Atlantic States Marine Fisheries Commission

Atlantic Herring Management Board

August 6, 2024
9:00 – 9:45 a.m.

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 *(M. Ware)*	9:00 a.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from October 2023	9:00 a.m.
3.	Public Comment	9:05 a.m.
4.	Review 2024 Atlantic Herring Management Track Assessment *(J. Deroba)*	9:15 a.m.
5.	Consider Approval of Fishery Management Plan Review and State Compliance for the 2023 Fishing Year *(E. Franke)* **Action**	9:30 a.m.
6.	Update from the New England Fishery Management Council on Council Activity *(J. Cournane)*	9:40 a.m.
7.	Other Business/Adjourn	9:45 a.m.

The meeting will be held at The Westin Crystal City (1800 Richmond Highway, Arlington, VA; 703.486.1111) and via webinar; click here for details.

MEETING OVERVIEW

Atlantic Herring Management Board
August 6, 2024
9:00 – 9:45 a.m.

Chair: Megan Ware Assumed Chairmanship: 08/22	Technical Committee Chair: Vacant	Law Enforcement Committee Representative: Delayne Brown (NH)
Vice Chair: Doug Grout	Advisory Panel Chair: Vacant	Previous Board Meeting: October 16, 2023
Voting Members: ME, NH, MA, RI, CT, NY, NJ, NMFS, NEFMC (9 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from October 2023

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. 2024 Atlantic Herring Management Track Assessment (9:15-9:30 a.m.)

Background

- The 2024 Management Track Assessment was completed by the NOAA Northeast Fisheries Science Center in July 2024 **(Briefing Materials)**.
- The New England Fishery Management Council's Scientific and Statistical Committee (SSC) is scheduled to meet July 30-31 to develop recommendations for 2025-2027 fishery specifications, which will be considered at the NEFMC September meeting.

Presentations

- Overview of management track assessment by J. Deroba.

5. Fishery Management Plan Review (9:30-9:40 a.m.) Action

Background

- State Compliance Reports were due on February 1, 2024.
- The Plan Review Team reviewed each state report and compiled the annual FMP Review **(Briefing Materials)**.

Presentations

- Overview of the FMP Review Report by E. Franke.

Board action for consideration at this meeting

- Accept 2024 FMP Review Report for the 2023 Fishing Year and State Compliance Reports.

6. Update from New England Fishery Management Council (9:40-9:45 a.m.)

Background

- Update on New England Fishery Management Council (NEFMC) activity on Atlantic herring **(Briefing Materials)**.

Presentations

- NEFMC update by J. Cournane.

7. Other Business/Adjourn

Atlantic Herring Technical Committee Task List

Activity Level: Medium

Committee Overlap Score: Medium

Committee Task List

While there are no Board tasks for the TC at present, there are several annual activities in which TC members participate, both through the Commission and NEFMC.

- TC and NEFMC PDT jointly prepare OFL and ABC recommendations for 2025-2027
- Participation on 2025 Research Track Working Group
- Participation on NEFMC PDT
- Summer/fall collection of spawning samples per the spawning closure protocol
- Annual state compliance reports are due February 1

TC Members

Matt Cieri (ME DMR), Robert Atwood (NHFG), Micah Dean (MA DMF), JA Macfarlan (RI DEM), Kurt Gottschall (CT DMF), Rich Pendleton (NY DEC), Conor Davis (NJ DEP), Jamie Cournane (NEFMC), Jonathan Deroba (NOAA NEFSC), Carrie Nordeen (NOAA)

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

ATLANTIC HERRING MANAGEMENT BOARD

Beaufort Hotel
Beaufort, North Carolina
Hybrid Meeting

October 16, 2023

TABLE OF CONTENTS

INDEX OF MOTIONS

ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Steve Train, ME (GA)
Rep. Allison Hepler, ME (LA)
Renee Zobel, NH, proxy for C. Patterson (AA)
Doug Grout, NH (GA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Melanie Griffin, MA, proxy for D. McKiernan (AA)
Raymond Kane, MA (GA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Conor McManus, RI, proxy for J. McNamee (AA)
David Borden, RI (GA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Justin Davis, CT (AA)
Bill Hyatt, CT (GA)
Craig Miner, CT, proxy for Rep. Gresko (LA)
Marty Gary, NY (AA)
Emerson Hasbrouck, NY (GA)
Joe Cimino, NJ (AA)
Jeff Kaelin, NJ (GA)
Adam Nowalsky, NJ, proxy for Sen. Gopal (LA)
Allison Murphy, NMFS

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

Ex-Officio Members

Delayne Brown, Law Enforcement Representative

Staff

Robert Beal
Toni Kerns
Tina Berger
Madeline Musante
Caitlin Starks
Tracey Bauer
Emilie Franke
James Boyle
Kristen Anstead
Katie Drew
Jeff Kipp

Guests

Max Appelman, NOAA
Robert Atwood, NH FGD
Pat Augustine
Rob Beal, ME Marine Patrol
Emily Bodell, NEFMC
Alex Boeri, MA DMF
Colleen Bouffard, CT DEEP
Michael Brown, ME DMR
Jeffrey Brust, NJ DEP
Dennis Colbert
Margaret Conroy, DE DNREC
Jamie Cournane, NEFMC
Caitlin Craig, NYS DEC
Scott Curatolo-Wagemann, Cornell Cooperative Extension of Suffolk County
F Joel Fodrie, Institute of Marine Sciences (UNC-CH)
Christine Ford, NOAA
Joe Gresko, CT (LA)
Jaclyn Higgins, TRCP
Jesse Hornstein, NYS DEC
Gregg Kenney, NYS DEC
Blaik Keppler, SC DNR
Chip Lynch, NOAA
John Maniscalco, NYS DEC
Daniel McKiernan, MA (AA)
Meredith Mendelson, ME DMR
Lorraine Morris, ME DMR
Rebecca Nuzzi, Maine Lobstermen's Assn.
Conor ODonnell, NH FGD
Scott Olszewski, RI DEM
Cheri Patterson, NH (AA)
Janice Plante, NEFMC
Will Poston
Marianne Randall, NOAA
Christopher Scott, NYS DEC
Somers Smott, VMRC
Kevin Sullivan, NH FGD
Rachel Sysak, NYS DEC
Laura Tomlinson, MA DMF
Corinne Truesdale, RI DEM
Beth Versak, MD DNR
Megan Ware, ME DMR
Craig Weedon, MD DNR
Shelby White, NC DDMF
Chris Wright, NOAA

The Atlantic Herring Management Board of the Atlantic States Marine Fisheries Commission convened in the Rachel Carson Ballroom via hybrid meeting, in-person and webinar; Monday, October 16, 2023, and was called to order at 9:00 a.m. by Robert E. Beal

CALL TO ORDER

CHAIR ROBERT E. BEAL: All right, good morning, everyone. Let's go ahead and get the Atlantic Herring Board started. First off, welcome to Beaufort, and the ASMFC 81st Annual Meeting. A couple quick announcements before we get up and running with this Board, and I'll probably make them again later today.

Our federal partners from NOAA Fisheries have a travel ban, or they are transitioning to a new travel and budget software program, so they are unable to travel. The NOAA Fisheries folks that participate on our boards and on our other committees will not be in attendance, and they will be participating remotely.

As you notice on your agenda the Chair of this Board is Megan Ware, and I am not Megan Ware, I'm Bob Beal from ASMFC. Megan is coming down this evening, and she wasn't able to get down here last night. She asked me to go ahead and chair this meeting, just to make it simpler, and she doesn't have to do it virtually.

With that, I think those are the announcements we needed to make, and welcome to Beaufort. A number of folks will be around from North Carolina, if you have questions on where to go, where to eat, where to fish, and all those important things.

APPROVAL OF AGENDA

CHAIR BEAL: With that, let's go ahead and get up and running. First thing we need to do is Approval of the Agenda. Any changes or additions to the agenda? Pretty straightforward, we've only got 30 minutes. Not seeing any hands, anything online? I don't think we have any hands online. The agenda stands approved.

APPROVAL OF PROCEEDINGS

CHAIR BEAL: Any changes or additions to the proceedings from January of 2023? It's been a while since this Board has got together. All right, seeing none; those proceedings from January, 2023, are approved by consent.

PUBLIC COMMENT

CHAIR BEAL: That brings us to Public Comment. Any public in the room? There are not a lot of folks in the back here. Any public comments online? Are there any hands raised online? All right, no hands, no public comments here in the room. We will keep moving forward.

SET QUOTA PERIODS FOR THE 2024 AREA 1A FISHERY

CHAIR BEAL: Agenda Item Number 4 is setting the quota periods for the 2024 Area 1A fishery. Caitlin is going to give a quick presentation on that, and provide the background on that, then we'll take final action at the Board. Caitlin.

MS. CAITLIN STARKS: I'll just give a short overview of the Quota Period options for the 2024 Area 1A fishery. The Quota Period system was established by Amendment 3, and then Board action for consideration today is to consider setting the quota periods for the 2024 Area 1A fishery.

Per Amendment 3, quota periods shall be determined annually for Area 1A, and specifically the Board can consider distributing the Area 1A sub-ACL using a bimonthly, a trimester or a seasonal quota period to meet the needs of the fishery. The Board can also decide whether quota from January 1 through May 31, will be allocated to later in the fishing season.

Finally, the Board can specify if underages might be rolled over from one period to the next within the same year. Here on the screen are the three quota

period options outlined in Amendment 3. It's important to note that these allocation percentages are all fixed, and they can only be modified through an addendum.

Up on top of this screen is the bimonthly quota period category, with quota allocated to two-month periods throughout the year, and then two options for no landings prior to June 1st. The next option is in the bottom left, and that is the trimester quota period with three quota periods throughout the year. Finally, there is the seasonal quota category with one option for landings prior to June 1st, and one option for no landings before June 1st.

For reference here, the quota periods that were approved by the Board in recent years. In 2019, the Board allocated the 1A sub-ACL using the bimonthly option, with no landings prior to June 1st. For the most recent four years, the 2020 through 2023, the Board has allocated the Area 1A sub-ACL using the seasonal quota period, with no landings prior to June 1st. That is 72.8 percent allocated to June through September, and 27.2 percent for October through December.

In all of these years the Board did allow underages in one quota period to be rolled into the next period. To wrap up, the Board's action for today is to consider setting the quota period for the 2024 Area 1A fishery from those options in Amendment 3, and for a reference the Area 1A sub-ACL for 2024 is 5,546 metric tons. I can take any questions.

CHAIR BEAL: Any questions for Caitlin on the presentation and process and options available for allocation of the Area 1A quota? Seeing none; I think this Board has been through this drill a number of times. Is there a motion for the allocation of Area 1A quota? Jeff Kaelin.

MR. JEFFREY KAELIN: Yes, I **move that the Board adopt the seasonal quota periods with no landings prior to June 1, the status quo option**.

CHAIR BEAL: Jeff, we're going to get that up on the screen. Make sure it reflects what your intent was. Then I'll ask for a second. Jeff, does this reflect what your intent was, what is up on the screen now? Okay.

MR. KAELIN: Oh, I'm sorry, it's got to be read, duh. Yes, does that satisfy what Caitlin had on the screen for the **status quo option, with the 25 and the 7 percent in the fourth quarter**? I think that's it.

CHAIR BEAL: I guess the other remaining part is whether the **unused quota from one period can be rolled over into the subsequent period**.

MR. KAELIN: I'm sorry, yes, I would like to **add that** if that is possible. I don't have a second anyway.

CHAIR BEAL: Okay, we'll **add that to the motion**, then I'll ask for a second. I think Melanie Griffen had here hand up online. All right, Jeff, are you satisfied with that?

MR. KAELIN: Yes, I am, thank you.

CHAIR BEAL: Ray Kane had his hand up, are you looking to make a second, or you have a question?

MR. RAYMOND W. KANE: I have a question on the wording. Are we implementing seasonal quotas or are we maintaining seasonal closures? I believe this is an FMP as it stands.

MS. STARKS: They have to be set annually, so each year you have to set a new quota period.

MR. KANE: Thanks.

CHAIR BEAL: Is there a second for this motion? Steve Train, thank you. Any discussion on this motion? Doug Grout.

MR. DOUGLAS E. GROUT: Just curious, do we need to **specify the percentages between the seasonal quotas**, or does it just say.

MR. KAELIN: I think it's assumed.

CHAIR BEAL: We will add that for clarity, Doug. We'll get that added while we continue our discussion. I think Melanie is online and had her hand up. Melanie.

MS. MELANIE GRIFFEN: Hey Bob, I was ready to offer a motion very similar with all the percentages in this, so yes, I appreciate the status quo. I think it's much like last years, should provide some stability and access in 1A, and what's in across user groups as we're trying to continue to support stock rebuilding. It's important to this motion, thanks.

CHAIR BEAL: Other comments on this motion, as we perfect it. All right, let's hang tight for a minute while staff perfects it, then I'll call for a vote, unless there is any other comment. **Jeff, this is a little out of order with Robert's Rules, but are you comfortable with the perfected motion that is up on the board? It puts more detail on what your intent was, I believe.**

MR. KAELIN: Yes, that's fine.

CHAIR BEAL: The seconder, is Steve Train, shaking his head yes. I will read the motion into the record, since I think it's been modified a couple times along the way, and then call for a vote. **Move that the Board implement seasonal quota for the 2024 Area 1A sub-ACL seasonally with 72.8% available from June through September and 27.2% allocated from October through December, with no landings prior to June 1, and underages to be rolled over into the next quota period of 2024**. Motion by Mr. Kaelin, second by Mr. Train.

Is there any objection to this motion from the Board? All right, seeing none; this motion stands approved by consent.

UPDATE FROM NEW ENGLAND FISHERY MANAGEMENT COUNCIL

CHAIR BEAL: That brings us to our next agenda item, which is a Report Out from Dr. Cournane from the New England Fishery Management Council. Jamie, are you online and ready to roll?

DR. JAMIE COURNANE: Good morning, I am, thank you. Thank you for the opportunity to provide a brief update from the New England Fishery Management Council. As many of you are aware, there was an inshore midwater trawl closure in place for about a year. It was a roughly 12-mile buffer zone from Rhode Island to the U.S/Canada border with a little larger buffer off of Cape Cod. It prohibited vessels from using, deploying or fishing with midwater trawl gear within that restricted area.

It was addressing concerns at the time by the Council of concentrated intense commercial fishing effort that would negatively impact other user groups that were dependent on herring as forage. It was in addition to the seasonal midwater trawl closure that is in place in Area 1A, and that run June 1 to September 30, annually.

That was vacated by the courts, and since that time the Council has been discussing how to revisit this Amendment 8 Inshore Midwater Trawl closure. Today what I'm going to report on is what the Council has decided to do in its work to address concerns about vacating that management area. Over a series of meeting that occurred in April and June, the Council developed what they refer to as a problem statement or a new action that they'll undertake.

The Council adopts the following problem statement, and the purpose of the action is to develop and implement management actions designed to obtain optimum yield, and improve the conservation status of Atlantic herring by accounting for its critically important role as a forage species in the ecosystem, and minimizing user conflicts created by competing interest on the

herring resource. Between the directed herring fishery and other important user groups, including commercial and recreational fisheries, whale watching and tourism.

Council will explore a range of management alternatives to minimizes user conflicts, including spatially and temporally explicit gear restrictions, area closures and possession limits. The geographic scope of the potential management measures will consider but not be limited to the spatial extent of the Midwater Trawl Restricted Area approved by the Council in Amendment 8, with a particular focus on areas not already subject to seasonal closures to midwater trawl.

Analysis conducted to support this action will also evaluate the changes in the incidental catch of shad and river herring that will likely result in measures adopted to reduce spatial and temporal user conflicts. This last point, the Council wanted to clarify that although we want to develop specific alternatives to address river herring and shad, the analysis conducted in any alternatives in this action will include an analysis of the impacts on river herring and shad. Furthermore, the Council went on to say that it was modifying its priorities to develop this action, and that it could include any gear types in the plan. Recently, at the September Council meeting, the Council had a series of motions to further articulate its plans for this action. It now is referred to Amendment 10. Amendment 10 we have a press release that we shared with the Board.

Hopefully you had a chance to look that over. It covers these three motions the Council made in their September meeting. First was to clarify what this action is going to address. It had been a priority on our list titled, revisit the Amendment 8 Inshore Midwater Trawl closure. Based on the Council's discussion in June, it was clear that this is expanding beyond, not only the footprint of the original area, but the gears that could be involved.

Now it's referred to as an action to minimize user conflicts related to the Atlantic herring fishery. The Council went on to specifically task the Herring Committee and the Plan Development Team to develop what they refer to as a Scoping Document and a schedule for public hearing. They would like to see this draft by the January, 2024 Council meeting. They want an opportunity for in-person hearings and at least one virtual hearing, and these should be designed to solicit participation from all user groups that are interested in the Atlantic herring resource.

They also went on to ask that we review and compile records from past discussions, including those that occurred in Amendment 8, and testimony we received on the Council actions as well. Lastly, the Council went a step further, and designated this as Amendment 10, stating that it's to address spatial and temporal allocation in management of Atlantic herring at the management unit level, to minimize user conflicts, contribute to optimum yield, and support rebuilding of the resource.

Thank you for the opportunity to provide this update. If there are any questions, I can take them. Otherwise, you are more than welcome to e-mail or call me if you have questions about the Council's next steps. We'll be working over the next few months to prepare a draft schedule, and draft scoping document in time for the Council's January meeting.

CHAIR BEAL: Great, thanks, Jamie for the update. One hand here in the room, Justin Davis.

DR. JUSTIN DAVIS: Thank you, Dr. Cournane for that presentation. I have a question. The revised problem statement here for Amendment 10, seems to have lost the language from the earlier problem statement related to assessing changes in incidental catch of shad and river herring that might result from any new management measures implemented. Was that intentional? Sort of, did the Council in their discussions at the most recent

meeting decide that that would not be part of Amendment 10 going forward?

DR. COURNANE: Thank you for your question. To clarify, everything that you see in these motions as well as the motions that took place in June on the problem statement stand. I think of maybe the last motion here on the screen as the Council expressing what kind of action it would like to undertake, and the public process in the second motion.

The third motion really speaks more to the scope, but the problem statement still stands. With respect to river herring and shad, just to be very clear. The Council is not planning to develop specific measures in this action, Amendment 10, that would, for example, reduce impacts on river herring and shad. But what they are committed to doing is analyzing any impacts of the measures that they develop. We look at that routinely with all the actions, but they wanted to be clear with the public that that analysis will occur with this action.

CHAIR BEAL: Great, thanks, any other questions in the room or online for Dr. Cournane? Seeing none; Jamie, thanks again for the update, and the Board looks forward to more updates as the Council works their way through Amendment 10. If there is anything ASMFC can do to help the Council move through that process, you know please reach out and we'll help out.

ELECT VICE-CHAIR

CHAIR BEAL: The next agenda item is the election of a Vice-Chair. I think Melanie Griffin has a motion ready to go. Melanie.

MS. GRIFFEN: I do, thank you. I would **move to nominate Doug Grout as Vice-Chair of the Atlantic Herring Board**.

CHAIR BEAL: Excellent, is there a second to the nomination of Doug Grout, Justin Davis. Dr. Davis, thank you. **Is there any objection to electing Doug Grout as the Vice-Chair, other than from Doug himself, that doesn't count? All right, not seeing any, congratulations, Doug, you are the Vice-Chair of the Herring Board.**

ADJOURNMENT

CHAIR BEAL: That brings us to Other Business. Other business before the Atlantic Herring Board, is there anything else that anyone needs to or wants to bring up at the end of this meeting? We've got a couple extra minutes. Not seeing any, I think we're done pretty quickly. That ends the deliberations of the Atlantic Herring Board.

(Whereupon the meeting adjourned at 9:30 a.m. on October 16, 2023)

draft working paper for peer review only

Atlantic Herring

2024 Management Track Assessment Report

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts

Compiled 07-02-2024

This assessment of the Atlantic Herring (Clupea harengus) stock is a management track assessment of the existing 2022 management track assessment conducted using the ASAP model. Based on the previous assessment, the stock was overfished but overfishing was not occurring. This assessment updated fishery catch data, survey indices, life history parameters (e.g., weights-at-age), and the ASAP assessment model and reference points (BRPs) through 2023. No significant changes were made to the methods in this assessment.

State of Stock: Based on this management track assessment, the Atlantic Herring stock is overfished and overfishing is not occurring (Figures 1-2). Retrospective adjustments were necessary (SSB Mohn's rho = 0.563 and F Mohn's rho = -0.261.). Adjusted spawning stock biomass (SSB) in 2023 was estimated to be 47,955 (mt) which is 26% of the biomass target (SSB_{MSY} *proxy* = 186,367; Figure 1). The 2023 adjusted average fishing mortality for ages 7-8 (fully selected ages for the mobile fleet) was estimated to be 0.263 which is 58% of the overfishing threshold proxy (F_{MSY} *proxy* = 0.45; Figure 2).

Table 1: Catch and status table for Atlantic Herring. All weights are in mt, recruitment is in 000s, and $\bar{F}_{7-8}$ is the average fishing mortality on ages 7 to 8, which are fully selected by the mobile fleet. Model results are from the current updated ASAP assessment and the values in this table are not adjusted for the retrospective pattern.

	2016	2017	2018	2019	2020	2021	2022	2023
				Data				
US Catch	62,597	48,796	45,527	12,792	8,076	5,202	3,929	9,505
Canadian Catch	4,132	2,133	13,036	5,821	6,041	2,663	3,937	936
Total Catch	66,729	50,929	58,563	18,613	14,117	7,865	7,866	10,441
				Model Results				
Spawning Stock Biomass	139,300	96,996	55,824	46,825	47,303	48,350	87,760	74,977
$\bar{F}_{7-8}$	0.492	0.546	0.793	0.377	0.218	0.137	0.078	0.194
recruits (age1)	314,330	942,400	730,670	1,229,200	756,860	364,770	567,500	1,757,800

Table 2: Comparison of reference points estimated in an earlier assessment and from the current assessment. An $F_{40\%}$ proxy was used for the overfishing threshold, and the biomass proxy reference point was based on long-term, stochastic, projections. 95% CI were reported in parentheses.

	2022	2024
F_{MSY} *proxy*	0.5	0.45
SSB_{MSY} (mt)	185,750 (91,100 - 355,800)	186,367 (95,900 - 340,000)
MSY mt	68,980 (37,390 - 120,154)	78,710 (45,000 - 128,800)
Median recruits (age 1)	2,820,600 (578,900 - 10,441,500)	2,493,500 (485,400 - 9,107,300)
Overfishing	No	No
Overfished	Yes	Yes

Projections: The projection results included here should be considered preliminary and subject to change based on future assessment and management decisions. This example projection applied the harvest control rule described in Amendment 8 of the hering Fishery Management Plan to the mobile fleet. The fixed gear catches are assumed constant during the projection period and equaled 4,047 mt. This fixed gear catch equals the sum of the ten year (2014-2023) averages of the Canadian (4,031 mt) and US (16 mt) fixed gear catches. The US fixed gear catches are those from stop seines, weirs, and pound nets. The reported $\bar{F}_{7-8}$ are those for the mobile fleet. Projected recruitment followed an autoregressive process (AR(1)), and projections were initialized at the 2023 estimated recruitment adjusted for the retrospective pattern (i.e., adjusted value = 1,124,659).

Table 3: Projection results.

Year	Catch mt	SSB (mt)	$\bar{F}_{7-8}$
2024	23,409	34,451	0.593

Year	Catch mt	SSB (mt)	$\bar{F}_{7-8}$
2025	6,741	51,904	0.076
2026	10,885	56,718	0.161
2027	15,435	86,607	0.184

Special Comments:

- What are the most important sources of uncertainty in this stock assessment? Explain, and describe qualitatively how they affect the assessment results (such as estimates of biomass, F, recruitment, and population projections).

  A definitive explanation for the continued poor recruitment has not been identified. While identifying a causal mechanism for poor recruitment would be immensely beneficial, finding explanations for patterns in recruitment have been elusive in fisheries science for decades. Another uncertainty in this assessment is natural mortality. In this assessment, natural mortality was assumed constant among ages and years. Justifications for including age- or time-varying natural mortality in previous assessments have quickly deteriorated. Uncertainty in natural mortality affects the scale of abundance and fishing mortality estimates, but is unlikely to be related to the recent poor recruitments. Stock structure, particularly mixing with Nova Scotian herring, is also an uncertainty. Migration can be conflated with changes in mortality and contribute to retrospective patterns. Again, however, this is unlikely to explain recent poor recruitment.

- Does this assessment model have a retrospective pattern? If so, is the pattern minor, or major? (A major retrospective pattern occurs when the adjusted SSB or $\bar{F}_{7-8}$ lies outside of the approximate joint confidence region for SSB and $\bar{F}_{7-8}$).

  This assessment model had a retrospective pattern that could be classified as major and required adjustments. While recent assessments have not had major retrospective patterns, these assessments also suggested that the lack of a retrospective pattern could be due to structural changes in the model (e.g., splitting the NMFS BTS survey in 2009 when the R/V Bigelow came into service; NEFSC 2018) and so the reemergence of a retrospective pattern was not suprising.

- Based on this stock assessment, are population projections well determined or uncertain? If this stock is in a rebuilding plan, how do the projections compare to the rebuilding schedule?

  The projections are uncertain, especially in regards to recruitment.Without other information about recruitment, the likelihood penalty has the effect of pulling the more recent recruitment estimates (i.e., 2022 and 2023) upwards towards the median. The upward increase in recent recruitments was partially offset in projections by applying a retrospective adjustment. Furthermore, assumptions about terminal year recruitment do not have much effect on projection results for 3 or more years because herring are 50% selected by the mobile fleet at about age-4, which causes a delay in the effect of terminal year recruitment assumptions. Just the same, recruitment is a significant uncertainty. Based on the projections done during this management track, the stock is behind the rebuilding schedule (See Framework 9 table 26). The rebuilding plan suggested the population would have a 43% chance of rebuilding by 2025, but this assessment projects <1% chance in that year. The rebuilding plan, however, used the full time series of recruitments when defining reference points and proejctions, which makes them more optimistic than the shortened time frame of recruitments and the AR(1) process applied in this assessment. A sensitivity using an AR(1) process was done during development of the rebuilding plan, but even those projections were more optimistic (25% chance of rebuilding in 2025) than those done during this assessment.

- Describe any changes that were made to the current stock assessment, beyond incorporating additional years of data and the effect these changes had on the assessment and stock status.

  None.

- If the stock status has changed a lot since the previous assessment, explain why this occurred.
  The stock status has not changed a lot since the previous assessment.

- Provide qualitative statements describing the condition of the stock that relate to stock status.
  Continued poor recruitment is the main issue driving stock status. Management decisions that reduced US catches had the effect of avoiding overfishing.

- Indicate what data or studies are currently lacking and which would be needed most to improve this stock assessment in the future.
  Studies related to stock structure and movement would be beneficial, as this has been proposed as a possible explanation for retrospective patterns. While an explanation for drivers of recruitment would be beneficial, it would not directly effect the assessment, and as noted, such explanations are difficult to identify. Modeling the effect of haddock predation on herring eggs is being considered in the Research Track, however. An index of age-1 recruitment based on seabird diet data is being considered in the ongoing Research Track Assessment. This index could be especially informative because the fishery and indices based on bottom trawls do not consistently capture age-1 herring, The seabird diet data are collected by multiple entities (National Audubon Society, USFWS, University of New Brunswick, and University of New Hampshire). Collating this data and developing the index was a tremendous undertaking, only made possible by willing collaborators that collect the data and a volunteer student (Sean Hardison). Continued consideration of this data would benefit from more formal and streamlined sharing agreements with NMFS.

- Are there other important issues?
  No other important issues were identified.

References:

NEFSC (Northeast Fisheries Science Center). 2018. 65^{th} Northeast Regional Stock Assessment Workshop (65^{th} SAW) Assessment Report. US Dept. of Commerce, NEFSC Ref. Doc. 18-11.

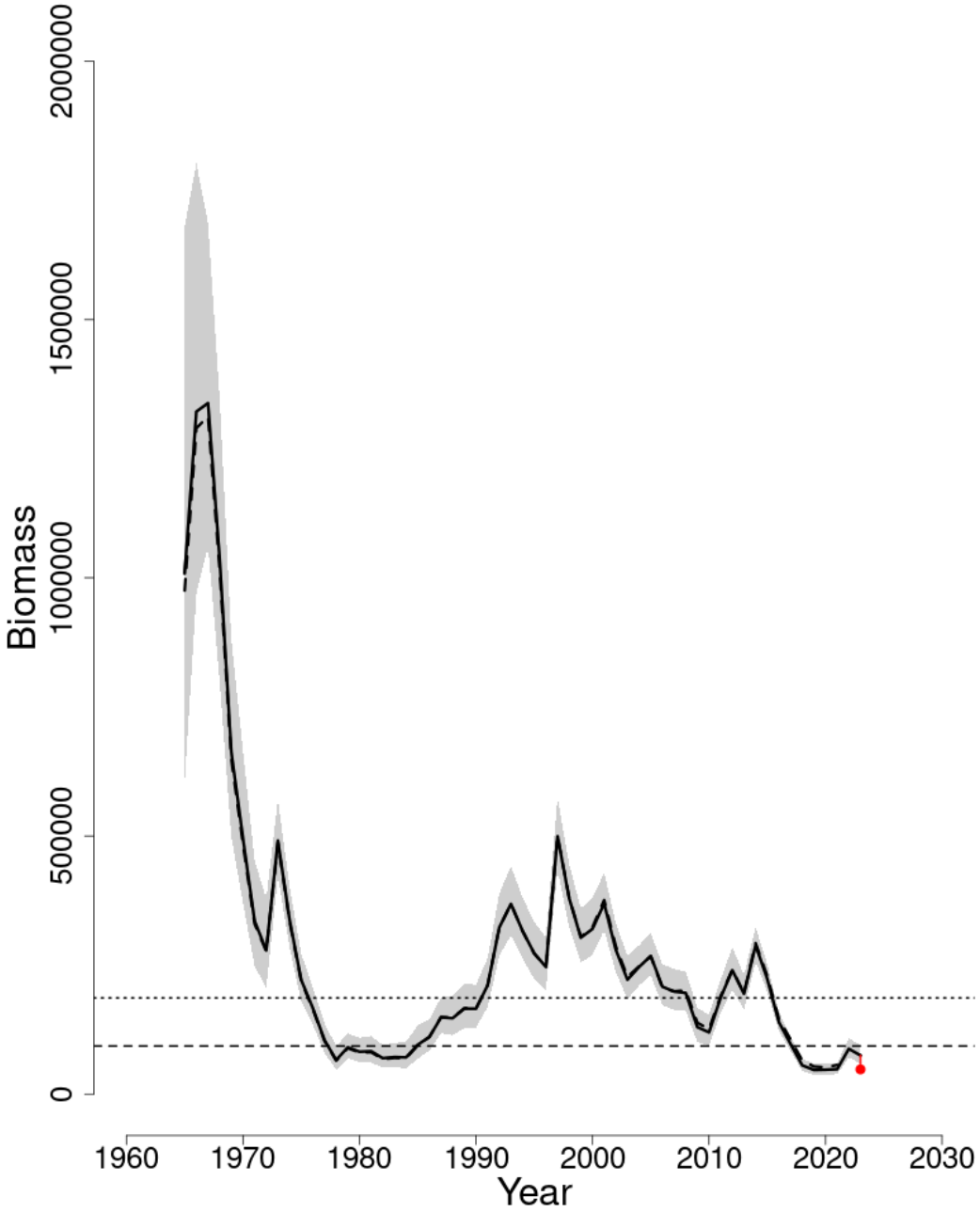


Figure 1: Trends in spawning stock biomass of Atlantic Herring between 1965 and 2023 from the current (solid line) and previous (dashed line) assessment and the corresponding $SSB_{Threshold}$ ($\frac{1}{2}$ SSB_{MSY} *proxy*; horizontal dashed line) as well as SSB_{Target} (SSB_{MSY} *proxy*; horizontal dotted line) based on the 2024 assessment. The approximate 90% confidence intervals are shown. The red line and dot show the value from the 2024 assessment adjusted for the retrospective pattern.

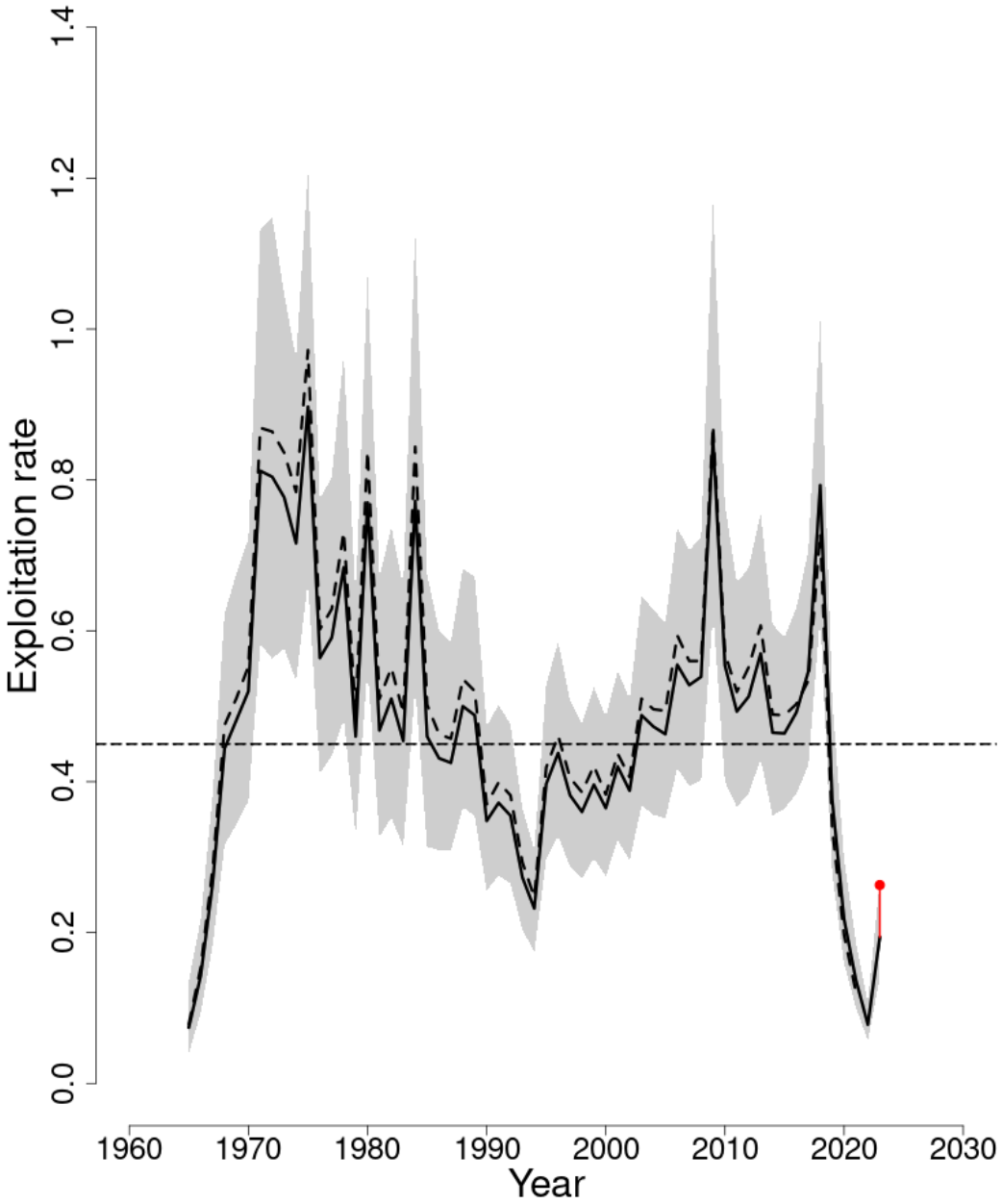


Figure 2: Trends in the average fishing mortality rate for ages 7-8, which are fully selected by the mobile fleet ($\bar{F}_{7-8}$), between 1965 and 2023 from the current (solid line) and previous (dashed line) assessment and the corresponding $F_{Threshold}$ (F_{MSY} *proxy*=0.45; horizontal dashed line). The approximate 90% confidence intervals are shown. The red line and dot show the value from the 2024 assessment adjusted for the retrospective pattern.

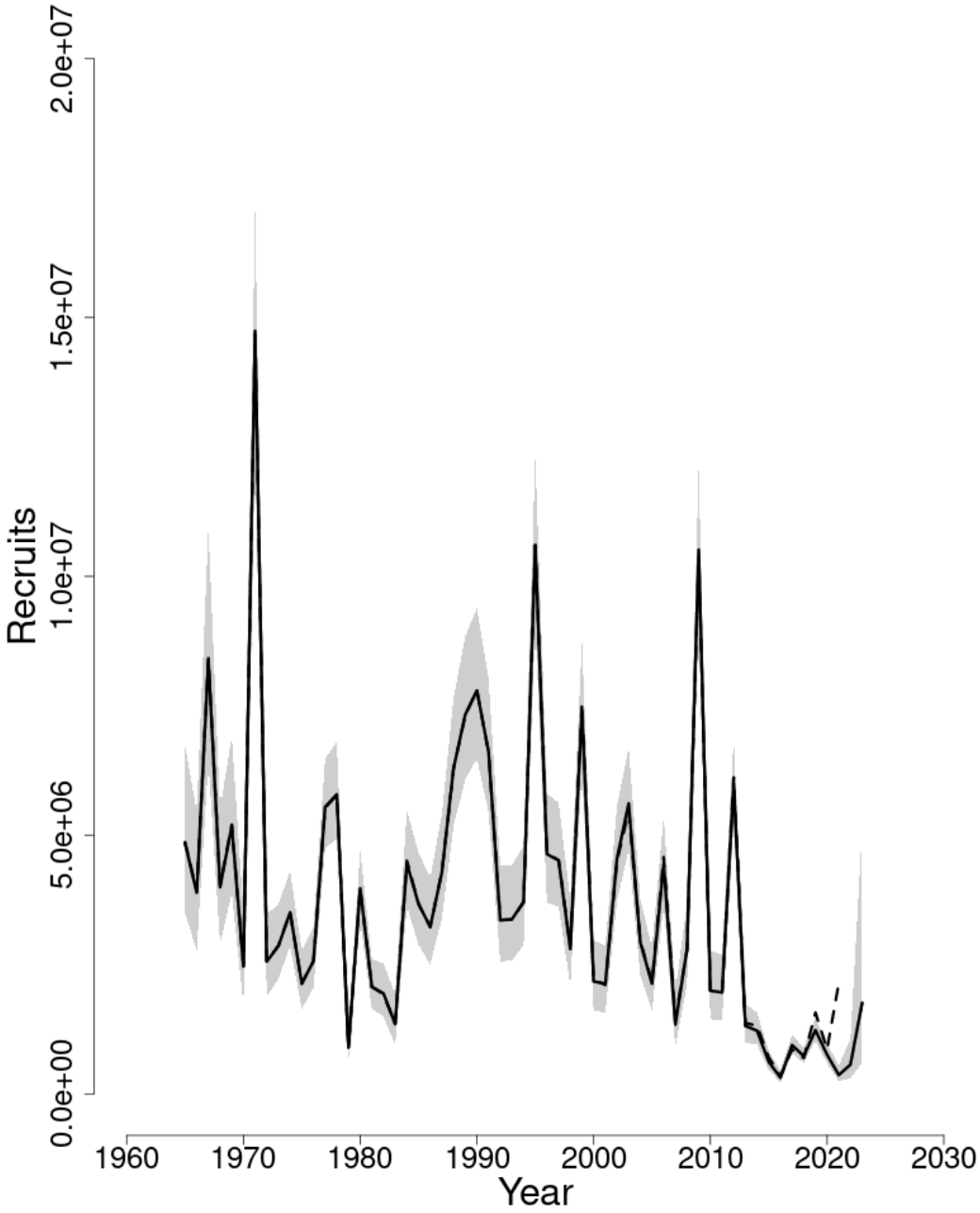


Figure 3: Trends in recruits (age-1)(000s) of Atlantic Herring between 1965 and 2023 from the current (solid line) and previous (dashed line) assessment. The approximate 90% confidence intervals are shown.

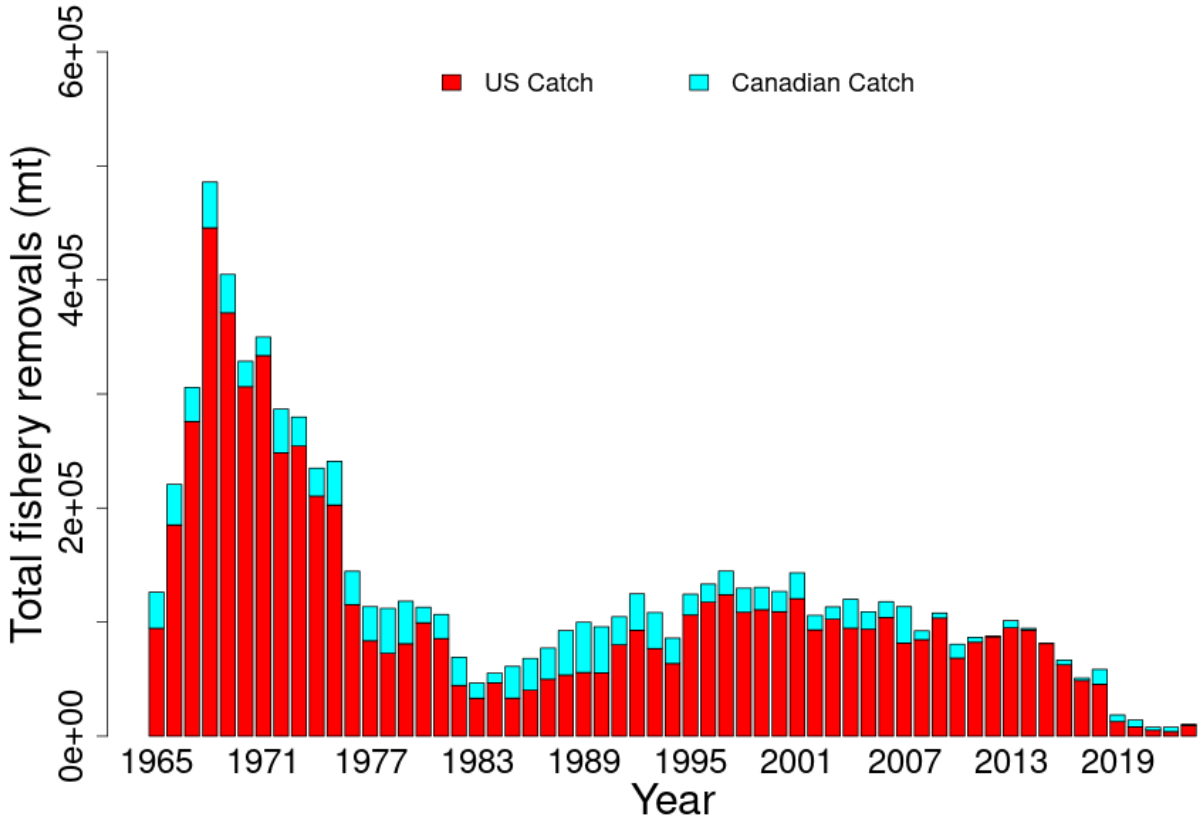


Figure 4: Total catch of Atlantic Herring between 1965 and 2023 by US and Canadian fleets.

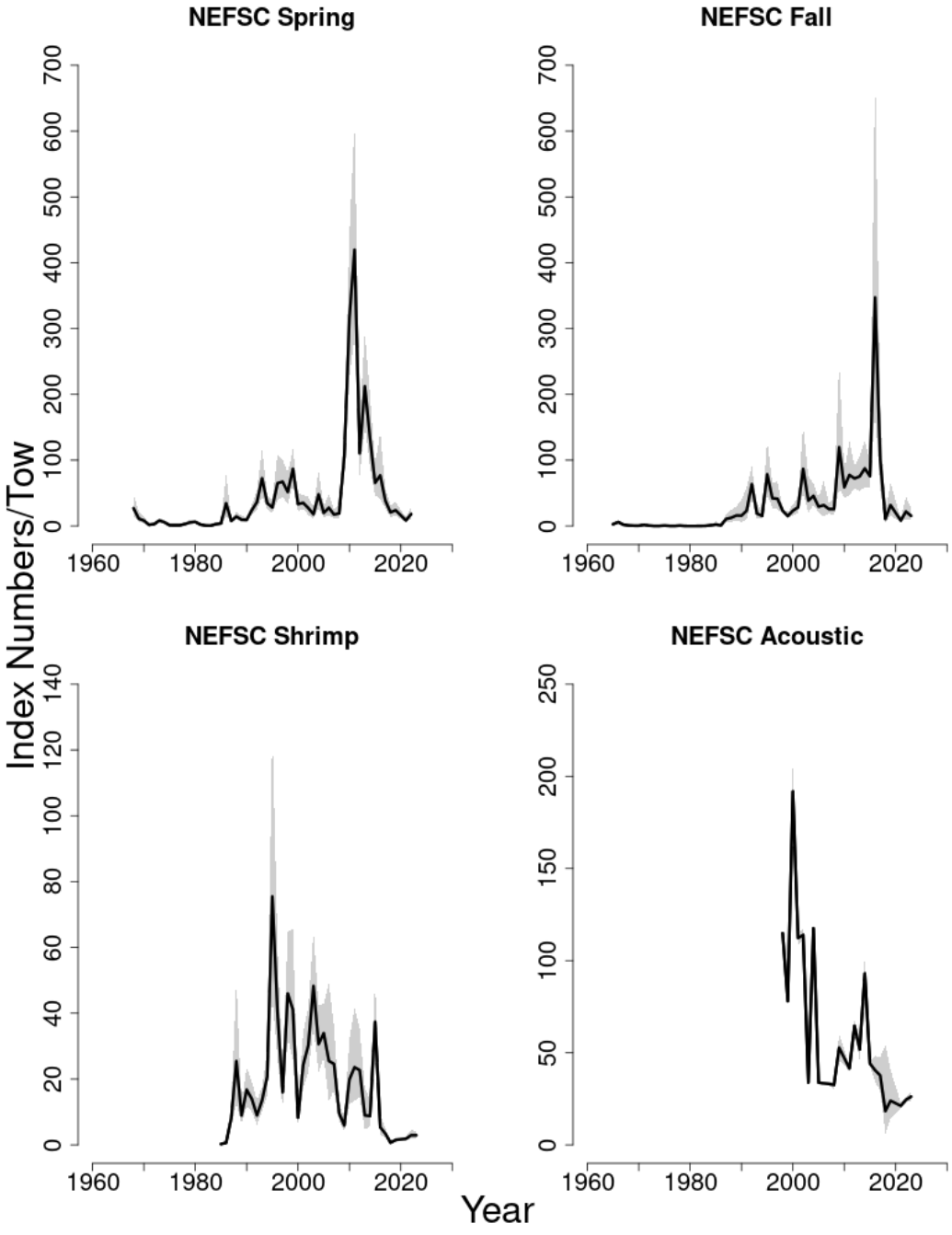


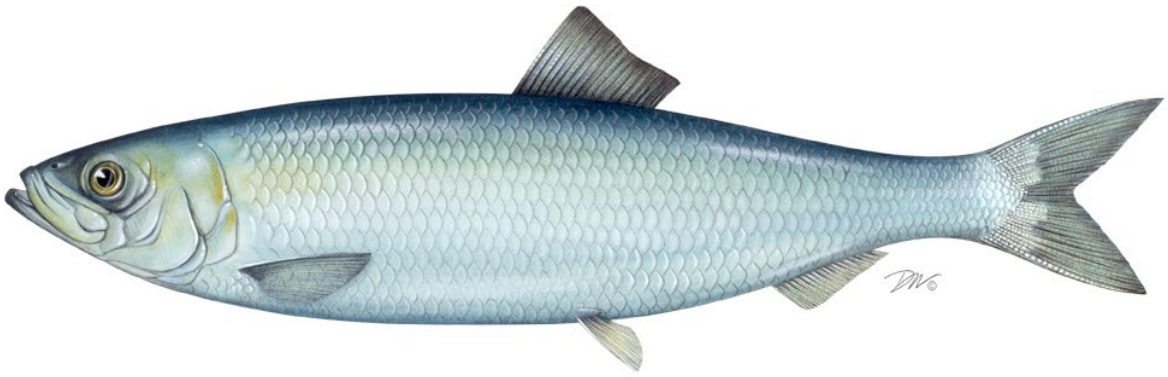
Figure 5: Indices of abundance for Atlantic Herring between 1965 and 2023 for the Northeast Fisheries Science Center (NEFSC) spring, fall, and shrimp bottom trawl surveys. The NEFSC acoustic index is collected during the fall bottom trawl survey and is in units of acoustic backscatter, not absolute numbers. The approximate 90% confidence intervals are shown.

ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR ATLANTIC HERRING
(Clupea harengus)

2023 FISHING YEAR



Prepared by the Atlantic Herring Plan Review Team

For Board Review July 2024

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

Table of Contents

I. Status of Fishery Management Plan

Date of FMP Approval	November 1993
Amendments	Amendment 1 (February 1999) Amendment 2 (March 2006) Amendment 3 (February 2016)
Addenda	Addendum I to Amendment 1 (July 2000) Technical Addendum #1A to Amendment I (October 2001) Addendum II to Amendment I (February 2002) Technical Addendum 1 to Amendment 2 (August 2006) Addendum I to Amendment 2 (March 2009) Addendum II to Amendment 2 (December 2010) Addendum V to Amendment 2 (October 2012) Addendum VI to Amendment 2 (August 2013) Addendum I to Amendment 3 (May 2017) Addendum II to Amendment 3 (May 2019)
Management Unit	US waters of the northwest Atlantic Ocean from the shoreline to the seaward boundary of the Exclusive Economic Zone (East Coast of Maine), and from the US/Canadian border to the southern end of the species range (Cape Hatteras, North Carolina).
States With Declared Interest	Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, and New Jersey
Active Boards/Committees	Atlantic Herring Management Board (Since August 2018; previously Section), Advisory Panel, Technical Committee, Stock Assessment Subcommittee, and Plan Review Team

Atlantic herring (*Clupea harengus*), also known as sea herring, are an oceanic fish that occur in large schools and undergo seasonal inshore-offshore migrations. Herring are important to the Northwest Atlantic ecosystem as a forage species and to the fishing industry as bait for lobster, blue crab, and tuna. To a lesser degree this resource also serves as a food, typically canned, pickled, or smoked. The U.S. Atlantic herring fishery is currently managed as a single stock through complementary plans by the Atlantic States Marine Fisheries Commission (ASMFC) and the New England Fishery Management Council (NEFMC).

The stockwide annual catch limit (ACL) is divided amongst four distinct management areas (Figure 1): inshore Gulf of Maine (Area 1A), offshore Gulf of Maine (Area 1B), Southern New England/Mid- Atlantic (Area 2), and Georges Bank (Area 3). The Area 1A fishery is managed by ASMFC's Atlantic Herring Management Board (Board), which includes representatives from Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York and New Jersey.

Amendment 1 (February 1999) was developed in order to maintain consistency between the ASMFC and NEFMC FMPs. This amendment establishes the same overfishing definition and biological reference points as the NEFMC, which were created under guidelines stipulated in the revised Magnuson-Stevens Fishery Conservation and Management Act prior to the 2006 re-authorization. The overfishing and biological reference points are based on an estimate of maximum sustainable yield (MSY) for the entire stock complex.

Amendment 1 also establishes "days out" control measures which prohibit directed fishing on Friday and Saturday when 50% of the TAC is projected to be harvested, Friday through Sunday when 75% of the TAC is projected to be harvested, and Thursday through Sunday when 90% of the TAC is projected to be harvested.

Addendum I (July 2000)
The Section developed Addendum I (to Amendment 1) to re-address the protection of spawning areas because NOAA Fisheries rejected the spawning closures in federal waters for Management Area 1A (inshore Gulf of Maine). Specifically, Addendum I redefines the state waters spawning areas outlined in Amendment I. This addendum also changed the due date for annual state compliance reports to February 1st.

Technical Addendum 1a (October 2001)
The Section approved Technical Addendum #1a (to Amendment 1) to change the delineation of the Eastern Maine spawning boundary because the spawning aggregations were not adequately protected in 2000.

Addendum II (February 2002)
Addendum II (to Amendment 1) was developed in conjunction with the NEFMC's Framework Adjustment I to allocate the Management Area 1A Total Allowable Catch (TAC) on a seasonal basis. Addendum II also specifies the procedures for allocating the annual Internal Waters Processing (IWP) quota.

Amendment 2 (March 2006)
Amendment 2 was developed in close coordination with the NEFMC as they developed Amendment 1 to the Federal Fishery Management Plan for Atlantic Herring. The NEFMC's Amendment 1 is complementary to ASMFC Amendment 2 in that both documents' goal is optimum yield through coordinated management between state and federal waters. Amendment 2 altered the management boundaries, set biological reference points, expanded on the TAC specification setting process, established research set-asides, altered days out measures, removed any allowance for fishing during spawning closures, and granted exemptions for east of Cutler fixed gear fishermen.

Changes to the management boundaries were based on recommendations from the 2003 TRAC to better reflect spawning distributions and minimize reporting errors. The new boundaries result in a larger boundary for Area 3.

The biological reference points, based on MSY = 220,000 metric tons (mt), give a measurable criteria for overfishing and overfished and allow management to determine if rebuilding efforts are necessary. The TAC process only changed slightly with Amendment 2. Amendment 2 allows analytical approaches other than those defined in Amendment 1 to establish area-specific TACs. These changes allow the TC to use the best available science when recommending TACs rather than binding them to methods that were the best when Amendment 1 was created. Another change to the TAC process under Amendment 2 is that the Section will set the TACs for three years with the flexibility to adjust in interim years.

Research set asides were established under Amendment 2 allowing up to 3% of an area to be designated for and allocated to research.

In addition to establishing a number of new management measures, Amendment 2 altered several measures enacted in Amendment 1. Default percentages for setting days out were removed to allow states adjacent to an area to meet and agree on which days to take out as best meets the needs of the fishery for that given year. The 20% spawning tolerance for directed fishing during spawning closures was removed and a "Zero-Tolerance" measure was enacted. Amendment 2 also granted exemptions for east of Cutler fixed gear fishermen from days out and spawning closure restrictions established in Amendment 1. These exemptions were granted because the east of Cutler landings are part of a New Brunswick stock and have been insignificantly small historically. These herring do not often migrate inshore until after the Area 1A TAC is harvested making exemptions the only way to protect this historical fishery. These landings are counted against the overall Area 1A TAC.

Technical Addendum I (August 2006)

Technical Addendum I was developed to clarify the intent of the "Zero Tolerance" spawning provision of Amendment 2. Some states were interpreting the zero tolerance to mean that you could still fish in an area closed to spawning as long as no spawn herring were present in the area. This addendum makes it clear that *any vessel is prohibited to fish for, take, land, or possess herring from or within a restricted spawning area.*

Addendum I (February 2009)

Addendum I (to Amendment 2) was developed to control effort in Area 1A using a combination of quotas, additional days out restrictions, and weekly state reporting requirements to effectively manage quota. Specifically, Addendum I allows states adjacent to Area 1A to select bimonthly, trimester, or seasonal quotas as best meets the needs of the fishery. States also have the flexibility to save quota from January – May and distribute it to later in the year when price and demand are often higher. Fishermen are restricted to one landing per day and state-only fishermen must report weekly in order to effectively manage quota.

Addendum II (December 2010)

Addendum II was designed to mirror the NEFMC Amendment 4 and changes the specifications' definitions (and associated acronyms), modifies the process to set specifications, and establishes accountability measure (AM) paybacks. Under Addendum II, the overall quota is

now called an annual catch limit (ACL) and the quota allocated to each management area (Area 1A, 1B, 2, 3) is called a sub-ACL (previously TAC). In addition, if harvest in any area is exceeded, the sub-ACL will be reduced by an amount equal to the overage the first year after final landings are available.

NEFMC's Amendment 4 includes provisions to bring the Herring FMP into compliance with provisions of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. It changes the specification setting process and definitions to include an overfishing limit, acceptable biological catch, annual catch limits, and accountability measures, as well as involvement of a Science and Statistical Committee.

Addendum V (August 2012)
Addendum V refines and clarifies current spawning regulations without making significant changes. Specifically, Addendum V establishes when closures are triggered based on the percent of stage III – V spawn herring that are greater than or equal to 23 cm and increased the number of samples states are required to collect from 50 to 100 (states are currently sampling at this level). The Addendum replaces all spawning regulations in previous management documents to provide a single, clear document for states to use when complying with ASMFC spawning regulations.

Addendum VI (August 2013)
The Addendum improves alignment between state and federal Atlantic herring management by allowing the use of consistent tools across all four management areas of the species range. The Addendum's measures include (1) seasonal splitting of the annual catch limit sub-components (sub-ACLs) for Areas 1B, 2, and 3; (2) up to 10% carryover of a sub-ACL for all management areas; (3) the establishment of triggers to initiate the closing of directed fisheries; and (4) the use of the annual specification process to set triggers.

Amendment 3 (February 2016)
Amendment 3 refines the spawning closure system, modifies the fixed gear set-aside, and includes an empty fish hold provision contingent on federal adoption. The Amendment allows for the use of a modified GSI-based spawning monitoring system to track reproductive maturity in an effort to better align the timing of spawning area closures with the onset of spawning, which was tested and evaluated for effectiveness during the 2016 fishing season. Additionally, the fixed gear set-aside that was previously available to fixed gear fishermen exclusively only through November 1, is now accessible to them as long as the directed fishery is open. Amendment 3 consolidates prior amendments (and associated addenda) and recent management decisions into a single document; it is now the comprehensive document for Atlantic herring management in state waters.

Addendum I (May 2017)
Addendum I includes management measures intended to stabilize the rate of catch in the Area 1A fishery and distribute the seasonal quota throughout Trimester 2 (June through September), which has 72.8% of the season's allocation. For the 2017 fishing season, the addendum

established that the Section would separately address days out provisions for federal herring Category A vessels and small-mesh bottom trawl vessels with a federal herring Category C or D permit. In addition to landing restrictions associated with the days out program, Category A vessels are now prohibited from possessing herring caught from Area 1A during a day out of the fishery. Small-mesh bottom trawl vessels with a Category C or D permit must notify states of their intent to fish in Area 1A prior to June 1st. The addendum also implements a weekly harvester landing limit for vessels with a Category A permit for the 2017 fishing season. Forty-five days prior to the start of the fishing season, Category A vessels will notify states of their intent to fish in Area 1A, including a specification of gear type, to provide states with an estimate of effort to calculate the weekly landing limit. States may also either implement measures that herring caught in Area 1A can only be landed by the respective harvester vessel (i.e. no carrier vessels) or that herring carrier vessels are limited to receiving at-sea transfers from one harvester vessel per week and landing once per 24-hour period. Through the addendum, NOAA Fisheries granted access to vessel monitoring system-submitted daily catch report data for select staff in Maine, New Hampshire and Massachusetts to provide real-time data for the states to implement a weekly landing limit. The Section also approved continuing the use of the GSI30-based forecast system to determine spawning closures in Area 1A.

Addendum II (May 2019)

Addendum II strengthens spawning protections in Area 1A (inshore Gulf of Maine) by initiating a closure when a lower percentage of the population is spawning (from approximately 25% to 20%), and extending the closure for a longer time (from four to six weeks). The Addendum also modifies the trigger level necessary to reclose the fishery, with the fishery reclosing when 20% or more of the sampled herring are mature but have not yet spawned. These changes to spawning protections are in response to the results of the 2018 Benchmark Stock Assessment which showed reduced levels of recruitment and spawning stock biomass over the past five years, with 2016 recruitment levels the lowest on record.

II. Status of the Stock

A 2024 Management Track Assessment (i.e., assessment update) for Atlantic herring was completed by NOAA's Northeast Fisheries Science Center (NEFSC) and is an update to the 2022 Management Track Assessment which was peer reviewed in June 2022 (NEFSC 2024; Miller et al. 2022; NEFSC 2022). No significant changes were made to the methods in the 2024 assessment as compared to the 2022 assessment. The 2024 assessment updated fishery catch data, survey indices, life history parameters (e.g., weights-at-age), and the age-structured model (ASAP) and biological reference points (BRPs) with data through 2023.

The 2024 assessment update indicates the Atlantic herring stock is overfished but not experiencing overfishing based on the biological reference points for spawning stock biomass (SSB) and fishing mortality (F). This is the same stock status as determined by the 2022 assessment. SSB has been declining since 2014 and was estimated to be 47,955 metric tons in 2023, which is 26% of the SSB target of 186,367 metric tons (Figure 2). F was estimated to be 0.263 in 2023, which is 58% of the overfishing threshold of 0.45. Both the 2022 and 2024

assessments noted poor recruitment, and the difficulty of identifying a causal mechanism for this recruitment trend.

The Atlantic herring stock is currently under a rebuilding plan in response to the overfished finding of the 2020 management track assessment (NEFSC 2020). The final rule implementing Framework Adjustment 9 to the federal Atlantic Herring FMP established a rebuilding plan for herring that became effective in August 2022 (87 FR 42962; July 19, 2022). The rebuilding plan applies the acceptable biological catch (ABC) control rule implemented for Atlantic herring.

The NEFMC and the ASMFC Atlantic Herring Management Board will consider the results of the 2024 stock assessment, stock projections, and the rebuilding plan to inform setting specifications for 2025-2027.

III. Status of the Fishery

There is an Atlantic herring fishery in the United States and Canada (Figure 3). Herring in the US are primarily caught using mobile gear (e.g., purse seines and mid-water trawls). Herring in Canada and a small portion of US-caught herring are caught using fixed gear (e.g., weir fishery).

The U.S. Atlantic herring fishery is controlled by annual catch limits (ACL) set by NOAA Fisheries. The stockwide ACL is distributed among the four management areas. Specifications are set every three years and adjusted annually to account for overages or underages from the previous fishing season. Once 92% of the sub-ACL for an area is reached, the respective fishery is closed. The stockwide fishery closes when 95% of the total ACL is projected to be reached. Following a closure, there is a 2,000 lb trip limit to allow for incidental bycatch of Atlantic herring for the remainder of the fishing year. In addition to quota-based closures, the "days out" and spawning closure programs in Area 1A provide additional measures to control fishing effort.

For the 2023 fishing season, the ACL was set at 27.4 million pounds (12,429 mt), which was later adjusted to 27.1 million pounds (12,287 mt) to account for overages in 2021. The ACL is further subdivided into sub-ACLs by the Atlantic herring management areas as follows (accounting for adjustments due to 2021 catch overages/underages): Area 1A = 7.4 million pounds (3,345 mt), Area 1B = 1.2 million pounds (555 mt), Area 2 = 7.9 million pounds (3,589 mt), and Area 3 = 10.6 million pounds (4,806 mt). After adjusting for the 30 mt fixed gear set-aside and the 8% buffer (Area 1A closes at 92% of the sub-ACL), the 2023 Area 1A sub-ACL was 3,050 mt. There was no research-set-aside for 2023. The Board established the following seasonal allocations for the 2023 Area 1A sub-ACL: 72.8% available from June 1 – September 30 and 27.2% available from October 1 – December 31.

The domestic Atlantic herring fishery is predominantly commercial; preliminary data indicate recreational harvest accounted for less than 2% of landings in 2023. For the past five years (2019-2023), recreational harvest has accounted for an average 2.9% of total landings each year. Since 2000, annual commercial landings by the United States Atlantic herring fleet

averaged roughly 143.5 million pounds (65,091 mt) (ACCSP, Figure 4). Since 2013, commercial landings have generally decreased and reached the lowest levels the time series in 2021 and 2022 at below 12 million pounds (below 5,443 mt) each year (Figures 3-4).

The Interstate FMP implements specific effort control measures for Area 1A (inshore Gulf of Maine). Catch, in metric tons, from Area 1A is shown in Table 1a. Preliminary information from 2023 indicates that 4,345 mt were caught in Area 1A, representing 101% of the Area 1A sub-ACL (not including the 30 mt fixed gear set-aside). Since the directed fishery closes (i.e., 2,000 pound possession limit) when 92% of an area's sub-ACL is projected to be reached, the Area 1A fishery in state waters closed and landings were prohibited effective 6:00 p.m. on November 6, and the Area 1A fishery in federal waters closed effective 12:01 a.m. on November 8.

Table 1a: Area 1A catch, sub-ACL, and associated directed fishery closures from 2014-2023. 2023 data are preliminary. Source of catch information: NOAA Fisheries.

Year	Area 1A Sub-ACL (mt)	Area 1A Catch (mt)	% Utilized	Area 1A Sub-ACL Closure
2014	33,031	32,898	100%	Oct-26
2015	30,585	28,861	94%	Nov-2
2016	30,524^	27,806	91%	Oct-18
2017	32,115^	28,682	89%	NA
2018	28,038	24,861	89%	NA
2019	5,223^	4,916	94%	Nov-27
2020	4,244^	4,353	103%	Nov-11$^{\pm}$
2021	2,609^	2,856	109%	Nov-11$^{\pm}$
2022	2,075^	2,325	116%	Nov-8$^{\pm}$
2023	4,315^ (not including 30 mt fixed gear set-aside)	4,345**	101%	Nov-8$^{\pm}$

^Area 1A sub-ACL was increased by 1,000 mt during the season as required when the Canadian New Brunswick weir fishery lands less than a specified amount through October 1st. This action re-allocates 1,000 mt from the management uncertainty buffer to the Area 1A sub-ACL and ACL.
***Preliminary landings data*
$^{\pm}$The Area 1A fishery in state waters closed and landings were prohibited effective Nov 7, 2020, Nov 8, 2021, Nov 7, 2022, and Nov 6, 2023; the Area 1A fishery in federal waters closed effective Nov 11 in 2020-2021 and Nov 8 in 2022-2023.

In 2023, a 2,000 pound possession limit was implemented in Area 1B from January 11 through March 22 and in Area 3 from January 13 through March 22 due to catch projections reaching 92% and 98% of the area sub-ACLs, respectively. Effective March 23, specifications for 2023 were revised and sub-ACLs for those management areas increased, thereby removing the initial 2,000 pound possession limits. Starting May 14, a 2,000 pound possession limit was implemented in Management Area 3 due to catch projections reaching 98% of the area's revised sub-ACL. Starting April 26, a 2,000 pound possession limit for midwater trawl vessels was implemented in the Cape Cod River Herring and Shad Catch Cap Area (spanning parts of

Area 1B and Area 3) due to projections reaching 95% of the river herring and shad catch cap for that area.

Catch, in metric tons, from all management areas is shown in Table 1b for the last five years (2023 data are preliminary).

Table 1b: Catch and sub-ACL for all management areas 1A, 1B, 2, and 3 from 2019-2022. 2022 data are preliminary. Source of catch information: NOAA Fisheries

Year	Area	Sub-ACL (mt)	Catch (mt)	% Utilized
2019	1A	5,223	4,916	94%
	1B	628	159	25%
	2	4,062	4,750	117%
	3	5,700	3,254	57%
	Overall	**15,574**	**13,079**	**84%**
2020	1A	4,244	4,353	103%
	1B	483	831	172%
	2	3,120	353	11%
	3	4,378	4,054	93%
	Overall	**12,224**	**9,591**	**78%**
2021	1A	2,609	2,856	109%
	1B	239	0	0%
	2	652	191	29%
	3	2,181	2,222	102%
	Overall	**5,128**	**5,268**	**103%**
2022	1A	2,075	2,325	112%
	1B	0	6	-
	2	1,300	79	6%
	3	1,824	1,825	100.1%
	Overall	**4,813**	**4,234**	**88%**
2023	1A	4,315+	4,345**	101%**
	1B	555	197**	35.5%**
	2	3,589	462**	13%**
	3	4,806	5,141**	107%**
	Overall	**13,287**	**10,144****	**76%****

***Preliminary 2023 landings data from 12-29-2023 NOAA Fisheries Quota Monitoring Report*
+Not including 30 mt fixed gear set-aside.

2023 Fishing Season

Based on preliminary data provided in state compliance reports, coastwide landings in 2023 were approximately 23 million pounds, which is more than double 2022 landings, primarily due to more quota being available in 2023. Notably, landings in Maine about quadrupled relative to 2022, and landings in Rhode Island increased tenfold relative to 2022. Landings in Massachusetts were about the same in 2023 as in 2022.

Maine and Massachusetts accounted for the majority (>90%) of the commercial Atlantic herring landings in 2023 (Table 2), similar to previous years. Rhode Island accounted for over 6% of commercial landings in 2023, which is an increase from recent years when it has typically accounted between 1 and 4% of commercial landings.

Landings in Connecticut and New York remained low in 2023 at less than 1% each of the coastwide total. In their compliance report, Connecticut noted the very low landings in recent years and are substantially less than landings in the early 2000s; further, Connecticut noted the Atlantic herring fishery for bait component has diminished with the reduction in of the number of active Connecticut commercial lobstermen in the last twenty years.

It is also important to note that some vessels regularly land herring in states outside of their homeport state (e.g., New Jersey vessels often land in Massachusetts).

The PRT noted that Atlantic herring landings can be variable in some states, particularly from Areas 2 and 3, dependent on the occurrence of mackerel trips. Additionally, Atlantic herring may overlap with other species in those areas in certain gears (e.g., small mesh bottom trawls and midwater trawls), which can be challenging for harvesters if possession limits are in place for some overlap species. For example, Atlantic mackerel trips limits have been restrictive to midwater trawl vessels targeting Atlantic herring.

A small portion of total Atlantic herring landings are from fixed gear, primarily in Maine state waters. In 2022 and 2023, anecdotal reports from Maine fixed gear harvesters noted that larger, adult herring were present and available to the fishery compared to past recent years. In 2023, anecdotal reports from fixed gear harvesters also noted general high abundance of fish in Maine state waters in May and June, including Atlantic herring, menhaden, Atlantic mackerel, and alewives. The harvesters noted that the overlap of these species made targeted fishing more challenging. For example, the increased presence of harvestable Atlantic herring may not have fully translated to fixed gear landings because some fixed gear catches had to be released due to the additional presence of river herring. Per Maine regulations for river herring, there is a 5% tolerance for river herring as bycatch (no more than 5% of the total catch by count is comprised of river herring).

Table 2. 2023 commercial landings by state and percent of total harvest. 2023 landings data are considered preliminary at this time. Source: State compliance reports.

	Commercial Landings (lbs) Preliminary	**Percent of Total**
ME	16,114,140	<70%
NH	0	0%
MA	5,487,938	<24%
RI	1,592,747	<7%
CT	Confidential	<1%
NY	10,757	<1%
NJ	0	0%

Days Out Provisions for Area 1A

Table 3 outlines the 'days out' program and effort control measures which were implemented in Area 1A in 2023. The Board implemented seasonal allocations for the 2023 fishery which allocated the Area 1A sub-ACL between Season 1: June-September (72.8%) and Season 2: October-December (27.2%). Maine, New Hampshire, and Massachusetts delayed the start of the fishery until July 16. Specifications for Season 1 established five (5) consecutive landing days a week for vessels with a Category A permit, and six (6) consecutive landing days a week for vessels with a Category C or D permit. Vessels with a Category A permit were also limited to a weekly landing limit of 320,000 pounds (8 trucks) per harvester vessel. The fishery moved to zero (0) landings days starting August 26 through September 30 as the harvest had reached 92% of the Season 1 allocation.

Landing days were set at zero for Season 2 from October 1 through October 9. Landing days were then set at two consecutive days for October 10-11, followed by a period of zero landing days from October 12 through November 4. Following the reallocation of 1,000 mt from the management uncertainty buffer to the Area 1A sub-ACL based on catch information from the Canadian New Brunswick weir fishery, the fishery moved to four consecutive landing days per week starting November 5 at 6:00 p.m. The Area 1A fishery in state waters closed and landings were prohibited effective November 6 at 6:00 p.m. and the Area 1A fishery in federal waters closed effective November 8 at 12:01 a.m. as NOAA had projected that 92% of the Area 1A sub-ACL to have been harvested.

Table 3: 2023 'days out' program for seasonal quota periods in Area 1A.

Seasonal quota periods	Date Effective	Consecutive Landing Days for Category A Permit	Weekly Landings Limit for Category A Permit	Consecutive Landing Days for Category C/D Permits	Poundage that can be Transferred to a Carrier Vessel
1	July 16*-Aug 25	5	320,000	6	0
	Aug 26-Sept 30	0	0	0	0
2	Oct 1-Oct 9	0	NA**	NA**	NA**
	Oct 10-11	2	NA**	NA**	NA**
	Oct 12-Nov 4	0	NA**	NA**	NA**
	Nov 5	4	NA**	NA**	NA**

**Zero landings days were specified for June 1 until the start of the fishery. Fishery did not begin until July 16 in all three Area 1A states (Maine, New Hampshire, and Massachusetts)*

***Weekly Landing Limits, Landing Days for Category C/D Permits, and Carrier Vessel limits can only be specified through Sept 30*

Spawning Area Closures

The Atlantic Herring Area 1A (inshore Gulf of Maine) fishery regulations include seasonal spawning closures for portions of state and federal waters in Eastern Maine, Western Maine and Massachusetts/New Hampshire. In 2017, the Commission's Atlantic Herring Section permanently implemented the GSI_{30} Based Forecast System for spawning closures in Area 1A. This forecasting method relies upon at least three samples, each containing at least 25 female herring in gonadal stages III-V, to trigger a spawning closure. If sufficient samples are not available, the spawning closure occurs on the default dates outlined in Amendment 3. As noted in the Status of the Fishery Management Plan section, Addendum II to Amendment 3 further modified the trigger for initiating a closure as well as the length of closures.

In 2023, the Eastern Maine spawning area closed on the default date of August 28th through October 8th, given there were no samples from the area at the time. The Western Maine and Massachusetts/New Hampshire spawning closed due to insufficient samples on the default date of September 23rd through November 3rd.

IV. Status of Research and Monitoring

Under Amendment 3, states are not required to conduct monitoring for Atlantic herring. However, state survey programs designed to catch other species may encounter herring regularly, so some states do collect biological information on Atlantic herring. A summary of these surveys results follows.

Maine and New Hampshire: These states jointly operate an inshore bottom trawl survey in the spring and fall that is designed to catch groundfish, but regularly encounters adult Atlantic herring. In 2023, the survey reported Atlantic herring observations during both the Spring and Fall surveys. In the Spring 2023 survey, Atlantic Herring were caught in 39 of the 97 tows, and a maximum of 16,224 were caught in one tow (a decrease from the maximum tow in Spring 2022). In the Fall survey, Atlantic Herring were caught in 45 of the 78 tows, and a maximum of 13,330 were caught in one tow (an increase from the maximum tow in Fall 2022).

Maine Department of Marine Resources also conducts commercial portside catch sampling. In 2022, a total of 31 biological sampling events occurred, covering purse seine, mid-water trawl, small-mesh bottom trawl and fixed gear trips. The collection of samples in 2023 was a doubling of samples that occurred in 2022 when 14 samples were collected. This reflects the moderate increase in management area sub-ACLs and fishing activity.

New Hampshire Fish and Game Department also conducts a juvenile finfish seine survey in the Great Bay, its tributaries, and other coastal harbors. In 2023, 28 Atlantic herring were observed during the months of June, August, and September. This is similar to the low observation of 83 Atlantic herring in the 2022 survey, and much lower than the 2021 survey when 2,410 Atlantic herring were observed during the months of June through November.

Massachusetts Division of Marine Fisheries noted fishery dependent sampling was once again not conducted due to lack of Research Set-Aside. Commercial samples were collected from Area 1A fishery landings in support of Maine Department of Marine Resources' biological sampling project.

Rhode Island Division of Marine Fisheries conducts a Seasonal Trawl Survey to develop abundance indices for Atlantic herring. The survey is conducted seasonally (spring/fall) in Rhode Island and Block Island Sound and monthly in Narragansett Bay. Fishery-independent monitoring for 2023 revealed contrasting signals between monthly and seasonal surveys. There was lower monthly biomass (0.07 kg/tow) and abundance (38.14 fish/tow) in 2023 when compared with the five year average (2018-2022: 77.85 fish/tow, 0.40 kg/tow). In contrast the seasonal spring survey was higher in both number of fish per tow and biomass per tow (140.28 fish/tow, 1.69 kg/tow) than the 5 year average (2018-2022: 107.67 fish/tow, 0.96 kg/tow).

Connecticut Department of Energy and Environmental Protection monitors Atlantic herring through the Long Island Sound Trawl Survey (LISTS), which is conducted each spring and fall since 1984. LISTS was completed in 2023, however the April survey was not conducted due to delays in vessel repairs. April has historically seen higher catches during the survey, so a lower spring index of abundance would be expected. However, over the last seven years Atlantic herring abundance has also had four of the lowest indices in the time series. The 2023 spring index was the same as in 2022 at 0.24 fish/tow. The 2017 index is the lowest since 1984 at 0.11 fish/tow. The 2023 Atlantic herring spring index is about 63% less than the previous ten years and 86% lower than the time series average (1.67 fish/tow). As noted, most of LISTS catches typically have occurred in the month of April, prior to herring leaving the Sound, however warming water temperatures in Long Island Sound particularly have affected the timing of Atlantic herring leaving, and this is likely one of the main drivers of recent low catches. Most Atlantic herring taken in LISTS spring survey are greater than 20 cm fork length, however, LISTS has seen numerous catches of smaller herring (<10cm) during the spring of 1997-1999 and 2004-2013. Juvenile Atlantic herring are poorly retained in the survey codend mesh (54 mm). It is believed that juvenile Atlantic herring may have been a significant component of the Long Island Sound forage base at the time. Typically few fish appear in the fall survey and those present are generally less than 15 cm.

New York has *de minimis* status and does not conduct directed monitoring of Atlantic herring.

New Jersey Division of Fish and Wildlife monitors Atlantic herring through the New Jersey Ocean Trawl Survey, which collects samples during five surveys conducted throughout the year (January, April, June, August, October) between Sandy Hook, NJ and Cape Henlopen, Delaware. In 2023, due to vessel issues the January Ocean trawl survey was cancelled, but all other months were sampled. The 2023 ocean trawl survey yielded 19.25 pounds (166 individuals) of Atlantic herring. This was much lower than the 2022 observations of 781.03 pounds (2,692 individuals) of Atlantic herring.

V. Status of Assessment Advice

Research recommendations from the 2018 benchmark stock assessment (NEFSC 2018)[1] and the 2022 management track assessment (Miller et al. 2022)[2] are listed in the final assessment reports starting on p.517 of the benchmark stock assessment report and p.10 of the 2022 assessment peer review report.

VI. Management Measures and Issues

Amendment 3 to the Interstate Fishery Management Plan for Atlantic Herring lists the following state regulatory requirements:

1. Each jurisdiction shall prohibit the landing of herring when the management area sub-ACL has been attained.
2. Vessels are prohibited from landing more than 2,000 lbs. of Atlantic herring from Area 1A when the fishery is closed, during a 'day out' or during spawning closures.
3. Jurisdictions will close the directed fishery when 92% of a management area's sub-ACL is projected to be harvested.
4. Each jurisdiction must enact spawning area restrictions that are at least as restrictive as those in Section 4.2.6.
5. States adjacent to Area 1A will implement days out restrictions as identified in Section 4.2.4.1.
6. States are required to implement weekly reporting by all non-federally permitted fishermen on Atlantic herring (including mobile and fixed gear).
7. Any herring vessel transiting a management area that is under a herring spawning closure or a 'day out' must have all of its fishing gear stowed.
8. The harvest of herring for the primary purpose of reduction to meal or meal-like product is prohibited.
9. Internal Water Processing operations will be prohibited from processing herring caught in all state waters.

VII. PRT Recommendations

State Compliance

All states with a declared interest in the management of Atlantic herring have submitted compliance reports and have regulations in place that meet the requirements of the Interstate Fisheries Management Plan for Atlantic Herring as described in Amendment 3.

Request for *De Minimis* Status

A state may be eligible for *de minimis* status if its combined average of the last three years of commercial landings (by weight) constitute less than one percent of the coastwide commercial landings for the same three-year period.

[1] https://repository.library.noaa.gov/view/noaa/22729

[2] http://www.asmfc.org/uploads/file/63ceca552022AtlHerring_PeerReviewandManagementTrackAssessment.pdf

New York has requested *de minimis* status and meets the requirements. The state's 2021-2023 combined average commercial landings is less than 0.07%, which is less than 1% of coastwide commercial landings during the same three-year period.

Research and Monitoring Recommendations

The PRT recognizes the decreasing capacity for fishery-dependent data collection over the past few years, due largely to limited resources and low quota and catch levels. Although quotas increased in 2023, it is important for the Board to recognize this challenge and discuss how to move forward with sampling the fishery in a low capacity scenario.

One challenge for fishery-dependent data collection is the current lack of funding to continue the Maine Department of Marine Resources' (ME DMR) Atlantic herring portside commercial sampling program, which is currently funded through mid-2025. ME DMR has been sampling the commercial herring fishery since the 1960s, and the sampling includes age, length, maturity, sex, and other important biological attributes. Without funding, ME DMR would be unable to collect biological samples out of state and unable to conduct portside bycatch sampling. These samples have been and are being used in management for the inshore spawning closures and for documenting the effect of management action on the size and age of fish harvested. The commercial sampling program is a vital data source for both the current ASAP and future WHAM assessment models, both of which are fundamentally age structured. Without this sampling program, Atlantic herring would likely revert to an index, or biomass-based method of assessment, increasing uncertainty. If commercial sampling were halted, it would negatively impact the ability to effectively monitor the rebuilding program for Atlantic herring and severely curtail the ability to provide projections for sustainable quota development using the current harvest control rule.

The PRT recommends the Board discuss potential long-term funding solutions for the ME DMR portside sampling program. The Board previously identified two potential approaches: (1) states can collect samples themselves and send to Maine DMR for processing, or (2) secure alternative funding source(s) for DMR data collection.

Another challenge is the insufficient number of samples to inform the three Area 1A spawning closures in recent years, which likely due to the timing of Area 1A fishery operation. The Area 1A fishery has been at zero landing days from mid-late August through September due to the June-September seasonal allocation being reached in early-mid August. Spawning in Area 1A typically occurs in late summer/early fall during this break in directed harvest, and along with reduced effort from small mesh bottom trawl vessels, these factors have contributed to very few samples available to inform spawning closures.

The PRT recommends the Atlantic Herring Technical Committee review the current spawning closure protocol in Addendum II and determine if there are any concerns with prolonged periods of insufficient samples and implementation of the default closure dates. The PRT notes that Addendum II was developed before the quotas drastically decreased, but also recognizes that during Addendum II development, this scenario of insufficient samples was

discussed. While the current default closure dates may already reflect a conservative approach, it may be beneficial for the Technical Committee to review the spawning closure protocol at this point.

The PRT will continue to discuss survey data submitted by states each year, and encourages states to note year-over-year changes and observations in the monitoring sections of the compliance reports.

In addition to the research recommendations outlined in the 2018 benchmark stock assessment and 2022 stock assessment update, the Plan Development Team (PDT) has previously recommended the following categorized research recommendations, which have been included in past FMP Review Reports. The PRT noted these recommendations are still relevant but are not specific to an immediate management or compliance concern, and therefore do not require Board action in 2024, besides Board consideration of funding for ME DMR's portside sampling program as noted above. The PRT recommends the TC review these research recommendations following the 2025 benchmark stock assessment.

<u>Fishery-Dependent Priorities</u>

High

- Investigate bycatch and discards in the directed herring fishery through both at-sea and portside sampling.
- Continue commercial catch sampling of Atlantic herring fisheries according to ACCSP protocols.

<u>Fishery-Independent Priorities</u>

High

- Expand monitoring of spawning components.

Low

- Continue to utilize the inshore and offshore hydroacoustic and trawl surveys to provide a fishery-independent estimation of stock sizes. Collaborative work between NMFS, DFO, state agencies, and the herring industry on acoustic surveys for herring should continue to be encouraged.

<u>Modeling / Quantitative Priorities</u>

Moderate

- Conduct simulation studies to evaluate ways in which various time series can be evaluated and folded into the assessment model.
- Develop new approaches to estimating recruitment (i.e., juvenile abundance) from fishery-independent data.
- Examine the possible effects of density dependence (e.g., reduced growth rates at high population size) on parameter estimates used in assessments.

Low

- Conduct a retrospective analysis of herring larval and assessment data to determine the role larval data plays in anticipating stock collapse and as a tuning index in the age structured assessment.
- Investigate the M rate assumed for all ages, the use of CPUE tuning indices, and the use of NEFSC fall bottom trawl survey tuning indices in the analytical assessment of herring.

Life History, Biological, and Habitat Priorities

Moderate

- Continue tagging and morphometric studies to explore uncertainties in stock structure and the impacts of harvest mortality on different components of the stock. Although tagging studies may be problematic for assessing survivorship for a species like herring, they may be helpful in identifying the stock components and the proportion of these components taken in the fishery on a seasonal basis.

Low

- Research depth preferences of herring.

Management, Law Enforcement, and Socioeconomic Priorities

High

- Continue to organize annual US-Canadian workshops to coordinate stock assessment activities and optimize cooperation in management approaches between the two countries.

Moderate

- Develop a strategy for assessing individual spawning components to better manage heavily exploited portion(s) of the stock complex, particularly the Gulf of Maine inshore spawning component.
- Develop socioeconomic analyses appropriate to the determination of optimum yield.
    - The PRT recognized the ongoing work of the ASMFC Committee on Economics and Social Sciences (CESS) and ASMFC Risk and Uncertainty Workgroup to incorporate socioeconomic criteria into the Risk and Uncertainty Decision Tool (currently under development). The PRT recommends tracking the development of this tool and considering future application to Atlantic herring management.

Low

- Develop economic analyses necessary to evaluate the costs and benefits associated with different segments of the industry.
    - The PRT specified that costs and benefits of management decisions on different segments (e.g. gear types) of the herring industry and on other fisheries that rely on herring as bait should be evaluated. The PRT noted the importance of considering the state-level economic data that would be required to conduct these analyses for non-federal fishing activity.

IX. References

Miller, T., Y. Chen, Y. Jiao, and J. Wiedenmann. 2022. 2022 Management Track Peer Review Panel Report. NOAA Fisheries. 22p.

Northeast Fisheries Science Center (NEFSC). 2018. 65th Northeast Regional Stock Assessment Workshop (65th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 18-11; 659 p.

NEFSC. 2020. Atlantic Herring 2020 Assessment Update Report (draft working paper for peer review only). US Dept Commer; 9p.

NEFSC. 2022. Atlantic Herring 2022 Management Track Assessment Report (draft working paper for peer review only). US Dept Commer; 10p.

NEFSC. 2024. Atlantic Herring 2024 Assessment Update Report (draft working paper for peer review only). US Dept Commer; 9p.

Wilberg, M., E. Houde, and F. Serchuk. 2020. 2020 Management Track Peer Review Committee Report. NOAA Fisheries. 17p.

X. Figures

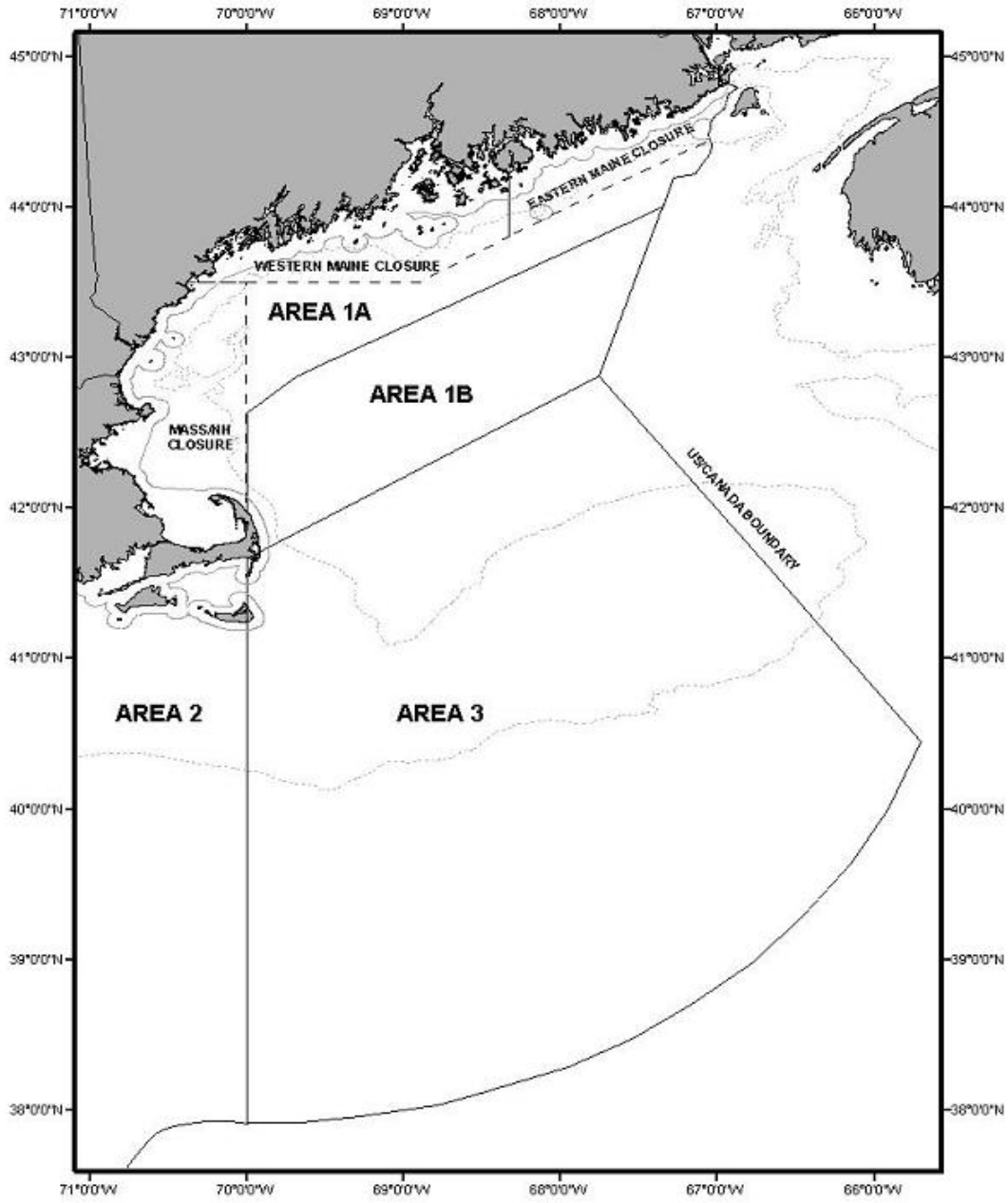


Figure 1. Map of Atlantic herring management areas with boundaries and the three spawning areas are within Area 1A, the inshore region of Gulf of Maine.

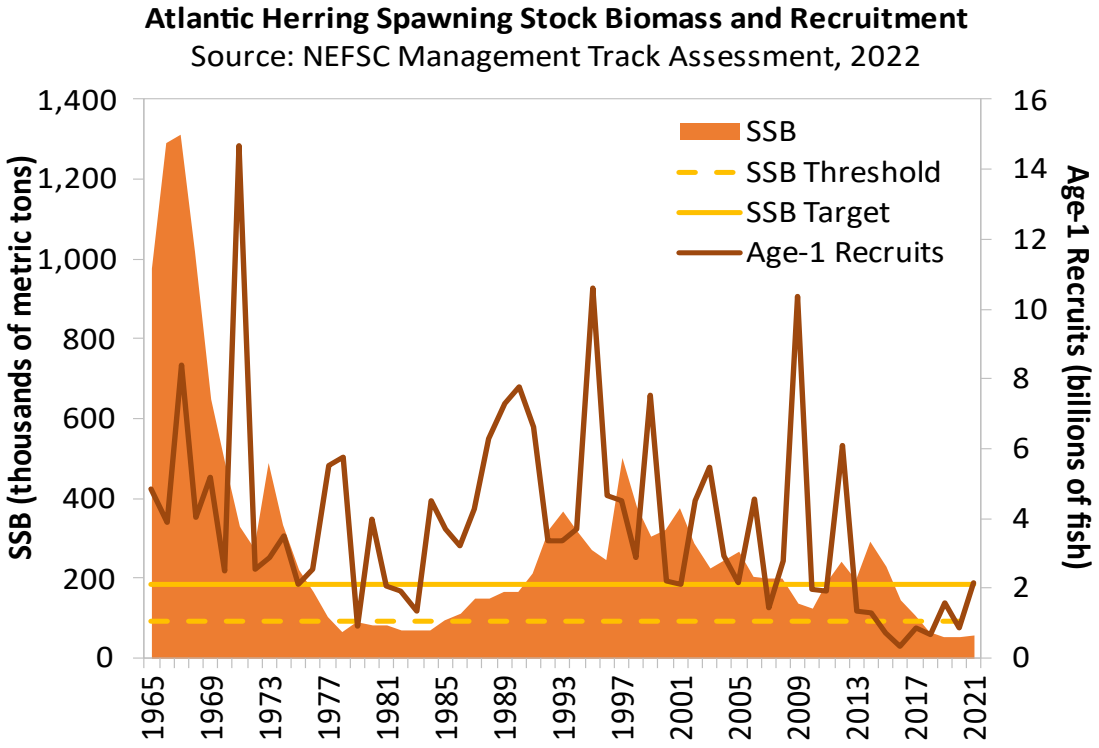


Figure 2. To Be Updated with 2024 Assessment Results. Spawning stock biomass and recruitment from 1965 to 2021. Source: 2022 Management Track Assessment

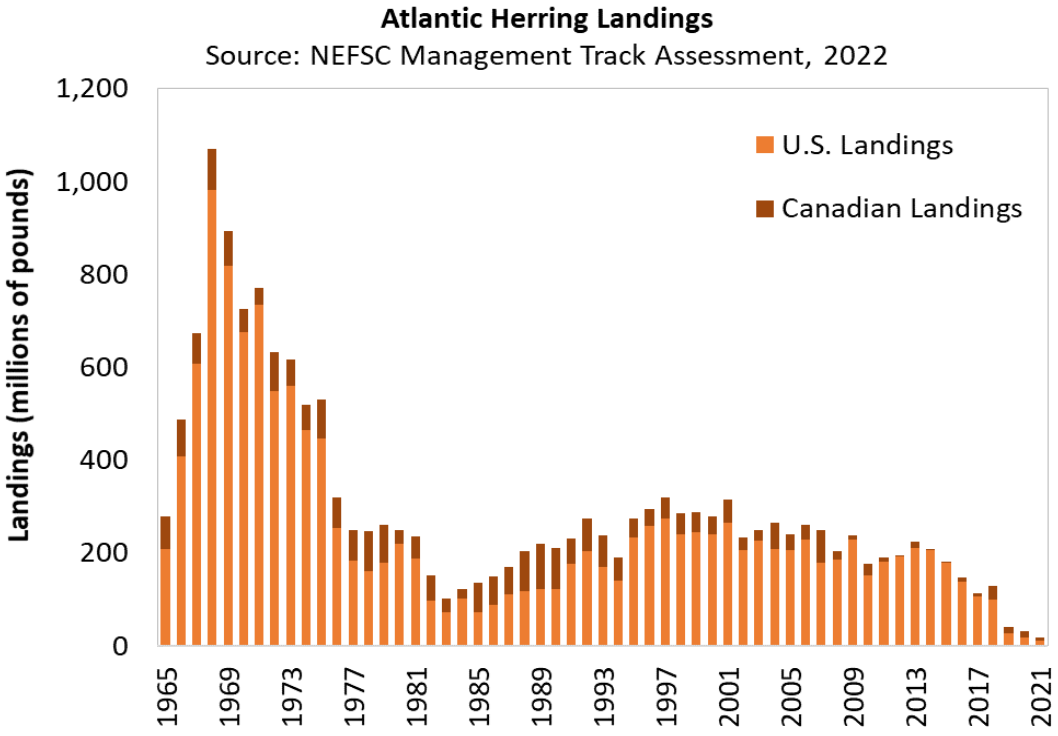


Figure 3. To Be Updated with 2024 Assessment Results. U.S. and Canadian commercial landings from 1965 to 2021. Source: 2022 Management Track Assessment

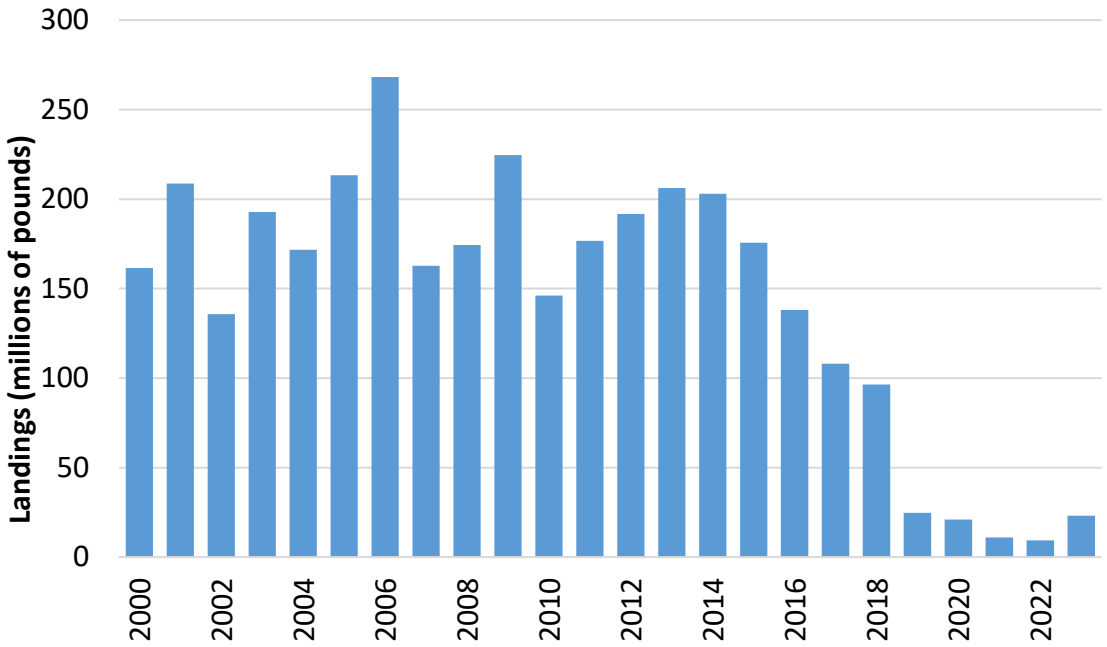


Figure 4. Commercial Atlantic herring landings (non-confidential landings only) by the U.S. fleet from 2000-2023. Source: ACCSP Data Warehouse for 2000-2022; State Compliance Reports for 2023.

Appendix. Days Out and Spawning Closure Notices from 2023

2023 days out and spawning closure notices are enclosed in the following pages.

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

MEMORANDUM

TO: **Atlantic Herring Management Board, Atlantic Herring Technical Committee, Atlantic Herring Advisory Panel, Interested Parties**

FROM: **Toni Kerns, Fisheries Policy Director** TMK

DATE: **April 27, 2023**

SUBJECT: **Area 1A 2023 Effort Controls for June through September**

The Atlantic States Marine Fisheries Commission's Atlantic Herring Management Board members from Maine, New Hampshire, and Massachusetts set the effort control measures for the 2023 Area 1A (inshore Gulf of Maine) fishery for June 1 – September 30.

The Area 1A sub-annual catch limit (ACL) is 3,050 metric tons (mt) after adjusting for the overage from 2021, the 30 mt fixed gear set-aside, and the fact that Area 1A closes at 92% of the sub-ACL. In October 2022, the Board established the following seasonal allocations for the 2023 Area 1A sub-ACL: 72.8% available for season 1 (June 1 – September 30) and 27.2% available for season 2 (October 1 – December 31).

2023 Atlantic Herring 1A Quota (in mt) Allocation by Season

Season	1A Quota
1. June 1-September 30	2,220 mt
2. October 1-December 31	830 mt

Days Out of the Fishery

- Landing days will be set at zero (0) from June 1 until the start of the fishery on July 16 at 6:00 p.m.
- Landing days begin on Sunday of each week at 6:00 p.m. starting July 16.
- Vessels with an Atlantic herring Limited Access Category A permit that have declared into the Area 1A fishery may land herring five (5) consecutive days a week. The week shall begin at 6:00 p.m. on Sundays and conclude at 6:00 p.m. on Fridays. One landing per 24 hour period. Vessels are prohibited from landing or possessing herring caught from Area 1A during a day out of the fishery.
- Small mesh bottom trawl vessels with an Atlantic herring Limited Access Category C or Open Access D permit that have declared into the fishery may land herring six (6) consecutive days a week. The week shall begin at 6:00 p.m. on Sundays and conclude at 6:00 p.m. on Saturdays.

Weekly Landing Limit

- Vessels with an Atlantic herring Category A permit may harvest up to 320,000 lbs. (8 trucks) per harvester vessel, per week starting July 16.

At-Sea Transfer and Carrier Restrictions

The following applies to harvester vessels with an Atlantic herring Category A permit and carrier vessels landing herring caught in Area 1A to a Maine, New Hampshire, or Massachusetts port.

- A harvester vessel may transfer herring at-sea to another harvester vessel.
- A harvester vessel may not make any at-sea transfers to a carrier vessel.
- Carrier vessels may not receive at-sea transfers from a harvester vessel.

Fishermen are prohibited from landing more than 2,000 pounds of Atlantic herring per trip from Area 1A until July 16, 2023 at 6:00 p.m. Landings will be closely monitored and the fishery will be adjusted to zero landing days when the season 1 quota is projected to be reached.

Please contact Emilie Franke, Fishery Management Plan Coordinator, at efranke@asmfc.org or 703.842.0740 for more information.

Motions

Move to implement for the 2023 Area 1A Season 1:

- **For Category A vessels, 5 landing days and an 8 truck (320,000 pound) weekly landing limit**
- **Zero landing days before Sunday, July 16 at 6:00pm**
- **Allow harvester-to-harvester transfers but not allow transfers to carriers**
- **For Category C/D SMBT vessels, 6 landing days**

Motion by Ms. Ware, second by Ms. Griffin. Motion passes by consent without objection.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: **Atlantic Herring Management Board, Technical Committee, Advisory Panel, Interested Parties**

FROM: **Toni Kerns, Fisheries Policy Director** TMK

DATE: **August 21, 2023**

SUBJECT: **Atlantic Herring Eastern Maine Spawning Closure in Effect Starting August 28, 2023 through October 8, 2023; Area 1A Days Out Meeting on September 14**

The Atlantic herring Area 1A (inshore Gulf of Maine) fishery regulations include seasonal spawning closures for portions of state and federal waters in Eastern Maine, Western Maine and Massachusetts/New Hampshire. The Commission's Atlantic Herring Management Board approved a forecasting method that relies upon at least three samples, each containing at least 25 female herring in gonadal stages III-V, to trigger a spawning closure. However, if sufficient samples are not available then closures will begin on predetermined dates.

There are currently no samples from the Eastern Maine spawning area to determine spawning condition. Therefore, per the Addendum II default closure dates, the Eastern Maine spawning area will be closed starting at 12:01 a.m. on August 28, 2023 extending through 11:59 p.m. on October 8, 2023. The Eastern Maine spawning area includes all waters bounded by the following coordinates:

Maine coast 68° 20' W
43° 48' N 68° 20' W
44° 25' N 67° 03' W
North along the US/Canada border

Vessels in the directed Atlantic herring fishery cannot take, land or possess Atlantic herring caught within the Eastern Maine spawning area during this time. The incidental bycatch allowance of up to 2,000 pounds of Atlantic herring per trip per day applies to vessels in non-directed fisheries that are fishing within the Eastern Maine spawning area. In addition, all vessels traveling through the Eastern Maine spawning area must have all seine and mid-water trawl gear stowed.

Upcoming Days Out Meeting
In addition, Atlantic Herring Management Board members from the States of Maine, New Hampshire and the Commonwealth of Massachusetts will meet via webinar on September 14, 2023 from 10:30 a.m. to 12:00 p.m., to discuss Season 2 (October 1 – December 31) days out measures for the 2023 Area 1A fishery (inshore Gulf of Maine). Days out measures include consecutive landings days for Season 2. The webinar and call information are included below:

Atlantic Herring Days Out Meeting

September 14, 2023

10:30 a.m. – 12:00 p.m.

You can join the meeting from your computer, tablet or smartphone at the following link: https://meet.goto.com/738566485. If you are new to GoToMeeting, you can download the app ahead of time (click here) and be ready before the meeting starts. **For audio, the meeting will be using the computer voice over internet (VoIP)**, but if you are joining the webinar from your phone only, you can dial in at **+1 (872) 240-3212** and enter access code **738-566-485** when prompted. The webinar will start at 10:15 a.m., 15 minutes early, to troubleshoot audio as necessary.

The 2023 Area 1A sub-annual catch limit (sub-ACL) is 3,345 metric tons (mt). The initial specification for the 2023 Area 1A sub-ACL of 3,592 mt decreased by 247 mt due to the catch overage in Area 1A in 2021. After adjusting for the 30 mt fixed gear set-aside and the 8% buffer (Area 1A closes at 92% of the sub-ACL), the Area 1A sub-ACL is 3,050 mt. There is no research-set-aside for 2023.

The Board established the following seasonal allocations for the 2023 Area 1A sub-ACL: 72.8% available from June 1 – September 30 and 27.2% available from October 1 – December 31.

Please contact Caitlin Starks, Fishery Management Plan Coordinator, at 703.842.0740 or cstarks@asmfc.org for more information.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: **Atlantic Herring Management Board, Advisory Panel, Technical Committee, Interested Parties**

FROM: **Toni Kerns, Fisheries Policy Director** TMK

DATE: **August 25, 2023**

SUBJECT: **Atlantic Herring Area 1A Fishery Moves to Zero Landing Days for Season 1 on August 26, 2023 at 12:01 a.m.**

The Area 1A (inshore Gulf of Maine) Atlantic herring fishery is projected to have harvested 92% of the Season 1 (June 1 – September 30) allocation by August 25, 2023. Beginning at 12:01 a.m. on Saturday, August 26, 2023, the Area 1A fishery will move to zero landing days through September 30, 2023, as specified in Amendment 3 to the Interstate Fishery Management Plan for Atlantic Herring.

Vessels participating in other fisheries may not possess more than 2,000 pounds of Atlantic herring per trip per day harvested from Area 1A. In addition, all vessels traveling through Area 1A must have all seine and mid-water trawl gear stowed.

Atlantic Herring Management Board members from Maine, New Hampshire, and Massachusetts are expected to reconvene in September via conference call to set effort controls for the 2023 Area 1A fishery for Season 2 (October 1 – December 31). An announcement will be issued once the meeting is scheduled.

For more information, please contact Caitlin Starks, Fishery Management Plan Coordinator, at 703.842.0740 or cstarks@asmfc.org.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: **Atlantic Herring Management Board, Atlantic Herring Technical Committee, Atlantic Herring Advisory Panel, Interested Parties**

FROM: **Toni Kerns, Fisheries Policy Director** TMK

DATE: **September 15, 2023**

SUBJECT: **Western Maine and Massachusetts/New Hampshire Spawning Closures in Effect Starting September 23, 2023 through November 3, 2023; Days Out Measures for Season 2 of the 2023 Atlantic Herring Area 1A Fishery**

The Atlantic herring Area 1A fishery regulations include seasonal spawning closures for portions of state and federal waters in Eastern Maine, Western Maine and Massachusetts/New Hampshire. The Commission's Atlantic Herring Management Board approved a forecasting method that relies upon at least three samples, each containing at least 25 female herring in gonadal stages III-V, to trigger a spawning closure. However, if sufficient samples are not available then closures will begin on predetermined dates.

There are currently insufficient from both the Western Maine spawning area and the Massachusetts/New Hampshire spawning area. Therefore, per Addendum II default closure dates, the Western Maine and Massachusetts/New Hampshire spawning areas will be closed starting at 12:01 a.m. on September 23, 2023 extending through 11:59 p.m. on November 3, 2023. The Western Maine spawning area includes all waters bounded by the following coordinates:

43° 30' N Maine coast
43° 30' N 68° 54.5' W
43° 48' N 68° 20' W
North to Maine coast at 68° 20' W

The Massachusetts/New Hampshire spawning area includes all waters bounded by the Massachusetts, New Hampshire and Maine coasts, and 43° 30' N and 70° 00' W.

Vessels in the directed Atlantic herring fishery cannot take, land or possess Atlantic herring caught in either the Western Maine or Massachusetts/New Hampshire spawning areas during this time and must have all fishing gear stowed when transiting through the area. The incidental bycatch allowance of up to 2,000 pounds of Atlantic herring per trip per day applies to vessels in non-directed fisheries that are fishing within the Western Maine or Massachusetts/ New Hampshire spawning areas.

Days Out Measures for Season 2 of the 2023 Atlantic Herring Area 1A Fishery

The Atlantic States Marine Fisheries Commission's Atlantic Herring Management Board members from Maine, New Hampshire, and Massachusetts met September 14 via webinar to set effort control measures for the 2023 Area 1A fishery for Season 2 (October 1 – December 31). The Season 2 quota is approximately 955 metric tons (mt), which is 27.2% of the Area 1A sub-annual catch limit (ACL) after adjusting for the 30 mt fixed gear set-aside, a slight underage from Season 1, and an 8% buffer (since the Area 1A closes at 92% of the sub-ACL). This does not take into account the possible reallocation of 1,000 mt to the Area 1A sub-ACL based on catch information from the Canadian New Brunswick weir fishery.

The days out measures for Season 2 are as follows:

- Landing days will be set at zero (0) from October 1 to 9.
- The fishery will move to two (2) landing days from 12:01 am October 10 to 11:59 p.m. October 11.
- The fishery will move to zero (0) landing days from October 12 to November 4.
- The fishery will move to four (4) consecutive landing days per week starting on November 5 at 6:00 p.m. until 92% of the Area 1A sub-ACL is caught. Landing days are Sundays from 6:00 p.m. through Thursdays at 5:59 p.m., weekly.

The fishery will only move to four (4) landing days on November 5 at 6 pm if there is remaining Season 2 quota at that time. Quota availability will depend on how much is landed from October 10-11 and if the 1,000 mt reallocation from the Canadian weir fishery to the Area 1A sub-ACL occurs.

While landing days are set at zero (0), harvesters are prohibited from landing more than 2,000 pounds of Atlantic herring per trip from Area 1A during Season 2.

Please contact Caitlin Starks, Fishery Management Plan Coordinator, at cstarks@asmfc.org or 703.842.0740 for more information.

Days Out Meeting Motions (September 14, 2023)

Move to set the following schedule for Area 1A landing days in Trimester 3:

- **Zero landing days from October 1- 9**
- **Two landing days from 12:01am October 10 to 11:59pm October 11**
- **Zero landing days from October 12 – November 4**
- **Starting on November 5 at 6pm, move to 4 landing days per week until 92% of the Area 1A sub-ACL is caught**

Motion by Ms. Ware.
Motion passed by consent.

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: **Atlantic Herring Management Board, Technical Committee, Advisory Panel, Interested Parties**

FROM: **Toni Kerns, Policy Director** TMK

DATE: **November 6, 2023**

SUBJECT: **Directed Atlantic Herring Fishery Closure for Management Area 1A**

NOAA Fisheries and the states of Maine and New Hampshire, and the Commonwealth of Massachusetts project the Atlantic herring fishery will catch 92% of the Area 1A sub-ACL by November 6, 2023. The Area 1A directed fishery will close effective 6:00 p.m. on November 6, 2023 and remain closed until further notice. Vessels that have entered port before 6:00 p.m. on November 6, 2023 may land and sell, from that trip, greater than 2,000 pounds of herring from Area 1A.

During a closure, vessels participating in other fisheries may retain and land an incidental catch of herring that does not exceed 2,000 pounds per trip or calendar day. In addition, directed herring vessels traveling through Area 1A must have all fishing gear stowed.

In accordance with the Amendment 3 to the Interstate Fishery Management Plan for Atlantic Herring, the fixed gear set-aside of 30 metric tons will continue to be available to fixed gear fishermen operating in Area 1A west of Cutler, Maine through December 31, 2023.

Please contact Emilie Franke, Fishery Management Plan Coordinator, at 703.842.0716 or efranke@asmfc.org for more information.

New England Fishery Management Council

FOR IMMEDIATE RELEASE
June 26, 2024

PRESS CONTACT: Janice Plante
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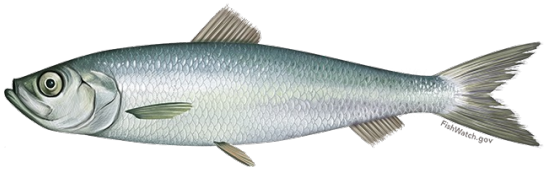
Council Receives Herring Amendment 10 Scoping Summary and Provides Guidance; Approves 2024-2028 Research Priorities

The New England Fishery Management Council discussed two issues related to Atlantic herring when it met in Freeport, Maine for its June 2024 meeting. It also received an update from its On-Demand Fishing Gear Conflict Working Group and approved a list of 2024-2028 research priorities and data needs.



Atlantic Herring Amendment 10: The Council conducted six scoping meetings in March and April 2024 on Amendment 10 to the Atlantic Herring Fishery Management Plan.

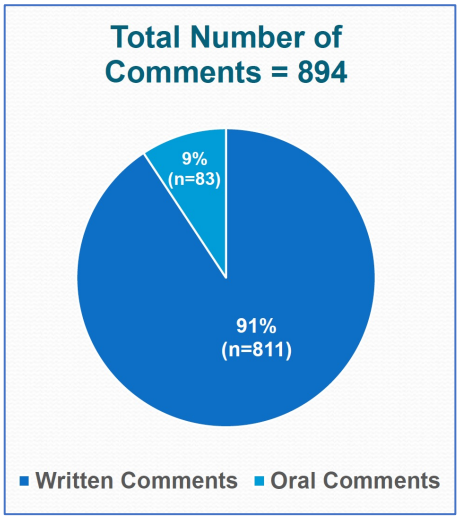
This amendment proposes to (1) minimize user conflicts, contribute to optimum yield, and support rebuilding of Atlantic herring; and (2) enhance river herring and shad avoidance and catch reduction.

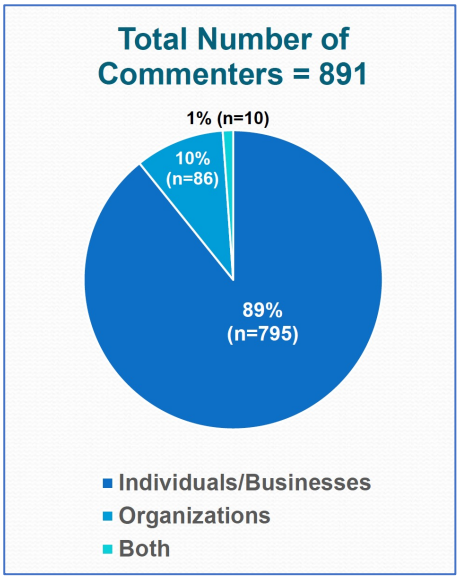
The Council received a comprehensive overview of the scoping process, which covered: the number of attendees at in-person and webinar scoping meetings; the number commenters at each meeting; a breakdown of commenters by affiliation or home state; the number of written comments received; general sentiments, major themes, and perceptions of current problems expressed during the meetings; desired outcomes from Amendment 10; the types of potential measures the action could contain; suggested data sources; and more.

Many of the comments focused on river herring and shad, emphasizing the role these species play in the ecosystem and their social and economic importance to many communities.

- The compiled summary of all oral and written comments in available in this document.

After hearing the summary, the Council then provided additional guidance to its Herring Committee on next steps. The Council did so



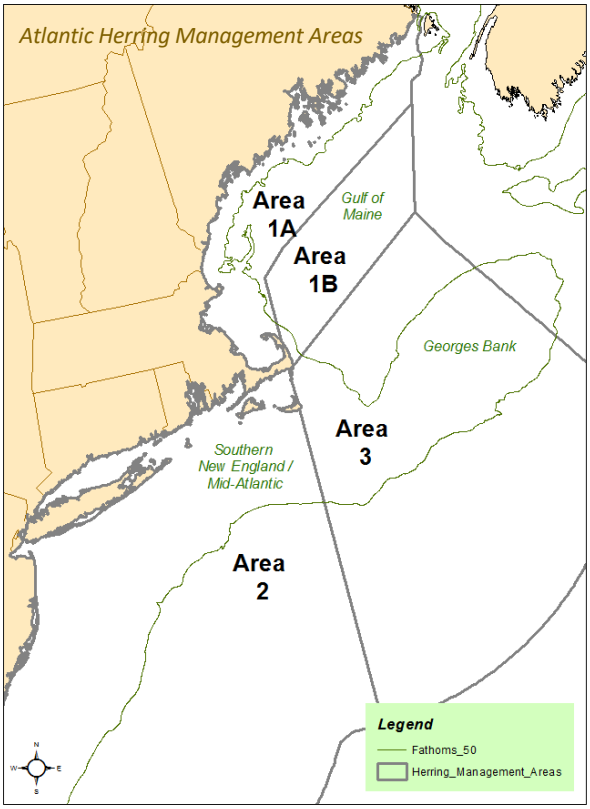


via three motions to direct the Herring Plan Development Team (PDT) on where it should focus its efforts down the road. The tasking specified that the Herring PDT:

- Assess data availability and analyze and develop alternatives for Amendment 10 that implement time/area closures for portions of Atlantic Herring Management Areas 2 and 3 where aggregations of river herring and shad overlap with the directed Atlantic herring fishery;
- Assess data availability and analyze and develop alternatives for Amendment 10 that implement revisions to the basis of river herring and shad catch cap values that: (1) are reflective of regional river herring/shad abundance, and (2) scale with ceilings and floors to changes in Atlantic herring abundance and/or regional river herring abundance; and
- Analyze and develop recommendations for implementing improvements to the accuracy and precision of river herring and shad catch estimates in the directed Atlantic herring fishery.

The PDT will work on Amendment 10 this summer and fall as time allows, but its priority and primary focus will be developing fishery specifications for 2025-2027.

The Atlantic States Marine Fisheries Commission (ASMFC) is conducting a River Herring Benchmark Stock Assessment. The results will be presented at the Commission's August 2024 meeting. Above, two species of river herring: alewife (top) and blueback herring (bottom). – NOAA Fisheries graphics



Atlantic Herring Specifications for Fishing Years 2025-2027: The Council received a brief overview of the timeline to establish specifications for the next three herring fishing years. The resulting catch limits will hinge in large part on the new Atlantic Herring Management Track Stock Assessment, which was first discussed during the 2024 Assessment Oversight Panel (AOP) Meeting for June Stocks.

The AOP categorized this assessment as Level 1, which means the results will be delivered directly to the Council's Herring PDT and Scientific and Statistical Committee (SSC), as well as the ASMFC's Herring Technical Committee.

The Council's SSC, Herring Committee, and Herring Advisory Panel (AP) will discuss the results at meetings later this summer. The SSC will develop overfishing limit (OFL) and acceptable biological catch (ABC) recommendations for the 2025-2027 fishing years as part of the process. Final action is planned for the Council's September 2024 meeting in Gloucester, Massachusetts. (More news on next page.)

New England Fishery Management Council

2024-2028 Council Research Priorities and Data Needs

The Council approved a list of 2024-2028 research priorities and data needs to support its work over the next several years. The Magnuson-Stevens Fishery Conservation and Management Act requires all fishery management councils, in conjunction with their scientific and statistical committees (SSCs), to establish five-year research priorities for "fisheries, fishery interactions, habitats, and other areas of research that are necessary for management purposes."

The Council last approved research priorities in 2022. For this current update, the Council's various committees, working with advice from their respective plan development teams and advisory panels, reviewed the previous 2022-2026 list and suggested additions, deletions, and modifications for 2024-2028. The revisions then were reviewed by the Council's SSC, which provided feedback and additional edits.

Each priority was ranked as: (1) **urgent** for research that's **essential** for compliance with federal requirements; (2) **important** to reach a **near-term** or ongoing management goal; or (3) **strategic** to address **future needs** related to Council actions.

The Council discussed and resolved outstanding issues. It then approved the draft list containing 110 research priorities for the new five-year cycle. Once ready, a final list will be posted on the Council's website in the sidebar here under Quick Documents. The document also will be submitted to the Northeast Fisheries Science Center and the Greater Atlantic Regional Office of NOAA Fisheries for consideration in developing research priorities and budgets.

AT-A-GLANCE: Here are snapshots of a few of the **"urgent (essential)"** research priorities identified by the Council. Note that some of this work is already underway, and many more urgent priorities are outlined in the 2024-2028 research priorities and data needs document.

SCALLOPS – Urgent (essential): Scallop surveys to estimate abundance and biomass. Research to evaluate the performance of scallop rotational areas. Research on the impacts of fishing in areas with high densities of scallops, including scenarios with heavy fishing pressure.

New England Fishery Management Council

ATLANTIC HERRING/SHAD AND RIVER HERRING – Urgent (essential): Investigate stock definition, stock movements, mixing, and migration for Atlantic herring. Further investigate recent low recruitment of Atlantic herring and possible drivers. Enhance herring fishery sampling (portside, at-sea observers, and monitors) to track spawning activity on Georges Bank.

MONKFISH – Urgent (essential): Monkfish life history work focusing on age and growth and recruitment, longevity, reproduction, natural mortality, and diet composition, including monkfish tagging and telemetry studies.

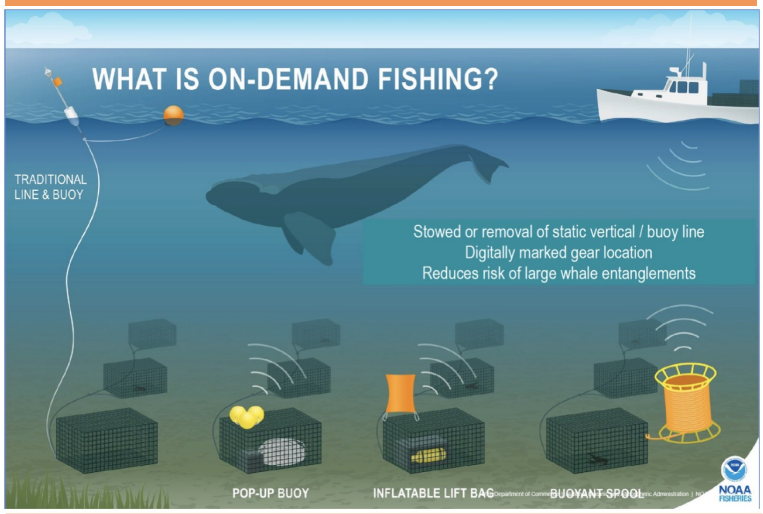
GROUNDFISH – Urgent (essential): Continue to explore uncertainties in groundfish stock assessments. Update the Northeast Fisheries Science Center's recreational bioeconomic model for cod and haddock. Investigate groundfish discard mortality rate estimates across gear types.

ASSESSMENTS, PERMITS – Urgent (essential): Develop guidance for when stock assessments are rejected and next steps, including how to set new biological reference points if an assessment/model is rejected. Investigate the feasibility of permit splitting across and within all fishery management plans. Better understand species responses to climate change.

QUESTIONS? CONTACT:

- **Atlantic Herring, River Herring/Shad:** Dr. Jamie Cournane, jcournane@nefmc.org;
- **Research Priorities and Data Needs:** Emily Bodell at ebodell@nefmc.org; and
- **On-Demand Gear Conflict Working Group:** David McCarron at dmccarron@nefmc.org

On-Demand Fishing Gear Conflict Working Group



The Council received an update from its On-Demand Fishing Gear Conflict Working Group that focused on: (1) highlighting progress across the group's terms of reference; and (2) setting the stage for the working group's July 17, 2024 meeting.

- *The Council meeting presentation is posted here.*

The working group is aiming to identify the implications of on-demand fishing gear usage on Council-managed fisheries. On-demand gear, which is often referred to as ropeless fishing gear, is a tool being testing to reduce interactions with North Atlantic right whales and other large whale species.

- *Visit the On-Demand Fishing Gear Conflict Working Group webpage.*

Council members requested additional information on the location of on-demand fishing gear projects. NOAA Fisheries has posted charts, locations, and details about on-demand gear projects at:

- *2024 Northeast Experimental On-Demand Gear System Testing Underway; and*
- *Detecting On-Demand Fishing Gear*

New England Fishery Management Council
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Eric Reid, *Chair* | Cate O'Keefe, PhD, *Executive Director*

MEMORANDUM

DATE: July 23, 2024

TO: Scientific and Statistical Committee

CC: NEFMC Atlantic Herring Committee & ASMFC Atlantic Herring Management Board

FROM: NEFMC Atlantic Herring Plan Development Team & ASMFC Atlantic Herring Technical Committee

SUBJECT: **Atlantic Herring OFLs and ABCs for 2025 through 2027**

The New England Fishery Management Council's (Council) Atlantic Herring Plan Development Team (PDT) and the Atlantic States Marine Fisheries Commission's (Commission) Atlantic Herring Technical Committee (TC) held a joint meeting by webinar on July 9, 2024. The primary purpose of the meeting was to discuss the results of the 2024 management track stock assessment.

Overview

This memorandum provides information to support fishing year (FY) 2025 through 2027 overfishing (OFL) and acceptable biological catch (ABC) recommendations to the Scientific and Statistical Committee (SSC). To develop recommendations, the PDT/TC reviewed 2022 and 2024 stock assessments and peer review reports, SSC reports, PDT reports, and survey information. The PDT/TC applied the Council's ABC control rule for Atlantic herring and rebuilding plan (following Amendment 8 and Framework Adjustment 9). Appendix I provides a summary of past specifications and Appendix II includes an overview of recent trends in the fishery.

Briefly, the PDT/TC's recommendations are summarized in Table 1.

Table 1. Summary of PDT/TC recommendations for SSC consideration of 2025 through 2027 OFLs and ABCs for Atlantic herring. Fixed gear catches were assumed equal to their 10-year averages with Canadian Catch = 4,031 mt US Fixed = 16 mt and are included in these projections.

Year	OFL (mt)	ABC (mt)
2025	18,273	6,741
2026	21,659	10,885
2027	30,050	15,435

1. Management Track Stock Assessment (2024)

Trends

Fishery catches in 2021 and 2022 represent the lowest (7,865 mt and 7,866 mt, respectively) in the time series, 1965-2023 (Figure 1), with the last three years (2021-2023) of catch as the lowest on record. Overall, spawning stock biomass (SSB) generally declined from 1965 to 1980 and then generally increased from 1981 through the mid-90s. SSB declined again from 1997 to 2010, increased for several years until 2014, and has been declining since. Fishing mortality (F) was relatively stable following decreases in the 1990s, followed by a gradual increase in 2009. Since 2018, fishing mortality has declined (Figure 2). Age-1 recruitment has been below average since 2013 (Figure 2). The time series high for recruitment was in 1971. The time series low occurred in 2016, and the second lowest occurred in 2018.

Figure 1. Total catch of Atlantic herring between 1965 and 2023 by the US and Canada (NEFSC 2024).

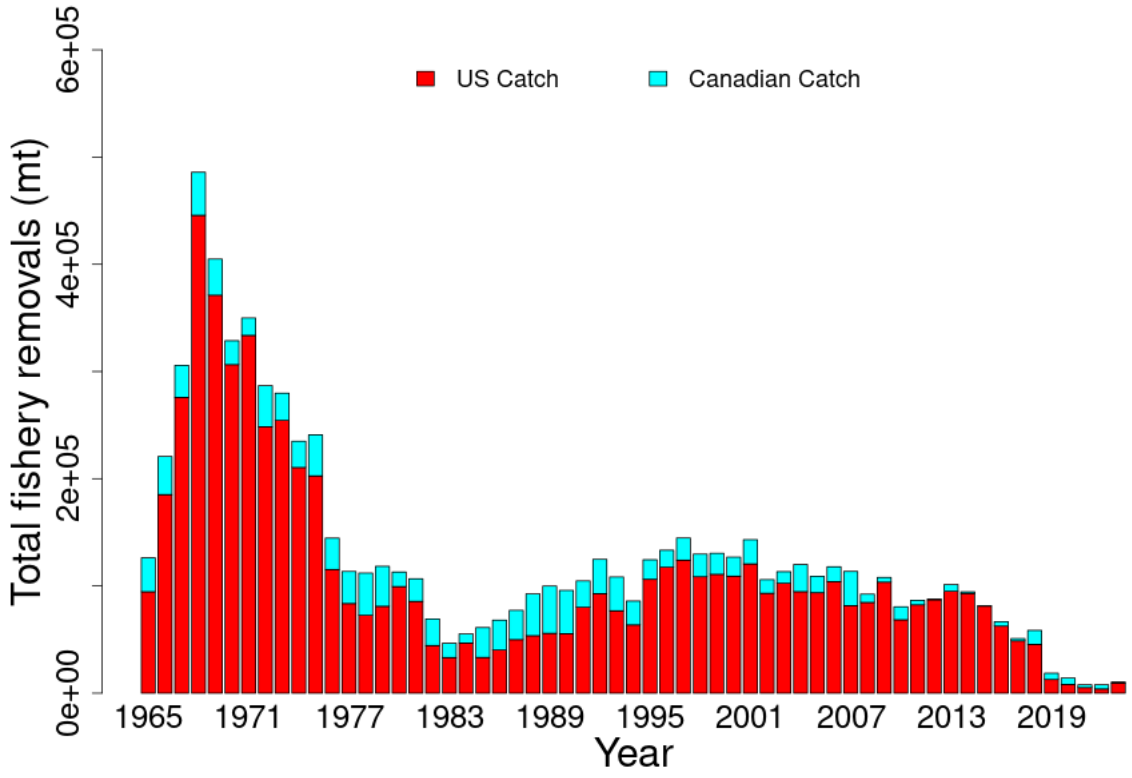
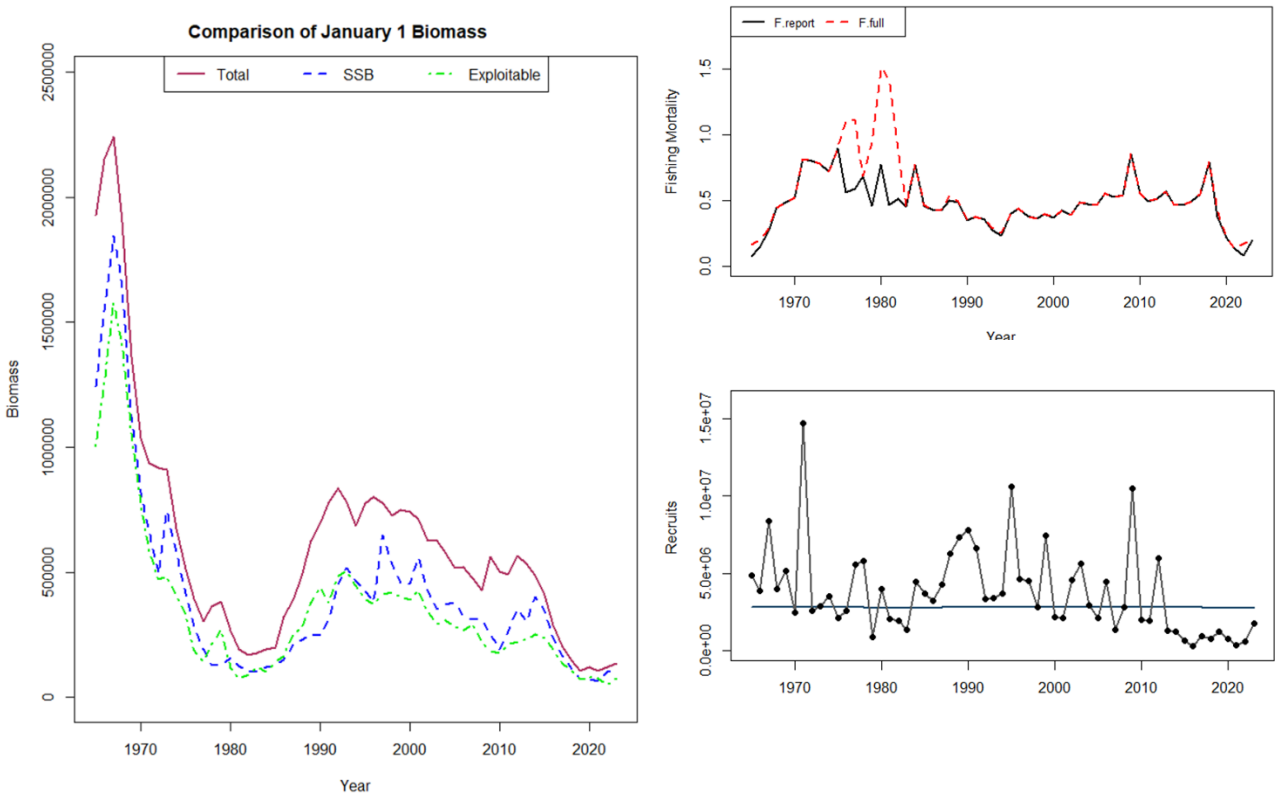


Figure 2. Atlantic herring spawning stock biomass (mt) and fishing mortality (F.report averaged over ages 7 and 8; F.full is fully selected) time series from the age structured assessment program (ASAP model) for 1965-2023. Atlantic herring annual recruit (000s) time series, 1965-2023. The horizontal line is the average over the time series (NEFSC 2024).



Stock Status

The methods used to derive biological reference points (BRPs) were unchanged from the 2022 stock assessment, in particular:

1) Long-term projections used to define BRPs accounted for mortality from the fixed gear fishery. The fixed gear fishing mortality equaled the average of the estimated fishing mortalities from the most recent 10 years.
2) The recruitment stanza used to estimate BRPs was 1992-2021 (adding two years since the 2022 assessment), based on a change-point analysis of recruits per spawner suggesting a shift in environmental conditions since 1992 affecting recruitment.

Therefore, the updated numerical values for the reference points are:

- FMSYproxy = 0.45
- SSBMSYproxy = 186,367 mt
- ½ SSBMSYproxy = 93,184, and
- MSYproxy = 78,710 mt.

Retrospective adjustments were necessary for SSB and F (SSB Mohn's rho = 0.563 and F Mohn's rho = -0.261), which reflect biomass being overestimated and fishing mortality being

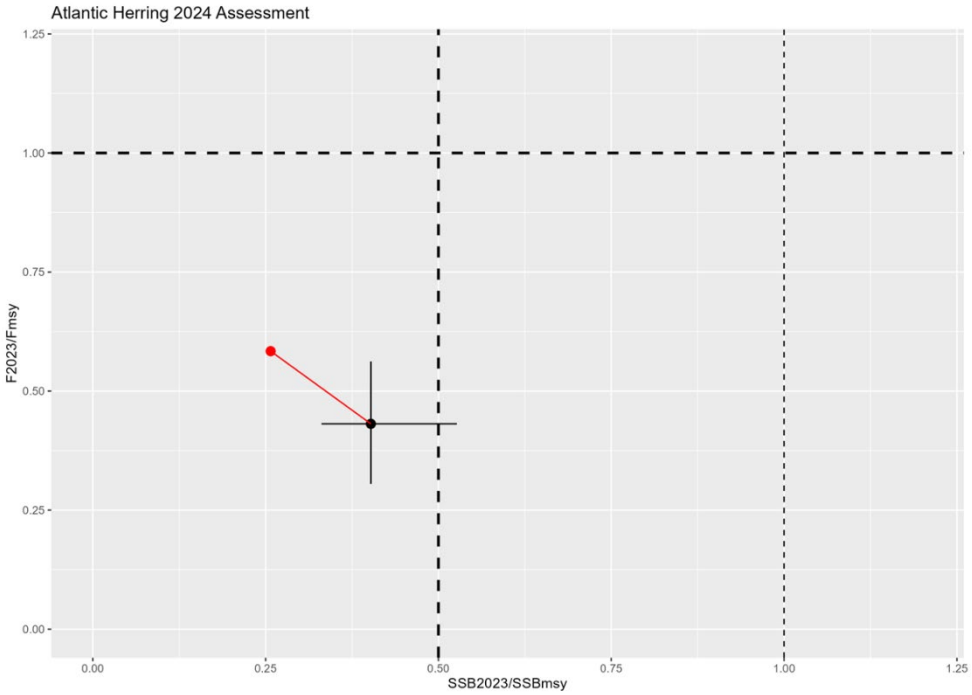
underestimated. The adjusted SSB in 2023 was estimated to be 47,955 mt which is 26% of the biomass target (SSBMSY proxy). The 2023 average fishing mortality for ages 7-8 (fully selected ages for the mobile fleet) was estimated to be 0.263, which is 58% of the overfishing threshold proxy (FMSY proxy) (Figure 3). Therefore, Atlantic herring is ***overfished but not subject to overfishing*** in 2023.

The prior values from the 2022 assessment are:

- FMSYproxy = 0.5
- SSBMSYproxy = 185,750 mt
- ½ SSBMSYproxy = 92,875, and
- MSYproxy = 68,980 mt.

Atlantic herring is in a rebuilding plan, with an initial rebuild by date of 2026. Year one of the plan is 2022 (5 years to rebuild, effective date of August 18, 2022).[1] New projections generated based on the 2022 management track assessment indicated Atlantic herring was not likely to rebuild by 2026, but it could rebuild by 2028. The interim final rule setting 2023-2025 fishery specifications revised the target rebuilding date for Atlatnic herring to 2028 to reflect the results of these updated analyses (88 FR 17397; March 23, 2023). Furthermore, the 2024 stock assessment projections extend the rebuilding period until at least 2031 (see *Section 3*). This still falls within the 10-year rebuilding period.

Figure 3. Atlantic herring stock status in 2023. The black dot indicates 2023 ratios from the model with 90% confidence bounds, and the red dot indicates the rho adjusted ratios (NEFSC 2024).



[1] See Framework Adjustment 9: https://www.nefmc.org/library/framework-9-3

Sources of Uncertainty

Projections - The projections are uncertain, especially regarding recruitment. Without other information about recruitment, the likelihood penalty has the effect of pulling the more recent recruitment estimates (i.e., 2022 and 2023) upwards towards the median. This upward increase in recent recruitments was partially offset in the projections by applying a retrospective adjustment.

Recruitment- An explanation of continued poor recruitment with a causal link has not been identified and remains an uncertainty for decades now.

Natural Mortality (M) - Natural mortality remains an uncertainty in this stock assessment. M was assumed constant in the 2024 management track, as in the 2020, 2022 management tracks and SAW 65, but M is likely to vary among time and age (size).

Stock Structure - Stock structure remains an uncertainty for this stock assessment, particularly mixing with the Nova Scotian stock. Migration can be conflated with changes in mortality or fishery selectivity and contribute to retrospective patterns.

2023 Spring Trawl Survey - Another source of uncertainty is that the 2023 spring NEFSC bottom-trawl survey did not cover the entire stock area for Atlantic herring (i.e., limited sampling on Georges Bank). Therefore, the survey was treated as missing in the model.

Previous Assessment Uncertainty

Figure 4 compares the estimates of SSB from previous assessments. Relatively large shifts in the SSB time series between assessments are likely related to structural changes in the assessment, such as shifting from a virtual population analysis (VPA) (1995-2004) to age structured assessment program (ASAP) (2005-2018), inclusion or exclusion of time-varying M, splitting the NMFS bottom trawl surveys so that the *R/V Bigelow* was its own time series (2015 to 2020), or some combination of these or other structural changes.

A summary of Mohn's rho for SSB, F and recruitment in stock assessments since the 2018 benchmark is provided in Table 2.

Figure 4. Atlantic herring historic retrospective pattern for SSB (NEFSC 2024).

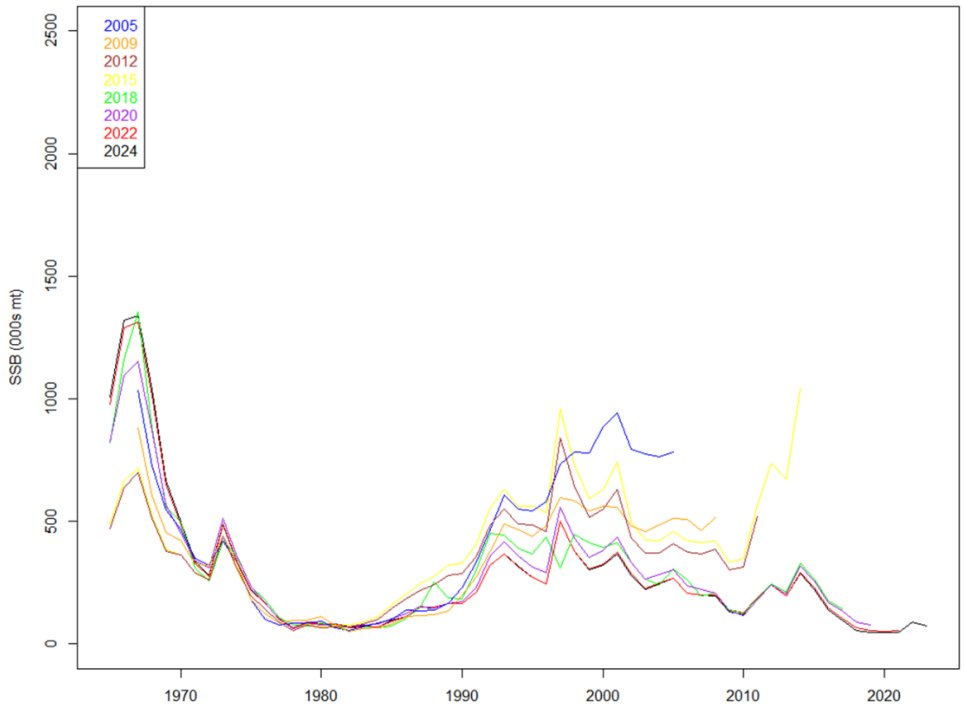


Table 2. Summary of Mohn's rho for SSB, F and recruitment in stock assessments since the 2018 benchmark for the 2020, 2022 and 2024 stock assessments and if an adjustment was applied to the terminal year (NEFSC 2020, 2022, 2024).

Stock Assessment Year	Assessment Terminal Year	SSB	F	Recruitment	Adjustment
2020	**2019**	0.052	-0.005	0.836	No, considered minor
2022	**2021**	0.447	-0.21	2.775	Yes, considered major for all
2024	**2023**	0.563	-0.261	3.15	Yes, considered major for all

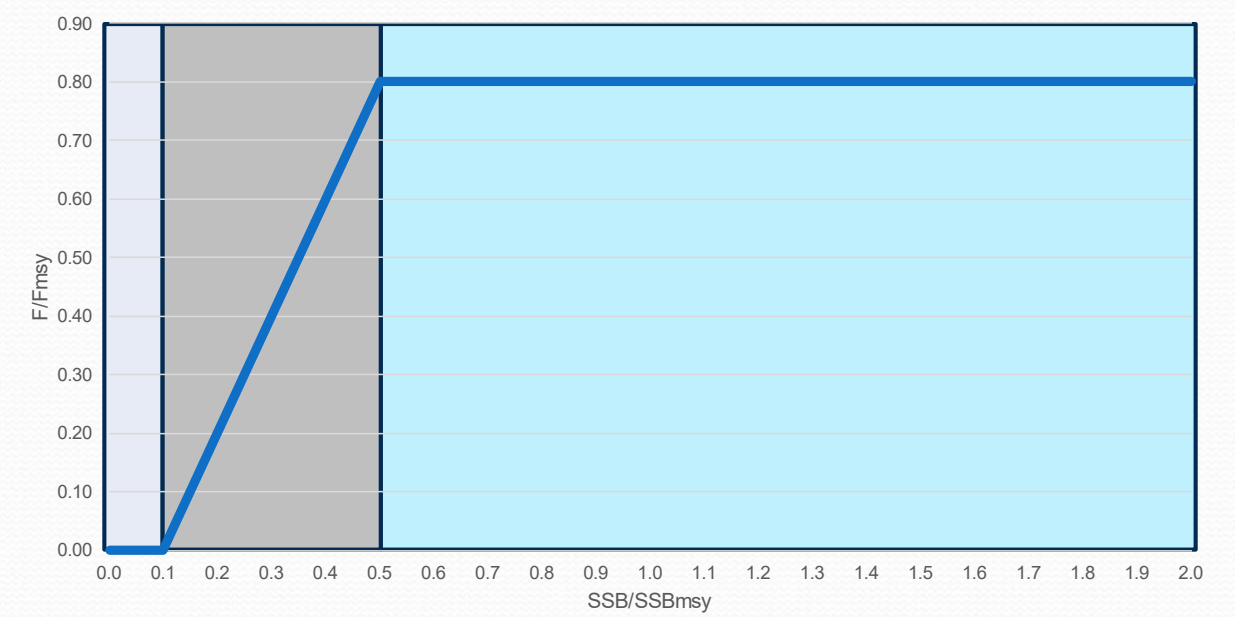
2. OFL and ABC Projections (2023-2025)

Short-term projections of future stock status were conducted (Table 3).

These projections **use the Council's ABC control rule**, applied to the mobile fleet, plus the assumed Canadian[2] and US fixed gear catches. The projections use a 10-year average for both Canadian and US fixed gear catch estimates. Canadian fixed gear catch is more variable and can swing by relatively large amounts from year to year. US fixed catch however has been relatively stable and much lower for most years, under 30 mt.

The **Council's Atlantic herring ABC control rule is biomass-based**[3]:

- When biomass is greater than 0.5 for the ratio of SSB/SSB_{MSY}, the maximum fishing mortality allowed is 80% of F_{MSY}.
- As biomass declines, fishing mortality declines linearly, and if biomass falls below 0.1 for the ratio of SSB/SSB_{MSY}, then ABC is set to zero, no fishery allocation.
- **The estimate of 2023 SSB relative to SSB_{MSY} is about 26%; therefore, reduced fishing mortality is allowed under the ABC control rule.**



The **rebuilding plan applies the ABC control rule**.

The PDT/TC reviewed the short-term projections and recommended these OFL and ABC values be considered by the SSC for 2025-2027 (Table 3). These projections are:

- consistent with the Council's ABC control rule,

[2] The FMP removes a portion of the ABC for management uncertainty to account for uncertain Canadian fixed-gear catch. The New Brunswick weir and shutoff fisheries are not quota managed; therefore, actual catches may be higher or lower than the assumed value used in these projections.
[3] See Amendment 8: https://www.nefmc.org/library/amendment-8-2

- based on the rebuilding plan[4] with updates to recruitment assumptions in the 2024 assessment,
- incorporate an estimate of catch from the New Brunswick fixed gear fishery, and
- use the most updated data available.

Table 3. Short-term projections of future stock status. Fixed gear catches were assumed equal to their 10-year averages with Canadian Catch= 4031 mt US Fixed= 16 mt. The ABC harvest control rule was applied to define the mobile fleet catches.

CHPTRECS_FIXED10YRAVG_HCR_AR annual Canadian Catch= 4031 US Fixed= 16

	Mobile Fleet F	SSB	P(overfishing)	P(overfished)	OFL	ABC	SSB/SSBmsy	P(rebuild)
2024	0.593	34451	0.923	1.000	–	–	0.185	0.000
2025	0.076	51904	0.000	0.886	18273	6741	0.279	0.009
2026	0.161	56718	0.005	0.857	21659	10885	0.304	0.014
2027	0.184	86607	0.035	0.565	30050	15435	0.465	0.058

3. PDT/TC Discussion

Missing 2023 spring NMFS bottom-trawl survey

For the 2024 stock assessment, the 2023 spring NMFS bottom-trawl survey was treated as missing. In the 2022 stock assessment, a likelihood penalty was used in the absence of the 2020 surveys. This approach was used again, however there were three other surveys providing information for 2023 (unlike for 2020). Additionally, the spring NMFS bottom-trawl survey does not catch age 1 herring. The 2024 survey index was available for comparison and remained low relative to recent years (Table 4).

Table 4. NMFS spring bottom-trawl survey abundance index (numbers/tow) for 2015-2024. 2020 and 2023 are treated as missing in the model. 2024 is not included in the model and provided for purposes of comparison.

Survey Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Index Value	65.5272	76.8743	38.4025	20.682	23.935	n/a	8.4231	17.9873	n/a	11.2738

[4] See Framework Adjustment 9: https://www.nefmc.org/library/framework-9-3

Canadian Catch Component

The PDT/TC discussed Canadian catches in recent years and recognizes the inter-annual variability of the New Brunswick fishery. The approach recommended is to keep the 10-year average consistent in the stock assessment and for the management uncertainty buffer. This would capture the possible variability of the landings and reduce the risk of overfishing the stock.

Projection Uncertainty

The PDT/TC discussed that the projections have been overly optimistic historically and that seems to be continuing. This is especially the case for the out-years of 2026 and 2027 and is driven by recruitment assumptions, despite the decisions made on projected recruitment (e.g., rho adjustment and auto-regressive approach unique to herring). Looking ahead, the Research Track Working Group is attempting to address the topic of recruitment.

Stock Rebuilding

Based on updated projections, stock rebuilding is falling behind schedule (Table 5) and may not rebuild in 10 years. There is a concern, similar to the short-term projections, that the out-years are highly uncertain and too optimistic.

2024 Catch Assumption

In the standard projections, the 2024 total ABC is used as the catch assumption. The projections indicate a high (>90%) probability of the stock experiencing overfishing if the full ABC is caught in 2024 (Table 5).

The PDT/TC developed a sensitivity run of the projection considering less than full utilization of the ABC (Table 6). The sensitivity projection adjusts the 2024 US mobile fleet bridge year catch by reducing it by 25% from 19,189 mt to 14,392 mt. All other assumptions were the same as the standard projections. The sensitivity run indicates that relatively modest reductions in bridge year catch can reduce the probability of overfishing below 50%. In addition, there are relatively minor changes in the short-term and rebuilding projections compared to standard projections.

The PDT/TC discussed some reasons why the US fishery may not catch the full ACL in 2024 and some of the uncertainties for catches in the second half of the fishing year (Figure 5):

- Area 2 currently has low catch relative to the sub-ACL. This area is typically a seasonal fishery and already past the peak herring timing. The fishery could take the full quota in the fall, but this is unlikely.
- The Area 1A sub-ACL is usually fully harvested. There is a transfer provision, which could increase the Area 1A sub-ACL in late fall by 1,000 mt.
- Stakeholders indicated is it difficult to justify going offshore in Area 3 because it is expensive to fish there, but the fishery could catch the full amount in the second half of the year if those fish are available.

- Area 1B catch is more uncertain and overall has a low sub-ACL. Much of this area falls within the River Herring/Shad Cape Cod Catch Cap Area. The fishery is currently under a 2,000 lb possession limit for midwater trawl gear. The full quota could still be utilized just outside the catch cap area.
- Preliminary data for 2023 indicates 76% of total US ACL was caught. By comparison, catch was 78% of US ACL in 2020, 103% of US ACL in 2021, and 88% of US ACL in 2022.

Table 5. 10-year projections of future stock status. Fixed gear catches were assumed equal to their 10-year averages with Canadian Catch= 4,031 mt US Fixed= 16 mt. The ABC harvest control rule was applied to define the mobile fleet catches.

	Mobile Fleet F	Mobile Fleet F 95%CI		SSB	SSB 95%CI		P(overfishing)	P(overfished)	OFL	ABC	SSB/SS Bmsy	SSB/SSBmsy 95%CI		P(rebuild)	P(closure)
2024	0.593	0.409	0.859	34450	21803	52779	0.923	1.000	–	–	0.185	0.117	0.283	0.000	0.009
2025	0.076	0.033	0.151	51905	24655	141054	0.000	0.886	18272	6741	0.279	0.132	0.757	0.009	0.004
2026	0.161	0.067	0.344	56730	27483	153330	0.005	0.857	21653	10882	0.304	0.147	0.823	0.014	0
2027	0.184	0.066	0.489	86578	40574	228835	0.035	0.567	30078	15450	0.465	0.218	1.228	0.057	0
2028	0.328	0.093	1.318	119449	45609	405658	0.300	0.321	40029	31117	0.641	0.245	2.177	0.221	0
2029	0.360	0.080	2.884	144384	47435	569121	0.375	0.236	48649	40581	0.775	0.255	3.054	0.348	0
2030	0.360	0.067	5.000	168847	49956	692995	0.389	0.182	56715	47209	0.906	0.268	3.718	0.443	0
2031	0.360	0.060	5.000	188966	52847	777716	0.395	0.147	63880	53116	1.014	0.284	4.173	0.508	0
2032	0.360	0.056	5.000	204360	55831	836424	0.396	0.123	69715	57953	1.097	0.300	4.488	0.554	0
2033	0.360	0.054	5.000	215281	58263	877951	0.399	0.108	74081	61555	1.155	0.313	4.711	0.583	0
2034	0.360	0.052	5.000	222616	60367	900895	0.398	0.097	77072	64038	1.195	0.324	4.834	0.601	0
2035	0.360	0.051	5.000	227582	61866	923870	0.397	0.091	79082	65692	1.221	0.332	4.957	0.616	0

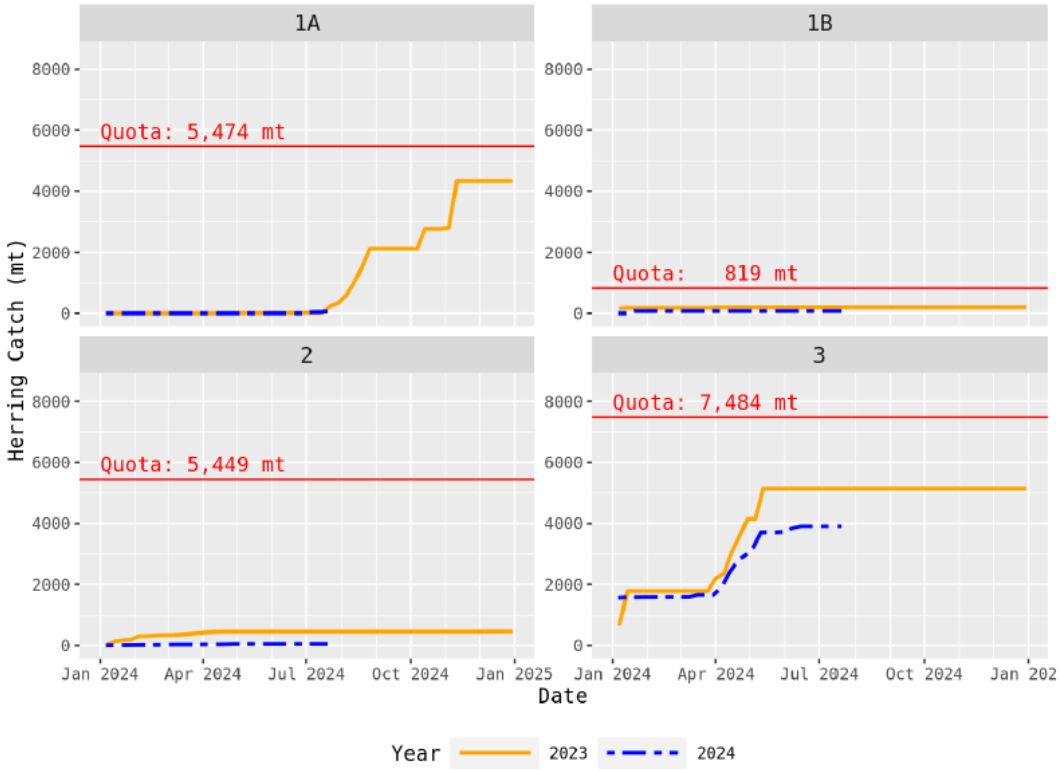
Table 6. Sensitivity run 10-year projections of future stock status. US mobile fleet bridge year catch in 2024 reduced by 25% from 19,189 mt to 14,392 mt with all other assumptions the same as the standard projections. Fixed gear catches were assumed equal to their 10-year averages with Canadian Catch= 4,031 mt US Fixed= 16 mt. The ABC harvest control rule was applied to define the mobile fleet catches.

	Mobile Fleet F	SSB	P(overfishing)	P(overfished)	OFL	ABC	SSB/SSBmsy	P(rebuild)
2024	0.422	38054	0.365	1.000	–	–	0.204	0.000
2025	0.094	55285	0.000	0.875	19496	7649	0.297	0.009
2026	0.177	58638	0.006	0.846	22513	11903	0.315	0.014
2027	0.193	87259	0.041	0.561	30525	16197	0.468	0.057
2028	0.331	119434	0.304	0.321	40180	31456	0.641	0.220
2029	0.360	144244	0.375	0.236	48638	40564	0.774	0.348
2030	0.360	168712	0.389	0.182	56667	47170	0.905	0.442
2031	0.360	188830	0.394	0.148	63829	53080	1.013	0.508
2032	0.360	204277	0.396	0.123	69679	57919	1.096	0.554
2033	0.360	215247	0.399	0.108	74060	61539	1.155	0.583
2034	0.360	222581	0.398	0.097	77063	64031	1.194	0.601
2035	0.360	227572	0.397	0.091	79075	65688	1.221	0.616

Figure 5. In-season 2024 Atlantic herring quota monitoring by sub-area and the total ACL, compared to 2023 catches (GARFO).

Report Run on: 2024-07-18
Quota Year: **2024** *(January 1, 2024 to December 31, 2024)*

Area	Quota (mt)	Cumulative Catch (mt)	Percent Quota Caught
1A	5,474	54.3	1.0%
1B	819	68.9	8.4%
2	5,449	51.1	0.9%
3	7,484	3,909.5	52.2%
ACL	19,141	4,083.8	21.3%



APPENDIX I: Past Atlantic Herring Fishery Specifications

This section provides a historical perspective on the degree of uncertainty in past Atlantic herring stock assessments, and the buffers that were established in the subsequent fishery specifications packages to account for those uncertainties. Table 7 summarizes the past specifications, uncertainty identified from previous Atlantic herring stock assessments, and the related SSC recommendations for catch advice.

2023-2025 Atlantic Herring Fishery Specifications

The SSC accepted the continued use of the ASAP model with new treatment of BRPs and projections for setting catch advice. The SSC appreciated the improvements made to the methods to calculate BRPs and short-term projections, specifically: 1) long-term projections used to define BRPs accounted for mortality from the fixed gear fishery, and 2) the recruitment stanza used to define BRPs was shortened (1992-2019) based on a changepoint analysis, representing the current lower productivity regime of Atlantic herring.

The SSC recommended setting OFLs and ABCs for fishing years 2023 to 2025 based on the Council's Atlantic herring ABC control rule, applied to projected biomass estimates for 2023-2025. The OFL and ABC projections were consistent with the Council's ABC control rule, based on the rebuilding plan with updates to recruitment assumptions in the 2022 assessment, incorporated an estimate of catch from the Canadian fixed gear fishery, and used the most updated data available.

During its deliberation, the SSC discussed two proposals for setting catch advice: 1) application of the Atlantic herring ABC control rule and 2) holding a constant ABC over the three-year period with the value based on the 2023 ABC derived from the ABC control rule. While there is still scientific uncertainty in the stock assessment (i.e., retrospective patterns) and projections, improvements were made to the model to address concerns raised by the SSC about BRPs. The SSC noted that a management track assessment is scheduled for Atlantic herring in 2024 and a research track assessment scheduled for 2025. Thus, the third year of catch advice will likely be replaced with a new set of specifications. There was concern expressed that projections have been consistently overly optimistic for this stock and there is no evidence of improved recruitment. The SSC noted that both the OFL and ABC projections increased with the changes made to calculation of BRPs and expressed concern about the magnitude of increase in ABC for a stock that is in a rebuilding plan. A proposal for setting catch advice constant was considered, but the SSC decided not to deviate from the Council's ABC control rule in setting catch advice.

2021-2023 Atlantic Herring Fishery Specifications

The SSC was prepared to implement the harvest control rule selected through the Amendment 8 MSE process. However, the SSC had reservations about the projections for Atlantic herring and were concerned about the assumptions regarding future recruitment, though noted that previous work indicated that the impact of low recruitment within the window of the short-term projections did not have strong impacts on the catch advice generated from the control rule. The SSC noted that age 1 recruitment in projections for 2021-2023 was drawn from 1965-2015 and the resulting projected biomass showed a substantial increase in the third year of the projection

relative to the earlier years of the projection. The SSC considered that the projected increase in biomass in 2023 was uncertain and were concerned about setting ABC based on this value. Following a discussion on this topic, the SSC resolved to make ABC recommendations for 2021 and 2022 based on the ABC control rule and ASAP projections but recommended keeping ABC in 2023 the same as 2022 due to the uncertainty in recruitment assumptions underlying the projections. However, the SSC recommended that the OFL be set to follow the projections for all three years of the advice.

The use of the reduced ABC in 2023 is consistent with the SSC's role in accounting for scientific uncertainty. It acknowledges that the projections are sensitive to the assumptions around recruitment. The SSC discussed that the Gulf of Maine and Georges Bank is considerably warmer than during most of the 1965-2015 period and that there may be other environmental factors that could be controlling herring recruitment. In carrying the 2022 ABC into 2023 instead of using the projections, the SSC is following the practice it developed in 2018. During that meeting, the projections were run using a more conservative recruitment assumption. Applying the harvest control rule to the final year of that projection led to an ABC that was similar to carrying the second year value forward. This suggests that the rationale of adding an additional uncertainty buffer onto the third year by holding it static is an appropriate way to handle scientific uncertainty for the herring stock.

2019-2021 Atlantic Herring Fishery Specifications

The SSC was prepared to recommend the Council implement the harvest control rule selected through the Amendment 8 MSE process. However, the SSC had reservations about the projections for Atlantic herring and were concerned about the assumptions regarding future recruitment. The SSC was concerned that age 1 recruitment in projections for 2019-2021 was drawn from 1965-2015 and the resulting projected biomass which showed a substantial increase over time. The SSC did not have confidence in the projected increase in biomass in 2021 and were concerned about setting ABC based on this value. Following an extensive discussion on this topic, the SSC resolved to make ABC recommendations for 2019 and 2020 based on the ABC control rule but recommended keeping ABC in 2021 the same as 2020 due to the uncertainty in the projections.

In addition, the SSC recommended the NEFMC request an updated assessment in 2020 based on the existing benchmark assessment. The objective of this update was to verify projected trend in biomass and recruitment with the aim of revising advice for 2021 based on more informed estimates of recent recruitment. That assessment was completed as a management track assessment in 2020. Finally, the SSC recommended further investigation into understanding the recent low recruitment of Atlantic herring and possible drivers.

2016-2018 Atlantic Herring Fishery Specifications

The SSC reviewed the catch projection included within the operational assessment report (2015) as well as an option developed by the PDT using the same control rule used in the previous specifications. That control rule involved a constant catch approach in fishing years 2016-2018, with the ABC set such that the probability of overfishing does not exceed 50% in any of those years. Based on the projection, the probability of overfishing was estimated to reach 50% in the

third year (2018). That control rule resulted in an ABC of 111,000 mt for 2016, 2017 and 2018, and associated OFLs of 138,000 mt in 2016, 117,000 mt in 2017, and 111,000 mt in 2018.

The rationale for this recommendation discussed by the SSC was as follows:

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

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

2013-2015 Atlantic Herring Fishery Specifications

When developing catch advice for the 2013-2015 Atlantic herring fishery specifications, the SSC considered projections at 75% FMSY as well as a constant catch approach. The SSC also considered two ABC control rules based on those utilized for forage fish in other regions. Given the condition of the Atlantic herring stock complex at that time, the control rules based on constant catch and 75% F_{MSY} were expected to produce approximately the same cumulative catch over the three years. The SSC noted that there is a higher risk of overfishing in the first year associated with the 75% F_{MSY} control rule and a higher risk of overfishing in the second and third years associated with the constant catch control rule. However, the SSC could not find any scientific reason to prefer one of these control rules over the other and considered them to be comparable in terms of risk of overfishing, given the information available. All considerations led the SSC to conclude that either control rule can be applied for 2013-2015 with low probability of overfishing or causing the stock to become overfished. The SSC recommended that the Council select either of these alternatives to specify ABC for the 2013-2015 fishing years.

The SSC considered several characteristics of the herring fishery and stock assessment before arriving at this decision regarding the ABC control rule for the 2013-2015 fishing years. The SSC did discuss the role of herring in the ecosystem and options for setting ecosystem-based ABCs. At that time, the SSC concluded that both control rules for the next three years would result in fishing mortality rates well below the natural mortality (M) rate and a stock size that is well above the standard biomass target, thereby likely meeting ecosystem-based biomass targets for a forage species by default if not by design. The SSC also agreed with the Herring PDT conclusion that natural mortality and consumption of herring by predators has been addressed in the SAW 54 benchmark assessment to the extent possible. Addressing M in this manner seems appropriate given herring's role as a forage species and appears to be consistent with other sources of information regarding food consumption and predation. Natural mortality and consumption have been evaluated in this stock assessment more thoroughly than assessments for other species in the Northeast Region.

2010-2012 Atlantic Herring Fishery Specifications

The Atlantic herring specifications for 2010-2012 were developed based on a 2009 update to the 2006 TRAC benchmark assessment. During the development of the 2010-2012 fishery specifications, the Council considered factors identified by the SSC when setting ABC and accounted for scientific uncertainty, including a retrospective pattern that resulted in an overestimation of stock biomass, MSY reference points estimated from the biomass dynamics model are inconsistent with the age-based - stochastic projection, recruitment, biomass projections, and the importance of herring as a forage species.

The SSC reviewed the TRAC update assessment and pointed out two sources of considerable scientific uncertainty:

> *(1) The assessment has a strong 'retrospective pattern' in which estimates of stock size are sequentially revised downward as new data are added to the assessment; and (2) Maximum sustainable yield reference points estimated from the biomass dynamics model are inconsistent with the age-based, stochastic projection; such that fishing at the current estimate of F_{MSY} is expected to maintain equilibrium biomass that is less than the current estimate of B_{MSY}.*

Other sources of uncertainty were discussed regarding recruitment, biomass projections, and herring as a forage species. Exploitable biomass was projected to decline during 2010–2012 due to the recruitment of poorer than average year-classes. Furthermore, the risk of depleting spawning components and the role of herring in the ecosystem as a forage species was also considered. Given the magnitude of uncertainty in the herring assessment and reference points, the SSC could not derive an ABC control rule at that time and recommended a new benchmark assessment of herring as soon as possible. The SSC suggested that the next benchmark assessment should revise MSY reference points to be consistent with the assessment method and consider including estimates of consumption and spatial structure in the assessment (September 2009 SSC Report).

The average retrospective inconsistency in the estimate of exploitable biomass is approximately 40%, and according to the 2009 TRAC Report, "uncertainty due to model configuration is

dwarfed by uncertainty due to retrospective bias." Therefore, the SSC considered that the magnitude of retrospective inconsistency accounts for the major sources of uncertainty in the assessment, and the buffer between OFL and ABC should be 40% (approximately 90,000 mt in 2010). Alternatively, the assessment suggested that recent catches have maintained a relatively abundant stock size (estimates of stock biomass from 1998 to 2008 have been greater than B_{MSY}) and low fishing mortality (estimates 1998 to 2008 fishing mortality have been less than F_{MSY}).

Total catch of the herring stock complex by U.S. and Canada in 2008 was 90,000 mt. Given the consistency in catch advice from these two approaches, the SSC's initial recommendation was that ABC should be 90,000 mt each year until the stock assessment is revised.

At its September 2009 Council meeting, the Council approved a motion to request that "the SSC revisit the size of the 40% buffer between OFL and ABC to consider whether application of recent years retrospective difference of about 17% is sufficient to account for scientific uncertainty caused by retrospective patterns." The SSC considered the Council request and concluded that there is no scientific basis for a 17% buffer, and that a 17% buffer is insufficient to account for scientific uncertainty. However, the SSC recommended that, as an alternative approach, annual catches in 2010 to 2012 could be limited to recent catch. Catches were 90,000 mt in 2008; the average for 2006 to 2008 was 106,000 mt; and the average for 2004 to 2008 was 108,000 mt. Acceptable biological catch (ABC) for Atlantic herring was ultimately set by the Council at 106,000 mt for 2010-2012 (Table 2). An additional buffer was taken to account for management uncertainty (primarily Canadian catch), and the stockwide ACL for 2010-2012 was specified at 91,200 mt, with an opportunity to add 3,000 mt to the Area 1A fishery if the Canadian catch did not exceed 9,000 mt by November 1.

Table 7. Summary of Previous Specifications for the Atlantic Herring Fishery and Buffers Between OFL/ABC.

	2010-2012			2013-2015			2016-2018			2019-2021		
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021****
OFL	145,000	134,000	127,000	169,000	136,000	114,000	138,000	117,000	111,000	30,668	41,830	59,788
ABC	106,000	106,000	106,000	114,000	114,000	114,000	111,000	111,000	111,000	21,266	16,131	16,131
Total ACL/OY	91,200*	91,200	91,200	107,800	107,800	107,800	104,800	104,800	104,800 ***(49,900)****	15,065	11,571	11,471
Catch (U.S.)	68,454	82,444	87,171	95,191	93,084	81,203	63,515	48,796	45,527	12,782	8,076	
Catch (NB Weir)	12,221	4,133	513	6,440	2,667	884	4,849	2,368	11,912	5,115	6,041	
Stock Assessment	2009 TRAC (US/Canada) Update Assessment			SAW/SARC 54 Benchmark Assessment, June 2012			Operational Update Assessment, 2015			SAW/SARC 65 Benchmark Assessment, 2018		
Reference Points	B_{MSY} 670,000; F_{MSY} 0.27; MSY =178,374			SSB_{MSY} 157,000; F_{MSY} 0.27; MSY =53,000			SSB_{MSY} 311,145; F_{MSY} 0.24; MSY =77,247			$SSB_{MSY\ PROXY}$189,000, $F_{MSY\ proxy}$ 0.51; MSY =112,000		
Status	Not Overfished (651,700; 97%); Not overfishing (0.14)			Rebuilt (518,000); Not overfishing (0.14)			Rebuilt (622,991); Not overfishing (0.16)			Not overfished (SSB=141,473) and overfishing not occurring (F=0.45)		
Uncertainty	(1) Significant retrospective pattern; (2) MSY reference points			(1) 2008 Year Class; (2) Natural Mortality (M); Biological Reference Points			(1) 2011 Year Class; (2) Natural Mortality (M); Biological Reference Points			(1) Natural mortality; (2) stock recruit relationship; (3) stock structure		
Rationale	• SSC recommended 90,000 ABC (40% buffer) but Council asked SSC to revisit; SSC then recommended recent avg. catch, and Council selected 2006-2008 (106,000); • Buffer from ABC/ACL to account for NB weir catch; 3,000 added to 1A if NB weir catch less than 9,000; • Herring PDT – accounting for retro pattern should account for other uncertainty			• SSC – Constant catch and 75% FMSY produce close to the same catch/result over three years; • Provides more buffer in Years 1/2 for the 2008 YC; • Addressing M in this manner seems appropriate for this species; • Achieves result of ecosystem-based CR by default, if not by design; • Supported by industry (stability)			• Constant catch is preferred approach of Council and industry. • Key attributes of stock and assessment have not changed, but 2011 year class will contribute significantly. • Retro has become worse, Mohn's rho correction applied. • P overfishing is 50% in year 3, but P overfished is zero. • Realized catch generally well below ABC. Catch to estimated consumption is 1:4.			• The SSC recommendation - 2019 and 2020 based on the ABC control rule but keep ABC in 2021 the same as 2020 due to the uncertainty in the projections. • The SSC recommended the NEFMC request an update assessment in 2020 to verify projected trend in biomass and recruitment.		

** In-season action was implemented on August 22, 2018 to reduce the 2018 sub-ACLs to prevent overfishing based on results of 2018 assessment. Note: All numbers are expressed in metric tons (mt). U.S. Atlantic herring catch estimates and NB weir catch are from SAW65 which are calculated differently than final catch estimate, and 2020-2023 are from the 2022 and 2024 management track assessments.*

***Updated in next cycle.*

Continued. Summary of Previous Specifications for the Atlantic Herring Fishery and Buffers Between OFL/ABC

	2021-2023			2023-2025		
	2021	**2022**	**2023****	**2023**	**2024**	**2025**
OFL	23,423	26,292	44,600	29,138	32,233	40,727
ABC	9,483	8,767	8,767	16,649	23,409	28,181
Total ACL/OY	4,814	4,098 3,813 *adjusted due to 2020 overage*	4,098	12,429	19,189 19,141 *adjusted due to 2022 overage*	23,961
Catch (U.S.)	5,202	3,929	N/A	9,505	N/A	
Catch (NB Weir)	2,663	3,937	N/A	936	N/A	
Stock Assessment	Management Track Assessment, 2020			Management Track Assessment, 2022		
Reference Points	$SSB_{MSY\ PROXY}$ 269,000, $F_{MSY\ proxy}$ 0.54; MSY =99,400			$SSB_{MSY\ PROXY}$ 185,750 mt $F_{MSY\ proxy}$ 0.5 MSY = 68,980 mt.		
Status	Overfished (SSB2019 = 39,091; rho adjusted) and Overfishing not occurring (F2019=0.153, rho adjusted)			Overfished (SSB2021 = 47,955; rho adjusted) and Overfishing not occurring (F2021= 0.263, rho adjusted)		
Uncertainty	(1) Natural mortality; (2) stock recruit relationship; (3) stock structure			Natural mortality; stock recruit relationship; stock structure; low recruitment / projections		
Rationale	• The SSC resolved to make ABC recommendations for 2021 and 2022 based on the ABC control rule and ASAP projections, but recommended keeping ABC in 2023 the same as 2022 due to the uncertainty in recruitment assumptions underlying the projections. • The SSC recommended that the OFL be set to follow the projections for all three years of the advice.			• The SSC recommended setting OFLs and ABCs for fishing years 2023 to 2025 based on the Council's Atlantic herring ABC control rule, applied to projected biomass estimates for 2023-2025. The OFL and ABC projections were consistent with the Council's ABC control rule, based on the rebuilding plan • The SSC also considered applying a constant approach, due to concerns about the projections.		

APPENDIX II: Recent Catches, Effort, Revenue and Current Atlantic Herring Fishery Specifications

Atlantic herring

Atlantic herring (*Clupea harengus*) are small schooling fish found along the east coast from Labrador to Cape Hatteras, North Carolina. They are migratory, spending winters in the Mid-Atlantic, then traveling to Georges Bank (GB) and the Gulf of Maine (GOM) in early summer to spawn. Atlantic herring play a role as forage in the ecosystem for many predator species, including marine mammals, large fish, sharks, elasmobranchs, and seabirds. Many bottom-dwelling fish species such as cod, winter flounder, haddock, and red hake feed on herring eggs.

Initially managed by the Atlantic States Marine Fisheries Commission (ASMFC) and international agreements, a Federal Fishery Management Plan for Atlantic herring was developed in 2001. Co-management continues today.

ABC Control Rule – The Council's Atlantic herring Acceptable Biological Catch (ABC) control rule is biomass-based, designed to account for its role in the ecosystem. Implemented through Amendment 8 (A8) to the Atlantic Herring Fishery Management Plan, the ABC control rule has been in place since February 10, 2021. When biomass is greater than 0.5 for the ratio of Spawning Stock Biomass (SSB) / SSBMSY (Spawning Stock Biomass at Maximum Sustainable Yield), the maximum fishing mortality allowed is 80% of Fishery Mortality at Maximum Sustainable Yield (FMSY). As biomass declines, fishing mortality declines linearly, and if biomass falls below 0.1 for the ratio of SSB/SSBMSY, then ABC is set to zero, and there is no fishery allocation. The ABC control rule explicitly accounts for Atlantic herring as forage in the ecosystem by limiting F to 80 percent of F_{MSY} when biomass is high and setting it at zero when biomass is low.

Stock Status - Atlantic herring was determined to be overfished, but overfishing was not occurring, following a 2020 management track stock assessment. The overfished condition triggered the need for a rebuilding plan, which the Council developed through Framework Adjustment 9 (FW9) and was implemented July 19, 2022. The rebuilding plan is based on the ABC control rule.

Recent Assessments - Atlantic herring underwent a management track stock assessment in 2022, where the stock was found to still be overfished, but not subject to overfishing. SSB generally declined from 1997 to 2010, increased until 2014, and has been declining since (NEFMC 2023). The assessment estimated that SSB in 2021 was 39,091 mt, which is approximately 21% of the biomass target. The assessment identified continued poor recruitment as the main issue driving stock status, noting that some combination of spawning stock size and environmental conditions are likely driving recruitment. However, a definitive explanation for continued poor recruitment has not yet been identified (NEFSC 2022). Updated projections indicate the stock has a 50% chance of rebuilding by 2028, which is a two-year extension from the original rebuilding plan (5 years to 7 years) but is still within ten years from the start date of 2022 (NEFMC 2023).

A management track assessment for Atlantic herring occurred in June of 2024, for use in setting 2025-2027 specifications. A research track stock assessment is currently underway with a peer review scheduled for March of 2025.

Optimum Yield (OY) is the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, taking into account the protection of marine ecosystems, including maintenance of a biomass that supports

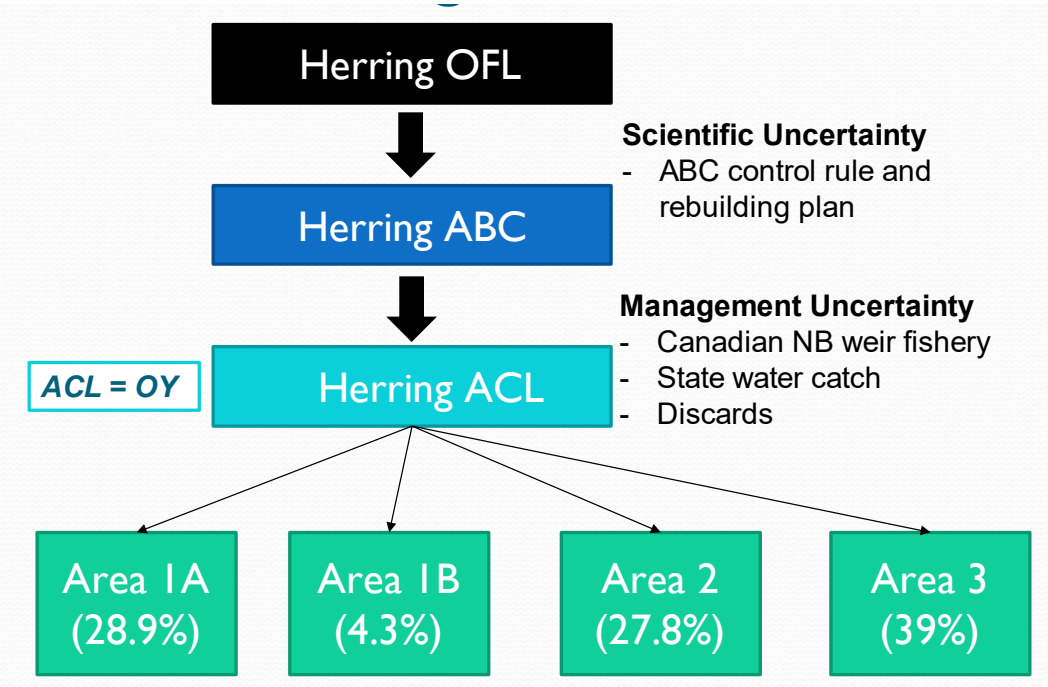
the ocean ecosystem, predator consumption of herring, and biologically sustainable human harvest (NEFMC 2019).

The stock-wide *Annual Catch Limit* (ACL) is determined as:

ABC – Management Uncertainty = Stock-wide ACL = OY

The stock-wide ACL for the fishery is distributed across four management areas: Area 1A (GOM), Area 1B (GOM), Area 2 (Southern New England/Mid-Atlantic Bight, SNE/MA), and Area 3 (GB) (Figure 1 and Map 1). The directed fishery is subject to in-season closures when 92% of a sub-ACL or 95% of the total ACL are caught, with a two-step process for Areas 2 and 3. There are also catch caps for haddock (GOM and GB) and river herring (alewife and blueback herring) and shad (American and Hickory) monitored in-season.

Figure 6. Overview of specifications for Atlantic herring.



Fishery Performance

Atlantic herring are used primarily as lobster bait, with a secondary food-grade market. Three main gear types are used to target herring: purse seine, midwater trawl, and bottom trawl. Atlantic herring are also harvested using fixed gear such as weirs. The Atlantic herring fishery is a high volume and low value fishery which has declined in recent years. In 2022, overall commercial landings totaled 9.3 million pounds. By comparison, a decade prior in 2013, commercial landings totaled 206 million pounds (Table 2).

Map 1. Atlantic herring management areas and river herring and shad catch cap areas in Northeast/Mid-Atlantic waters. Map Source: NOAA Fisheries.

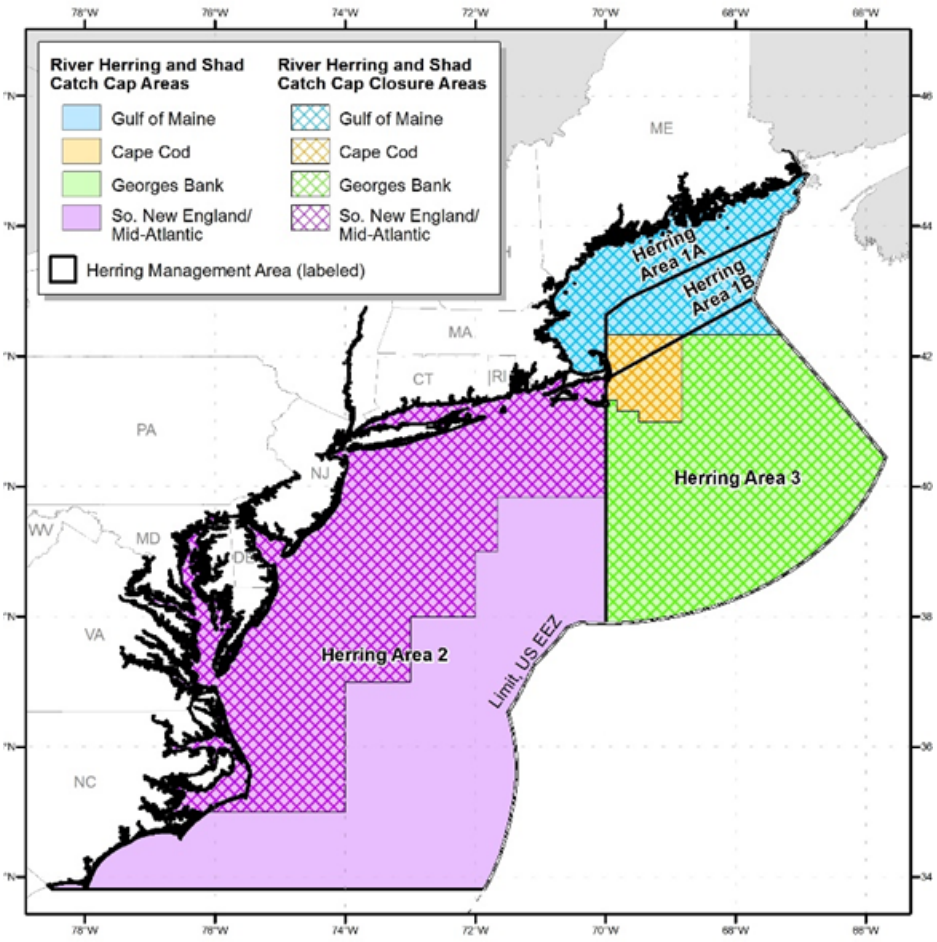


Table 8. Atlantic Herring Fishery Specifications for FY 2024.

	2024 specification value (mt)
Overfishing Limit (OFL)	32,233
ABC	23,409
OY/ACL	19,189*
Area 1A sub-ACL (28.9%)	5,546*
Area 1B sub-ACL (4.3%)	825
Area 2 sub-ACL (27.8%)	5,335
Area 3 sub-ACL (39%)	7,484

Source: 2023-2025 Atlantic Herring Fishery Specifications, 88 Fed. Reg. 17397 (March 23, 2023).
* if New Brunswick weir landings are less than 2,722 mt through October 1, then 1,000 mt will be subtracted from the management uncertainty buffer and reallocated to the Area 1A sub-ACL and ACL.

Table 9. Atlantic herring commercial landings, FY 2012- FY 2022.

Year	Landings (lb)	Landings (mt)
2012	191,756,605	86,980
2013	206,182,273	93,524
2014	202,308,678	91,767
2015	175,681,708	79,689
2016	138,135,658	62,658
2017	108,039,776	49,007
2018	96,510,245	43,777
2019	24,722,949	11,214
2020	20,841,921	9,454
2021	10,869,104	4,930
2022	9,301,244	4,219
Data Source: NOAA Fisheries Office of Science and Technology, Commercial Landings Query. Available at www.fisheries.noaa.gov/foss. Accessed 1/9/2024. Note: Data includes New England and Mid-Atlantic herring landings.		

Performance measures are summarized below and are focused on trips with 50% or more trip revenue from Atlantic herring (Table 3). Based on this threshold, around 21 vessels currently participate in the herring fishery. The top herring ports include: Portland, ME; Gloucester, MA; Rockland, ME; New Bedford, MA; and Point Judith, RI. Some vessels also participate in other fisheries, such as menhaden, squid, or mackerel.

Revenue in 2022 was $3.7 million, a steep decline from revenue in 2013 of $36.5 million. Since 2012, the number of vessels participating in the herring fishery has declined by roughly 60%, with the number of trips declining substantially, by just over 90%. These decreases correspond to catch limit restrictions beginning in 2018 in response to a decreasing herring stock. While the average price per pound of herring has increased over time to approximately $0.41/lb in 2022, revenue per vessel as well as total revenues have generally declined.

Table 10. Number of vessels, trips, average prices, and revenues based on trips with 50% or more of trip revenue from Atlantic herring, FY 2012-FY 2022. Normalized to 2022 dollars.

Fishing Year	Number of Vessels	Number of Trips	Average Price ($/lb)	Herring Revenue ($)	
				Average Per Vessel	Total
2012	51	975	0.17	649,398	33,119,298
2013	57	1126	0.18	640,811	36,526,196
2014	51	948	0.17	664,866	33,908,148
2015	43	804	0.17	676,971	29,109,731
2016	46	693	0.25	734,859	33,803,509
2017	50	737	0.30	611,774	30,588,696
2018	36	545	0.28	718,484	25,865,432
2019	33	209	0.40	316,703	10,451,204
2020	25	192	0.37	288,876	7,221,888
2021	21	189	0.37	160,283	3,365,937
2022	21	76	0.41	178,276	3,743,794

Data Source: NOAA Fisheries performance measures.
Notes: Data includes trips, vessels, and revenues assigned to the herring FMP. Trips are assigned to the herring FMP if 50% or more of trip revenue comes from Atlantic herring.
Economic values are normalized to 2022 dollars using the GDP implicit price deflator.

The following summarizes recent catch trends. The Atlantic herring fishing year starts on January 1 and catch is monitored based on a calendar year. Figure 2 shows Atlantic herring catch by month and area for fishing years 2018-2022. The Atlantic herring fishery is generally prosecuted south of New England (Areas 2 and 3) during the winter (January-April), and oftentimes as part of the directed mackerel fishery. There is overlap between the herring and mackerel fisheries in Area 2 and in Area 3 during the winter months. The Atlantic herring summer fishery (May-August) is generally prosecuted throughout the GOM in Areas 1A, 1B and in Area 3 (GB) as fish are available, though in 2020 Area 3 was closed in June. Restrictions in Area 1A have pushed the fishery in the inshore GOM to later months (late summer). The Atlantic herring fleet is restricted from fishing in Area 1A during the first half of the year because 0% of the Area 1A sub-ACL split is available for harvest January - May, and vessels are further prohibited from fishing with midwater trawl gear in Area 1A during June - September. Fall fishing (October-December) tends to be more variable and dependent on fish availability; the Area 1A (inshore GOM) sub-ACL is almost always fully utilized and typically closes sometime around November. As the 1A and 1B quotas are taken, larger vessels become increasingly dependent on offshore fishing opportunities (GB, Area 3) when fish may be available.

Figure 7. Atlantic herring sub-ACL use by month and herring management area (2018-2022).