

Atlantic States Marine Fisheries Commission

Shad and River Herring Management Board

October 25, 2016

4:45 – 5:30 p.m.

Bar Harbor, Maine

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 (*B. Goldsborough*) 4:45 p.m.
2. Board Consent 4:45 p.m.
 - Approval of Agenda
 - Approval of Proceedings from May 2016
3. Public Comment 4:50 p.m.
4. Consider Approval of the Nemasket River (MA) Sustainable Fishery Management Plan **Final Action** (*B. Chase*) 5:00 p.m.
 - Review Technical Committee Memo on the Nemasket River Sustainable Fishery Management Plan
5. Discuss the Timetable for the Five-Year Update of Shad and River Herring Sustainable Fishery Management Plans (*A. Harp*) 5:15 p.m.
6. Review Mid-Atlantic Fishery Management Council Decision on Potential Management of Shad and River Herring (*B. Goldsborough*) 5:20 p.m.
7. Other Business/Adjourn 5:30 p.m.

The meeting will be held at the Harborside Hotel; 55 West Street; Bar Harbor, ME; 207.288.5033

MEETING OVERVIEW

Shad and River Herring Management Board Meeting

October 25, 2016

4:45 – 5:30 p.m.

Bar Harbor, Maine

Chair: Bill Goldsborough (MD) Assumed Chairmanship: 1/16	Technical Committee Chair: Brad Chase (MA)	Law Enforcement Committee Representative: Furlong (PA)
Vice Chair: John Clark	Advisory Panel Chair: Pam Lyons Gromen	Previous Board Meeting: May 3, 2016
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, DC, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS (19 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from May 2016

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 Board 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 Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Consider Approval of the Nemasket River Sustainable Fishery Management Plan (5:00 – 5:15 p.m.)

Background

- The Massachusetts Division of Marine Fisheries submitted a Sustainable Fishery Management Plan for river herring in the Nemasket River. It was developed in partnership with the Middleborough-Lakeville Herring Fishery Commission.
- The Technical Committee reviewed the document, provided comments and the document was subsequently updated. The Technical Committee recommends the revised Nemasket River Sustainable Fishery Management Plan for Shad and River Herring Board approval.
- **Nemasket River Sustainable Fishery Management Plan in Briefing Materials, Technical Committee Recommendation in Supplemental Materials**

Presentations

- Overview of the Nemasket River Sustainable Fishery Management Plan and Technical Committee Recommendations by B. Chase

Board actions for consideration at this meeting

- Approve the Nemasket River Sustainable Fishery Management Plan

5. Discuss the Timetable for the Five-Year Update of Shad and River Herring Sustainable Fishery Management Plans (5:15 -5:20 p.m.)**Background**

- The Shad and River Herring Sustainable Fishery Management Plans that have been approved by the Board (in 2011/2012) will be reviewed and updated in 2017. As a result, a summary report of each review will be presented to the Board in 2017.

Presentations

- Timetable will be presented by A. Harp

6. Review Mid-Atlantic Fishery Management Council Decision on Potential Management of Shad and River Herring (5:20 -5:30 p.m.)**Background**

- At the October Mid-Atlantic Fishery Management Council meeting, the Council did not add Shad and River Herring as stocks in the fishery. The Council emphasized its continued interest in protecting shad and river herring in partnership with the National Marine Fisheries Service and ASMFC. The Council will review its 2017 strategic plan at the December meeting, which will include shad and river herring priorities.

7. Other Business/Adjourn

**DRAFT PROCEEDINGS OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
SHAD AND RIVER HERRING MANAGEMENT BOARD**

**The Westin Alexandria
Alexandria, Virginia
May 3, 2016**

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1. **Approval of Agenda** by Consent (Page 1).
2. **Approval of Proceedings of May, 2015** by Consent (Page 1).
3. **Move to approve the 2015 FMP Review of the 2014 Fishing Year, and approve de minimis requests for river herring, New Hampshire, Massachusetts, and Florida and for shad, Maine, New Hampshire, Massachusetts, and Florida** (Page 7). Motion by Bill Adler; second by Steve Train. Motion passes unanimously (Page 8).
4. **Move to nominate John Clark as Vice Chair to the Shad and River Herring Management Board** (Page 8). Motion by Michael Armstrong; second by Dave Simpson. Motion passes unanimously (Page 8).
5. **Move to adjourn** by Consent (Page 8).

ATTENDANCE

Board Members

Terry Stockwell, ME, proxy for P. Keliher (AA)	David Saveikis, DE (AA)
Steve Train, ME, GA	John Clark, DE, Administrative proxy
Cheri Patterson, NH, proxy for D. Grout (AA)	Craig Pugh, DE, proxy for Rep. Carson (LA)
Ritchie White, NH (GA)	Roy Miller, DE (GA)
Mike Armstrong, MA, proxy for D. Pierce (AA)	Mike Luisi, MD, proxy for D. Blazer (AA)
William Adler, MA (GA)	Bill Goldsborough, MD (GA)
Rep. Sarah Peake, MA (LA)	Kyle Schick, VA, proxy for Sen. Stuart (LA)
Sarah Ferrara, MA, Legislative proxy	Rob O'Reilly, VA, proxy for J. Bull (AA)
Bob Ballou, RI, proxy for J. Coit (AA)	Cathy Davenport, VA (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)	Michelle Duval, NC, proxy for B. Davis (AA)
Dave Simpson, CT (AA)	Mel Bell, SC, proxy for M. Rhodes (GA)
Mike Falk, proxy for Sen. Boyle (LA)	Robert Boyles, Jr., SC (AA)
Jim Gilmore, NY (AA)	Pat Geer, GA, proxy for Rep. Burns (LA)
Emerson Hasbrouck, NY (GA)	Spud Woodward, GA (AA)
Russ Allen, NJ, proxy for D. Chanda (AA)	Jim Estes, FL, proxy for J. McCawley (AA)
Tom Fote, NJ (GA)	Martin Gary, PRFC
Adam Nowalsky, NJ, proxy for Asm. Andrzejczak (LA)	Bryan King, DC
Andy Shiels, PA, proxy for J. Arway (AA)	Mike Millard, USFWS
Loren Lustig, PA (GA)	Derek Orner, NOAA

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

Ex-Officio Members

Staff

Bob Beal	Kirby Rootes-Murdy
Toni Kerns	Jeff Kipp
Max Appelman	

Guests

John Bullard, NOAA	Jeff Deem, VMRC
Charles Lynch, NOAA	Shaun Gehan, Gehan Law, DC
Jon Hare, NOAA	Susanna Brian, Baltimore, MD
Wilson Laney, USFWS	Jeffrey Pierce, Alewife Harvesters, ME
Dan McKiernan, MA DMF	Abden Simmons, Maine Elver Fishermen's Assn.
Stew Michels, DE DFW	Jeff Kaelin, Lund's Fisheries, NJ
Joe Cimino, VMRC	Arnold Leo, E. Hampton, NY

Draft Proceedings of the Shad and River Herring Management Board Meeting May 2016

The Shad and River Herring Management Board of the Atlantic States Marine Fisheries Commission convened in the Edison Ballroom of the Westin Hotel, Alexandria, Virginia, May 3, 2016, and was called to order at 11:58 o'clock a.m. by Chairman Bill Goldsborough.

CALL TO ORDER

CHAIRMAN BILL GOLDSBOROUGH: Good morning everyone, by my watch it is still two minutes before noon, so it is still morning. Welcome to the Shad and River Herring Board. My name is Bill Goldsborough. I have the honor of being the new Chair of the Board. I may have forgotten that sequence; since we haven't had a meeting in a year, but Terry Stockwell is the previous Chairman. I want to thank Terry for his service. He didn't let any species get listed on his watch.

APPROVAL OF AGENDA

CHAIRMAN GOLDSBOROUGH: Let's all take a look at the agenda. Does anybody have any additions or changes they would like to recommend? Seeing none; we'll consider the agenda approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN GOLDSBOROUGH: The proceedings from the May, 2015 meeting, or in the meeting information, does anybody have any changes to offer for them? Seeing none; the proceedings from the May 2015 meeting stand approved.

PUBLIC COMMENT

CHAIRMAN GOLDSBOROUGH: We'll take public comment at this time for any issues that are not on the agenda. I see a hand in the back. Des, there is a public microphone right back there.

MR. DESMOND KAHN: For those of you who don't know me my name is Desmond Kahn; I worked for Delaware for a couple of decades, and I was on many of the technical committees for the Commission during that period. I sent

you all an e-mail, or as many of you as I had the e-mail addresses for an e-mail yesterday; on the subject of striped bass predation on shad and herring.

In that e-mail, I attached a paper that I presented last summer at the American Fishery Society annual meeting in Portland, Oregon. I was invited to speak at a symposium on conservation and utilization for sustaining our fisheries. The title of my talk was management of a top inshore predator; deferring recreational and commercial goals, and the impacts on other fisheries.

I am sure many of you are aware of a couple of the points I'm briefly going to try to make today. We're trying to manage shad and herring, yet at the same time we have built up one of their primary predators to very high abundance levels. I think we're kind of working across purposes there. My background is in ecology, and in ecology we've learned that when a primary predator builds up the high abundances, its primary prey usually decline.

I am sure many of you know that the primary prey of striped bass has been found to be members of the herring family, including shad and river herring. There is conclusive scientific evidence now that in several river systems, particularly the Connecticut River and the Delaware River, striped bass predation has driven down the abundance of American shad and river herring. I presented some graphs of that in my paper. This was documented in the Connecticut River by Dr. Victor Creeco, who is really the world's authority on American shad. He's published more peer reviewed scientific papers on this topic than anyone on the topic of American shad. He documented that in the 2007 assessment, but with Tom Savoy, who also works for Connecticut.

Dr. Creeco has since retired, but they tried to bring this information to the board, but their report was removed from the body of the

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report, and put in as an appendix. A separate report for the Connecticut River was written, and their names were put on the report, and it was published as part of the assessment; although they never saw this report.

If you go back to that assessment and you look at the appendix, you will find their report detailing the way that striped bass predation really controlled the abundance of shad. I think we have to start taking a look at some of the tradeoffs in our management among species, and really take an ecosystem-based approach. I would like to encourage you to start thinking about that. Thank you very much.

CHAIRMAN GOLDSBOROUGH: Thank you Des. From that e-mail it looked to me like it didn't go to the most current list of Board members, so maybe staff can make sure that all of you that may not have gotten it do get it. I found the presentation to be very interesting; a good reminder about the ecosystem-based management needing to be a priority. Okay let's move on to Agenda Item Number 4. Jeff, I'll give you the floor.

TIMETABLE FOR AMERICAN SHAD AND RIVER HERRING STOCK ASSESSMENTS

MR. JEFF KIPP: I'll just be giving a quick update on the upcoming American shad and river herring assessments, and a slight change to the assessment schedules for those species. Just a little background, the most recent stock assessments for American shad, there was a benchmark stock assessment in 2007.

There was a benchmark stock assessment for the river herring species in 2012. What we're proposing is a stock assessment update for river herring in 2017. That recommendation was made in the 2012 benchmark assessment, with an update in five years, which would be 2017, and a benchmark assessment ten years from that assessment, which would be 2022.

We did have a call with the Technical Committees and discussed this recommendation, and felt that this was still an appropriate recommendation. Technical Committee members did note that there are some beneficial monitoring efforts that have come, due to Amendment II, that will hopefully be useful in a benchmark assessment; but due to the short time series of those monitoring efforts, an update at this time is still appropriate.

There is also the need to develop robust stock specific ocean bycatch estimates; that preclude a lot of the assessment approaches that are done in other assessments and for other species. But there are some developments with some genetic studies, looking at the ocean bycatch that hopefully will be useful in a benchmark assessment down the road.

We did propose to move this assessment update from 2018, where it was originally on our stock assessment schedule up to 2017; and that is due to NOAA Fisheries revisiting the Endangered Species Act Listing Determination made in 2013, which they said they would be revisiting five years from that date. They are hoping to have the information from this assessment update for that revisiting of that listing determination. For the American shad stock assessment, we're proposing an update of that assessment to be completed in 2018. But we did want to note, we want to keep flexibility to potentially change that to a benchmark assessment, and that determination would be made at a data workshop, when we have a better chance to look at the data that have come online since the last benchmark assessment for American shad.

Similar to river herring, there were notes of the beneficial monitoring efforts due to Amendment III for that species. However, again it was noted that there would be a particularly short time series for most of those new monitoring efforts, and again for American shad

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as well there is the need to develop robust, stock specific, ocean bycatch estimates for that species as well; to move to some more complex assessment approaches.

We've proposed to move this assessment update from 2017 to 2018, to accommodate the river herring assessment; and those changes to the stock assessment schedule will be presented tomorrow to the policy board. The timetables for these assessments moving forward, we plan to have a webinar with the Technical Committees and Stock Assessment Subcommittees in late May, and I did want to note here that the Stock Assessment Subcommittees for shad and river herring will need to be repopulated.

Kirby will be reaching out to the commissioners to repopulate those Stock Assessment Subcommittees. We plan to have a joint data workshop for shad and for river herring in the fall of 2016. Due to the overlap in some of the folks that will be working on those assessments, and also some of the similarities in the data that we'll be going over, we felt that this was a more efficient use of a data workshop to combine those.

Then following that data workshop, efforts will focus on completing the river herring assessment update in 2017. Once that update is completed, we'll then focus our efforts on completing the American shad assessment update by 2018. That is my update, and if there are any questions on those upcoming assessments, I can take those now.

CHAIRMAN GOLDSBOROUGH: Any questions for Jeff on the stock assessment timetable? Yes, Rob.

MR. ROB O'REILLY: Not on the timetable, but more if I may, on the genetic study to look at the ocean intercept fishery. I'm curious as to what is thought about there for that type of study. There were some studies done in the

past, both tagging and genetic; but it was mitochondrial DNA study in the nineties.

I think before the ASMFC went on the closeout of the American shad intercept fishery, there was talk of maybe having sort of a synoptic study to look closely at the intercept fishery. But that never really materialized, so I'm wondering how involved this next study is, and will it utilize the results from the former studies; which those studies didn't really corroborate each other very well.

In fact the tagging study in the early nineties had sort of contradictory results, depending on which study it was. One study gave more of a northern intercept of northern stocks, Connecticut and other stocks north, and the second time around it was more of a southerly approach, as far as where the fish were being intercepted. The mitochondrial DNA study didn't really balance that out either. A couple of questions would be, are you going to tap into the old existing data and how involved is this genetic study going to be? What type of a genetic study is it going to be exactly? Is it a nuclear DNA study? What's anticipated?

MR. KIPP: The study was recently published in 2012 that I mentioned specifically. I don't know the details of it, but it did find disproportionate effects of ocean bycatch on some of the different genetic distinct stocks. I think that information will be synthesized with the studies you just mentioned, and some of that other information.

However, I think that information will come more into play when we move to benchmark assessments, when we have a better handle on the ocean bycatch; not only the magnitude of that bycatch, but also how to partition that across the different stocks we're assessing the population at. I think again that information will come more into play when we move to a benchmark assessment, and again we'll synthesize that genetic study with, hopefully

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any of the other existing information, being tagging study or genetic studies that have been done in the past.

MR. O'REILLY: Sort of a follow up. The absence of a shad fishery in the ocean, and the absence of a directed fishery, and the absence of a directed fishery in the bay, for the most part for many, many years, this type of information could be very good for the natal areas to have this information.

CHAIRMAN GOLDSBOROUGH: Anything else on the assessment timetable? Emerson.

MR. EMERSON C. HASBROUCK: On the American shad assessment in 2018, is that going to be an update or a full benchmark assessment?

MR. KIPP: The plan right now is that that will be an update of the 2007 benchmark stock assessment, with the potential to move to a benchmark assessment, if the Technical Committee and Stock Assessment Subcommittee feel that that is warranted, once we sit down at the data workshop happening this fall; and feel that there are either new data that could be incorporated, or different assessment approaches that were not looked at in that 2007 assessment that could potentially be useful in a new benchmark assessment in 2018.

REPORT FROM DATA STANDARDIZATION COLLECTION WORKSHOP

CHAIRMAN GOLDSBOROUGH: Let's move on to Agenda Item 5.

MR. KIRBY ROOTES-MURDY: I am going to go through this item pretty quickly, and happy to take any questions as they may come up. In May of 2015, the TC and members of the TEWG recommended to the board that a workshop be conducted, looking at data collection and

standardization of current monitoring programs across the coast.

The focus would be on those fishery independent survey programs. This recommendation really went hand in hand with some of the research needs that were outlined in the 2012 stock assessment for river herring. In November of 2015, staff worked with NOAA Fisheries in pulling together a data standardization collection workshop that was approximately two and a half days in Baltimore.

We had 30 participants, including 15 state agencies, 2 federal agencies, NOAA and U.S. Fish and Wildlife, 1 federally recognized tribe, and members from Canada's Department of Fisheries and Ocean. Going into the workshop we had each of those representatives send us their monitoring program write-ups first, and their data; to kind of categorize it by survey type, to really try to break it out and discuss each of these really by category and biological sampling. Coming out of that workshop, the group was able to make a number of recommendations, as I said by survey type, looking at what are the best ways to move most of the surveys that are being conducted along the coast towards a more standardized approach?

That was generated primarily from those state and federal partners who are currently leading those surveys, and have been doing them for a long time series. Trying to get these surveys in line in term of a standardized approach, by survey type, is really important for being able to compare across different parts of the coast; and this approach is useful for helping us move forward in the next stock assessment.

In highlighting both what the best ways to move towards standardization and the financial cost in doing so, the workshop was really useful in outlining how we can start to move things towards more uniform approaches across different regions of the coast. The other part

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was recommendations on biological sampling, to make sure that all the current agencies involved in monitoring river herring are able to collect the same data, and was able to then utilize that in the next assessment.

The workshop report was completed in early 2016. We have it now up on our website. It was included in the meeting materials. We have a hard copy available in the back of the room if people are interested. At this point, I'm happy to take any questions. I'll also point out that Jeff Kipp was also there, and took part, and between the two of us we're happy to answer all questions you have on the workshop.

CHAIRMAN GOLDSBOROUGH: Questions on the workshop. Seeing none; thank you, Kirby. Let's move on then to Agenda Item 6.

UPDATE ON ACTIVITIES OF THE RIVER HERRING TECHNICAL EXPERT WORK GROUP

MR. ROOTES-MURDY: On a related note, I'm going to provide you guys an update, on some of the activities of the River Herring Technical Expert Working Group, also referred to as the TEWG. TEWG activities in 2015, some of the major highlights that I just wanted to make clear to the board were this time last year the conservation plan was made available online.

This is a website that lives on NOAA's website, and basically lays out all the current monitoring programs, the research needs, the management program in place for river herring across the coast; and it was helped informed by the TEWG in providing the specific information that is needed to further the conservation of river herring.

In addition to the Conservation Plan there was funding of a number of restoration projects, including doing run counts in the St. Croix Watershed, doing dam removals on the Exeter River, and barrier removals in Connecticut. Another important point that will be touched on later on today, with climate change, is NMFS

participation in the Northeast Fisheries Science Center's Climate Vulnerability Assessment.

One procedural thing that I wanted to highlight for the board moving forward is that the TEWG leading up to making the Conservation Plan publically available, had been meeting quarterly and having subcommittee meetings in support of those quarterly meetings. Because the Conservation Plan is now online and we are in more of a maintaining that plan and providing updates when needed, full TEWG meetings are now going to be twice a year. Subcommittees can still meet as often as they see are needed for talking about issues relevant to their subgroup, but there will be a move to also have an annual report that highlights what the previous year's big research endeavors were, conservation endeavors, and outcomes of TEWG meetings.

We're in the process of finalizing the 2015 Executive Summary. That has gone out to TEWG members this week, and we will hopefully have that up online in the next couple weeks. With that I'll take any other questions there are on TEWG activities.

CHAIRMAN GOLDSBOROUGH: Questions for Kirby on the workgroup? You guys are making it way too easy. Let's move on to Agenda Item 7.

CONSIDER APPROVAL OF 2015 SHAD AND RIVER HERRING FMP REVIEW AND STATE COMPLIANCE

MR. ROOTES-MURDY: I'm going to go through the 2015 Shad and River Herring FMP Review and Compliance Report. Generally there has been a steady decline in landings over time, as many of you are aware. This has been in part to the moratorium that was implemented through Amendments II and III. States with shad commercial landings were New Jersey, Virginia, North Carolina, South Carolina, and Georgia.

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States with river herring commercial landings were Maine, New Hampshire, New York, Maryland, North Carolina, and South Carolina. Again, states that are able to maintain these fisheries are ones that have demonstrated through their sustainable fishing plans that they can do so. This is a report again for 2014 fishing year as opposed to 2015.

We have a lag in the time between when we received compliance reports and were able to report out on them. In 2014, a total of 776,000 pounds of American shad were landed and 1.8 million pounds of river herring were landed, and 119,000 pounds of hickory shad were landed; and this is coastwide.

The largest states for landings of shad were North Carolina and South Carolina, and the largest landings for river herring was Maine at 1.8 million pounds. In looking at river herring passage counts, the states of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, Pennsylvania, Maryland, and South Carolina all currently collect data on river herring passage counts.

Coastwide in 2014, 2.86 million river herring were counted. Coastwide for shad it was 747,000 shad. What this represents relative to the 2013 fishing year, is about a 1 percent increase in the passage counts for river herring and about a 96 percent increase for shad. When looking at coastwide stocking programs, currently Maine, Massachusetts, Pennsylvania, North Carolina, and South Carolina are currently engaged in stocking programs.

For 2014, 26.4 million shad were introduced and contributed, as well as 296,000 alewives. Percentage increase is relative to 2013 is about a 45 percent increase for American shad, relative to 2013, and about a 10 percent increase for river herring; compared to 2013. Another component of the shad and river herring compliance reports are sturgeon interactions.

In 2014 there was 101 interactions reported in the states of Rhode Island, Connecticut, New Jersey, North Carolina, South Carolina, and Georgia, all released alive with the exception of one fatality. Last, in terms of de minimis requests. The states of Maine, New Hampshire, Massachusetts, and Florida have submitted de minimis requests for shad and for river herring. New Hampshire, Massachusetts, and Florida have requested for river herring and all these states meet the requirements for de minimis. At this point I'll take any questions any of the board members have on compliance reports and FMP review for shad and river herring.

CHAIRMAN GOLDSBOROUGH: Questions for Kirby. John Clark.

MR. JOHN CLARK: I just wanted to point out you didn't have Delaware listed as a state that is stocking shad, and we are.

CHAIRMAN GOLDSBOROUGH: Other questions on the FMP Review or the Compliance Reports or the de minimis requests. Bill Adler.

MR. WILLIAM A. ADLER: Is it appropriate for a motion to accept the de minimis recommendations yet?

CHAIRMAN GOLDSBOROUGH: If I see no other hands. Can we take this hand first Bill, I'll come back to you. Cheri.

MS. CHERI PATTERSON: I just had a question on the Compliance Reports. On unreported, again I'm sorry; I'm a little new to this committee or this board. What is done with all of the unreported information that is indicated in the states compliance reports?

MR. ROOTES-MURDY: It is a good question. You're referring to the biological sampling requirements that are asked of the states, or samplings that are done of different fisheries?

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MS. PATTERSON: Well, I believe that there are standards that are defined, as to what a compliance report needs to submit. I presume that if those are not included in the compliance report that that is what is reflected under unreported information and compliance issues. Are those ever pursued to be completed throughout the year, or are they something that is a repetitive pattern that is never really addressed and we're missing information due to all this?

MR. ROOTES-MURDY: It is a good question. For shad and river herring, one of the issues we've run into is that because there has been a moratorium for much of the fisheries that used to be in place for both species along the coast. A lot of the reporting requirements, for biological sampling that are contingent on recreational fisheries, and commercial fisheries to be taking place, then preclude us from being able to get data on those fisheries when they are no longer happening.

There are requirements that came out of Amendment II and Amendment III, asking for states to have these reports out annually, but if they don't have those fisheries anymore, then they no longer are able to collect that data. The other issue that a number of the states have is in terms of funding and staffing. That if they aren't able to annually provide that data through a fishery independent survey, because they don't have staff able to do it, then it becomes an issue where they annually aren't able to report out on it, even if it is a requirement.

MS. PATTERSON: Is that defined? It isn't really indicated that clearly on a state-by-state basis under the under reported information. Can that in the future be defined; so that we can understand those reasoning are behind some of this unreported information?

MR. ROOTES-MURDY: Yes, and this was discussed by the Plan Review Team, and we

took notes on that and went through each item that a state, for example hadn't provided information and was noted. Though I thought I provided summary information under that for most of the states. If you have specifics on certain states, I can go back and give you some more information; and in the future we can look to provide more information under each of those items that are not listed in depth.

MS. PATTERSON: Yes, I'm willing to take this offline. Thank you.

CHAIRMAN GOLDSBOROUGH: Any other questions for Kirby? Roy.

MR. ROY W. MILLER: Mr. Chairman I'm curious about the Massachusetts de minimis request for river herring. Mike, I seem to recall many years ago now, a considerable effort on the part of Massachusetts for providing fish passage for river herring. Has that program fallen on hard times? It was Buzzy DiCarlo, if memory serves that was your expert in that regard. Have the river herring subsequently disappeared from those systems that were laddered?

MR. MICHAEL ARMSTRONG: No, actually the program is quite robust, and our runs are really back to historic levels right now, in part due to the ladder work we've been doing. But we requested de minimis, because right now we have zero harvest from the runs.

CHAIRMAN GOLDSBOROUGH: Other questions? Okay Bill, I'm back to you.

MR. ADLER: **I would like to move to approve the 2015 FMP Review of the 2014 Fishing Year, and approve these de minimis requests for river herring, New Hampshire, Massachusetts, and Florida and for shad, Maine, New Hampshire, Massachusetts, and Florida.**

CHAIRMAN GOLDSBOROUGH: Thank you, Bill, is there a second? Second from Steve, is there any discussion on the motion? Seeing none; all

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in favor raise your right hand please. Oops, I'm sorry. We're going to wait until we get the motion up on the board; make it official here. Okay, Bill, does that reflect your motion? Okay let's try this again. **Motion is on the board, all in favor please raise your right hand; opposed same sign, abstentions, and null votes. Motion passes unanimously.** All right we're on to Agenda Item 8, Roy.

(Whereupon the meeting was adjourned at 12:33 o'clock p.m. on May 3, 2016.)

ELECT VICE-CHAIR

MR. MILLER: Mr. Chairman, just out of curiosity, considering what we just did. Since so many states are closed for river herring directed harvest, like in our state are. Perhaps in this next updated stock assessment, it would be good if we reexamined the definition of de minimis, and what the requirements are for a de minimis state; in terms of reporting.

CHAIRMAN GOLDSBOROUGH: Good point, Roy, thank you. Okay, as I said at the outset, I have just descended to the Chair, which means the Vice-Chair seat is vacant and we need to fill it. I'll take any motions for Vice-Chair. Mike Armstrong.

MR. ARMSTRONG: I would move to nominate John Clark as Vice-Chair to the Shad and River Herring Management Board.

CHAIRMAN GOLDSBOROUGH: Thank you, Mike, is there a second? I see a second from Dave Simpson. We need Pat Augustine here, but maybe lacking that I'll just go the old fashioned way and say, all in favor please raise your right hand, opposed same sign, abstentions, and null votes. **Seeing none; the motion passes unanimously.** Congratulations, John, and thank you.

ADJOURNMENT

CHAIRMAN GOLDSBOROUGH: Is there any other business to come before the Shad and River Herring Board? Seeing none; we are adjourned.

These minutes are draft and subject to approval by the Shad and River Herring Management Board. The Board will review the minutes during its next meeting.



David E. Pierce, Ph.D.
Director

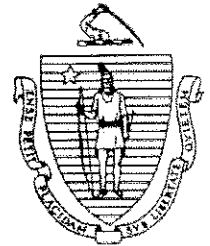
Commonwealth of Massachusetts

Division of Marine Fisheries

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Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

George N. Peterson, Jr.
Commissioner

Mary-Lee King
Deputy Commissioner

August 22, 2016

Ashton Harp
River Herring Fishery Mgt. Plan Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22201

Re: Nemasket River Sustainable Fishery Plan for River Herring

Dear Ashton,

The Massachusetts Division of Marine Fisheries submits the attached Sustainable Fishery Plan for river herring in the Nemasket River for review by the Atlantic States Marine Fisheries Commission.

The Division received a petition from the Middleborough-Lakeville Herring Fishery Commission in December 2013 to open river herring harvest in the Nemasket River. We have since worked with the Herring Fishery Commission to prepare this Sustainable Fishery Plan. The plan has received extensive review from our Division staff and by the Massachusetts Environmental Police.

We request your assistance to schedule the plan's review by the River Herring Technical Committee and Management Board as soon as possible.

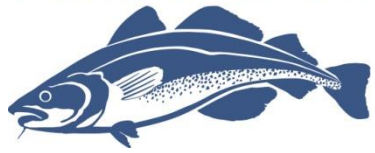
Sincerely,

A handwritten signature in cursive script that reads "David E. Pierce".

David E. Pierce, Ph.D.
Director

Cc: Dan McKiernan, Mike Armstrong, Greg Skomal, Brad Chase, *Marine Fisheries*
David Cavanaugh, Middleborough-Lakeville Herring Fishery Commission

Enc: Nemasket River Sustainable Fishery Plan for River Herring



Nemasket River Sustainable Fishery Plan for River Herring

Developed Cooperatively by the Massachusetts Division of Marine Fisheries and
Middleborough-Lakeville Herring Fishery Commission

August 2016

INTRODUCTION

The Taunton River watershed in southeastern Massachusetts contains at least 10 tributaries that support river herring runs of which the Nemasket River is acknowledged as the most productive in Massachusetts. River herring harvest in Massachusetts has been prohibited since 2006 due to concerns over declining stocks. The objective of this sustainable fishery plan is to allow a reopening of the recreational river herring fishery in the Nemasket River, located within the towns of Middleborough and Lakeville, Massachusetts (Figure 1).

River herring were an important food source for Native American tribes living along coastal rivers. Locally, the Wampanoag people established villages along the Nemasket River (which means “place of fish”) and caught herring during the annual spring migration. The Wampanoag taught the early European settlers to catch herring for sustenance and for fertilizer. Soon after Middleborough was incorporated as a town, laws were established for commercial and personal river herring harvesting. The early Middleborough rules provided allowances for citizens to catch herring, with shares given to widows, orphans, and the poor. Mill owners along the river were required to allow the passage of herring during the annual migration. Also around this time, a long-standing practice began to elect or appoint herring wardens to oversee the herring catch and enforce the fishery regulations. The Town of Lakeville split from Middleborough in 1853 and established itself as a separate town. The incorporating legislation specifically states that Lakeville and Middleborough jointly own and control the Nemasket River Herring Run and jointly share profits (Appendix 1).

The herring in the Taunton and Nemasket Rivers consist of two species, commonly known as river herring. Most river herring in the Nemasket River are alewives (*Alosa pseudoharengus*); typically arriving in mid-March, although in warm winters, they can arrive in late-February. Blueback herring (*Alosa aestivalis*) follow two to three weeks later. Herring are present throughout April and into May. Traditionally the upstream migration peaks in April and fades during the second or third week of May, although in times of abundance the run can continue into June.

WATERSHED

The Taunton River starts at the confluence of the Matfield River and Town River, and flows into Mount Hope Bay near the City of Fall River. The Taunton River is unique among large coastal rivers in Massachusetts in having no main stem dams. The entire watershed is 562 mi² and covers a wide range of rural, suburban, and urban areas in 43 towns and cities. One stream flow gauge station is present on the main stem river in Bridgewater (USGS #01108000; drainage area = 261 mi²). The mean April discharge for the time series to present is 887 cfs. The river was used extensively for commerce and water power during colonial and industrial times. Presently, the mills have long since been closed, water quality has improved, and the Taunton River is now designated as a Wild and Scenic River by the U.S Congress.

The eleven-mile long Nemasket River starts at the Assawompsett Pond dam and flows north, entering the Taunton River near the Bridgewater/Middleborough line. The Nemasket River is flat and slow throughout the entire length and has only one small section of what could be considered rapids, a short distance below Wareham Street in Middleborough. The river is crossed by ten roads (including a multi-lane highway) and two railroad tracks. The low river slope and changes in water supply withdrawals may have contributed to recent increases in aquatic vegetation and siltation. The upper one third of the river forms the boundary between Middleborough and Lakeville. For approximately the lower two thirds of its length, the Nemasket River flows entirely within Middleborough.

Overall, river herring migrate approximately 23 miles and must pass three obstructions in the Nemasket River on the way from Mount Hope Bay to the spawning grounds in the Assawompsett Pond complex. A partially restored colonial mill complex is located at Oliver Mill Park, an attractive and popular public park that includes a large and functional pool and weir fish ladder (Figure 2). The second obstruction is a remnant industrial mill dam and a movable bascule gate from a previous power plant at Wareham Street. A concrete pool and weir fish ladder is located here; originally built in 1874 and reconstructed many times, most recently by *Marine Fisheries* in 1996 (Reback et al. 2004). The third obstruction is the Assawompsett Pond dam where a 1968 Denil fish ladder, the first Denil built in Massachusetts (Reback and DiCarlo 1972), provides passage. Recently, water level operations have allowed passage directly through the gates of the dam, negating the need for the fish to use the ladder.

SPAWNING HABITAT

The Assawompsett Pond complex consists of Assawompsett Pond, Pocksha Pond, Great Quittacus Pond, Little Quittacus Pond, and Long Pond providing over 5,000 acres of river herring spawning and nursery habitat. The first four are directly connected, forming the largest naturally occurring pond in Massachusetts. This amount of habitat is certainly a contributing reason why the Nemasket River hosts the largest river herring run in Massachusetts. Much of the surrounding watershed land, except for Long Pond, is owned by cities, the state, or conservation trusts. Long Pond has experienced more traditional lakeside development, with many seasonal cottages now trending towards year-round neighborhoods.

All ponds in the Assawompsett Pond complex except Long Pond are protected water supply reservoirs for the cities of Taunton and New Bedford. As such, the cities vigorously protect the watershed, and did not even allow fishing from the shore for almost a hundred years. Given the protections and goals of the water supply, the lakes have maintained suitable water quality. The lakes are shallow and prone to temperature changes, although except for years of very low water, there has been no observed limitation of spawning or nursery habitat quality. Spawning adult herring can access the entire pond complex, except for Little Quittacus Pond (not shown in Figure 1) which is gated off to ensure herring do

not enter the intake pump at the New Bedford water treatment plant. Juvenile herring remain in the complex for several months, until exiting during a seaward migration occurring primarily in the fall.

HERRING FISHERY COMMISSION

The towns of Middleborough and Lakeville have a long standing commitment to manage and protect the Nemasket River herring run. This tradition has been supported by monetary incentives and interest to sustain a natural resource used widely by the public. Over the years, individuals and commercial enterprises were allowed allotments of herring and commercial licenses were issued through annual bids. For many years, Middleborough and Lakeville residents were allowed one bushel of herring annually. Commercial herring fishing on the Nemasket River ended in 1965. For many decades, herring wardens were appointed by the Selectmen, but no formal program was in place. In 1996, the current Middleborough-Lakeville Herring Fishery Commission was established and new harvest rules were promulgated. Any Middleborough or Lakeville residents could buy a permit allowing up to four dozen (48) herring being taken per week, with four days open for harvest. Three hundred permits were reserved for residents of other communities. The harvest was overseen by the wardens and several volunteer observers. The season ran from the last Wednesday in March to June 15, although catching usually ended in May as the herring run faded. This system remained in place until *Marine Fisheries* instituted the ban on recreational herring harvest in 2006.

The current Commission consists of seven volunteer fish wardens, appointed jointly by the Boards of Selectmen in Middleborough and Lakeville. Wardens are the voting members of the Commission and are assisted by several volunteers. The Commission is broadly charged with administering and enforcing herring harvest regulations, maintaining and enhancing herring habitat, and public education on the herring run. It was agreed that since the spawning grounds and river boundaries were in both Middleborough and Lakeville, and the law gave control of the herring run to both towns, then both towns should work jointly to protect the herring. Operating as a Chapter 44, Section 53E and ½ revolving fund agency, Commission funds came solely from the sale of herring permits. With the ban on herring catching, no permits have been sold and no operating funds have been generated since 2005. Through frugal management practices the Commission presently maintains an annual operating budget.

POPULATION AND HARVEST ESTIMATES

Early in the 20th century Belding (1921) reported the Nemasket River herring run was underperforming mainly due to blockages and pollution related to mill works on the river. The herring harvest in 1912 was reported as 200 barrels (about 140,000 fish) with an estimated potential of 2,000 barrels (about 1,400,000 fish) (Belding 1921). A review of more recent river herring surveys by *Marine Fisheries* (Reback and DiCarlo 1972; Reback et al. 2004) and Herring Commission files reveals a pattern of improvement in the herring run during the 20th century that may reflect rebounding habitat quality as mills closed, improved passage at obstructions, and the stewardship of the Herring Commission.

Volunteer herring counts were established in 1996 and utilize a ten-minute count at the top of the Wareham Street fish ladder, along with recording air temperature, water temperature, weather at the time of the count, and barometric pressure. The volunteer counts were provided to *Marine Fisheries*, who calculate annual estimates of herring passage based on extrapolating the ten-minute counts.

The Nemasket River herring count data was revisited in 2012 to generate run size estimates using a random stratified sampling design recommended by *Marine Fisheries* (Nelson 2006). The updated analysis partitions 10-minute counts into three periods of each day. This approach avoids bias that can occur when counts are concentrated at a time of day of run peaks and these data influence the

extrapolated results for other times of the day. The updated analysis results in lower run size estimates than the earlier method (Table 1, Figure 3). The run size time series shows a low point in 2004 and 2005 of less than 250,000 herring with a moderate increasing trend since the harvest ban in 2006. The series high estimate was over 1.3 million fish in 2002 followed by about 840,000 fish in 2013. These catch numbers relative to other herring counts in Massachusetts support the commonly held assertion of the Nemasket River being the largest herring run in the state.

For decades prior to 1996, the residents of Middleborough and Lakeville were allowed one bushel of herring per year, although recreational harvest enforcement was not consistent and was poorly reported. The illegal harvest of herring mainly for lobster and striped bass bait became a growing problem that no records can accurately describe. In 1996, local control was formally established and the Herring Commission has since endeavored to record recreational herring catch numbers. Issued permits were formatted to allow Herring Wardens at the catching station to record the number of fish taken on each catching day. Harvest permitting ceased with the state-wide ban in 2006.

Stocking Source. The Nemasket River has been a source of river herring for stocking to augment or create runs at other rivers for many decades. For the last ten years, the Commission participated in formal multi-year stocking programs in cooperation with *Marine Fisheries*. Typically, the Commission provided 2,000 herring per year to restock other runs on a five-year program. The five-year period allowed for one or two years of continued stocking after the first returns of spawning fish should have occurred. Stocking efforts have been recently conducted for the Town, Concord, and Ten Mile rivers, and in cooperation with the Rhode Island Department of Environmental Management, University of Massachusetts, and *Marine Fisheries* for stock enhancement and research purposes.

SUSTAINABLE HARVEST PLAN

ASMFC. The Atlantic States Marine Fisheries Commission's (ASMFC) Amendment 2 to the Interstate Fishery Management Plan for Shad and River Herring gives states guidance for developing Sustainable Fishery Plans (SFP) for river herring (ASMFC 2009). These plans are to be developed and approved by State jurisdictions then reviewed by the ASMFC Technical Committee and if suitable forwarded to the ASMFC Shad and River Herring Management Board for approval. The premise is that SFPs should allow harvest while not diminishing the potential future reproduction and recruitment of herring stocks. The SFPs are based on Sustainability Targets that relate management responses to population action and warning levels. SFPs can be river-specific, regional or state-wide. The ASMFC guidelines also state that a minimum of 10 years of demographic data is needed to support Sustainable Fishery Plans.

ASMFC Sustainability Targets. *The recommended sustainability targets in Amendment 2 included: spawning stock biomass, fish passage counts, mortality rates, repeat spawning ratio, and juvenile abundance indices. From these measures, thresholds or targets shall be set to prompt action level (mgt. action such as fishery closure or regulation change) or warning level responses (documentation and mgt. planning).*

Five state plans were reviewed and approved during 2011–2012 (ME, NH, NY, NC and SC). Most sustainability targets are based on exploitation rates and escapement targets related to fishery dependent harvest or independent herring passage counts. Single applications occur for both using a recruitment failure definition and a juvenile index as targets. Two states are investigating the use of population metrics (mortality, length, CPUE, and repeat spawning ratio) as sustainability "measures" or warning limits.

Herring Commission Objectives. The Middleborough-Lakeville Herring Fishery Commission sent an inquiry to *Marine Fisheries* on December 18, 2013 in regard to the potential and process for opening

harvest of river herring at the Nemasket River. Consequently, several meetings occurred to discuss the topic and *Marine Fisheries* staff evaluated the available biological and count data that could be used to develop metrics for a river herring sustainable fishery plan. The Commission, with their decades of experience managing the Nemasket River run, stated their belief that their previous harvest system of permitting, reporting, and limited harvest days under Commission supervision would allow a sustainable harvest. They support this contention by outlining that the modest harvest of 1999–2005 averaged about 15% of the annual run count with no evidence of impact on future recruitment. Furthermore, these harvest years include the two lowest run counts in the time series (2004 and 2005) that were followed by nearly 10 years of steady improvements to run counts. Therefore, they expressed an interest in opening harvest to allow similar catches as occurred in 1999–2005, that when removed from the present stock, would constitute an exploitation rate of less than 10% of the run size.

State Role. *Marine Fisheries* supports this request conceptually and has proceeded to evaluate the existing biological and count data from the Nemasket River and four additional herring runs to provide regional context and to gain a wider perspective on recent stock changes. From this review, the following framework is presented for a Nemasket River Sustainable Fishery Plan for river herring. The proposed SFP would commence in 2017. The harvest ban would at that time have been in place for 11 years (2006–2016) and the count time series duration will be 21 years.

Management Unit. The SFP has a river-specific management unit of the Nemasket River herring run in the Towns of Middleborough and Lakeville.

Sustainability Measures. The ongoing run count with calculated run size will serve as the primary measure to monitor the Nemasket River run status.

Sustainability Target. One fishery-independent sustainability target will be used. Harvest will be capped at 10% of the time series mean (TSM). This value will be recalculated each year. This level was selected as a conservative level of harvest that will be lower proportionally than 1999–2005 harvest levels in the Nemasket River and will allow within-year management measures to adjust daily limits and close harvest when the harvest target is reached. Table 1 and Figure 3 provide the run count statistics that formed the basis of the recommended sustainability target. The review also considered reductions from the 25th percentile as conservative levels of harvest. The selected harvest target of 10% of the TSM produces a similar harvest as a 15% reduction from the 25th percentile and was preferred due to the reduced complexity.

Primary Action Threshold. The 25th percentile of the Nemasket River run count time series will serve as the primary action threshold to trigger a management response to declining run size.

Management Actions. With two consecutive years where the Nemasket River run count is below the 25th percentile, the sustainability target will be reduced to 5% of the TSM for the following year. Three consecutive years with the run count below the 25th percentile of the time series will trigger a minimum 3-year closure the following year. In order to reopen the harvest, an opening threshold of three consecutive years above the TSM would have to occur.

Secondary Threshold. An annual exploitation rate of 10% of the run size will serve as a secondary threshold or warning limit. An exploitation rate of 10% of annual run size would recently have been similar to a harvest target of 10% TSM; but also would provide an alternative annual signal of how harvest relates to run size. Two exploitation rates in approved SFP presently target 18% (SC) and 20% (NH) of average run counts. Annual exploitation rates will be tracked each year with a threshold of 10% assigned as a warning limit. Following a single, annual exceedance of this threshold, *Marine Fisheries* will meet with the Middleborough-

Lakeville Herring Fishery Commission to review harvest records and management practices and document the review and cause of increase in exploitation rate in a joint memorandum.

Potential Future Metrics. With the SFP implementation, and increasing time series, efforts will be made to develop additional primary and secondary thresholds. *Marine Fisheries* has conducted annual biological sampling of alewife and blueback sex, size, and age data at the Nemasket River since 2004 (Tables 2 and 3, and Figure 4). These data allow the calculation of age, length, and weight statistics and estimates of sex ratios, mortality, and survival. The target sampling level is 100 river herring per week for the duration of the run to meet suitable levels of power to discern trends (Nelson et al. 2011) for both sexes and species. The targeted run duration is usually six weeks. Aging is conducted using otoliths and following published *Marine Fisheries* protocols (Elzey et al. 2015).

The data derived from biological sampling can provide additional information on population status and supporting evidence for management measures. However, as found in Nelson et al. (2011), the length and age metrics for river herring analyzed to date in Massachusetts provide little predictive power when related to population abundance. Mean lengths and mean ages of fish within a run can point to long-term changes in demography, but the current time series appears to be tracking inter-annual fluctuations in year class recruitment into the population and indicates that robust age structure has not been recovered. With these conditions, it is not presently possible to clearly identify thresholds associated with the biological data. This limitation is not unexpected nor prevents the development of future metrics: 11 years of size and age data allows the tracking of only two generations of river herring. *Marine Fisheries* recommends that biological data continue to be collected from the Nemasket River herring run with the goal of developing population thresholds based on the following metrics:

Age Structure. Evidence of age structure truncation is present now in Massachusetts river herring populations, including the Nemasket River population. Additional cohorts to evaluate age structure or mortality rates may become useful for setting warning limits. Changes in age structure will be examined annually using the χ^2 test as described in Davis and Schultz (2009).

Repeat Spawners. A target percentage of repeat spawners in annual spawning run could be used for setting a warning limit. However, with the present focus on otoliths for aging, it would take a renewed effort to collect and process a subsample of scales from older Nemasket River herring to compare to earlier scale samples.

Escapement Targets. Alternatively to annually opening harvest at the start of the run, the Commission could consider not allowing harvest until a suitable escapement target of incoming spawners was met. The escapement target would depend on real-time reporting from an electronic or video counting station at one of the Nemasket River fishways and relate counts to a metric on spawning habitat productivity. For example, the Maine Department of Marine Resources uses a calculation based on spawners per surface acre of spawning and nursery habitat (Havey 1961, Havey 1973) to set escapement targets. This would guarantee a certain number of spawners entering the spawning habitat and guard against unexpected low returns. One potential drawback in some systems could be focusing the harvest on later arrivals that may have a higher proportion of younger fish or blueback herring.

HARVEST MANAGEMENT

Opening harvest in a single river creates management and enforcement challenges given that Massachusetts has about 80 rivers within 48 coastal towns that contain river herring runs. The Nemasket River is presently the only river proposed for harvest in 2017. Ideally, a regional approach

would be established to allow several runs to open at the same time. This would reduce concerns over harvest compliance and enforcement while providing a larger opportunity for Commonwealth citizens who are not town residents to purchase harvest permits. This has been a goal of *Marine Fisheries*; however, while several Towns have expressed an interest in opening harvest, no other herring runs presently have the full complement of favorable stock status, a suitable data series, and the infrastructure and dedication found in the Middleborough-Lakeville Herring Fishery Commission.

The prior system of harvest management in the Nemasket River was managed by the Middleborough-Lakeville Herring Commission until the 2006 state-wide ban (Appendix A2). They used a proven system of selling an unlimited number of permits to residents and 200–300 permits to non-residents with a weekly maximum catch of 48 fish that could be taken on four open days at only one catching area. Catching was only allowed in the presence of a Commission herring warden or volunteer observer. The permits were printed with punch-card features on the border that allowed the herring wardens to mark each weekly harvest.

The Commission was interested in opening harvest in 2017 with an approach similar to pre-2006 that allowed a large permit base to have access to 48 fish per week with the acknowledgement that many permit holders won't maximize their allowable catch. Following review of three alternative management options, the following approach was selected for balancing the interest of providing access to many harvesters and preventing overages of the harvest target (10% of TSM = 55,967 fish).

Harvest Management. Typically 600-700 resident permits were sold per year in the decade prior to the harvest ban and non-resident permits were capped at 200-300 and provided via lottery. The available harvest records do not presently allow a determination of the harvest rate per permit or number of inactive permits. However, the Commission's impression is that a majority of permits did not realize their maximum harvest rate and many were inactive or marginally used. Therefore, this proposal seeks to limit the potential for overharvesting the sustainability target by reducing the harvest period to five weeks, reducing the harvest days to three per week, and reducing the weekly catch limit per permit to 20 fish. Using the range of permits sold previously, this approach would have a potential maximum harvest that ranged from 80,000 to 100,000 fish (800 to 1000 permits). By allowing unlimited resident permits and 250 non-resident permits via lottery the Commission is expecting about 900 total permits. The maximum harvest under this scenario would be 90,000 fish. An assumed harvest rate of 50% of the maximum potential harvest would result in a harvest of 45,000 fish.

The potential for harvest to exceed the sustainability target exists for this approach if a high proportion of permit holders takes the full weekly harvest each week. This proportion is expected to be low given the Commission's past experience. This outcome is hard to predict but will be easily tracked once harvest is open. The SFP will diligently monitor harvest performance by permit and week in order to make annual adjustments to relate the harvest target to the numbers of permits issued.

The previous "punch-card" permit system would be augmented with the issuance of daily catch cards to each permit holder that harvests herring. The card would indicate the date, permit number, and number of fish. State regulations will be changed by *Marine Fisheries* to require that any possession of river herring in Massachusetts be accompanied by the Nemasket River harvest permit and the daily harvest card. Herring frozen in bags must have the original daily harvest card placed in the bag. The permits and daily catch cards would be professionally printed on waterproof paper.

The usage of harvested river herring trended sharply towards striped bass bait in the decade leading up to the state-wide harvest ban. *Marine Fisheries* recognizes that a component of the concern that led to the state-wide ban on river herring harvest was excesses in the harvest for striped bass bait. Recreational bait use will be allowed; however, the SFP seeks to promote and encourage traditional uses of consumption of river herring as grilled, pickled, and smoked fish and fried roe. To do this, the Commission will accommodate herring consumption requests as able. For example, requests for only females for roe harvest might be allowed when manageable. In these cases, the Commission should record the female only harvests and compensate on a daily basis as needed by providing males for bait use.

Native American Harvest. The Commonwealth of Massachusetts recognizes the aboriginal practice of the Wampanoag tribe to harvest river herring in Massachusetts. An agreement has been signed between the parties with the tribe agreeing to harvest only for sustenance purposes and to report their harvest by river to *Marine Fisheries*. The tribe's harvest is not bound to SFP measures; however, an accurate accounting of their harvest in the Nemasket River will be essential for a successful SFP. *Marine Fisheries* will discuss the possibility of issuing free permits to the Wampanoag tribe and to coordinate with the tribe to encourage responsible harvest and record keeping.

STATEWIDE REGULATIONS AND ENFORCEMENT

For this harvest opening to be successful and enforceable, the process will need a tightly managed accounting system for daily harvest, well-planned coordination with the State Environmental Police, and participation from Town law enforcement. A coordination meeting will be held with the Massachusetts Environmental Police, *Marine Fisheries*, Town Police, and the Herring Fishery Commission each year prior to the season start. *Marine Fisheries* will enact changes to the existing state regulations that ban state-wide harvest to allow harvest and possession of Nemasket River herring in accordance to this SFP and the Herring Fishery Commission regulations. This process will include a review of existing penalties for non-compliance and updating the penalties as needed.

The Massachusetts Environmental Police has recommended that the Commission provide information on permit records and seasonal harvest records to improve the enforcement of harvest regulations. The ideal approach would be to have an online source of permit records and the names and schedules of herring wardens available at the start of each season with weekly updates in harvest by permit. The Commission does not have the present capacity to provide an online permit data source or online weekly updates of harvest. However, the Commission recognizes the value in these communications for law enforcement and will endeavor to work with *Marine Fisheries* to prepare a spreadsheet of permit holder information and river herring warden names, schedules, and phone numbers for the start of the 2017 season.

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TABLES & FIGURES

Table 1. River herring run counts and harvest data for the Nemasket River, Middleborough, MA. Recorded at the Wareham Street fishway.

Year	Original Run Count (No.)	Updated Run Count (No.)	Permits (No.)	Harvest (No.)	% of Count (%)	Summary Statistics	
1996	1,094,860	696,666				TSM	559,673
1997						Median	548,835
1998	866,538	651,441				Minimum	225,904
1999	1,043,906	766,694	742	104,992	0.14	Maximum	1,361,691
2000	1,069,286	560,986		76,426	0.14	75% TSM	419,755
2001	476,779	284,498	1966	59,514	0.21	1st Q	387,894
2002	1,919,402	1,361,691	2698	86,301	0.06		
2003	792,990	548,835	2113	61,945	0.11	10% of 1st Q	38,789
2004	578,000	244,832	2109	64,593	0.26	15% of 1st Q	58,184
2005	401,000	225,904	1931	33,964	0.15	20% of 1st Q	77,579
2006	505,246	313,242				10% of TSM	55,967
2007	659,880	462,000					
2008	848,848	392,451					
2009	760,717	383,338					
2010	763,884	489,931					
2011	662,052	512,139					
2012	NR	567,952					
2013	NR	840,033					
2014	NR	590,105					
2015	NR	741,048					

Time series mean (TSM), 75% of TSM and first Quartile are derived from the count time series and displayed in Figure 2.

Table 2. The number collected (n), mean length (mm), and standard deviation (SD) of river herring from the Nemasket River by sex during 2004-2014.

Year	Female			Male		
	n	Mean Length	SD	n	Mean Length	SD
2004	127	291.5	14.36	141	282.6	15.15
2005	130	280.4	15.20	148	273.0	16.11
2006	127	275.3	13.66	197	265.1	13.35
2007	255	278.1	12.41	395	276.6	12.84
2008	228	281.9	12.49	276	269.1	12.94
2009	191	278.3	11.33	313	268.1	11.06
2010	277	272.1	10.69	276	272.1	10.67
2011	220	287.1	11.21	283	275.2	11.42
2012	154	284.3	13.44	229	270.3	12.50
2013	213	279.5	9.79	284	270.5	10.14
2014	236	287.2	11.63	324	277.2	11.24

Table 3. The annual number alewife by age in biological samples collected from the Nemasket River during 2004-2014.

Age	Female										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2	0	0	0	0	0	0	0	0	0	0	0
3	0	4	27	22	2	0	22	17	59	115	73
4	23	50	56	163	38	48	80	95	72	48	93
5	52	54	34	59	134	60	71	57	19	6	6
6	40	19	6	5	33	36	14	7	2	2	1
7	8	1	1	1	5	4	2	2	2	0	1
8	0	1	0	1	0	0	0	0	0	0	0
Totals	123	129	124	251	212	148	189	178	154	171	174

Age	Male										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2	0	0	0	0	0	0	0	0	9	11	0
3	4	10	62	41	36	8	42	36	91	113	103
4	39	51	91	257	76	118	88	98	61	42	59
5	65	17	31	82	110	98	51	44	12	6	11
6	30	17	9	12	37	29	7	4	1	0	2
7	1	6	1	1	1	1	1	0	1	0	0
8	0	0	1	0	0	0	0	0	0	0	0
Totals	139	101	195	393	260	254	189	182	175	172	175

Figure 1. Nemasket River Watershed

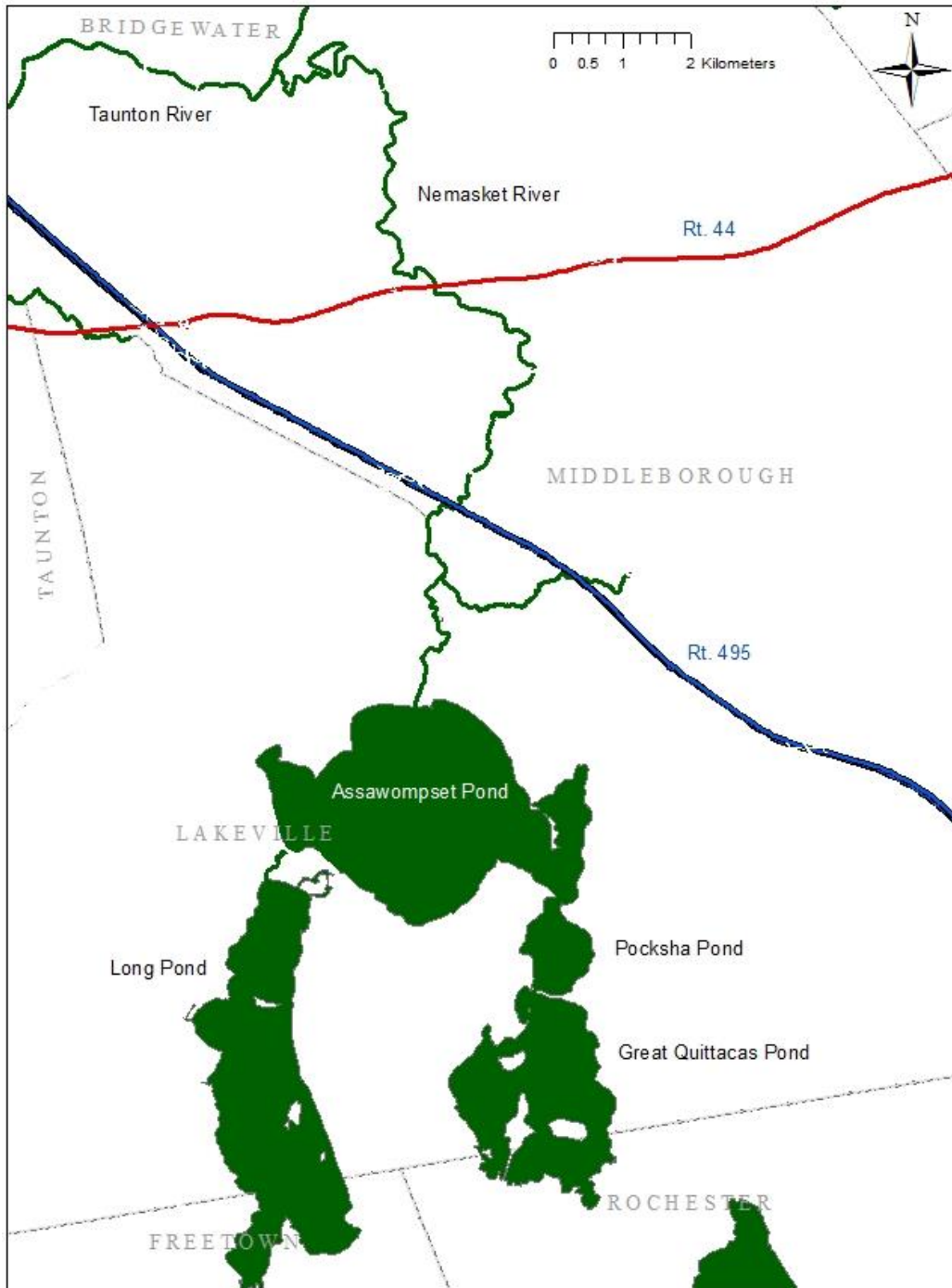


Figure 2. Oliver Mill Park, Nemasket River, Middleborough.



Figure 3. Annual river herring run count estimates for the Nemasket River, 1996 - 2015. The horizontal lines delineate the time series mean (TSM), 75% of the TSM, and 25th percentile (1st Q).

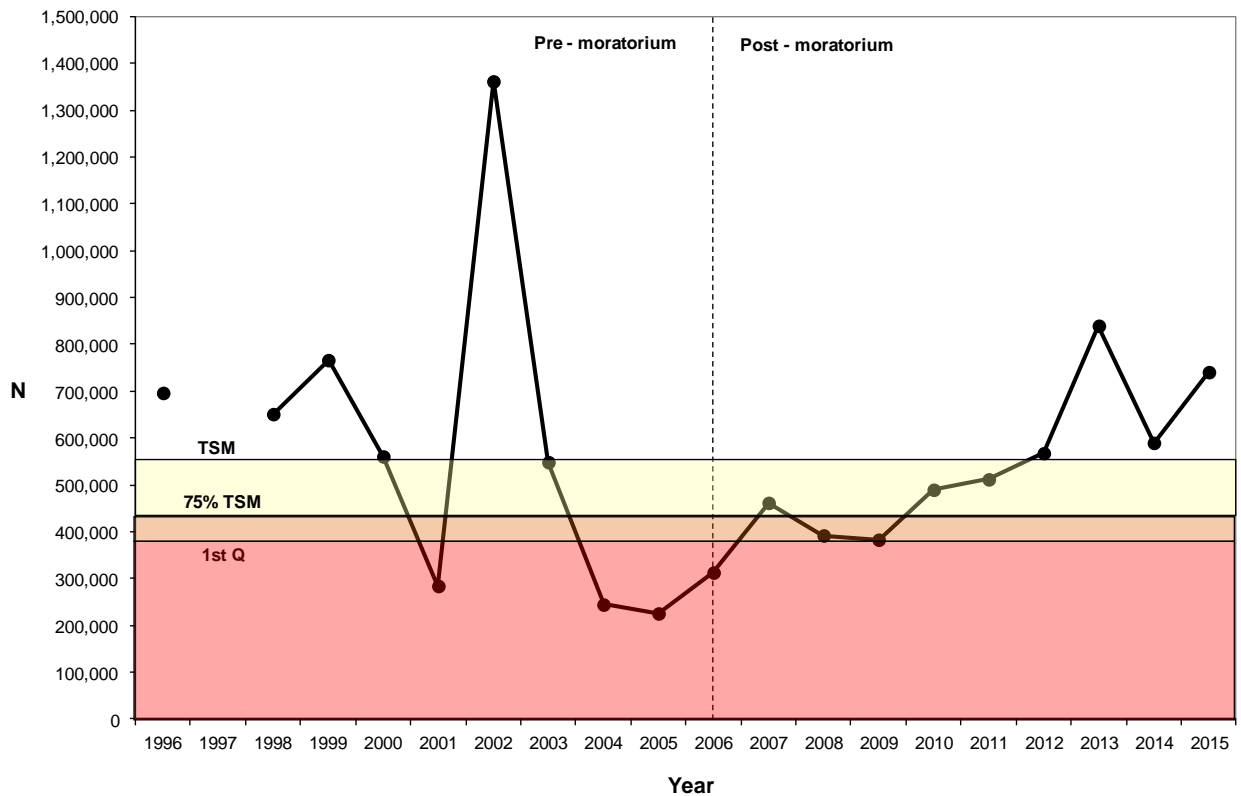
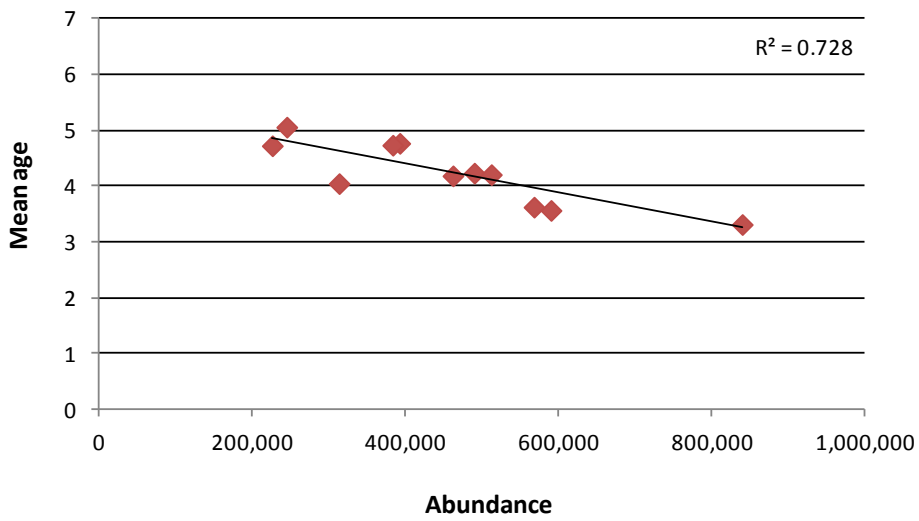


Figure 4. Scatterplot with linear trend and R^2 value of the mean age in years against abundance (run count) for alewife sampled at the Nemasket River, Wareham Street, during the period 2004-2014. The age data combines male and female alewife.



APPENDIX

A1. Massachusetts Legislature, Acts of 1853; Chapter 338, Section 5 of the Act incorporating the Town of Lakeville, Massachusetts.

"The alewife fisheries of the Nemasket River shall be and remain the property of said towns of Middleborough and Lakeville, and the manner of taking said fish, and the whole management of said fisheries, shall be regulated by the selectmen of said towns; and the proceeds thereof shall be divided between the said towns, in proportion to the number of ratable polls in each respectively, and the respective parts of such protocols shall be disposed of by said towns respectively, in such a manner and for such purposes as each town shall for itself determine and direct."

A2. Middleborough-Lakeville Herring Fishery Commission: Herring Rules and Regulations, December 2004 (the last revisions prior to the state-wide ban in 2006).



Bank Building, 20 Centre Street, Middleborough, Massachusetts 02346

HERRING RULES AND REGULATIONS

A. No herring may be taken without a valid and signed permit. Herring may only be taken during posted hours with a Warden or Volunteer Observer on duty.

B. A **maximum** of 48 fish per week may be taken, in any combination of visits. The Warden or Observer on duty may limit the catch as conditions warrant.

C. Herring may **ONLY** be taken by hand-held hoop net **WITH A MESH OF 3/8 INCH OR SMALLER** or by hand. Herring that are "gilled" or otherwise injured must be harvested first.

D. Permits are sold at the Middleborough Town Clerk's Office, 20 Center Street, Monday through Friday from 8:45 AM to 5:00 PM. The Commission will determine the number of permits sold and the manner of sale each season.

E. Permit Fees: Valid identification will be required.

\$5.00 Middleborough/Lakeville Residents	\$25.00 Non-residents
\$1.00 Middleborough/Lakeville Senior Citizens	\$5.00 Non-resident Senior Citizen

Duplicate Permits \$2.00 (with proof of identification).

F. Catching Days and Times:

Wednesday:	4:00 PM to 8:00 PM
Friday:	6:00 AM to 7:00 PM
Saturday:	5:00 AM to 7:00 PM
Sunday:	6:00 AM to 10:00 AM

The season opens on the last Wednesday in March and ends June 15, unless closed earlier as dictated by the availability of fish.

Exception: To accommodate sport fishermen and tide considerations; herring may be taken at other times of the day or night, from May 15 to June 15 (depending on the availability of fish). The Middleborough Town Manager must be notified at least 24 hours in advance. Call (508) 947-0928 during business hours to set an appointment with a Warden or Volunteer Observer.

G. Catching Area:

1. The pool below the falls at the Wareham Street fish ladder in Middleborough is the **ONLY** legal catching area in Middleborough or Lakeville. **No herring may be taken without the direct permission of the Warden or Volunteer Observer on duty.**

2. No one is permitted to enter the fish ladder, including the concrete mouth of the ladder. No one is permitted to disturb, injure, hinder or obstruct the passage of herring in any fish ladder. Fishing in the pools above or below the fish ladders at Oliver Mill Park and Wareham Street with a rod and reel in a manner which disturbs the herring, or which could snag a herring is prohibited.

3. For safety reasons, to prevent disturbing herring eggs and to prevent hindering the passage of herring; no person is permitted to enter the river at any time.

H. Littering in the general park area or throwing rocks, sticks or other objects into the fish ladders or catching areas is prohibited. Visitors and catchers shall assume all risk and liability.

It is the Commission's intention to provide a safe recreational area. Disorderly conduct or public drunkenness will not be tolerated. Offenders will be ejected from park areas.

MGL Chapter 130 Sect. 95 applies throughout Middleborough and Lakeville:

Taking Fish From Fisheries Without Permission

"Whoever takes, kills or hauls onshore or disturbs, injures, hinders or obstructs the passage of any herring, alewives or other swimming marine food fish ... shall be punished by a fine of not less than five nor more than fifty dollars."

The Towns of Middleborough and Lakeville and the Mass. Environmental Police may prosecute violation of these rules. Violators are subject to arrest, fine, seizure of equipment, and loss of permit.

All Rules and Regulations are subject to the discretion of the Warden or Volunteer Observer on duty. Regulations may be modified as conditions warrant.

Revised: December 2004