landings from the NB weir fishery have always been somewhat variable; however, the fishery occurs primarily during the late summer and fall months (June-October). The NB weir fishery is dependent on many factors including weather, fish migration patterns, and environmental conditions. Over the time series shown in Table 9, catch from the NB weir fishery occurring after October (November/December) averaged less than 4% of the total catch reported for the year from the fishery.

Table 9 Monthly Weir Landings (mt) for Weirs Located in New Brunswick, 1978 to 2008

PROVINCE	YEAR	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Total
N.B.	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
	2004					21	336	2,694	8,354	8,298	913	3		20,620
	2005						213	802	7,145	3,729	740	11		12,639
	2006					8	43	1,112	3,731	3,832	2,328	125	462	11,641
	2007	182		20	30	84	633	3,241	11,363	7,637	6,567	314	73	30,145
	2008						81	1,502	2,479	1,507	389	49	32	6,041
NB Average Catch (t)		160	34	9	38	134	331	3,673	8,390	5,657	3,087	682	119	21,829

For the 2016-2018 Atlantic herring fishery specifications, the Council considered possible deductions from the ABC to account for management uncertainty based on updated (most recent) 3-year, 5-year, and 10-year average catch totals from the NB weir fishery (see Table 10 on following page). This is consistent with the range of deductions that the Council considered during the 2013-2015 fishery specifications process.

The Council recommends that the 2013-2015 management uncertainty deduction of 6,200 mt be maintained for 2016-2018 to account for the potential catch of Atlantic herring in the Canadian (NB) weir fishery. This management uncertainty deduction is greater than the most recent three-year and five-year average catch in the NB weir fishery and would provide a more conservative buffer than utilizing the same approach that was utilized for the 2013-2015 fishery specifications to specify management uncertainty (most recent three-year average NB weir catch). Moreover, the management uncertainty buffer is based on average catch from the NB weir *and* shutoff fishery (catch reported in Table 7 versus Table 8). For the most part, shutoffs are not located in the same area as weirs, and landings from shutoffs are thought to be from the 4WX stock component, not the Atlantic herring stock component. This provides additional buffer against removals of the U.S. Atlantic herring stock component that may occur in the NB weir fishery over the next three years.

Table 10 Possible Deductions for Management Uncertainty (NB Weir Fishery) in 2016-2018 Atlantic Herring Specifications

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

The Council's recommendation for 2016-2018 is shaded in grey.

The Council's recommendation of 6,200 mt is based on recent performance in the NB weir fishery, including the total annual catch and the average number of active weirs. This recommendation is more conservative than the five-year average NB weir catch, including catch from shutoffs (4WX stock). There does not appear to be a need to buffer against the 10-year average NB weir catch for the next three years. Information provided by the industry in Canada suggests that the 2015 NB weir fishery catch has been very low, totaling no more 150 tons so far this season. (*The DFO Herring Fishery Report as of August 27, 2015 reports that a total of 60 mt has been caught in the NB weir fishery during the 2015 calendar year.*). Canadian industry speculation is that NB weir catch is not likely to exceed 2,000 mt in 2015. At this time, effort in the fishery appears to be at than 25 weirs. Many fishermen who were participating in the historical NB weir fishery have shifted to other fisheries and are reluctant to re-invest in the weir fishery. While the reasons for reduced NB weir catch are not entirely clear, the industry speculates that this is due more to environmental conditions, as Canadian seiners have reported seeing fish in offshore areas (Connors Bros., personal communication with Council staff).

Finalize rationale after September 2015 Council meeting

2.2.1.2 Atlantic Herring Catch in State Waters

The vast majority of the Atlantic herring resource is harvested in Federal waters. Catch by Federal permit holders that occurs in State waters is reported and counted against the sub-ACLs. Catch by state-only permit holders is monitored by the ASMFC and is not large enough to substantially affect management of the Federal fishery and the ability to remain under the sub-ACLs. Total Atlantic herring catch by vessels fishing in state waters was about 41,000 pounds in 2015.

The non-federally permitted commercial landings of Atlantic herring are by fishermen Maine, primarily using fixed gear and a small number of seines. Table 11 provides updated catch estimates from the fixed gear fishery through 2013. The Council specifies a set-aside for West of Cutler fixed gear fishermen (FGSA), currently 295 mt. The un-used portion of the FGSA is returned to the Area 1A fishery after November 1. The ASMFC's requirement that fixed gear fishermen must report through IVR (and therefore have catch counted against the sub-ACL) has reduced any management uncertainty associated with State waters landings to an insignificant amount.

Table 11 Atlantic Herring Landings from Fixed Gear Fishery Before and After November 1 Rollover Date

Year	Sub-ACL Closure Date	Area 1A Sub-ACL (mt)	Cumulative Catch (mt) by Dec 31	Fixed Gear Landings (mt)	
				Jan-Oct	Nov-Dec
2004	11/19/2004	60,000	60,071	49	0
2005	12/2/2005	60,000	61,570	53	0
2006	10/21/2006	50,000	59,980	528	0
2007	10/25/2007	50,000	49,992	392	0
2008	11/14/2008	43,650	42,257	24	0
2009	11/26/2009	43,650	44,088	81	0
2010	11/17/2010	26,546	27,741	823	0
2011	10/27/2011	29,251	29,359	23	0
2012	11/5/2012	27,668	25,057	0	0
2013	10/15/2013	29,775	29,820	C	C
2014	10/26/2014	33,031	33,428	C	C

Source: ASMFC.

Note: "C" denotes that the value cannot be reported due to confidentiality.

2.2.1.3 Atlantic Herring Discards

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

Atlantic herring discards are estimated by NMFS using vessel and observer data and are counted against the management area sub-ACLs. To date, uncertainty related to estimating Atlantic herring discards has not been a significant source of management uncertainty. There does not appear to be a need to change this conclusion when considering management uncertainty for the 2016-2018 Atlantic herring fishery specifications. This is because increased sampling has improved bycatch accounting and reduced uncertainty associated with estimating Atlantic herring discards in recent years. In 2010, the Northeast Fisheries Observer Program (NEFOP) revised the training curriculum for observers deployed on herring vessels to focus on effectively sampling in high-volume fisheries. NEFOP also developed a discard log to collect detailed information on discards in the herring fishery, such as why catch was discarded, the estimated amount of discarded catch, and the estimated composition of discarded catch. Moreover, management measures implemented through Amendment 5 and other future actions will continue to improve catch monitoring and the accuracy of herring discard estimates in future years.

Table 12 provides Atlantic herring discard estimates for 2010-2013 based on three sources of data: VMS, VTR, and observer data expansion. VMS discards were summed together by year using the GARFO Atlantic herring VMS catch report database. The VTR discards were summed together by year using the GARFO VTR databases. Lastly, the observer extrapolated data were acquired from the 2010-2013 year-end summary reports. Catch reporting through VMS was not required until 2011, so no discard estimates from VMS catch reports can be generated for 2010. With the exception of 2013, Atlantic herring discard reports from NMFS and VTRs are generally similar; discard estimates extrapolated from observer data tend to be more variable and have decreased in more recent years. Overall, regardless of data source, Atlantic herring discards represent a very small fraction of total catch. Total Atlantic herring catch in 2013 was 95,764 mt, so discards represented 0.01%--.2% of the total 2013 Atlantic herring catch. Given recent actions to enhance catch monitoring and reporting, there is no indication that uncertainty regarding Atlantic herring discard estimation is expected to increase during the upcoming fishery specifications cycle (2016-2018).

Table 12 Atlantic Herring Discards (mt) by Reporting Method, 2010-2013

Year	VMS*	VTR**	Observer – Fleet Expansion***
2010	N/A	263	137
2011	179	179	210
2012	144	154	87
2013	113	169	18

Source: VMS, VTR databases and herring year end reports as of 8/28/2015.

**GARFO herring VMS catch report table fso_admin.vms_herring_catch_report_stg.*

***GARFO VTR databases under the NOAA schema.*

****Year-End discard calculation using observer data extrapolated out to the herring fleet.*

Framework 4 Management Measures to Address Net Slippage

Consideration of recent management actions adopted by the Council to further address net slippage and a review of 2014 observer data regarding *catch that is not brought on board* support the Council's rationale for the proposed 2016-2018 management uncertainty specification. Framework 4 to the Atlantic Herring FMP was finalized by the Council in 2014, and publication of the Final Rule is pending. In Framework 4, the Council proposed additional management measures to address net slippage on limited access herring vessels carrying an observer on board. If the measures to address net slippage in Framework 4 are approved/implemented by NMFS, the following rules would apply to limited access Atlantic herring vessels:

- Observed slippage events (*catch not brought on board*) due to *safety, mechanical failure, or spiny dogfish* would be considered "allowable" slippage events and would be subject to existing requirements for a Released Catch Affidavit as well as a 15-nm move along rule.
- Observed slippage events (catch *not brought on board* for reasons other than safety, mechanical failure, and spiny dogfish) would be considered "non-allowable" slippage events and would be subject to existing requirements for a Released Catch Affidavit as well as trip termination.
- Operational discards reported by observers would *not* be prohibited outside the groundfish closed areas; although operational discards represent catch that is not brought on board, they would *not* be treated like slippage events.
- Catch reported by observers as "*not brought on board due to gear damage"* would be considered the same as "*not brought on board due to mechanical failure"* for the purposes of complying with and enforcing the regulations to address net slippage. In other words, when catch is released due to gear damage, vessels would be subject to current requirements for a Released Catch Affidavit as well as the 15-mile move along requirement.
- Fish that are documented by observers to fall out of gear (and therefore are not brought on board the vessel) would *not* be treated like slippage events (no additional consequences).

The Northeast Fisheries Observer Program (NEFOP) implemented a discard log in 2010 to obtain more detailed information regarding catch that may not be brought on board in high-volume fisheries. The discard log is being completed for every haul, and it includes fields to provide information on what kind of discard event may have occurred, whether or not the observer could see the contents of the codend when pumping stopped, why catch may have been discarded, information about the composition of discarded catch, and any challenges the observer may have experienced when observing the haul. Observers are also documenting released catch (including operational discards and slippage events) with photographs whenever possible, and bringing in samples of fish from every trip to confirm species identification. Operational discards have been confirmed by observers to be relatively small amounts of fish that may remain in the net following a successful haul/pump; these fish are usually caught in the net and/or cannot be pumped on board. Information collected by observers about operational discards has improved, and hauls with operational discards are considered to be "observed" hauls; the operational discards are estimated by the observers. Observers document operational discards as *Herring NK* if they are able to see the fish that are not pumped and confirm that the discards are all herring-bodied fish. Otherwise, the discards are documented as *Fish NK*.

When reviewing the data on the following pages, it is important to understand that an observed "event" is not synonymous with a "haul," as multiple events may occur within a single haul. For example, a haul may have three different reasons for not bringing catch onboard the vessel: a species fell from the net into the water as the net is being reeled in; clearing a blockage during pumping caused additional fish to be released; and after pumping was completed, a small amount of fish remained in the net (operational discards).

Table 13 and Table 14 summarize data from any observed purse seine trips on which catch was documented as "not brought on board" during 2014. This table supplements the observer data for catch not brought on board/slippage from 2010-2013 that was recently provided in Framework 4 to the Atlantic Herring FMP. Information about observer coverage on purse seine vessels during 2014 is provided in Section 3.2.2 of this document (p. 47). Overall, 13 slippage events and 29 operational discard events were observed on 26 purse seine trips during 2014. None of these slippage events were cited due to safety, mechanical failure, or spiny dogfish. Slippage was observed on purse seine vessels in 2014 due primarily to vessel capacity filled and not enough fish to pump; if the Framework 4 measures to address slippage are implemented (Final Rule pending), these events would require trip termination. Five events were observed where fish were released on the purse seine vessel due to gear damage, which are not considered slippage events. Release from gear damage represented the largest component of catch that was documented as not brought on board observer purse seine trips during 2014.

Table 13 Summary of NEFOP Observer Data for Catch Not Brought on Board, 2014 Observed Purse Seine Trips

HERRING MANAGEMENT AREA	NOT BROUGHT ONBOARD VESSEL		
	SLIPPAGE EVENTS		NON-SLIPPAGE EVENTS
			Other
AREA 1A and AREA 2 Due to confidentiality constraints, Areas 1A and 2 are combined	13		36 29: operational discards 5: Not brought onboard, gear damage prevented capture 2: Not brought onboard, fell out/off of gear
TOTAL TRIPS	TOTAL OBSERVED KEPT ATL. HERRING (lbs)	TOTAL OBSERVED SLIPPED CATCH (lbs)	TOTAL OBSERVED NON-SLIPPED CATCH (lbs)
26	3,915,757	116,850	262,203
TOTAL TRIPS	TOTAL (all areas)	TOTAL (all areas)	TOTAL (all areas)
26	3,915,757 lbs	116,850 lbs	262,203 lbs
Total slippage (or total non-slippage)/Total kept	N/A	2.98%	6.70%

TOTAL SLIPPED CATCH (ALL AREAS)	116,850 lbs
% DOGFISH	0%
% SAFETY	0%
% MECHANICAL FAILURE	0%

Note: slippage was not due to safety, dogfish, or mechanical failure.

Table 14 Disposition Code Reported for Catch Not Brought on Board Purse Seine Vessels on Observed Trips in 2014

Fish Disposition Code	Hail Weight
040 (not brought onboard, operational discards, non-slippage)	1,188 lbs
041 (not brought onboard, reason not specified, slippage)	10,000 lbs
042 (not brought onboard, gear damage prevented capture, non-slippage)	260,000 lbs
043 (Not brought onboard, fell out/off of gear, non-slippage)	1,015 lbs
044 (not brought onboard, no market value, slippage)	65 lbs
048 (not brought onboard, vessel capacity filled, slippage)	92,000 lbs
049 (not brought onboard, not enough fish to pump, slippage)	14,850 lbs

Table 15 and Table 16 summarize data from any observed midwater trawl trips (single and paired) on which catch was documented as "not brought on board" across all management areas in 2014. This table supplements the observer data for catch not brought on board/slippage from 2010-2013 that was recently provided in Framework 4 to the Atlantic Herring FMP. Information about observer coverage on midwater trawl vessels during 2014 is provided in Section 3.2.2 of this document (p. 47).

Overall, 41 slippage events and 123 operational discard events were observed on 125 midwater trawl (single and paired) trips during the 2014 fishing year. 32 of the observed slippage events occurred in Area 3 (Georges Bank). Slippage represented just under 1% of the total observed midwater trawl catch, and catch not brought on board for other reasons represented 0.05% of the total observed catch on midwater trawl vessels during 2014. Observed slippage events were not reported due to spiny dogfish. There were three observed slippage events associated with mechanical failure and one observed slippage event associated with safety. Slippage was observed on midwater trawl vessels in 2014 due primarily to vessel capacity filled, not enough fish to pump, and no market value; if the Framework 4 measures to address slippage are implemented (Final Rule pending), these events would require trip termination.

Table 15 Summary of NEFOP Observer Data for Catch Not Brought on Board, 2014 Observed Midwater Trawl Trips (Single and Paired) in All Areas

HERRING MANAGEMENT AREA	NOT BROUGHT ONBOARD VESSEL		
	SLIPPAGE EVENTS		NON-SLIPPAGE EVENTS
			Other
AREA 1A and AREA 1B are combined due to confidentiality	6		25 23: Operational Discards 1: Not brought onboard, fell out/off of gear 1: Not brought onboard, gear damage prevented capture
TOTAL TRIPS	TOTAL OBSERVED KEPT ATL. HERRING (lbs)	TOTAL OBSERVED SLIPPED CATCH (lbs)	TOTAL OBSERVED NON-SLIPPED CATCH (lbs)
28	11,887,010	70,250	12,499
AREA 2	3		3 3: Operational Discards
TOTAL TRIPS	TOTAL OBSERVED KEPT ATL. HERRING (lbs)	TOTAL OBSERVED SLIPPED CATCH (lbs)	TOTAL OBSERVED NON-SLIPPED CATCH (lbs)
8	2,034,817	61,000	120
AREA 3	32		102 97: Operational discards 4: Not brought onboard, fell out/off of gear 1: Not brought onboard, gear damage prevented capture
TOTAL TRIPS	TOTAL OBSERVED KEPT ATL. HERRING (lbs)	TOTAL OBSERVED SLIPPED CATCH (lbs)	TOTAL OBSERVED NON-SLIPPED CATCH (lbs)
89	33,198,161	310,118	11,067
TOTAL TRIPS	TOTAL (all areas)	TOTAL (all areas)	TOTAL (all areas)
125	47,119,988 lbs	441,368 lbs	23,686 lbs
Total slippage (or total non-slippage)/Total kept	N/A	0.94%	0.05%

TOTAL SLIPPED CATCH (ALL AREAS)	441,368 lbs
% DOGFISH	0%
% SAFETY	2.27%
% MECHANICAL FAILURE	2.04%

Note: Observed slippage was not due to dogfish. There were 3 observed slippage events associated with mechanical failure and one observed slippage event associated with safety.

Table 16 Disposition Code Reported for Catch Not Brought on Board Midwater Trawl Vessels on Observed Trips in 2014

AREA 1A and 1B	
Fish disposition	**Hailweight**
040 (not brought onboard, operational discards, non-slippage)	489 lbs
042 (not brought onboard, gear damage prevented capture, non-slippage)	12,000 lbs
043 (not brought onboard, fell out/off of gear, non-slippage)	10 lbs
048 (not brought onboard, vessel capacity filled, slippage)	65,000 lbs
049 (not brought onboard, not enough fish to pump, slippage)	5,000 lbs
071 (not brought onboard, clogged other, slippage)	250 lbs
AREA 2	
Fish disposition	**Hailweight**
040 (not brought onboard, operational discards, non-slippage)	120 lbs
041 (not brought onboard, reason not specified, slippage)	50,000 lbs
046 (not brought onboard, mechanical failure, slippage)	5,000 lbs
048 (not brought onboard, vessel capacity filled, slippage)	6,000 lbs
AREA 3	
Fish disposition	**Hailweight**
040 (not brought onboard, operational discards, non-slippage)	3,537 lbs
041 (not brought onboard, reason not specified, slippage)	20,818 lbs
042 (not brought onboard, gear damage prevented capture, non-slippage)	5,000 lbs
043 (not brought onboard, fell out/off of gear, non-slippage)	2,530 lbs
044 (not brought onboard, no market value, slippage)	111,350 lbs
045 (not brought onboard, safety reason, slippage)	10,000 lbs
046 (not brought onboard, mechanical failure, slippage)	4,000 lbs
048 (not brought onboard, vessel capacity filled, slippage)	100,000 lbs
049 (not brought onboard, not enough fish to pump, slippage)	43,000 lbs
071 (not brought onboard, clogged other, slippage)	20,950 lbs

2.2.2 Specification of DAH, DAP, BT, and USAP

The Atlantic Herring FMP specifies that domestic annual harvest (DAH) will be set less than or equal to OY and will be composed of domestic annual processing (DAP) and the amount of Atlantic herring that can be taken in U.S. waters and transferred to Canadian herring carriers for transshipment to Canada (BT). Domestic annual harvest (DAH) is established based on the expected catch from U.S. fishing vessels during the upcoming fishing year and equals OY for the U.S. fishery.

Stockwide ACL = OY = DAH

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

DAH = DAP + BT

DAH Specification

When specifying DAH for the Atlantic herring fishery, important considerations relate to the actual and potential capacity of the U.S. harvesting fleet. Recent fishery performance (landings) is also an important factor in this fishery. The Herring FMP became effective during the 2001 fishing year, and since 2001, total landings in the U.S. fishery have decreased. Table 42 on p. 90 of this document summarizes total Atlantic herring catch as a percentage of the total available catch in each year from 2003-2014. Atlantic herring catch has been somewhat consistent over the time period (and in previous years), averaging about 91,925 mt from 2003-2014, with the highest catch of the time series observed in 2009 (103,943 mt) and lowest in 2010 (72,852 mt). However, the quota allocated to the fishery (stockwide ACL/OY) has decreased 50% over the twelve-year period. Consequently, and without increasing fishing effort, the Atlantic herring fishery has become more fully utilized in recent years, and the fishery utilized 100% of the total Atlantic herring ACL for the first time in 2012. The 2013-2015 Atlantic herring fishery specifications increased the stockwide Atlantic herring ACL by more than 15,000 mt from the 2010-2012 specifications; an additional 5,000 mt was caught under the higher quota in 2013 and 2014, and overall, the fishery utilized about 90% of the stockwide Atlantic herring ACL.

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

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

DAP Specification

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

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

BT Specification

The Border Transfer specification represents U.S.-caught herring transshipped to Canada via Canadian carrier vessels and used for human consumption. This specification is not a set-aside; rather, it represents a maximum amount of Atlantic herring caught from Area 1A that can be transshipped to Canadian vessels for human consumption. NMFS GARFO tracks BT utilization through a separate dealer code. Specification of BT has remained at 4,000 mt since the implementation of the Atlantic Herring FMP, and there was no change for the 2013-2015 fishing years. There does not appear to be a need to change this specification for 2016-2018. Therefore, the **BT specification is proposed to remain 4,000 mt for the 2016-2018 fishing years**.

Table 17 indicates a decrease in BT from 1994-2014, with 2011 utilizing 946 mt (24% of 4,000 border transfer mt). UPDATE

Table 17 Utilization of Border Transfer (mt)

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

Source: NMFS.

USAP Specification

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

During the 2007-2009 fishing years, the Council maintained a USAP specification of 20,000 mt (Areas 2/3 only) based on information received about a new at-sea processing vessel that intended to utilize a substantial amount of the USAP specification. At that time, landings from Areas 2 and 3 – where USAP is authorized – were considerably lower than allocated sub-ACLs for each of the past several years. Moreover, the specification of 20,000 mt for USAP did not restrict either the operation or the expansion of the shoreside processing facilities during the 2007-2009 fishing years. However, this operation never materialized, and none of the USAP

specification was used during the 2007-2009 fishing years. Consequently, the Council set USAP at zero for the 2010-2012 fishing years and the 2013-2015 fishing years. The Council has not received any information that would suggest changing this specification for the 2016-2018 fishing years. Therefore, **the specification of USAP for the 2016-2018 fishing years is proposed to remain at 0 mt.**

2.2.3 Specification of Management Area Sub-ACLs for 2016-2018

Because the Atlantic herring ABC specification recommended by the SSC for 2016-2018 (111,000 mt) is not substantially different than the 2013-2015 ABC specification (114,000 mt), the Council, based on a recommendation from the Herring Committee, has determined that there is no need to consider modifying the distribution of the total ACL among the Atlantic herring management areas for 2016-2018. Additionally, information from the Atlantic herring operational assessment report (April 2015) does not suggest that there is a biological need to consider modifying the distribution of the stockwide ACL. To this end, a "status quo" approach for 2016-2018 Atlantic herring sub-ACLs is recommended by the Council (see Table 18 below), based on an ABC specification of 111,000 mt. The status quo approach applies the same (2013-2015) proportional distribution of the stockwide Atlantic herring ACL among the management areas. This approach is applied to determine the sub-ACLs under both Alternative 2 (status quo, Section 0) and Alternative 3 (***Preferred Alternative***, Section 2.1.4). The Council has also determined that there is no need to consider changing the seasonal (monthly) divisions of the Area 1A and Area 1B sub-ACLs; these sub-ACL seasons are therefore carried over to Alternatives 2 and 3.

Table 18 Status Quo Approach for 2016-2018 Atlantic Herring Sub-ACLs

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

**Based on SSC recommendation of 111,000 mt for ABC.*

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

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

According to the catch information presented in Table 41 (see p. 89), it is anticipated that there will be a deduction from the 2016 sub-ACLs for Area 1A and Area 1B to account for overages that occurred in these areas during the 2014 fishing year. There should also be a carryover of some portion (up to 10%) of the unused 2014 sub-ACL from Areas 2 and 3 to the 2016 sub-ACLs for these areas (but the stockwide Atlantic herring ACL will not increase, consistent with Framework 2 to the Atlantic Herring FMP).

2.2.4 Specification of Research Set-Asides (RSAs)

The RSA process is a competitive grants process administered by the Northeast Fisheries Science Center. Proposals are requested for research, and incoming proposals are reviewed and ranked by a technical body. With competitive grants awarded through this process, different entities will apply. For catch monitoring, it is important to ensure that only qualified entities apply, and it would be difficult to ensure a consistent monitoring program with multiple entities potentially competing for the available funds in any given year. The 2013-2015 Atlantic herring fishery specifications deducted a 3% RSA from the ACL for all management areas and identified river herring bycatch avoidance and portside sampling as top priorities for cooperative research to be funded by herring RSA in 2014 and 2015.

For the 2016-2018 Atlantic herring fishery specifications, the Council is proposing to maintain the specification of 3% RSA from each management area for the 2016-2018 fishing years.

Top Priorities for Cooperative Research 2016-2018

In January 2015, the Council recommended the following four research priorities under any RSAs that may be allocated in the 2016-2018 Atlantic herring fishery specifications (without ranking, i.e., equally-important):

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

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

2.2.5 Specification of Fixed Gear Set-Aside (FGSA)

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

Table 11 (p. 21) provides Atlantic herring catch estimates from the fixed gear fishery through 2013. According to Table 11, none of the FGSA has been utilized since 2012 and it has all been returned to the Area 1A fishery after November 1. At its July 22, 2015 meeting, the Herring Committee recommended that the Council maintain the specification of 296 mt for the FGSA for the 2016-2018 fishing years.

2.3 ALTERNATIVES FOR 2016-2018 RIVER HERRING/SHAD (RH/S) CATCH CAPS

The alternatives under consideration for specifying the 2016-2018 RH/S catch caps, as well as information/rationale to support the ***Preferred Alternative***, are provided in the following subsections. Appendix I includes the Herring PDT's analysis, *Development of Options for River Herring and Shad Catch Caps in the Atlantic Herring Fishery, 2016-2018,* and can be referenced for more detailed information.

2.3.1 RH/S Alternative 1: No Action (Framework 3 Catch Caps)

RH/S Alternative 1 represents the no action alternative. This alternative would maintain the 2014/2015 RH/S catch caps implemented in Framework 3 for the 2016-2018 fishing years. Under this alternative, the 2016-2018 RH/S catch caps would be based on the median value of estimated RH/S catch from 2008-2012 from Fw 3 (Table 19). The RH/S catch caps under this alternative would continue to apply to midwater trawl vessels in the Gulf of Maine and Cape Cod Catch Cap Areas, and to both midwater trawl and small mesh bottom trawl vessels in the southern New England/Mid-Atlantic Catch Cap Area (see RH/S Catch Cap Areas shaded on Figure 1, p. 3) on all trips landing more than 6,600 pounds of Atlantic herring. No RH/S catch cap would be adopted for the GB Catch Cap Area.

Table 19 RH/S Alternative 1 (No Action)

RH/S Catch Cap Area	2016-2018 RH/S Catch Cap (mt)
GOM	Midwater Trawl – 85.5
CC	Midwater Trawl – 13.3
SNE/MA	Midwater Trawl – 123.7 Bottom Trawl – 88.9
GB	0

2.3.2 RH/S Alternative 2 (Non-Preferred)

Under RH/S Alternative 2, the 2016-2018 RH/S catch caps would be based on the Herring PDT's updates/revisions to the 2008-2012 RH/S catch estimates from Framework 3 (see Section 3.2.3.1 and Appendix I). The same five-year time series that was utilized in Fw 3 (2008-2012 with updated/revised data) would be utilized to determine the RH/S catch caps under this alternative, with options to select either the median or weighted mean from the time series (Table 20). The RH/S catch caps under this alternative would continue to apply to midwater trawl vessels in the Gulf of Maine and Cape Cod Catch Cap Areas, and to both midwater trawl and small mesh bottom trawl vessels in the southern New England/Mid-Atlantic Catch Cap Area (see RH/S Catch Cap Areas shaded on Figure 1, p. 3) on all trips landing more than 6,600 pounds of Atlantic herring. No RH/S catch cap would be adopted for the GB Catch Cap Area.

Option 1: Median. Option 1 would base the 2016-2018 RH/S catch caps on the median values of the 2008-2012 revised RH/S catch estimates.

Option 2: Weighted Mean. Option 2 would base the 2016-2018 RH/S catch caps on the weighted mean values of the 2008-2012 revised RH/S catch estimates. The weighted mean represents the arithmetic average of the total RH/S catch per year (by area and gear type for each of the five years in the time series), weighted by the number of sampled trips in that stratum (see Appendix I for more information).

Table 20 RH/S Alternative 2

RH/S Catch Cap Area	2016-2018 RH/S Catch Cap (mt) Option 1 (Median)	2016-2018 RH/S Catch Cap (mt) Option 2 (Weighted Mean)
GOM	Midwater Trawl – 98.1	Midwater Trawl – 98.3
CC	Midwater Trawl – 8.9	Midwater Trawl – 27.6
SNE/MA	Midwater Trawl – 83.9 Bottom Trawl – 19.6	Midwater Trawl – 115.4 Bottom Trawl – 28.2
GB	0	0

2.3.3 RH/S Alternative 3 (*Preferred*): Revised Data with Seven-Year Time Series (Weighted Mean)

Under RH/S Alternative 3, the 2016-2018 RH/S catch caps would be specified based on RH/S catch estimates from 2008-2014, using the Herring PDT's revised/updated data (see Section 3.2.3.1 and Appendix I). This alternative would incorporate RH/S catch estimates from the most recent two years, extending the time series to seven years, with options to select either the median or weighted mean values as the 2016-2018 RH/S catch caps (Table 21). The RH/S catch caps under this alternative would continue to apply to midwater trawl vessels in the Gulf of Maine and Cape Cod Catch Cap Areas, and to both midwater trawl and small mesh bottom trawl vessels in the southern New England/Mid-Atlantic Catch Cap Area (see RH/S Catch Cap Areas shaded on Figure 1, p. 3) on all trips landing more than 6,600 pounds of Atlantic herring. No RH/S catch cap would be adopted for the GB Catch Cap Area. Alternative 3 (using Option 2, the weighted mean) represents the ***Preferred Alternative*** for specifying 2016-2018 RH/S catch caps a this time.

Option 1: Median. Option 1 would base the 2016-2018 RH/S catch caps on the median values of the 2008-2014 revised RH/S catch estimates.

Option 2: Weighted Mean. Option 2 would base the 2016-2018 RH/S catch caps on the weighted mean values of the 2008-2014 revised RH/S catch estimates. The weighted mean represents the arithmetic average of the total RH/S catch per year (by area and gear type for each of the seven years in the time series), weighted by the number of sampled trips in that stratum (see Appendix I for more information). This option represents the ***Preferred Alternative*** for specifying the 2016-2018 RH/S catch caps.

Table 21 RH/S Alternative 3 (*Option 2 Preferred*)

RH/S Catch Cap Area	2016-2018 RH/S Catch Cap (mt) Option 1 (Median)	2016-2018 RH/S Catch Cap (mt) Option 2 (Weighted Mean)
GOM	Midwater Trawl – 11.3	Midwater Trawl – 76.7
CC	Midwater Trawl – 29.5	Midwater Trawl – 32.4
SNE/MA	Midwater Trawl – 83.9 Bottom Trawl – 24.0	Midwater Trawl – 129.6 Bottom Trawl – 122.3
GB	0	0

Rationale for Preferred Alternative

TBD after September 2015 Council meeting

2.3.4 Summary of RH/S Catch Cap Alternatives Under Consideration

Table 22 below summarizes the alternatives under consideration for specifying the 2016-2018 RH/S catch caps for the directed Atlantic herring fishery (trips landing more than 6,600 pounds of Atlantic herring). The ***Preferred Alternatives*** are shaded in grey.

Table 22 Alternatives/Options for Specifying 2016-2018 RH/S Catch Caps

RH/S Catch Cap Area	Alternative	Options			
		Bottom Trawl		Midwater Trawl	
		Median	Wgt Mean	Median	Wgt Mean
GOM	1 - Fw3 (08-12)			85.5	
	2 - Fw3 Revised (08-12)			98.1	98.3
	3 - Seven Years (08-14)			11.3	76.7
CC	1 - Fw3 (08-12)			13.3	
	2 - Fw3 Revised (08-12)			8.9	27.6
	3 - Seven Years (08-14)			29.5	32.4
SNE/MA	1 - Fw3 (08-12)	88.9		123.7	
	2 - Fw3 Revised (08-12)	19.6	28.2	83.9	115.4
	3 - Seven Years (08-14)	24.0	122.3	83.9	129.6

The Preferred Alternative is shaded in grey.

No RH/S catch caps are proposed for the Georges Bank Catch Cap Area for 2016-2018.

2.4 ALTERNATIVES CONSIDERED BUT REJECTED

TBD FOR FINAL DOCUMENT

3.0 AFFECTED ENVIRONMENT

The Affected Environment is described in this document based on valued ecosystem components (VECs). VECs represent the resources, areas, and human communities that may be affected by the management measures under consideration in this management action. VECs are the focus since they are the "place" where the impacts of management actions are exhibited. The VECs for consideration in the 2016-2018 Atlantic herring fishery specifications package include: **Atlantic Herring**; **Non-Target Species** (with particular focus on river herring/shad); **Physical Environment and Essential Fish Habitat (EFH)**; **Protected Resources**; and **Fishery-Related Businesses and Communities**.

The 2013-2015 Atlantic herring fishery specifications package (which also served as Framework 2), Framework 3 (RH/S catch caps), and Framework 4 to the Atlantic Herring FMP (measures to address slippage/dealer reporting) provide detailed information about the VECs addressed in this document. To the extent possible, information from these recent documents is not repeated in the following subsections but has been updated to support the Council's decision-making regarding the 2016-2018 Atlantic herring fishery specifications.

3.1 ATLANTIC HERRING

The NEFMC manages the Atlantic herring fishery under the Atlantic Herring FMP. This document serves as a framework adjustment to the Herring FMP. A complete description of the Atlantic herring resource can be found in Section 7.1 of the FEIS for Amendment 1 to the Herring FMP. Updated information to supplement that presented in Amendment 1 can be found in the Amendment 5 EIS and Framework 2 to the Herring FMP (which includes the 2013-2015 Atlantic herring fishery specifications). The following subsections update information through 2013/2014 where possible and summarize the stock status and recent biological information for Atlantic herring. Based on the best available scientific information, the Atlantic herring resource is not overfished at this time and overfishing is not occurring (the stock is considered rebuilt).

The Atlantic herring (*Clupea harengus*), is widely distributed in continental shelf waters of the Northeast Atlantic, from Labrador to Cape Hatteras. Herring can be found in every major estuary from the northern Gulf of Maine to the Chesapeake Bay. They are most abundant north of Cape Cod and become increasingly scarce south of New Jersey (Kelly and Moring 1986) with the largest and oldest fish found in the southern most portion of the range (Munro 2002). Spawning occurs in the summer and fall, starting earlier along the eastern Maine coast and southwest Nova Scotia (August – September) than in the southwestern GOM (early to mid-October in the Jeffreys Ledge area) and GB (as late as November – December; Reid et al. 1999). In general, GOM herring migrate from summer feeding grounds along the Maine coast and on GB to SNE/MA areas during winter, with larger individuals tending to migrate farther distances. Presently, herring from the GOM (inshore) and GB (offshore) stock components are combined for assessment purposes into a single coastal stock complex.

3.1.1 Atlantic Herring Stock Status

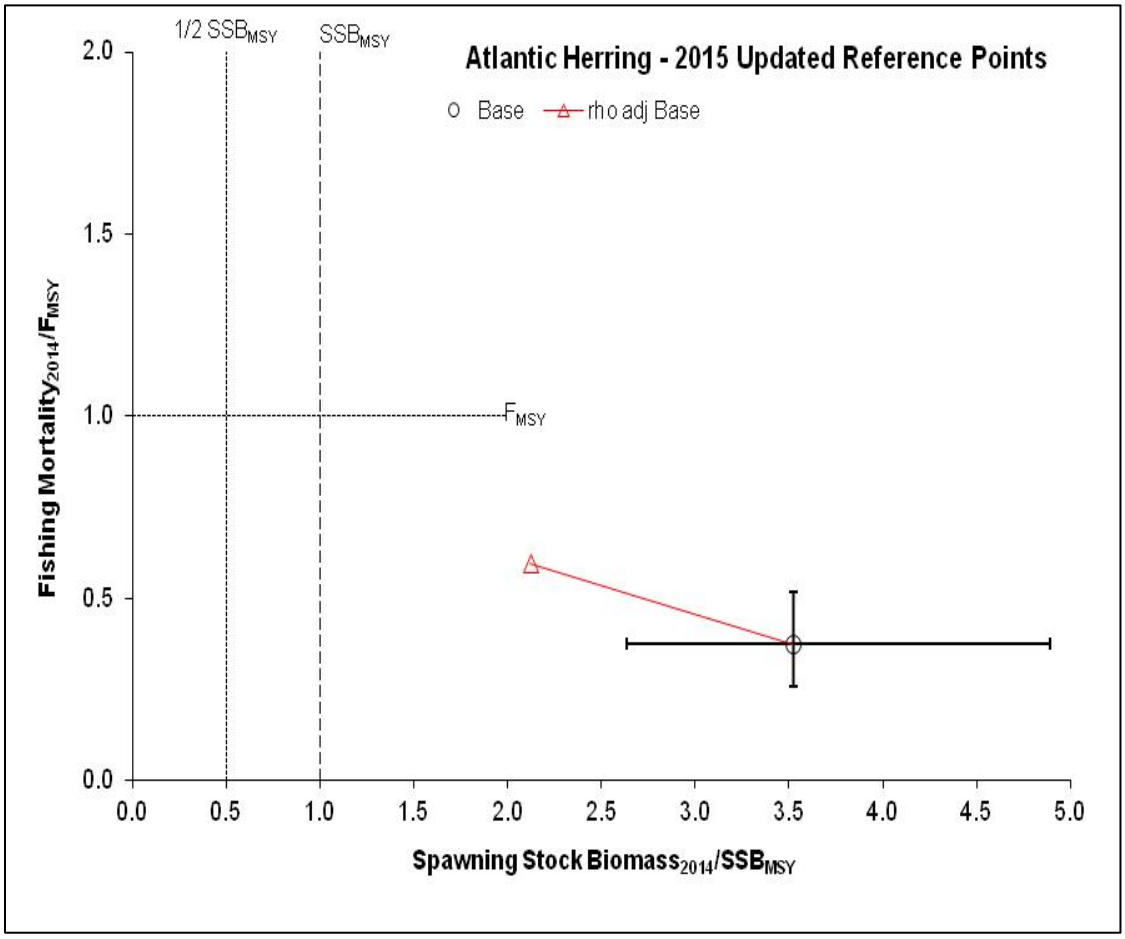
The Atlantic herring operational (update) assessment meeting was held in Woods Hole, MA on April 8-9, 2015. This assessment serves as an update to the SAW/SARC 54 benchmark assessment conducted in 2012.

Overall, the updated assessment indicates that the Atlantic herring resource continues to remain well above its biomass target (rebuilt), and fishing mortality remains well below the F_{MSY} threshold (not overfishing). A retrospective pattern re-emerged when updating the assessment model, which suggests that Atlantic herring spawning stock biomass (SSB) is likely to be overestimated and fishing mortality (F) is likely to be underestimated in the terminal year of the assessment. Resolution of a technical error in the contribution of recruitment to the objective function (i.e., negative log-likelihood) of the assessment model also affected the severity of the retrospective pattern. As a result, the assessment review panel applied a retrospective adjustment to the SSB and F values for the terminal year (2014) using Mohn's Rho. The retrospective adjustments resulted in approximately a 40% decrease in the terminal year (2014) SSB estimate and a 60% increase in the 2014 F estimate. Even with the retrospective adjustments, the Atlantic herring stock complex remains above the biomass target and below the fishing mortality threshold (Table 23, Figure 2).

Table 23 Summary of Atlantic Herring Reference Points and Terminal Year SSB/F Estimates from Benchmark Assessment (2012) and Update Assessment (2015)

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

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



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

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

3.1.2 Considerations Related to Scientific Uncertainty

With respect to the 2015 Atlantic herring operational assessment, the re-emerging retrospective pattern, assumptions about natural mortality (M), and the mis-match between implied consumption and estimated consumption appear to be the primary sources of uncertainty (see discussion in following subsections).

The size/strength of the 2011 year class and other sources of uncertainty were also identified in the assessment report. However, signals related to the 2011 year class (possibly the second-largest on record) are similar to those for the 2008 year class that were noted in the 2012 Atlantic herring benchmark stock assessment. The update assessment indicates that the 2008 year class has persisted through the fishery as the strongest on record.

3.1.2.1 Retrospective Pattern

Since the benchmark assessment, an issue with the contribution of recruitment to the negative log likelihood in the assessment framework, ASAP, was discovered. This issue was resolved for the operational assessment. Differences in results and diagnostics between the benchmark and the update are partially attributable to the likelihood issue. Resolving the likelihood issue had the effect of changing the scale of estimates (e.g., increasing abundance estimates), particularly in recent years. Regardless of the likelihood issue, diagnostic problems (e.g., retrospective patterns) were present in the update assessment. Resolving the likelihood issue only amplified these diagnostic problems (e.g., worsening retrospective patterns). To account for retrospective bias, the assessment review panel made a retrospective adjustment to the terminal year (2014) estimates of SSB (40%) and F (60%). The retrospective-adjusted estimates of SSB, F, and numbers-at-age are utilized for the short-term (2016-2018) catch projections (see Section 4.1.1 of this document for catch projections). No retrospective adjustment was applied to the benchmark terminal year (2011) biomass and fishing mortality estimates that were utilized in the projections for the 2013-2015 Atlantic herring fishery specifications.

The re-emergence of the retrospective pattern suggests a fundamental diagnostic problem with the assessment model that remains a cause for concern. However, it appears that the stock would remain above the biomass target and below the fishing mortality thresholds even if the 80% confidence intervals (i.e., 90^{th} and 10^{th} percentiles) associated with the terminal year estimates of F and SSB (see Figure 2 on p. 41) are applied to the retrospective-adjusted estimates (i.e., stock status would not change, 2014 F would remain below the threshold, and 2014 SSB would remain above the target).

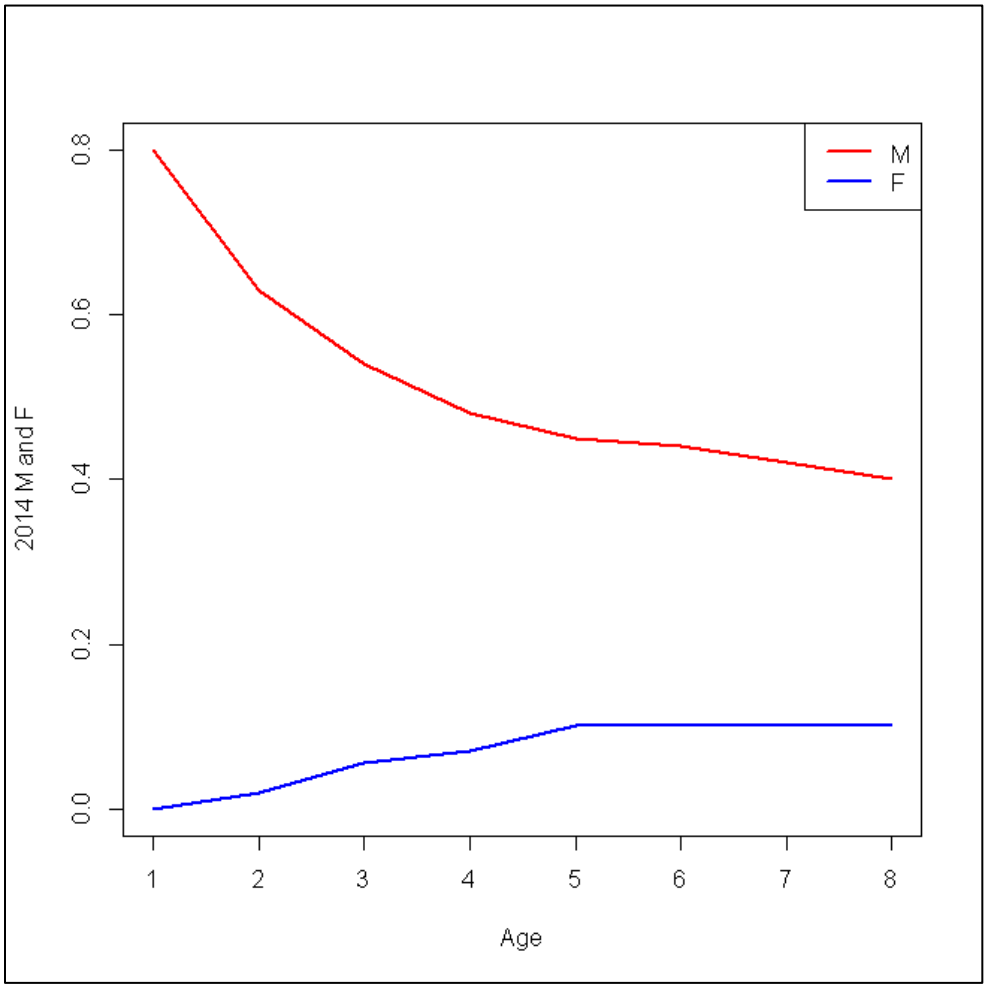
3.1.2.2 Natural Mortality (M) and Consumption

Additional uncertainty is associated with the treatment of natural mortality (M) in the assessment model and the divergence between NMFS' consumption estimates (based on stomach content data) and levels of consumption implied by the input M values in the assessment model. The mismatch between estimated and implied consumption became apparent when the assessment model was updated. This may not be of significant concern because of the possible inaccuracy of consumption estimates derived from the food habits data. These data can be extremely

sensitive to presence/absence of herring in just a few stomach samples. While food habits data are used to estimate consumption by teleost predators (fish), estimates of consumption by marine mammals, seabirds, and some larger predators (ex. tuna) are derived from prior research and assumed to be constant in recent years; these data may not be complete. Moreover, consumption of Atlantic herring and other species may change due to factors other than M (e.g., herring abundance, spatial overlap).

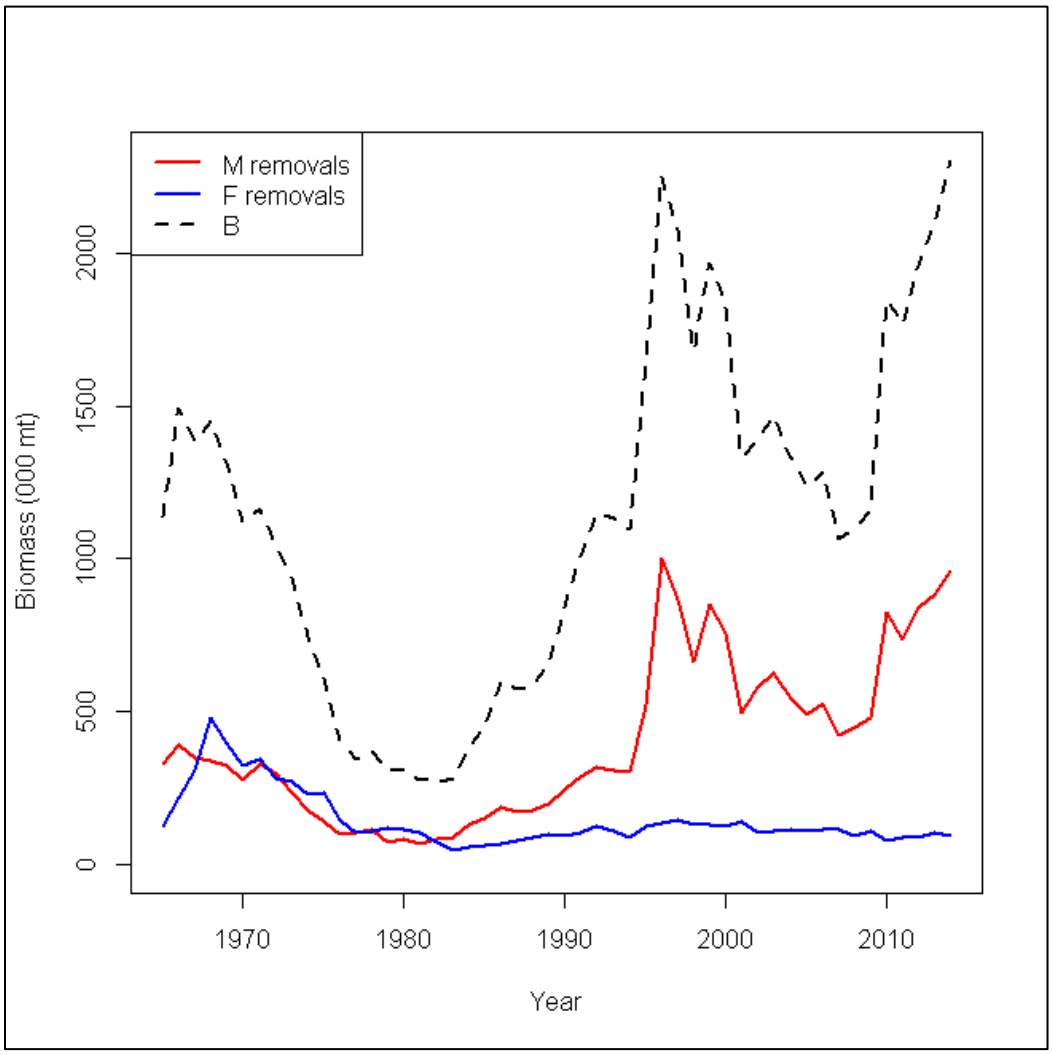
The assessment model assumes a significant amount of natural mortality on Atlantic herring, particularly at younger ages, before the fish experience mortality from the fishery. Figure 3 shows how the assessment model treats natural mortality (red line) and fishing mortality (blue line) by age class in 2014. Thus, the model assumes that M is a much higher fraction of total mortality than fishing mortality. Figure 4 illustrates removals from fishing mortality and natural mortality estimated from the assessment model relative to total biomass over the entire time series.

Figure 3 Atlantic Herring Operational Assessment: 2014 Estimated Natural Mortality (M) and Fishing Mortality (F) by Age



Source: Atlantic Herring Operational Assessment Meeting, April 8-9, 2015.

Figure 4 Atlantic Herring Operational Assessment: Estimated Removals from Natural Mortality (M) and Fishing Mortality (F) Relative to Total Estimated Biomass (B)



Source: Atlantic Herring Operational Assessment Meeting, April 8-9, 2015.

3.2 NON-TARGET SPECIES

3.2.1 Overview

Non-target species refers to species other than Atlantic herring which are caught/landed by federally permitted vessels while fishing for herring. The MSA defines *bycatch* as fish that are harvested in a fishery, but are not retained (sold, transferred, or kept for personal use), including economic discards and regulatory discards. 16 U.S.C. § 1802(2). The MSA mandates the reduction of *bycatch*, as defined, to the extent practicable. 16 U.S.C.§ 1851(a)(9). Incidental catch, on the other hand, is typically considered to be non-targeted species that are harvested while fishing for a target species and is retained and/or sold. In contrast to bycatch, there is no statutory mandate to reduce incidental catch. When non-target species are encountered in the Atlantic herring fishery, they are either discarded (bycatch) or they are retained and sold as part of the catch (incidental catch). The majority of catch by herring vessels on directed trips is Atlantic herring, with extremely low percentages of bycatch (discards). Atlantic mackerel is targeted in combination with Atlantic herring during some times of the year in the southern New England and Mid-Atlantic area and is therefore not considered a non-target species.

Due to the high-volume nature of the Atlantic herring fishery, non-target species, including river herring (blueback herring and alewives), shad (hickory shad and American shad), and some groundfish species (particularly haddock), are often retained once the fish are brought on board (see Amendment 5 FEIS at 173). The catch of non-target species in the directed Atlantic herring fishery can be identified through sea sampling (observer) data collected by the Northeast Fisheries Observer Program (NEFOP). Portside sampling data collected by MA DMF and ME DMR can be utilized to estimate catch of any non-target species that are landed. Dealer and VTR data can be used to identify/cross-check incidental landings of some non-target species that may be separated from Atlantic herring.

The primary non-target species in the directed Atlantic herring fishery are **groundfish (particularly haddock)** and the **river herring/shad (RH/S) species**. Dogfish, squid, butterfish, Atlantic mackerel are also common non-target species in the directed Atlantic herring fishery (mackerel and some other non-target species catch is often landed and sold). Comprehensive information about the catch of these species in the Atlantic herring fishery can be found in Section 5.2 of the FEIS for Amendment 5 and Sections 3.2 (River Herring/Shad) and 3.3 (Other Non-Target Species) of Framework 3 to the Atlantic Herring FMP. Summary information is provided below and updated where possible. For this management action, particular focus is given to RH/S and the potential impacts of the proposed RH/S catch caps.

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

Table 24 summarizes haddock catch by the herring midwater trawl vessels from 2011-2014. Starting in 2011, data used to estimate/monitor the cap include observer data, vessel trip reports (VTR), and dealer reports. During the 2012 groundfish fishing year, the haddock catch cap was fully utilized in the GB area. The 2013 Georges Bank cap was slightly exceeded. As a result, the 2014 catch cap was adjusted downward from 179 mt to 162 mt to account for the overage. There remains very little catch of Gulf of Maine haddock by midwater trawl vessels in the Atlantic herring fishery.

Table 24 Haddock Catch by Midwater Trawl Vessels Subject to Haddock Catch Cap (2011-2014)

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

Catch Caps are based on groundfish fishing year (May 1 – April 30).
Source: NOAA/NMFS (http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm)

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

3.2.2 Observer Coverage in the Atlantic Herring Fishery

The catch of non-target species in the directed Atlantic herring fishery can be identified through sea sampling (observer) data collected by the Northeast Fisheries Observer Program (NEFOP). Table 25 summarizes NEFOP observer coverage rates by gear type and herring management area during the 2012 fishing year for trips taken by the primary gears involved in the Atlantic herring fishery. Coverage rates in this table are calculated based on NEFOP observed herring pounds caught/VTR-reported herring pounds landed.

Table 25 2012 NEFOP Coverage Rates by Gear Type and Herring Management Area (Pounds Observed/Pounds Landed)

Gear Type	Atlantic Herring Management Area			
	1A	1B	2	3
Midwater Trawl (Single)	6.4%	0%	2.6%	71.2%
Pair Trawl	17.6%	36.5%	23.8%	75%
Purse Seine	16.3%	N/A	N/A	0%
Small Mesh Bottom Trawl	4.9%	0%	24.30%	0%

Note: VTR data were preliminary when these estimates were generated.

Table 26 summarizes 2013 observer coverage rates on midwater trawl trips (single and paired) by month. As of November 2013, the Northeast Fisheries Observer Program (NEFOP) had achieved 526 midwater trawl sea days during the 2013 fishing year (360 sea days were tasked to this fishery for the entire 2013 year). By the end of the fishing year, NEFOP observers sampled a total of 127 midwater trawl trips (see Table 26). Observer coverage on midwater trawl vessels was relatively high during September and October 2013, but not as high as 2012. The average observer coverage rate for midwater trawl vessels (% of trips) in 2013 was **26**%.

The percent of midwater trawl trips observed in 2013 is lower than in 2012 primarily because there were significantly less pre-trip notifications for CAI, which requires 100% observer coverage. In 2012, there were 158 trips that notified for CAI and were covered, thereby increasing the overall coverage on midwater trawl vessels. In 2013, there were far fewer trip notifications to CAI, and the Area 3 (Georges Bank) herring fishery closed in October. NEFOP personnel noted that call-in compliance was 100% over the 2013 summer season.

Table 26 2013 NEFOP Observer Coverage on Midwater Trawl Trips

	# Declared Trips	# Observed Trips	% Trips Covered
January	78	9	**12**
February	59	7	**12**
March	40	13	**33**
April	16	2	**13**
May	19	11	**58**
June	34	16	**47**
July	44	6	**14**
August	47	9	**19**
September	41	23	**56**
October	33	19	**58**
November	5	2	**40**
December	75	10	**13**

Table 27 (following page) provides a preliminary summary of observer coverage in the Atlantic herring fishery by month for 2014 and 2015 YTD. The observed trips were identified based on VMS gear declaration, and declared gear type and target species for small mesh bottom trawl vessels. VMS gear declarations do not specify single midwater trawl versus pair trawl, so the numbers in Table 27 account for single and paired midwater trawl combined. The data are still considered preliminary and require further investigation to cross-check errors in VMS declarations (for example, 120% coverage on small mesh bottom trawl vessels during December 2014 is likely the result of an error with a gear declaration.

In 2014, NEFOP observers covered almost 41% of all declared midwater trawl trips (single and paired), 8.7% of all declared purse seine trips, and 26.2% of all declared small mesh bottom trawl trips targeting Atlantic herring. Observer coverage decreased dramatically during the first half of 2015, primarily due to budget restrictions and funding limitations imposed by the omnibus amendment to revise the Region's standardized bycatch reporting methodology (SBRM). From January – June 2015, preliminary estimates indicate that observer coverage on declared midwater trawl trips was just under 6%, just under 7% on declared purse seine trips, and just over 31% on small mesh bottom trawl trips targeting Atlantic herring.

Table 27 NEFOP Observer Coverage on Trips in the Atlantic Herring Fishery, 2014 and 2015 YTD (Preliminary)

2014	Midwater Trawl			Purse Seine			Small Mesh Bottom Trawl		
	Observed Trips	VMS Declared Trips	% Coverage	Observed Trips	VMS Declared Trips	% Coverage	Observed Trips	VMS Declared Trips	% Coverage
Jan	15	68	**22**	1	0	**0**	13	40	**33**
Feb	22	62	**35**	0	0	**0**	4	27	**15**
March	11	30	**37**	0	0	**0**	2	10	**20**
April	2	2	**100**	0	0	**0**	0	2	**0**
May	13	26	**50**	0	0	**0**	0	0	**0**
June	18	38	**47**	7	34	**21**	0	1	**0**
July	5	34	**15**	6	66	**9**	2	26	**8**
August	11	44	**25**	5	97	**5**	3	36	**8**
Sept	29	34	**85**	6	85	**7**	8	13	**62**
Oct	35	36	**97**	3	40	**8**	0	3	**0**
Nov	5	11	**45**	0	0	**0**	0	0	**0**
Dec	5	35	**14**	0	0	**0**	12	10	**120***
2015	**Midwater Trawl**			**Purse Seine**			**Small Mesh Bottom Trawl**		
	Observed Trips	VMS Declared Trips	% Coverage	Observed Trips	VMS Declared Trips	% Coverage	Observed Trips	VMS Declared Trips	% Coverage
Jan	10	83	**12**	0	0	**0**	12	34	**35**
Feb	0	28	**0**	0	0	**0**	2	9	**22**
March	2	58	**3**	0	0	**0**	0	2	**0**
April	1	27	**4**	0	2	**0**	0	0	**0**
May	1	32	**3**	0	0	**0**	0	0	**0**
June	2	44	**5**	3	42	**7**	0	0	**0**

**Note: Coverage levels over 100% are likely the result of an incorrect gear declaration; this will be corrected when the data are finalized.*

3.2.3 River Herring and Shad (RH/S)

River herring and shad are non-target species of particular concern, and catch of RH/S in the directed Atlantic herring fishery is managed through gear and area-specific catch caps, which are proposed to be specified for 2016-2018 in this management action. For the purposes of this document, the term "river herring" refers to the species of alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), and the term "shad" refers to the species of American shad (*Alosa sapidissima*) and hickory shad (*Alosa mediocris*). Collectively, these four species are referred to throughout this document as "RH/S." The following section provides some updated information about RH/S as non-target species in the Atlantic herring fishery; a comprehensive description of the RH/S resources can be found in Section 3.2 of Framework 3 to the Atlantic Herring FMP (NEFMC, 2014). RH/S catch by Atlantic herring vessels is summarized in Section 3.2.4.4 of the Framework 3 document and updated in Appendix I to this document.

River herring and shad are anadromous fish that spend the majority of their adult lives at sea, only returning to freshwater in the spring to spawn. Historically, RH/S spawned in virtually every river and tributary along the coast. The oceanic ranges of all four species extend beyond the northern and southern latitudinal range of the NEFSC spring and fall surveys, which occur from the Gulf of Maine to Cape Hatteras, NC (35° 30' to 44° 30' N). The geographic range of blueback herring in the northwest Atlantic extends from Cape Breton, Nova Scotia, to the St. Johns River in FL and the range of American shad extends from the Sand Hill River in Labrador to the St. John's River in FL (Page and Burr 1991). The geographic range of alewife extends from Red Bay, Labrador, to SC. Hickory shad have a narrower geographic range than these three species and is most abundant between Cape Cod, MA and the St. John's River in FL, but is also infrequently found in the Gulf of Maine (Munroe 2002).

Targeting RH/S occurs almost exclusively in State waters, and river herring and shad are managed under the Atlantic States Marine Fisheries Commission's (ASMFC) Shad and River Herring Fishery Management Plan (FMP), which was developed in 1985. A more detailed description of the ASMFC Interstate Management Program for RH/S can be found in Section 3.2.3 of the Framework Adjustment 3 document (NEFMC 2014).

RH/S Stock Status

A stock assessment for American shad was completed in 1997 and submitted for peer review in early 1998 based on new information and the Board recommended terms of reference. The 1998 assessment estimated fishing mortality rates for nine shad stocks and general trends in abundance for 13 shad stocks. A coastwide American shad stock assessment was completed and accepted in 2007 and found that American shad stocks are currently at all-time lows and do not appear to be recovering. Recent declines of American shad were reported for Maine, New Hampshire, Rhode Island, and Georgia stocks, and for the Hudson (NY), Susquehanna (PA), James (VA), and Edisto (SC) rivers. Low and stable stock abundance was indicated for Massachusetts, Connecticut, Delaware, the Chesapeake Bay, the Rappahannock River (VA), and some South Carolina and Florida stocks. Stocks in the Potomac and York Rivers (VA) have shown some signs of recovery in recent years. There are no coastwide reference points for American shad. There is currently no stock assessment available for hickory shad.

The 2007 assessment of American shad identified primary causes for stock decline as a combination of overfishing, pollution, and habitat loss due to dam construction. In recent years, coastwide harvests have been on the order of 500-900 mt, nearly two orders of magnitude lower than in the late 19th century. Given these findings, the peer review panel recommended that current restoration actions need to be reviewed and new ones need to be identified and applied. The peer review panel suggested considering multiple approaches including a reduction in fishing mortality, enhancement of dam passage, mitigation of dam-related fish mortality, stocking, and habitat restoration.

The ASMFC completed the river herring benchmark stock assessment and peer review in 2012, examining 52 stocks of alewife and blueback herring with available data in US waters. The stock assessment technical team examined indices from fishery-dependent (directed river herring landings and bycatch estimates in ocean fisheries) and fishery-independent (young-of-year indices, adult net and electrofishing indices, coastal waters trawl surveys, and run count indices) datasets. From this information, the status of 23 stocks was determined to be *depleted* relative to historic levels, and one stock was increasing. Statuses of the remaining 28 stocks could not be determined, citing times-series of available data being too short. "*Depleted*" was used, rather than "*overfished* and "*overfishing*," due to many factors (i.e., directed fishing, incidental fishing/bycatch, habitat loss, predation, and climate change) contributing to the decline of river herring populations. Furthermore, the stock assessment did not determine estimates of river herring abundance and fishing mortality due to lack of adequate data. For many of these reasons, the stock assessment team suggested reducing the full range of impacts on river herring populations.

NMFS River Herring ESA Determination

On August 12, 2013, NMFS published its determination in the *Federal Register* regarding the 2011 petition to list alewife and blueback herring as threatened or endangered throughout all or a significant portion of their range under the Endangered Species Act (ESA). Based on the best scientific and commercial information available, NMFS determined that listing alewife and blueback herring as threatened or endangered under the ESA is not warranted at this time.

While neither species of river herring is currently considered endangered or threatened, both species are at low abundance compared to historical levels, and NMFS indicated that monitoring both species is warranted. Given the uncertainties and data deficiencies for both species, NMFS committed to revisiting both species of river herring in 3 – 5 years. During this 3- to 5-year period, NMFS is coordinating with ASMFC, the MAFMC, and the NEFMC on a strategy to develop a long-term and dynamic conservation plan (e.g., priority activities and areas) for river herring considering the full range of both species and with the goal of addressing many of the high priority data gaps for river herring (see TEWG below).

River Herring Technical Expert Working Group (TEWG)

When NOAA Fisheries published the ESA listing decision for river herring in August 2013, NMFS indicated that it would partner with ASMFC to form a Technical Expert Working Group (TEWG). The TEWG is focused on developing a dynamic conservation plan to help restore river herring throughout their range from Canada to Florida, identifying and implementing important conservation efforts, and conducting research to fill in some of the critical data gaps for the river herring species, including the following:

- Identify threats to both species throughout their range
- Identify and create a priority list of conservation actions to address critical threats and associated costs
- Identify key data gaps
- Create a priority list of research projects and associated costs to fill existing data gaps
- Provide/compile information for NMFS/ASMFC to use in the development of a dynamic, long term conservation plan
- Track and monitor progress of conservation actions and research
- Revise actions as needed

The goal of the TEWG meetings was information gathering, whereby individual expert opinion on data, ideas, or recommendations will be sought from all participants. The meetings were not consensus-driven.

Because of its comprehensive scope and extensive membership, the TEWG includes subgroups (by topic) to focus discussions, as well as an overarching committee comprised of chairs/co-chairs from the subgroups. The TEWG held its first meeting in March 2014 to discuss river herring conservation planning and the structure and process for TEWG participation. Additional meetings were held in June, September, and December 2014, and subgroups are also meeting in between larger TEWG meetings. As this effort expands, NOAA Fisheries continues to coordinate with all of management partners including the Mid-Atlantic and the New England Councils to maximize resources and identify ways to complement ongoing efforts to promote river herring restoration. The TEWG's work products, including recommendations for a comprehensive restoration plan, were recently released (see http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/conserv/index.html). NMFS is scheduled to brief the Council regarding the conservation/restoration plan at an upcoming Council meeting.

As part of the effort for conservation planning, NMFS recently provided a grant to ASMFC ($295K) to support research projects that seek to address data gaps identified through the TEWG process – (1) *Linking life stages: marine bycatch mortality, freshwater productivity, and spawning stock recruitment*; (2) *Determination of extant herring runs in the Barnegat Bay and Raritan River watersheds*. Continued leadership by ASMFC and NMFS is expected to stimulate additional research efforts. For example, *NMFS has provided funds to the NEFSC to develop habitat models to predict river herring (and shad) distribution in relation to Atlantic herring and Atlantic mackerel distribution. These environmentally-driven, predictive species distribution models would be used to try to forecast river herring and shad catch, and be iteratively improved through close cooperation with fishing industry partners* (GARFO, personal communication).

Continued RH/S Catch/Bycatch Minimization (NEFMC and MAFMC)

In Federal waters, the New England Council continues to manage and minimize RH/S interactions through the Atlantic Herring FMP and its associated amendments and framework adjustments. Most recently, Amendment 5 to the Herring FMP adopted a long-term monitoring/avoidance strategy to minimize RH/S catch and established the authority to develop catch caps for RH/S through a framework adjustment to the Atlantic Herring FMP (March 2014). Quickly following the completion of Amendment 5, the Council developed Framework 3 to the Atlantic Herring FMP, which established catch caps for RH/S and related provisions to manage and minimize interactions with these species in the directed Atlantic herring fishery. The RH/S catch caps and related provisions implemented through Framework 3 became effective in late 2014. 2015 is the first full fishing year in which the directed herring fishery will operate under RH/S catch caps.

The Mid-Atlantic Fishery Management Council (MAFMC) manages RH/S bycatch issues in the Atlantic mackerel fishery primarily through its Mackerel, Squid, and Butterfish (MSB) FMP. Recently, Amendment 14 to the Mackerel Squid Butterfish (MSB) FMP was developed in coordination with Amendment 5 to the Herring FMP and implemented a comprehensive catch monitoring system for the mackerel, squid, and butterfish (MSB) fishery. Many of the actions contained with both amendments were developed to compliment and/or replicate each other to avoid conflicting overlaps of restrictions on vessels that participate in both the herring and mackerel fisheries. Similarly, the Mid-Atlantic Council implemented a RH/S catch cap for the directed mackerel fishery through its specifications process. During the MSB specifications process (June 2015), the MAFMC voted to recommend a catch cap of 89 mt for the directed mackerel fishery for the 2016 fishing year. This represents a reduction from the 82 mt catch cap during 2015. The Mid-Atlantic Council's intent is to continue to provide a strong incentive for vessels participating in the Atlantic mackerel fishery to avoid RH/S in order to preserve their ability to harvest the mackerel quota.

The Mid-Atlantic Fishery Management Council also formed the RH/S Committee as part of a proactive coordinated effort to conserve RH/S stocks. Three members of the New England Fishery Management Council currently serve on the RH/S Committee. The RH/S Committee held its first meeting in April 2014. There will be opportunity for the two Councils to better align the catch caps in the overlapping southern New England/Mid-Atlantic area for the 2016 fishing year and beyond. This has been identified as an important objective by the MAFMC RH/S Committee. The New England Council built flexibility into the RH/S catch cap process in Framework 3 to allow development of a joint herring/mackerel fishery RH/S catch cap for the southern New England/Mid-Atlantic area with the MAFMC.

3.2.3.1 Updated RH/S Catch Data (Herring PDT)

To develop alternatives for the 2016-2018 RH/S catch caps, the Herring PDT updated RH/S catch data and estimates of RH/S catch by gear type and RH/S catch cap area for the 2013 and 2014 fishing years, providing a longer time series of data (2008-2014) than Framework 3 (2008-2012). As part of this process, the 2008-2012 RH/S catch cap data used in Fw 3 were also revised/updated by the Herring PDT to:

(1) Incorporate some shad landings that were previously omitted;

(2) Include trips from multiple catch cap areas that were previously omitted because sub-trips (catch from one cap area) did not meet the 6,600-pound Atlantic herring landings threshold; and

(3) Improve matching of trips sampled by multiple agencies (for removal of redundancies).

A complete discussion of the Herring PDT analysis and updated RH/S catch data can be found in Appendix I (*Development of Options for River Herring and Shad Catch Caps in the Atlantic Herring Fishery, 2016-2018*, Herring PDT). Summary information is provided below.

The tables/figures on the following pages provide updated RH/S catch estimates by gear/area/year and encompass all of the changes from the Framework 3 data/methods listed below (discussed in more detail in Appendix I):

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

Table 28 summarizes the total number of RH/S catch cap trips (trips landing more than 6,600 pounds of Atlantic herring) that occurred in each gear-area strata during each year from 2008-2012. The proportion of these trips that were sampled – either at-sea (observers) or portside (portside samplers) is represented by the shaded bars in Figure 5.

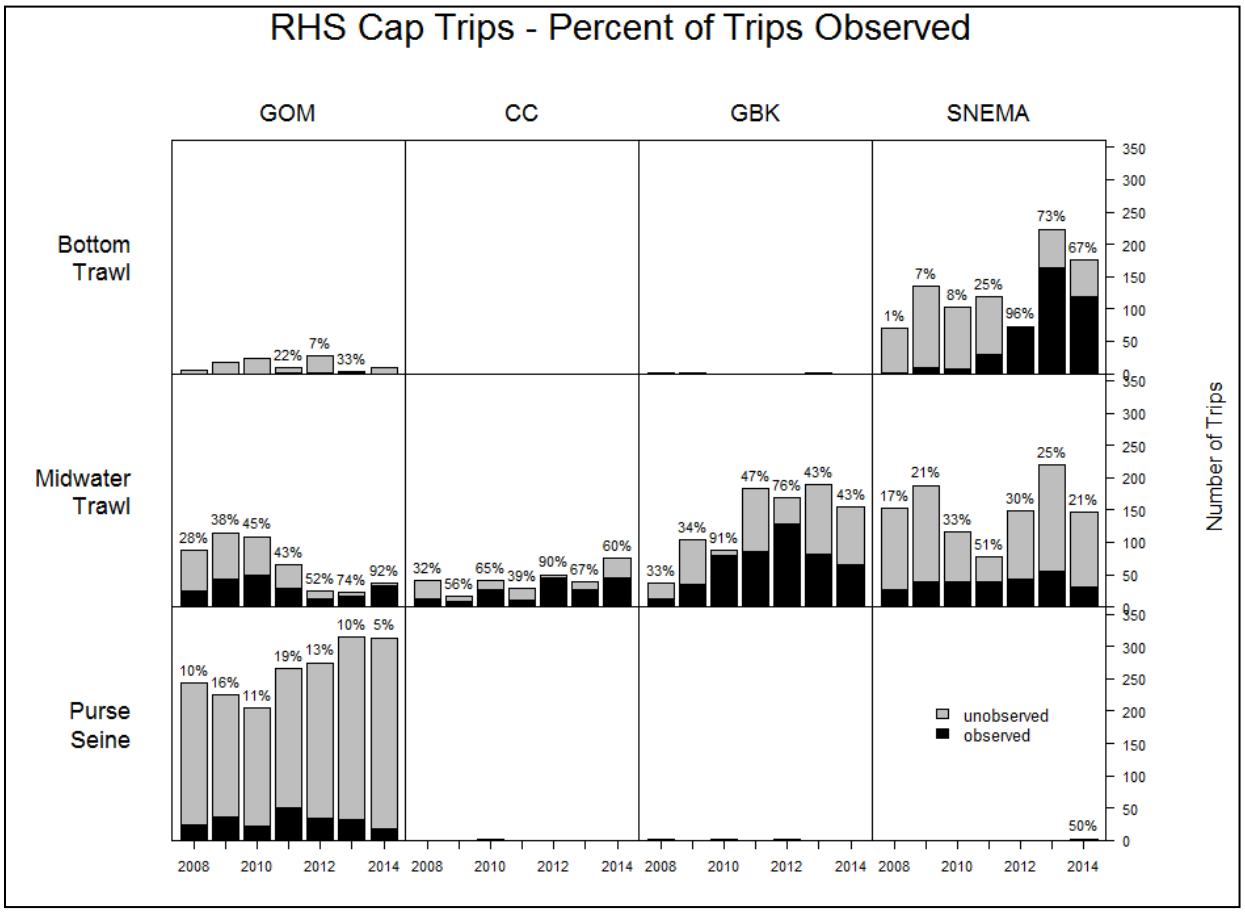
Additional discussion TBD – see Appendix I.

Table 28 Total Number of RH/S Catch Cap Trips and Landings by Strata, 2008-2014

Trips with Atlantic Herring Landings >6,600 lbs									
Gear	**Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
Bottom Trawl	**GOM**	5	18	24	9	27	3	9	**95**
	CC	0	0	0	0	0	0	0	**0**
	SNEMA	70	135	103	118	73	223	175	**897**
	GBK	36	103	87	183	169	189	154	**921**
Midwater Trawl	**GOM**	88	115	109	65	25	23	36	**461**
	CC	40	16	40	28	50	39	75	**288**
	SNEMA	152	188	116	77	148	219	146	**1,046**
	GBK	1	0	1	0	2	0	0	**4**
Purse Seine	**GOM**	243	225	205	265	275	314	313	**1,840**
	CC	0	0	1	0	0	0	0	**1**
	SNEMA	0	0	0	0	0	0	2	**2**
	GBK	0	0	0	0	0	0	0	**0**
	Total	**635**	**800**	**686**	**745**	**769**	**1,010**	**910**	**5,555**
Total Landings (MT) from Trips with Atlantic Herring Landings >6,600 lbs									
Gear	**Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
Bottom Trawl	**GOM**	32	100	109	40	121	10	39	**451**
	CC	0	0	0	0	0	0	0	**0**
	SNEMA	3,186	5,952	4,558	4,629	4,935	9,422	5,503	**38,185**
	GBK	7,564	26,669	14,237	32,172	30,355	35,795	27,052	**173,844**
Midwater Trawl	**GOM**	17,663	22,803	18,628	12,875	4,258	6,563	7,381	**90,171**
	CC	7,280	2,806	5,522	5,769	12,569	6,002	17,199	**57,147**
	SNEMA	26,460	36,070	22,158	9,799	18,207	16,788	14,230	**143,712**
	GBK	67	0	66	0	89	0	0	**222**
Purse Seine	**GOM**	25,200	21,694	8,272	17,001	19,295	22,981	27,247	**141,690**
	CC	0	0	9	0	0	0	0	**9**
	SNEMA	0	0	0	0	0	0	58	**58**
	GBK	0	0	0	0	0	0	0	**0**
	Total	**87,452**	**116,094**	**73,559**	**82,285**	**89,829**	**97,561**	**98,709**	**645,489**

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

Figure 5 Total Number of Trips that Caught >6,600 lbs of Atlantic Herring by Year, Gear, and RH/S Catch Cap Area, 2008-2014



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

Table 29 Annual Estimates of Total RHS Catch (landed + discarded) on Directed Atlantic Herring Trips, 2008-2014

Gear	Cap Area	2008	2009	2010	2011	2012	2013	2014	Median	Weighted Mean
Bottom Trawl	GOM				0.6	0.1	0.0		0.1	0.3
	SNEMA	0.0	105.9	13.5	19.6	24.0	236.5	58.5	24.0	122.3
Midwater Trawl	GOM	157.2	98.1	146.8	5.9	1.9	11.3	6.7	11.3	76.7
	CC	39.8	0.0	0.7	8.9	49.6	29.5	45.3	29.5	32.4
	SNEMA	348.7	83.9	28.0	29.6	157.3	231.5	30.3	83.9	129.6
	GBK	0.0	0.2	1.6	0.9	0.5	1.3	0.4	0.5	0.8
Purse Seine	GOM	2.0	2.8	2.9	0.1	1.2	4.1	66.5	2.8	7.0
	Total	**547.7**	**290.8**	**193.5**	**65.6**	**234.4**	**514.2**	**207.6**		

3.2.3.2 RH/S Catch YTD Under 2015 Catch Caps

As previously noted, RH/S catch in the directed Atlantic herring fishery is managed through gear-specific and area-specific caps implemented through Framework 3 to the Atlantic Herring FMP (November 2014). The RH/S catch caps are monitored based on the Atlantic herring fishing year (January 1-December 31). Once a RH/S catch cap is harvested, a 2,000 pound Atlantic herring possession limit goes into effect for that Catch Cap AM Area and gear type for the remainder of the fishing year.

The method for estimating RH/S catch by Atlantic herring vessels is similar to the method for estimating RH/S catch in the Atlantic mackerel fishery. This method replaces estimated pounds with observed pounds where available. The cumulative method uses catch from the entire year to estimate a RH/S catch ratio for each RH/S catch cap area and gear type. The RH/S catch ratio is calculated for a catch cap area and gear type by dividing observed RH/S catch for the year by the observed kept all (total amount of all species) for the year. RH/S pounds per unobserved trip are then estimated by multiplying the catch ratio by the kept all from unobserved Atlantic herring vessels fishing in that RH/S catch cap area with that gear type.

Table 30 summarizes RH/S catch on midwater trawl and SNE/MA small mesh bottom trawl trips landing more than 6,600 pounds of Atlantic herring during the 2015 year through August 26, 2015. Thus far in 2015, just about 1/3 of the RH/S removals allowed under the 2015 RH/S catch caps has been taken on trips landing 6,600 pounds or more Atlantic herring. The vast majority (98%) of RH/S catch in the directed Atlantic herring fishery has occurred in the SNE/MA Area, which is where the Area 2 Atlantic herring fishery occurs (see Figure 1 on p. 3 of this document). Most of the RH/S catch occurred prior to April 1, consistent with the timing of the winter fishery for Atlantic herring (see Figure 7 and Figure 8). Small mesh bottom trawl vessels directing on Atlantic herring in Area 2 have caught 57% of the RH/S catch cap, and midwater trawl vessels

have caught almost 38% of the SNE/MA catch cap as of late August 2015; about 35% of the Atlantic herring Area 2 sub-ACL has been taken (see Section 3.5.1 for Atlantic herring catch information). It is not anticipated that effort in the directed Atlantic herring fishery in southern New England/Mid-Atlantic will increase significantly again until very late in the year (December).

Table 30 RH/S Catch on Trips Subject to RH/S Catch Cap (2015 YTD)

RH/S Catch Cap Area	Cumulative Catch (mt)	Catch Cap (mt)	Percent of Catch Cap
Gulf of Maine MWT	0.0	86	0.00%
Cape Cod MWT	1.8	13	14.05%
SNE/MA Bottom Trawl	50.8	89	57.13%
SNE/MA MWT	46.9	124	37.86%
Total	**99.6**	**312**	**31.93%**

Source: http://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/reports_frame.htm
Data reported through August 26, 2015.

Figure 6 2015 RH/S Catch YTD by Herring Midwater Trawl Vessels in the Cape Cod Catch Cap Area

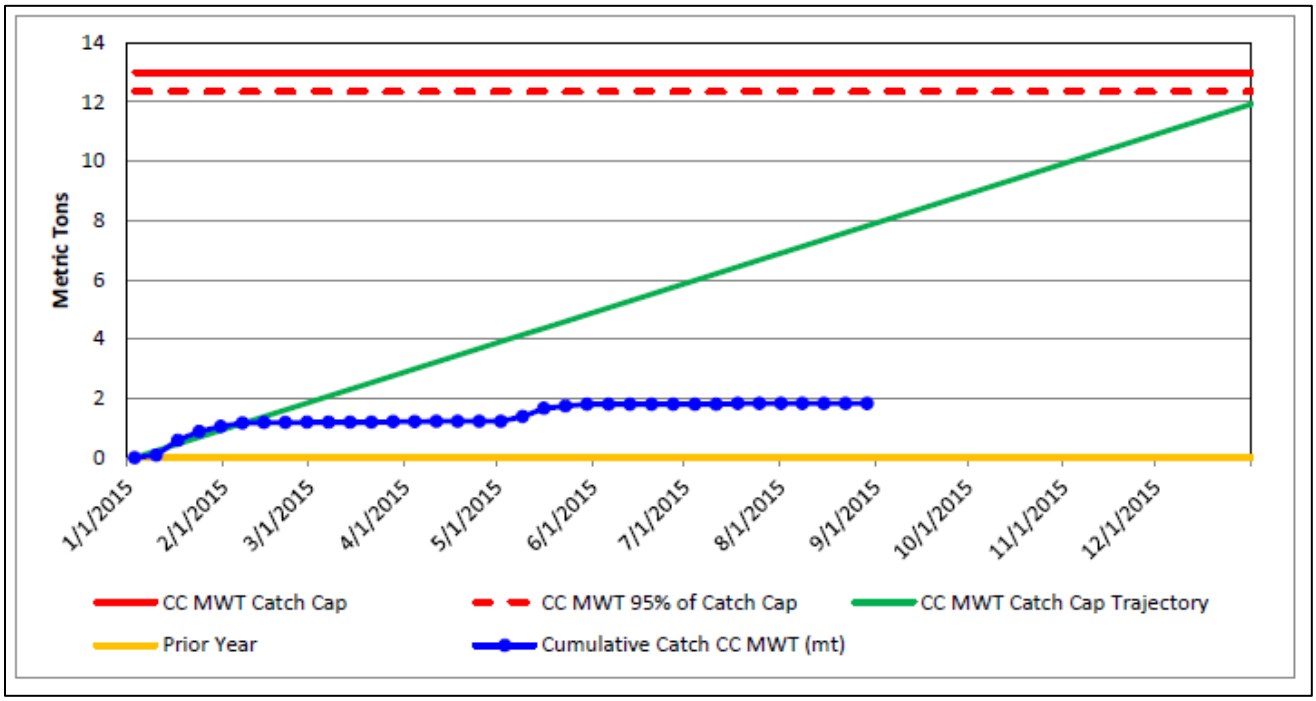


Figure 7 2015 RH/S Catch YTD by Herring Midwater Trawl Vessels in the SNE/MA Catch Cap Area

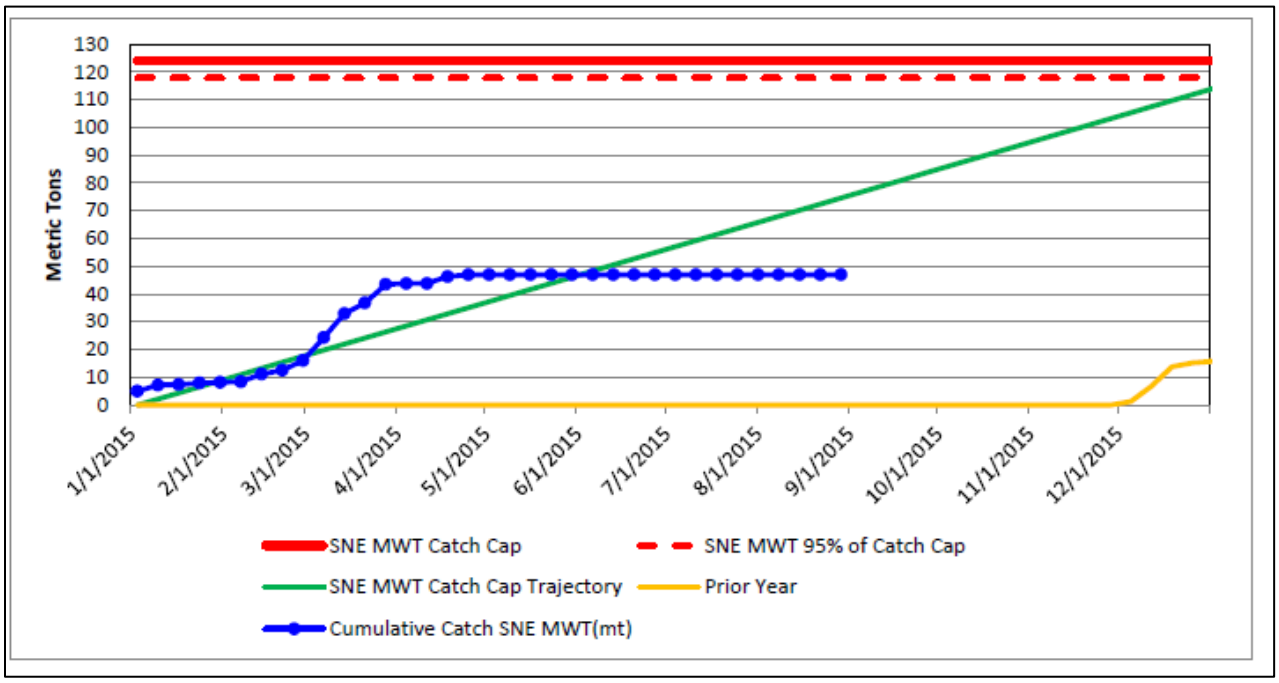
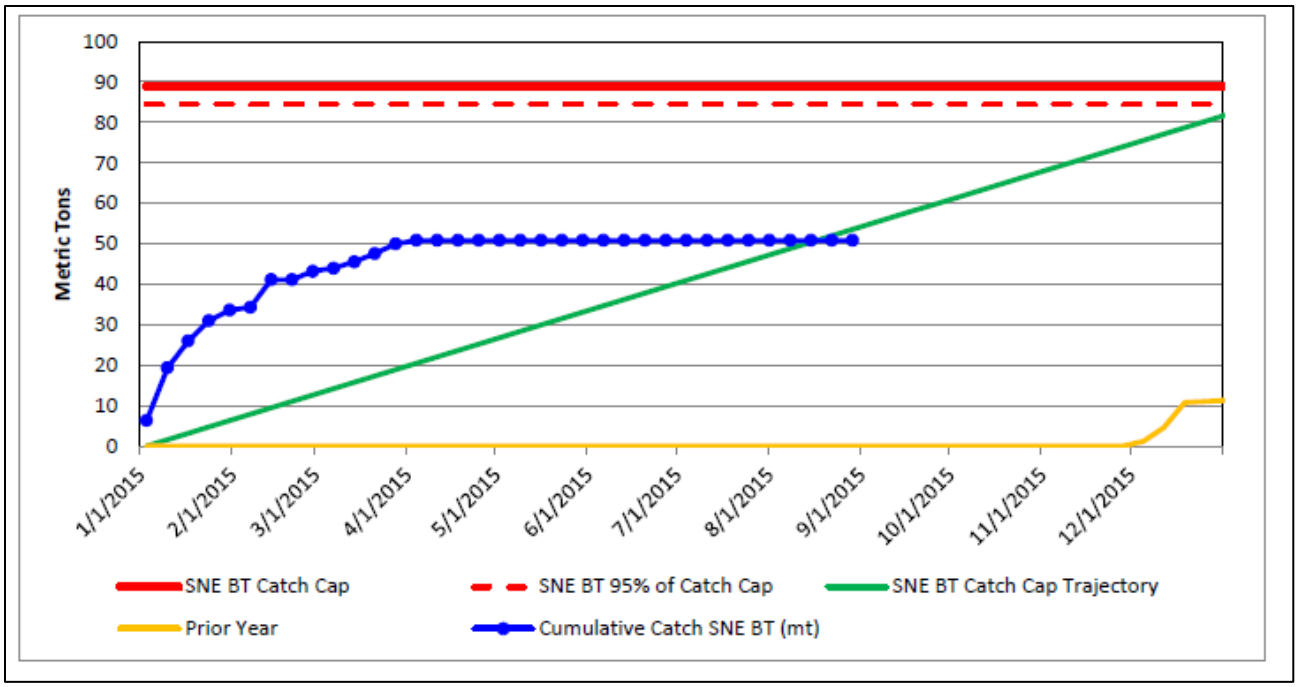


Figure 8 2015 RH/S Catch YTD by Herring Small Mesh Bottom Trawl Vessels in the SNE/MA Catch Cap Area



Source: http://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/reports_frame.htm
Data reported through August 26, 2015.

3.2.3.3 SMAST/MADMF/SFC River Herring Bycatch Avoidance Program

In January 2015, the New England Fishery Management Council received an overview/update of the river herring bycatch avoidance program coordinated by MADMF with UMASS Dartmouth School of Marine Science and Technology (SMAST) and the Sustainable Fisheries Coalition (SFC). Overall, the Council expressed continued support for the bycatch avoidance program as well as the portside sampling programs conducted by MADMF and ME DMR.

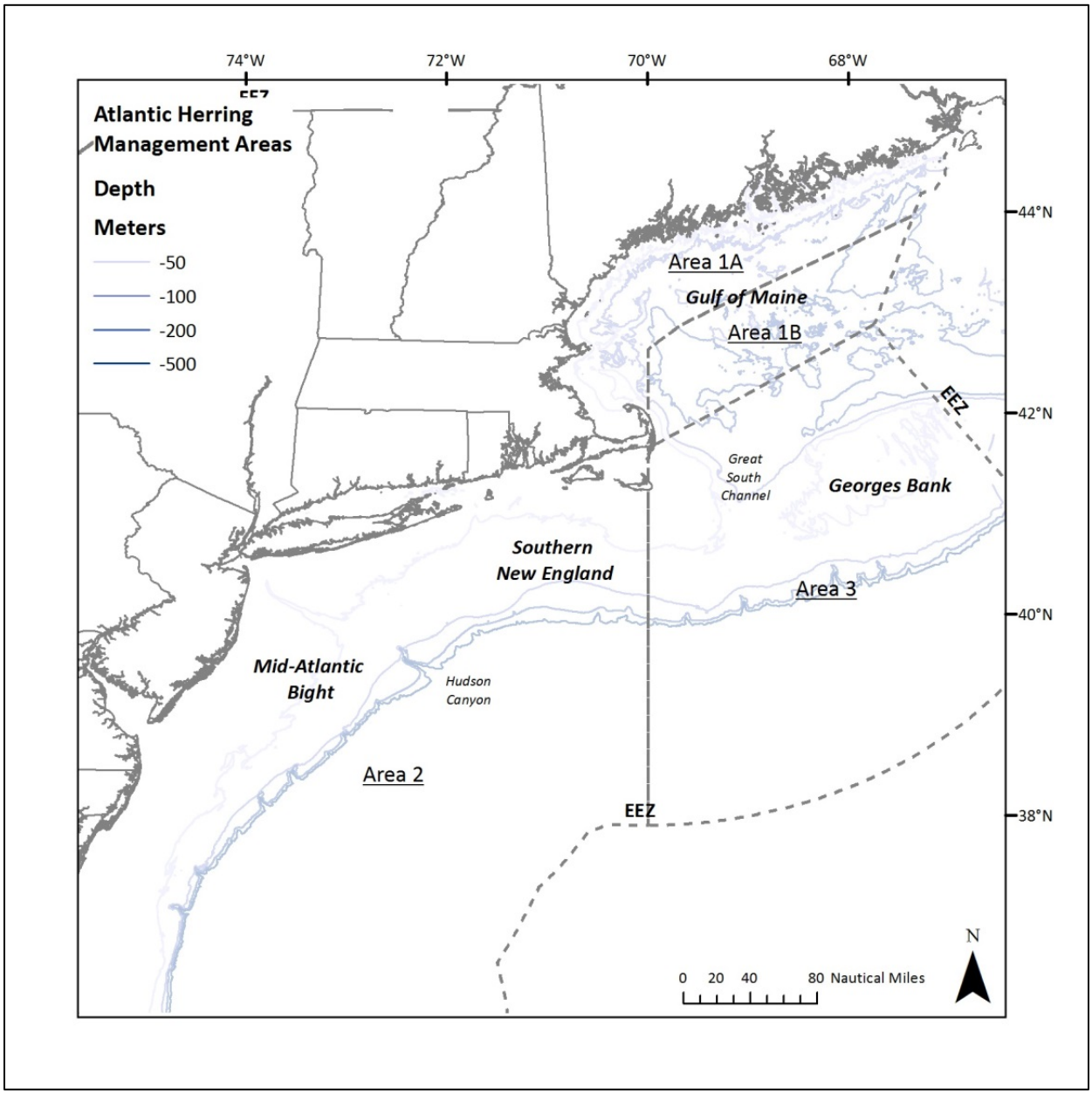
Add Summary Section

3.3 PHYSICAL ENVIRONMENT AND ESSENTIAL FISH HABITAT

3.3.1 Physical Environment

The Atlantic herring fishery is prosecuted in four areas defined as Areas 1A, 1B, 2, and 3 (Figure 9). These areas collectively cover the entire northeast U.S. shelf ecosystem, which has been defined as the Gulf of Maine south to Cape Hatteras, North Carolina, extending from the coast seaward to the edge of the continental shelf, including offshore to the Gulf Stream (Sherman et al. 1996). Three distinct sub-regions, the Gulf of Maine, Georges Bank, and the southern New England/Mid-Atlantic region, were described in the Affected Environment section of Amendment 5 to the Atlantic Herring FMP, based on a summary compiled for the gear effects technical memo authored by Stevenson et al. (2004). Roughly, Areas 1A and 1B cover the Gulf of Maine, Area 2 covers southern the New England/Mid-Atlantic region, and Area 3 covers Georges Bank.

Figure 9 Atlantic Herring Management Areas and the Northeast U.S. Shelf Ecosystem



3.3.2 Essential Fish Habitat (EFH)

Since 1996, the MSA has included a requirement to evaluate the potential adverse effects of the Atlantic herring fishery on Atlantic herring EFH and on the EFH of other species. The EFH final rule specifies that measures to minimize impacts should be enacted when adverse effects that are 'more than minimal' and 'not temporary in nature' are anticipated.

The magnitude of adverse effects resulting from a fishery's operations is generally related to (1) the location of fishing effort, because habitat vulnerability is spatially heterogeneous, and (2) the amount of fishing effort, specifically the amount of seabed area swept or bottom time. To the extent that adoption of a particular alternative would shift fishing to more vulnerable habitats, and/or increase seabed area swept, adoption would be expected to cause an increase in habitat impacts as compared to no action. If adoption of an alternative is expected to reduce seabed area swept or cause fishing effort to shift away from more vulnerable into less vulnerable habitats, a decrease in habitat impacts would be expected. The magnitude of an increase or decrease in adverse effects relates to the proportion of total fishing effort affected by a particular alternative.

Bearing in mind that both the direction and magnitude of changes are difficult to predict, because changes in fishing behavior in response to management actions can be difficult to predict, potential shifts in adverse effects are discussed for each of the alternatives proposed in this action. However, changes in the magnitude of fishing effort as a result of individual measures should be viewed in the context of the overall impacts that the herring fishery is estimated to have on seabed habitats. *Specifically, previous analyses have concluded that adverse effect to EFH that result from operation of the herring fishery do not exceed the more than minimal or more than temporary thresholds.*

An assessment of the potential effects of the directed Atlantic herring commercial fishery on EFH for Atlantic herring and other federally-managed species in the Northeast region of the U.S. was conducted as part of an EIS that evaluated impacts of the Atlantic herring fishery on EFH (NMFS 2005). This analysis was included in Appendix VI, Volume II of the FEIS for Amendment 1 to the Atlantic Herring FMP. It found that midwater trawls and purse seines do occasionally contact the seafloor and may adversely impact benthic habitats utilized by a number of federally-managed species, including EFH for Atlantic herring eggs. However, after reviewing all the available information, the conclusion was reached that if the quality of EFH is reduced as a result of this contact, the impacts are minimal and/or temporary and, pursuant to MSA, do not need to be minimized, i.e., that there was no need to take specific action at that time to minimize the adverse effects of the herring fishery on benthic EFH. This conclusion also applied to pelagic EFH for Atlantic herring larvae, juveniles, and adults, and to pelagic EFH for any other federally-managed species in the region.

EFH for Atlantic Herring

The EFH designation for Atlantic herring was developed as part of EFH Omnibus Amendment 1 in 1998. EFH Omnibus Amendment 2, which includes updates to the EFH designation for herring, as well as for other NEFMC-managed species, is currently in development. Based on the 1998 designation, which is currently in effect, EFH for Atlantic herring is described in as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated in Figure 10 through Figure 13 and in Table 31 and 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 as depicted in Figure 10. 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 as depicted in Figure 11. 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 as depicted in Figure 12. 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 as depicted in Figure 13. 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 as depicted in Figure 13. 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.

Table 31 EFH 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).

Figure 10 EFH Designation for Atlantic Herring Eggs

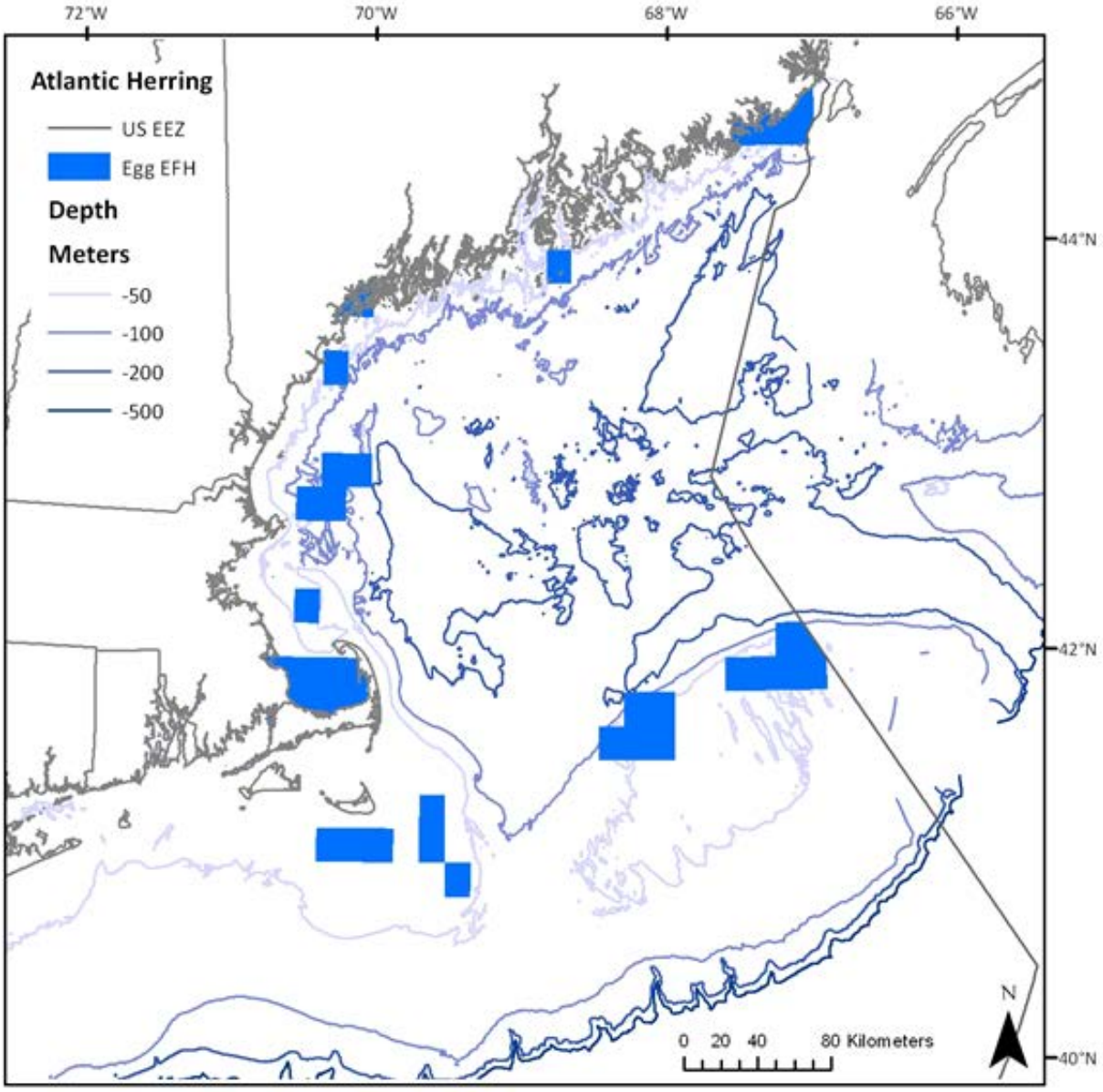


Figure 11 EFH Designation for Atlantic Herring Larvae

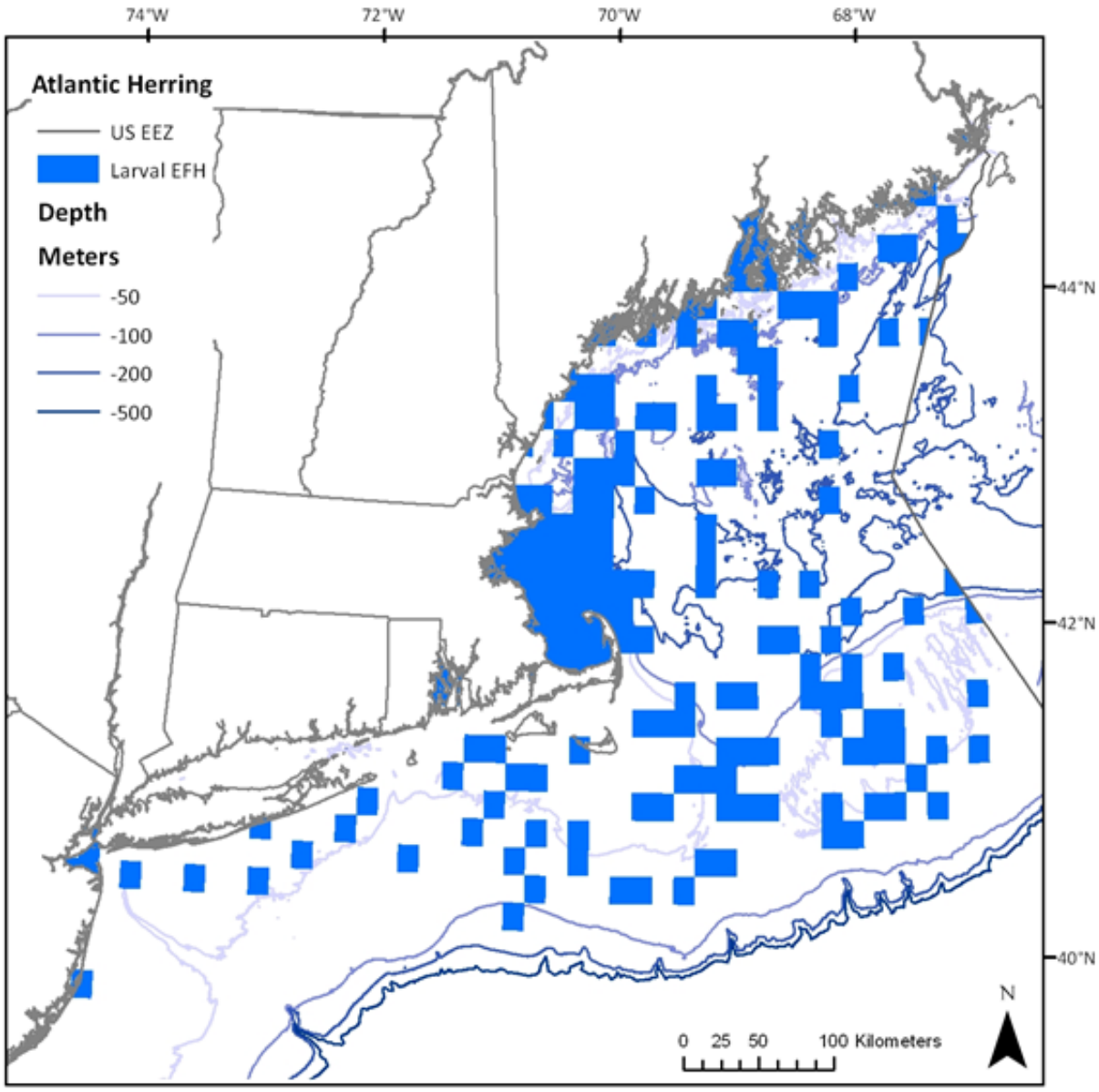


Figure 12 EFH Designation for Atlantic Herring Juveniles

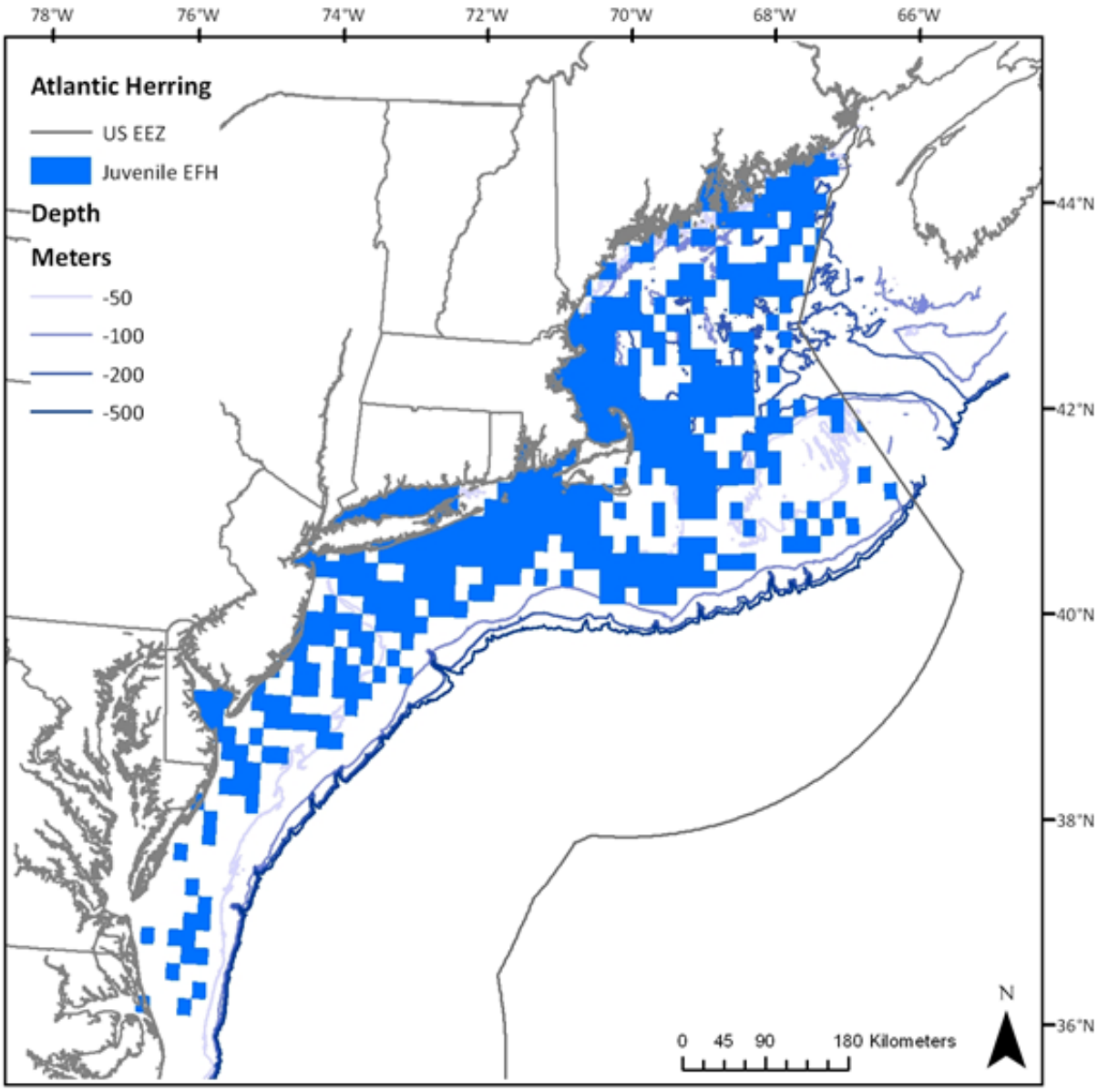
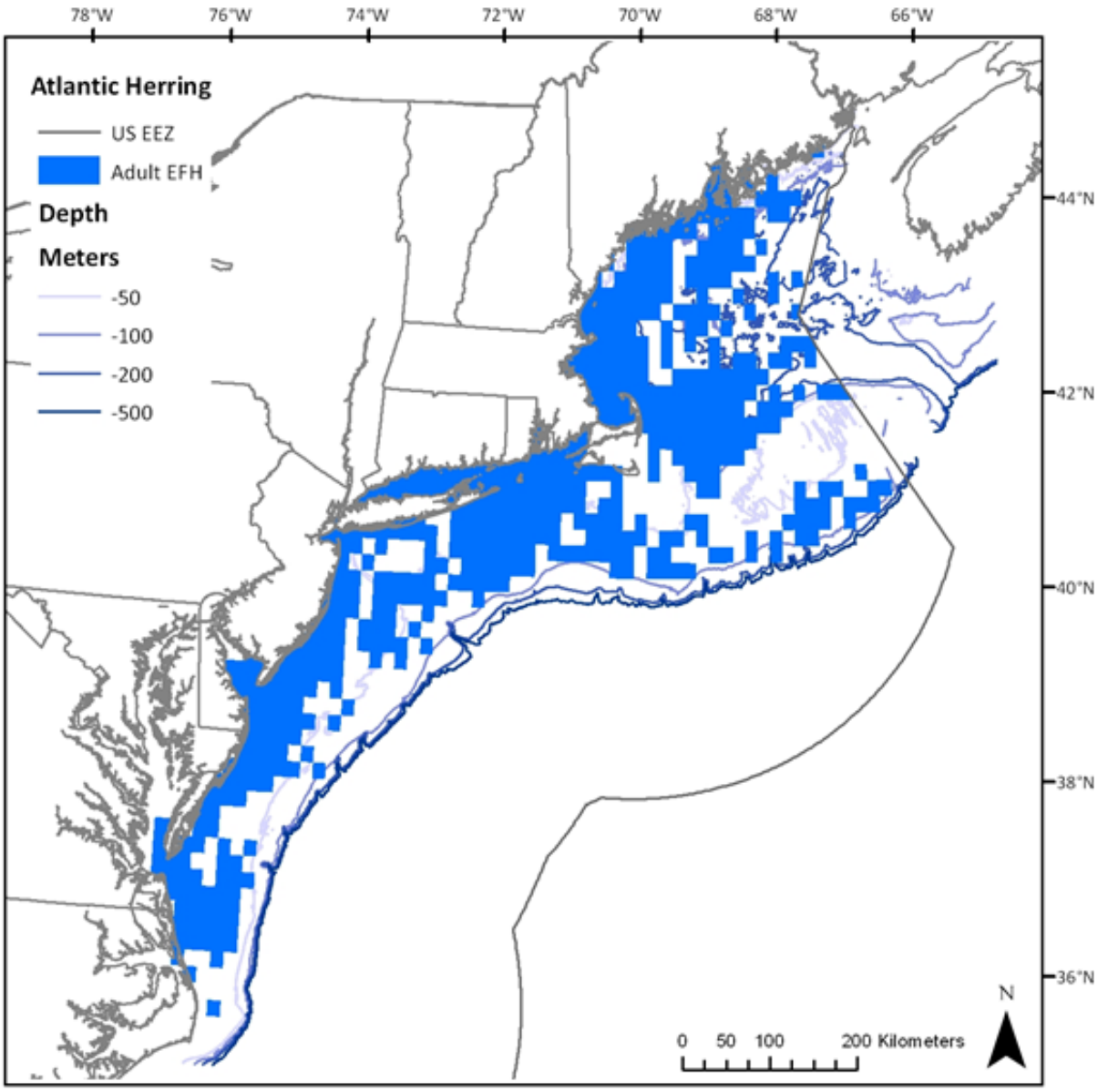


Figure 13 EFH Designation for Atlantic Herring Adults



EFH for Other Species

The environment that could potentially be affected by the Proposed Action has been identified as EFH for the benthic life stages of the species listed in Table 32. Additional information can be found in the FMP document that most recently updated each species' EFH designation (last column in Table 32). NOAA's EFH Mapper is also a good source of information and is a useful way to visualize the designations in a particular location: http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html.

Table 32 Listing of Sources for Current EFH Designation Information

Species	Management Authority	Plan Managed Under	Action where EFH designation was last updated
Monkfish	NEFMC, MAFMC	Monkfish	Amendment 1
Atlantic herring	NEFMC	Atlantic Herring	Original FMP
Atlantic salmon	NEFMC	Atlantic salmon	Original FMP
Atlantic sea scallop	NEFMC	Atlantic Sea Scallop	Amendment 9
American plaice	NEFMC	NE Multispecies	Amendment 11
Atlantic cod	NEFMC	NE Multispecies	Amendment 11
Atlantic halibut	NEFMC	NE Multispecies	Amendment 11
Atlantic wolffish	NEFMC	NE Multispecies	Amendment 16
Haddock	NEFMC	NE Multispecies	Amendment 11
Ocean pout	NEFMC	NE Multispecies	Amendment 11
Offshore hake	NEFMC	NE Multispecies	Amendment 12
Pollock	NEFMC	NE Multispecies	Amendment 11
Red hake	NEFMC	NE Multispecies	Amendment 12
Redfish	NEFMC	NE Multispecies	Amendment 11
Silver hake	NEFMC	NE Multispecies	Amendment 12
White hake	NEFMC	NE Multispecies	Amendment 11
Windowpane flounder	NEFMC	NE Multispecies	Amendment 11
Winter flounder	NEFMC	NE Multispecies	Amendment 11
Witch flounder	NEFMC	NE Multispecies	Amendment 11
Yellowtail flounder	NEFMC	NE Multispecies	Amendment 11
Barndoor skate	NEFMC	NE Skate Complex	Original FMP
Clearnose skate	NEFMC	NE Skate Complex	Original FMP
Little skate	NEFMC	NE Skate Complex	Original FMP
Rosette skate	NEFMC	NE Skate Complex	Original FMP
Smooth skate	NEFMC	NE Skate Complex	Original FMP
Thorny skate	NEFMC	NE Skate Complex	Original FMP
Winter skate	NEFMC	NE Skate Complex	Original FMP
Red crab	NEFMC	Red Crab	Original FMP
Spiny dogfish	MAFMC/NEFMC	Spiny Dogfish	Original FMP
Atlantic surfclam	MAFMC	Atlantic Surfclam Ocean Quahog	Amendment 12
Ocean quahog	MAFMC	Atlantic Surfclam Ocean Quahog	Amendment 12
Bluefish	MAFMC	Bluefish FMP	Amendment 1
Atlantic mackerel	MAFMC	Squid, Mackerel, Butterfish	Amendment 11
Butterfish	MAFMC	Squid, Mackerel, Butterfish	Amendment 11
Longfin squid	MAFMC	Squid, Mackerel, Butterfish	Amendment 11
Shortfin squid	MAFMC	Squid, Mackerel, Butterfish	Amendment 11

Note: Longfin squid egg EFH designation was in Amendment 9 to the Squid, Mackerel, Butterfish FMP.

Table 32 continued.

Black sea bass	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Amendment 12
Scup	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Amendment 12
Summer flounder	MAFMC	Summer Flounder, Scup, and Black Sea Bass	Amendment 12
Tilefish	MAFMC	Tilefish	Amendment 1

Note: Longfin squid egg EFH designation was in Amendment 9 to the Squid, Mackerel, Butterfish FMP.

3.4 PROTECTED RESOURCES

There are numerous protected species that inhabit the affected environment of the Atlantic Herring FMP management unit (Table 33). These species are afforded protection under the Endangered Species Act (ESA) of 1973 (i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act (MMPA) of 1972, and are under NMFS' jurisdiction. Table 33 also includes one candidate fish species (species being considered for listing as endangered or threatened), as identified under the ESA.

Table 33 Species and/or Critical Habitat Protected Under the ESA and/or MMPA that Occur in the Affected Environment of the Atlantic Herring Fishery

Species	Status	Potentially affected by this action?[1]
Cetaceans		
North Atlantic right whale (*Eubalaena glacialis*)	Endangered	No
Humpback whale (*Megaptera novaeangliae*)	Endangered	Yes
Fin whale (*Balaenoptera physalus*)	Endangered	Yes
Sei whale (*Balaenoptera borealis*)	**Endangered**	**Yes**
Blue whale (*Balaenoptera musculus*)	**Endangered**	**No**
Sperm whale (*Physeter macrocephalus*	**Endangered**	**No**
Minke whale (*Balaenoptera acutorostrata*)	Protected	Yes
Pilot whale (*Globicephala spp.*)[2]	**Protected**	**Yes**
Risso's dolphin (*Grampus griseus*)	**Protected**	**Yes**
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected	Yes
Short Beaked Common dolphin (*Delphinus delphis*)[3]	Protected	Yes
Bottlenose dolphin (*Tursiops truncatus*)[4]	Protected	No
Harbor porpoise (*Phocoena phocoena*)	Protected	No
Pygmy sperm whale (*Kogia breviceps*)	**Protected**	**No**
Dwarf sperm whale (*Kogia sima*)	**Protected**	**No**

Species	Status	Potentially affected by this action?[1]
Striped dolphin (*Stenella coeruleoalba*)	**Protected**	**No**
Atlantic spotted dolphin (*Stenella frontalis*)	**Protected**	**No**
Beaked whales (*Ziphius and Mesoplodon spp*)[5]	**Protected**	**No**
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle (*Chelonia mydas*)	Endangered[6]	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	No
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk (*Brosme brosme)*	Candidate	No
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected	Yes
Gray seal (*Halichoerus grypus*)	Protected	Yes
Harp seal (*Phoca groenlandicus*)	Protected	No
Hooded seal (*Cystophora cristata*)	Protected	No
Critical Habitat		
North Atlantic Right Whale Critical Habitat[7]		No
Northwest Atlantic DPS of Loggerhead Sea Turtle Critical Habitat		No

Bolded/shaded species prefer continental shelf edge/slope waters (i.e., >200 meters), although incursions into continental shelf waters do occur seasonally or sporadically during periods of high prey abundance.

Additional Notes for Table 33:

[1] The determination for whether a species may be affected by the Atlantic herring fishery is based on whether there has been confirmed Atlantic herring fishery interaction with the species or confirmed interactions with gear types similar to those primarily used in the Atlantic herring fishery (see Waring *et al*. 2007, 2014, 2015; NMFS NEFSC FSB 2015; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html).

[2] There are 2 species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.

[3] Prior to 2008, this species was called "common dolphin."

[4] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins.

[5] There are multiple species of beaked whales in the Northwest Atlantic. They include the cuvier's (*Ziphius cavirostris*), blainville's (*Mesoplodon densirostris*), gervais' (*Mesoplodon europaeus*), sowerbys' (*Mesoplodon bidens*), and trues' (*Mesoplodon mirus*) beaked whales. Species of *Mesoplodon*; however, are difficult to identify at sea, and therefore, much of the available characterization for beaked whales is to the genus level only.

[6] Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters. On March 23, 2015, a proposed rule was issued to remove the current range-wide listing and, in its place, list eight DPSs as threatened and three as endangered (80 FR 15272).

[7]Originally designated June 3, 1994 (59 FR 28805); Newly proposed February 20, 2015 (80 FR 9314).

In Table 33, please note that cusk, a NMFS "species of concern," as well as a "candidate species" under the ESA, occurs in the affected environment of the Atlantic herring fishery. Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA and also include those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. Once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, this species will not be discussed further in this section. However, for additional information on cusk and proactive conservation efforts being initiated for the species, please visit http://www.nero.noaa.gov/prot_res/CandidateSpeciesProgram/CuskSOC.html.

3.4.1 Species and Critical Habitat Not Likely to be Affected by the Proposed Action

Based on available information, it has been determined that this action is not likely to affect Atlantic right whales, blue whales, sperm whales, pygmy sperm whales, dwarf sperm whales, striped dolphins, Atlantic spotted dolphins, bottlenose dolphins, harbor porpoise, beaked whales, Atlantic salmon, shortnose sturgeon, hooded seals, harp seals, or hawksbill sea turtles. Further, this action is not likely to adversely affect the Northwest Atlantic DPS of loggerhead or North Atlantic right whale critical habitats. This determination has been made because either the occurrence of the species is not known to overlap with the Atlantic herring fishery and/or there have never been documented interactions between the species and the Atlantic herring fishery (Waring et al. 2014, 2015; NMFS NEFSC FSB 2015; See: http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). In the case of critical habitat, this determination has been made because the Atlantic herring fishery will not affect the primary constituent elements of the critical habitat, and therefore, will not result in the destruction or

adverse modification of critical habitat (See: http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm).

3.4.2 Species Potentially Affected by the Proposed Action

3.4.2.1 Sea Turtles

There are four species of sea turtles that occur in the affected environment of the Atlantic herring fishery. Three of the four species are considered hard-shelled turtles (i.e., green, loggerhead, and Kemp's ridley). A general overview of sea turtle occurrence and distribution in waters of the Northwest Atlantic Ocean is provided below to assist in understanding how the Atlantic herring fishery overlaps in time and space with the occurrence of sea turtles. Additional background information on the range-wide status of the four sea turtle species, as well as a description and life history of the species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant et al. 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS et al. 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

Hard-shelled sea turtles

Distribution

In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida (FL) to Cape Cod, Massachusetts (MA), although their presence varies with the seasons due to changes in water temperature (Shoop and Kenney 1992; Epperly et al. 1995a, 1995b; Braun and Epperly 1996; Mitchell et al. 2003; Braun-McNeill et al. 2008; TEWG 2009). While hard-shelled turtles are most common south of Cape Cod, MA, loggerhead sea turtles are known to occur in the Gulf of Maine (GOM), feeding as far north as southern Canada. Loggerheads have been observed in waters with surface temperatures of 7 □C to 30□C, but water temperatures 1992; Epperly et al. favorable (Shoop and K 1995b). Sea turtle presence in U.S. Atlantic waters is also influenced by water depth. While hard-shelled turtles occur in waters from the beach to beyond the continental shelf, they are most commonly found in neritic waters of the inner continental shelf (Mitchell et al. 2003; Braun-McNeill and Epperly 2004; Morreale and Standora 2005; Blumenthal et al. 2006; Hawkes et al. 2006; McClellan and Read 2007; Mansfield et al. 2009; Hawkes et al. 2011; Griffin et al. 2013).

Seasonality

Hard-shelled sea turtles occur year-round in waters south of Cape Hatteras, North Carolina (NC). As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Epperly et al. 1995a, 1995b, 1995c; Braun-McNeill and Epperly 2004; Morreale and Standora 2005; Griffin et al. 2013), occurring in Virginia (VA) foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop and Kenney 1992). The trend is reversed in the fall

as water temperatures cool. The large majority leave the GOM by September, but some remain in Mid-Atlantic and Northeast areas until late fall. By December, sea turtles have migrated south to waters offshore of NC, particularly south of Cape Hatteras, and further south (Shoop and Kenney 1992; Epperly et al. 1995b; Hawkes et al. 2011; Griffin et al. 2013).

Leatherback sea turtles.

Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992; James et al. 2005; James et al. 2006; Dodge et al. 2014). Leatherbacks, a pelagic species, are also known to use coastal waters of the U.S. continental shelf (James et al. 2005; Eckert et al. 2006; Murphy et al. 2006; Dodge et al. 2014). Leatherbacks have a greater tolerance for colder water in comparison to hard-shelled sea turtles. They are also found in more northern waters later in the year, with most leaving the Northwest Atlantic shelves by mid-November (James et al. 2005; James et al. 2006; Dodge et al. 2014).

3.4.2.2 Large Cetaceans

Table 34 provides the species of large whales that occur in the affected environment of the Atlantic herring fishery. For additional information on the biology, status, and range wide distribution of each whale species please refer to: Waring et al. 2015; NMFS 1991, 2010b, 2011.

Table 34 Large Whale Species Present in the Affected Environment of the Atlantic Herring Fishery

Species	Listed Under the ESA	Protected Under the MMPA	MMPA Strategic Stock[1]
Humpback Whale	Yes-Endangered	Yes	Yes
Fin Whale	Yes-Endangered	Yes	Yes
Sei Whale	Yes-Endangered	Yes	Yes
Minke Whale	No	Yes	No

Notes:
[1]A strategic stock is defined under the MMPA as a marine mammal stock: for which the level of direct human-caused mortality exceeds the potential biological removal level; which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; or which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA.

***Source*:** Waring *et al*. 2015

Humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean. In general, these species follow an annual pattern of migration between low latitude (south of 35oN) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41oN; Waring et al. 2015; NMFS 1991, 2010b, 2011). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g., humpback whales), some portion of the population remains in higher latitudes throughout the winter (Waring et al. 2015; Clapham et al. 1993; Swingle et al. 1993; Vu et al. 2012). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution and movements of large whales to foraging grounds in the spring/summer is well understood. Movements of whales into higher latitudes coincide with peak productivity in these waters. As a result, the distribution of large whales in higher latitudes is strongly governed by prey availability and distribution, with large numbers of whales coinciding with dense patches of preferred forage (Payne et al.1986, 1990; Schilling et al. 1992). It is important to note, these foraging areas are consistently returned annually, and therefore, can be considered important, high use areas for whales. For additional information on the biology, status, and range wide distribution of each whale species please refer to: Waring et al. 2014, 2015; NMFS 1991, 2010b, 2011.

To further assist in understanding how the Atlantic herring fishery may overlaps in time and space with the occurrence of large whales, a general overview on species occurrence and distribution in the affected environment of the Atlantic herring fishery is provided in the following table (Table 35).

Table 35 Large Cetacean Occurrence in the Affected Environment of the Atlantic Herring Fishery

Species	Prevalence and Approximate Months of Occurrence
Humpback	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year. • New England waters (GOM and GB regions): **Foraging Grounds** (approximately March-November). • Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern (West Indies) calving grounds. • Increasing evidence of wintering areas (for juveniles) in Mid-Atlantic (e.g., waters in the vicinity of Chesapeake and Delaware Bays; peak presence approximately January through March).
Fin	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year. • Mid-Atlantic waters: › Migratory pathway to/from northern (high latitude) foraging and southern (low latitude) calving grounds. › Possible offshore calving area (October-January) • New England/SNE waters (GOM, GB, and SNE regions): **Foraging Grounds** (greatest densities March-August; lower densities September-November). Important foraging grounds include: > Massachusetts Bay (esp. Stellwagen Bank) > Great South Channel > Waters off Cape Cod (~40-50 meter contour) > western GOM (esp. Jeffrey's Ledge) > Eastern perimeter of GB > Mid-shelf area off the east end of Long Island. • Evidence of wintering areas in mid-shelf areas east of New Jersey, Stellwagen Bank; and eastern perimeter of GB.
Sei	• Uncommon in shallow, inshore waters of the Mid-Atlantic (SNE included), GB, and GOM; however, occasional incursions during peak prey availability and abundance. • Primarily found in deep waters along the shelf edge, shelf break, and ocean basins between banks. • Spring through summer, found in greatest densities in offshore waters of the GOM and GB (eastern margin into the Northeast Channel area; along the southwestern edge in the area of Hydrographer Canyon).
Minke	• Widely distributed throughout continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB during the spring, summer and fall; however, spring through summer found in greatest densities in the GOM and GB.

***Sources*:** NMFS 1991, 2010b, 2011; Hain *et al.* 1992; Payne 1984; Payne *et al*.1990; CETAP 1982; Clapham *et al*. 1993; Swingle *et al*. 1993; Vu *et al*. 2012; Baumgartner *et al*. 2011; Risch *et al*. 2013; Waring *et al*. 2014; Waring *et al*. 2015.

3.4.2.3 Small Cetaceans

The following MMPA protected small cetaceans may occur in the affected environment of the Atlantic herring fishery: Atlantic white sided dolphins, short and long finned pilot whales, rissos dolphins, and short beaked common dolphins. These species can be found throughout the year in waters of the Northwest Atlantic Ocean (Waring et al. 2014, 2015). Within this range; however, there are seasonal shifts in species distribution and abundance. To further assist in understanding how the Atlantic herring fishery may overlap in time and space with the occurrence of small cetaceans, a general overview of species occurrence and distribution in the affected environment of the Atlantic herring fishery is provided in the following table (Table 36). For additional information on the biology, status, and range wide distribution of each species please refer to Waring et al. 2014, 2015.

Table 36 Small Cetacean Occurrence in the Affected Environment of the Atlantic Herring Fishery

Species	Prevalence and Approximate Months of Occurrence
Atlantic White Sided Dolphin	• Distributed throughout the continental shelf waters (primarily to 100 meter isobath) of the Mid-Atlantic (north of 35°N), Southern New England, GB, and GOM ; however, most common in continental shelf waters from Hudson Canyon (~ 39°N) onto GB, and into the GOM. • **January-May**: low densities found from GB to Jeffreys Ledge. • **June-September**: Large densities found from GB, through the GOM. • **October-December**: intermediate densities found from southern GB to southern GOM. • South of GB (SNE and Mid-Atlantic), low densities found year round, with waters off VA and NC representing southern extent of species range during winter months.
Short Beaked Common Dolphin	• Regularly found throughout the continental shelf-edge-slope waters (primarily between the 100-2,000 meter isobaths) of the Mid-Atlantic, SNE, and GB (esp. in Oceanographer, Hydrographer, Block, and Hudson Canyons). • Less common south of Cape Hatteras, NC, although schools have been reported as far south as the Georgia (GA)/South Carolina (SC) border. • **January-May**: occur from waters off Cape Hatteras, NC, to GB (35° to 42°N). • **Mid-summer-autumn**: Occur primarily on GB with small numbers present in the GOM; *Peak abundance* found on GB in the autumn.
Risso's Dolphin	• Common in the continental shelf edge waters from FL to eastern Newfoundland; low numbers found in the GOM. • **March-November**: distributed along continental shelf edge from Cape Hatteras, NC, to GB. • **December-February**: primarily distributed in continental shelf edge of the Mid-Atlantic (including SNE), although species can be found in the Mid-Atlantic year round.
Pilot Whales: *Short- and Long-Finned*	**Short- Finned Pilot Whales** • Primarily occur south of 40°N (Mid-Atl and SNE waters); although low numbers have been found along the southern flank of GB, but no further than 41°N. • May through December (approximately): distributed primarily near the continental shelf break of the Mid-Atlantic and SNE; individuals begin shifting to southern waters (i.e., 35°N and south) beginning in the fall. **Long-Finned Pilot Whales**

Species	Prevalence and Approximate Months of Occurrence
	• Range from 35°N to 44°N • Winter to early spring (November through April): primarily distributed along the continental shelf edge-slope of the Mid-Atlantic, SNE, and GB. • Late spring through fall (May through October): movements and distribution shift onto/within GB, the Great South Channel, and the GOM. **Area of Species Overlap:** between 38°N and 41°N

Notes :

[1] Information presented in table is representative of small cetacean occurrence in the Northwest Atlantic continental shelf waters out to the 2,000 meter isobath.

Sources**:** Waring *et al*. 1992, 2007**,** 2014, 2015**;** Payne and Heinemann 1993; Payne 1984; Jefferson *et al*. 2009.

3.4.2.4 Pinnipeds

The following MMPA protected species of pinnipeds occur in the affected environment of the Atlantic herring fishery: Harbor, and grey, harp seals. Pinnipeds are found in the nearshore, coastal waters of the Northwest Atlantic Ocean. They are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35oN) (Waring et al. 2014, 2015). To further assist in understanding how the Atlantic herring fishery may overlap in time and space with the occurrence of pinnipeds, a general overview of species occurrence and distribution in the affected environment of the Atlantic herring fishery is provided in the following table (Table 37). For additional information on the biology, status, and range wide distribution of each species of pinniped please refer to Waring et al. (2014, 2015).

Table 37 Pinniped Occurrence in the Affected Environment of the Atlantic Herring Fishery

Species	Prevalence
Harbor Seal	• Primarily distributed in waters from NJ to ME; however, increasing evidence indicates that their range is extending into waters as far south as Cape Hatteras, NC (35^{o}N). • **Year Round**: Waters of Maine • **September-May**: Waters from New England to NJ; potential for some animals to extend range into waters as far south as Cape Hatteras, NC.
Gray Seal	• Distributed in waters from NJ to ME. • **Year Round**: Waters from ME to MA. • **September-May**: Waters from Rhode Island to NJ.
***Sources*:** Waring *et al*. 2014, 2015.	

3.4.2.5 Atlantic Sturgeon DPSs

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range (ASSRT 2007; Dovel and Berggren 1983; Dadswell et al. 1984; Kynard et al. 2000; Stein et al. 2004a; Dadswell 2006; Laney et al. 2007; Dunton et al. 2010; Erickson et al. 2011; Wirgin et al. 2012; Waldman et al. 2013; O'Leary et al. 2014; Wirgin et al. 2015). In fact, several genetic studies, have been conducted to address DPS distribution and composition in marine waters (Wirgin et al. 2012; Damon-Randall et al. 2013; Waldman et al. 2013; O'Leary et al. 2014; Wirgin et al. 2015). Using samples from Atlantic sturgeon captured from various marine aggregation sites along the Northeast coast, results from these studies showed that these aggregations, regardless of location, were comprised of all 5 DPSs of Atlantic sturgeon; however, each DPS comprised various percentages of the aggregation depending on the area along the coast the aggregation was found and sampled (Wirgin et al. 2012; Damon-Randall et al. 2013; Waldman et al. 2013; O'Leary et al. 2014).

Based on fishery- independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein et al. 2004 a,b; Erickson et al. 2011; Dunton et al. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein et al. 2004a,b; Dunton et al. 2010; Erickson et al. 2011)). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon undertake seasonal movements along the coast (Dunton et al. 2010; Erickson et al. 2011). In general, analysis of fishery-independent survey data indicates a coastwide distribution of Atlantic sturgeon from the spring through the fall, with Atlantic sturgeon being more centrally located (e.g., Long Island to Delaware) during the summer months; and a more southerly (e.g., North Carolina, Virginia) distribution during the winter (Dunton et al. 2010; Erickson et al. 2011). Although studies such as Erickson et al. (2011) and Dunton et al. (2010) provide some indication that Atlantic sturgeon are undertaking seasonal movements horizontally and vertically along the U.S. eastern coastline, there is no evidence to date that all Atlantic sturgeon make these seasonal movements and therefore, may be present throughout the marine environment throughout the year.

3.4.3 Interactions Between Gear and Protected Resources

The Atlantic herring fishery is prosecuted primarily with midwater trawls, and purse seines. Please note, the Atlantic herring fishery only uses purse seines in the GOM. As a result, the following discussion on purse seines and interaction risks to protected species are only in reference to Atlantic herring purse seine fishery prosecuted in the GOM.

A subset of protected species of fish, marine mammals, and see turtles (see Table 33) are known to be vulnerable to interactions with midwater and/or purse seines. In the following sections, available information on protected species interactions with these gear types will be provided. Please note, these sections are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on those gear types primarily used to prosecute the Atlantic herring fishery.

3.4.3.1 Marine Mammals

Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery.[1] The categorization in the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA such as registration, observer coverage, and take reduction plan requirements. Individuals fishing in Category I or II fisheries must comply with requirements of any applicable take reduction plan.

Categorization of fisheries is based on the following two-tiered, stock-specific approach:

- **Tier 1**- considers the cumulative fishery mortality and serious injury for a particular stock. If the total annual mortality and serious injury rates within a stock resulting from all fisheries are less than or equal to ten percent of the stock's potential biological removal rate (PBR), all fisheries associated with this stock fall into Category III.[2] -If mortality and serious injury rates are greater than ten percent of PBR, the following Tier 2, analysis occurs.

- **Tier 2** -considers fishery-specific mortality and serious injury for a particular stock. Specifically, this analysis compares fishery-specific annual mortality and serious injury rates to a stock's PBR to designate the fishery as a Category I, II, or III fishery (see Table 38).

Table 38 Descriptions of the Tier 2 Fishery Classification Categories (50 CFR 229.2)

Category	Level of incidental mortality or serious injury of marine mammals	Annual mortality and serious injury of a stock in a given fishery is…
Category I	frequent	≥50% of the PBR level
Category II	occasional	between 1% and 50% of the PBR level
Category III	remote likelihood, or no known	≤1% of the PBR level

[1] The most recent LOF was issued August 25, 2014; 79 FR 50589.

[2] PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

3.4.3.1.1 Large Cetaceans

Midwater Trawl Gear

Based on information provided by Waring et al. (2014), Waring et al. (2015), and NMFS NEFSC FSB (2014), aside from minke whales, there has been no confirmed serious injury or mortality or documented interactions, in general, with large whales and midwater trawls. Minke whales are the only species of large whales that have been observed seriously injured and killed in midwater trawl gear, although these instances are rare. Since 2009, there has also been only two observed minke whale incidentally taken in midwater trawl gear; this incidence was observed in 2009 and 2013 (Waring et al. 2014, 2015; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). Based on this information, midwater trawl gear is not expected to pose a significant serious injury or mortality risk to any large whale species.

Purse Seine (GOM Atlantic herring fishery)

Since 2008, three (3) humpback whales and one (1) fin/sei whale have been documented as interacting with purse seines, specifically those operating in the GOM targeting Atlantic herring (see: http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). All interactions; however, resulted in the animals being realeased from the nets unharmed (http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; Waring et al. 2015). Based on this information, although interactions are possible with large whales, we do not expect purse seines to pose a serious injury or mortality risk to these species. This conclusion is further supported by the fact that the LOF has identified the Gulf of Maine Atlantic herring purse seine fishery as a Category III fishery, that is, a fishery that causes a remote to no likelihood of causing serious injury or mortality to marine mammals (see Table 38).

3.4.3.1.2 Small Cetaceans and Pinnipeds

Midwater Trawl Gear

Midwater trawl fisheries (Northeast or Mid-Atlantic) are considered Category II fisheries under the LOF. Small cetacean and pinniped species are known to be seriously injured or killed by this gear type, and in fact, based on observer data, bycatch of small cetaceans and pinnipeds have been attributed to the Atlantic herring fishery (see: http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; Waring et al. 2014, 2015). Table 39 provides a list of small cetacean and pinniped species observed seriously injured and/or killed by midwater trawl Category II fisheries from 2007-2012 (see Waring et al. 2014, 2015).

Table 39 Cetacean and Pinniped Species Observed Seriously Injured and/or Killed by Category II Midwater Fisheries in the Affected Environment of the Atlantic Herring Fishery from 2007-2012

Category II	
Fishery/Gear Type	**Species Observed Injured/Killed**
Mid-Atlantic Midwater Trawl (Including Pair Trawl)	Risso's dolphin
	White-sided dolphin (*)
	Short-beaked common dolphin
	Long and short-finned pilot whales
	Gray seal
	Harbor seal
Northeast Midwater Trawl (Including Pair Trawl)	White-sided dolphin
	Short-beaked common dolphin
	Long and short-finned pilot whales (*)
	Gray seal
	Harbor seal
Sources: Waring *et al*. 2014, 2015; August 25, 2014, List of Fisheries (79 FR 50589).	

A (*) indicates those species driving the fisheries classification.

In 2006, based on observed midwater trawl interactions with long-finned pilot whales, short-finned pilot whales, common dolphins, and white sided dolphins, the Atlantic Trawl Gear Take Reduction Team (ATGTRT) was convened to address the incidental mortality and serious injury of these species incidental to bottom and midwater trawl fisheries operating in both the Northeast and Mid-Atlantic regions. Because none of the marine mammal stocks of concern to the ATGTRT are classified as a "strategic stock," nor do they currently interact with a Category I fishery, it was determined at the time that development of a take reduction plan was not necessary.

In lieu of a take reduction plan, the ATGTRT agreed to develop an Atlantic Trawl Gear Take Reduction Strategy (ATGTRS). The ATGTRS identifies informational and research tasks, as well as education and outreach needs the ATGTRT believes are necessary, to provide the basis for decreasing mortalities and serious injuries of marine mammals to insignificant levels approaching zero mortality and serious injury rates. The ATGTRS also identifies several potential voluntary measures that can be adopted by certain trawl fishing sectors to potentially reduce the incidental capture of marine mammals (e.g., reducing the numbers of turns made by the fishing vessel and tow times while fishing at night; increasing radio communications between vessels about the presence and/or incidental capture of a marine mammal). For additional details on the ATGTRS, please visit:
http://www.greateratlantic.fisheries.noaa.gov/Protected/mmp/atgtrp/

Purse Seine (GOM Atlantic Herring Fishery)

There have been no observed small cetacean interactions with purse seines operating in the GOM. As a result, this gear type is not expected to pose an interaction risk with small cetacean species. However, purse seines, specifically those operating in the GOM targeting Atlantic herring, are known to interact with pinniped species (i.e., gray and harbor seals; see http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; Waring et al. 2014, 2015). However, most observed interactions to date have resulted in the release of the animals unharmed (Table 40); only two unknown seal species have been observed serious injured and killed in the GOM Atlantic herring purse seine fishery (see http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; Waring et al. 2014, 2015). As a result, although interactions are possible with seals, we do not expect purse seines to pose a significant serious injury or mortality risk to these species. This conclusion is further supported by the fact that the LOF has identified the Gulf of Maine Atlantic herring purse seine fishery as a Category III fishery, that is, a fishery that causes a remote to no likelihood of causing serious injury or mortality to marine mammals (see Table 38).

Table 40 2005-2014 Observed Gray and Harbor Seal Interactions with the GOM Atlantic Herring Purse Seine Fishery

Seal Species	Number of Observed Interactions	Released Alive
Unknown	13	11-Yes/ 2-No
Harbor Seal	10	Yes
Gray Seal	101	Yes

3.4.3.2 Sea Turtles

Midwater Trawl

NEFOP and ASM observer data from 1989-2014 have recorded five (5) leatherback sea turtle interactions with midwater trawl gear; the primary species landed during these interactions was tuna (see http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; NMFS NEFSC FSB 2015). Based on the best available information, although interactions with this gear type are possible, the risk of a sea turtle interacting with midwater trawl gear targeting Atlantic herring is expected to be low. Further, with no observed sea turtle interactions attributed to the Atlantic herring midwater trawl fishery since 1989, we do not expect midwater trawls targeting Atlantic herring to pose a significant serious injury or mortality risk to any sea turtle species.

Purse Seine (GOM Atlantic Herring Fishery)

NEFOP and ASM observer data from 1989-2014 have recorded no sea turtle interactions with purse seine gear where the primary species landed during these interactions was Atlantic herring (see http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; NMFS NEFSC FSB 2015). However, purse seine interactions with sea turtles have been observed in other fisheries targeting other fish species in the Mid-Atlantic. Based on the best available information, although interactions with this gear type are possible, the risk of a sea turtle interacting with purse seine gear targeting Atlantic herring in the GOM is expected to be low. Further, with no observed sea turtle interactions attributed to the Atlantic herring GOM purse seine fishery since 1989, we do not expect purse seines targeting Atlantic herring to pose a significant serious injury or mortality risk to these sea turtle species.

3.4.3.3 Atlantic Sturgeon

Midwater Trawl

To date, there have been no observed/documented interactions with Atlantic sturgeon and midwater trawl gear (NMFS NEFSC FSB 2015). As a result, this gear type is not expected to pose an interaction risk to the species.

Purse Seine (GOM Atlantic herring fishery)

NEFOP and ASM observer data from 1989-2014 have recorded two (2) Atlantic sturgeon interactions with purse seine gear targeting Atlantic herring in the GOM (NEFSC FSB 2015). These interactions were recorded in 2004 and 2005, prior to the listing of Atlantic sturgeon under the ESA. While capture of sturgeon in this gear type is possible, interactions have been extremely rare (only two observed over the last 25 years) and therefore, the risk of an interaction is likely low.

3.5 FISHERY-RELATED BUSINESSES AND COMMUNITIES

The U.S. Atlantic herring fishery occurs over the Mid-Atlantic shelf region from Cape Hatteras to Maine, including an active fishery in the inshore Gulf of Maine and seasonally on Georges Bank. The Atlantic herring resource is managed as one stock complex, but this stock is thought to be comprised of inshore and offshore components that segregate during spawning. In recognition of the spatial structure of the herring resource, the Atlantic herring annual catch limit (ACL) is divided into sub-ACLs and assigned to four herring management areas. Area 1 is the Gulf of Maine (GOM) divided into an inshore (Area 1A) and offshore section (Area 1B); Area 2 is located in the coastal waters between MA and NC (generally referred to as southern New England/Mid-Atlantic), and Area 3 is on Georges Bank (GB) (see Figure 1 on p. 3 of this document).

The Atlantic herring fishery is generally prosecuted south of New England in Area 2 during the winter (January-April), and oftentimes as part of the directed mackerel fishery. There is overlap between the herring and mackerel fisheries in Area 2 and in Area 3 during the winter months, although catches in Area 3 tend to be relatively low. The herring summer fishery (May-August) is generally prosecuted throughout the GOM in Areas 1A, 1B and in Area 3 (GB) as fish are available. Restrictions in Area 1A have pushed the fishery in the inshore GOM to later months (late summer). The midwater trawl (single and paired) fleet is restricted from fishing in Area 1A in the months of January through September because of the Area 1A sub-ACL split (0% January-May) and the purse seine-fixed gear only area (all of Area 1A) that is effective June-September. A sub-ACL split for Area 1B (0% January – April, 100% May – December) is effective for all vessels during the 2014 and 2015 fishing years.

Fall and winter fishing (September-December) tends to be more variable and dependent on fish availability; the Area 1A sub-ACL is always fully utilized, and the inshore Gulf of Maine fishery usually closes sometime around November. As the 1A and 1B quotas are taken, larger vessels become increasingly dependent on offshore fishing opportunities (Georges Bank, Area 3) when fish may be available.

Atlantic herring is also caught in state waters and in the New Brunswick weir fishery. Section 2.2.1 contains more information about those fisheries.

3.5.1 Atlantic Herring Catch

The Atlantic herring stockwide ACL and management area sub-ACLs are tracked/ monitored based on the ***total catch – landings and discards***, which is provided and required by herring permitted vessels through the vessel monitoring system (VMS) catch reports and vessel trip reports (VTRs) as well as through Federal/state dealer data. Atlantic herring harvesters are required to report discards in addition to landed catch through these independent reporting methods.

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

Table 41 summarizes recent Atlantic herring catch estimates by year and management area from 2004-2014. The following bullets describe how these estimates were derived:

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

**Catch of Atlantic herring by State-only permitted vessels (fishing in State waters) is tracked by the States and ASMFC; recent information regarding state waters Atlantic herring catch is summarized in Section 2.2.1 of this document (p. 15).*

Table 41 Atlantic Herring Catch by Year and Management Area, 2004-2014

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

*Source: NMFS. *2014 totals are preliminary.*
Note: shaded rows indicate overages.

Table 42 summarizes total Atlantic herring catch as a percentage of the total available catch in each year from 2003-2014 based on NMFS catch estimation methods. Atlantic herring catch has been somewhat consistent over the time period (and in previous years), averaging about 91,925 mt from 2003-2014, with the highest catch of the time series observed in 2009 (103,943 mt) and lowest in 2010 (72,852 mt). However, the quota allocated to the fishery (stockwide ACL/OY) has decreased 50% over the twelve-year period. Consequently, and without increasing fishing effort, the Atlantic herring fishery has become more fully utilized in recent years, and the fishery utilized 100% of the total Atlantic herring ACL for the first time in 2012. The 2013-2015 Atlantic herring fishery specifications increased the stockwide Atlantic herring ACL by more than 15,000 mt from the 2010-2012 specifications; an additional 5,000 mt was caught under the higher quota in 2013 and 2014, and overall, the fishery utilized about 90% of the stockwide Atlantic herring ACL.

Table 42 Total Annual Atlantic Herring Catch 2003-2014

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

*Source: NMFS. *2014 totals are preliminary.*

Table 43 provides updated/adjusted Atlantic herring sub-ACLs and the total ACL for the 2015 fishing year relative to 2015 Atlantic herring catch year to date (YTD). Thus far, 55.2% of the total ACL has been caught, and the Area 1A sub-ACL has had the highest utilization rate, 68.7%.

Table 43 2015 Atlantic Herring Sub-ACLs (Adjusted) and Catch YTD (mt)

AREA	2015 CATCH (MT)	2015 SUB-ACL* (MT)	% SUB-ACL CAUGHT
1A	20,799	30,290	68.7%
1B	2,883	4,922	58.6%
2	11,346	32,100	35.4%
3	22,711	44,910	50.6%
TOTAL	**57,738**	**104,566**	**55.2%**

Source: NMFS Quota Monitoring Report through September 2, 2015.

**Adjustments to initial allocations include overage deductions/carryovers from 2013 and deductions for the 2015 research set-asides.*

3.5.2 Monthly Atlantic Herring Quota Utilization

The temporal and spatial variability of the Atlantic herring fishery may be understood by examining the quota utilization in each management area on a monthly basis over the course of the fishing year. In general, the fishery concentrates in Area 2 during the first few months of the year, then effort shifts towards Area 1A through the summer and fall, as well as into Area 3 during the fall and early winter. Area 1B is used throughout the year as fish and markets are available. A more detailed description is provided in the 2013-2015 Atlantic herring fishery specifications (Section 3.5.1.2.3).

3.5.3 Atlantic Herring Permit Categories

Limited-access Atlantic herring vessel permit categories include:

Category A – limited access in all management areas;

Category B – limited access in Areas 2 and 3 only;

Category C – limited access in all management areas, with a 25 mt (55,000 lb) Atlantic herring catch limit per trip and one landing per calendar day.

Open-access Atlantic herring vessel permit categories include:

Category D – open access in all management areas, with a 3 mt (6,600 lb) Atlantic herring catch limit per trip and one landing per calendar day;

Category E – open access in Areas 2 and 3 only, with a 9 mt (20,000 lb) Atlantic herring catch limit per trip and landing per calendar day.

The Category E Atlantic herring permit was established through Amendment 5 and implemented in March 2014. Vessels that have not been issued a limited access herring permit, but that have been issued a limited access mackerel permit, are eligible for this permit.

[Add Atlantic Herring Landings by Permit Category]

3.5.4 Atlantic Herring Vessels

This section provides information regarding the vessels participating in the Atlantic herring fishery from 2008-present. Nominal revenues for "herring trips" are presented. Here, a herring trip is defined liberally as any trip in which at least one pound of Atlantic herring is retained.

Active Vessels in the Atlantic Herring Fishery

Since 2008, the number of vessels with either a limited access or an open access Atlantic herring permit has decreased annually (Table 44 and Table 45). This includes a decrease in the limited access directed fishery vessels (Categories A and B), which comprise the majority of the herring fishery, with 43 permitted in 2014. In 2014, 44% of the limited access vessels were active (defined broadly as landing at least one pound of Atlantic herring during the fishing year). Many of the Category A, B, and C vessels are also active in the Atlantic mackerel fishery (managed by the MAFMC). Although there have been far fewer active limited access versus open access vessels, the limited access vessels account for about 97% of annual Atlantic herring landings and revenues.

For the open access vessels, just 3-5% of the Category D permits have been active since 2009 (Table 44 and Table 45). The Category E permit was implemented during permit year 2013 (May-April). In 2014, there were just over 50 E permits issued, mostly to vessels with a D permit as well. About 11% of the E permits were active that year.

Table 44 Fishing Vessels with Federal Atlantic Herring Permits, 2008-2011

Permit Category	2008	2009	2010	2011
A	44 (64%)	44 (66%)	43 (63%)	42 (64%)
B, C	5 (40%)	4 (75%)	4 (75%)	4 (50%)
C	53 (13%)	51 (25%)	51 (33%)	45 (20%)
Total Limited Access	**102 (34%)**	**99 (45%)**	**98 (48%)**	**91 (52%)**
D	2,390 (3%)	2,373 (3%)	2,231 (5%)	2,038 (4%)

Source: NMFS Permit database (http://www.nero.noaa.gov/permits/permit.html) and VTR database.

Note: In parentheses are the percent active vessels, defined as having landed at least one pound of Atlantic herring. This includes all pair trawl vessels, whose partner vessel landed the catch. Data as of August 2015.

Table 45 Fishing Vessels with Federal Atlantic Herring Permits, 2012-2014

Permit Category		2012	2013	2014
Limited Access	A	38 (61%)	40 (63%)	39 (67%)
	B, C	4 (50%)	4 (75%)	4 (50%)
	C	46 (24%)	44 (34%)	42 (21%)
	Total	**88 (41%)**	**88 (42%)**	**85 (44%)**
Open Access	D	2,026 (4%)	1,909 (4%)	1,788 (3%)
	D,E	n/a	n/a	53 (11%)
	E	n/a	n/a	1*
	Total	**2,026 (4%)**	**1,909 (4%)**	**1,842 (3%)**

Source: NMFS Permit database (http://www.nero.noaa.gov/permits/permit.html) and VTR database.

Note: In parentheses are the percent active vessels, defined as having landed at least one pound of Atlantic herring. This includes all pair trawl vessels, whose partner vessel landed the catch. Permit and landings data are as of August 2015 and do not include 2015 landings.

n/a = The Category E permits could first be issued at the end of 2013, but could not become active until 2014.

**Data confidentiality restrictions preclude reporting the percent active.*

Fishing Gear

Atlantic herring vessels primarily use purse seines, single midwater trawls or midwater pair trawls for fishing gear, with the midwater pair trawl fleet harvesting the majority of landings since 2008 (Table 46 and Table 47). Some herring vessels use multiple gear types during the fishing year. Single and pair trawl vessels generally fish in all areas (October-December in Area 1A), though Areas 1A and 1B account for less of their overall landings in recent years. The purse seine fleet fishes primarily in Area 1A and to a lesser extent, Areas 1B and Area 2, though in recent years, purse seines have not been active in Area 2. The single midwater trawl has been most active in Area 3. Small mesh bottom trawl vessels represented 5% of herring landings since 2008; other gear types (e.g., pots, traps, shrimp trawls, hand lines) comprise less than 0.5% of the fishery.

Table 46 Atlantic Herring Landings by Fishing Gear Type and Area, 2008-2011

Gear Type	Area 1A (mt)	Area 1B (mt)	Area 2 (mt)	Area 3 (mt)	Total
Bottom Otter Trawl	463 (0.3%)	1 (0%)	14,288 (16%)	117 (0.1%)	**14,869** **(4%)**
Single Midwater Trawl	6,340 (5%)	3,246 (17%)	4,886 (5%)	12,830 (14%)	**27,302** **(8%)**
Midwater Pair Trawl	56,769 (43%)	12,612 (64%)	68,336 (76%)	78,518 (86%)	**216,235** **(65%)**
Purse Seine	69,074 (52%)	3,696 (19%)	2,221 (2%)	0 (0%)	**74,991** **(22%)**
Other	817 (0.6%)	0 (0%)	17 (0%)	1 (0%)	**834** **(0.2%)**
Total	**133,463** **(100%)**	**19,555** **(100%)**	**89,748** **(100%)**	**91,466** **(100%)**	**334,231** **(100%)**

Source: VTR database. September 2012.

Note: Data include all vessels that landed one pound or more of Atlantic herring.

Table 47 Atlantic Herring Landings by Fishing Gear Type and Area, 2012-2014

Gear Type	Area 1A (mt)	Area 1B (mt)	Area 2 (mt)	Area 3 (mt)	Total
Bottom Otter Trawl	534 (1%)	16,967 (64%)	0 (0%)	267 (0%)	**17,768** **(7%)**
Single and Pair Midwater Trawl	14,677 (18%)	9,068 (34%)	44,746 (100%)	110,227 (100%)	**178,718** **(67%)**
Purse Seine	68,409 (82%)	310 (1%)	0 (0%)	0 (0%)	**68,719** **(26%)**
Other	3 (0%)	0 (0%)	3 (0%)	0 (0%)	**6** **(0%)**
Total	**83,623** **(100%)**	**26,345** **(100%)**	**44,749** **(100%)**	**110,494** **(100%)**	**265,211** **(100%)**

Source: VTR database. August 2015.

Note: Data include all vessels that landed one pound or more of Atlantic herring. Single and pair midwater trawl data are combined due to data confidentiality restrictions.

Revenue

Table 48 provides percentage revenues from Atlantic herring by permit category from 2008-2011 for trips landing Atlantic herring, showing the contribution of Atlantic herring revenues to those trips. Category A vessels catching Atlantic herring in Areas 1A, 1B, and 3 are catching herring almost exclusively. However, when these vessels catch herring in Area 2, a substantial portion of revenues (nearly 40%) are attributable to other species. Category C and D vessels have derived relatively small amounts of revenue from herring trips. The remainder of the revenue for these vessels is derived from other species (e.g., whiting).

Table 48 Percentage of Revenue from Atlantic Herring by Permit Category and Management Area for Trips Landing Atlantic Herring, 2008-2011

	Category A	Category B/C	Category C	Category D
Area 1A	99.9%		55.1%	32.8%
Area 1B	99.7%			
Area 2	61.6%	94.8%	6.7%	2.5%
Area 3	96.8%			1.2%
Total	**86.4%**	**94.8%**	**30.3%**	**11.2%**

Table 49 provides percentage revenues from Atlantic herring in each management area from each permit category, 2014-2014, showing the importance of each management area to vessels of the different permit categories. Category A vessels have been active in each management area in recent years, and at least 87% of the revenue from a given area as attributable to Category A vessels, 100% in the case of Area 3. Category B and C vessels have been active primarily in Area 2, secondarily in Area 1A. The open access permit vessels (Category D and E) have been active only in Areas 1A and B in recent years.

Table 49 Percentage of Revenue of Atlantic Herring by Permit Category and Management Area, 2012-2014

	Category A	Category B or C	Category D orE
Area 1A	98.0%	1.5%	0.5%
Area 1B	97.8%		2.2%
Area 2	87.0%	13.0%	
Area 3	100.0%		

3.5.5 Atlantic Herring Dealers

The number of Atlantic herring dealers has remained fairly constant since 2012 at just over 280. Table 50 summarizes all issued Atlantic herring permits by state and permit type for the past few years. Dealer permits can be issued and cancelled throughout the year, so at any given time, the number of active dealer permits could fluctuate from the totals reported. Most of the Atlantic herring dealers are based in Maine, Rhode Island, New York, and New Jersey.

Table 50 Issued Atlantic Herring Dealer Permits, 2012-2015

	2012	2013	2014	2015
United States				
ME	76	83	84	85
NH	8	7	7	8
MA	57	61	60	62
RI	35	32	27	26
CT	2	2	3	3
VT	1	1	1	1
NY	52	50	50	48
NJ	26	26	26	28 (1)*
PA	2	2	2	2
DE	1		1	1
MD	3	3	3	2
VA	7	7	8	8
NC	9	8	8	8
GA	1	1		
Canada				
NB	1	1	1	1
NS	1	3	3	3
Total				
	282	**287**	**284**	**286(1)**

Source: GARFO permit database as of 7/31/2015.

Notes: 2015 permit counts are preliminary due to ongoing issuance. Individual entities may possess more than one permit type, i.e. total permits issued not equal to total number of dealers.

** One at-sea dealer permit has been issued in 2015.*

3.5.6 Atlantic Herring Prices, Use as Bait, and Substitute Goods

Between 2008-2014, Atlantic herring catch ranged from 72,852-103,943 mt (with discards representing a very small fraction, see Table 42 as well as Table 12 on p. 23) while nominal prices generally ranged from about $160-350 per mt (Figure 14 and Figure 15). Overall, Atlantic herring prices have been increasing over time with a peak in 2013. Atlantic herring caught in the Northeast U.S. is eaten by consumers worldwide and used as lobster bait. There are likely to be good substitutes for both uses; therefore, prices are likely insensitive to quantity changes.

In general, prices will decrease when quantity supplied increases, and prices will increase when quantity supplied decreases. The extent to which prices are responsive to changes in quantities supplied (and therefore by changes in ACLs and sub-ACLs) depends on the availability of good substitutes. If good substitutes are available, then prices will not be sensitive to changes in quantity supplied. However, if good substitutes are not available, then prices will be quite sensitive to changes in quantity supplied.

Limited amounts of Atlantic herring are consumed as food domestically. In the world market, there is likely one substitute: European herring. U.S. production of Atlantic herring is quite small relative to the worldwide production. Since total U.S. landings of Atlantic herring have been near 100,000 mt annually, while total worldwide landings of Atlantic herring are near 2,000,000 mt. Therefore, U.S. producers of herring as human food are likely to be price takers on the world market. This means that moderate changes in the quantity of herring produced for food are unlikely to have an effect on price of herring.

Figure 14 Average Nominal Price per Metric Ton of Atlantic Herring, 2008-2012

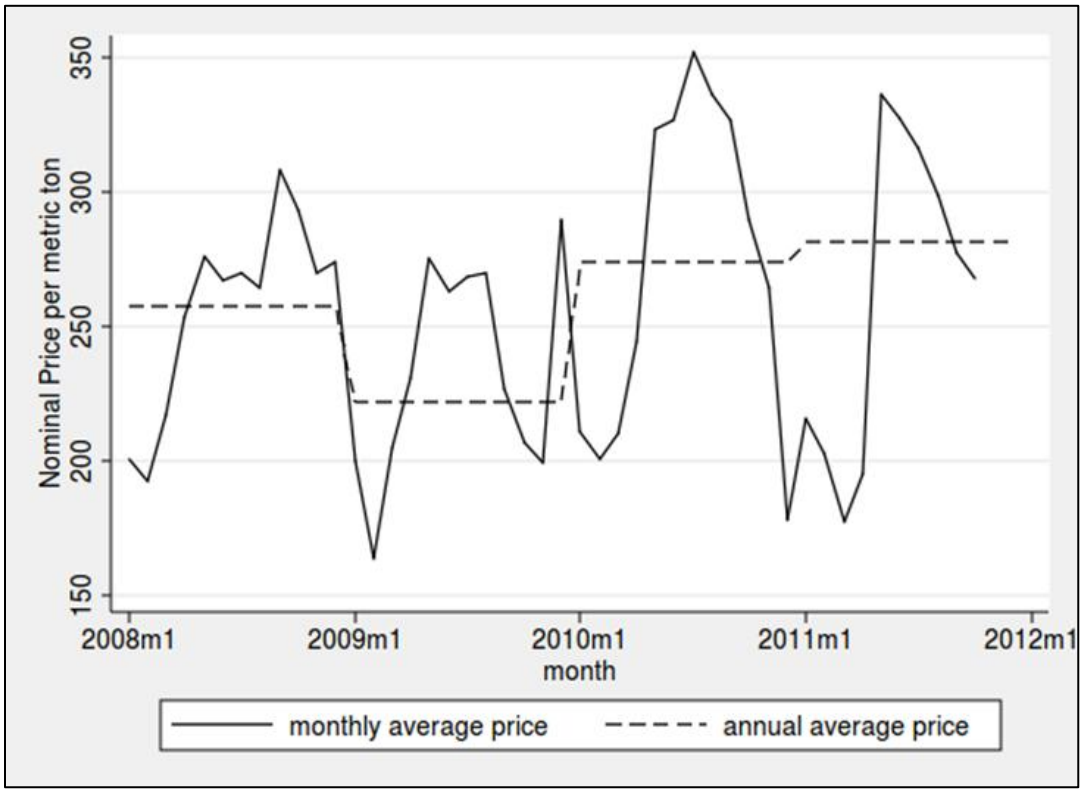
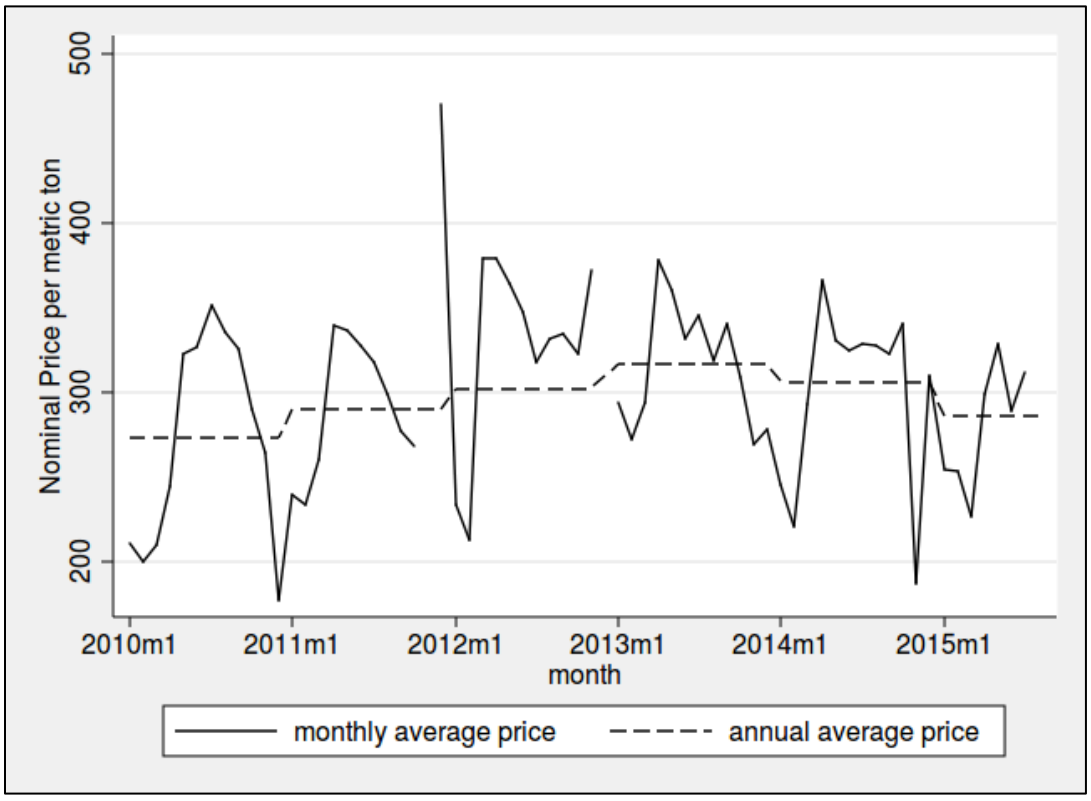


Figure 15 Average Nominal Price per Metric Ton of Atlantic Herring, 2010-2015



In the bait market, Atlantic menhaden, managed by the Atlantic States Marine Fisheries Commission, is one substitute for Atlantic herring. Use of menhaden for bait has increased in importance relative to fish meal and oil. Between 2001 and 2012, the percent of total menhaden landings that were used for bait rose from 13% to a high of 28% in 2012 (63,540 mt). In 2013, bait harvest composed approximately 22% of the total menhaden harvest. Menhaden landings for bait have recently dipped due to reductions in allowable catch; landings in 2013 were 35,043 mt, 34% below the average landings during 2010-2012 (52,900 mt) (ASMFC 2015). During 2008-2011, *ex-vessel* menhaden prices ranged from $139-$169 per mt. This is about 33-50% lower than *ex-vessel* herring prices. If the quantity of Atlantic herring supplied into the bait market declines dramatically, more menhaden may be used as bait, moderating the increases in herring prices.

Menhaden is primarily used to produce fish meal and oil. However, the Atlantic Herring FMP prohibits use of herring for fish meal, so herring is not a substitute in the production of those goods.

Atlantic herring is used as bait for many fisheries, such as lobster, tuna, and various recreational fisheries. A more detailed description of the bait sector of the industry is provided in Amendments 1 and 5 to the Herring FMP. According to NMFS dealer data, 77% of the Atlantic herring landed from 2012-2014 was sold as bait; most of the rest was used for human consumption. Ports in Maine (61%) and Massachusetts (36%) landed 97% of all herring used for bait.

The lobster industry, particularly in Maine, is dependent on herring as a bait source, though it depends on price and availability. A 2008 survey of 6,832 lobster license holders in Maine revealed that 58% of respondents answered "very much" to the question "Could the supply or price of herring for bait impact your decisions on how to fish?" (MEDMR, 2008). For lobstermen surveyed from Maine, New Hampshire and Massachusetts who harvest in Lobster Conservation Management Area A (inshore Gulf of Maine), herring is the predominant bait source (Table 51).

Table 51 Bait Usage in the Inshore Gulf of Maine Lobster Fishery

	ME Zone A	ME Zone B	ME Zone C	ME Zone D	ME Zone E	ME Zone F	ME Zone G	NH	MA
Herring	90%	86%	73%	73%	84%	37%	75%	60%	76%
Pogies	3%	2%	0%	15%	14%	39%	11%	4%	13%
Redfish	1%	8%	12%	4%	1%	19%	8%	0%	0%
Racks	1%	2%	1%	2%	0%	1%	1%	26%	6%
Alewives	1%	1%	0%	1%	0%	0%	0%	0%	0%
Other	4%	2%	13%	5%	0%	4%	4%	9%	4%

Source: Dayton et al. (2014)

Data from New Hampshire port sampling reveals that New Hampshire vessels may be less dependent on herring as a bait source than the aforementioned survey indicates. Table 52 presents the use of herring as bait in NH from 2005 to 2011 (due to funding shortages, these data are no longer collected). Atlantic herring is a small percentage of the bait used by these vessels, ranging between 1.8% in 2010 and 4.6% in 2005. In terms of herring per trap just in Lobster Management Area (LMA) 1, the most used was in 2005 and the least in 2010. This correlates with overall high and low points in the percent of herring bait used. Historically, Atlantic herring is used for bait by smaller inshore vessels more than larger offshore vessels, because it is typically less expensive; in addition, alternative bait options like skates tend to be preferred for longer soaks in offshore waters.

Note that the offshore LMA Area 3 vessels are not included in the herring per trap calculation because, at present, there is only one vessel in this category, which tends to utilize redfish and skates as primary bait sources. This is because redfish and skates do not degrade as rapidly as herring in deeper colder water. Furthermore, the LMA 3 vessel is not included to avoid skewing the data, however marginally, due to the diversity in bait types and the sheer volume of bait that is utilized throughout a fishing trip.

Table 52 Atlantic Herring Use as for Lobster Bait in New Hampshire

Year	Herring Bait (lbs)	Other Bait (lbs)	Total Bait (lbs)	% Herring of all Bait	# Types of Bait	Herring Per Trap LMA 1* (lbs)
2005	8,200	169,725	177,925	4.6%	11	0.33
2006	9,700	293,125	302,825	3.2%	13	0.20
2007	8,300	226,350	234,650	3.5%	10	0.18
2008	7,658	247,000	254,658	3.0%	12	0.16
2009	8,825	189,690	198,515	4.4%	11	0.25
2010	3,350	181,728	185,078	1.8%	11	0.14
2011	6,100	249,900	256,000	2.4%	9	0.21

Source: NH Fish & Game Department

3.5.7 Atlantic Herring Fishing Communities

In the 1996 amendments to the Magnuson Stevens Act, Congress added National Standards directly related to social and economic factors for consideration by Councils and NMFS. National Standard 8 (NS8) states that:

> *Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.*

NS 8 requires the consideration of impacts on fishing communities. Section 316 of MSA defines a fishing community as:

> *"A community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community."*

To gain a better perspective on the nature of the Atlantic herring fishery and the character of the affected human environment, a broader interpretation of fishing community has been applied to include almost all communities with a substantial involvement in or dependence on the Atlantic herring fishery. In terms of National Standard 8 (NS 8), some of the communities identified in this section may not fit the strict interpretation of the criteria for substantial dependence on fishing. The fishing communities that meet the legal definition (as promulgated through NS 8) are likely to be considered a subset of the broader group of communities of interest that are engaged in the herring fishery and identified in this document.

Because Atlantic herring is widely used as bait for the lobster fishery, especially in Maine, it is not practical to identify every community with substantial involvement in the lobster fishery (and consequently some level of dependence on the herring fishery) for assessment in this document. Instead, some of the communities of interest were selected, in part, because of their involvement in or dependence on the lobster fishery; assessment of the impacts of the Amendment 1 measures on these communities should provide enough context to understand the potential impacts on any community with substantial involvement in the lobster fishery. Parallels can be drawn between the communities that are identified in this section and other similar communities engaged in the lobster fishery.

NS 8 requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. "Sustained participation" is interpreted as continued access to the fishery within the constraints of the condition of the resource.

Communities of Interest

The following five criteria were used in Amendments 1 and 5 to the Herring FMP to define *Communities of Interest* for the Atlantic herring fishery, which must meet at least one criterion:

1. Atlantic herring landings of at least 10M pounds (4,536 mt) per year from 1997-2008, or anticipated landings above this level based on interviews and documented fishery-related developments.
2. Infrastructure dependent in part or whole on Atlantic herring.
3. Dependence on herring as lobster and/or tuna bait.
4. Geographic isolation in combination with some level of dependence on the Atlantic herring fishery.
5. Utilization of Atlantic herring for value-added production.

Based on the above criteria, there are 11 *Communities of Interest* for the Atlantic herring fishery, identified below and further evaluated in Amendment 5 to the Atlantic Herring FMP (Section 4.5.3). Community profiles of each are available from the NEFSC Social Sciences Branch website (Clay et al. 2007). Since Amendment 1, this list has changed slightly with changes in harvesting and processing sectors.

1. Portland, Maine
2. Rockland, Maine
3. Stonington/Deer Isle, Maine
4. Vinalhaven, Maine
5. Lubec/Eastport, Maine
6. Sebasco Estates, Maine
7. NH Seacoast (Newington, Portsmouth, Hampton/Seabrook)
8. Gloucester, Massachusetts
9. New Bedford, Massachusetts
10. Southern Rhode Island (Point Judith, Newport, North Kingstown)
11. Cape May, New Jersey

Home Ports

Of the Atlantic herring *Communities of Interest*, Gloucester and New Bedford, Southern RI, and Cape May are homeports with largest concentrations of vessels that have Atlantic Herring limited access directed fishery permits, Categories A and B (Table 53). Mid-Coast ME, Portland and Seacoast NH also are home to a few of these permit holders. Beyond the communities of interest, a few Category A and B permit holders have homeports in Bath, Cundys Harbor, Hampden, and Matinicus ME; Boston and Woods Hole MA; and Wanchese NC. For the most part, these vessels use a community of interest as a landing port (NMFS 2012). The distribution of important homeports for Atlantic Herring vessels is largely unchanged between 2011 and 2015 (Table 53), particularly for the limited access vessels.

Table 53 Distribution of Herring Permit Holders in 2011 and 2015 which have an Atlantic Herring Community of Interest as a Homeport

Homeport		Atlantic Herring Permit Category					
		Limited Access (A, B, C)		Open Access (D, E)		Total	
		2011	2015	2011	2015	2011	2015
ME	Portland	3	3	129	30	132	33
	Rockland	1	1	2	2	3	3
	Stonington/Deer Isle	1	0	0	2	1	2
	Vinalhaven	0	0	2	2	2	2
	Lubec/Eastport	0	0	2	1	2	2
	Sebasco Estates	0	0	3	1	3	2
	Maine, other	11	7	196	146	207	153
NH	Seacoast	6	5	96	93	102	98
MA	Gloucester	7	8	174	120	181	128
	New Bedford	9	8	201	178	210	186
	Massachusetts, other	9	8	377	324	386	332
RI		15	14	117	104	132	128
NJ	Cape May	12	13	93	83	105	96
	New Jersey, other	0	0	200	177	200	177
Other		12	12	494	388	506	400

Source: NMFS permit database. (http://www.nero.noaa.gov/permits/permit.html). 2011 data accessed September 2012. 2015 data accessed July 2015.

Landing Ports

From 2008-2011, Atlantic herring harvested from Areas 1A and 1B are landed in fishing communities in Maine, New Hampshire, and Massachusetts, whereas herring from Areas 2 and 3 are landed in a wider range of ports (Table 54). Communities in Rhode Island and New Jersey fish in Area 2 for herring almost exclusively. Portland, Rockland, Gloucester, and New Bedford are ports with the most herring landings in recent years. Within New Jersey, Cape May is the most active landing port.

Table 54 Landing Port Distribution of Atlantic Herring Landings from Fishing Areas (2008-2011)

Landing Port		Area 1A (mt)	Area 1B (mt)	Area 2 (mt)	Area 3 (mt)
Maine	Portland	23%	22%	1%	23%
	Rockland	26%	15%	1%	10%
	Stonington/Deer Isle	8%	12%	0.5%	0%
	Vinalhaven	2%	5%	0%	2%
	Lubec/Eastport	0%	0%	0%	0%
	Sebasco Estates	0%	0%	0%	0%
	Maine, other	6%	0.3%	0.8%	4%
New Hampshire	Seacoast	3%	0.9%	0.4%	1%
Massachusetts	Gloucester	23%	42%	17%	45%
	New Bedford	8%	2%	45%	16%
	Massachusetts, other	1%	0.1%	4%	0%
Rhode Island	Southern	0%	0%	17%	0.1%
New Jersey	Cape May	0%	0%	13%	0%
	New Jersey, other	0%	0%	0%	0%
Other States		0%	0%	0.1%	0%
Total		**133,463 (100%)**	**19,555 (100%)**	**89,748 (100%)**	**91,466 (100%)**

Source: NMFS VTR database. September 2012.

4.0 IMPACTS OF PROPOSED MANAGEMENT ACTION AND OTHER ALTERNATIVES

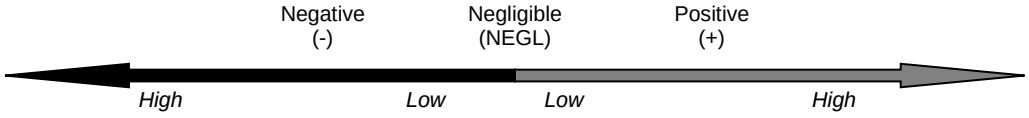
In this section, the impacts of the proposed 2016-2018 Atlantic herring fishery specifications and RH/S catch caps are evaluated and discussed relative to each of the valued ecosystem components (VECs) described in the Affected Environment (Section 3.0 of this document, beginning on p. 39). The impacts of the no action alternative and non-preferred alternatives considered by the Council are also addressed in this section.

In general, the descriptive and analytic components of this document are constructed in a consistent manner. The Affected Environment for the 2016-2018 Atlantic herring fishery specifications updates the biological and management history related to each VEC since the implementation of Amendment 1 to the Atlantic Herring FMP (in 2006) through Amendment 5 (finalized by the Council in 2013). The Affected Environment section is designed to enhance the readers' understanding of the baseline conditions and recent trends in order to fully understand the anticipated environmental impacts of the management measures under consideration in this management action. The impacts of the proposed 2016-2018 fishery specifications and RH/S catch caps are assessed in the following sub-sections of this document using a similar structure to that found in the Affected Environment.

To enhance clarity and maintain consistency, the terms described in Table 55 are used to summarize the impacts of each alternative/option on the VECs in this document. In some instances (although less common), impacts on a VEC may be characterized as neutral, particularly if there may be both positive and negative impacts resulting from a management measure. If impacts are determined to be neutral, the reasons for making such a determination are provided in the discussion.

Table 55 Terms Used in Tables to Summarize Impacts of Proposed Action on VECs

Impact Definition			
	Direction		
VEC	**Positive (+)**	**Negative (-)**	**Negligible**
Atlantic Herring; Non-Target Species; Protected Resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Fishery-Related Businesses and Communities (Human Environment)	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
	Impact Qualifiers:		
Low (L, as in low positive or low negative)	To a lesser degree		
High (H; as in high positive or high negative)	To a substantial degree		
Likely	Some degree of uncertainty associated with the impact		



4.1 IMPACTS ON ATLANTIC HERRING

The Atlantic herring fishery is administered in accordance with the Atlantic Herring FMP, as modified by applicable amendments and framework adjustments. The Atlantic Herring FMP was developed by the Council and implemented by NMFS in 2000. The Atlantic herring fishery specification-setting process is the primary management tool used to manage the U.S. catch of Atlantic herring to ensure that overfishing does not occur. The specifications process was modified in Amendment 1 (from annual to every three years) and in Amendment 4 (for consistency with the ACL/AM provisions in the reauthorized MSA). Overall, fishing mortality on Atlantic herring is managed through the specification of the stockwide ACL (reduced from the overfishing limit and acceptable biological catch to address scientific uncertainty and management uncertainty) and sub-ACLs that are intended to minimize risk to individual stock components while maximizing opportunities for the fishery to achieve OY.

Updated information about the Atlantic herring resource is provided in Section 3.1 of this document (p. 39). Based on the best available scientific information (Atlantic herring operational assessment, April 2015), the Atlantic herring resource continues to remain well above its biomass target (**rebuilt**), and fishing mortality remains well below the F_{MSY} threshold (**not overfishing**). A retrospective pattern re-emerged when updating the stock assessment model from the 2012 benchmark assessment; the retrospective pattern suggests that Atlantic herring SSB is likely to be overestimated and F is likely to be underestimated in the terminal year of the assessment. The retrospective adjustments made by the assessment review panel resulted in approximately a 40% decrease in the terminal year (2014) SSB estimate and a 60% increase in the 2014 F estimate. Even with the retrospective adjustments, the Atlantic herring stock complex remains above the biomass target and below the fishing mortality threshold (see Table 23, Figure 2, p. 40 of this document for more information).

The Council's SSC reviewed the 2015 Atlantic herring operational assessment results and recommended the proposed 2016-2018 Atlantic herring OFL and ABC specifications, which form the basis of the action alternatives considered by the Council in this document (the 2015 Atlantic herring operational assessment report and the May 20, 2015 SSC Meeting Report should be referenced for more information). The impacts of the proposed 2016-2018 Atlantic herring fishery specifications and alternatives for 2016-2018 RH/S catch caps on the Atlantic herring resource are discussed in the following subsections.

4.1.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on Atlantic Herring

Each of the alternatives considered by the Council for the 2016-2018 fishery specifications includes an annual specification for OFL, ABC, a stockwide Atlantic Herring ACL (OY), DAH, DAP, USAP, BT, management area sub-ACLs (and seasons), RSA, and FGSA for 2016-2018. The OFL represents the amount of annual Atlantic herring catch that would likely result in overfishing of the Atlantic herring resource; the ABC is the annual catch level recommended by the SSC to reduce the risk of overfishing while accounting for scientific uncertainty; the stockwide ACL/OY represents the maximum annual amount of Atlantic herring that the U.S. fishery can harvest, buffered for management uncertainty (in this case, Atlantic herring that may be caught in Canadian fisheries). AMs further ensure that the stockwide ACL is not exceeded in the U.S. fishery. Therefore, to evaluate the potential impacts of the 2016-2018 fishery specifications on the Atlantic herring resource, the maximum potential removals under the stockwide Atlantic herring ACL/OY specification can be compared to the OFL to compare the risk of overfishing under each alternative.

To facilitate the evaluation of the impacts of the alternatives on the Atlantic herring resource, Table 56 lists the potential annual removals of Atlantic herring that can be expected under each alternative, assuming that the stockwide Atlantic herring ACL is fully utilized. Table 56 also summarizes the accountability measures (AMs) that apply to the U.S. Atlantic herring fishery and provides some summary information about recent catch in the U.S. and Canadian fisheries that affect the Atlantic herring resource.

On average, total annual removals of Atlantic herring (from both the U.S. and NB weir fisheries) have been well below the maximum removals for the U.S. fishery (the stockwide ACL) that would be allowed under any of the alternatives under consideration for 2016-2018. Alternative 2 would allow for the highest annual removals of Atlantic herring from the U.S. fishery – 108,000 mt. According to Table 42 (see p. 90), annual U.S. Atlantic herring catch has been well below 108,000 mt for at least the last ten years, even during years when the total allowable catch was much higher (180,000 mt). Total Atlantic herring removals (U.S. and Canadian fishery combined) in 2014 were 90% of the 108,000 mt stockwide ACL proposed in Alternative 2, and the five-year average total herring removals are about 86% of the Alternative 2 stockwide ACL (Table 56). In other words, if Atlantic herring catch in the U.S. fishery during 2016-2018 is similar to 2014 catch (around 95,000 mt), there would be a considerable additional buffer to account for a significant increase in the NB weir catch before total removals would reach the overfishing limit. This should increase confidence that none of the alternatives under consideration are likely to result in catch levels above the stockwide Atlantic herring ACL. This also provides greater assurance that the risk of overfishing will continue to be minimized in the event that the NB weir fishery lands an unusually large amount of Atlantic herring in any of the next three years.

Table 56 Potential Removals of Atlantic Herring (mt) Under Alternatives for 2016-2018 Specifications

Specifications	No Action Alternative (2015 Specifications)	Alternative 2	Alternative 3 *Preferred Alternative*
OFL	2016 – 114,000 2017 – 114,000 2018 – 114,000	2016 – 138,000 2017 – 117,000 2018 – 111,000	2016 – 138,000 2017 – 117,000 2018 – 111,000
ABC	**114,000**	**111,000**	**111,000**
Mgmt. Uncertainty	*6,200*	*3,000*	*6,200*
Stockwide ACL/OY	**107,800**	**108,000**	**104,800**
Stockwide ACL with NB weir option	**N/A** **107,800**	**N/A** **108,000**	**105,800**
Accountability Measures	• Directed fishery in management area closes when 92% of the sub-ACL is projected to be reached • Directed fishery in all management areas close when 95% of the stockwide ACL is projected to be reached • Overage paybacks for management area sub-ACLs and stockwide ACLs (one-year lag) • Underage carryovers up to 10% for sub-ACLs (with one-year lag), cannot increase stockwide ACL		
	U.S. Atl Herring Fishery	**NB Weir Fishery (Canada)**	**Total Herring Removals**
2014 Catch	95,037	2,149	**97,186**
Three-Year Avg.	93,787	3,028	**96,815**
Five-Year Avg.	88,092	4,751	**92,843**

Overall Biological Impacts

The biological impacts of the alternatives for the 2016-2018 Atlantic herring fishery specifications were assessed using three-year projections of SSB, fishing mortality, and probability of overfishing/overfished in each year. In the projections, fishing mortality is derived from the estimate of F_{MSY} in the Atlantic herring operational assessment, and the terminal year estimates of F and SSB from the operational assessment (2014, with the retrospective adjustment) are used. A simulation of 1,000 projections is then run to capture possible outcomes of SSB and F for 2016-2018. The results of the projections are provided in Table 57 (p. 113) and Table 58 (p. 114) and discussed below relative to each alternative under consideration for the 2016-2018 fishery specifications.

The SSC's recommendation for ABC for the 2016-2018 fishing years only differs from the 2013-2015 Atlantic herring ABC specification by 3,000 mt (2.6%). Because the ABC specifications are very similar, the three-year projections of Atlantic herring SSB and F provided in the following subsections demonstrate that there is no discernable difference between the impacts of Alternatives 1-3 on the Atlantic herring resource. The projections show that under each of the OFL/ABC specifications, Atlantic herring SSB and F resulting from fully utilizing ABC fall within the same range (based on the 80% confidence intervals). None of the alternatives are expected to change or jeopardize the biological status of the Atlantic herring resource (rebuilt, above SSB target). For these reasons, all three alternatives under consideration for the 2016-2018 fishery specifications are expected to have a ***negligible impact*** on the Atlantic herring resource.

The differential impacts between the alternatives relate to the size of the buffer between OFL/ABC and the specification of the stockwide Atlantic herring ACL/OY, i.e., the maximum amount of total annual removals from the U.S. fishery under each of the alternatives. Alternatives that allow for higher annual removals from the U.S. fishery are considered to be less precautionary with respect to the risk of overfishing (exceeding the OFL). However, as the preceding discussion indicates, the risk of exceeding the ABC and/or OFL is very low under all three alternatives. The differences between the alternatives are discussed more in the following sub-sections.

Because the Atlantic herring ABC specification proposed for 2016-2018 is only 2.6% lower than the 2013-2015 ABC specification, and because available biological/fishery information does not indicate a need to consider major changes to the distribution of allowable catch in the herring fishery or other specifications, the alternatives that the Council considered for 2016-2018 maintain the status quo for many specifications. The potential impacts on the Atlantic herring resource resulting from the status quo fishery specifications (common to all alternatives) are discussed generally below.

DAH, DAP, BT, USAP

Specifications of DAH, DAP, BT, and USAP are consistent with the formulas in the Atlantic Herring FMP and are proposed to remain unchanged for the 2016-2018 fishing years. These fishery specifications are administrative in nature and represent components of the stockwide Atlantic herring ACL/OY for 2016-2018. Impacts of these specifications on the Atlantic herring resource, therefore, are expected to be ***negligible***.

RSA

For the 2016-2018 Atlantic herring fishery specifications, the Council is proposing to maintain the specification of 3% RSA from each management area for the 2016-2018 fishing years. Overall, this specification is administrative in nature and does not affect removals of Atlantic herring from the fishery. The impacts of the RSA specifications for 2016-2018 on the Atlantic herring resource are therefore expected to be ***negligible***.

Of course, there are long-term benefits to the Atlantic herring resource from enhancing management through cooperative research. A 3% RSA for the 2016-2018 fishing year encourages the industry to continue to participate in the collection of scientific information and

conduct research to reduce interactions with non-target species affected by the Atlantic herring fishery. The Council has identified river herring bycatch avoidance, portside sampling, electronic monitoring, and research to enhance the Atlantic herring stock assessment as top priorities for cooperative research to be funded through any RSA program supported by the 2016-2018 specifications (see Section 2.2.4, p. 33). Long-term benefits to the Atlantic herring resource can be expected from cooperative research programs that address these priorities, particularly if research funded under the 2016-2018 RSA provides information to enhance the Atlantic herring stock assessment. Allocating RSA for 2016-2018 under these research priorities is consistent with the goals and objectives of the Atlantic herring management program.

FGSA

Specification of the FGSA is proposed to remain unchanged for the 2016-2018 fishing years. This specification is administrative in nature and represents a component of the Area 1A sub-ACL. Amendment 2 to the ASMFC Interstate Herring FMP requires fixed gear fishermen East of Cutler to report catch weekly through the federal IVR system. ME DMR requires the ME state commercial fixed gear fishermen to be compliant with the federal IVR weekly reporting requirements and regulations as well as reporting monthly to ME DMR. Any unused portion of the FGSA is returned to the Area 1A Atlantic herring fishery after November 1, and catch is tracked by NMFS against the Area 1A sub-ACL.

The FGSA specification does not affect total removals of Atlantic herring. Impacts on the Atlantic herring resource, therefore, are expected to be ***negligible***.

Sub-ACLs and Seasonal Sub-ACL Divisions

Because the Atlantic herring ABC specification recommended by the SSC for 2016-2018 (111,000 mt) is only 2.6% less than the 2013-2015 ABC specification (114,000 mt), the Council, in consultation with the PDT, AP, and Herring Committee, determined that there is no need to consider modifying the distribution of the stockwide Atlantic herring ACL among the four management areas for 2016-2018. Moreover, information from the Atlantic herring operational assessment report (April 2015) does not indicate that there is a biological need to consider modifying the distribution of the stockwide Atlantic herring ACL at this time. All of the alternatives for the 2016-2018 Atlantic herring fishery specifications therefore maintain a status quo approach to distributing the stockwide Atlantic herring ACL (see Table 18 on p. 32). The status quo approach applies the same (2013-2015) proportional distribution of the stockwide ACL among the management areas, as well as the same seasonal (monthly) divisions of the Area 1A and Area 1B sub-ACLs.

When the stockwide Atlantic herring ACL is distributed across the four management areas under any of the alternatives, the resulting sub-ACLs change by less than 1,000 mt in most cases (see Table 3, p. 10). Therefore, because the change in the seasonal/spatial distribution of Atlantic herring catch and fishing effort is expected to be minor, the impacts of the 2016-2018 sub-ACL distributions and seasonal divisions on the Atlantic herring resource are expected to be ***negligible***.

4.1.1.1 Impacts of Alternative 1 (No Action)

Under the no action alternative, the annual specification of Atlantic herring OFL and ABC would remain 114,000 mt from 2016-2018. This ABC specification is higher than the SSC's recommended specification of 111,000 mt. Because this alternative specifies OFL and ABC at the same level in all three years, this alternative would result in no buffer between OFL and ABC to account for scientific uncertainty. This does not appear to be consistent with the best available scientific information.

Table 57 summarizes the biological impacts of Alternative 1 (no action) on the Atlantic herring resource with respect to fishing mortality and projected SSB for 2016-2018. Under Alternative 1, median Atlantic herring SSB is projected to decline 24% by 2018 to 421,000 mt, which would still be well above the biomass target of 311,145 mt (i.e., the stock would still be considered rebuilt). The projections indicate that there is a 2% chance that SSB could fall below the biomass threshold. Median fishing mortality would increase close to F_{MSY} levels over the three years, and there would be a 54% chance that fishing mortality would exceed F_{MSY} in 2018 (i.e., that overfishing would occur). Over the three-year simulation, expected Atlantic herring SSB and F under this alternative are within the same range as Alternatives 2 and 3 (based on the 80% confidence intervals, see Table 58 for the SSB/F projection under Alternatives 2 and 3). SSB declines, but the stock remains above its biomass target. Therefore, all three alternatives under consideration for the 2016-2018 fishery specifications are expected to have a ***negligible*** impact on the Atlantic herring resource because they would not jeopardize the biological status of the resource (rebuilt, i.e., above the SSB target).

However, because this alternative does not provide a buffer between OFL and ABC and allows annual catch to exceed the SSC recommendation for 2016-2018, and because there is a 54% probability that overfishing would occur in Year 3 (2018), this alternative is less conservative/precautionary than Alternatives 2 and 3. This is the least precautionary alternative under consideration. It is also not based on the best available scientific information (SSC advice). When compared to Alternatives 2 and 3, therefore, the impacts of Alternative 1 on the Atlantic herring resource are *more negative*.

Table 57 Three-Year F/SSB Projection Under Alternative 1 (No Action)

	No Action ABC (114,000mt)		
	2016	**2017**	**2018**
Median F	0.19	0.24	0.26
80%CI	0.13-0.30	0.15-0.37	0.15-0.44
Catch mt	**114,000**	**114,000**	**114,000**
Median SSB mt	555,000	454,000	421,000
80%CI	341,000-940,000	279,000-756,000	232,000-732,000
Prob SSB<(SSB_{MSY}/2)	**0.00**	**0.00**	**0.02**
Prob F>F_{MSY}	**0.27**	**0.47**	**0.54**

Projections assume that Atlantic herring catch equals the ABC specification in each of the three years.

4.1.1.2 Impacts of Alternative 2 (Non-Preferred)

Under Alternative 2 (as well as Alternative 3), the annual specification of Atlantic herring ABC for 2016-2018 would be 111,000 mt, based on the recommendations of the Council's SSC. The ABC specification proposed for 2016-2018 only differs from the 2013-2015 ABC specification by 3,000 mt (2.6%). Table 58 summarizes the biological impacts of Alternative 2 (and Alternative 3) on the Atlantic herring resource with respect to fishing mortality and projected SSB for 2016-2018. Under the ABC specification proposed in Alternatives 2 and 3, median Atlantic herring SSB is projected to decline 23% by 2018 to 427,000 mt, which would still be well above the biomass target of 311,145 mt (i.e., the stock would still be considered rebuilt). By Year 3 (2018), median fishing mortality would increase close to F_{MSY} levels, but not as high as under Alternative 1, and there would be a 50% chance that fishing mortality would exceed F_{MSY} in 2018 (i.e., that overfishing would occur).

Over the three-year simulation, expected Atlantic herring SSB and F under this alternative are within the same range Alternative 1, provided that ABC is not exceeded (based on the 80% confidence intervals, see Table 57 for the projection under Alternative 1). SSB declines, but the stock remains above its biomass target. Therefore, all three alternatives under consideration for the 2016-2018 fishery specifications are expected to have a ***negligible*** impact on the Atlantic herring resource because they would not jeopardize the biological status of the resource (rebuilt, i.e., above the SSB target).

However, both Alternatives 2 and 3 are considered to be more precautionary than Alternative 1 because they have a lower risk of overfishing (exceeding the OFL); the impacts of Alternatives 2 and 3 on the Atlantic herring resource are therefore expected to be *more positive* than Alternative 1 (no action). Unlike Alternative 1, Alternatives 2 and 3 also provide a buffer between the OFL and ABC in Years 1 and 2 to account for scientific uncertainty. This is consistent with the application of the interim ABC control rule for Atlantic herring in the 2013-2015 fishery specifications and the advice from the Council's SSC regarding the specification of ABC for 2016-2018. This buffer may afford more protection to the 2011 year class of Atlantic herring

that is just starting to recruit into the mobile gear fishery (see Atlantic herring operational assessment report for more information).

Alternatives 2 and 3 differ from each other in terms of the buffer they provide between the stockwide ACL/U.S. OY and the OFL, which reduces the probability of overfishing. The stockwide ACL represents the maximum amount of catch that the U.S. Atlantic herring fishery could take in a year. A lower stockwide ACL specification is considered to be more precautionary because it provides a greater buffer to account for management uncertainty (NB weir fishery catch) and reduces the likelihood of exceeding the OFL. The suite of AMs in the Atlantic herring fishery further prevent the stockwide ACL from being exceeded. In the case of the U.S. Atlantic herring fishery, the stockwide ACL has only been reached/exceeded once in the last ten years (see Table 42, p. 90).

Table 56 on p. 109 lists the potential annual removals of Atlantic herring that can be expected under each alternative, assuming that the stockwide Atlantic herring ACL/OY is fully utilized. Alternative 2 would allow for the highest annual removals of Atlantic herring from the U.S. fishery with a stockwide ACL specification of 108,000 mt. This is very slightly higher than the total removals allowed under Alternative 1 (stockwide ACL/OY 107,800 mt). However, the risk of overfishing is higher under Alternative 1, and the ABC specification in Alternative 1 is inconsistent with the best available scientific information. Under Alternative 3, the stockwide Atlantic herring ACL/OY would be 105,800 mt with the NB weir payback option and 104,800 mt without the NB weir payback option. When compared to Alternative 3, the risk of exceeding the OFL is slightly higher under Alternative 2, particularly in Year 3. Alternative 2 is therefore considered to be more precautionary than Alternative 1 and less precautionary than Alternative 3. While the overall impact of Alternative 2 on the Atlantic herring resource is expected to be ***negligible***, Alternative 2 is expected to have *more positive* impacts on the Atlantic herring resource than Alternative 1, and *less positive* impacts than Alternative 3.

Table 58 Three-Year F/SSB Projection Under Alternatives 2 and 3

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

Projections assume that Atlantic herring catch equals the ABC specification in each of the three years.

4.1.1.3 Impacts of Alternative 3 (*Preferred Alternative*)

Similar to Alternative 2, the specification of Atlantic herring ABC for 2016-2018 under Alternative 3 would be 111,000 mt, based on the recommendations of the Council's SSC. The three-year SSB and F projection under this alternative is provided in Table 58 (see previous section). Over the three-year projection, expected Atlantic herring SSB and F under this alternative are within the same range as Alternatives 1 and 2, provided that ABC is not exceeded (based on the 80% confidence intervals, see Table 57 for the projection under Alternative 1). Atlantic herring SSB declines, but the stock remains above its biomass target of 311,145 mt. For the reasons discussed above, all three alternatives under consideration for the 2016-2018 Atlantic herring fishery specifications are expected to have a ***negligible*** impact on the Atlantic herring resource. None of the alternatives are expected to change or jeopardize the biological status of the Atlantic herring resource (rebuilt, i.e., above the SSB target).

As previously discussed, both Alternatives 2 and 3 are considered more precautionary than Alternative 1 because they have a lower risk of overfishing (exceeding the OFL); the impacts of Alternatives 2 and 3 on the Atlantic herring resource are therefore expected to be *more positive* than Alternative 1 (no action). Unlike Alternative 1, Alternatives 2 and 3 also provide a buffer between the OFL and ABC in Years 1 and 2 to account for scientific uncertainty. This is consistent with the application of the interim ABC control rule for Atlantic herring in the 2013-2015 fishery specifications and the advice from the Council's SSC regarding the specification of ABC for 2016-2018. This buffer may afford more protection to the 2011 year class of Atlantic herring that is just starting to recruit into the mobile gear fishery (see Atlantic herring operational assessment report for more information).

Alternatives 2 and 3 differ from each other in terms of the buffer they provide between the stockwide ACL/U.S. OY and the OFL, which reduces the risk of overfishing in any one year. The stockwide ACL represents the maximum amount of annual catch that the U.S. Atlantic herring fishery could take. A lower stockwide ACL specification is considered to be more precautionary because it provides a greater buffer to account for management uncertainty (NB weir fishery catch) and reduces the probability of exceeding the OFL. A number of AMs in the Atlantic herring fishery further prevent the stockwide ACL from being exceeded. In the case of the U.S. Atlantic herring fishery, the stockwide ACL has only been reached/exceeded once in the last ten years (see Table 42, p. 90).

Table 56 on p. 109 lists the potential annual removals of Atlantic herring that can be expected under each alternative, assuming that the stockwide Atlantic herring ACL/OY is fully utilized by the U.S. fishery. Alternative 2 would allow for the highest annual removals of Atlantic herring from the U.S. fishery with a stockwide ACL specification of 108,000 mt. This is slightly higher than the total removals allowed under Alternative 1 (stockwide ACL/OY 107,800 mt). However, the risk of overfishing is higher under Alternative 1, and the ABC specification in Alternative 1 is inconsistent with the best available scientific information. Under Alternative 3, the stockwide Atlantic herring ACL/OY would be 105,800 mt with the NB weir payback option and 104,800 mt without the NB weir payback option. When compared to Alternative 2, the risk of exceeding the OFL is lower under Alternative 3, particularly in Year 3. Therefore, while the overall impact of Alternative 3 on the Atlantic herring resource is expected to be ***negligible***, Alternative 3 is expected to have *more positive* impacts on the Atlantic herring resource than Alternative 1 and

Alternative 2. Of the three alternatives under consideration for the 2016-2018 Atlantic herring fishery specifications, Alternative 3 is expected to have the most positive impact on the Atlantic herring resource because it provides for the largest buffer between the OFL and the stockwide Atlantic herring ACL.

4.1.2 Impacts of 2016-2018 RH/S Catch Caps on Atlantic Herring

The alternatives under consideration for specifying the 2016-2018 RH/S catch caps are summarized in Table 22 on p. 38 of this document. The following subsections discuss the potential impacts of these alternatives on the Atlantic herring resource.

4.1.2.1 Impacts of RH/S Alternative 1 (No Action)

RH/S Alternative 1 represents the no action alternative. Alternative 1 would maintain the 2014/2015 RH/S catch caps implemented in Framework 3 for the 2016-2018 fishing years. Under this alternative, the 2016-2018 RH/S catch caps would be based on the median value of estimated RH/S catch from 2008-2012 from Framework 3 (see Table 19 on p. 35). Framework 3 became effective very late in the 2014 fishing year, so 2015 will be the first fishing year that the directed Atlantic herring fishery is operating under RH/S catch caps. The effects of the Framework 3 catch caps, therefore, have not yet been realized.

Overall, the alternatives for the 2016-2018 RH/S catch caps are not expected to substantially impact the Atlantic herring resource because they are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified through the Atlantic herring OFL, ABC, and the stockwide ACL/OY (see Section 4.1.1 of this document for a discussion of the impacts of these specifications on the Atlantic herring resource). The proposed RH/S catch caps (by gear and area) are intended to provide an opportunity for the vessels participating in the directed Atlantic herring fishery to fully utilize the total stockwide ACL for Atlantic herring (U.S. OY) if they can continue to avoid RH/S.

The continued collaborative effort between Atlantic herring fishermen, SMAST, and MA DMF (see Section 3.2.3.3, p. 60) is expected to increase the potential for RH/S avoidance and better ensure that the fleet can fully utilize the available annual herring yield under all of the alternatives. High levels of cooperation and participation by industry members in the avoidance program continues to be documented. The overall behavior of the vessels within the program's avoidance areas also provides evidence of cooperation, and the appearance of distinct spatial and temporal bycatch patterns within the target areas suggests vessels can avoid large catches of alosines. The RH/S catch caps specified for 2016-2018 may result in synergy between regulatory and voluntary bycatch mitigation efforts. The avoidance systems could provide fishermen with a tool that will help them stay below alosine catch limits, enabling them to fully utilize the available Atlantic herring OY. Assuming the fleet can continue to target Atlantic herring and avoid RH/S, the impacts of all of the RH/S catch cap alternatives under consideration for 2016-2018 on the Atlantic herring resource are expected to be ***negligible***.

However, depending on which RH/S catch cap alternative is selected by the Council, it is possible that one or more of the RH/S catch caps may result in the closure of a RH/S Catch Cap Area(s) sometime during the 2016-2018 fishing years. This can be expected for the alternatives that base the catch caps on the median value of a recent time series of RH/S catch estimates (the median value suggests that if the directed fishery operates the same way as it did in the reference time frame, RH/S catch will be above the median level 50% of the time). The spatial distribution of (1) the proposed RH/S catch caps, (2) the Atlantic herring resource and available ACL, and (3) fishing effort in the directed Atlantic herring fishery will influence whether Atlantic herring catch may be reduced under any of the RH/S catch cap alternatives.

In general, if Atlantic herring catch is less than expected (based on the stockwide ACL), there could be a positive impact on the Atlantic herring resource. The potential to reduce Atlantic herring catch due to reaching a RH/S catch cap can be evaluated by considering the total removals of RH/S that would be allowed under each RH/S catch cap alternative. Presumably, alternatives that allow for more removals of RH/S would have a lower likelihood of closing the directed Atlantic herring fishery (and consequently reducing Atlantic herring catch), and alternatives that allow for fewer removals of RH/S would have a higher likelihood of closing the directed Atlantic herring fishery and reducing Atlantic herring catch.

Table 59 on p. 127 of this document summarizes the total potential removals of RH/S in the directed Atlantic herring fishery (trips landing more than 6,600 pounds of Atlantic herring) under the RH/S catch caps proposed in each alternative, assuming that 100% of the caps are caught. Of the alternatives under consideration, Alternative 3 with the Weighted Mean (***Preferred Alternative***) would allow for the highest RH/S removals, followed by Alternative 1 (no action alternative), then Alternative 2 with the Weighted Mean, and Alternative 2 with the Median. Alternative 3 with the Median would allow for the lowest amount of total annual RH/S removals. Therefore, while the impacts of all of the RH/S catch cap alternatives on the Atlantic herring resource are expected to be ***negligible***, there is a greater chance of closing the directed Atlantic herring fishery and reducing Atlantic herring removals in one or more areas under Alternative 1 only when compared to Alternative 3 Weighted Mean. In terms of potential impacts on the Atlantic herring resource, therefore, RH/S Alternative 1 is likely to be *more positive* than Alternative 3 Weighted Mean and *less positive* than all of the other alternatives under consideration.

4.1.2.2 Impacts of RH/S Alternative 2 (Non-Preferred)

Under RH/S Alternative 2, the 2016-2018 RH/S catch caps would be based on the Herring PDT's updates/revisions to the 2008-2012 RH/S catch estimates from Framework 3 (see Appendix I for more information). The same five-year time series that was utilized in Framework 3 (2008-2012 with updated/revised data) would be utilized to determine the RH/S catch caps under this alternative, with options to select either the median or weighted mean from the time series (see Table 20 on p. 36).

Option 1: Median. This option would allow for up to 190.9 mt of RH/S to be taken by midwater trawl vessels and 19.6 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1 (no action), this option would decrease the amount of RH/S that could be taken by midwater trawl vessels by 14% and would significantly decrease (78%) the amount of RH/S that could be taken by SNE/MA SMBT vessels. Overall, the amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 32.4% from 2015 levels under this option. This option includes the lowest RH/S catch cap for the southern New England/Mid-Atlantic SMBT fleet. Relative to the no action alternative, there is a higher likelihood that this option could reduce Atlantic herring catch by closing the directed fishery in one or more catch cap/AM areas.

Option 2: Weighted Mean. This option would allow for up to 241.3 mt of RH/S to be taken by midwater trawl vessels and 28.2 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1 (no action), this option would increase the amount of RH/S that could be taken by midwater trawl vessels by 8.4% and would decrease the amount of RH/S that could be taken by SNE/MA SMBT vessels by 68.3%. Overall, the amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 13.5% from 2015 levels under this option. Relative to the no action alternative, there is a higher likelihood (although less than under the Median option) that this option could reduce Atlantic herring catch by closing the directed fishery in one or more catch cap/AM areas.

Impacts on Atlantic Herring

Overall, the impacts of RH/S Alternative 2 on Atlantic herring are expected to be similar to those under Alternative 1 (no action) and are discussed in the previous subsection. Any RH/S catch caps that are specified for 2016-2018 are not expected to substantially impact the Atlantic herring resource because they are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified through the OFL, ABC, and the stockwide ACL (see Section 4.1.1 of this document for a discussion of the impacts of these specifications on the Atlantic herring resource). The proposed RH/S catch caps (by gear and area) are intended to provide an opportunity for vessels participating in the directed Atlantic herring fishery to fully utilize the total stockwide ACL for Atlantic herring (U.S. OY) if the fleet can continue to avoid RH/S. If the fleet continues to avoid RH/S and is able to fully utilize the Atlantic herring OY, the impacts of this alternative (both options) on the Atlantic herring resource are expected to be ***negligible***.

Table 59 on p. 127 of this document summarizes the total potential removals of RH/S in the directed Atlantic herring fishery (trips landing more than 6,600 pounds of Atlantic herring) under the RH/S catch caps proposed in each alternative, assuming that 100% of the caps are caught. Of the alternatives under consideration, Alternative 3 Weighted Mean would allow for the highest RH/S removals, followed by Alternative 1 (no action), Alternative 2 Weighted Mean, and Alternative 2 Median. Alternative 3 Median would allow for the lowest amount of total RH/S removals. Therefore, while the impacts of Alternative 2 on the Atlantic herring resource are expected to be *negligible*, there is a greater chance of closing the directed Atlantic herring fishery in one or more areas under Alternative 2 when compared to Alternative 1 (no action) and Alternative 3 Weighted Mean. In terms of potential impacts on the Atlantic herring resource, therefore, RH/S Alternative 2 is likely to be *more positive* than RH/S Alternative 1 and RH/S Alternative 3 Weighted Mean and less positive than RH/S Alternative 3 Median. RH/S Alternative 2 Median could have a more positive impact than Alternative 2 Weighted Mean (due to reduced Atlantic herring catch) if the fleet cannot continue to avoid RH/S and fully utilize Atlantic herring OY.

4.1.2.3 Impacts of RH/S Alternative 3 (*Preferred*)

Under RH/S Alternative 3, the 2016-2018 RH/S catch caps would be specified based on RH/S catch estimates from 2008-2014, using the Herring PDT's revised/updated data (see Appendix I for more information). This alternative would incorporate RH/S catch estimates from the most recent two years as well, extending the time series to seven years, with options to select either the median or weighted mean values (Table 21 on p. 37). Alternative 3, Option 2 represents the ***Preferred Alternative*** for the 2016-2018 RH/S catch caps at this time.

Option 1: Median. This option would allow for up to 124.7 mt of RH/S to be taken by midwater trawl vessels and 24 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1 (no action), this option would decrease the amount of RH/S that could be taken by midwater trawl vessels by 44% and would decrease the amount of RH/S that could be taken by SNE/MA SMBT vessels by 73%. With respect to RH/S removals, this is the most conservative option under consideration for the 2016-2018 RH/S catch caps. Overall, the total amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 52.2% from 2015 levels under this option. Relative to other alternatives under consideration, this alternative/option has the highest potential to reduce Atlantic herring catch by closing the directed fishery in one or more catch cap/AM areas.

Option 2: Weighted Mean (*Preferred Alternative*). This option would allow for up to 238.7 mt of RH/S to be taken by midwater trawl vessels and 122.3 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. This is the only option that includes an increase in the RH/S catch cap for southern New England/Mid-Atlantic SMBT vessels. Relative to Alternative 1 (no action), this option would increase the amount of RH/S that could be taken by midwater trawl vessels by 7.3% and would increase the amount of RH/S that could be taken by SNE/MA SMBT vessels by 37.6%. Overall, the total amount of RH/S that could be taken by the directed Atlantic herring fishery would increase by 15.9% from 2015 levels under this option. Relative to other alternatives under consideration, this

alternative/option has the lowest potential to reduce Atlantic herring catch by closing the directed fishery in one or more catch cap/AM areas.

Impacts on Atlantic Herring

Overall, the impacts of RH/S Alternative 3 on Atlantic herring are expected to be similar to those under Alternative 1 (no action) and Alternative 2, and are discussed in the previous subsections. Any RH/S catch caps that are specified for 2016-2018 are not expected to substantially impact the Atlantic herring resource because they are not expected to affect the amount of Atlantic herring available for harvest in any given fishing year, which is specified through the OFL, ABC, and the stockwide ACL (see Section 4.1.1 of this document for a discussion of the impacts of these specifications on the Atlantic herring resource). The proposed RH/S catch caps (by gear and area) are intended to provide an opportunity for vessels participating in the directed Atlantic herring fishery to fully utilize the total stockwide ACL for Atlantic herring (U.S. OY) if the fleet can continue to avoid RH/S. If the fleet continues to avoid RH/S and is able to fully utilize the Atlantic herring OY, the impacts of this alternative (both options) on the Atlantic herring resource are expected to be ***negligible***.

Table 59 on p. 127 of this document summarizes the total potential removals of RH/S in the directed Atlantic herring fishery (trips landing more than 6,600 pounds of Atlantic herring) under the RH/S catch caps proposed in each alternative, assuming that 100% of the caps are caught. Of the alternatives under consideration, Alternative 3 with the weighted mean would allow for the highest RH/S removals, followed by Alternative 1 (no action), Alternative 2 with the weighted mean, and Alternative 2 with the median. Alternative 3 with the median would allow for the lowest amount of total RH/S removals. Therefore, while the impacts of Alternative 3 on the Atlantic herring resource are expected to be *negligible*, the options under Alternative 3 differ in terms of their potential to reduce Atlantic herring catch through closure of the directed fishery in one or more areas. Alternative 3 Median has the greatest likelihood of reducing Atlantic herring catch, and Alternative 3 Weighted Mean has the lowest likelihood of reducing Atlantic herring catch. In terms of potential impact on the Atlantic herring resource, therefore, RH/S Alternative 3 Median is likely to be *the most positive* alternative under consideration, and RH/S Alternative 3 Weighted Mean is likely to be the *least positive*.

4.2 IMPACTS ON NON-TARGET SPECIES

The primary non-target species in the directed Atlantic herring fishery are groundfish (particularly haddock) and the river herring/shad (RH/S) species. Spiny dogfish, squid, butterfish, Atlantic mackerel are also common non-target species in the directed Atlantic herring fishery (mackerel and some other non-target species catch is often landed and sold). Comprehensive information about the catch of these species in the Atlantic herring fishery can be found in Section 5.2 of the FEIS for Amendment 5 and Sections 3.2 (River Herring/Shad) and 3.3 (Other Non-Target Species) of Framework 3 to the Atlantic Herring FMP. Some updated and summary information about non-target species is provided in Section 3.2 of this document (p. 45). River herring and shad are non-target species of particular concern, and catch of RH/S in the directed Atlantic herring fishery is managed through gear and area-specific catch caps, which are proposed to be set for 2016-2018 in this management action.

The ASMFC completed the river herring benchmark stock assessment and peer review in 2012, examining 52 stocks of alewife and blueback herring with available data in US waters. The stock assessment technical team examined indices from fishery-dependent (directed river herring landings and bycatch estimates in ocean fisheries) and fishery-independent (young-of-year indices, adult net and electrofishing indices, coastal waters trawl surveys, and run count indices) datasets. From this information, the status of 23 stocks were determine to be *depleted* relative to historic levels, and one stock was increasing. Statuses of the remaining 28 stocks could not be determined, citing times-series of available data being too short. "*Depleted*" was used, rather than "*overfished* and "*overfishing*," due to many factors (i.e., directed fishing, incidental fishing/bycatch, habitat loss, predation, and climate change) contributing to the decline of river herring populations. Furthermore, the stock assessment did not determine estimates of river herring abundance and fishing mortality due to lack of adequate data. For many of these reasons, the stock assessment team suggested reducing the full range of impacts on river herring populations.

The following subsections discuss the impacts of the alternatives for the proposed 2016-2018 Atlantic herring fishery specifications and RH/S catch caps on non-target species, with particular focus on impacts to the RH/S stocks.

4.2.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on Non-Target Species

General Impacts

Interactions between the Atlantic herring fishery and non-target species are managed through provisions required to minimize bycatch/bycatch mortality to the extent practicable (National Standard 9) as well as other required and discretionary provisions of the MSA. Available data indicate that the majority of catch by Atlantic herring vessels on directed trips is Atlantic herring, with low percentages of bycatch.

Each of the alternatives considered by the Council for the 2016-2018 Atlantic herring fishery specifications includes an annual specification for OFL, ABC, a stockwide Atlantic herring ACL (OY), DAH, DAP, USAP, BT, management area sub-ACLs (and seasons), RSA, and FGSA for 2016-2018. Under all of the alternatives for the 2016-2018 Atlantic herring fishery specifications, the following applies:

- Haddock catch by midwater trawl vessels in the Atlantic herring fishery will continue to be managed through a catch cap established in 2006 though Framework 43 to the Multispecies (Groundfish) Fishery Management Plan (FMP) and modified in 2011 through Framework 46. Currently, under the provisions established through Framework 46, the herring midwater trawl fleet (including both single and paired midwater trawl vessels) is subject to a stock-specific cap on haddock catch that is equal to 1% of the GB haddock ABC and 1% of the GOM haddock ABC (see Section 3.2.1, p. 45 for more information about the catch of haddock by midwater trawl vessels in the Atlantic herring fishery).
- River herring and shad (RH/S) are non-target species of particular concern that may be caught/landed incidentally by vessels in the directed Atlantic herring fishery. The catch of RH/S in the directed Atlantic herring fishery will continue to be managed by area-based and gear-based catch caps. The alternatives under consideration for 2016-2018 RH/S catch caps are described in Section 2.3 of this document (p. 35) and analyzed throughout Section 4.0.

In addition, regardless of which alternative is selected for the 2016-2018 Atlantic herring fishery specifications, the directed catch of non-target species and other sources of mortality will continue to be managed through their respective FMPs (Northeast Multispecies FMP and ASMFC Interstate Management Plans for River Herring and Shad) as well as other conservation/restoration efforts.

It is difficult to quantify specific positive or negative impacts on non-target species that may result from the proposed OFL/ABC levels for 2016-2018. In general, alternatives that allow for higher Atlantic herring catch may increase interactions with non-target species, but the impacts, whether positive or negative, will depend on changes in patterns in the Atlantic herring fishery (timing/effort) as well as the distribution/abundance of non-target species. Variability associated with these factors prevents specific predictions regarding impacts. However, in the two action alternatives under consideration (Alternative 2 and Alternative 3), the Atlantic herring ABC specification proposed for 2016-2018 is only 2.6% lower than the 2013-2015 ABC specification (Alternative 1). When the stockwide Atlantic herring ACL is distributed across the four management areas, the resulting sub-ACLs change by less than 1,000 mt in most cases (see Table 3, p. 10). Overall, because the change in Atlantic herring catch is expected to be minor

under any of the alternatives, and because interactions with the primary non-target species in the Atlantic herring fishery (haddock and RH/S) will continue to be managed through catch caps, the impacts of all three alternatives on non-target species are expected to be ***negligible***.

Moreover, because available biological/fishery information does not indicate a need to consider major changes to the distribution of allowable catch in the Atlantic herring fishery or other specifications, the alternatives that the Council considered for 2016-2018 maintain the status quo for many specifications. The potential impacts on non-target species resulting from the status quo Atlantic herring fishery specifications (common to all alternatives) are discussed generally below. The impacts of each alternative considered by the Council are discussed individually in the following subsections.

DAH, DAP, BT, USAP

Specifications of DAH, DAP, BT, and USAP are consistent with the formulas in the Atlantic Herring FMP and are proposed to remain unchanged for the 2016-2018 fishing years. These fishery specifications are administrative in nature and represent components of the stockwide Atlantic herring ACL/OY for 2016-2018. None of these specifications affect removals of Atlantic herring or interactions with non-target species. Impacts of these specifications on non-target species, therefore, are expected to be ***negligible***.

RSA

For the 2016-2018 Atlantic herring fishery specifications, the Council is proposing to maintain the specification of 3% RSA from each management area for the 2016-2018 fishing years. Overall, this specification is administrative in nature and does not affect removals of Atlantic herring from the fishery, assuming the RSAs are utilized. The impacts of the RSA specifications for 2016-2018 on non-target species are therefore expected to be ***negligible***.

Of course, there are long-term benefits to the Atlantic herring resource, participants in the Atlantic herring fishery, non-target species, and protected resources from enhancing management through cooperative research. A 3% RSA for the 2016-2018 fishing year encourages the industry to continue to participate in the collection of scientific information and conduct research to reduce interactions with non-target species affected by the Atlantic herring fishery. The Council has identified river herring bycatch avoidance, portside sampling, electronic monitoring, and research to enhance the Atlantic herring stock assessment as top priorities for cooperative research to be funded through any RSA program supported by the 2016-2018 specifications (see Section 2.2.4, p. 33). Long-term benefits to non-target species and other fisheries can be expected from cooperative research programs that address these priorities. Allocating RSA for 2016-2018 under these research priorities is consistent with the goals and objectives of the Atlantic herring management program and the catch monitoring program implemented in Amendment 5.

FGSA

Specification of the FGSA is proposed to remain unchanged for the 2016-2018 fishing years. This specification is administrative in nature and represents a component of the Area 1A sub-ACL. Amendment 2 to the ASMFC Interstate Herring FMP requires fixed gear fishermen East of Cutler to report catch weekly through the federal IVR system. ME DMR requires the ME state commercial fixed gear fishermen to be compliant with the federal IVR weekly reporting requirements and regulations as well as reporting monthly to ME DMR. Any unused portion of the FGSA is returned to the Area 1A Atlantic herring fishery after November 1, and catch is tracked by NMFS against the Area 1A sub-ACL.

The FGSA specification does not affect interactions with non-target species. Impacts on non-target species, therefore, are expected to be ***negligible***.

Sub-ACLs and Seasonal Sub-ACL Divisions

Because the Atlantic herring ABC specification recommended by the SSC for 2016-2018 (111,000 mt) is only 2.6% less than the 2013-2015 ABC specification (114,000 mt), the Council, in consultation with the PDT, AP, and Herring Committee, determined that there is no need to consider modifying the distribution of the stockwide Atlantic herring ACL among the four management areas for 2016-2018. Moreover, information from the Atlantic herring operational assessment report (April 2015) does not indicate that there is a biological need to consider modifying the distribution of the stockwide Atlantic herring ACL at this time. All of the alternatives for the 2016-2018 Atlantic herring fishery specifications therefore maintain a status quo approach to distributing the stockwide Atlantic herring ACL (see Table 18 on p. 32). The status quo approach applies the same (2013-2015) proportional distribution of the stockwide ACL among the management areas, as well as the same seasonal (monthly) divisions of the Area 1A and Area 1B sub-ACLs.

When the stockwide Atlantic herring ACL is distributed across the four management areas under any of the alternatives, the resulting sub-ACLs change by less than 1,000 mt in most cases (see Table 3, p. 10). Therefore, because the change in the seasonal/spatial distribution of Atlantic herring catch and fishing effort is expected to be minor, the impacts of the 2016-2018 sub-ACL distributions and seasonal divisions on non-target species are expected to be ***negligible***.

4.2.1.1 Impacts of Alternative 1 (No Action)

Under the no action alternative, the annual specification of Atlantic herring OFL and ABC would remain 114,000 mt from 2016-2018. This ABC specification is higher than the SSC's recommended specification of 111,000 mt. Because the seasonal/spatial distribution of Atlantic herring catch and fishing effort would not change from 2013-2015 levels, and due to the continuing management of non-target species catch in the Atlantic herring fishery and ongoing efforts to avoid/minimize bycatch, this alternative is not expected to affect the biological status of any non-target species. Alternative 1 is therefore expected to have ***negligible*** impacts on non-target species.

4.2.1.2 Impacts of Alternative 2 (Non-Preferred)

Under Alternative 2 (as well as Alternative 3), the annual specification of Atlantic herring ABC for 2016-2018 would be 111,000 mt, based on the recommendations of the Council's SSC. This is only 2.6% lower than the 2013-2015 Atlantic herring ABC specification (Alternative 1). When the stockwide Atlantic herring ACL is distributed across the four management areas under this alternative, there is very little change in the management area sub-ACLs when compared to Alternative 1 or Alternative 3 (see Table 3, p. 10). Because the change in the seasonal/spatial distribution of Atlantic herring catch and fishing effort under this alternative is expected to be minor, and due to the continuing management of non-target species catch in the Atlantic herring fishery and ongoing efforts to avoid/minimize bycatch, this alternative is not expected to affect the biological status of any non-target species. The impacts of Alternative 2 on non-target species are expected to be ***negligible***.

4.2.1.3 Impacts of Alternative 3 (*Preferred Alternative*)

Under Alternative 3 (as well as Alternative 2), the annual specification of Atlantic herring ABC for 2016-2018 would be 111,000 mt, based on the recommendations of the Council's SSC. This is only 2.6% lower than the 2013-2015 Atlantic herring ABC specification (Alternative 1). When the stockwide Atlantic herring ACL is distributed across the four management areas under this alternative, the change in management area sub-ACLs is less than 1,000 mt in most cases, when compared to Alternative 1 or Alternative 2 (see Table 3, p. 10). Because the change in the seasonal/spatial distribution of Atlantic herring catch and fishing effort under this alternative is expected to be minor, and due to the continuing management of non-target species catch in the Atlantic herring fishery and ongoing efforts to avoid/minimize bycatch, this alternative is not expected to affect the biological status of any non-target species. The impacts of Alternative 3 on non-target species are expected to be ***negligible***.

4.2.2 Impacts of 2016-2018 RH/S Catch Caps on Non-Target Species

The alternatives under consideration for specifying the 2016-2018 RH/S catch caps are summarized in Table 22 on p. 38 of this document. The following subsections discuss the potential impacts of these alternatives on non-target species. Because the proposed catch caps are focused exclusively on river herring and shad (RH/S), the impacts of the alternatives on other non-target species are expected to be negligible. Particular consideration is given in the following discussion to the potential impacts of the catch cap alternatives for 2016-2018 on river herring and shad (RH/S).

While stock and fishery data are not robust enough at this time to determine a biologically-based RH/S catch cap and/or the potential impacts of such a catch cap on the RH/S stocks, setting a cap on the catch of these species in the directed Atlantic herring fishery is a proactive action intended to manage and minimize catch to the extent practicable while allowing the Atlantic herring fishery to continue to operate and fully utilize OY during 2016-2018 if RH/S can be avoided. The catch of RH/S in the directed Atlantic herring fishery would likely be less under any of the alternatives when compared to not specifying catch caps in the fishery because catch would be capped, and there would be a regulatory incentive for the fleet to avoid RH/S. Generally, lower catches should result in positive impacts on RH/S.

Moreover, continuing to specify RH/S catch caps may generate more information, which can provide the Council with the ability to link RH/S catch in the Atlantic herring fishery to RH/S stock status and fishing mortality in the future. It is possible that this will allow for future RH/S catch caps in the directed Atlantic herring fishery to be set such that more specific impacts on the RH/S stocks can be quantified. Due to the depleted status of many of the RH/S stocks and concerns about the impact of RH/S catch/bycatch and associated mortality in the Atlantic herring fishery, there is likely to be a biological benefit to continuing to specify RH/S catch caps for the directed Atlantic herring fishery. The impacts of all of the RH/S catch cap alternatives on non-target species, particularly RH/S, are therefore expected to be ***positive***.

There are, however, differences between the alternatives under consideration and their potential impacts on RH/S stocks. Specific biological impacts will be influenced by changes in directed Atlantic herring fleet behavior and shifts in the distribution/aggregation of RH/S stocks/sub-stocks resulting from changes in fishing activity, environmental factors, climate change, restoration efforts, and other factors. Comparing the total removals of RH/S that may be allowed under each catch cap alternative for 2016-2018 provides a basis for understanding the differences between the alternatives and their potential impacts on RH/S. Alternatives that would allow for lower annual RH/S removals in the directed Atlantic herring fishery are assumed to have a *more positive* impact on RH/S; alternatives that would allow for higher annual RH/S removals in the directed Atlantic herring fishery are assumed to have a *less positive* impact on RH/S.

Table 59 summarizes the total potential removals of RH/S in the directed Atlantic herring fishery (trips landing more than 6,600 pounds of Atlantic herring) under the RH/S catch caps proposed in each alternative, assuming that 100% of the caps are caught. Of the alternatives under consideration for the 2016-2018 RH/S catch caps, Alternative 3 with the weighted mean would allow for the highest RH/S removals, followed by Alternative 1 (no action), Alternative 2 with

the weighted mean, and Alternative 2 with the median. Alternative 3 with the median would allow for the lowest amount of total RH/S removals.

Table 59 Potential Removals of River Herring/Shad (mt) Under Each RH/S Catch Cap Alternative

	Alt 1 (No Act)	Alt 2 (Median)	Alt 2 (Wgt Mean)	Alt 3 (Median)	Alt 3 (Wgt Mean)
Midwater Trawl GOM	85.5	98.1	98.3	11.3	76.7
Midwater Trawl Cape Cod	13.3	8.9	27.6	29.5	32.4
Midwater Trawl SNE/MA	123.7	83.9	115.4	83.9	129.6
Total Midwater Trawl	222.5	190.9	241.3	124.7	238.7
Small Mesh Bottom Trawl SNE/MA	88.9	19.6	28.2	24.0	122.3
Total RH/S Removals	**311.4**	**210.5**	**269.5**	**148.7**	**361**

**Estimated RH/S removals in the table above assume that 100% of the caps are taken on trips landing more than 6,600 pounds of Atlantic herring during the fishing year.*

4.2.2.1 Impacts of RH/S Alternative 1 (No Action)

RH/S Alternative 1 represents the no action alternative. Alternative 1 would maintain the 2014/2015 RH/S catch caps implemented in Framework 3 for the 2016-2018 fishing years. Under this alternative, the 2016-2018 RH/S catch caps would be based on the median value of estimated RH/S catch from 2008-2012 from Framework 3 (see Table 19 on p. 35). Framework 3 became effective very late in the 2014 fishing year, so 2015 will be the first fishing year that the directed Atlantic herring fishery is operating under RH/S catch caps. The effects of the Framework 3 catch caps on the RH/S stocks, therefore, have not yet been realized.

If 100% of the RH/S caps are taken in the directed Atlantic herring fishery (trips landing more than 6,600 pounds) during the fishing year, then Alternative 1 (no action) would allow for more total RH/S removals than Alternative 2 (Median and Weighted Mean) and Alternative 3 Median, but less total RH/S removals than Alternative 3 Weighted Mean (see Table 59).

As discussed above, due to the depleted status of many of the RH/S stocks and concerns about the impact of RH/S catch/bycatch and associated mortality in the Atlantic herring fishery, there is likely to be a biological benefit to continuing to specify RH/S catch caps for the directed Atlantic herring fishery. The impacts of all of the RH/S catch cap alternatives on non-target species, particularly RH/S, are therefore expected to be ***positive***. When compared to the other alternatives, the impacts of Alternative 1 on non-target species is expected to be *less positive* than Alternative 2 (Median and Weighted Mean), *less positive* than Alternative 3 Median, and *more positive* than Alternative 3 Weighted Mean.

4.2.2.2 Impacts of RH/S Alternative 2 (Non-Preferred)

Under RH/S Alternative 2, the 2016-2018 RH/S catch caps would be based on the Herring PDT's updates/revisions to the 2008-2012 RH/S catch estimates from Framework 3. The same five-year time series that was utilized in Framework 3 (2008-2012 with updated/revised data) would be utilized to determine the RH/S catch caps under this alternative, with options to select either the median or weighted mean from the time series (see Table 20 on p. 36 and Appendix I for more information).

Option 1: Median. This option would allow for up to 190.9 mt of RH/S to be taken by midwater trawl vessels and 19.6 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to the no action alternative (2015 RH/S catch caps), this option would decrease the amount of RH/S that could be taken by midwater trawl vessels by 14% and would significantly decrease (78%) the amount of RH/S that could be taken by SNE/MA SMBT vessels. Overall, the amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 32.4% from 2015 levels under this option. This option includes the lowest RH/S catch cap for the southern New England/Mid-Atlantic SMBT fleet.

Option 2: Weighted Mean. This option would allow for up to 241.3 mt of RH/S to be taken by midwater trawl vessels and 28.2 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to the no action alternative (2015 RH/S catch caps), this option would increase the amount of RH/S that could be taken by midwater trawl vessels by 8.4% and would decrease the amount of RH/S that could be taken by SNE/MA SMBT vessels by 68.3%. Overall, the amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 13.5% from 2015 levels under this option.

Impacts on Non-Target Species (RH/S)

Of the RH/S catch cap alternatives under consideration for 2016-2018, Alternative 3 Weighted Mean would allow for the highest annual RH/S removals, followed by Alternative 1 (no action), Alternative 2 Weighted Mean, and Alternative 2 Median (see Table 59 on p. 127). Alternative 3 Median would allow for the lowest amount of total RH/S removals and is the most conservative option under consideration with respect to removals. If 100% of the RH/S caps are taken in the directed Atlantic herring fishery (trips landing more than 6,600 pounds) during the fishing year, then Alternative 2 (Median and Weighted Mean) is more conservative with respect to total RH/S removals than Alternative 1 (no action) and Alternative 3 Weighted Mean (***Preferred Alternative***), and it is less conservative than Alternative 3 Median. Alternative 2 Median is more conservative than Alternative 2 Weighted Mean.

As discussed above, due to the depleted status of many of the RH/S stocks and concerns about the impact of RH/S catch/bycatch and associated mortality in the Atlantic herring fishery, there is likely to be a biological benefit to continuing to specify RH/S catch caps for the directed Atlantic herring fishery. The impacts of all of the RH/S catch cap alternatives on non-target species, particularly RH/S, are therefore expected to be ***positive***. When compared to the other RH/S catch cap alternatives in terms of potential RH/S removals, the impacts of Alternative 2 Median on non-target species are expected to be *less positive* than Alternative 3 Median and *more positive* than the other alternatives under consideration. The impacts of Alternative 2

Weighted Mean on non-target species are expected to be *less positive* than Alternative 2 Median and Alternative 3 Median and *more positive* than Alternative 1 and Alternative 3 Weighted Mean.

4.2.2.3 Impacts of RH/S Alternative 3 (*Preferred*)

Under RH/S Alternative 3, the 2016-2018 RH/S catch caps would be specified based on RH/S catch estimates from 2008-2014, using the Herring PDT's revised/updated data (see Appendix I for more information). This alternative would incorporate RH/S catch estimates from the most recent two years as well, extending the time series to seven years, with options to select either the median or weighted mean values (Table 21 on p. 37). Alternative 3, Option 2 represents the ***Preferred Alternative*** for the 2016-2018 RH/S catch caps at this time.

Option 1: Median. This option would allow for up to 124.7 mt of RH/S to be taken by midwater trawl vessels and 24 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to the no action alternative (2015 RH/S catch caps), this option would decrease the amount of RH/S that could be taken by midwater trawl vessels by 44% and would decrease the amount of RH/S that could be taken by SNE/MA SMBT vessels by 73%.

With respect to RH/S removals, this is the most conservative alternative/option under consideration for the 2016-2018 RH/S catch caps. Overall, the total amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 52.2% from 2015 levels under this option. While this option would allow for midwater trawl removals of RH/S to increase in the Cape Cod Area, overall removals of RH/S allowed by midwater trawl vessels under this option are the lowest of the alternatives under consideration. This option also proposes a significant reduction in the RH/S catch cap for small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area.

Option 2: Weighted Mean (*Preferred Alternative*). This option would allow for up to 238.7 mt of RH/S to be taken by midwater trawl vessels and 122.3 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. This is the only option that includes an increase in the RH/S catch cap for southern New England/Mid-Atlantic SMBT vessels. Relative to the no action alternative (2015 RH/S catch caps), this option would increase the amount of RH/S that could be taken by midwater trawl vessels by 7.3% and would increase the amount of RH/S that could be taken by SNE/MA SMBT vessels by 37.6%. Overall, the total amount of RH/S that could be taken by the directed Atlantic herring fishery would increase by 15.9% from 2015 levels under this option.

Impacts on Non-Target Species (RH/S)

Of the RH/S catch cap alternatives under consideration for 2016-2018, Alternative 3 Weighted Mean would allow for the highest annual RH/S removals, followed by Alternative 1 (no action), Alternative 2 Weighted Mean, and Alternative 2 Median (see Table 59 on p. 127). Alternative 3 Median would allow for the lowest amount of total RH/S removals. If 100% of the RH/S caps are taken in the directed Atlantic herring fishery (trips landing more than 6,600 pounds) during the fishing year, then Alternative 3 Median is the most conservative option under consideration with respect to total RH/S removals, and Alternative 3 Weighted Mean (***Preferred Alternative***) is the least conservative (see Table 59 on p. 127). Alternative 3 Weighted Mean would allow total RH/S removals to increase about 16% from the potential removals allowed under the 2015 RH/S catch caps (Alternative 1).

As discussed above, due to the depleted status of many of the RH/S stocks and concerns about the impact of RH/S catch/bycatch and associated mortality in the Atlantic herring fishery, there is likely to be a biological benefit to continuing to specify RH/S catch caps for the directed Atlantic herring fishery. The impacts of all of the RH/S catch cap alternatives on non-target species, particularly RH/S, are therefore expected to be ***positive***. When compared to the other RH/S catch cap alternatives in terms of potential RH/S removals, the impacts of Alternative 3 Median on non-target species are expected to be *more positive* than any other alternatives under consideration. The impacts of Alternative 3 Weighted Mean (***Preferred Alternative***) on non-target species are expected to be *less positive* than any other alternatives under consideration.

4.3 IMPACTS ON PHYSICAL ENVIRONMENT AND ESSENTIAL FISH HABITAT

A general description of the physical environment and EFH is provided in Section 3.3 of this document (p. 60). An assessment of the potential effects of the directed Atlantic herring commercial fishery on EFH for Atlantic herring and other federally-managed species in the Northeast region of the U.S. was conducted as part of an EIS that evaluated impacts of the Atlantic herring fishery on EFH (NMFS 2005). This analysis was included in Appendix VI, Volume II of the FEIS for Amendment 1 to the Atlantic Herring FMP. It found that midwater trawls and purse seines do occasionally contact the seafloor and may adversely impact benthic habitats utilized by a number of federally-managed species, including EFH for Atlantic herring eggs. However, after reviewing all the available information, the conclusion was reached that if the quality of EFH is reduced as a result of this contact, the impacts are minimal and/or temporary and, pursuant to MSA, do not need to be minimized, i.e., that there was no need to take specific action at that time to minimize the adverse effects of the herring fishery on benthic EFH. This conclusion also applied to pelagic EFH for Atlantic herring larvae, juveniles, and adults, and to pelagic EFH for any other federally-managed species in the region. Additional information can be found in the FEIS for Amendment 1 to the Atlantic Herring FMP, which was updated in the FEIS for Amendment 5 to the Atlantic Herring FMP.

The impacts of each of the alternatives considered by the Council in the 2016-2018 Atlantic herring fishery specifications package on the Physical Environment and EFH are discussed in the following subsections. Overall, given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery, the alternatives under consideration are expected to have a ***negligible*** impact on the physical environment and EFH.

4.3.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on the Physical Environment and EFH

Each of the alternatives considered by the Council for the 2016-2018 fishery specifications includes an annual specification for OFL, ABC, a stockwide Atlantic Herring ACL (OY), DAH, DAP, USAP, BT, management area sub-ACLs (and seasons), RSA, and FGSA for 2016-2018. Because the Atlantic herring ABC specification proposed for 2016-2018 is only 2.6% lower than the 2013-2015 ABC specification, and because available biological/fishery information does not indicate a need to consider major changes to the distribution of allowable catch in the herring fishery or other specifications, the alternatives that the Council considered for 2016-2018 maintain the status quo for many specifications. Given the minimal and temporary nature of adverse effects on EFH in the Atlantic herring fishery, these specifications are expected to have a ***negligible*** impact on the physical environment and EFH. The impacts of each alternative are addressed individually below.

4.3.1.1 Impacts of Alternative 1 (No Action)

TBD

4.3.1.2 Impacts of Alternative 2 (Non-Preferred)

TBD

4.3.1.3 Impacts of Alternative 3 (***Preferred Alternative***)

TBD

4.3.2 Impacts of 2016-2018 RH/S Catch Caps on the Physical Environment and EFH

The alternatives under consideration for specifying the 2016-2018 RH/S catch caps are summarized in Table 22 on p. 38 of this document. The following subsections discuss the potential impacts of these alternatives/options on the physical environment and EFH.

4.3.2.1 Impacts of RH/S Alternative 1 (No Action)

RH/S Alternative 1 represents the no action alternative. Alternative 1 would maintain the 2014/2015 RH/S catch caps implemented in Framework 3 for the 2016-2018 fishing years. Under this alternative, the 2016-2018 RH/S catch caps would be based on the median value of estimated RH/S catch from 2008-2012 from Framework 3 (see Table 19 on p. 35).

TBD

4.3.2.2 Impacts of RH/S Alternative 2 (Non-Preferred)

Under RH/S Alternative 2, the 2016-2018 RH/S catch caps would be based on the Herring PDT's updates/revisions to the 2008-2012 RH/S catch estimates from Framework 3. The same five-year time series that was utilized in Framework 3 (2008-2012 with updated/revised data) would be utilized to determine the RH/S catch caps under this alternative, with options to select either the median or weighted mean from the time series (see Table 20 on p. 36).

Option 1: Median. This option would allow for up to 190.9 mt of RH/S to be taken by midwater trawl vessels and 19.6 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1, this option would decrease the amount of RH/S that could be taken by midwater trawl vessels by 14% and would significantly decrease (78%) the amount of RH/S that could be taken by SNE/MA SMBT vessels. Overall, the amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 32.4% from 2015 levels under this option.

Option 2: Weighted Mean. This option would allow for up to 241.3 mt of RH/S to be taken by midwater trawl vessels and 28.2 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1, this option would increase the amount of RH/S that could be taken by midwater trawl vessels by 8.4% and would decrease the amount of RH/S that could be taken by SNE/MA SMBT vessels by 68.3%. Overall, the amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 13.5% from 2015 levels under this option.

Impacts on Physical Environment and EFH

TBD

4.3.2.3 Impacts of RH/S Alternative 3 (*Preferred*)

Under RH/S Alternative 3, the 2016-2018 RH/S catch caps would be specified based on RH/S catch estimates from 2008-2014, using the Herring PDT's revised/updated data (see Appendix I for more information). This alternative would incorporate RH/S catch estimates from the most recent two years as well, extending the time series to seven years, with options to select either the median or weighted mean values (Table 21 on p. 37). Alternative 3, Option 2 represents the ***Preferred Alternative*** for the 2016-2018 RH/S catch caps at this time.

Option 1: Median. This option would allow for up to 124.7 mt of RH/S to be taken by midwater trawl vessels and 24 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1 (no action), this option would decrease the amount of RH/S that could be taken by midwater trawl vessels by 44% and would decrease the amount of RH/S that could be taken by SNE/MA SMBT vessels by 73%. With respect to RH/S removals, this is the most conservative alternative/option under consideration for the 2016-2018 RH/S catch caps. Overall, the total amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 52.2% from 2015 levels under this option.

Option 2: Weighted Mean (*Preferred Alternative*). This option would allow for up to 238.7 mt of RH/S to be taken by midwater trawl vessels and 122.3 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. This is the only option that includes an increase in the RH/S catch cap for southern New England/Mid-Atlantic SMBT vessels. Relative to Alternative 1 (no action), this option would increase the amount of RH/S that could be taken by midwater trawl vessels by 7.3% and would increase the amount of RH/S that could be taken by SNE/MA SMBT vessels by 37.6%. Overall, the total amount of RH/S that could be taken by the directed Atlantic herring fishery would increase by 15.9% from 2015 levels under this option.

Impacts on Physical Environment and EFH

TBD

4.4 IMPACTS ON PROTECTED RESOURCES

The protected resources that are evaluated with respect to this management action are described in Section 3.4 of this document (p. 70). The ESA and MMPA requirements addressed in Section 3.4 further explain the protected species/resources and have been well-documented in the major gear types currently used in the Atlantic herring fishery. Additionally, actions to minimize takes on protected resources specifically certain cetaceans and harbor porpoise are required under ALWTRP and HPTRP measures respectively.

The following subsections discuss the impacts of the alternatives for the 2016-2018 Atlantic herring fishery specifications and RH/S catch caps on protected resources.

4.4.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on Protected Resources

Each of the alternatives considered by the Council for the 2016-2018 Atlantic herring fishery specifications includes an annual specification for OFL, ABC, a stockwide Atlantic Herring ACL (OY), DAH, DAP, USAP, BT, management area sub-ACLs (and seasons), RSA, and FGSA for 2016-2018. Because the Atlantic herring ABC specification proposed for 2016-2018 is only 2.6% lower than the 2013-2015 ABC specification, and because available biological/fishery information does not indicate a need to consider major changes to the distribution of allowable catch in the herring fishery or other specifications, the alternatives that the Council considered for 2016-2018 maintain the status quo for many specifications. Therefore, the potential impacts on protected resources resulting from the status quo fishery specifications (common to all alternatives) are discussed generally below. The impacts of each alternative considered by the Council are discussed individually in the following subsections.

DAH, DAP, BT, USAP

Specifications of DAH, DAP, BT, and USAP are consistent with the formulas in the Atlantic Herring FMP and are proposed to remain unchanged for the 2016-2018 fishing years. These fishery specifications are administrative in nature and represent components of the stockwide Atlantic herring ACL/OY for 2016-2018. None of these specifications affect removals of Atlantic herring or interactions with protected resources. Impacts of these specifications on protected resources, therefore, are expected to be ***negligible***.

RSA

For the 2016-2018 Atlantic herring fishery specifications, the Council is proposing to maintain the specification of 3% RSA from each management area for the 2016-2018 fishing years. Overall, this specification is administrative in nature and does not affect removals of Atlantic herring from the fishery, assuming the RSAs are utilized. The impacts of the RSA specifications for 2016-2018 on protected resources are therefore expected to be ***negligible***.

Of course, there are long-term benefits to the Atlantic herring resource, participants in the Atlantic herring fishery, non-target species, and protected resources from enhancing management through cooperative research. A 3% RSA for the 2016-2018 fishing year encourages the industry to continue to participate in the collection of scientific information and conduct research

to reduce interactions with non-target species affected by the Atlantic herring fishery. The Council has identified river herring bycatch avoidance, portside sampling, electronic monitoring, and research to enhance the Atlantic herring stock assessment as top priorities for cooperative research to be funded through any RSA program supported by the 2016-2018 specifications (see Section 2.2.4, p. 33). Long-term benefits to non-target species and other fisheries can be expected from cooperative research programs that address these priorities. Allocating RSA for 2016-2018 under these research priorities is consistent with the goals and objectives of the Atlantic herring management program and the catch monitoring program implemented in Amendment 5.

FGSA

Specification of the FGSA is proposed to remain unchanged for the 2016-2018 fishing years. This specification is administrative in nature and represents a component of the Area 1A sub-ACL. Amendment 2 to the ASMFC Interstate Herring FMP requires fixed gear fishermen East of Cutler to report catch weekly through the federal IVR system. ME DMR requires the ME state commercial fixed gear fishermen to be compliant with the federal IVR weekly reporting requirements and regulations as well as reporting monthly to ME DMR. Any unused portion of the FGSA is returned to the Area 1A Atlantic herring fishery after November 1, and catch is tracked by NMFS against the Area 1A sub-ACL.

The FGSA specification does not affect interactions with protected resources. Impacts on protected resources, therefore, are expected to be ***negligible***.

Sub-ACLs and Seasonal Sub-ACL Divisions

Because the Atlantic herring ABC specification recommended by the SSC for 2016-2018 (111,000 mt) is only 2.6% less than the 2013-2015 ABC specification (114,000 mt), the Council, in consultation with the PDT, AP, and Herring Committee, determined that there is no need to consider modifying the distribution of the stockwide Atlantic herring ACL among the four management areas for 2016-2018. Moreover, information from the Atlantic herring operational assessment report (April 2015) does not indicate that there is a biological need to consider modifying the distribution of the stockwide Atlantic herring ACL at this time. All of the alternatives for the 2016-2018 Atlantic herring fishery specifications therefore maintain a status quo approach to distributing the stockwide Atlantic herring ACL (see Table 18 on p. 32). The status quo approach applies the same (2013-2015) proportional distribution of the stockwide ACL among the management areas, as well as the same seasonal (monthly) divisions of the Area 1A and Area 1B sub-ACLs.

When the stockwide Atlantic herring ACL is distributed across the four management areas under any of the alternatives, the resulting sub-ACLs change by less than 1,000 mt in most cases (see Table 3, p. 10). Therefore, because the change in the seasonal/spatial distribution of Atlantic herring catch and fishing effort is expected to be minor, the impacts of the 2016-2018 sub-ACL distributions and seasonal divisions on protected resources are expected to be ***negligible***.

4.4.1.1 Impacts of Alternative 1 (No Action)

Under the no action alternative, the annual specification of Atlantic herring OFL and ABC would remain 114,000 mt from 2016-2018. This ABC specification is higher than the SSC's recommended specification of 111,000 mt.

Because Atlantic herring catch and fishing effort would not change, this alternative is expected to have ***negligible*** impacts on protected resources.

4.4.1.2 Impacts of Alternative 2 (Non-Preferred)

Under Alternative 2 (as well as Alternative 3), the annual specification of Atlantic herring ABC for 2016-2018 would be 111,000 mt, based on the recommendations of the Council's SSC. This is only 2.6% lower than the 2013-2015 Atlantic herring ABC specification (Alternative 1). When the stockwide Atlantic herring ACL is distributed across the four management areas under this alternative, there is very little change in the management area sub-ACLs when compared to Alternative 1 or Alternative 3 (see Table 3, p. 10). Because the change in the seasonal/spatial distribution of Atlantic herring catch and fishing effort under this alternative is expected to be minor, the impacts on protected resources are expected to be ***negligible***.

4.4.1.3 Impacts of Alternative 3 (*Preferred Alternative*)

Under Alternative 3 (as well as Alternative 2), the annual specification of Atlantic herring ABC for 2016-2018 would be 111,000 mt, based on the recommendations of the Council's SSC. This is only 2.6% lower than the 2013-2015 Atlantic herring ABC specification (Alternative 1). When the stockwide Atlantic herring ACL is distributed across the four management areas under this alternative, the change in management area sub-ACLs is less than 1,000 mt in most cases, when compared to Alternative 1 or Alternative 2 (see Table 3, p. 10). Because the change in the seasonal/spatial distribution of Atlantic herring catch and fishing effort under this alternative is expected to be minor, the impacts on protected resources are expected to be ***negligible***.

4.4.2 Impacts of 2016-2018 RH/S Catch Caps on Protected Resources

The alternatives under consideration for specifying the 2016-2018 RH/S catch caps are summarized in Table 22 on p. 38 of this document. The following subsections discuss the potential impacts of these alternatives/options on protected resources.

Overall, the alternatives under consideration for the 2016-2018 RH/S catch caps are not expected to substantially impact protected resources because they are intended to provide an opportunity for the vessels participating in the directed Atlantic herring fishery to fully utilize the total stockwide ACL for Atlantic herring (U.S. OY) if they can continue to avoid RH/S. Any changes in fishing patterns and/or fishing effort in the Atlantic herring fishery resulting from the 2016-2018 RH/S catch caps are not likely to substantially impact interactions with protected resources and therefore are not likely to influence the biological status of protected resources. Moreover, the ongoing management protected resources interactions in the Atlantic herring fishery would continue to address fishing mortality and the conservation of protected resources. Therefore,

assuming the directed Atlantic herring fleet can continue to target Atlantic herring and avoid RH/S, the impacts of all of the RH/S catch cap alternatives under consideration on protected resources are expected to be ***negligible***.

However, depending on which RH/S catch cap alternative is selected by the Council, it is possible that one or more of the RH/S catch caps may result in the closure of a RH/S Catch Cap Area(s) sometime during the 2016-2018 fishing years. This can be expected for the alternatives that base the catch caps on the median value of a recent time series of RH/S catch estimates (the median value suggests that if the directed fishery operates the same way as it did in the reference time frame, RH/S catch will be above the median level 50% of the time). The spatial distribution of (1) the proposed RH/S catch caps, (2) the Atlantic herring resource and available ACL, and (3) fishing effort in the directed Atlantic herring fishery will influence whether Atlantic herring catch may be reduced under any of the RH/S catch cap alternatives.

The specific impacts of the RH/S catch cap alternatives for 2016-2018 on protected resources cannot be predicted with certainty because they will result from changes in interactions and encounters with protected resources in the directed Atlantic herring fishery. The potential for interaction with protected resources may increase or decrease depending on when and how directed herring fishing effort changes as a result of the particular catch caps. In general, if Atlantic herring catch is less than expected (based on the stockwide ACL) because a RH/S catch cap precludes the directed fishery in one or more management areas, there could be a positive impact on protected resources if the reduction in Atlantic herring fishing effort reduces interactions with protected resources. Presumably, RH/S catch cap alternatives that allow for more removals of RH/S would have a lower likelihood of closing the directed Atlantic herring fishery (and consequently reducing Atlantic herring fishing effort), and alternatives that allow for fewer removals of RH/S would have a higher likelihood of closing the directed Atlantic herring fishery and reducing Atlantic herring fishing effort. The RH/S catch cap alternatives are evaluated accordingly to determine the potential impacts on protected resources in the following subsections.

4.4.2.1 Impacts of RH/S Alternative 1 (No Action)

RH/S Alternative 1 represents the no action alternative. Alternative 1 would maintain the 2014/2015 RH/S catch caps implemented in Framework 3 for the 2016-2018 fishing years. Under this alternative, the 2016-2018 RH/S catch caps would be based on the median value of estimated RH/S catch from 2008-2012 from Framework 3 (see Table 19 on p. 35).

Table 59 on p. 127 of this document summarizes the total potential removals of RH/S in the directed Atlantic herring fishery (trips landing more than 6,600 pounds of Atlantic herring) under the RH/S catch caps proposed in each alternative, assuming that 100% of the caps are caught. Of the alternatives under consideration, Alternative 3 with the Weighted Mean (***Preferred Alternative***) would allow for the highest RH/S removals, followed by Alternative 1 (no action alternative), then Alternative 2 with the Weighted Mean, and Alternative 2 with the Median. Alternative 3 with the Median would allow for the lowest amount of total annual RH/S removals. Therefore, while the impacts of all of the RH/S catch cap alternatives on protected resources are expected to be ***negligible***, there is a greater chance of closing the directed Atlantic herring

fishery and reducing Atlantic herring fishing effort in one or more areas under Alternative 1 only when compared to Alternative 3 Weighted Mean. In terms of potential impacts on protected resources, therefore, RH/S Alternative 1 is likely to be *more positive* than Alternative 3 Weighted Mean and *less positive* than all of the other alternatives under consideration.

4.4.2.2 Impacts of RH/S Alternative 2 (Non-Preferred)

Under RH/S Alternative 2, the 2016-2018 RH/S catch caps would be based on the Herring PDT's updates/revisions to the 2008-2012 RH/S catch estimates from Framework 3 (see Appendix I for more information). The same five-year time series that was utilized in Framework 3 (2008-2012 with updated/revised data) would be utilized to determine the RH/S catch caps under this alternative, with options to select either the median or weighted mean from the time series (see Table 20 on p. 36).

Option 1: Median. This option would allow for up to 190.9 mt of RH/S to be taken by midwater trawl vessels and 19.6 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1 (no action), this option would decrease the amount of RH/S that could be taken by midwater trawl vessels by 14% and would significantly decrease (78%) the amount of RH/S that could be taken by SNE/MA SMBT vessels. Overall, the amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 32.4% from 2015 levels under this option.

Option 2: Weighted Mean. This option would allow for up to 241.3 mt of RH/S to be taken by midwater trawl vessels and 28.2 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1 (no action), this option would increase the amount of RH/S that could be taken by midwater trawl vessels by 8.4% and would decrease the amount of RH/S that could be taken by SNE/MA SMBT vessels by 68.3%. Overall, the amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 13.5% from 2015 levels under this option. Relative to the no action alternative, there is a higher likelihood (although less than under the Median option) that this option could reduce Atlantic herring fishing effort by closing the directed fishery in one or more catch cap/AM areas.

Impacts on Protected Resources

Overall, for the reasons discussed above, if the directed Atlantic herring fleet continues to avoid RH/S and is able to fully utilize the Atlantic herring OY, the impacts of this alternative (both options) on protected resources are expected to be ***negligible***.

Table 59 on p. 127 of this document summarizes the total potential removals of RH/S in the directed Atlantic herring fishery (trips landing more than 6,600 pounds of Atlantic herring) under the RH/S catch caps proposed in each alternative, assuming that 100% of the caps are caught. Of the alternatives under consideration, Alternative 3 Weighted Mean would allow for the highest RH/S removals, followed by Alternative 1 (no action), Alternative 2 Weighted Mean, and Alternative 2 Median. Alternative 3 Median would allow for the lowest amount of total RH/S removals. Therefore, while the impacts of Alternative 2 on protected resources are expected to be ***negligible***, there is a greater chance of closing the directed Atlantic herring fishery in one or

more areas under Alternative 2 Median and Weighted Mean when compared to Alternative 1 (no action) and Alternative 3 Weighted Mean. There is a greater chance of closing the directed herring fishery under Alternative 2 Median when compared to Alternative 2 Weighted Mean. In terms of potential impacts on protected resources, therefore, RH/S Alternative 2 is likely to be *more positive* than RH/S Alternative 1 and RH/S Alternative 3 Weighted Mean and *less positive* than RH/S Alternative 3 Median. RH/S Alternative 2 Median could have a *more positive* impact than Alternative 2 Weighted Mean (due to reduced Atlantic herring fishing effort) if the fleet cannot continue to avoid RH/S and fully utilize Atlantic herring OY.

4.4.2.3 Impacts of RH/S Alternative 3 (*Preferred*)

Under RH/S Alternative 3, the 2016-2018 RH/S catch caps would be specified based on RH/S catch estimates from 2008-2014, using the Herring PDT's revised/updated data (see Appendix I for more information). This alternative would incorporate RH/S catch estimates from the most recent two years as well, extending the time series to seven years, with options to select either the median or weighted mean values (Table 21 on p. 37). Alternative 3, Option 2 represents the ***Preferred Alternative*** for the 2016-2018 RH/S catch caps at this time.

Option 1: Median. This option would allow for up to 124.7 mt of RH/S to be taken by midwater trawl vessels and 24 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. Relative to Alternative 1 (no action), this option would decrease the amount of RH/S that could be taken by midwater trawl vessels by 44% and would decrease the amount of RH/S that could be taken by SNE/MA SMBT vessels by 73%. Overall, the total amount of RH/S that could be taken by the directed Atlantic herring fishery would decrease by 52.2% from 2015 levels under this option. Relative to other alternatives under consideration, this alternative/option has the highest potential to reduce Atlantic herring catch by closing the directed fishery in one or more catch cap/AM areas.

Option 2: Weighted Mean (*Preferred Alternative*). This option would allow for up to 238.7 mt of RH/S to be taken by midwater trawl vessels and 122.3 mt of RH/S to be taken by small mesh bottom trawl vessels fishing in the southern New England/Mid-Atlantic area. This is the only option that includes an increase in the RH/S catch cap for southern New England/Mid-Atlantic SMBT vessels. Relative to Alternative 1 (no action), this option would increase the amount of RH/S that could be taken by midwater trawl vessels by 7.3% and would increase the amount of RH/S that could be taken by SNE/MA SMBT vessels by 37.6%. Overall, the total amount of RH/S that could be taken by the directed Atlantic herring fishery would increase by 15.9% from 2015 levels under this option. Relative to other alternatives under consideration, this alternative/option has the lowest potential to reduce Atlantic herring catch by closing the directed fishery in one or more catch cap/AM areas.

Impacts on Protected Resources

Overall, for the reasons discussed above, if the directed Atlantic herring fleet continues to avoid RH/S and is able to fully utilize the Atlantic herring OY, the impacts of this alternative (both options) on protected resources are expected to be ***negligible***.

Table 59 on p. 127 of this document summarizes the total potential removals of RH/S in the directed Atlantic herring fishery (trips landing more than 6,600 pounds of Atlantic herring) under the RH/S catch caps proposed in each alternative, assuming that 100% of the caps are caught. Of the alternatives under consideration, Alternative 3 Weighted Mean (***Preferred Alternative***) would allow for the highest RH/S removals, followed by Alternative 1 (no action), Alternative 2 Weighted Mean, and Alternative 2 Median. Alternative 3 Median would allow for the lowest amount of total RH/S removals. Therefore, while the impacts of Alternative 3 on protected resources are expected to be ***negligible***, the options under Alternative 3 differ in terms of their potential to reduce Atlantic herring catch through closure of the directed fishery in one or more areas. Alternative 3 Median has the greatest likelihood of reducing Atlantic herring catch, and Alternative 3 Weighted Mean has the lowest likelihood of reducing Atlantic herring catch. In terms of potential impact on protected resources, therefore, RH/S Alternative 3 Median is likely to be *the most positive* alternative under consideration, and RH/S Alternative 3 Weighted Mean is likely to be the *least positive*.

4.5 IMPACTS ON FISHERY-RELATED BUSINESSES AND COMMUNITIES

The analysis of impacts on fishery-related businesses and communities characterizes the magnitude and extent of the economic and social impacts likely to result from the alternatives considered for the 2016-2018 Atlantic herring fishery specifications as compared to the no action alternatives. National Standard 8 requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. Thus, continued overall access to fishery resources is a consideration, but not a guarantee that fishermen will be able to use a particular gear type, harvest a particular species of fish, fish in a particular area, or fish during a certain time of the year.

A fundamental difficulty exists in forecasting economic and social change relative to fishery management alternatives when communities or other societal groups are constantly evolving in response to numerous external factors, such as market conditions, technology, alternate uses of waterfront, and tourism. Certainly, management regulations influence the direction and magnitude of economic and social change, but attribution is difficult with the tools and data available. While this analysis focuses generally on the economic and social impacts of the proposed fishing regulations, external factors may also influence change, both positive and negative, in the affected communities. In many cases, these factors contribute to a community's vulnerability and ability to adapt to new or different fishing regulations.

When examining potential economic and social impacts of management measures, it is important to consider impacts on the following: the fishing fleet (vessels grouped by fishery, primary gear type, and/or size); vessel owners and employees (captains and crew); herring dealers and processors; final users of herring; community cooperatives; fishing industry associations; cultural components of the community; and fishing families. While some management measures may have a short-term negative impact on some communities, this should be weighed against potential long-term benefits to all communities which can be derived from a sustainable herring fishery.

The social impact factors outlined below can be used to describe the Atlantic herring fishery, its sociocultural and community context and its participants. These factors or variables are considered relative to the management alternatives and used as a basis for comparison between alternatives. Use of these kinds of factors in social impact assessment is based on NMFS guidance (NMFS 2007) and other texts (e.g. Burdge 1998). Longitudinal data describing these social factors region-wide and in comparable terms is limited. While this analysis does not quantify the impacts of the management alternatives relative to the social impact factors, qualitative discussion of the potential changes to the factors characterizes the likely direction and magnitude of the impacts. The factors fit into five categories:

- *Size and Demographic Characteristics* of the fishery-related workforce residing in the area; these determine demographic, income, and employment effects in relation to the workforce as a whole, by community and region.

- The *Attitudes, Beliefs, and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding the behavior of fishermen on the fishing grounds and in their communities.
- The effects of the proposed action on *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities.
- The *Non-Economic Social Aspects* of the proposed action; these include lifestyle, health, and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.
- The *Historical Dependence on and Participation in* the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights (NMFS 2007).

In general, the economic effects of regulations can be categorized into regulations that change costs (including transactions costs such as search, information, bargaining, and enforcement costs) or change revenues (by changing market prices or by changing the quantities supplied). These economic effects may be felt by the directly regulated entities. They may also be felt by related industries. For the herring fishery, this might include, for example, participants in the lobster fishery, zoos, and purchasers of herring for food.

4.5.1 Impacts of Alternatives for 2016-2018 Atlantic Herring Fishery Specifications on Fishery-Related Businesses and Communities

General Impacts

Each of the alternatives considered by the Council includes an annual specification for OFL, ABC, a stockwide Atlantic herring ACL (OY), DAH, DAP, USAP, BT, management area sub-ACLs (and seasons), RSA, and FGSA for 2016-2018. Because the Atlantic herring ABC specification proposed for 2016-2018 (recommended by the SSC, see Section 2.1.1) only differs from the 2013-2015 ABC specification by 3,000 mt (2.6% lower), and because available biological/fishery information does not indicate a need to consider major changes to the distribution of allowable catch or other specifications, the alternatives for 2016-2018 maintain the status quo (2013-2015) for many of the fishery specifications. The alternatives considered by the Council differ primarily through the specification of management uncertainty and the overall (stockwide) Atlantic herring ACL.

Overall, relative to no action, the impacts to fishery-related businesses and communities is expected to be ***negligible***, and there are only minor differences between the alternatives. Stability in specifications provides a sense of certainty about regulations and the future of the Atlantic herring fishery, which is a substantial benefit to business and household planning.

Over the long-term, harvesting within OFL, ABC, and ACL constraints should provide for a sustainable herring fishery, which has positive economic and social impacts. For the OFL, ABC, and ABC specification alternatives herein (Section 2.1), the SSC has determined that Alternatives 2 and 3 are biologically acceptable (NEFMC 2015). When considering the

importance of fishery resources to fishing communities, National Standard 8 specifies that, "All other things being equal, where two alternatives achieve similar conservation goals, the alternative that provides the greater potential for sustained participation of such [fishing] communities and minimizes the adverse economic impacts on such communities would be the preferred alternative (NMFS 2009)."

The analysis in this section assumes that the directed Atlantic herring fishery will not get shut down by the RH/S catch caps (Section 2.3), the negative consequences of which are described in Section 4.5.2.

DAH

Under all three alternatives, DAH would be set equal to Optimum Yield. This would maximize fishing opportunity for the industry. Given that the maximum difference in DAH between the alternatives is slight (only 3,200 mt or 3% of DAH), employment opportunities would largely be unchanged, resulting in ***negligible*** impacts to the *Size and Demographic Characteristics* of the fishery-related workforce and the *Historical Dependence on and Participation in* the fishery. Alternative 2 would have the highest DAH, so impacts may be slightly more positive relative to No Action and Alternative 3. Likewise, Alternative 3 has the lowest DAH, so impacts of Alternative 3 may be slightly lower than Alternative 1 (no action) and Alternative 2.

DAP

Under all three alternatives, DAP would remain at DAH minus 4,000 mt for border transfer. As with DAH, the maximum difference in DAP between the alternatives is slight (about 3% of DAP). Thus, impacts are ***negligible***, similar to those described for DAH.

BT

Under all three alternatives, BT would remain at 4,000 mt. This specification does not represent an allocation from a specific management area or areas; rather, it represents a maximum amount of Atlantic herring (caught from any management areas) that can be caught in U.S. waters and transferred to Canadian vessels for trans-shipment to Canada. Because the set-aside for BT would be unchanged, there would likely be no new social or economic impacts relative to the status quo, such that the impacts are likely ***negligible***. BT has generally decreased since 1994, with a peak of 3,690 in 1996 (Section 2.2.2; p. 29). The average BT between 1994 and 2011 has been 971 mt per year, but since 2007, the average has been 200 mt per year (5% of BT). There is no information available that would indicate a change in this trend, thus, the specification of BT will likely leave a few thousand mt of Atlantic herring uncaught. In the short-term, this would have slight negative impacts on the industry, but it would augment the buffers against overfishing, which would have long-term benefits to the industry.

USAP

Under all three alternatives U.S. At-sea Processing is set at 0 mt. Currently, there are no at-sea processing businesses in operation, so there is no need to allocate a portion of the catch in this manner. Thus, there would likely be no new social or economic impacts of USAP relative to any of the alternatives under consideration, such that the impacts are likely ***negligible***.

RSA

Under all three alternatives, 3% of the ACL is deducted for use as a Research Set Aside. With no change in the amount of RSA catch, there would likely be no new social or economic impacts of RSA relative to any of the alternatives under consideration, such that the impacts are likely ***negligible***. To the degree that research results stemming from RSA contribute to sustainable management of the Atlantic herring resource, the RSA program has long-term positive impacts on fishery-related businesses and communities.

FGSA

Under all three alternatives, a Fixed Gear Set-Aside of 296 mt has been specified. In recent years, catch under the FGSA has been low and there is no information to expect effort to increase. With no change in the FGSA, there would likely be no new social or economic impacts of the FGSA relative to any of the alternatives under consideration, such that the impacts are likely ***negligible***. If the FGSA is not caught, there would be slight negative impacts on the industry, but it would augment the buffers against overfishing, which would have long-term benefits to the industry.

Sub-ACLs and Seasonal Sub-ACL Divisions

Under all three alternatives, there is no change in the percent distribution of the ACL to the sub-ACLs or in the seasonal restrictions of the sub-ACL areas. Thus, there would likely be no new social or economic impacts of this distribution relative to any of the alternatives under consideration, such that the impacts are likely ***negligible***.

4.5.1.1 Impacts of Alternative 1 (No Action)

Under the no action alternative, the herring fishery specifications from 2015 would remain constant for 2016-2018 fishing years. The specification of Atlantic herring ABC would remain at 114,000 mt, which is above the SSC recommendation for 2016-2018 (111,000 mt).

With no change in the ABC, Alternative 1 would likely result in a degree of constancy and predictability for fishing industry operations and a steady supply to the market (in addition to the stability provided by a three-year specifications process). Maintaining the status quo ABC would likely result in negligible social and economic impacts in the short term. The *Size and Demographic Characteristics* of the fishery-related workforce would likely be unchanged, as would the *Historical Dependence on and Participation in* the fishery. However, since the ABC is slightly higher than the level recommended by the SSC to be biologically acceptable (e.g., there is a 54% probability that overfishing would occur in Year 3 (2018)), Alternative 1 may lead to overfishing in Year 3, which could have negative impacts if it necessitates a reduction in future Atlantic herring catch. There may also be a negative impact on the *Attitudes, Beliefs, and Values* of stakeholders towards management should overfishing actually occur. Overall, because of the relatively low probability of overfishing associated with this alternative, the impacts of Alternative 1 on fishery-related businesses and communities are expected be ***negligible***.

4.5.1.2 Impacts of Alternative 2 (Non-Preferred)

Alternative 2 would specify Atlantic herring ABC at the level recommended by the SSC (111,000 mt) and would maintain a status quo approach to specifying the management uncertainty buffer for 2016-2018 (value is 3,000 mt lower). All other fishery specifications (e.g., border transfer) would be unchanged.

Relative to Alternative 1, Alternative 2 provides essentially the same fishing opportunities for participants in the Atlantic herring fishery in all three years (the stockwide Atlantic herring ACL would be 200 mt greater under Alternative 2 and slightly more than Alternative 3 (3,200 mt greater without the NB weir payback provision). Because ready substitutes for Atlantic herring exist, prices are not likely to change dramatically when the quantity supplied of herring changes, so an increase in supply relative to No Action is likely to correspond to an increase in revenue (Section 3.5.5). If a minor increase in quantity supplied is realized, employment opportunities would either be stable or slightly increase, resulting in negligible to low positive impacts to the *Size and Demographic Characteristics* of the fishery-related workforce relative to Alternative 1. The *Historical Dependence on and Participation* in the fishery would either be sustained or increased. Like Alternative 1, this alternative maintains a constant ABC over the specifications period (2016-2018), providing consistency for fishing industry operations, stability for the industry and a steady supply to the market (in addition to the stability provided by a three-year specifications process).

Overall, as previously discussed, the impacts of Alternative 2 on fishing businesses and communities are likely ***negligible***. Relative to Alternative 1, the impacts of Alternative 2 on fishing businesses and communities are expected to be *more positive*, and relative to Alternative 3, the impacts are expected to be *less positive*.

4.5.1.3 Impacts of Alternative 3 (*Preferred Alternative*)

Alternative 3 would specify Atlantic herring ABC at the level recommended by the SSC (111,000 mt) and would maintain the status quo value for the management uncertainty buffer for 2016-2018. All other specifications (e.g., border transfer) would be unchanged.

Relative to Alternatives 1 and 2, Alternative 3 would provide slightly less fishing opportunity in 2016-2018 for participants in the herring fishery (the stockwide Atlantic herring ACL lower by 3,000 and 3,200 mt, respectively, without the NB weir payback provision). If a decrease in quantity supplied is realized, employment opportunities would likely decrease, resulting in low negative impacts to the *Size and Demographic Characteristics* of the fishery-related workforce relative to Alternatives 1 and 2. The *Historical Dependence on and Participation in* the fishery would either be sustained or decreased. Like Alternatives 1 and 2, this alternative maintains a constant ABC over the specifications period, providing consistency for fishing industry operations, stability for the industry and a steady supply to the market (in addition to the stability provided by a three-year specifications process).

Alternative 3 contains an option that up to 1,000 mt of catch could be added to the Area 1A sub-ACL in October of each year should NMFS determine that less than 4,000 mt has been caught by the New Brunswick weir fishery by that time. Relative to Alternative 1 and Alternative 2, this option would have *positive* impacts on the fishery-related businesses (82% purse seines in 2012-2014, Table 47) and communities (primarily Portland, Rockland, Gloucester; Table 54) that rely on fishing in Area 1A.

Overall, as previously discussed, the impacts of Alternative 3 on fishing businesses and communities are likely ***negligible***. Relative to Alternatives 1 and 2, the impacts of Alternative 3 on fishing businesses and communities are expected to be *more negative* because the stockwide Atlantic herring ACL available to the fishery would be lower. There are no discernable differences between the impacts of Alternatives 1 and 2 relative to Alternative 3 because the stockwide ACLs are almost the same in Alternatives 1 and 2.

4.5.2 Impacts of 2016-2018 RH/S Catch Caps on Fishery-Related Businesses and Communities

The 2016-2018 RH/S catch cap alternatives (Table 22, p. 38) would apply to midwater trawl vessels in the Gulf of Maine and Cape Cod Catch Cap Areas, and to both midwater trawl and small mesh bottom trawl vessels in the southern New England/Mid-Atlantic Catch Cap Area (see RH/S Catch Cap Areas shaded on Figure 1, p. 3) on all trips landing more than 6,600 pounds of Atlantic herring. No RH/S catch cap would be adopted for the GB Catch Cap Area. Since only limited access herring vessels (permit categories A/B/C) are allowed to land more than 6,600 pounds of Atlantic herring, these are the vessels that this alternative would directly impact. The trips landing more than 6,600 pounds of Atlantic herring accounted for 96% or more of annual Atlantic herring landings between 2008 and 2012. While the catch caps directly impact the active limited-access herring vessels, they may indirectly impact users of herring (e.g. lobstermen who use herring as bait). Framework 3 details the impacts of establishing a catch cap program, which has only been in place for 2015, so analysis of the impact of the alternatives in this section are somewhat hampered by scant data on the performance of the caps to date.

General Discussion of Positive Impacts: RH/S catch caps are unlikely to have substantial negative impacts on fishery-related businesses and communities, as long as the caps do not constrain Atlantic herring harvest. RH/S catch caps incentivize participants in the directed herring fishery to find innovative, low-cost solutions to avoid river herring and shad. Communication networks developed for river herring avoidance might be used for other reasons, for example, safety-related circumstances that arise suddenly or other fisheries or fishing-related problems. Having a RH/S catch cap in inshore areas may incentivize fishing offshore which may reduce gear conflicts. To the extent that the caps successfully lead to increases in RH/S abundance, establishing caps would increase the sense of well-being of those whose businesses rely on herring as forage, and RH/S stocks could eventually be of less concern. It would likely lead to improved coordination with the MAFMC, resulting in greater trust in management among the industry, a positive impact on the formation of *Attitudes* and *Beliefs.* To the extent that the caps successfully limit catch of RH/S, the herring catch may be cleaner, requiring less culling.

General Discussion of Negative Impacts: RH/S catch caps could result in some negative impacts on fishery-related businesses and communities as well. If the RH/S catch cap is reached for a gear type in the directed fishery in a particular area(s), the resultant closure of the directed fishery could reduce fishing profits in the herring fishery. This could lead to lower employment and a decrease in the *Size and Demographic Characteristics* of the fishery-related workforce. Fishermen could hold negative *Attitudes* and *Beliefs* towards management if herring fishing is closed part-way through the year. Interruption in the supply of herring could raise the cost of bait for the lobster fishery and other users, thereby potentially affecting the *Size and Demographic Characteristics* of the lobster industry. Additional reporting burdens could produce negative *Attitudes* about management. Closing the fishery to certain gear types in certain areas may cause resentment or conflict between fishing groups, a negative social impact in the form of changes to *Social Structures and Organizations*. Closing the fishery inshore may incentivize smaller vessels to fish offshore, which may lead to unsafe fishing conditions, a negative impact on the *Non-Economic Social Aspects* of the action.

4.5.2.1 Impacts of RH/S Alternative 1 (No Action)

Under the no action alternative, the 2016-2018 RH/S catch caps would be based on the median value of estimated RH/S catch from 2008-2012 from Framework 3 (Table 19, p. 35).

Based on the performance of the fishery under the first year of the RH/S catch caps so far (2015 not yet complete), the impacts of Alternative 1 on fishery-related businesses and communities are likely to be ***neutral***. The status quo would be maintained, and the caps have not yet shut down the directed Atlantic herring fishery (see Table 30 in Section 3.2.3.2 (p. 57) for information about RH/S catch under the 2015 catch caps YTD). Most of the RH/S interactions have been in the Cape Cod and Southern New England areas (no catch to date in the GOM midwater trawl fishery). Although 57% of the SNE bottom trawl fishery RH/S catch cap has been caught, that fishery is most active in the early months of the year, so it is unlikely that this fishery will be constrained this year.

4.5.2.2 Impacts of RH/S Alternative 2 (Non-Preferred)

Under RH/S Alternative 2, the 2016-2018 RH/S catch caps would be based on the Herring PDT's updates/revisions to the 2008-2012 RH/S catch estimates from Framework 3. The same five-year time series that was utilized in Framework 3 (2008-2012 with updated/revised data) would be utilized to determine the RH/S catch caps under this alternative, with options to select either the median or weighted mean from the time series (Table 20, p. 36).

If the Alternative 2 caps constrain the directed Atlantic herring fishery, there would be negative impacts on fishery-related businesses and communities. For the Gulf of Maine midwater trawl fishery, the Alternative 2 caps are higher than Alternatives 1 and 3, but none are likely to be constraining based on 2015 performance to date. The cap with the greatest potential to be constraining under Alternative 2 is the cap for the SNE/MA bottom trawl fishery, as the cap (19.6 or 28.2 mt) is much lower than catch to date in 2015 (46.9 mt). Using more accurate RH/S catch data for the basis of management would have positive impacts on the *Attitudes and Beliefs* of stakeholders on their perceptions of management. Overall, the impacts of Alternative 2 would be ***negligible*** relative to No Action, except for the SNE/MA bottom trawl fleet, which would likely have ***negative*** impacts.

Option 1: Median. Option 1 uses the median values of the 2008-2012 revised data. The impacts of Option 1 on fishery-related businesses and communities would be *more negative* relative to Option 2. The caps would be more constraining of the directed Atlantic herring fishery. Option 1 would allow more river herring to remain in the ecosystem, a positive impact to users of the river herring resource.

Option 2: Weighted Mean. Option 2 uses the weighted mean values of the 2008-2012 revised data. The impacts of Option 2 on fishery-related businesses and communities would be *more positive* relative to Option 1. The caps would be less constraining of the directed Atlantic herring fishery. Option 2 would allow less river herring to remain in the ecosystem, a negative impact to users of the river herring resource.

4.5.2.3 Impacts of RH/S Alternative 3 (*Preferred*)

Under RH/S Alternative 3, the 2016-2018 RH/S catch caps would be specified based on RH/S catch estimates from 2008-2014, using the Herring PDT's revised/updated data (Appendix I). This alternative would incorporate RH/S catch estimates from the most recent two years as well, extending the time series to seven years, with options to select either the median or weighted mean values (Table 21, p. 37). Alternative 3, Option 2 represents the ***Preferred Alternative*** for the 2016-2018 RH/S catch caps at this time.

The impacts of Alternative 3 on fishery-related businesses and communities are likely to be ***negligible*** relative to Alternative 1. Using improved data for the basis of management would have positive impacts on the *Attitudes and Beliefs* of stakeholders on their perceptions of management. Alternative 3 would lower the catch caps for some gear types and areas, but increase them for others, relative to Alternatives 1 and 2.

If the Alternative 3 caps constrain the directed Atlantic herring fishery, there would be negative impacts on fishery-related businesses and communities. For the Gulf of Maine midwater trawl fishery, the Alternative 3 caps are lower than Alternatives 1 and 2, but none are likely to be constraining based on 2015 performance to date. The cap with the greatest potential to be constraining under Alternative 3 is the median cap for the SNE/MA bottom trawl fishery, as the cap (24.0 mt) is much lower than catch to date in 2015 (46.9 mt). Using more accurate RH/S catch data for the basis of management would have positive impacts on the *Attitudes and Beliefs* of stakeholders on their perceptions of management. Overall, the impacts of Alternative 3 would be neutral, except potentially for the SNE/MA bottom trawl fleet (should the median value be selected), which would likely have negative impacts.

Option 1: Median. Option 1 uses the median values of the 2008-2014 data. The impacts of Option 1 on fishery-related businesses and communities would be *more negative* relative to Option 2. The caps would be more constraining of the directed Atlantic herring fishery (particularly for the SNE/MA bottom trawl fleet). Option 1 would allow more river herring to remain in the ecosystem, a positive impact to users of the river herring resource.

Option 2: Weighted Mean (*Preferred Alternative*). Option 2 uses the weighted mean values of the 2008-2014 data. The impacts of Option 2 on fishery-related businesses and communities would be *more positive* relative to Option 1. The caps would be less constraining of the directed Atlantic herring fishery. Option 2 would allow less river herring to remain in the ecosystem, a negative impact to users of the river herring resource.

4.6 CUMULATIVE EFFECTS ASSESSMENT

To be completed for Final Document

A cumulative effects assessment (CEA) is a required part of an EIS or EA according to the Council on Environmental Quality (CEQ) (40 CFR part 1508.7) and NOAA's agency policy and procedures for NEPA, found in NOAA Administrative Order 216-6. The purpose of the CEA is to integrate into the impact analyses the combined effects of many actions over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective but, rather, the intent is to focus on those effects that are truly meaningful. This section serves to examine the potential direct and indirect effects of the alternatives in Framework 2 and the 2013-2015 Atlantic herring fishery specifications together with past, present, and reasonably foreseeable future actions that affect the environment related to the Atlantic herring fishery. It should also be noted that the predictions of potential synergistic effects from multiple actions, past, present and/or future will generally be qualitative in nature.

The regulatory atmosphere within which Federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of resources, habitat, and human communities. Consistent with NEPA, the MSA requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, impacts on all VECs (except short-term impacts to human communities) from past, present and reasonably foreseeable future actions, when combined with baseline conditions, have generally been positive and are expected to continue in that manner for the foreseeable future. This is not to say that some aspects of the various VECs are not experiencing negative impacts, but rather that when taken as a whole and compared to the level of unsustainable effort that existed prior to and just after the fishery came under management control, the overall long-term trend is positive.

The following analysis will identify and characterize the impact on the environment from the proposed 2016-2018 Atlantic herring specifications 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.

4.6.1 Valued Ecosystem Components

Consistent with the guidelines for CEA, cumulative effects can be more easily identified by analyzing the impacts of the Proposed Action on valued ecosystem components (VECs). The affected environment is described in this document based on VECs that were identified for consideration relative to the proposed specifications. VECs represent the resources, areas, and human communities that may be affected by a Proposed Action or alternatives and by other actions that have occurred or will occur outside the Proposed Action. VECs are generally the "place" where the impacts of management actions are exhibited. An analysis of impacts is performed on each VEC to assess whether the direct/indirect effects of an alternative adds to or

subtracts from the effects that are already affecting the VEC from past, present and future actions outside of the Proposed Action (i.e., cumulative effects).

The Affected Environment is described in this document (Section 3.0) based on VECs that were identified specifically for Framework 4. The VECs for consideration in this assessment include:

1. Atlantic Herring (Section 3.1);
2. Non-Target Species (Section 3.2);
3. Physical Environment and Essential Fish Habitat (EFH) (Section 3.3);
4. Protected Resources (Section 3.4); and
5. Fishery-Related Businesses and Communities (Section 3.5).

TBD for final document

4.6.2 Spatial and Temporal Boundaries

The geographic area that encompasses the physical, biological and human communities impacts to be considered in the cumulative effects analysis are described in detail in Section 3.0 of this document (Affected Environment). The geographic range for impacts to fish species is the range of each fish species in the western Atlantic Ocean. The physical environment, including habitat and EFH, is bounded by the range of the Atlantic herring fishery, from the Gulf of Maine through the mid-Atlantic Bight, and includes adjacent upland areas (from which non-fishing impacts may originate). For protected species, the geographic range is the total range of Atlantic herring. The geographic range for fishery-related businesses and communities is defined in the Affected Environment as well.

Overall, while the effects of the historical herring fishery are important and are considered in the analysis, the temporal scope of past and present actions for Atlantic herring, non-target species and other fisheries, the physical environment and EFH, protected species, fishery-related businesses and communities is focused principally on actions that have occurred since 1996, when the MSA was amended and implemented new fisheries management and EFH requirements. The temporal scope for marine mammals begins in the mid-1990s, when NMFS was required to generate stock assessments for marine mammals that inhabit waters of the U.S. EEZ that create the baseline against which current stock assessments are evaluated. For turtle species, the temporal scope begins in the 1970s, when populations were noticed to be in decline. The temporal scope for Atlantic herring is focused more on the time since the Council's original Herring FMP was implemented at the beginning of the 2001 fishing year. The Atlantic Herring FMP serves as the primary management action for the Atlantic herring fishery and has helped to shape the current condition of the resource.

While the Atlantic herring fishery specifications are assessed only for the 2016-2018 fishing years, the temporal scope of other management measures proposed in this framework/specifications document generally extends five years into the future for all VECs. This period was chosen because of the dynamic nature of resource management and lack of specific information on projects that may occur in the future, which make it difficult to predict

impacts beyond this time frame with any certainty. This is also the rebuilding time frame for the Atlantic herring resource, as defined in the Atlantic Herring FMP, should the resource become overfished and subject to a rebuilding program in the future.

4.6.3 Analysis of Total Cumulative Effects

A cumulative effects assessment ideally makes effect determinations based on the culmination of the following: (1) impacts from past, present and reasonably foreseeable future actions; plus (2) the baseline condition for resources and human communities (note – the baseline condition consists of the present condition of the VECs plus the combined effects of past, present and reasonably foreseeable future actions); plus (3) impacts from the Proposed Action and alternatives.

A description of past, present and reasonably foreseeable future actions is presented in XXX. The baseline conditions of the resources and human community are subsequently summarized in Section , although it is important to note that beyond the stock managed under this FMP and protected species, quantitative metrics for the baseline conditions are not available. Finally, a brief summary of the impacts from the alternatives contained in this specifications is included. The culmination of all these factors is considered when making the cumulative effects assessment.

4.6.4 Past, Present, and Reasonably Foreseeable Future Actions

TBD

4.6.5 Baseline Conditions

TBD

4.6.6 Summary of Impacts from 2016-2018 Atlantic Herring Fishery Specifications

TBD

4.6.7 Cumulative Effects Summary

TBD

5.0 RELATIONSHIP TO APPLICABLE LAW

5.1 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (MSA)

5.1.1 National Standards

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act requires that fishery management plans (FMPs) contain conservation and management measures that are consistent with ten National Standards:

TBD FOR FINAL DOCUMENT

In General. – Any fishery management plan prepared, and any regulation promulgated to implement any such plan, pursuant to this title shall be consistent with the…national standards for fishery conservation and management.

(1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The primary goal of managing the Atlantic herring fishery is to maintain long-term sustainable catch levels, consistent with the National Standards of the MSA. The first objective of the Herring FMP is to prevent overfishing. The Herring FMP established a fishery specifications process that ensures a consistent review of the herring stock status, fishery performance, and other factors in order to manage by annual catch limits (ACLs) and prevent overfishing. The additional management measures implemented in the herring fishery should further achieve the goals/objectives and reduce the possibility of overfishing the Atlantic herring resource. Optimum yield (OY) for the Atlantic herring fishery is defined in the Herring FMP (as modified by Amendments 1 – 4) and specified annually (in this document for 2016-2018) so that it will not exceed the Allowable Biological Catch (ABC, which accounts for scientific uncertainty), and cannot exceed the overfishing limit (OFL), which is based upon a target fishing mortality rate that is determined as prescribed in the overfishing definition. This ensures that yield from the fishery can be optimized while preventing overfishing on a continuing basis.

(2) Conservation and management measures shall be based upon the best scientific information available.

Biological information from peer-reviewed stock assessments is used to formally evaluate stock condition. In 2012, the 54th stock assessment workshop (SAW 54) completed an Atlantic herring benchmark stock assessment. These formal stock assessments undergo rigorous development and review, and are peer-reviewed through the Stock Assessment Review Committee (SARC) process, which are the only such comprehensive assessments. This assessment therefore represents the best available information regarding the status of the Atlantic herring resource. Conclusions and results were available during the development of the action proposed in this document were evaluated with respect to the alternatives/options considered during the 2016-2018 Atlantic herring specifications process.

The economic analyses provided in this document are based primarily on landings, revenue, and effort information collected through the NMFS data collection systems used for this fishery. Although there are some limitations to the data used in the analysis of impacts of management measures, these data have been thoroughly reviewed and are considered to be the best available. Information about bycatch is based on reports collected by the NEFSC Sea Sampling (Observer) Branch and incorporated into the NOAA Fisheries observer database. The observer data are collected using an approved, scientifically-valid sampling process. Furthermore, the analyses were prepared by and reviewed by the Council's Herring Plan Development Team and complies with the Information Quality Act (IQA, see Section 5.6 for more discussion related to the IQA).

TBD

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The Atlantic Herring FMP and all related management actions address the long-term management of Atlantic herring throughout the range of the species in U.S. waters, in accordance with the jurisdiction of U.S. law. Most Atlantic herring are caught in the Exclusive Economic Zone (EEZ). While most herring are landed in Maine, Massachusetts, and Rhode Island, Atlantic herring landings have been reported in every state from Maine through Virginia. In order to address that portion of the resource that is caught in State waters, the Herring FMP and related actions, including this framework adjustment and specifications package, were developed in close coordination with the Atlantic States Marine Fisheries Commission.

TBD

(4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

Fishery-related businesses and communities that participate in/depend on the Atlantic herring fishery are described in detail in Section 3.5 of this document. The proposed 2016-2018 Atlantic herring specifications do not discriminate between residents of different States. This action does not allocate or assign fishing privileges among various fishermen.

The measures proposed in the 2016-2018 Atlantic herring fishery specifications are intended to be applied equally to herring permit holders of the same category (A/B, C, and/or D), regardless of homeport or location. However, the fact that fish are not distributed evenly, and that individual vessels may target specific stocks at different times of the year, means that distributive impacts cannot be avoided in some cases. While the measures do not discriminate between permit holders from different States, they may result in variable impacts across permit holders/fishery participants. The impacts of the proposed measures on fishing-related businesses

and communities are discussed in various sections throughout Section 4.5 of this document; differential impacts are identified and evaluated to the extent possible in the analyses.

TBD

(5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

The management measures proposed in this document should promote efficiency in the utilization of fishery resources through appropriate measures intended to provide access to the herring fishery for both current and historical participants while minimizing the race to fish in any of the herring management areas. Economic allocation is not the sole purpose the proposed 2016-2018 Atlantic herring fishery specifications. The ***Preferred Alternatives*** in this document are intended to promote biological stability in the fishery and also provide a benefit to the industry over the long-term.

TBD

(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Changes in fisheries occur continuously, both as the result of human activity (for example, new technologies or shifting market demand) and natural variation (for example, oceanographic perturbations). There are a number of factors which could introduce variations into the Atlantic herring fishery. As discussed in the Herring FMP as well as other recent stock assessment documents, there is some uncertainty in the estimate of current stock size. In addition, the structure and status of individual spawning components cannot be determined with precision, resulting in the assessment of a coastal stock complex rather than separate assessments for each individual spawning component. Because of the lack of a permitting and reporting system prior to VTR requirements and implementation of the Herring FMP, there is some uncertainty regarding the total harvest of Atlantic herring and the proportion of herring that is utilized for food/bait, particularly in more historical years. Market fluctuations, environmental factors, and predator-prey interactions constantly introduce additional variations among, and contingencies in, the herring resource, the fishery, and the available catch.

TBD

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

As always, the Council considered the costs and benefits associated with the proposed 2016-2018 Atlantic herring specifications. Any costs incurred as a result of the measures proposed in this document are considered to be necessary in order to achieve the goals and objectives of the herring management program and are viewed to be outweighed by the benefits of taking the management action. The management measures proposed in this document are not duplicative

and were developed in close coordination with NMFS, the Atlantic States Marine Fisheries Commission (ASMFC), and other interested entities and agencies to minimize duplicity.

The proposed 2016-2018 Atlantic herring specifications are intended to minimize costs and avoid unnecessary duplication, to the extent possible. TBD

(8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

TBD

(9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

TBD

(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Fishing is a dangerous occupation; participants must constantly balance the risks imposed by weather against the economic benefits. A management plan should be designed so that it does not encourage dangerous behavior by the participants. According to the National Standard guidelines, the safety of the fishing vessel and the protection from injury of persons aboard the vessel are considered the same as "safety of human life at sea. The safety of a vessel and the people aboard is ultimately the responsibility of the master of that vessel. Each master makes many decisions about vessel maintenance and loading and about the capabilities of the vessel and crew to operate safely in a variety of weather and sea conditions. This national standard does not replace the judgment or relieve the responsibility of the vessel master related to vessel safety. The Councils, the USCG, and NMFS, through the consultation process of paragraph (d) of this section, will review all FMPs, amendments, and regulations during their development to ensure they recognize any impact on the safety of human life at sea and minimize or mitigate that impact where practicable."

TBD

5.1.2 Other Required Provisions of MSA

Section 303 of the Magnuson-Stevens Fishery Conservation and Management Act contains 14 additional required provisions for FMPs, which are discussed below. Any FMP prepared by any Council, or by the Secretary, with respect to any fishery, shall:

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are-- (A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery; (B) described in this subsection or subsection (b), or both; and (C) consistent with the National Standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law;

TBD

(2) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any;

TBD

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification;

TBD

(4) assess and specify-- (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3); (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing; and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States;

TBD

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors;

TBD

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery;

TBD

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;

TBD

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

TBD

(9) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on-- (A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;

TBD

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;

TBD

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority-- (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided;

TBD

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

TBD

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors;

TBD

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery.

TBD

5.2 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

NEPA provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document is designed to meet the requirements of both the MSA and NEPA. The Council on Environmental Quality (CEQ) has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508). All of those requirements are addressed in this document, as referenced below.

To prepare the 2016-2018 Atlantic herring fishery specifications, the Council held meetings of its Scientific and Statistical Committee, Herring Plan Development Team, Herring Oversight Committee, and Herring Advisory Panel, in addition to Council meetings. All of these meetings were open to the public. Final selection of the Atlantic herring fishery specifications proposed in this document occurred at the September 2015 New England Fishery Management Council meeting.

5.2.1 Environmental Assessment

The required elements of an Environmental Assessment (EA) are specified in 40 CFR 1508.9(b). They are included in this document, in addition to other relevant sections, as follows:

- An Executive Summary (beginning of the document);
- A Table of Contents (beginning of the document);
- The need for this action is described in Section 1.2;
- The alternatives that were considered are described in Section 2.0;
- A description of the Affected Environment is found in Section 3.0;
- The environmental impacts of the Proposed Action are described in Section 4.0;
- Cumulative impacts of the Proposed Action are discussed in Section 4.6;
- A Finding of No Significant Impact is provided in Section 5.2.2 (below);
- The list of preparers and agencies consulted on this action is provided in Section 7.0.

5.2.2 Finding of No Significant Impact (FONSI)

TBD FOR FINAL DOCUMENT

National Oceanic and Atmospheric Administration Order (NAO) 216-6 (revised May 20, 1999) provides sixteen criteria for determining the significance of the impacts of a final fishery management action. These criteria are discussed below:

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

Response: The proposed action is not expected to jeopardize the sustainability of the target species affected by this action – Atlantic herring. Relative to the no action alternative, the proposed action is more conservative and is consistent with the best available scientific information (Atlantic herring operational assessment, April 2015). Overall, based on the updated stock assessment and related recommendations provided by the Herring PDT and the SSC, the Council has concluded the Atlantic herring resource is healthy at this time (rebuilt), and the proposed action is therefore biologically-sound. The acceptable biological catch level for 2016-2018 has been endorsed by the Council's SSC.

Three-year projections provided in Section 4.1.1 of this document (p. 108) indicate that Atlantic herring SSB is expected to decrease under the catch levels implemented through the 2016-2018 specifications, but not t a level that would change or jeopardize the biological status of the stock (rebuilt, above the SSB target). Moreover, the proposed 2016-2018 Atlantic herring specifications continue to manage the fishery at reduced harvest levels when compared to historical levels. TBD

2. Can the Proposed Action reasonably be expected to jeopardize the sustainability of any non-target species?

Response: The action proposed in the 2016-2018 Atlantic herring fishery specifications cannot reasonably be expected to jeopardize the sustainability of any non-target species that may be affected. Non-Target species are generally described in Section 3.2 of this document, and impacts are discussed throughout Section 4.0. TBD

3. Can the Proposed Action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

Response: The proposed 2016-2018 Atlantic herring specifications cannot be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identifies in the FMP. EFH and habitat are generally described in Section 3.3 of this document, and impacts are discussed throughout Section 4.0. 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. An evaluation of the impacts to EFH in the proposed 2016-2018 specifications package stated that TBD

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

Response: Nothing in the proposed 2016-2018 Atlantic herring specifications can reasonably be 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. No such impacts were expected from specifications for previous years, and the Council has received no comments from affected members of the public suggesting that such impacts could be expected from the specifications that are proposed for the 2016-2018 fishing years. The safety of human life at sea is discussed further in Section 5.1.1 of this document (National Standard 10).

- Can the Proposed Action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Response: Protected resources that may be affected by the proposed action are generally described in Section 3.4 of this document, and impacts are discussed throughout Section 4.0. The proposed 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 proposed action are within the scope of the FMP and do not change the basis for the determinations made in previous consultations. Though the proposed action may increase interactions with protected species as compared to the status quo, there is likely to be continued minimal interaction.

5. Can the Proposed Action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

TBD FOR FINAL DOCUMENT

Response: The proposed 2016-2018 Atlantic herring fishery specifications are not expected to have a substantial impact on biodiversity and ecosystem function within the affected area. While Atlantic 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 tuna. The Atlantic herring itself is not known to prey on other species of fish but prefers chaetognaths and euphausiids. Consumption of Atlantic herring by predator species was factored into the 2012 benchmark stock assessment (SAW 54, July 2012) and affected current biological reference points including MSY (see Section 3.1.1 for more information). To the extent possible, the proposed 2016-2018 Atlantic herring fishery specifications account for these important issues.

The proposed action is intended to continue to ensure biodiversity and ecosystem stability over the 2016-2018 fishing years, and the proposed specifications account for scientific and management uncertainty and have been endorsed by the Council's SSC. In addition to accounting for predation through the stock assessment, the proposed buffer between the F_{MSY}-based catch level (OFL) and the U.S. OY (ACL) should ensure that an adequate forage base continues to be available for important fish, marine mammal, and bird species in the Gulf of Maine region during the upcoming years.

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

Response: A complete discussion of the potential impacts of the proposed 2016-2018 Atlantic herring fishery specifications is provided in Section 4.0 of this document. The environmental assessment concludes that no significant natural or physical effects will result from the implementation of the 2016-2018 Atlantic herring specifications. TBD

NMFS has determined that despite the potential socio-economic impacts resulting from this action, there is no need to prepare an EIS. The purpose of NEPA is to protect the environment by requiring Federal agencies to consider the impacts of their Proposed Actions on the human environment, defined as "the natural and physical environment and the relationship of the people with that environment." This Environmental Assessment (EA) describes and analyzes the proposed specifications and alternatives and concludes there will be no significant impacts to the natural and physical environment. Any impacts expected from the proposed specifications do not require the preparation of an EIS, as supported by NEPA's implementing regulations at 40 C.F.R. 1508.14. Consequently, because the EA demonstrates that the action's potential natural and physical impacts are not significant, the execution of a FONSI remains appropriate under criteria 7.

7. Are the effects on the quality of the human environment likely to be highly controversial?

Response: The effects of the proposed 2016-2018 Atlantic herring specifications on the quality of human environment are not expected to be highly controversial. The need to maintain a sustainable Atlantic herring resource is grounded in Federal fisheries law and forms the basis of the goals and objectives of the herring management program, as described in the Atlantic Herring FMP. The Council developed the proposed 2016-2018 herring fishery specifications while considering the needs of herring fishery participants, other fishery-related interests, and the long-term health of the Atlantic herring resource.

8. Can the Proposed Action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

Response: The proposed 2016-2018 Atlantic herring fishery specifications are not expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas. The proposed action affects fishing for herring in the U.S. Exclusive Economic Zone and is not expected to have any impacts on shoreside historical and/or cultural resources. In addition, the proposed action is not expected to substantially affect fishing and other vessel operations around the unique historical and cultural resources encompassed by the Stellwagen Bank National Marine Sanctuary.

9. Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: The proposed 2016-2018 Atlantic herring fishery specifications are not expected to result in highly uncertain effects on the human environment or involve unique or unknown risks. The specifications proposed in this document are generally consistent with those adopted in past years and are based on the provisions for the specifications process outlined in the Atlantic Herring FMP. Scientific uncertainty related to the Atlantic herring stock assessment is addressed through the reduction in the F_{MSY}-based catch level to the proposed ABC level, as recommended by the Council's SSC. Management uncertainty is addressed through the reduction in the ABC to the total U.S. OY (stockwide Atlantic herring ACL). The proposed specifications account for uncertainty such that the risk of overfishing the Atlantic herring resource has been minimized to the extent practicable.

10. Is the Proposed Action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: The proposed 2016-2018 Atlantic herring specifications are not related to other actions with individually insignificant, but cumulatively significant impacts. The cumulative effects analysis presented in Section 4.6 of this document considers the impacts of the proposed action in combination with relevant past, present, and reasonably foreseeable future actions and concludes that no additional significant cumulative impacts are expected from the 2016-2018 Atlantic herring fishery specifications.

11. Is the Proposed Action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: The proposed 2016-2018 Atlantic herring fishery specifications are not likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor is the proposed action expected to cause loss or destruction to significant scientific, cultural, or historical resources. The proposed action is specific only to the specifications and catch levels for the Atlantic herring fishery, which occurs primarily in the EEZ.

12. Can the Proposed Action reasonably be expected to result in the introduction or spread of a non-indigenous species?

Response: The proposed 2016-2018 Atlantic herring fishery specifications are not expected to result in the introduction or spread of a non-indigenous species. The proposed action relates specifically to removals of Atlantic herring in the Northeast Region using traditional fishing practices. Vessels affected by the proposed action are those currently engaged in the Atlantic herring fishery. The fishing-related activity of these vessels is anticipated to occur solely within the Northeast Region and should not result in the introduction or spread of a non-indigenous species.

13. Is the Proposed Action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: The proposed 2016-2018 Atlantic herring fishery specifications are not likely to establish a precedent for future actions with significant effects and does not represent a decision in principle about a future consideration. The proposed action adopts specifications for the 2016-2018 fishing years only, with flexibility for the Council to adjust the specifications during the interim years if the need arises or if new information becomes available. This action is consistent with specifications adopted in past years and is based on the provisions for the specifications process outlined in the Atlantic Herring FMP. The intent of the process is to establish specifications and other sub-ACLs for a short time frame (in this case, three years) so that new stock and fishery information can be reviewed and considered prior to making decisions about specifications in future years. The measures are designed to specifically address current stock and fishery conditions and are not intended to represent a decision about future management actions that may include other measures.

14. Can the Proposed Action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: The proposed 2016-2018 Atlantic herring fishery specifications are intended to establish catch levels that will offer protection to marine resources, particularly Atlantic herring, and would not threaten a violation of Federal, State, or Local law or other requirements to protect the environment. NMFS will determine whether this action is consistent with the Coastal Zone Management Act (CZMA) requirements of the affected States.

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

Response: As specified in the responses to the first two criteria of this section, the proposed 2016-2018 Atlantic herring specifications are not expected to result in cumulative adverse effects that would have a substantial effect on target or non-target species. As described in the sub-sections contained in Section 4.0 of this document, impacts on resources encompassing herring and other stocks are expected to be minimal.

In view of the analysis presented in this document, the establishment of the 2016-2018 Atlantic herring fishery specifications will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the Proposed Action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not required.

_____ _____

Assistant Administrator for Fisheries, NOAA *Date*

5.3 MARINE MAMMAL PROTECTION ACT (MMPA)

The New England Fishery Management Council has reviewed the impacts of the proposed 2016-2018 Atlantic herring fishery specifications on marine mammals and has concluded that the management actions proposed are consistent with the provisions of the MMPA. Although they are likely to affect marine mammals inhabiting the management unit, the specifications will not alter the effectiveness of existing MMPA measures to protect those species, such as take reduction plans, based on the overall reductions in fishing effort and the effectiveness of other management measures that have been implemented through the Atlantic Herring FMP.

5.4 ENDANGERED SPECIES ACT (ESA)

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. A description of the protected resources potentially affected by the proposed 2016-2018 Atlantic herring fishery specifications is provided in Section 3.4 of this document (p. 70). For further information on the potential impacts of the fishery as well as the ***Preferred Alternative*** and other alternatives considered by the Council on listed species, see Section 4.0 of this document.

5.5 PAPERWORK REDUCTION ACT (PRA)

The purpose of the PRA is to control and, to the extent possible, minimize the paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by or for the Federal Government. The authority to manage information and recordkeeping requirements is vested with the Director of the Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

The proposed Atlantic herring fishery specifications for the 2016-2018 fishing years contain no new or additional collection-of-information requirements.

5.6 INFORMATION QUALITY ACT (IQA)

TBD for Final Document

Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554, also known as the Data Quality Act or Information Quality Act) directed the Office of Management and Budget (OMB) to issue government-wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by federal agencies." OMB directed each federal agency to issue its own guidelines, establish administrative mechanisms allowing affected persons to seek and obtain correction of information that does not comply with the OMB guidelines, and report periodically to OMB on the number and nature of complaints. The NOAA Section 515 Information Quality Guidelines require a series of actions for each new information product subject to the Data Quality Act. Information must meet standards of utility, integrity and objectivity. This section provides information required to address these requirements.

Utility of Information Product

The proposed 2016-2018 Atlantic herring fishery specifications include: a description of the management issues to be addressed, statement of goals and objectives, a description of the proposed action and other alternatives/options considered, analyses of the impacts of the proposed specifications and other alternatives/options on the affected environment, and the reasons for selecting the preferred specifications. These proposed modifications implement the FMP's conservation and management goals consistent with the Magnuson-Stevens Fishery Conservation and Management Act as well as all other existing applicable laws.

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 information presented in this document is helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the proposed action, the measures proposed, and the impacts of those measures. A discussion of the reasons for selecting the proposed action is included so that intended users may have a full understanding of the proposed action and its implications. 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 the 2016-2018 Atlantic herring specifications package concerning the status of the Atlantic herring fishery is updated based on landings and effort information through the 2013 and 2014 fishing years when possible. Information presented in this document is intended to support the proposed specifications for the 2016-2018 fishing years, 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. In addition, the final 2016-2018 Atlantic Herring Specifications document will be available on the Council's website (www.nefmc.org) in standard PDF format. Copies will be available for anyone in the public on CD ROM and paper from the Council's office.

Integrity of Information Product

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. All electronic information disseminated by NOAA adheres to the standards set out in Appendix III, "Security of Automated Information Resources," OMB Circular A-130; the Computer Security Act; and the Government Information Security Reform Act. If information is confidential, it is safeguarded pursuant to the Privacy Act and Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business and financial information).

Objectivity of Information Product

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.

For purposes of the Pre-Dissemination Review, this document is considered to be a "Natural Resource Plan." Accordingly, the document adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, Fishery Management Plan Process; the Essential Fish Habitat Guidelines; the National Standard Guidelines; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act. 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 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.

This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Stock status (including estimates of biomass and fishing mortality) reported in this document are based on either assessments subject to peer-review through the Stock Assessment Review Committee (SARC) or on updates of those assessments. Landings and revenue information is based on information collected daily VMS catch reports and VTR reports, and supplemented with state/federal dealer data. Information on catch composition and bycatch is based on reports collected by the NOAA Fisheries Service observer program and incorporated into the sea sampling or observer database systems. These reports are developed using an approved, scientifically valid sampling process. In addition to these sources, additional information is presented that has been accepted and published in peer-reviewed journals or by scientific organizations. Original analyses in this document were prepared using data from accepted sources, and the analyses have been reviewed by members of the Herring Plan Development Team.

The 2016-2018 Atlantic herring specifications package is supported by the best available scientific information. The supporting science and analyses, upon which the proposed action is based, are summarized and described in Section 2.2 and Section 4.0 of this document. All supporting materials, information, data, and analyses within this document have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency. 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 the 2016-2018 Atlantic herring specifications 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 actions. Thus, the review process for any FMP modification, including the fishery specifications for the 2016-2018 fishing years, is performed by technically-qualified individuals to ensure the action is valid, complete, unbiased, objective, and relevant.

5.7 IMPACTS ON FEDERALISM/E.O. 13132

This E.O. established nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. The E.O. also lists a series of policy making criteria to which Federal agencies must adhere when formulating and implementing policies that have federalism implications. This action does not contain policies with federalism implications sufficient to warrant preparation of an assessment under E.O. 13132. The affected States have been closely involved in the development of the proposed fishery specifications through their representation on the Council (all affected states are represented as voting members of at least one Regional Fishery Management Council) and coordination with the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council.

5.8 ADMINISTRATIVE PROCEDURES ACT (APA)

This action was developed in compliance with the requirements of the Administrative Procedures Act, and these requirements will continue to be followed when the proposed regulation is published. Section 553 of the Administrative Procedure Act establishes procedural requirements applicable to informal rulemaking by Federal agencies. The purpose of these requirements is to ensure public access to the Federal rulemaking process, and to give the public adequate notice and opportunity for comment. At this time, the Council is not requesting any abridgement of the rulemaking process for this action.

5.9 COASTAL ZONE MANAGEMENT ACT (CZMA)

Section 307(c)(1) of the Federal CZMA of 1972 requires that all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. Pursuant to the CZMA regulations at 15 CFR 930.35, a negative determination may be made if there are no coastal effects and the subject action: (1) Is identified by a state agency on its list, as described in § 930.34(b), or through case-by-case monitoring of unlisted activities; or (2) which is the same as or is similar to activities for which consistency determinations have been prepared in the past; or (3) for which the Federal agency undertook a thorough consistency assessment and developed initial findings on the coastal effects of the activity. The Council has determined that this action is consistent with the coastal zone management plan and policies of the coastal states in this region. NMFS will formally request consistency reviews by CZM state agencies following Council submission of Framework 2 and the 2013-2015 Atlantic herring fishery specifications.

5.10 REGULATORY FLEXIBILITY ACT (RFA)/E.O. 12866 (REGULATORY PLANNING AND REVIEW)

TBD FOR FINAL DOCUMENT

5.10.1 Regulatory Flexibility Act (RFA) – Initial Regulatory Flexibility Analysis

TBD FOR FINAL DOCUMENT

5.10.2 E.O. 12866 (Regulatory Planning and Review)

TBD FOR FINAL DOCUMENT

5.11 E.O. 13158 (MARINE PROTECTED AREAS)

The Executive Order on Marine Protected Areas requires each federal agency whose actions affect the natural or cultural resources that are protected by an MPA to identify such actions, and, to the extent permitted by law and to the extent practicable, avoid harm to the natural and cultural resources that are protected by an MPA. The E.O. defines a Marine Protected Area as "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." The E.O. requires that the Departments of Commerce and the Interior jointly publish and maintain such a list of MPAs. The Tilefish Gear Restricted Areas in Oceanographer, Lydonia, Veatch, and Norfolk canyons are included in the National System of Marine Protected Areas (MPAs). This action under the Atlantic Herring FMP is not expected to occur within any of these MPAs. No further guidance related to this Executive Order is available at this time.

5.12 E.O 12898 (ENVIRONMENTAL JUSTICE)

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations provides guidelines to ensure that potential impacts on these populations are identified and mitigated, and that these populations can participate effectively in the NEPA process (EO 12898 1994). These individuals or populations must not be excluded from participation in, denied the benefits of, or subjected to discrimination because of their race, color, or national origin. Although the impacts of the Atlantic herring specifications may affect communities with environmental justice concerns, the actions in this document should not have disproportionately high effects on low income or minority populations. The proposed measures would apply to all participants in the affected area, regardless of minority status or income level.

The existing demographic data on participants in the Atlantic herring fishery (i.e. vessel owners, crew, dealers, processors, employees of supporting industries) do not allow identification of those who live below the poverty level or are racial or ethnic minorities. Thus, it is not possible to fully determine how the actions within this specification document may impact these

population segments. The public comment processes is an opportunity to identify issues that may be related to environmental justice, but none have been raised relative to the 2016-2018 Atlantic herring specifications. The public has never requested translations of documents pertinent to the Atlantic herring fishery.

6.0 REFERENCES

TBD FOR FINAL DOCUMENT

Abbott JK and Wilen JE. 2010. Voluntary cooperation in the commons? Evaluating the sea state program with reduced form and structural models. Land Economics 86(1): 131-154.

ASMFC [Atlantic States Marine Fisheries Commission]. 2007. American shad stock assessment report for peer review, Vol. I. Stock Assessment Report No. 01-01 (Supplement). 224 p. ASMFC [Atlantic States Marine Fisheries Commission]. 2008. 2008 river herring stock status report.662 p.

ASMFC. 2015. Fisheries Focus. Arlington (VA): Atlantic States Marine Fisheries Commission. 24(1) February/March 2015.

Burdge RJ. 1998. A Conceptual Approach to Social Impact Assessment. Revised ed. Madison, WI: Social Ecology Press. 284 p.

Clay PM, Colburn LL, Olson J, Pinto da Silva P, Smith SL, Westwood A, Ekstrom J. Community Profiles for the Northeast U.S. Fisheries. August 22, 2012. Woods Hole (MA): Northeast Fisheries Science Center; Available from: http://www.nefsc.noaa.gov/read/socialsci/communityProfiles.html.

Dayton A, Sun JC, Larabee J. 2014. Understanding Opportunities and Barriers to Profitability in the New England Lobster Industry. Portland, ME: Gulf of Maine Research Institute. 19 p.

Mid-Atlantic Fishery Management Council (MAFMC). 2013. Amendment 14 to the Atlantic Mackerel, Squid, and Butterfish (MSB) Fishery Management Plan (FMP). Available at: http://www.mafmc.org/.

New England Fishery Management Council (NEFMC). 2015. Framework Adjustment 4 to the Atlantic Herring Fishery Management Plan. Incorporating the Environmental Assessment. NEFMC in consultation with the ASMFC, MAFMC, and NMFS. Final document submitted March 30, 2015.

New England Fishery Management Council (NEFMC). 2014. Framework Adjustment 3 to the Atlantic Herring Fishery Management Plan. Incorporating the Environmental Assessment. NEFMC in consultation with the ASMFC, MAFMC, and NMFS. Final document submitted March 26, 2014.

New England Fishery Management Council (NEFMC). 2013. Final Framework Adjustment 2 to the Atlantic Herring Fishery Management Plan and 2013-2015 Atlantic Herring Fishery Specifications package. Incorporating the Environmental Assessment. NEFMC in

consultation with the ASMFC, MAFMC, and NMFS. Final document submitted July 2, 2013.

New England Fishery Management Council (NEFMC). 2012. Final Amendment 5 to the Atlantic Herring Fishery Management Plan. Incorporating the Environmental Impact Statement. Volume I and II. NEFMC in consultation with the ASMFC, MAFMC, and NMFS. Final document submitted March 25, 2013.

New England Fishery Management Council (NEFMC). 2010. Final Amendment 4 to the Atlantic Herring Fishery Management Plan. Incorporating the Environmental Assessment. NEFMC in consultation with the ASMFC, MAFMC, and NMFS.

New England Fishery Management Council (NEFMC). 2006. Final Amendment 1 to the Atlantic Herring Fishery Management Plan. Incorporating the Environmental Impact Statement. Volume I and II. NEFMC in consultation with the ASMFC, MAFMC, and NMFS. Final document submitted May 3, 2006.

New England Fishery Management Council (NEFMC). 1999. Final Atlantic Herring Fishery Management Plan. Incorporating the environmental impact statement and regulatory impact review. Volume I. NEFMC in consultation with the ASMFC, MAFMC, and NMFS. Final document submitted March 8, 1999.

NEFMC. 2015. Science and Statistical Committee report, May 29, 2015. Newburyport, MA 5 p.

NMFS. 2007. Guidelines for Assessment of the Social Impact of Fishery Management Actions. In: NMFS Council Operational Guidelines - Fishery Management Process. Silver Spring, MD: National Oceanic and Atmospheric Administration. 39 p.

NMFS. 2009. NMFS National Standards Guidelines. 50 CFR 600310 et seq.

NOAA (National Oceanic and Atmospheric Administration) 2013. Fisheries Weekly Quota Management Report Available from <http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm>

SMAST (University of Massachusetts School for Marine Science and Technology). Bycatch Avoidance Programs: River herring avoidance in the Atlantic herring and mackerel fisheries. Available from <http://www.umassd.edu/smast/smastnewsyoucanuse/bycatchavoidanceprograms/>

7.0 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 include:

- Lori Steele, NEFMC Staff, Herring PDT Chair
- Rachel Feeney, NEFMC Staff
- Michelle Bachman, NEFMC Staff
- Matt Cieri, ME DMR Biologist, ASMFC Herring TC Chair
- Sara Weeks, NEFOP
- Jon Deroba, NEFSC Population Dynamics
- Min-Yang Lee, NEFSC Social Sciences
- Micah Dean, MA DMF Biologist
- Madeleine Hall-Arber, MIT Sea Grant
- Carrie Nordeen, NMFS GARFO
- Tim Cardiasmenos, NMFS GARFO
- Danielle Palmer, NMFS GARFO
- Brandt McAfee, NMFS GARFO
- Jason Didden, MAFMC Staff
- Renee Zobel, NH Fish and Game Marine Biologist

The following agencies were consulted during the development of the 2013-2015 Atlantic Herring Specifications, either through direct communication/correspondence and/or participation on the Herring Committee or Herring PDT:

- NOAA Fisheries, National Marine Fisheries Service, Greater Atlantic Regional Office, Gloucester MA
- Northeast Fisheries Science Center, Woods Hole MA
- Atlantic States Marine Fisheries Commission and Atlantic Herring Section (Ashton Harp, ASMFC Staff)
- Mid-Atlantic Fishery Management Council (Jason Didden, MAFMC Staff)

Intentionally Blank

2016-2018 Atlantic Herring Fishery Specifications Package

APPENDIX I

Development of Options for River Herring and Shad Catch Caps in the Atlantic Herring Fishery, 2016-2018

Atlantic Herring Plan Development Team
New England Fishery Management Council

September 2015

Background and Herring PDT Methods for Updating Catch Data and Estimating RH/S Catch

During the development of specifications for the 2016-18 Atlantic herring (AH) fishery, the PDT re-examined all available data on river herring and shad (RHS) catch, as well as the methods previously used to set the catch cap. The RHS catch caps were originally established by the Council under Framework 3 and were set at the median level of catch observed over a 5 year reference period (2008-2012). At that time, an examination of available data identified a weak relationship between the total landings per trip (K_{ALL}) and RHS catch. Therefore, the annual RHS catch was estimated by multiplying the average observed catch rate per trip by the total number of trips that occurred in the fishery, instead of using a ratio estimator that relied on K_{ALL}. However, this created an inconsistency between the setting and monitoring of the RHS catch cap, because NOAA uses ratio estimators to monitor all catch caps. To ensure uniformity throughout the process, the PDT modified their methods for the 2016-2018 specifications by using a ratio estimator to derive annual RHS catch:

$$\mathrm{RHS_{tot}} = \mathrm{KALL_{tot}} * \frac{\sum \mathrm{RHS_{obs}}}{\sum \mathrm{KALL_{obs}}}$$

This assumes that the amount of RHS caught on an AH trip is proportional to the total landings of all species on that trip. This modification has resulted in significant change in the estimated amount of annual RHS catch, particularly for gears and areas that have some large trips with low observed RHS catch (e.g., GOM midwater trawl) (Table 1).

There is considerable interannual variability in the total annual RHS catch amount estimated for this fishery (Figure 1; Table 2). As such, it is difficult to establish an "average" annual RHS catch level (the basis of the catch caps) from only five years. For this reason, the PDT recommends including two additional years (2013-2014) to the reference period to provide better representation of the distribution of annual catch amounts. However, going forward it is not recommended to continue to include additional years to this reference period; 2014 is the last year that the AH fishery operated without the limitations imposed by a RHS catch cap. Including "cap years" in the reference period would provide incentive for fishermen to increase their RHS catch, which is in opposition to the goal of the RHS catch caps.

The PDT also recommends using a weighted average of annual catch amounts (weighted by the number of samples in each year) to represent the "average" annual RHS catch, instead of the median. There has been considerable variation in the number of observed trips between years, and a weighted mean takes into account this varying level of precision among annual estimates (Figures 2 and 3). The use of a median gives years with very few samples (e.g., SNEMA bottom trawl in 2008 – 1 observation) the same amount of weight as years with many samples (e.g., SNEMA bottom trawl in 2013 – 163 observations).

Under the original five year reference period (2008-2012), it was noted that nearly all of the observed RHS catch was landed and not discarded at-sea. Because only rare small amounts of discarded bycatch were observed at-sea, the PDT did not consider this a problem for combining portside and at-sea datasets at the time. However, upon reviewing catch data from the most recent two years (2013-2014), it has become apparent that discards now constitute a much larger proportion of total RHS catch, particularly for SNE/MA bottom trawl (up to ~73% in 2014).

Therefore, a more formal treatment of the two data types (landed catch vs discarded catch) is now warranted.

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

Several other changes were made to either the data or methods used to estimate annual RHS catch, all of which had a relatively minor influence over the resulting values:

- Included some shad landings that were previously omitted from RHS estimates
- Included some trips that were previously omitted because sub-trips did not meet 6600 lbs AH criteria
- Improved matching of trips sampled by multiple agencies (for removal of redundancies)
- Use of DMIS (NOAA-reconciled dealer/fishermen database) for K_{ALL} (total lbs of all species kept) in all expansions (to the trip and to the fishery).

Table 1. Possible RHS catch cap values based on annual estimates of total RHS catch from two time periods (2008-2012; 2008-2014). "Wgt Mean" is the arithmetic average of the total RHS catch per year, weighted by the number of sampled trips. The previous cap values are shaded in gray.

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

Table 2. Annual estimates of total RHS catch (landed + discarded) from the Atlantic herring fishery.

Gear	Cap Area	2008	2009	2010	2011	2012	2013	2014	Median	Weighted Mean
Bottom Trawl	**GOM**				0.6	0.1	0.0		0.1	0.3
	SNEMA	0.0	105.9	13.5	19.6	24.0	236.5	58.5	24.0	122.3
Midwater Trawl	**GOM**	157.2	98.1	146.8	5.9	1.9	11.3	6.7	11.3	76.7
	CC	39.8	0.0	0.7	8.9	49.6	29.5	45.3	29.5	32.4
	SNEMA	348.7	83.9	28.0	29.6	157.3	231.5	30.3	83.9	129.6
	GBK	0.0	0.2	1.6	0.9	0.5	1.3	0.4	0.5	0.8
Purse Seine	**GOM**	2.0	2.8	2.9	0.1	1.2	4.1	66.5	2.8	7.0
	Total	**547.7**	**290.8**	**193.5**	**65.6**	**234.4**	**514.2**	**207.6**		

Table 3. Total number of trips and total landings from trips that landed > 6600 lbs of Atlantic herring.

Trips with Atlantic Herring Landings >6600 lbs									
Gear	**Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
Bottom Trawl	**GOM**	5	18	24	9	27	3	9	**95**
	CC	0	0	0	0	0	0	0	**0**
	SNEMA	70	135	103	118	73	223	175	**897**
	GBK	36	103	87	183	169	189	154	**921**
Midwater Trawl	**GOM**	88	115	109	65	25	23	36	**461**
	CC	40	16	40	28	50	39	75	**288**
	SNEMA	152	188	116	77	148	219	146	**1046**
	GBK	1	0	1	0	2	0	0	**4**
Purse Seine	**GOM**	243	225	205	265	275	314	313	**1840**
	CC	0	0	1	0	0	0	0	**1**
	SNEMA	0	0	0	0	0	0	2	**2**
	GBK	0	0	0	0	0	0	0	**0**
	Total	**635**	**800**	**686**	**745**	**769**	**1010**	**910**	**5555**
Total Landings (MT) from Trips with Atlantic Herring Landings >6600 lbs									
Gear	**Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
Bottom Trawl	**GOM**	32	100	109	40	121	10	39	**451**
	CC	0	0	0	0	0	0	0	**0**
	SNEMA	3186	5952	4558	4629	4935	9422	5503	**38185**
	GBK	7564	26669	14237	32172	30355	35795	27052	**173844**
Midwater Trawl	**GOM**	17663	22803	18628	12875	4258	6563	7381	**90171**
	CC	7280	2806	5522	5769	12569	6002	17199	**57147**
	SNEMA	26460	36070	22158	9799	18207	16788	14230	**143712**
	GBK	67	0	66	0	89	0	0	**222**
Purse Seine	**GOM**	25200	21694	8272	17001	19295	22981	27247	**141690**
	CC	0	0	9	0	0	0	0	**9**
	SNEMA	0	0	0	0	0	0	58	**58**
	GBK	0	0	0	0	0	0	0	**0**
	Total	**87452**	**116094**	**73559**	**82285**	**89829**	**97561**	**98709**	**645489**

Table 4. Sampled RH/S Catch Cap Trips by Strata, 2008-2014

NEFOP At-Sea Observed Cap Trips*									
** only includes trips with >6,600 lbs herring*									
Gear	**Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
Bottom Trawl	**GOM**	0	0	0	2	2	1	0	**5**
	SNEMA	1	9	7	20	19	46	47	**149**
Midwater Trawl	**CC**	11	9	24	11	38	14	36	**143**
	GBK	12	33	79	77	114	72	44	**431**
	GOM	17	40	40	25	8	11	20	**161**
	SNEMA	26	30	34	34	23	13	5	**165**
Purse Seine	**GOM**	24	35	22	51	35	31	15	**213**
	Total	**91**	**156**	**206**	**220**	**239**	**188**	**167**	**1267**
MADMF Portside Observed Cap Trips*									
** only includes trips with >6,600 lbs herring that were not also sampled at-sea by NEFOP*									
Gear	**Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
Bottom Trawl	**SNEMA**	0	0	0	9	49	112	67	**237**
Midwater Trawl	**CC**	2	0	2	0	6	12	9	**31**
	GBK	0	2	0	9	13	9	22	**55**
	GOM	8	4	9	3	4	6	13	**47**
	SNEMA	0	7	4	5	20	31	18	**85**
Purse Seine	**GOM**	0	2	0	0	0	0	1	**3**
	Total	**10**	**15**	**15**	**26**	**92**	**170**	**130**	**458**
MEDMR Portside Observed Cap Trips*									
** only includes trips with >6,600 lbs herring that were not also sampled at-sea by NEFOP*									
Gear	**Cap Area**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**
Bottom Trawl	**SNEMA**	0	0	1	1	2	5	4	**13**
Midwater Trawl	**CC**	0	0	0	0	1	0	0	**1**
	GBK	0	0	0	0	1	0	0	**1**
	SNEMA	0	2	0	0	1	11	7	**21**
Purse Seine	**GOM**	0	0	0	0	0	1	1	**2**
	Total	**0**	**2**	**1**	**1**	**5**	**17**	**12**	**38**

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

Figure 1. Estimated total RHS catch from trips that caught >6600 lbs of Atlantic herring by year, gear and cap area. The blue error bars represent 2 standard errors, and the number above each bar is the number of observed trips.

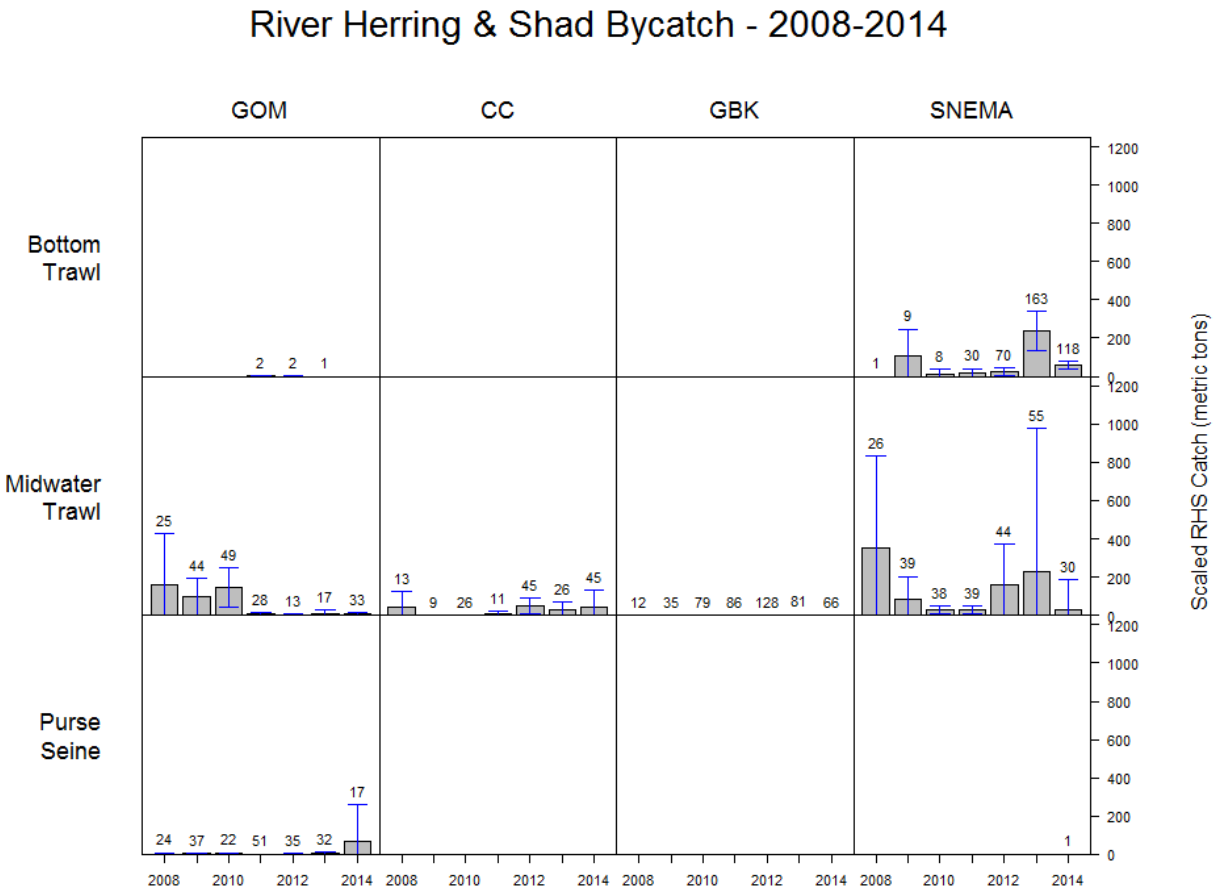


Figure 2. Total number trips that caught >6600 lbs of Atlantic herring by year, gear, and cap area. The dark portion of each bar represents the proportion of total trips that was observed in that year, with the % observed shown above each bar.

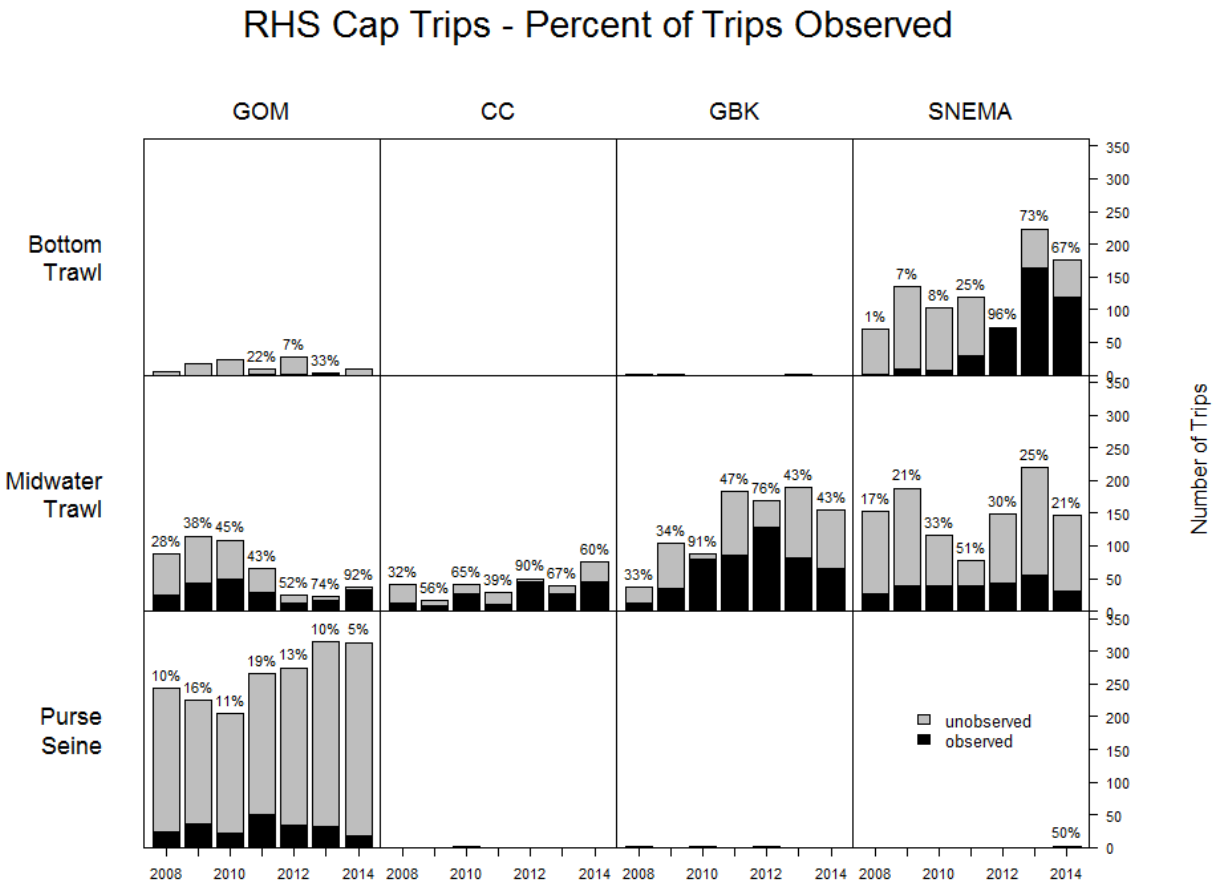
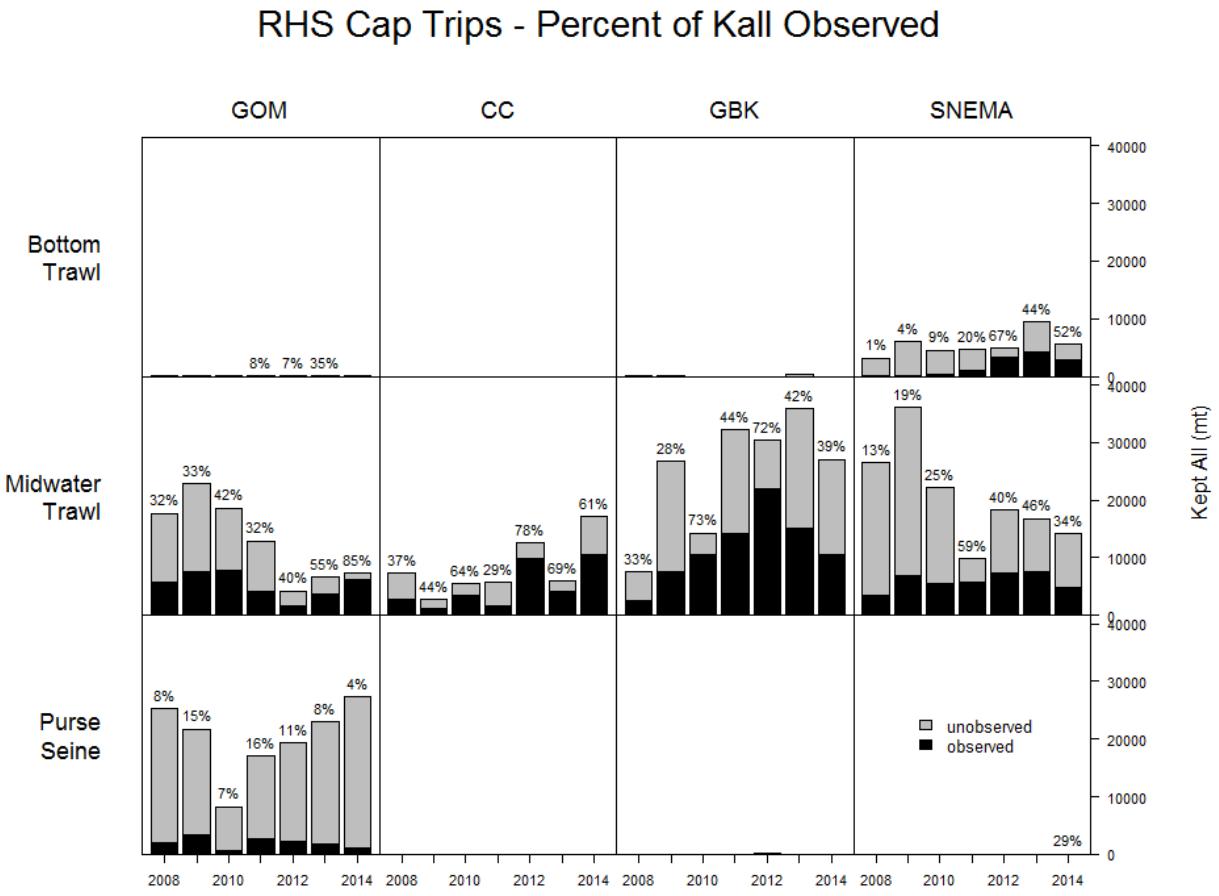


Figure 3. Total catch of all species (Kall) from trips that caught >6600 lbs of Atlantic herring by year, gear, and cap area. The dark portion of each bar represents the proportion of total Kall that was observed in that year, with the % observed shown above each bar.



Sender: Derek Duplissis
RE: Herring spawning please read
Date: August 26, 2015

I'm writing to you as a Herring fisherman who's concerned about the spawning closures. It's not that I don't think we should have them or that I want more time fishing. It's that the timing of the closures is completely WRONG. The date now Is august 25 and for nearly 10 days we have been catching spawners. It doesn't take a biology degree to notice a fish full of eggs or sperm. Last year I witnessed the same thing happen. For 3-4 weeks the siener fleet fished spawners not until the close to the end did they get sent to the easterd. My question is if one siener catches 200,000 lbs of spawners how many herring are we loosing for the future. There needs to be a closer eye kept on what's going on with the herring. Mother nature doesn't have time for buerocracy or the patience for a letter to get signed. Herring are the bait fish for the ocean and we need to insure a good stock for future fish and fisherman. If this email isn't enough please just go to Maine lobster wharf and take a look at the bait. The ocean can afford to loose cod but not herring too much depends on it.

I'm a simple fisherman trying to insure a future for myself and everyone else who depends on the ocean. Please forward this to anyone with the power to help out.