Atlantic Herring Committee Report

Council Staff

New England Fishery Management Council
September 28, 2022
Goal:
Discuss the draft Supplemental information Report (SIR) and draft proposed action.

Key discussion question:
Do you recommend the proposed action?

Possible Outcomes:
1. Motion to recommend the Proposed Action in Section 5: Draft Proposed Action and Changes from the Original Action.
2. Motion to submit the 2023-2025 Atlantic herring specifications document to NOAA Fisheries, as amended today.
2023-2025 Specifications

Expected to set:

1. Overfishing limit, acceptable biological catch (ABC) using ABC control rule and rebuilding plan
2. Management uncertainty, annual catch limit (ACL), management area sub-ACLs, river herring and shad catch caps, and other components

Meetings:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 27-29</td>
<td>Atlantic herring Management Track assessment peer review</td>
<td>Webinar</td>
</tr>
<tr>
<td>July 7 &amp; 15</td>
<td>Plan Development Team develops OFL and ABC recommendations</td>
<td>Webinars</td>
</tr>
<tr>
<td>August 4</td>
<td>Scientific and Statistical Committee recommends OFLs and ABCs</td>
<td>Webinar</td>
</tr>
<tr>
<td>Aug 16 &amp; Sep 6</td>
<td>Plan Development Team prepares the draft supplemental information report (SIR)</td>
<td>Webinar</td>
</tr>
<tr>
<td>September 23</td>
<td>Advisory Panel and Committee review analysis (SIR), recommends proposed action</td>
<td>Webinar</td>
</tr>
<tr>
<td>September 26-29</td>
<td>Council final action</td>
<td>In-Person &amp; Webinar Gloucester, MA</td>
</tr>
</tbody>
</table>
Draft Supplemental Information Report

2.0 PURPOSE OF THIS SUPPLEMENTAL INFORMATION REPORT

3.0 ORIGINAL ACTION AND BACKGROUND

4.0 NEW INFORMATION AND CIRCUMSTANCES

   4.1 2022 Atlantic Herring Management Track Assessment

   4.2 Recent Catch and Landings

   4.3 Updated Atlantic Herring Rebuilding Projections

   4.4 Herring Landings in New Brunswick, Canada (Weir Fishery)

   4.5 Analysis of River Herring/Shad Catch Caps

   4.6 Herring Georges Bank Haddock Sub-ACL

5.0 PROPOSED ACTION AND CHANGES FROM THE ORIGINAL ACTION

6.0 NEPA COMPLIANCE AND SUPPORTING ANALYSIS

7.0 CONCLUSION
### Specifications and Catches

<table>
<thead>
<tr>
<th>Year</th>
<th>OFL (mt)</th>
<th>ABC (mt)</th>
<th>ACL (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>23,423</td>
<td>9,483</td>
<td>5,128</td>
</tr>
<tr>
<td>2022</td>
<td>26,292</td>
<td>8,767</td>
<td>3,813</td>
</tr>
<tr>
<td>2023</td>
<td>44,600</td>
<td>8,767</td>
<td>4,098</td>
</tr>
</tbody>
</table>
The Council’s herring ABC control rule is biomass-based:

- When biomass is greater than 0.5 for the ratio of SSB/SSBMSY, the maximum fishing mortality allowed is 80% of 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, no fishery allocation.
Rebuilding Plan

- Effective date, August 18, 2022.
- Framework Adjustment 9 establishes a rebuilding plan for Atlantic herring based on the Council’s ABC Control Rule.
  - Rebuilding projections indicated herring can rebuild in 5 years (by fishing year 2026) under this rebuilding plan, assuming long-term average recruitment.
  - The rebuilding plan continues to use the ABC control rule that is currently used to set herring specifications.
Main Conclusions

- **Overfished** but **overfishing is not occurring** in 2021.
- **Retrospective adjustments** were necessary.
- **Spawning stock biomass (SSB)** in 2021 was estimated to be 39,091 mt which is **21% of the biomass target**, SSBMSYproxy = 185,750 mt
- The 2021 average **fishing mortality** (F) for ages 7-8 (fully selected ages for the mobile fleet) was estimated to be 0.153 which is **31% of the overfishing threshold** proxy (FMSYproxy = 0.5).
- Sources of **uncertainty** include missing 2020 surveys, recruitment, natural mortality, and stock structure.
Updates to the projections included the same changes applied to the BRPs and an autoregressive model for recruitment (rather than recruits drawn from a CDF of the entire time series).
### Projections

<table>
<thead>
<tr>
<th>Mobile Fleet F</th>
<th>Mobile Fleet F 95%CI</th>
<th>SSB</th>
<th>SSB 95%CI</th>
<th>P(overfishing)</th>
<th>P(overfished)</th>
<th>OFL</th>
<th>ABC</th>
<th>SSB/SS Bmsy</th>
<th>SSB/SSbmsy 95% CI</th>
<th>P(rebuild)</th>
<th>P(closure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022 0.097</td>
<td>0.068 0.131</td>
<td>61644</td>
<td>46005 86896</td>
<td>0 0.989</td>
<td>-</td>
<td>-</td>
<td>0.332 0.248</td>
<td>0.468 0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2023 0.232</td>
<td>0.11 0.38</td>
<td>79231</td>
<td>46022 184552</td>
<td>0 0.677</td>
<td>29138</td>
<td>16649</td>
<td>0.427 0.248</td>
<td>0.994 0.025</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2024 0.327</td>
<td>0.139 0.634</td>
<td>76795</td>
<td>41591 196387</td>
<td>0.109 0.683</td>
<td>32233</td>
<td>23409</td>
<td>0.413 0.224</td>
<td>1.057 0.033</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2025 0.313</td>
<td>0.113 0.84</td>
<td>103645</td>
<td>50853 274160</td>
<td>0.167 0.397</td>
<td>40727</td>
<td>28181</td>
<td>0.558 0.274</td>
<td>1.476 0.105</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2026 0.4</td>
<td>0.114 1.686</td>
<td>138320</td>
<td>54435 458186</td>
<td>0.35 0.22 0.21121</td>
<td>42683</td>
<td>0.745 0.293</td>
<td>2.467 0.301</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2027 0.4</td>
<td>0.095 2.993</td>
<td>168201</td>
<td>56989 616405</td>
<td>0.371 0.153</td>
<td>60565</td>
<td>50421</td>
<td>0.906 0.307</td>
<td>3.318 0.437</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2028 0.4</td>
<td>0.083 5</td>
<td>194274</td>
<td>61431 720356</td>
<td>0.383 0.112</td>
<td>70578</td>
<td>58654</td>
<td>1.046 0.331</td>
<td>3.878 0.528</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>2029 0.4</td>
<td>0.077 5</td>
<td>213345</td>
<td>65510 774133</td>
<td>0.388 0.088</td>
<td>78664</td>
<td>65354</td>
<td>1.149 0.353</td>
<td>4.168 0.587</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2030 0.4</td>
<td>0.073 5</td>
<td>225340</td>
<td>69176 803006</td>
<td>0.388 0.073</td>
<td>84175</td>
<td>69922</td>
<td>1.213 0.372</td>
<td>4.323 0.622</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2031 0.4</td>
<td>0.071 5</td>
<td>232682</td>
<td>72049 829619</td>
<td>0.39 0.065</td>
<td>87762</td>
<td>72929</td>
<td>1.253 0.388</td>
<td>4.466 0.643</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>2032 0.4</td>
<td>0.07 5</td>
<td>236942</td>
<td>73668 843212</td>
<td>0.39 0.059</td>
<td>89950</td>
<td>74740</td>
<td>1.276 0.397</td>
<td>4.539 0.654</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2033 0.4</td>
<td>0.069 5</td>
<td>239156</td>
<td>75045 844595</td>
<td>0.389 0.056</td>
<td>91092</td>
<td>75713</td>
<td>1.288 0.404</td>
<td>4.547 0.662</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
## PDT Recommendations

**Rationale:**
- Consistent with the Council’s ABC control rule,
- Based on the rebuilding plan with updates to recruitment assumptions in the 2022 assessment,
- Incorporates an estimate of catch from the New Brunswick fixed gear fishery, and
- Uses the most updated data available.

Although projections may continue to be optimistic, the PDT believes the updates to the projections are an improvement using the change-point analysis and provide a more realistic expectation of future recruitment. Even with the projected 2-year extension (5 years to 7 years) on the rebuild-by date (from 2026 to 2028), these are still within 10 years from the start date of 2022.

<table>
<thead>
<tr>
<th>Year</th>
<th>OFL (mt)</th>
<th>ABC (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023</td>
<td>29,138</td>
<td>16,649</td>
</tr>
<tr>
<td>2024</td>
<td>32,233</td>
<td>23,409</td>
</tr>
<tr>
<td>2025</td>
<td>40,727</td>
<td>28,181</td>
</tr>
</tbody>
</table>
SSC Recommendations, Aug. 4, 2022

The SSC supports the PDT recommendations for OFL and ABC values for fishing years 2023 – 2025 for Atlantic herring based on application of the Council’s herring ABC control rule. The SSC recommends the following OFLs and ABCs:

<table>
<thead>
<tr>
<th>Year</th>
<th>OFL (mt)</th>
<th>ABC (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023</td>
<td>29,138</td>
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<tr>
<td>2024</td>
<td>32,233</td>
<td>23,409</td>
</tr>
<tr>
<td>2025</td>
<td>40,727</td>
<td>28,181</td>
</tr>
</tbody>
</table>
Specifications and Management Areas

Herring OFL

Herring ABC

Herring ACL

Scientific Uncertainty
- ABC control rule and rebuilding plan

Management Uncertainty
- Canadian NB weir fishery
- State water catch
- Discards

Area 1A (28.9%)
Area 1B (4.3%)
Area 2 (27.8%)
Area 3 (39%)
### Summary of Atlantic herring fishery specifications (mt) under the Original Action and the Proposed Action

<table>
<thead>
<tr>
<th></th>
<th>Original Action</th>
<th>Proposed Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2023</td>
<td>2023</td>
</tr>
<tr>
<td>Overfishing Limit (OFL)</td>
<td>44,600</td>
<td>29,138</td>
</tr>
<tr>
<td>Acceptable Biological Catch (ABC)</td>
<td>8,767</td>
<td>16,649</td>
</tr>
<tr>
<td>Management Uncertainty*</td>
<td>4,669</td>
<td>4,220</td>
</tr>
<tr>
<td>Optimum Yield (OY) / Annual Catch Limit (ACL)</td>
<td>4,098</td>
<td>12,429</td>
</tr>
<tr>
<td>Domestic Annual Harvest (DAH)</td>
<td>4,098</td>
<td>12,429</td>
</tr>
<tr>
<td>Border Transfer (BT)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Domestic Annual Processing (DAP)</td>
<td>4,098</td>
<td>12,429</td>
</tr>
<tr>
<td>US At-Sea Processing (USAP)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Area 1A sub-ACL (28.9%)</td>
<td>1,184</td>
<td>3,592</td>
</tr>
<tr>
<td>Area 1B sub-ACL (4.3%)</td>
<td>176</td>
<td>534</td>
</tr>
<tr>
<td>Area 2 sub-ACL (27.8%)</td>
<td>1,139</td>
<td>3,455</td>
</tr>
<tr>
<td>Area 3 sub-ACL (39%)</td>
<td>1,598</td>
<td>4,847</td>
</tr>
<tr>
<td>Fixed Gear Set-Aside</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Research Set-Aside (RSA) as % of sub-ACL</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Summary of river herring and shad (RH/S) catch caps (mt) under the Original Action and the Proposed Action.

<table>
<thead>
<tr>
<th></th>
<th>Original Action</th>
<th>Proposed Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2023</td>
<td>2023</td>
</tr>
<tr>
<td>Midwater Trawl Gulf of Maine</td>
<td>76.7</td>
<td>76.7</td>
</tr>
<tr>
<td>Midwater Trawl Cape Cod</td>
<td>32.4</td>
<td>32.4</td>
</tr>
<tr>
<td>Midwater Trawl Southern New England and Mid-Atlantic</td>
<td>129.6</td>
<td>129.6</td>
</tr>
<tr>
<td>Bottom Trawl southern New England and Mid-Atlantic</td>
<td>122.3</td>
<td>122.3</td>
</tr>
</tbody>
</table>
Summary

- The specifications under the Proposed Action are similar to those considered in the Original Action, which evaluated the impacts on the Valued Ecosystem Components (VEC; target species, non-target, protected species, habitat, and human communities) of the Atlantic herring fishery.
- Changes in impacts to these VECs are expected to be similar overall because there is very little change in the specifications beyond what has been previously analyzed.
- The OFLs under the Proposed Action are within the range of the Original Action and therefore not substantially different.
Summary

- Notably, 2022 is the first year of the rebuilding plan and these specifications reflect the most recent stock assessment and application of the plan.
- Furthermore, the revised ABCs are an increase relative to the specifications in the Original Action.
- The catch limits under the Proposed Action are based on the most recent science.
- The stock assessment includes additional catch data, research surveys of abundance, and an updated recruitment stanza used to define BRPs that provide more realistic expectations of future recruitment.
- The resulting ABCs in the Proposed Action are consistent with the ABC control rule and rebuilding plan.
- The ABC control rule is biomass-based and estimates of 2021 SSB relative to SSBMSY are about 21%, therefore relatively low fishing mortality is allowed.
The Atlantic herring ACL in the Proposed Action would continue to reflect the substantially reduced catch limits set in the Original Action compared to limits prior to 2018.

Any changes are a direct result from the increased ACL and potential resulting increased fishing effort, but effort will continue to be constrained by the same RH/S bycatch caps that were in place in the Original Action.

A summary of the impacts for the VECs under the Proposed Action follows which are not substantially different from the Original Action.
## Summary of Impacts by VEC

<table>
<thead>
<tr>
<th>Target Species</th>
<th>Non-Target Species</th>
<th>Protected Species</th>
<th>Physical Environment EFH</th>
<th>Human Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slight Negative to Negligible</td>
<td>Slight Positive to Negligible</td>
<td>Slight Negative to Negligible</td>
<td>Slight Negative to Negligible</td>
<td>Continue to be negative to Low positive</td>
</tr>
</tbody>
</table>

Images: https://www.fisheries.noaa.gov/new-england-mid-atlantic/fisheries-observers/industry-funded-monitoring-northeast
### Section 5: Draft Proposed Action & Changes from the Original Action

**Choose one.**

<table>
<thead>
<tr>
<th>Section 5: Original Action</th>
<th>Section 5: Draft Proposed Action</th>
<th>Preferred by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain FY2023 Atlantic herring specifications and river herring/shad catch caps.</td>
<td>Update the annual specifications for FY2023 through FY2025 for Atlantic herring and set river herring/shad catch caps.</td>
<td>AP</td>
</tr>
</tbody>
</table>

#### Decisions/Questions/Information to Consider
- See SSC report from August 4, 2022 meeting.

#### Other important Considerations/SIR References
- See Section 4 for New Information and Circumstances.
- See Section 5 for comparison tables of specifications under the Original Action and the Draft Proposed Action.
- See Section 6 for NEPA Supporting Analysis.
2023-2025 Specifications: For Today

**Goal:**
Discuss the draft Supplemental information Report (SIR) and draft proposed action.

**Key discussion question:**
Do you recommend the proposed action?

**Possible Outcomes:**
1. Motion to recommend the Proposed Action in *Section 5: Draft Proposed Action and Changes from the Original Action*.

2. Motion to submit the 2023-2025 Atlantic herring specifications document to NOAA Fisheries, as amended today.
### Framework Adjustment 7

<table>
<thead>
<tr>
<th>Year</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>• Contract to review A. herring spawning on Georges Bank. Sept: action initiated to protect spawning herring in Areas 1B, 2, 3. Ideas for alternatives floated, not approved.</td>
</tr>
</tbody>
</table>
| 2020 | • April: set goal and objective – protect spawning adults and egg mats, considering measures like in Area 1A.  
• June-Dec: develop alternatives (areas, closures, spawning tolerance, program review). |
| 2021 | • Feb: develop alternatives (avoidance program).  
• April: focus action on declared herring vessels and on protecting spawning adults (not egg mats).  
• June: pause for joint PDT/AP meeting to discuss in-season monitoring of spawning tolerance. |
| 2022 | • May: PDT/AP mtg. Many details to develop still. PDT: difficult to monitor and enforce. AP supports incentive to avoid spawning herring.  
• June: Committee passed no motions. Tabled motion to stop action. Council postponed further work over the summer. |
Goal:
Consider a motion from the Committee to change priorities to discontinue work on this action to protect adult spawning herring on Georges Bank.

Key discussion question:
Do you recommend a change in priorities?

Possible outcome:
Motion to recommend a change in priorities.
Extra Slides
<table>
<thead>
<tr>
<th>Council Priority</th>
<th>Jan – Mar</th>
<th>Apr - Jun</th>
<th>July - Sept</th>
<th>Oct - Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framework Adjustment 7</td>
<td></td>
<td>Develop alternatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Framework Adjustment 9</td>
<td>Final Submission</td>
<td></td>
<td>GARFO implementation</td>
<td></td>
</tr>
<tr>
<td>Specifications</td>
<td></td>
<td></td>
<td>Develop specifications and SIR</td>
<td>Take final action</td>
</tr>
<tr>
<td>2022-2026 Research Priorities</td>
<td>Make additions / revisions to research priorities</td>
<td></td>
<td>Preliminary/Final Submissions</td>
<td></td>
</tr>
<tr>
<td>Stock Assessment</td>
<td></td>
<td></td>
<td>Management Track (MT) - June</td>
<td></td>
</tr>
<tr>
<td>2023 Council Priorities</td>
<td></td>
<td>Preliminary discussion/list</td>
<td></td>
<td>Set 2023 Priorities</td>
</tr>
</tbody>
</table>
Recent Spatial and Temporal Catch Trends
2022 Stock Assessment
2022 Stock Assessment
2020 Assessment
FMSYproxy = 0.54
SSBMSYproxy = 269,000 mt
(½ SSBMSYproxy = 134,500), and
MSYproxy = 99,400 mt.

2022 Assessment
FMSYproxy = 0.5
SSBMSYproxy = 185,750 mt
(½ SSBMSYproxy = 92,875), and
MSYproxy = 68,980 mt.
**2022 Stock Assessment**

**Stock Status**

Methods used to derive biological reference points (BRPs) were updated:

1. As recommended in the previous management track, 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 define BRPs was 1992-2019, based on a change-point analysis of recruits per spawner suggesting a shift in environmental conditions since 1992 affecting recruitment. The most recent two years (2020 and 2021) were not used due to greater uncertainty in those estimates.
Sources of Uncertainty

- **Missing 2020 survey data** - The lack of 2020 survey data made estimation of the two most recent recruitments (i.e., 2020 and 2021) impossible without the addition of a likelihood penalty. The penalty has the effect of pulling the estimates toward the median.

- **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 2022 management track, as in the 2020 management track 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.