

CORRESPONDENCE



New England Fishery Management Council

50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

February 29, 2016

Mr. John Bullard
GARFO Regional Administrator
NMFS/NOAA Fisheries
55 Great Republic Drive
Gloucester, MA 01930

Dear John:

On January 27, 2016, the Council selected preliminary preferred alternatives for the IFM Amendment. The Council adopted the following guiding principles related to the IFM Amendment:

Motion 1: That the Council adopts the following guiding principles for Industry Funded Monitoring (IFM) programs implemented by GARFO. Data collection programs for the estimation of fishery catch should: (1) Be fit for purpose-the reason, or clear need, for data collection should be identified to ensure objective design criteria; (2) Be affordable-the cost of data collection programs should not diminish net benefits to the nation, nor threaten the continued existence of our fisheries. However, essential data collection is needed to assure conservation and sustainability, and is reason to seek less data intensive ways to assess and manage fisheries on the economic margins; (3) Should apply modern technology-data collection should prioritize the utilization of modern technology to the extent possible to meet our data collections needs, while recognizing an affordable robust program is likely to need a mix of data collection by people and technology; and Incentivize reliable self-reporting.

The motion carried on a show of hands (15/1/1).

Motion 2: That the Council recommends the removal of the IFM service provider requirement to not deploy the same observer on the same vessel for more than two consecutive multi-day trips or for more than twice in a given month.

The motion carried on a show of hands (12/2/3).

The Council selected Alternative 2 (Standardized cost responsibilities and standardized administrative requirements for industry-funded monitoring service providers) and Alternative 2.6 (allow FMPs to establish a monitoring set aside via a framework) as their preliminary preferred alternative in the IFM Amendment. The Council also selected Alternative 2.1 (Council-led Prioritization Process) as their preliminary preferred alternative in the IFM Amendment. The Council also passed a motion making it clear that the prioritization process could be modified via a framework adjustment, which should be reflected in the IFM Draft EA/Amendment. The Council did not identify a specific approach to prioritize the Herring and Mackerel IFM Programs proposed under the IFM Amendment. Therefore, we encourage Council and GARFO

staff coordination to identify an approach to address this issue.

Motion 3: That the Council select Alternative 2 (Standardized cost responsibilities and standardized administrative requirements for industry-funded monitoring service providers) as the preliminary preferred alternative for the IFM amendment.

The motion carried on a show of hands (10/5/2).

Motion 4: That the Council select Alternative 2.6 (allow FMPs to establish a monitoring set aside via a framework) as the preliminary preferred alternative for the Industry-Funded Monitoring Amendment.

The motion carried on a show of hands (16/1/0).

Motion 5: That the prioritization process in the IFM Amendment could be modified via a Framework Adjustment.

The motion carried on a show of hands (16/1/0).

Motion 6: That the Council select Alternative 2.2 (Council-led Prioritization Process) as the preliminary preferred alternative for the IFM Amendment.

The motion carried on a show of hands (14/1/2).

Please contact me if you have questions.

Sincerely,

A handwritten signature in black ink that reads "Thomas A. Nies". The signature is written in a cursive style with a large, stylized 'T' and 'N'.

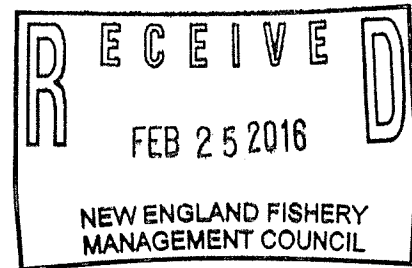
Thomas A. Nies
Executive Director

c.c.: Dr. Christopher Moore (MAFMC, Executive Director)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

February 25, 2016



Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dear Tom:

Through conversations over the last few days, I realize that we made some careless mistakes in our February 11, 2016, letter on the 2016-2018 Atlantic Herring Specifications. We did not intend to single out any staff or imply that there was a deliberate refusal to accept our advice. I apologize for having sent a letter with wording that implied that. With our ongoing and future actions, we will be more mindful to support our shared goal of a collaborative process.

Our staffs have already begun to take positive steps toward effective collaboration. My staff talked through our edits and comments on the specifications with your staff. I understand that they are resolving specific issues with the document and have paved the way for moving forward with the action. They have also set a goal of meeting face-to-face in the near future to strengthen their working relationship.

While I cannot take back the words in the letter, I would like to clarify our intent, specifically with the following paragraph:

"My staff worked with yours in the development of impact designations. Through discussions prior to the submission of the EA during PDT meetings, phone calls, and in staff-to-staff email exchanges, we highlighted the need to assess the impact of maintaining status quo measures relative to the baseline conditions described in the Affected Environment. Many of our recommendations were not accepted, but we believe that our recommended impact descriptions would better inform the public and are more consistent with the intent of NEPA."

We inadvertently changed the message that my staff was trying to convey in this paragraph when we revised a draft of the letter. The initial draft of this paragraph highlighted the successful discussions between our staffs, including an October 2015 email exchange, regarding how to describe the impact of the no action alternative for the herring specifications on protected species. We did not intend to convey that your staff ignored our specific comments to revise impact conclusions for the no action alternative for the specifications from negligible to low positive. Rather, in this paragraph, my staff

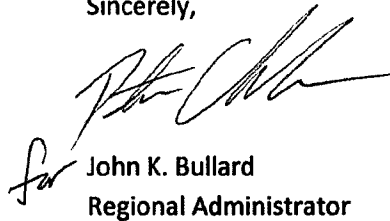
cbk, rf



wanted to convey that the same NEPA rationale that applied to the protected species revisions should also apply to the impacts of the no action alternative for the specifications across all valued ecosystem components (VECs). Ultimately, we removed references to the protected resources impacts discussion and did not consider how that changed the message in the paragraph. Finally, saying "Many of our recommendations were not accepted..." was not necessary, and we should have omitted that part of the sentence. Again, we do not believe that your staff deliberately ignored our suggestions.

We value a strong and effective relationship, and we truly look forward to building that with you and your staff.

Sincerely,

A handwritten signature in black ink, appearing to read "John K. Bullard", is written over the typed name. The signature is fluid and cursive.

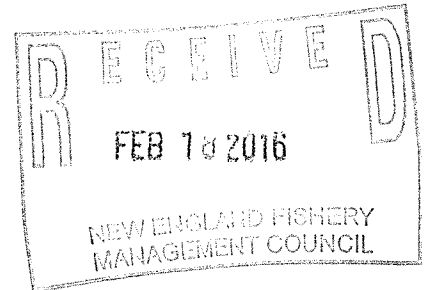
John K. Bullard
Regional Administrator



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

FEB 11 2016

Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950



Dear Tom:

Please see our comments in the attached Environmental Assessment (EA) regarding the Atlantic herring 2016-2018 Specifications you submitted to us on November 4, 2015. In it, we identify some important issues that need to be addressed before we can accept the EA and complete the regulatory process for the action. Many of the issues we have noted reflect concerns that my staff raised and communicated through the Herring Plan Development Team as part of the development of the EA.

We based many of our comments on the EA's assessment of impacts of proposed measures as positive, negative, or negligible. Given the successful management of this fishery, it is more appropriate to characterize the continued management of this fishery (i.e., status quo) as having a low positive impact on the herring resource, rather than indicating the impacts are negligible. We should be viewing management decisions that maintain catch and bycatch at healthy levels as positive management strategies, not as strategies that have negligible impacts. We have attached an updated Table 63 that summarizes changes that we request your staff make.

My staff worked with yours in the development of impact designations. Through discussions prior to the submission of the EA during PDT meetings, phone calls, and in staff-to-staff email exchanges, we highlighted the need to assess the impact of maintaining status quo measures relative to the baseline conditions described in the Affected Environment. Many of our recommendations were not accepted, but we believe that our recommended impact descriptions would better inform the public and are more consistent with the intent of NEPA.

We also need you to clarify in the EA that the proposed herring specification alternatives only differ with regard to ABC and ACL (driven by the choice of management uncertainty buffer), and that all other specifications (DAH, DAP, BT, USAP, RSA, and FGSA) are status quo. These other specifications are status quo because the Council did not consider a range of alternatives for these specifications. Additional comments deal largely with revisions/updates of catch data that are not accurate, description of how decisions were made on management matters, and clarification of text in the EA.

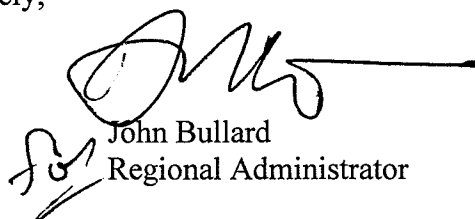
Rather than outline our changes in an attachment to this letter, our staff has collectively added comments and edits to the previously submitted EA Word document. Please resubmit the document (in Word, in Track Changes mode, is our strong preference) when you have made



revisions. It is important that we are able to identify where changes were made, and how our comments were addressed, as that will speed up the remainder of the review process. If we need you to make additional revisions, we will inform you in writing.

Please let us know if you have any concerns or questions.

Sincerely,



John Bullard
Regional Administrator

Table 63

	Atlantic Herring	Non-Target Species	Fishery-Related Businesses and Communities
2016-2018 Atlantic Herring Fishery Specifications			
Alt 1 (No Action)	Low Positive*	Negligible	Low Positive*
Alt 2	Low Positive*	Negligible	Low Positive*
Alt 3 (Preferred)	Low Positive*	Negligible	Low Positive*
2016-2018 RH/S Catch Caps			
RHS Alt 1 (No Action)	Negligible	Low Positive**	Negligible
RHS Alt 2	Negligible	Low Positive**	Negligible (Possibly Negative for SNE/MA SMBT)
RHS Alt 3 (Preferred)	Negligible	Low Positive**	Negligible (Possibly Negative for SNE/MA SMBT)

*Differences between impacts of Alt 1, Alt 2, and Alt 3 are negligible

** Differences between impacts of RHS Alt 1, RHS Alt 2, and RHS Alt3 are negligible



New England Fishery Management Council

50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

February 5, 2016

Mr. John Bullard
Greater Atlantic Regional Administrator
NMFS/NOAA Fisheries
55 Great Republic Drive
Gloucester, MA 01930

Dear John:

At the January 2016 meeting of the New England Fishery Management Council, the Council passed a motion in support of using state portside data in monitoring the bycatch caps of the Atlantic herring fishery:

"The Council supports the motion postponed from the September 2015 Council meeting regarding use of portside data to monitor river herring/shad catch caps, with the inclusion of using portside data to monitor the haddock catch caps."

Postponed motion from September 2015:

"Because river herring/shad bycatch in the sea herring fishery is monitored by NMFS solely from observer data, the Council requests NMFS include state portside monitoring of river herring/shad catch to determine that catch relative to the bycatch caps."

Portside sampling of herring and mackerel trips has been conducted by Maine and Massachusetts since 1999 and 2008, respectively. The portside data have proven to be an important tool in setting river herring/shad bycatch caps. Analyses by the Herring Plan Development Team (Amendment 5, Framework 3) and Maine Department of Marine Resources indicate that there is no significant difference between river herring/shad catch estimates derived from at-sea observers versus portside samplers on trips sampled by both.

The Council understands that additional technical work is required prior to using the data for in-season monitoring and encourages continued collaboration with state partners to this end. Thank you for considering this request of the Council. Please contact me if you have any questions.

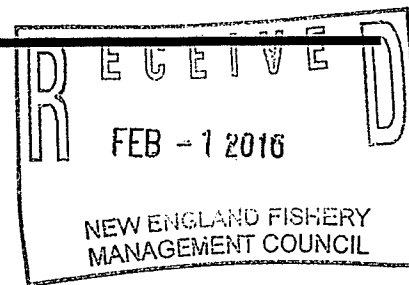
Sincerely,

Thomas A. Nies
Executive Director

51

Sherie Goutier

From: Doug Morrison <dougmorrison@doverps.com>
Sent: Sunday, January 31, 2016 9:10 AM
To: info info
Subject: Herring bycatch limits
Expires: Friday, July 29, 2016 12:00 AM



Please do not weaken the limits on river herring bycatch. The fish are vital to our ecosystem!

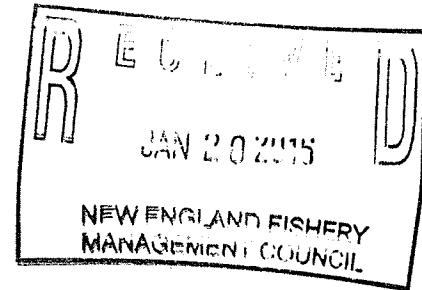
Thank you.

Doug

Douglas Morrison CPA
Dover Professional Search
Accounting | Finance | Tax
(508) 242-3099 work
(617) 834-0639 cell
dougmorrison@doverps.com



THE
PEW
CHARITABLE TRUSTS



January 20, 2016

Robert E. Beal, Executive Director
Atlantic States Marine Fisheries Commission
1050 North Highland St., Suite 200 A-N
Arlington, VA 22201

RE: Draft Amendment 3 to the Atlantic Herring FMP

Dear Mr. Beal:

On behalf of The Pew Charitable Trusts, I submit these comments regarding the Atlantic States Marine Fisheries Commission's (ASMFC) Draft Amendment 3 to the Atlantic Herring Interstate Fishery Management Plan (Amendment 3). We commend the ASMFC for initiating this amendment to strengthen spawning protections for Atlantic herring in the Gulf of Maine. Protecting the forage base of the Northeast Shelf ecosystem, including Atlantic herring, is essential to successful fisheries management. While Pew supports many of the changes proposed in this amendment, we also strongly support and encourage ASMFC's continued focus on expanding protections for spawning Atlantic herring in the offshore areas of Georges Bank and Nantucket Shoals.

Specifically, Pew urges the ASMFC to:

- Approve and implement Amendment 3, particularly the measures developed to improve protection for spawning herring including: a spawning forecast system to improve the timing of closures, merging the Western Maine and Massachusetts-New Hampshire closures into a single tri-state area, extending the spawning closure periods to six weeks, and re-closing the spawning areas for two weeks if one catch sample shows herring are still in spawning condition.
- Approve and implement the requirement for fish holds to be empty of fish before vessels depart on a herring trip to reduce wasteful fishing and improve accounting of catch and bycatch, and remove the fixed gear set-aside rollover provision to allow fixed gear fishermen to maintain access to this dedicated quota throughout the fishing year.
- Immediately make a formal request of NOAA Fisheries and the New England Fishery Management Council (NEFMC) to use the best scientific information available to improve spawning protections for Atlantic Herring in the Omnibus Habitat Amendment (OHA2).

Enhancing spawning protections for Atlantic herring in the inshore Gulf of Maine

Pew recommends that the ASMFC approve Amendment 3 and adopt the following measures for implementation:

The Pew Charitable Trusts
185 Devonshire St, Suite 701, Boston, MA 02110, p: 617.728.0300

RF- 1/22/16

Issue 1: Spawning Area Efficacy

- **Spawning Area Closure Monitoring System: Option C (GSI₃₀-Based Forecast System).** We support the spawning forecasting system developed and recommended by the Herring Plan Development Team (PDT). This tool will help managers forecast when spawning will begin so closures can be triggered proactively and based on sound science to better protect schools of spawning herring. Under this option, we support the most conservative trigger proposed to inform the start of a closure (i.e., the 70th percentile GSI₃₀ trigger value), which should offer more protection for herring in spawning condition, including aggregating and pre-spawning fish.
- **Default Closure Dates: Option C, Sub-Option C1 (70th Percentile, GSI₃₀ Trigger = 23).** If sufficient samples are not available for informing closures, closures should continue as established by the default dates associated with the 70th percentile trigger value. Similar to above, establishing closures based on the 70th percentile value will result in earlier closure dates that should better protect pre-spawning activity. The ASMFC should also establish a system for obtaining herring samples from fishery-independent sources to supplement commercial sampling and decrease reliance on default closure dates.
- **Spawning Area Boundaries: Option B (Tri-State Spawning Area).** We support the PDT recommendation to combine the Western Maine and Massachusetts/New Hampshire spawning areas into a single tri-state area, which will simplify management and help increase the number of herring samples available to inform the timing of this closure.
- **Spawning Closure Period: Option B (Six Week Spawning Closure).** We support increasing the current four-week closure period to a six-week closure, or longer if justified, to better protect aggregations of spawning herring. This is consistent with the PDT's finding and recommendation that the current closure period is inadequate and should be increased based on studies in the Gulf of Maine showing that herring typically spawn over a 40-day period.¹ Closure periods longer than six weeks may be justified in light of a variable and changing climate which can affect the timing of fish migration and spawning, often in unpredictable ways. A new study by NOAA researchers suggests the rate of ocean warming in the Gulf of Maine (which is already warming faster than 99 percent of the world's oceans) may be greater than previously projected, likely leading to more extreme effects on the ecosystem.²
- **Re-closure Protocol: Option B (Defined Protocol).** We support resuming spawning closures for an additional two weeks if one sample shows that significant numbers of herring are in spawning condition. However, we question whether the threshold used to define significant spawning (i.e., 25 percent or more mature herring in a 100-fish sample) is conservative enough to trigger a re-closure that meets the objective of providing protection for spawning herring. As mentioned above, the ASMFC should incorporate fishery-independent sampling to improve the detection of spawning fish.

Issue 2: Fixed Gear Set Aside Provision Adjustment: Option B (Remove the rollover provision)

- We support the adjustment that allows traditional fixed gear fishermen to maintain access to dedicated quota (currently 295 mt) through the end of the fishing year. Currently, regulations allow up to 500 mt of the Area 1A allowable catch to be allocated to fixed gear fisheries

¹ ASMFC (Jan. 2015). Technical Report on Gonadal-Somatic Index-Based Monitoring System for Atlantic Herring Spawning Closures in US Waters, pgs. 3-5.

² Saba, V. S., et al. (2015). Enhanced warming of the Northwest Atlantic Ocean under climate change, J. Geophys. Res. Oceans, 120; also see NOAA press release: http://www.nefsc.noaa.gov/press_release/pr2016/scispot/ss1601

operating in Area 1A until November 1st before the remaining set-aside is made available to other gear types. Fixed gear fishermen in Maine have requested access to this dedicated quota until the directed fishery in 1A closes. The PDT concluded there is no biological basis for or against adjusting the rollover provision, however issues associated with providing this quota in late fall to the midwater trawl fleet, where it could be utilized in ecologically important areas such as Ipswich Bay, were identified at the public hearings. We support allowing traditional fixed gear fishermen access to this quota until 1A closes (rather than making it available to other gear types), however we oppose rolling any unused quota for use in the next year.

Issue 3: Empty Fish Hold Provision. Option B2 (State Empty Fish Hold Provision).

- We support a requirement for Atlantic herring vessels (Category A/B) to have fish holds empty of fish prior to departing on a declared herring fishing trip, not contingent on federal adoption. As indicated in the amendment this provision aims to “to reduce waste from fishing...[and] benefit bycatch species, such as river herring, through better catch data and monitoring by preventing mixing of catch from multiple trips.”³ This measure is consistent with the empty fish hold provision approved and recommended by the New England Fishery Management Council (NEFMC) in Framework 4 to the Atlantic Herring FMP.

Advancing offshore spawning protections for Atlantic herring

In addition to addressing the management issues discussed above, we urge the ASMFC as part of Amendment 3 to request NOAA Fisheries and the NEFMC to take immediate action to institute offshore protections for spawning Atlantic herring on Nantucket Shoals and Georges Bank. Scientists widely recognize that Atlantic herring persist as a meta-population made up of multiple distinct groups. Thus, the protection of each spawning component is critical to ensure the stability and successful management of this important resource throughout the Northeast Large Marine Ecosystem. The importance of offshore spawning protection is further underscored by research demonstrating that the recovery of herring on Georges Bank, which collapsed in the mid-1970s, was due to recolonization from nearby spawning components in the Gulf of Maine and Nantucket Shoals.⁴

Protection of spawning herring, including offshore components, has been a priority of the ASMFC since it first initiated closures in 1994 as part of the 1993 Atlantic Herring FMP. Recently, the ASMFC has explored the potential for an offshore spawning study to inform spawning management in federal waters, and requested the collaboration and support of the NEFMC, the Greater Atlantic Regional Fisheries Office (GARFO) and Northeast Fisheries Science Center. As noted in its request dated April 14, 2014:⁵

³ ASMFC (Jan. 2016). Public Hearing Document For Draft Amendment 3 To The Atlantic Herring Interstate Fishery Management Plan For Public Comment, pg. 24.

⁴ Petitgas *et al.* (2010). Stock collapses and their recovery: mechanisms that establish and maintain life-cycle closure in space and time. – ICES Journal of Marine Science, 67: 1841–1848; Stevenson DK, Scott ML (2005). Essential fish habitat source document: Atlantic herring, *Clupea harengus*, life history and habitat characteristics (2nd edition). NOAA Tech Memo NMFS NE 192, 84 p; Overholtz, W. J., and Friedland, K. D. (2002). Recovery of the Gulf of Maine –Georges Bank Atlantic herring (*Clupea harengus*) complex: perspectives based on bottom trawl survey data. Fishery Bulletin US, 100: 593 –608.

⁵ Letter to NEFMC Executive Director Tom Nies from ASMFC Executive Director Robert Beal, dated April 14, 2014

...spawning fish must be protected not just near the coast, but in offshore waters as well, to ensure long-term sustainability of sea herring."

However, to date, it appears no further progress has been made on advancing this proposal to study and better protect spawning herring in offshore waters. The ASMFC and its federal partners should immediately prioritize this work and continue to aggressively seek funding and collaboration through government, industry, private foundations or other sources.

As we emphasized in our comments on the Public Information Document for Draft Amendment 3,⁶ the most immediate opportunity to protect spawning herring is through the NEFMC's Omnibus Habitat Amendment (OHA2). However, the OHA2, as proposed to NOAA Fisheries by the NEFMC, offers little protection for well-known herring spawning areas, particularly on Georges Bank and Nantucket Shoals. We have commented on the deficiencies in the NEFMC's approach to spawning throughout the development of the OHA2, most recently in letters to the NEFMC in March and June 2015.⁷ In our comments, we urged the NEFMC to take an integrated view of habitat protection, seeking out habitat areas that could achieve multiple goals, including protection of herring spawning aggregations and their eggs. For example, the OHA2 contains a number of habitat alternatives that would, with appropriate management, protect spawning Atlantic herring (See Appendix, Figure A1). Among these, Alternative 8 for Georges Bank is in a vital offshore herring spawning area. The OHA2 also contains options in Downeast Maine and the Great South Channel that could also improve a region-wide program for protection of these vital forage fish.

Such protections should be added to the NEFMC's OHA2, which the NEFMC recently submitted to NOAA Fisheries for review. Substantially all of the necessary data and analysis is already contained in the OHA2 and its accompanying EIS. Alternatively, although it would likely delay these needed protections and be less efficient, a new trailing action to OHA2 could instead be initiated and expedited to add these protections.

The vitality of the remaining offshore spawning groups is essential to the regional marine environment and to the re-establishment of near-shore spawning groups. The current lack of protections for these spawning components represents an outdated and risk-prone approach to managing for the long-term health of the herring resource. Special attention to Atlantic herring spawning, including coordination with the NEFMC in federal waters, is well aligned with the ASMFC's Five-Year Strategic Plan (2014-2018).⁸ Accordingly, we strongly encourage the ASMFC to immediately make a formal request of GARFO and the NEFMC to use the best scientific information available to improve the spawning protections for Atlantic Herring in the OHA2 before it is adopted into regulation.

Thank you for the opportunity to comment on the Draft Amendment 3 to the Atlantic Herring FMP. We look forward to working with ASMFC on proactive and precautionary long-term management of herring

⁶ Letter to ASMFC from Pew re: Draft Amendment 3 PID, dated July 10, 2014.

⁷ Letter to Council chair Terry Stockwell and Regional Administrator John Bullard, from Pew et. al., dated June 10, 2015; Letter to Council Executive Director Tom Nies from Pew, dated March 17, 2015

⁸ ASMFC Five-Year Strategic Plan 2014-2018

and other forage fish to ensure the health and productivity of the Atlantic coast marine ecosystem is maintained.

Sincerely,



Peter Baker
Director, U.S. Oceans, Northeast
The Pew Charitable Trusts

cc:

Mr. John Bullard, Regional Administrator
NOAA Fisheries Service, Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930

Thomas J. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Appendix: presented to the NEFMC February 20, 2014 as part of a comment letter on the Omnibus Habitat Amendment.

Appendix II: Forage Fish

Food: Atlantic herring EFH. Atlantic herring, their spawning grounds and other critical areas, must be protected as EFH. Herring is a keystone species within the Northeast U.S. Continental Shelf large marine ecosystem,⁹ serving a vital role as food for many of the region's most prized fish including Atlantic cod, haddock, and bluefin tuna. Herring also provide essential sustenance for other species under the stewardship of NOAA Fisheries, including whales and other mammals protected by both the ESA and the Marine Mammal Protection Act (MMPA). The influence of herring and a second major food source, sand lance, on the spatial distribution of cod was a focal point for a new analysis during the recent cod stock assessment. These two forage fish can represent over half of the adult cod diet and thus the places where these two forage species occur drive the spatial and temporal distributions of cod and other predators. When sand lance is in high abundance on Stellwagen Bank, cod concentrate there in places referred to as *forage hotspots* in the Gulf of Maine cod stock assessment.¹⁰ At other times, cod redistribute themselves in the Western Gulf of Maine when feeding on herring. A recent peer reviewed study in the Proceedings of the National Academy of Sciences showed that not only are adult herring vital as food for cod and other groundfish, but their eggs and larvae are a major source of food for haddock.¹¹

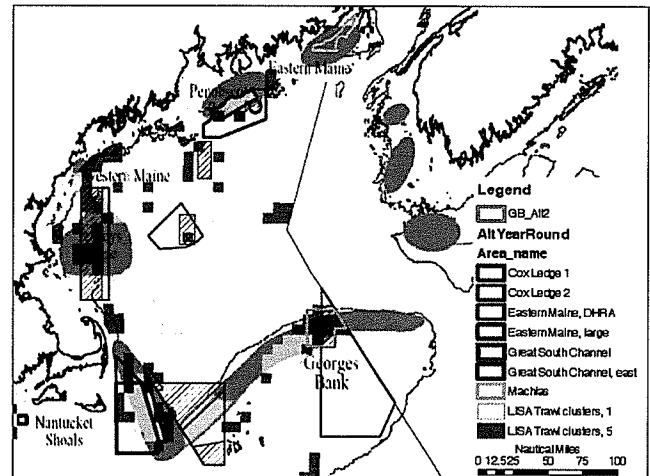


Figure A1. Spawning areas of Atlantic herring (green) shown together with SASI/LISA areas, existing EFH areas, and some of the DEIS alternatives. Spawning areas reproduced from the most recent stock assessment (SAW/SARC 54, 2012).

⁹ Overholtz; Richardson DE et al (2010) ICES; Read and Brownstein, 2003; Brandt and McEvoy, 2006; Overholtz and Link, 2007.

¹⁰ Gulf of Maine Atlantic Cod (*Gadus Morhua*) Stock Assessment For 2012, Updated Through 2011. 55th SAW Assessment Report. Northeast Fisheries Science Center Reference Document 13-11

¹¹ Richardson DE et al (2011) Role of egg predation by haddock in the decline of an Atlantic herring population. Proceedings of the National Academy of Sciences, 108 (33):13606–13611

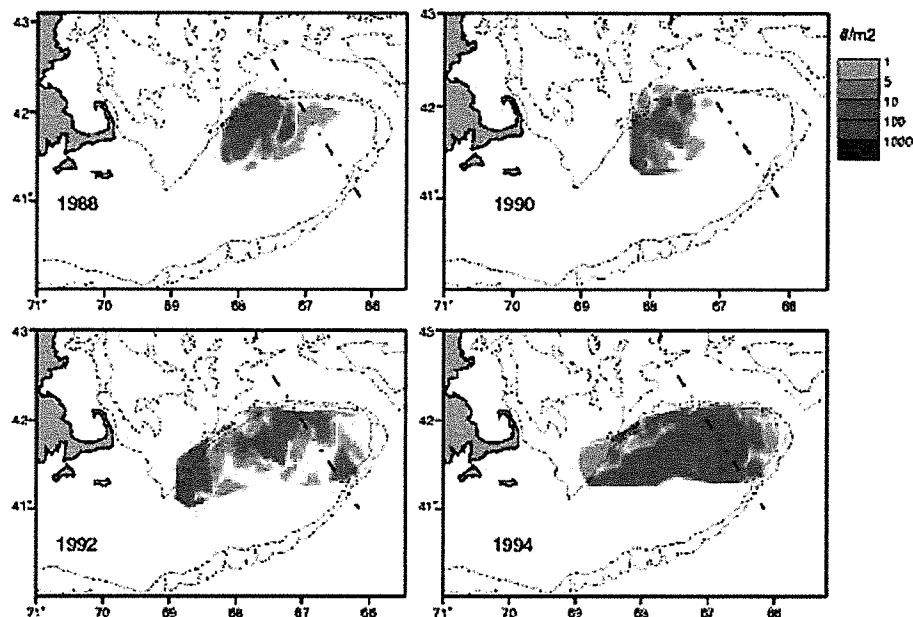


Figure A2. Distribution of recently hatched Atlantic herring on Georges Bank. Reproduced from EFH source document, NOAA Technical Memorandum NMFS-NE-192 (2005)

Atlantic herring form shoals during site-specific spawning behavior. In some cases, these shoals are vast (e.g., 250 million herring on the Northern Edge of Georges Bank at one time),¹² making the fish especially vulnerable to fishing at this critical life stage. Herring eggs are adhesive, sinking to the bottom where they adhere to rocks, pebbles, gravel, or shell beds selected for spawning, and form dense egg-mats.¹³ Thus, not only are aggregated adults vulnerable to fishing during spawning but so too are the eggs on the bottom. Any gear contacting the bottom will disturb the eggs, particularly mobile gears such as otter trawls, clam dredges, and mid-water herring trawls. Herring spawning in a given locality may have a dominant time in the year, but spawning can occur at many different times year, from early spring through late fall in the Northeast. Management should be designed to ensure that even small spawning contingents are not inadvertently extirpated by fishing, which makes the population as a whole more vulnerable, and reduces the availability of herring as food (i.e., eggs, larvae, juveniles and adults) in space and time.

Distinct spawning groups of Atlantic herring have been documented over the past century as illustrated in the map above, reproduced from the most recent herring stock assessment (Figure A1).¹⁴ This map does

¹² Makris NC et al (2009) Critical Population Density Triggers Rapid Formation of Vast Oceanic Fish Shoals. *Science* 323: 1734-1737.

¹³ Reviewed in Collette and Klein-MacPhee 2002

¹⁴ Figure A4- 3 reproduced from SAW/SARC 54 Stock Assessment of Atlantic Herring – Gulf of Maine/Georges Bank For 2012, Updated through 2011: *Generalized view of the current major herring spawning areas in the Gulf of Maine and on George Bank*; an identical map is included as Figure 3 of the Essential Fish Habitat Source Document: Atlantic Herring, *Clupea harengus*, Life History and Habitat Characteristics. Second Edition, 2005. NOAA Technical Memorandum NMFS-NE-192.

not capture a number of small near shore spawning localities, some of which may no longer exist, nor the spawning areas documented along the southern edge of Georges Bank.¹⁵

Both the EFH management areas and the measures adopted for them must ensure that the spawning grounds for Atlantic herring are afforded sufficient protection to ensure spawning success for herring throughout the year. Herring spawning is driven by specific conditions of the substrate and water flow and use of particular places has waxed and waned throughout recent history. Management should allow for reestablishing spawning in areas where spawning may be minimal today.

Food: Sand lance as EFH. Sand lance is widely recognized as another vital forage species in the region, supporting marine mammals, seabirds, cod and other fish important to commercial and recreational fisheries. As noted in the discussion of Atlantic herring above, studies done for the Gulf of Maine cod stock assessment indicate that cod aggregate on Stellwagen Bank to feed on sand lance when abundant.¹⁶

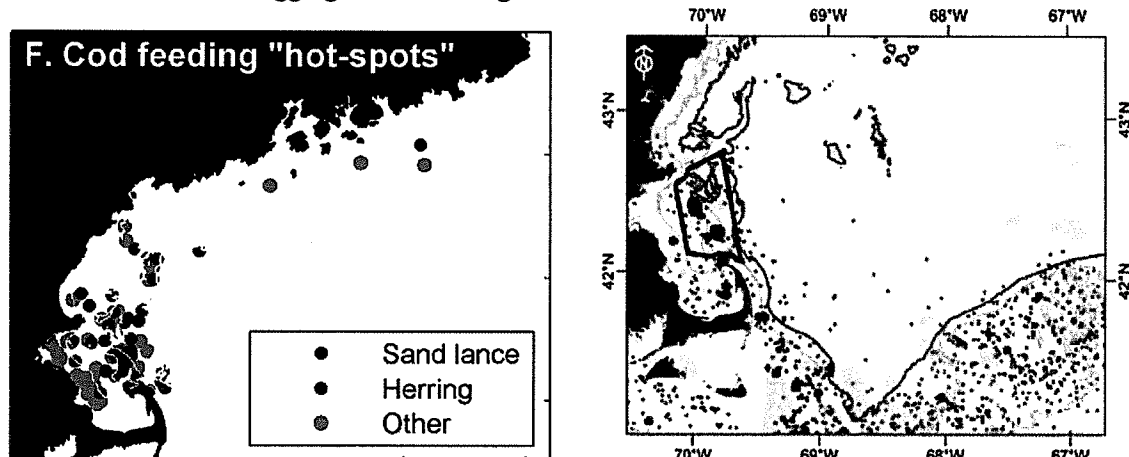


Figure A3. The left panel shows data on cod feeding based on stomach contents and the right panel depicts the distribution of sand lance, an important forage fish; abundance is proportional to the diameter of each red point (1975-2000).

With other historically important forage fishes diminished in the region (e.g., river herring and shad), the role of Atlantic herring and sand lance are particularly important. Analysis of the stomachs of cod has revealed that Stellwagen Bank is a foraging hotspot for sand lance consumption (Figure A3 left).¹⁷ The map above (Figure A3 right) shows the distribution of sand lance in Southern New England including Massachusetts Bay, Stellwagen and Georges Banks and the Nantucket Shoals area.¹⁸ Areas within Massachusetts and Cape Cod Bays, Georges Bank and points south which support high abundances of

¹⁵ See Overholtz et al (2004) Stock Assessment of the Gulf of Maine - Georges Bank Atlantic Herring Complex, 2003. Northeast Fisheries Science Center Reference Document 04-06.

¹⁶ Gulf of Maine Atlantic Cod (*Gadus Morhua*) Stock Assessment For 2012, Updated Through 2011. 55th SAW Assessment Report. Northeast Fisheries Science Center Reference Document 13-11; Richardson, DE, Palmer MC, Smith B. 2012. The relationship of forage fish abundance to aggregations of Gulf of Maine Atlantic cod (*Gadus morhua*) and possible implications for catch-per-unit-effort indices. SAW 55 Data Meeting. August 27-31, 2012. Working Paper 4. 41 p.

¹⁷ Slide from Presentation by Michael Palmer, March 4, 2013. *Gulf of Maine Cod: From Bankers' Hours to Bankruptcy and the Role of Fine Scale Spatial Dynamics on Stellwagen Bank*

¹⁸ Figure 50, page 102, Stellwagen Bank National Marine Sanctuary Final Management Plan and Environmental Assessment (2010).

sand lance should be integral to an effective EFH management plan, including protection from mobile bottom tending gear, and any gear capable of catching sand lance.

Food: River herring and shad as EFH. The fate of the once abundant river herring and shad species (aloses) has received considerable attention at all the East Coast management bodies including Atlantic States Marine Fisheries Commission (ASMFC), Mid-Atlantic Fishery Management Council (MAFMC) and the NEFMC, and in a recent ESA listing decision by NOAA. Extensive work has been carried out examining the incidental catch of these forage species in ocean fisheries, including examination of places and times when at-sea mortality is highest.¹⁹ Although this work has revealed discrete areas where large incidental catch events occur, there is no consideration of these alosine fishes within the context of the regional forage mosaic and the EFH DEIS. With adequate protection, aloses could again become a more important part of the regional forage base.

Food: Protecting forage species for which directed fisheries do not yet exist. Recognizing the keystone role of forage species in ocean ecosystems, the North Pacific Fishery Management Council began establishing policies regulating the development of new fisheries for forage species in 1998 with additional amendments in 2010.²⁰ The Pacific Council is following this example with its *Unmanaged Forage Fish Protection Initiative* and is in the process of establishing similar regulations, which represents a forward looking step to ensure a future for its fisheries.²¹ New England and the Mid-Atlantic managers must follow suit. The MAFMC is already developing approaches for addressing this important issue.²² Along with sand lance discussed above, there are other species that should be put off limits to directed fishing through the EFH amendment. These include river herring and shad, krill, shrimp, and copepods, all vital food sources in the regional ecosystems.

¹⁹ Courneau JM et al (2013) Spatial and temporal patterns of anadromous alosine bycatch in the US Atlantic herring fishery. *Fisheries Research* **141**:88– 94.

²⁰ See Final Rule implementing Amendments 36/39 to the NPFMC Groundfish FMP's at www.fakr.noaa.gov/frules/3639fr.pdf. This action identified and protected over 20 important forage species in 9 scientific families by prohibiting directed fishing on those species; 30 CFR 679; June 2004 PFMC Meeting. Exhibit G.4.a Situation Summary; Final Environmental Assessment for Amendments 87/96 to the NPFMC Groundfish FMP's at http://alaskafisheries.noaa.gov/sustainablefisheries/amds/95-96-87/final_ea_amd96-87_0910.pdf; Final Rule implementing the Arctic FMP at www.fakr.noaa.gov/frules/74fr56734.pdf

²¹ Ecosystem Plan Development Team Report on Authorities to Protect Unfished Species from Future Directed Fisheries. EPDT Report, June 2012 (Agenda Item G.1.b); Situation summary: Unmanaged Forage Fish Protection Initiative (I2_SITSUM_SEPT2013BB); Decision Summary Document Pacific Fishery Management Council September 12-17, 2013: *Unmanaged Forage Fish Protection Initiative*, available at www.pcouncil.org/wp-content/uploads/0913decisions.pdf;

Supplemental Ecosystem Workgroup Report: Ecosystem Workgroup Report on Unmanaged Forage Fish Protection Initiative (Agenda Item I. 2.b), PFMC, September 2013 (I2b_SUP_EWG_SEPT2013BB);

²² Approaches for Unmanaged Forage Species. Staff Memorandum to Executive Director Moore, MAFMC, February 3, 2014, Executive Director's Report, MAFMC Meeting, Briefing Materials (Tab 10), New Bern, NC February 11-14.

